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199A DEDUCTION FOR PASS-THROUGH FIRMS

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How Do Business Owners Respond to a Tax Cut? Examining the 199A Deduction for Pass-through Firms

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ABSTRACT

We measure the short- and medium-run responses of businesses and their owners to Section 199A, a deduction that reduced the effective tax rate on most U.S. pass-through business income beginning in 2018. Using tax records of individuals and businesses, we compare taxpayers with exogenously differing levels of exposure to the deduction, exploiting limitations within the statute. We find little evidence of an increase in reported business income eligible for the deduction during 2018 or 2019. With appropriate caveats about parallel trends in the disruptive COVID period, we also find no effect in 2020 and at most a modest effect in 2021. We do find some evidence of effects on specific hypothesized margins of adjustment. Partnerships reduced ineligible forms of compensation paid to owners by approximately 10 percent, in line with the incentives created by 199A, while S corporations reduced wage compensation to owners by at most 3 percent. We find no evidence that 199A encouraged movements from employee to contractor status or increased contractor activity in 2018. Finally, we find little evidence of changes in real economic activity as measured by physical investment, wages to non-owners, or employment.

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In 2019, over 22 million U.S. individual taxpayers enjoyed a reduced effective tax rate on certain business income. These taxpayers deducted \$160 billion from taxable income as a result of Section 199A, a provision created by the Tax Cuts and Jobs Act (TCJA) that became effective in 2018. Section 199A generally allows a deduction for 20 percent of “pass-through” business income, a category that comprises the vast majority of income from the self-employed and small- to mid-sized businesses as well as an increasing share of income from larger businesses. This reduces effective tax rates on eligible businesses by 20 percent—a large tax cut that was predicted to have substantial implications for the economy.

As a whole, the TCJA was the largest tax act in over thirty years, and Section 199A was a major part of it. The TCJA’s estimated ten-year revenue cost was \$1,456 billion, with \$415 billion attributed to Section 199A (Joint Committee on Taxation, 2017). The provision was controversial, in part because it reduces the progressivity of the tax system. We estimate that in 2019 over two-thirds of 199A deduction amounts were claimed by taxpayers with more than \$200,000 in adjusted gross income (AGI), and over one-third were claimed by taxpayers with more than \$1,000,000 in AGI. Under current law, Section 199A is set to expire after 2025; policymakers will soon be discussing any extension or modification of the provision (United States Congress, 2023).

In this paper, we seek to inform that discussion by studying individual and business behavioral responses to section 199A using administrative tax data through 2021. We analyze the total effect of the deduction on reported pass-through income as well as specific margins across which taxpayers can potentially convert non-qualifying income into qualifying income. We also study the deduction’s effect on real inputs to production, including business investment and employment. With some exceptions, we do not find evidence of large responses to the 199A deduction. This contrasts with critical predictions made by some commentators that section 199A would prompt a wave of tax avoidance, encouraging workers to move from employee to contractor status and causing business owners to shift income and perhaps restructure businesses to obtain a greater deduction (Duke, 2018; Kamin et al., 2019; Kleinbard, 2019).¹ Our results also stand somewhat in contrast with optimistic predictions that the business tax cut would encourage economic activity, although it is too early to observe long-run effects (Hassett and Hubbard, 2002; Barro and Furman, 2018).² Both the optimistic and pessimistic predictions were plausible *a priori* given the magnitude of the tax cut implicit in section 199A: the deduction effectively reduces marginal tax rates on qualifying income by between two to seven percentage points, with larger cuts for higher-income taxpayers. However, at least in the first four years of data available, the observed effects on taxpayers’ behavior have been modest.

We test for behavioral responses along a number of margins, using data on both the pass-through entity and the individual owner. First, we look for increases in individual income of a sort that would be eligible for the deduction if statutory requirements are met; we term this income “potential qualifying business income,” or “potential QBI” for short.³ We see no such increase in the time series. But in a counterfactual world without section 199A, it is possible that potential QBI would have fallen in 2018. To better identify 199A’s effects, we use two difference-in-differences research designs based on

¹ Senate testimony by Kamin (2018) summarizes the possible perverse incentives and tax avoidance effects from 199A. This testimony discusses both the incentives for workers to switch from employee to contractor status and the incentives for businesses to restructure to create additional tax units that meet 199A’s industry and capital and wage requirements.

² Barro and Furman (2018) show that if one applies existing estimates of how business investment responds to the marginal tax rate, making 199A permanent would increase the long run capital stock of pass-through businesses by 3 percent, with corresponding increases in productivity per worker.

³ Potential QBI is a subset of pass-through income that excludes income that is always ineligible for 199A: guaranteed payments paid by partnerships to partners as well as certain types of income from interest, dividends, and other investment income.

statutory limitations that restrict 199A eligibility. Specifically, taxpayers with income above a threshold (\$415,000 for married couples in 2018) face two limitations: for these owners, income derived from a specified service trade or business (SSTB; e.g., medical or legal services) does not qualify for the deduction, and income derived from a non-SSTB is limited according to a function of the business's wages paid and capital employed. Lower-income taxpayers face neither of these restrictions. Our first strategy restricts to owners in industries where the two limitations are most binding and compares owners above the income threshold (whose deductions are likely limited) to those below the income threshold (whose deductions tend not to be limited), based on lagged income. Our second strategy restricts to individuals above the income threshold, comparing owners in different industries whose limitations tend to be more or less binding. We validate both approaches: our treatment groups exhibit much higher 199A claiming rates than our control groups, indicating substantially different levels of 199A exposure.

We estimate that greater exposure to 199A leads to little to no change in the share of a pass-through business owner's income that comes from potential QBI. Exploiting the income thresholds for identification, we estimate small positive effects of 199A on the share of AGI that is potential QBI, but the estimates are in the range of pre-TCJA treatment and control differences. When we use industry variation for identification and focus on high-income owners, we find approximately zero effects of section 199A on the share of AGI that is potential QBI in 2018 and 2019. Results are similar when we instead consider potential QBI in levels. To detect longer-run effects, we extend our analysis through 2020 and 2021 with the caveat that this requires assuming the parallel-trends assumptions hold through the COVID period. Neither identification strategy finds an effect of 199A on the ratio of QBI to AGI in 2020 and both suggest at most a modest positive effect in 2021.

Second, we test for changes in the way that business income is distributed to owners. Partnerships and S corporations have some ability to shift the classification of income between the business profits of the firm and the labor compensation of its owners. Only the former may qualify for the section 199A deduction. For S corporations, some owner compensation for labor services is legally required and is taxed as wage income. For partners, receiving guaranteed payments for labor services is entirely optional.⁴ Using a similar difference-in-differences strategy, we find that guaranteed payments generally declined in 2018 and 2019 relative to previous years, and they decreased 3 to 10 percent more for partners with greater 199A exposure. On the extensive margin, the response is asymmetric, with a clear spike in the share of partners who stop receiving guaranteed payments and no change in the share starting. Our two identification strategies also suggest declines in wages paid to S-corporation shareholders, but the effects are relatively small. Depending on the specification, we estimate between a 1.5 and 2.5 percent decline in wages. Additionally, we find evidence that, among the small subset of S corporations for whom the 199A limitations incentivized an *increase* in owner wages, S corporations raised shareholder wages to bunch at the point that maximized 199A deductions. One potential explanation for this set of results is that while legal constraints may prevent S corporations from substantially reducing shareholder wages, no such constraints apply to S corporations increasing shareholder wages or to partnerships reducing guaranteed payments.

Next, we test whether section 199A increased contractor work relative to wage employment. Using a number of approaches, we do not find any evidence that 199A has led to increased contracting. When the TCJA passed, there was concern that firms and workers would classify existing or new

⁴Guaranteed payments are analogous to wages paid to S corporation owners because they are payments made regardless of the firm's profit; however, partners can also be compensated for labor services via their distributive share of profits.

workers as contractors rather than employees because contractor income would generally be eligible for the deduction while employee income would not (Duke, 2018). First, we use a sample of individual taxpayers to look at workers each year who change status within the same firm. We find no evidence that the number of worker transitions to contractor status has risen. Second, we examine whether there has been an increase in the prevalence of contractor income either as a primary or secondary income source. The number of people with contractor income has been rising in previous years, but we see no evidence in the aggregate that transitions to contractor status have increased above the trend in 2018.⁵ When we use a difference-in-differences strategy to compare workers above to those below the 199A income threshold, we see no evidence that those below the threshold were more likely to become contractors. We also find no evidence that new 2018 contractors were more likely to claim the deduction than existing contractors or new 2017 contractors, which we would expect if many of them became contractors to benefit from the deduction.

Finally, we test for section 199A's effects on real inputs to production. In particular, the deduction could change the break-even rate of return for investment projects in existing firms, potentially leading to changes in employment and investment in tangible property. Additionally, the tax reduction caused by section 199A could be shared with workers in the form of higher wages as a bargaining model would predict (Risch, 2020). We test for the effect of exposure to Section 199A on tangible investment, the number of non-shareholder employees, and the total non-shareholder wage bill. Our point estimates for each of these three outcomes in 2018 and 2019 are close to zero and statistically insignificant, though the confidence intervals cannot rule out meaningful effects. When we extend this analysis to 2020 and 2021, we find mixed and conflicting results. We estimate small positive effects on investment in our above-below income comparison but no effect in our specification using industry-level exposure for variation. We also find mixed results on wages and employment, estimating that wages paid to employees increased in 2021 among treated firms relative to control firms in our above-below comparison but that they decreased in both 2020 and 2021 in our comparison across industries. Employment appears to have risen in 2021 among treated firms in the above-below comparison but fallen sharply among treated firms in the industry comparison. Taken together, the results suggest it is unlikely that large increases in capital and labor investments occurred due to the deduction in the first years it was available.

Our analyses relate to several existing bodies of work. First, a small set of papers also study tax provisions that reduce the tax rate on pass-through business income relative to wage income. Prior to 199A, this literature focused on a tax reform in Kansas (which has since been reversed) that exempted some pass-through income from state income taxation (DeBacker et al., 2018, 2019; Goodman, 2018; McCloskey, 2018). These papers generally find small effects on both real economic activity and shifting between various tax bases, with the exception that DeBacker et al. (2018) do find a large shift away from guaranteed payments to partners. Along with our previous paper (Goodman et al., 2019), which simulated the 199A deduction using 2016 data, we contribute to this literature by studying a nationwide, highly salient change in the tax wedge between business and wage income. Additionally, we contribute to an unresolved literature that assesses the potential ramifications of section 199A, arguing that the unintended consequences might be severe (Kamin et al., 2019) or not (Oei and Ring, 2020).

Second, we expand the literature that uses tax data to describe the landscape of pass-through businesses in the United States. Two important such papers are Smith et al. (2019) and Cooper et al. (2016). The former explores the characteristics of high-income owners of pass-through businesses, concluding that the business income of these owners mostly reflects returns to human capital. The latter traces

⁵Due to data limitations related to COVID-19 processing challenges, we are unable to perform most of this analysis in 2019.

through the complicated ownership structures of partnerships and finds that partnership income faces a relatively low tax rate. We contribute to this literature by documenting some of the ways that the TCJA has and has not altered the organization of pass-through business activity.

More broadly, we add to studies of tax avoidance in the form of shifting income across tax bases. This literature goes at least as far back as Slemrod (1992), which proposed a hierarchy of tax response into (1) timing responses, (2) avoidance responses, including across tax bases, and (3) real responses. Interested readers are directed to the thorough reviews of this literature in Slemrod and Yitzhaki (2002), and Saez, Slemrod and Giertz (2012). Indeed, the growth of pass-through entities itself is arguably an example of such a response: the share of business income earned by pass-through entities increased substantially and immediately after the Tax Reform Act of 1986 made the pass-through form more tax favorable than the C corporate form in many circumstances (Saez, 2004; Auten, Splinter and Nelson, 2016). Our study examines newly created channels for tax avoidance, finding substantial shifting along some margins but not others.

In sum, our paper provides evidence that a large policy change, which reduced effective tax rates on non-corporate business and created incentives to shift income across a variety of margins, generally did not result in large behavioral responses. In particular, we find null or small effects on behavioral margins that are costly to change, such as business investment or worker classification, which introduces potential legal liability for the employer. In contrast, we find a few significant responses across margins that are easier to adjust, such as partnership guaranteed payments for services. We note that reducing these payments may have material economic effects, as shifting the partner's compensation to shares of profits could result in a riskier income stream. Nonetheless, this is a margin with fewer adjustment frictions. Responses along some of the margins with greater frictions may have been muted by the temporary nature of the deduction, which is set to expire after 2025. As the sunset date approaches, we hope that our study can inform discussions about the merits and demerits of potentially modifying or extending section 199A.

I Institutional Background

In this section, we provide a brief overview of business taxation to motivate our empirical approach and offer background on the incentives created by the Section 199A deduction, which applies only to pass-through business income earned by individual owners.⁶ Businesses can be divided into two categories based on their tax treatment: C corporations and pass-through businesses. Virtually all of the largest businesses in the United States are taxed as C corporations, which face an entity-level tax on profits and whose shareholders in general pay tax on dividends and capital gains. However, most small and medium (and some large) businesses are organized as “pass-through” entities, which generally do not pay tax at the entity level. Instead, their income “passes through” the business and is taxed as income to the owner. If the owner is an individual, then the income faces individual tax rates, with items like long-term capital gains retaining their character and therefore facing lower tax rates than items like ordinary business income, which faces ordinary income tax rates. Pass-through entities are characterized as sole proprietorships, S corporations, or partnerships for tax purposes. Limited liability companies (LLCs) as a default are taxed as sole proprietorships if they are single-member and as partnerships if they are multi-member; however, either form of LLC may elect to be taxed as an S corporation (or as a C corporation, foregoing pass-through status).

⁶Portions of this section are reproduced verbatim from our working paper, Goodman et al. (2019).

In addition to the issue of whether the business pays an entity-level tax, another key feature of the pass-through tax regime regards the timing of income. Owners of C corporations pay individual taxes only when dividends are distributed, while pass-through income is taxed in the year that it is earned regardless of when the income is distributed to owners. Despite this disadvantage, the share of business activity occurring in pass-through entities has steadily increased since the Tax Reform Act of 1986 (Smith et al., 2019; Saez, 2004). Today around half of business income in the United States is earned through pass-through businesses (Cooper et al., 2016) and we estimate that 39.5 million individual tax units reported pass-through income in 2019.

The taxation of pass-through owners' compensation for their labor varies depending on the entity type. Owners of sole proprietorships generally do not pay themselves wages; instead ordinary income from sole proprietorships faces ordinary income tax rates as well as self-employment taxes, which mimic the payroll taxes that would be applied to wage income. In contrast, active owners of S corporations are required to receive wages meeting reasonable compensation criteria. This income is deductible to the S corporation and for the owner is treated as any other wage income and therefore faces payroll tax. The remainder of S corporation income for these owners is not subject to payroll or self-employment taxes, creating a tax incentive to receive S corporation income as profits rather than reasonable compensation. Bull and Burnham (2008) estimate that S corporation owners disguise 35 percent of their labor income as profits. Individual partners face something of a hybrid of the tax treatments of sole proprietors and S corporation shareholders. Like sole proprietors they do not receive wage income, nor are they subject to reasonable compensation rules and the ordinary income they receive is generally subject to self-employment taxes. An important exception to this rule is that traditional "limited partners" (that is, a partner in a general partnership who has limited liability for the partnership's debt) are not subject to self-employment taxes on their ordinary business income. Thus their income is taxed like S corporation profits.

In December 2017, the bill originally titled the "Tax Cuts and Jobs Act" (hereafter TCJA) was signed into law. Among its many provisions is the introduction of Section 199A, which creates a deduction for pass-through owners, effective for tax years 2018 through 2025.⁷ Though the rules governing this deduction are complex, at its core it allows individuals to deduct up to twenty percent of their pass-through business income from taxable income. This change reduces effective average and marginal tax rates on pass-through business income relative to other forms of ordinary income such as wages.

Only income that is considered qualified business income (QBI) is eligible for the section 199A deduction. QBI from pass-throughs generally includes ordinary business income, rents and royalties, and interest income properly allocable to the business. As previously mentioned, income from a pass-through business generally retains its character when passed to an owner, so while capital gains and qualified dividends from a pass-through business are not considered QBI, they remain eligible for the lower capital gains rates. Any wages paid to active S corporation owners or guaranteed payments paid to partners are also not considered QBI.

There are a number of provisions that limit eligibility for the 199A deduction based on taxpayer income and business type. As we show in Goodman et al. (2019) these limitations could have a large effect on the distribution of the deduction benefits in the absence of behavioral responses. Individuals

⁷Section 199A replaces former Section 199, which provided the Domestic Production Activities Deduction for domestically produced goods. Section 199A also allows a deduction for qualified Real Estate Investment Trust dividends, qualified publicly traded partnership income, and certain income from co-operatives. In addition, Section 199A allows trusts to benefit from the general pass-through deduction. We do not study these aspects of the law.

with taxable income above the top of a phase-in range (in 2018, \$415,000 for married couples and \$207,500 for other taxpayers) are subject to two limitations.⁸ The first is that income derived from a specified service trade or business (SSTB) is not considered QBI and therefore is ineligible for the deduction.⁹ The second is that any portion of the deduction derived from a non-SSTB is reduced (potentially to zero) if the business does not pay a sufficient amount of wages to employees or own a sufficient amount of tangible capital. Specifically, the amount of the deduction derived from a non-SSTB cannot exceed the greater of: half of the owner's share of W-2 wages paid by the business, or the sum of 25 percent of the owner's share of the W-2 wages paid by the business plus 2.5 percent of the owner's share of the tangible capital of the firm.¹⁰

For all taxpayers, the section 199A deduction can only offset ordinary taxable income, not long-term capital gains or qualified dividends. In particular, the deduction cannot exceed 20 percent of ordinary taxable income, meaning that taxpayers with little or no ordinary taxable income may not receive much tax savings from the 199A deduction.¹¹ In addition, owners of multiple businesses must offset positive QBI with any negative QBI, potentially reducing the deduction. If the net quantity of QBI is negative, it must be carried forward, reducing the section 199A deduction in future years when QBI is positive.¹²

In August of 2018, the IRS and the Treasury Department issued proposed regulations interpreting and clarifying the operation of section 199A, and the regulations were finalized in February 2019. The regulations provided additional clarity and precision regarding the definition of SSTBs. They also created a presumption that individuals who switch from employment to independent contracting for the same employer would continue to be treated as an employee for the purpose of section 199A, making it more difficult for independent contracting income to qualify for the deduction.

An important question is whether businesses view the 199A tax deduction as temporary. The initial tax cut was implemented for eight years. Statements by Congress Members, accountants, and lobbyists, however, indicate that many stakeholders expect that section 199A will be extended or made permanent.¹³ In August of 2023, over 100 House members co-sponsored the Main Street Tax Certainty Act which if passed would make the 199A tax deduction permanent.¹⁴

II Data

Our analyses rely on two panel datasets: one based on a representative sample of individual tax filers and one covering the universe of S corporations. We need multiple datasets to examine responses at

⁸In 2018, these limitations are phased in from \$315,000 to \$415,000 in income for joint filers and \$157,500 to \$207,500 for other filers. For taxpayers with incomes in the phase-in region, only a fraction of the limitations apply while for taxpayers with incomes above the end of the phase-in region the limitations are in full effect. The threshold values are indexed for inflation.

⁹To be clear, for taxpayers below the phase-in thresholds, SSTBs can generate QBI. Therefore we include SSTB income in our definition of "potential QBI".

¹⁰"Owner's share of wages" refers to the taxpayer's share of the business owned (for purposes of the wage deduction) multiplied by the total W-2 wage bill paid to all employees. "Owner's share of tangible capital" refers essentially to the owner's share of the business owned (for purposes of depreciation deductions) multiplied by the total cost of depreciable property that was placed in service within the past 10 years (or longer for longer-lived assets such as structures). The total wage bill includes the wages paid to S corporation shareholders, but does not include guaranteed payments paid to partners.

¹¹This limitation is meaningful because 20 percent of QBI could in certain cases exceed 20 percent of ordinary taxable income due to tax deductions unrelated to the taxpayer's business, such as standard or itemized deductions.

¹²See Joint Committee on Taxation (2019) for a more detailed description of the 199A deduction, including examples of how it is calculated.

¹³See <https://www.nfib.com/content/analysis/national/u-s-house-re-introduces-bill-to-stop-a-small-business-tax-hike/> and <https://s-corp.org/2023/08/support-for-199a-reaches-new-heights/>

¹⁴<https://www.congress.gov/bill/118th-congress/house-bill/4721?s=1r=3>

the pass-through entity level and the level of individual business owners and workers. In each dataset, all dollar-denominated variables are adjusted for inflation to 2018 levels. The data come from the near-universe of administrative records of tax returns and information returns. This section provides an overview of the data construction with further details provided in later sections where relevant to each empirical exercise.

II.A Individual sample

Our first dataset, the “individual sample”, is based on a representative sample of all individuals who ever filed a tax return (as a primary or secondary filer) from 2008 through 2021. We select individuals into the sample in a stratified manner, oversampling certain groups that are most relevant to our empirical analyses; we postpone discussion of the stratification to Section III. In all specifications, we use sample weights to ensure the sample is representative of the underlying population to which that specification applies. We construct a panel using individuals’ tax returns and information returns for tax years 2008 through 2021, restricting to years in which the individual is 18 years of age or older and is still living according to Social Security records. The dataset includes information on businesses owned by individuals in our sample. This information comes from Form 1040 Schedules C, E, and F, as well as the tax returns and Schedule K-1s of partnerships and S corporations that the individual owns.

For each individual-year observation, we compute an income construct that we refer to as “potential QBI”. We define potential QBI as the sum of all net income reported on Schedules C and F, and business income reported on the individual’s Schedule K-1 information returns filed by partnerships and S corporations.¹⁵ This income is considered “potential” QBI since qualification for the deduction depends on (i) whether Section 199A is in effect that year, (ii) whether the activity rises to the level of a trade or business, (iii) whether the business is an SSTB, and (iv) whether the owner satisfies the wage and capital limitations, among other factors, as explained in Section I. Potential QBI excludes guaranteed payments to partners, as this income is entirely ineligible for the 199A deduction.

Our dataset also includes information from Forms W-2 and 1099-MISC. These forms allow us to study worker transitions between employee and contractor status from year to year. We derive our main measure of contractor earnings from non-employee compensation reported on Form 1099-MISC. A substantial share of 2019 Form 1099-MISC appear to be missing, likely due to COVID-19-related processing challenges. For this reason, our analysis of contractor transitions focuses on 2018 transitions with the exception of contractor transitions measured by new Schedule C filers, which we extend to 2019.

We measure the individual’s labor income as the sum of wages from Form W-2 and contractor earnings from non-employee compensation on Form 1099-MISC.¹⁶ We do not use income reported on the Form 1099-K to measure contractor income because of inconsistent reporting over time, including substantial reporting changes between 2017 and 2018 (Handwerger, 2018; Collins et al., 2019).

Panel A of Table 1 provides summary statistics for this full sample, which is representative of all filers. Around 21% of the sample has potential QBI in any given year. The most common source of

¹⁵To be precise, we add the following income types on Schedule K-1: ordinary business income, net rental real estate income, other net rental income, and royalties, and we subtract section 179 expense. Additionally, we exclude Schedule E rental income from potential QBI, because even for taxpayers with incomes below the 199A thresholds, we find that less than half of this income is claimed as QBI on tax returns. In some specifications reported in Appendix B.2, we report results using an alternative measure of potential QBI that includes Schedule E rental real estate income.

¹⁶Contractor earnings are included only if they exceed 600 nominal dollars, which is the threshold for mandatory reporting. We exclude payments under the threshold to provide consistency in measuring contractor activity regardless of the reporting behavior of the issuing firm.

QBI is Schedule C or Schedule F income, which 16% of taxpayers have. Only 7% of taxpayers have QBI from S corporations or partnerships. The average wage earnings are \$31,151 while the average contractor earnings are \$1,837.

Appendix Tables C1 and C2 use our individual sample to report information about the distribution of taxpayers who claimed section 199A deductions in 2018 and 2019. We estimate that 22.5 million tax units claimed a total of \$160 billion in section 199A deductions in 2019. Furthermore, we find that the deduction is strongly concentrated among high-income individuals. Over 35% of the deduction was claimed in 2019 by those with AGI in excess of \$1,000,000; an additional 32% was claimed by those with AGI between \$200,000 and \$1,000,000. While most of the dollars are claimed by high-income individuals, most of the claimants are located further down the income distribution. Approximately 27 percent of those claiming section 199A had under \$50,000 in AGI; another 27 percent had AGI between \$50,000 and \$100,000; and a further 26 percent had AGI between \$100,000 and \$200,000.¹⁷

II.B S corporation panel

Our second dataset is a panel of the universe of S corporations from 2008 to 2021 (the “S-corporation panel”). These data allow us to examine entity-level outcomes for S corporations, including wages paid to shareholders, wages paid to other employees, and investment. The panel includes all firm-years in which Form 1120-S was filed. To each firm-year observation, we attach information about the shareholders, including the fraction of shareholders with taxable incomes above the 199A phaseout thresholds. Additionally, we use the firm’s industry, indicated by reported NAICS code, to develop a treatment proxy for the firm’s 199A eligibility as described in more detail in Section III.

Panel A of Table 2 reports summary statistics for this universe. The mean number of shareholders is 1.55, and half of firms pay wages to shareholders. The mean level of gross receipts is \$1.6 million, the average wages paid to shareholders are \$51,500, and the average amount of potential QBI is \$109,000. The median for each of these statistics is substantially smaller, reflecting the skewness in the firm-size distribution.

II.C Data imperfection: missing K-1s in 2019

In general, S corporations and partnerships must file one Schedule K-1 each year for each shareholder or partner. Due to miscellaneous processing and/or compliance errors, in most years we are unable to find any Schedule K-1 for between two and four percent of firms that we observe filing a Form 1120S or 1065, causing a small amount of baseline measurement error. However, the share of firms without any observed K-1s increased substantially in tax year 2019, to around eight percent, possibly due to pandemic-related processing challenges. We show the share of S corporations and partnerships missing K-1s over time in Panel A of Appendix Figure C1. In Panel B, we show counts of Schedule K-1 (combined between Forms 1120-S and 1065) separately for electronically-filed and paper-filed forms; this figure strongly suggests that the missing forms were filed on paper. One plausible hypothesis is that these forms were destroyed by the IRS as part of pandemic-related operational prioritization (Treasury Inspector General for Tax Administration, 2021). In Appendix Table C4, we show, using our S corporation sample, that firms missing Schedule K-1 in 2019 tended to be smaller – both in terms of gross receipts and lagged number of shareholders – and were much more likely to file Form 1120-S

¹⁷Appendix Tables C1 and C2 are broadly consistent with the published statistics of Internal Revenue Service (2021).

itself on paper. Such firms were less likely to have high-income owners but had a similar prevalence of being an SSTB.

In our baseline specifications, we drop individuals and firms affected by this data issue. Specifically, in the individual sample, we drop all observations (in any year) of individuals who were 2018 owners of a partnership or S corporation that has missing Schedules K-1 in 2019. Similarly, in the S-corporation panel, we drop firms with missing 2019 K-1s from the full panel. For analysis that uses data from 2020 and 2021, we use an alternative approach to deal with missing K-1 data described in Section III.D.

III Empirical Strategy and Results

We now turn to our empirical analyses. We divide the analyses of the effects of section 199A into three categories: (a) changes in overall pass-through income, (b) adjustments along specific behavioral margins, including changes to the forms of owner compensation and changes in independent contracting, and (c) evidence on real economic outcomes, such as business investment and employment. While our main results concern the short-run effects of 199A in 2018 and 2019, we conclude the empirical analysis by extending our sample through 2021. This extension brings additional challenges to the identification and estimation strategies but also allows us to assess medium-run outcomes.

III.A The broad effect of 199A on pass-through income

By decreasing the effective tax rates on QBI, Section 199A created an incentive to earn or report more of this income. Using a number of different approaches, we test whether pass-through business owners responded to this incentive. First, we check for a break in the trend of pass-through income receipt in 2018. Figure 1 Panel A plots estimated counts of pass-through owners over time, normalized to one in 2017, using our individual sample. The solid black series plots the number of owners with non-zero potential QBI, which exhibits a fairly constant trend from 2010 to 2019. The remaining series in Panel A of Figure 1 plot the count of owners with potential QBI exceeding \$10,000, \$100,000, or \$1,000,000 (in 2018 dollars) respectively. These series tell a similar story: while there is some year-to-year variation, there are no large trend breaks in 2018.

Panel B plots trends in potential QBI relative to a broad measure of business and non-business income (adjusted gross income; AGI). The average ratio of QBI to AGI increases gradually throughout the sample period, as does the share of tax filers with more than 25% of their AGI coming from potential QBI.¹⁸ However, neither trend breaks in 2018. There is more variation in the ratio of aggregate QBI to aggregate AGI, but again we see no evidence of a substantial impact due to Section 199A in 2018. Most directly, Panel C plots the aggregate level of (inflation-adjusted) potential QBI each year, normalized to one in 2017. Here, too, we see a general rise in this pass-through business income, with no deviation from trend in 2018. Thus, at first glance, the time series fails to uncover evidence of a large response to section 199A.

III.A.1 Estimation equations

While the time series evidence is the simplest way to display changes in pass-through income receipt, it cannot rule out the possibility of a confounding temporal effect. In the absence of section 199A, pass-

¹⁸A large number of typical non-filers submitted a “dummy” Form 1040 for tax year 2019 with AGI set equal to \$1, often through specially established “non-filer portals”, in order to receive an Economic Impact Payment (EIP) during the pandemic. We drop these dummy Forms 1040 for the sake of this figure.

through income might have fallen in 2018 and 2019 relative to 2017. Therefore, our main analyses use a difference-in-differences regression framework to compare groups of taxpayers predicted to have different degrees of eligibility for section 199A given the statutory limitations. As discussed in section I, not all pass-through income constitutes QBI and qualifies for the 199A deduction. In particular, we focus on the limitations placed on high-income taxpayers for whom income received from SSTBs is ineligible and income from non-SSTBs is subject to additional limitations based on wages paid and capital employed in the firm.

Figure 2 panel A illustrates the effect of these limitations on 199A eligibility. The figure is a heat map of 199A treatment intensity—that is, the share of potential QBI that leads to a deduction—as a function of two variables. The x axis reflects the business-level limitation that results from either the disallowance of SSTB income or the wage and capital limitation. A value of zero corresponds to a business that is an SSTB or has no wages or tangible capital. A positive value corresponds to a non-SSTB, and a value of one corresponds to a non-SSTB with sufficient wages and capital to fully qualify for 199A. The y axis represents the income of the taxpayer (for illustration, we consider a married couple and use the thresholds for 2018). In the figure, all taxpayers with income below the bottom of the phase-out range (\$315,000 in this case) are fully eligible for section 199A regardless of the SSTB, wage, or capital status of the business. Those above the top of the phase-out range (\$415,000 in this case) are treated by section 199A exactly according to their position on the x axis. Those in the interior of the phase-out region have 199A treatment intensity equal to a convex combination of one and their x value.

We exploit this variation using two difference-in-differences regressions. The first identification strategy, illustrated by Figure 2 panel B, restricts the analysis to taxpayers whose potential QBI comes predominantly from SSTBs or businesses with low wages and capital. Within this group, lower-income individuals are fully treated (treatment group), while higher-income individuals receive little to no treatment (control group). The second identification strategy, illustrated by Figure 2 panel C, restricts the analysis to high-income taxpayers. Within this group, treatment intensity varies continuously based on the taxpayer’s business’s SSTB status, wages paid, and capital employed. For both strategies, we provide further implementation details below. Most importantly, the key characteristics that determine treatment intensity—current income, current wage and capital status, and even current industry—are endogenous. Thus we use proxies to assign axes values to taxpayers.

For the y axis, we use individual i ’s income in year $t - 2$, prior to the introduction of Section 199A. For the x axis, we begin by constructing an “industry treatment proxy” that measures 199A eligibility for a given business assuming it employs labor and capital in a similar manner as other businesses within the industry that have the same entity type. For this we use a separate dataset of firms: the IRS Statistics of Income (SOI) samples for partnerships (Form 1065); S corporations (Form 1120-S); and sole proprietorships and farms (Form 1040 Schedules C and F), pooled from 2013 to 2017. For each firm in these datasets, we calculate the share of potential QBI that would be eligible for the deduction based only on the wage and capital limitation. Next, we calculate the average share of potential QBI eligible for the deduction across firms in a three-digit NAICS code for each entity type (partnerships, S corporations, sole proprietorships, and farms). Since SSTB income is ineligible for the 199A deduction for high-income owners, we set the industry treatment proxy equal to zero for all firms in industries that we determine are likely SSTBs.¹⁹ We denote this treatment measure, which depends only on entity type and industry, as z_{jt} for any given firm j in year t .

¹⁹See Appendix A for details on SSTB status determination.

As an initial test of our industry treatment proxy, which is based on pre-2018 data, we compare it with actual deductions claimed in 2018 and 2019, when Section 199A was in effect. We restrict this analysis to a sample of business owners with income above the 199A thresholds who have only one business, ensuring a clean mapping between deductions and specific businesses, and ensuring that SSTB status is relevant. Appendix Figure C2 shows four binned scatter plots of the actual claiming ratio (that is, the observed QBI deduction²⁰ divided by 20% of potential QBI) on the y axis against the industry treatment proxy on the x axis. Each panel considers a separate entity type. For each type, the regression fit lies close to the 45 degree line, meaning that the industry treatment proxy accurately predicts actual treatment on average, both within and across entity types.²¹

Finally, to create an individual-owner-level measure, we aggregate industry treatment proxies across all businesses owned by each sampled individual, weighted by the absolute value of potential QBI coming from the business. Since individuals may endogenously select into 199A eligibility in year t , we use lagged data from year $t - 2$ to construct this measure, which we denote $\bar{z}_{i,t-2}$. This “aggregated industry treatment proxy” represents the predicted share of individual i ’s potential QBI that would be eligible for 199A in year t if they were above the top of the phase-out threshold, based on i ’s businesses in year $t - 2$. To the extent that business ownership and business characteristics are stable over time, the proxy will correlate well with true 199A exposure for high-income owners. Later we demonstrate that the treatment proxy performs well in this regard.

As mentioned previously, our first identification strategy focuses on owners predicted to have low levels of eligible potential QBI based on the industry treatment proxy—in particular, we require $\bar{z}_{i,t-2} < 0.2$.²² Within this subsample, we compare owners with $t - 2$ income below the 199A income thresholds (treatment group) to those with incomes above the phase-out of the 199A thresholds (control group). To improve the comparability of the treatment and control groups, we restrict the sample to those with $t - 2$ taxable income between 50% and 300% of the 199A thresholds. We drop those with income between 90% and 150% of the threshold, as their $t - 2$ income is less informative about their location relative to the threshold in t .

Our difference-in-differences regressions estimate how outcomes change for the treated versus untreated group after 199A is implemented in 2018. Our event study estimation equation is as follows:²³

$$Y_{it} = \alpha_1 \text{Below}_{i,t-2} + \sum_{\tau=2013}^{2016} \beta_{\tau} \text{Below}_{i,t-2} + \beta_{2018} \text{Below}_{i,t-2} + \beta_{2019} \text{Below}_{i,t-2} + X'_{it} \gamma + \epsilon_{it}. \quad (1)$$

Here Y_{it} refers to an outcome for taxpayer i in year t (2013-2019), and $\text{Below}_{i,t-2}$ denotes an indicator for having $t - 2$ income below the 199A threshold. This regression isolates the variation coming from income levels prior to the reform. Parameter α_1 soaks up time-invariant differences between those with higher and lower income. In X_{it} , we control for a three-way interaction between the lagged dependent variable in $t - 2$ (in 100 bins), the year, and the individual’s “primary entity type” (the entity type of the business from which the individual received the largest magnitude of potential QBI in $t - 2$). Overall year fixed effects and primary-entity-type fixed effects are subsumed into these control variables.²⁴ Our treatment-effect estimates therefore reflect comparisons over time between individuals (i) who

²⁰We subtract 20% of observed REIT dividends from the observed QBI deduction for this purpose.

²¹We consider all Schedule F activity to be a single industry, so there is no within-entity-type variation in this case. Still, the aggregate of all Schedule F activities lies reassuringly close to the 45 degree line.

²²To ensure that $\bar{z}_{i,t-2} < 0.2$ is well measured, we require at least \$5,000 in QBI, in absolute value, in $t - 2$ in order to be included in our regression samples.

²³Throughout the paper, we make use of the user-written Stata command `reghdfe` (Correia, 2019).

²⁴See Appendix B for further discussion of the role of control variables in our estimates.

own businesses with similarly low levels of the industry treatment proxy, (ii) who have similar intensity of pass-through income, and (iii) who earn their income predominantly through the same entity type, but (iv) whose overall prior income differs, yielding differing levels of 199A eligibility. The main coefficients of interest are β_{2018} and β_{2019} , which estimate the difference in outcomes between the treatment and control groups in 2018 and 2019, relative to their difference in 2017, after adjusting for the fixed effects and control variables. Standard errors are clustered at the individual level.

As also mentioned previously, our second identification strategy restricts the sample to individuals with $t - 2$ income above the top of the 199A phase-out region and compares those with different values of the aggregated industry treatment proxy, $\bar{z}_{i,t-2}$. This strategy exploits variation across industries in the share of income that is limited by either the wage and capital limitation or the SSTB limitation. The estimation equation is:

$$Y_{it} = f(\bar{z}_{i,t-2}) + \sum_{\tau=2013}^{2016} \beta_{\tau} \bar{z}_{i,t-2} + \beta_{2018} \bar{z}_{i,t-2} + \beta_{2019} \bar{z}_{i,t-2} + X'_{it} \gamma + \epsilon_{it}. \quad (2)$$

This equation is analogous to Equation (1), with some subtle differences. First, $f(\bar{z}_{i,t-2})$ represents fixed effects for ten deciles of $\bar{z}_{i,t-2}$; this absorbs time-invariant differences between those with higher and lower values of $\bar{z}_{i,t-2}$, analogous to parameter α_1 in Equation (1). Second, the key regressor, $\bar{z}_{i,t-2}$ interacted with year dummies, is continuous (between 0 and 1) rather than binary as it was in Equation (1). The control variables X_{it} are the same as in Equation (1), but here the identifying variation comes from individuals who (i) have similar incomes, (ii) have similar intensity of pass-through income, and (iii) earn their income predominantly through the same entity type, but (iv) own businesses in industries with different levels of the industry treatment proxy, yielding differing levels of 199A eligibility. Again the main coefficients of interest are β_{2018} and β_{2019} , which estimate the difference in outcomes between individuals fully exposed vs. fully unexposed (as measured by our proxies) to Section 199A in 2018 and 2019, relative to their difference in 2017, after adjusting for the fixed effects and control variables. Standard errors are clustered at the individual level.

Under the assumption that, in the absence of 199A, individual treatment status would not be correlated with any difference in outcomes specific to 2018 or 2019 once we adjust for the fixed effects and controls, then β_{2018} and β_{2019} capture the average treatment effect of section 199A for our sample. This is the standard difference-in-differences identification assumption, often referred to as “parallel trends.” Our regressions control for differences in outcomes associated with treatment status across all years (because we include $Below_{i,t-2}$ and $f(\bar{z}_{i,t-2})$ as regressors) as well as interactions between the year, the primary entity type, and the lagged dependent variable measured in $t - 2$. Our estimates require that, in the absence of 199A, individual outcomes would have evolved independently of treatment status conditional on these control variables. Additionally, when estimating Equation (2) we assume there is a proportional response to the share of eligible income for the deduction. For example, we would expect twice the response if 40 percent of income were predicted eligible compared to 20 percent.

III.A.2 Sample stratification

We strategically stratify our sample to maximize power in these specifications, subject to constraints on dataset size. While we set the baseline sampling rate to 0.2%, an individual’s sampling rate is 50% if, in at least one year, she owns at least one business with a low industry treatment proxy and has income high enough to be included in the regression when estimating Equation (1). In addition, high-

income (above the 199A threshold in at least one year) owners of high-industry-treatment-proxy firms are sampled at a rate of 25%, and moderate-income (above 50% of the 199A threshold in at least one year) owners of high-industry-proxy firms are sampled at a rate of 5%. Those who receive pass-through income but never contemporaneously have income high enough to qualify for the previous categories are sampled at a rate of 0.5%. While such individuals in this latter category are generally not included in any of the samples described in Section III.A, they may be included in some of the specifications studying specific margins of adjustment, described later.²⁵

Panels B through E of Table 1 report summary statistics for the subsets of the individual sample used in the difference-in-differences regressions described above. For these regressions, we require that the taxpayer has potential QBI in $t - 2$ (so we can measure $\bar{z}_{i,t-2}$), and we see that a high share – between 89 and 96 percent – of these individuals has nonzero potential QBI in year t as well. We also restrict our subsamples to individuals with positive AGI (because our main outcome variable is the ratio of potential QBI to AGI); thus each panel indicates that all observations have nonzero AGI. The individuals in these subsamples have much larger incomes than the overall sample described in Panel A, and between 31% to 37% of their AGI comes from potential QBI.

In estimating Equation (1), treatment status is binary and depends on whether $Below_{i,t-2}$ equals zero or one. In estimating Equation (2), treatment status is continuous based on the aggregated industry proxy. However, for the sake of Table 1 Panels B and C, we assign individuals to the treatment (control) group if their aggregated industry treatment proxy is greater (less) than 0.2. By construction, the treatment groups in Panels B and D have much higher average values of the individual treatment proxy than the control groups in panels C and E. In the comparison based on variation across industries among high-income owners, the treated group (Panel B) has around 66% of their income predicted to be eligible for the deduction on average compared to only 4% in the control group (Panel C). In the comparison between taxpayers below vs. above the income thresholds, all taxpayers in the treatment group (Panel D) have an individual treatment proxy equal to one because taxpayers just below the 199A income thresholds are not subject to any 199A limitations. Those above (Panel E) have (very low) positive values of treatment as they may have some non-SSTB businesses.

III.A.3 Results

Before we estimate the effects of section 199A on pass-through income, we test whether our measures of 199A exposure are indeed associated with higher levels of QBI deductions. Figure 3 Panel A shows our β_{2018} and β_{2019} estimates comparing taxpayers with incomes below the threshold to those above, where the outcome is the deduction claimed by the taxpayer scaled by the total possible deduction based on potential QBI.²⁶ We find that the treated group had a claiming rate that was about 50 percentage points higher than the control group. When we use our second identification strategy to look at differences among high-income taxpayers with more or less income predicted to be eligible for 199A, shown in Panel B, we see that a movement from 0 to 1 in our treatment measure increases the deduction claiming rate by nearly 90 percentage points. Had we been able to measure 199A exposure and potential QBI perfectly, each of these estimated treatment effects would be 100 percent, assuming taxpayers perfectly comply with the tax code.

²⁵There is one additional oversampled population motivated by the analysis in Section III.B.3. We postpone discussion of this group to that later section.

²⁶This sample is restricted to those with positive potential QBI. We remove the REIT portion of the deduction in this exercise to focus on the part of the deduction coming from business income.

There are several reasons why such ideal conditions do not hold; we list a few here. First, we use $t - 2$ information to predict treatment status in year t , which creates some error in treatment status as individuals change income levels and may have a different mix of business income in t . Second, the statutory eligibility of income for 199A does not follow NAICS codes and is not determined at the entity level, but at the trade or business level, adding complexity that we cannot observe. Third, the exact allocation of each owners' share of wages and capital may differ from our industry treatment proxy due to heterogeneity within industries, measurement differences, or business structures with tiered entities. Fourth, take-up of the deduction conditional on eligibility is likely not universal.

Despite all of the above, Figure 3 confirms that our treatment proxies are indeed strongly correlated with actual 199A exposure. The correlation is especially strong in Panel B's comparison using industry variation in predicted 199A exposure. In Panel A's comparison using income variation, the correlation is weaker. This is likely explained by higher levels of volatility between $t - 2$ and t in income as compared to industry ownership.

Given the success of our treatment proxies, we proceed with estimating the outcomes of interest. Our primary measure for pass-through income is the ratio of potential QBI to AGI. We censor the share of potential QBI at zero and one, and we only include taxpayers with positive AGI.

Across both of our identification strategies, we find mixed evidence on Section 199A's effect on overall pass-through income. Figure 4 plots the estimated control-group levels for each year as well as treatment-group levels constructed as control-group levels plus the estimated difference-in-differences coefficients (β_t), which are also shown for selected years. Panel A examines outcomes comparing SSTB owners below the income threshold to those above, estimating Equation (1). We estimate treatment effects of 0.70 and 0.42 percent of AGI in 2018 and 2019, respectively, relative to a baseline mean of around 37 percent in the years prior to Section 199A's introduction. These reflect roughly a 1.1 to 1.8 percent increase in potential QBI relative to AGI, and both coefficients are statistically significant. However, we also observe substantive and statistically significant prior-year differences as well (in 2014 and 2016). Thus we do not view the observed effects in 2018 or 2019 as robust evidence of an increase in business income.

Panel B provides further evidence. It depicts the same outcome but compares owners based on our aggregated industry treatment proxy, estimating Equation (2). The sample is limited to owners with incomes above the income thresholds. In this specification, we estimate treatment effects of +0.02 and +0.33 percent of AGI in 2018 and 2019, respectively. These effects are economically small and statistically insignificant. However, again we observe nontrivial and statistically significant prior-year differences (in 2013 to 2016). Across both panels, the evidence of Figure 4 suggests that the introduction of Section 199A had little to no effect on pass-through business income, but it also indicates that our difference-in-differences comparison is imperfect.

Figure 4's outcome measure, the potential-QBI share of AGI, misses any effect on QBI for taxpayers for whom the entirety of their AGI comes from QBI. This omission could be important; across our regression specifications, between 6% and 16% of owners derive more than 90% of their AGI from potential QBI. Therefore, we provide additional evidence using our difference-in-difference specification to estimate the effect of 199A on potential QBI in levels in Appendix B.2. We also consider a hyperbolic sine specification and an alternative where we redefine potential QBI to include Schedule E rental and royalty income. Across these alternative specifications, the results are consistently indicative of little to no effect of Section 199A on pass-through business income.

Overall, we find no evidence that Section 199A meaningfully increased pass-through business in-

come in 2018 and 2019. The time series evidence shows no measurable increase, while our difference-in-differences approach does not indicate that differences in potential QBI across our treatment and control groups changed after the introduction of Section 199A, relative to their differences commonly observed in the years prior to the deduction.

III.B Specific margins of adjustment

While we do not find evidence that overall business income increased much due to section 199A, this does not rule out specific behavioral responses among subsets of taxpayers that are not large enough to cause significant aggregate changes. In this subsection, we take a closer look at responses along some of these margins. We begin with changes in compensation for owners of partnerships and S corporations in response to incentives to reclassify income. We then look for strategic changes in businesses' reported industries. Finally, we consider movement across the boundary between employee and independent contractor relationships.

III.B.1 Owner compensation

Here we analyze whether owners of partnerships and S corporations reduced their labor compensation (which is ineligible for 199A), creating a corresponding increase in firm profits (which may be eligible). Because partners cannot be employees of their partnerships, they sometimes receive a "salary" in exchange for services provided in the form of a guaranteed payment.²⁷ Guaranteed payments are ineligible for the 199A deduction. They are (but for tax) economically identical to wages: a partner will be allocated their guaranteed payments (if any) plus their allocative share of the partnership income determined after subtracting guaranteed payments to all partners.

To identify the effect of 199A on partners' guaranteed payments, we use a similar strategy to that for overall reported QBI. We limit the individual sample to those with partnership income in years $t - 2$ and t and focus on the share of their AGI that comes from guaranteed payments. We winsorize this share at the 99th percentile of positive values. The other sample restrictions and treatment assignment are the same as those described in Section III.A. First, we compare individuals below the income threshold to those above who are likely to be limited based on our aggregated industry treatment proxy. Second, we limit the sample to individuals with lagged taxable income above the 199A phase-out threshold and use the aggregated industry treatment proxy to identify treatment status. As above, our control variables include fixed effects for the three-way interaction of year, the lagged dependent variable, and lagged primary entity type (which for this sample is almost always partnerships).

We find evidence that guaranteed payments fell in 2018 and 2019 for both treated and control partners, with treated partners experiencing larger declines. Figure 5 Panel A shows that the treated group saw guaranteed payments decline by 0.32 and 0.18 percent of AGI relative to the control group in 2018 and 2019, respectively. These effects are statistically significant and substantial relative to a baseline mean of around 5.7 percent of AGI, reflecting a decline in guaranteed payments relative to AGI of 3.2 to 5.6 percent. Similarly, using industry variation among high-income taxpayers, Panel B shows that partners treated under 199A had guaranteed payments fall by 0.55 and 0.83 percent of AGI relative to the control group in 2018 and 2019, respectively. Relative to a baseline mean of around 8 percent of

²⁷Less commonly, a partner can receive guaranteed payments in exchange for capital provided to the partnership; such guaranteed payments are also generally ineligible for 199A. In our data, both types of guaranteed payments are aggregated together. Therefore, any estimated effects on guaranteed payments will include effects on both components.

AGI, these statistically significant differences correspond to a decline in guaranteed payments relative to AGI of 6.9 to 10.4 percent.

In both panels, the figure also indicates the the control group's guaranteed payments fell after the introduction of Section 199A, consistent with our inability to perfectly separate treated and untreated individuals. Nonetheless, the fall in guaranteed payments was greater among our treated groups, who we have shown were more exposed to 199A. Although we identify a relatively large decline in guaranteed payments, these results are consistent with our overall null results on the share of AGI that comes from QBI because guaranteed payments only make up between 1 and 3 percent of AGI in our regression subsamples, as shown in Appendix Table C3.

To supplement this differences-in-differences analysis, we also examine the extent to which partners stopped or began receiving guaranteed payments. Among individuals who were partners in a partnership in $t - 2$ and t , we compute the share who “start” making guaranteed payments (i.e., guaranteed payments are positive in t conditional on zero in $t - 2$) and the share that “stop” (guaranteed payments are zero in t conditional on being positive in $t - 2$). Figure 6 Panel A shows that the share stopping was relatively constant at just above 20 percent between 2013 and 2017 before a large, five-percentage-point increase in 2018 and an additional four-percentage-point increase in 2019. Thus there appears to have been a significant response along the extensive margin, with partnerships ceasing guaranteed payments to many partners. In contrast, Panel B shows that the share of partners starting guaranteed payments has been relatively constant throughout our sample period at around 2 percent, with a small uptick in 2017 potentially reflecting anticipatory behavior, but with no noticeable dropoff in 2018 or 2019. This suggests there may have been a significant asymmetry in the extensive-margin response of guaranteed payments to 199A. Alternatively, it may be the case that the group of partners starting guaranteed payments were less exposed to 199A than those stopping.

Next we study the effects of 199A on S-corporation owner compensation. For S-corporation owners, labor compensation takes the form of Form W-2 wages. Because wages are subject to FICA while the profits of S corporations are not, owners generally face a tax wedge (predating TCJA) in favor of profits. In order to protect the FICA tax base, the IRS requires owners of S corporations to pay themselves “reasonable compensation” for their labor services, though there is no hard-and-fast rule that establishes whether compensation is reasonable. Section 199A generally strengthened the existing tax preference in favor of profits, increasing the incentive for owners to reduce their wages.

To identify the effect of section 199A on wages paid to S-corporation shareholders, we use similar strategies to that for overall reported QBI, although the outcomes and treatment status here are measured at the entity level. In the first identification strategy, we limit our S-corporation panel to entities with a firm treatment proxy less than 0.25, implying that owners above the income threshold would likely be ineligible for the deduction.²⁸ We define entity j 's treatment proxy in year t ($Treat_{jt}$) in a continuous manner based on the income of the owners in $t - 2$. A given owner has treatment equal to one if her income is below the bottom of the 199A phase-out range, zero if her income is above the top of the phase-out range, and the appropriate convex combination if her income is in the interior of the phase-out range. We then aggregate up to the entity level according to the individuals' ownership shares. Thus a treatment proxy of one means all owners were below the bottom of the phase-out range in $t - 2$. A treatment proxy of zero means all owners were above the top of the phase-out range in $t - 2$, and therefore the firm is unlikely to generate QBI eligible for the deduction. This approach compares S corporations in similar industries, with varying 199A exposure based on its owners' incomes.

²⁸In practice, for S corporations, this restriction is essentially equivalent to restricting to SSTBs.

The second strategy focuses on firms with a shareholder-income treatment value less than 0.5, meaning that the owners' incomes are generally high enough in $t - 2$ to be substantially affected by the income limitations under 199A. The treatment proxy ($Treat_{jt}$) is then equal to the industry treatment proxy, which captures the share of potential QBI that is 199A-eligible based on the SSTB status, wages, and capital of the average S corporation in firm j 's $t-2$ industry. This approach compares S corporations with similar owner incomes, with varying 199A exposure based on industry.

In both empirical strategies, we estimate the share of wages paid to owners as a fraction of the two-year lag of gross receipts, winsorized at the 99th percentile of positive values. As in the analysis at the individual-owner level, we include the interaction of year fixed effects with bins of the lagged dependent variable. Additionally, we interact these fixed effects with bins of lagged potential QBI produced by the firm. This means that, in the context of the regressions using owner income for variation, the variation is driven solely by the owner's *other* sources of income, in the spirit of Risch (2020).

Table 2 Panels B through E report summary statistics on the subsets of the S-corporation panel used in our regressions. Our control group in the specifications exploiting income thresholds (Panel E) has higher levels of receipts, wages to shareholders, QBI, investment, and number of non-shareholder employees than our treatment group (Panel D), which is expected as the control shareholders are higher income. Among S corporations with high-income owners, those with more income eligible for the deduction (Panel B) tend to have higher gross receipts, QBI, and investment than those with less income eligible (Panel C).

Based on section 199A's incentives, we expect the shareholder-wages share of gross receipts to decline for treated firms relative to control firms. Figure 7 Panel A displays the estimated treatment effects comparing S corporations in our treatment and control groups defined based on owner income levels, among businesses in industries that are likely SSTBs or are on-average severely constrained by the 199A wage and capital limitations. There are small, statistically insignificant differences in 2018 and 2019 between treated and control firms of -0.13 and -0.28 percent of gross receipts. The 95-percent confidence interval rules out a decline in shareholder wages paid of around 0.7 percent of gross receipts. In Panel B, we show the estimates from comparing eligible to ineligible firms among those with high-income owners, and here we estimate that treated firms have declines in shareholder wages of around 0.4 to 0.5 percent of gross receipts. The results are statistically significant, but the 95-percent confidence intervals rule out declines of 0.75 percentage points or more of gross receipts. To provide context for the magnitude of this effect, Bull and Burnham (2008) estimate that the pre-existing FICA wedge reduces wages to shareholders by 35 percent. At the lower end of our 95-percent confidence interval (i.e., the greatest magnitude), -0.75 percent of gross receipts translates to less than a 4-percent decline in shareholder wages (given baseline shareholder wages of around 20 percent of gross receipts, as seen in Figure 7). Overall, we conclude that there may have been an effect of section 199A on reducing wages paid to S-corporation shareholders, but the shift in aggregate was small.²⁹

Finally, we consider the response from the small subset of S corporations for whom 199A created an incentive to *increase* owners' wages. As described in Section I, pass-through business owners who are above the income threshold are still potentially eligible to use the 199A deduction for non-SSTB income, but the deduction is limited by a function of wages paid (to shareholders or otherwise) and tangible capital. Specifically, the amount of the deduction cannot exceed the greater of (i) 50 percent of

²⁹As an additional test, Appendix Figure B5 restricts to single-shareholder firms (defined as of $t - 2$), as such firms face the clearest shifting incentive. The effects are, if anything, slightly smaller in that subsample, and they lose their statistical significance.

the owner’s share of W-2 wages paid by the business to all employees, or (ii) 25 percent of the owner’s share of wages plus 2.5 percent of the owner’s share of tangible capital. For illustration, suppose a high-income individual’s only business is a non-SSTB S corporation earning profits of π before paying wages to her (w), and further assume that the firm pays no other wages and has no tangible capital. In that case, the owner’s deduction would equal the smaller of $0.2(\pi - w)$ (twenty percent of the net income of the firm) or $0.5w$. Whenever $w < \frac{2}{7}\pi$, the owner can increase her 199A deduction by increasing w .

To study whether owners of firms with such an incentive do in fact increase the firm’s wages paid to shareholders, we refine our S-corporation panel. Specifically, for the remainder of our S-corporation owner compensation analyses, we restrict to firm-year observations where (1) the firm is a non-SSTB (determined based on $t - 2$ reported NAICS code), (2) the firm has only one shareholder (as of $t - 2$), and (3) that shareholder was above the bottom of the 199A phase-out threshold in $t - 2$. This severe set of restrictions drops 96 percent of S-corporation observations. We focus on single-shareholder S corporations because multi-shareholder firms face greater adjustment costs due to coordination difficulties.

Within the four percent of S corporations identified above, we define a firm-year observation to be bound if the wage limitation would have limited the owner’s deduction in $t - 2$ by at least 50 percent. Because we are not able to observe the proper capital measure, we consider only the component of the limitation that refers to 50 percent of wages. This will tend to cause us to misclassify certain firms as “bound” that are not actually bound, which will have the general effect of attenuating our estimates. Roughly 23 percent of S-corporation observations in this analysis are identified as bound.

Figure 8 Panel A plots the share of bound firms (as measured in $t - 2$) that start paying shareholder wages in year t , among those that paid zero wages in $t - 2$. Prior to TCJA, the share that begins to pay wages to their shareholder is roughly flat at slightly more than 5 percent. In 2018 and 2019, the share of these firms that start paying wages to shareholders increases by over 0.5 percentage points in each year. While these firms represent a very small share of S corporations overall, it does appear that they responded to 199A by paying wages to their shareholder, increasing their ability to claim 199A.

For affected firms, the incentive to increase shareholder wages only applies until 50% of total wages equals 20% of potential QBI.³⁰ We therefore expect an excess mass of firms at this precise level of wages. Figure 8 Panel B confirms this expectation, plotting the density of the ratio of 50% of total wages to 20% of potential QBI among the set of S corporations meeting our sample restrictions (i.e., non-SSTB, with a single shareholder who is above the income threshold in $t - 2$). We observe a small, but visible, amount of bunching in 2018 and 2019 near where this ratio equals one, and no such bunching in 2016 and 2017 before the introduction of the deduction. In Panels C and D, we show that this bunching of wages comes from changes in the wages paid to shareholders and not those paid to non-shareholder employees. Panel C plots the change in wages paid to shareholders between $t - 2$ and t , while Panel D plots the change in wages paid to non-shareholder employees. This response is consistent with a strategic shifting of owner compensation in response to incentives created by 199A. However, we stress that this effect is modest in magnitude: from Panel A, fewer than 6% of bound firms that pay zero wages in $t - 2$ are paying positive wages in t , and the excess mass in Panel B represents less than 1.4% of firms in this restricted subsample and less than 0.05% of S corporations overall.

In summary, we find that the passage of 199A was associated with a substantial decline in partner guaranteed payments and a much smaller decline in S-corporation shareholder wages. The small subset

³⁰Under the assumption that the firm has no tangible capital, which may influence the deduction maximizing level of wages paid.

of S-corporation owners who faced an incentive to *increase* the wages they pay themselves did so, and some were able to precisely maximize their deduction. One potential explanation for this set of results is that pass-through business owners may be attentive to both tax incentives and legal constraints. In particular, owners of S corporations may not have reduced their wages in response to 199A by much because they were already bound by the reasonable-compensation standard. By contrast, there is no legal constraint preventing owners of S corporations from increasing their wages or preventing owners of partnerships from reducing or eliminating guaranteed payments.

III.B.2 Reported industries

In addition to shifting income types, another margin on which taxpayers may respond to section 199A is their business's reported SSTB status. We do not observe this margin directly, but we can look for indirect evidence. In the ordinary course of filing a tax return, firms must describe themselves via a six-digit NAICS code. As a legal matter, the NAICS code does not affect whether a business is an SSTB; rather, SSTB status is determined based on the facts and circumstances of the business. Nevertheless, a business owner might reasonably believe that the IRS could use the reported NAICS code as evidence when judging a SSTB determination. Thus, business owners who claim that their business generates non-SSTB income might have an incentive to report a NAICS code that is not associated with the service sector.

We test this hypothesis in Figure 9. The figure restricts the S-corporation sample to those that reported a NAICS code that we classify as an SSTB in $t - 2$. The left panel focuses on those that reported being "consultants" (NAICS 5416) in $t - 2$, while the right panel restricts to those that reported any other NAICS code in $t - 2$ that we classify as SSTB. The outcome is a dummy for reporting a non-SSTB NAICS code at time t . In each panel, we separately analyze those firms with at least one owner above the income threshold at $t - 2$ (where the SSTB classification matters most) compared to those with all owners below the income threshold. We find that nearly 6 percent of "consultant" S corporations in 2016 and 2017 with high-income owners reported non-SSTB NAICS codes in 2018 and 2019, up from approximately 1.5 percent in other years; firms without high-income owners had a much smaller jump. We also see a very slight increase in 2017, possibly reflecting changes to NAICS codes written on returns prepared during 2018 after TCJA had passed. There was also an increase in NAICS reclassifications among non-consultant SSTB S corporations after TCJA, but the magnitude of the increase is approximately one-tenth the size of the increase for consultant S corporations. Thus, we do find evidence of some firms changing their reported NAICS code in a manner consistent with the incentives of TCJA, but the overall magnitude was modest: over 90 percent of high-income consultant S corporations continued to list SSTB NAICS codes even after TCJA.

III.B.3 Employment vs. contracting

A more dramatic way in which section 199A affected compensation incentives is on the margin of employment versus contracting. Income received as an independent contractor is generally eligible for the 199A deduction, while wages earned as an employee are not. At the time of the law's passage, some observers speculated that workers and firms might restructure their labor arrangements from employment to contracting to decrease tax liability (Duke, 2018). Prior to 199A, there was already a modest trend towards hiring workers as contractors rather than employees (Katz and Krueger, 2019; Abraham et al., 2018). This rise in contracting could be driven by firms' and workers' changing demands for

traditional employee benefits versus workplace autonomy and flexibility. Additionally, new platform economy companies such as Uber and Lyft have used a large number of contractors to provide their services. We use a number of approaches to test whether contracting has further increased in response to Section 199A.

First, we examine whether worker reclassification within firms increased in 2018. We use data from Forms 1099-MISC and W-2 in our individual sample to identify individuals who receive non-employee compensation in year t and who received wages from the same employer (as proxied by EIN) in year $t - 1$. We only characterize individuals as switching from employee to contractor in year t when an individual receives at least 60 percent of their labor income from a firm on Form W-2 in year $t - 1$ and at least 60 percent of their labor income from that same firm on Form 1099-MISC in year t . Figure 10 Panel A shows the total number of such employee-to-contractor reclassifications each year. We find no evidence of an increase in 2018, suggesting a lack of behavioral response to section 199A on this margin.³¹ While 199A provided a tax incentive to change worker classification, the Section 199A regulations disincentivized them within employer by specifying that the nature of the work relationship must change when an employee becomes an independent contractor; otherwise the contractor income should be deemed ineligible for the deduction. Additionally worker classifications have larger ramifications for employment law beyond tax treatment.

Next, we examine transitions to contractor status more generally, including transitions between firms. Using our individual sample, we examine three types of transitions towards contracting: (i) newly receiving any contracting income as measured by non-employee compensation income from a Form 1099-MISC, (ii) newly receiving the majority of labor income from 1099-MISC contracting (which we refer to as being a “primary contractor”), and (iii) newly filing a Schedule C. In each case, we use the word “newly” to mean having the characteristic in year t but not $t - 1$. Although Schedule C is an imperfect measure of contracting income because it includes other types of income as well, we study it because section 199A may encourage individuals to report contracting income that may have otherwise gone unreported (Collins et al., 2019). In addition, Schedule C allows us to analyze contractors whose income is reported on Form 1099-K, which we cannot study directly due to inconsistent reporting over time (Handwerger, 2018; Collins et al., 2019). Moreover, unlike Form 1099-MISC, we are able to study Schedule C in 2019.

Trends in our three measures of contractor transitions are shown in Figure 10 Panel B, which plots the number of transitions to contractor status for an individual taxpayer, relative to the number of 2017 transitions. The dashed line represents transitions to primary contractor status. The number of primary contractor transitions is actually falling from 2014 through 2017, and we see a continuation of that trend in 2018. The black line shows transitions into any contractor income, which are rising over time, with the trend continuing uninterrupted into 2018. The grey line shows transitions into Schedule C filing, which display an upward trend from 2013 through 2016 with declines and increases between 2017 and 2019 that do not appear out of line with previous trends.

As with our time series evidence on pass-through income, these analyses are not definitive, as one cannot know the counterfactual outcomes that would have occurred in the absence of 199A. Thus we again employ a difference-in-differences approach to better isolate the causal effects of 199A, comparing individuals below the 199A income thresholds to those with taxable income above the thresholds (based on prior-year income). This analysis requires the individual to have filed a Form 1040 in both years t and $t - 1$. Our sample includes individuals with taxable income between 50% and 300% of the

³¹As discussed in Section II.A, we cannot extend analyses of Form 1099-MISC to 2019 due to data quality issues.

income thresholds excluding those with taxable income between 90% and 150% of the thresholds. We assume that contractors above the thresholds are providing labor services and therefore are ineligible for a substantial 199A deduction either because their business is a SSTB or because it is a non-SSTB with insufficient amounts of wages paid or tangible capital. To the extent that this assumption fails, it biases our estimates towards zero, as some control-group observations (those above the threshold) will in fact be treated.

Our difference-in-differences regressions do not indicate a detectable effect of 199A on contractor transitions. Figure 11 reports the estimates from the difference-in-differences regressions predicting the likelihood of becoming a contractor for those below the income threshold relative to those above, with 2017 as the reference year. The first three panels correspond to our three measures of transitions: primary contractor (Panel A), any contracting income (Panel B), and Schedule C filing (Panel C). For all three measures, the point estimates for 2018 are small, negative, and statistically insignificant. In Panel D, we examine changes in the share of labor income coming from contracting to test for responses on the intensive margin. We see no evidence that those who were more likely to be eligible for 199A shifted compensation towards contracting.

Finally, we examine whether new contractors in 2018 are more likely than existing contractors to claim the 199A deduction. If a substantial number of individuals transition to contracting *because* of the deduction, they should be more likely to claim it. However, Table 3 shows that new contractors in 2018 are less likely to claim the deduction than existing contractors. This is true among those who become primary contractors in 2018 (the first row) as well as those who start receiving any contractor income that year (the second row), and it remains true after controlling for taxable income, contractor income, age and filing status (columns 2, 4, 6, and 8).³² We also test whether those with incomes below the 199A threshold were more likely to claim the deduction because they would be eligible for the full 199A deduction (columns 3-4 and 7-8), but the point estimates are similar and negative. Finally we compare new-2018 to new-2017 contractors (in 2018) rather than all existing contractors in columns 5-8, and we find similar results. Thus individuals who became contractors in 2018 are less likely to claim the deduction, even after controlling for taxable income, contractor income, and demographic characteristics.

Taken together, our analyses of contractor transitions do not provide any evidence of a short-run increase in independent contracting as a result of section 199A. It is possible that the tax wedge was not large or salient enough to encourage many individuals and firms to incur the costs of coordinating to change employment arrangements. Alternatively, a substantial shift to contracting may take longer than one or two years to manifest, as a growing number of individuals change jobs and employers.

III.C Effects on real inputs to production

In this section, we test whether section 199A impacted real inputs to production, studying whether firms altered their investments in capital and labor in response to the deduction. While these investments would likely lead to increases in pass-through income in the long-run, they may decrease pass-through income in the short-run by increasing business deductions, potentially changing the interpretation of

³²Across specifications, we find that the contractor income and taxable income controls explain the majority of the difference in coefficients between “no controls” and “controls.” On average, new contractors earn less in contracting income and have lower taxable income than existing contractors; furthermore, higher contracting income and higher taxable income is correlated with claiming the section 199A deduction. These omitted variables drive the large negative estimates in the “no controls” columns (1, 3, 5, and 7).

our earlier analyses of pass-through business income.

Theoretically, the effective tax rate reduction under Section 199A has an ambiguous effect on incentives for investment. In the standard user cost of capital model (Hall and Jorgenson, 1967; Gravelle, 2014), the firm's break-even rate of return (f_K) on a marginal investment financed by equity (such as retained earnings) in tangible property is given by:

$$f_K = \frac{1 - \tau z}{1 - \tau} \times (\delta + r). \quad (3)$$

In this expression, τ is the tax rate, z is the schedule of depreciation deductions converted to present value, δ is the geometric depreciation rate, and r is the firm's exogenous discount rate (i.e., investors' required return gross of individual-level taxes). Intuitively, the tax rate matters for investment decisions for two reasons: taxes reduce the benefit of investment (by taxing the income stream produced by it), while taxes also reduce the cost of investment due to depreciation deductions. When $z < 1$, the former dominates, and a higher tax rate reduces investment.

However, it is the case that $z = 1$ (which corresponds to the case of full expensing) for many types of investment by pass-through firms in 2018 and 2019. Under sections 179 and 168(k) (as amended by TCJA), most equipment investment can be deducted immediately in the initial year. When $z = 1$, theory predicts that the reduction in costs and benefits precisely offset, meaning that the tax rate does not affect a marginal investment. Thus, taking this model literally, we should not expect exposure to section 199A to affect investment in categories of assets eligible for full expensing.

There are several modifications to the standard model that would predict an investment response to a change in the tax rate, though, even when $z = 1$. For example, suppose that the firm incurs $c > 0$ dollars of non-deductible costs (e.g., entrepreneurial effort) for each dollar of investment. In that case, with $z = 1$, the threshold rate of return becomes $\frac{1+c-\tau}{1-\tau} \times (\delta + r)$, which is increasing in τ , implying that a lower tax rate increases investment. Alternatively, if investment is financed by debt, debt-financed investment faces a *subsidy* when interest payments are deductible and $z = 1$. In this scenario, a decrease in the tax rate reduces the subsidy and therefore reduces investment. In sum, theory provides us little guidance even for the expected *sign* of section 199A's effect on investment.

We test for responses in investment, employment, and wages paid using the S-corporation panel. Our analyses are precisely analogous to the analysis of wages paid to shareholders described in III.B.1. To study effects on investment behavior, we use a measure of tangible investment, which we define as the sum of property placed in service on Form 4562, including structures and equipment, whether expensed (under section 179 or bonus depreciation) or depreciated over time. One limitation is that data from this form are available only for the 86 percent of S corporations that file Form 1120S electronically (e-file). Conditional on e-filing, approximately 45 percent report some investment on Form 4562. We construct two outcomes using this investment measure: investment levels as a share of receipts and an indicator for having any investment. We restrict the data to observations where the firm e-filed in both t and $t - 2$.

We find no evidence that section 199A changed investment among eligible firms relative to ineligible firms. Using variation in 199A exposure due to differences in owner incomes, Figure 12 Panel A shows that investment as a share of receipts did not change differentially by treatment status in either 2018 or 2019. The point estimates are close to zero, and our 95-percent confidence intervals can rule out increases of more than 0.2 percent of gross receipts and decreases in excess of 0.3 percent of gross receipts. Panel B shows similar results using variation in 199A eligibility across industries among firms with high-income owners. Its point estimates are also small and statistically insignificant, with the 95-

percent confidence intervals ruling out investment increases larger than 0.3 percent of gross receipts or decreases larger than 0.1 percent of gross receipts. Panels C and D present analogous analyses of the extensive margin. The share of S corporations reporting some investment on their Form 4562 exhibits a general downward trend over time that continues for both treatment and control firms in 2018 and 2019. These findings are consistent with the most basic neoclassical model, which predicts that investment is independent of the tax rate when $z = 1$. Alternatively, investment may depend on the tax rate, but too inelastically for us to detect an effect.

Next, we study the effect of the deduction on non-shareholder wages and employment. Even in the absence of an effect on investment, an employment and wage response could occur in a model of bargaining or surplus-sharing (Risch, 2020). Our first outcome is the total wages paid to non-shareholder employees as a share of the firm's gross receipts, and our second outcome is the log of the number of employees (plus one), where the number of employees is measured by the count of Forms W-2 issued by the EIN on the S corporation's return to individuals other than shareholders.

Figure 13 Panel A presents the estimated effect on wages paid to non-shareholders, comparing S corporations with owners with different incomes. These firms generally have increasing shares of receipts paid out as wages over time, but there is no meaningful change in the difference between treated and untreated firms in 2018 or 2019. We see a similar result using variation in industry 199A eligibility in Panel B. Our confidence intervals can rule out increases in wages paid of 0.25 percent of gross receipts, relative to a baseline value of around 18 or 19 percent. Panels C and D show our results for the count of non-shareholder employees, and we see no evidence of a change in the difference between treated and control firms in their number of employees after section 199A's introduction using either identification strategy.

In summary, we find no evidence that exposure to section 199A changed real outcomes in the form of investment, employment, or wages by S corporations during the first two years that the deduction was in effect. Changes to real inputs may be more sensitive to the provision's legislated sunset than income-shifting responses. They also may take longer to manifest. However, in the next section, we extend our analyses through 2021 and continue to find little effect on real firm investments in labor and capital.

III.D Extending the analysis through 2021

Thus far we have focused on the two years after the implementation of 199A. This allowed us to be relatively precise in our use of pre-treatment data to identify taxpayers above and below the income threshold or having high or low values of our aggregated industry treatment proxy. By examining 2018 and 2019 we also avoided using outcome data from the disruptive COVID-19 period, which is likely to have impacted different industries and income groups differently (Chetty et al., 2023).

In this section, we extend our analysis to 2020 and 2021 – the most recent years of data available as of this writing. This longer time period allows us to observe whether firms and taxpayers make delayed adjustments in response to the new deduction.

A priori, it is plausible that real responses, such as investment and hiring, respond only after a lag due to adjustment frictions. By contrast, the timing of behavioral responses involving shifting between tax bases is less clear. On the one hand, past experience suggests that behavioral responses involving shifting between tax bases might happen quickly. For example, Auten, Splinter and Nelson (2016) found that S-corporation owners recharacterized a large amount of their income from “passive” income

in 2012 to “active” income in 2013, immediately after the American Taxpayer Relief Act created an incentive to do so. Furthermore, aggregate business statistics studied by Saez (2004) and Auten, Splinter and Nelson (2016) show that the Tax Reform Act of 1986 (TRA86) led to an immediate shift of income from C corporations to pass-through businesses. This suggests that much of the shifting responses to section 199A would be detectable within the first two years. On the other hand, it is possible that the shifting response to section 199A could be slower than past experience. For instance, TRA86 reversed the tax wedge between C corporations and pass-through businesses, while section 199A (and TCJA as a whole) generally did not. Rather, section 199A created a new tax wedge between ordinary and business income within the individual income tax, and shifting on this margin might be slower than shifting between C-corporate income and pass-through income. Furthermore, we note that section 199A was a novel, complicated provision and the regulations to fully clarify its implementation were not finalized until February of 2019. Thus, it is plausible that some shifting responses in response to section 199A might not appear until several years after its passage.

Assessing medium-run outcomes in 2020 and 2021 requires modifying our estimation strategy in a number of ways. First, as the last year of the treatment period (2021) is four years from the last year of the pre-treatment period (2017), we switch to using four-year lags to assign treatment status. That is, we modify Equation (1) to use $Below_{i,t-4}$ in place of $Below_{i,t-2}$, and we modify Equation (2) to use $\bar{z}_{i,t-4}$ in place of $\bar{z}_{i,t-2}$. This longer lag somewhat reduces the accuracy of taxpayers’ assigned treatment statuses.

To be precise, we estimate the following equation, among those for whom $\bar{z}_{i,t-4} < 0.2$, using the four-year lag of income to identify taxpayers who are above versus below the income threshold:

$$Y_{it} = \alpha_1 Below_{i,t-4} + \sum_{\tau=2013}^{2016} \beta_{\tau} Below_{i,t-4} + \sum_{\tau=2018}^{2021} \beta_{\tau} Below_{i,t-4} + X'_{it}\gamma + \epsilon_{it}. \quad (4)$$

We also estimate the following equation among those with $Below_{i,t-4} = 0$:

$$Y_{it} = f(\bar{z}_{i,t-4}) + \sum_{\tau=2013}^{2016} \beta_{\tau} \bar{z}_{i,t-4} + \sum_{\tau=2018}^{2021} \beta_{\tau} \bar{z}_{i,t-4} + X'_{it}\gamma + \epsilon_{it}. \quad (5)$$

In principle, we could use the four-year lag for our entire analysis and make equations (4) and (5) our preferred specifications. We eschew this approach for three reasons. First, the parallel-trends assumption is less likely to hold during the COVID-19 period, making the 2020 and 2021 coefficients more difficult to interpret. Second, the data imperfection discussed in section II.C – where the database is missing a larger share of Schedules K-1 in 2019, 2020, and 2021 than in prior years – becomes a bigger problem with the longer panel. When we stop our data at 2019, we are able to drop the relatively small number of affected firms from the panel (as discussed in section II.C). However, this approach becomes untenable if we must drop firms with missing 2020 and 2021 K-1’s as well, which tend not to be the same firms. Thus, in order to extend the analysis to 2021, we switch our source of S-corporation and partnership potential QBI in all years from Schedule K-1 to the amounts reported by taxpayers on Schedule E of Form 1040, line 32. This measure of potential QBI is inferior to the K-1 measure we have used thus far because it includes partner guaranteed payments, which are ineligible for the QBI deduction. Third, the longer lags somewhat reduce the accuracy of the treatment proxies, as income and industry in $t - 4$ are modestly less predictive of income and industry in t than are income and industry in $t - 2$.

With these caveats in mind, Figure 14 displays our estimates for the impacts of section 199A on use

of the deduction (the first stage, Panels A and B) and on the ratio of potential QBI to AGI (Panels C and D), estimating Equations (4) and (5). We see that our identification strategy is still able to identify taxpayers treated by 199A, despite the extra two years of lag. In Panel A, taxpayers predicted to be below the income threshold (among those with a low aggregated industry treatment proxy) claim a 199A deduction that is 41 to 44 percent larger relative to the total possible deduction based on potential QBI. Using variation in our aggregated industry treatment proxy in Panel B, high-income treated taxpayers have 199A claiming rates 86 to 88 percentage points higher than high-income control taxpayers. These results compare to estimates of approximately 51 percentage points (Panel A) and 85 to 89 percentage points (Panel B) in the case of the two-year lags (see Figure 3).

Panels C and D show the estimated impacts of section 199A on potential QBI as a share of AGI. Panel C uses the income threshold for identification. The parallel-trends assumption still appears to hold reasonably well during the pre-treatment (2013-2016) period, with the treatment and control groups tracking each other somewhat closely. We do not see effects of 199A on potential QBI in 2018 and 2019, reinforcing our skepticism of any effects suggested by our main analysis in Figure 1 Panel A. We now also see a zero impact in 2020 and a small, statistically significant impact of 0.6 percent of AGI in 2021. This could be indicative of a modest, medium-run effect of section 199A, or it could be noise, not far from the magnitude of the difference in differences between treatment and control groups in 2014.

Panel D shows estimated impacts of section 199A using taxpayers above the income threshold with high versus low values of the aggregated industry treatment proxy. In the industry analysis, we see that the parallel-trends assumption holds less well in the pre-period. The estimated effects of 199A on potential QBI are 0.5 and 1.4 percent of AGI for 2020 and 2021 respectively; however, these are similar to the pre-period estimates of 1.4 and 1.2 percent of AGI for 2014 and 2016. Our inability to construct a cleanly matched treatment and control group makes our income-variation-based estimate of effects for 2020 and 2021 (Panel C) our preferred set of estimates. Nonetheless even the imperfect Panel D suggests that 199A did not have large impacts on potential QBI based on the fact that the 2020 and 2021 estimates in panel D resemble differences seen in the pre-period.

Next, Figure 15 extends the analysis of S-corporation wages and employment through 2021. The specifications are analogous to those in Section III.C but use four-year lags instead of two-year lags.³³ We again use our two identification strategies. The two outcome variables are wages scaled by the four-year lag of receipts and $\log(\text{employees} + 1)$, where *employees* excludes shareholders.³⁴ Using our shareholder-income-based identification strategy in Panels A and C, outcomes for the treated and control firms track each other relatively well both during the pre-period *and* during the post-period. While employment falls during the COVID-19 period, it does so equally for treated and control firms. Using our industry-based identification strategy, in Panels B and D, wages and employment are estimated to fall by more for the treated firms in 2020 and 2021. This is opposite of the effect one would expect if section 199A encouraged firm investment and growth. Taken together, neither identification strategy suggests that 199A increased wages or employment among S corporations.

Finally, in Figure 16 we use our S-corporation sample to extend the analysis of business investment through 2020 and 2021. Panels A and B use investment relative to the four-year lag of receipts as the outcomes variable. Panel A uses our shareholder-income identification strategy, and Panel B uses

³³These specifications require accurate information for Schedule K-1 at time $t - 4$, but do not heavily rely on Schedule K-1 from year t . Thus, for these specifications, we do not drop firms with missing 2019 (or later) Schedules K-1.

³⁴This outcome may be slightly mismeasured for firms with missing Schedules K-1 in 2019 and later.

variation in our industry treatment proxy. The estimated effects for 2021 are 0.29 and 0.04 percent of receipts, respectively, and the former is statistically significant. Panels C and D use the two identification strategies to look for extensive-margin effects, i.e., any investment by the S corporation. Panel C suggests a small positive impact in 2021 while Panel D finds a small negative impact.

Together our results suggest it is unlikely that large increases in capital and labor investments occurred due to the deduction in the short or medium run. The estimates in the prior section and this section both reveal no evidence of effects in 2018 and 2019 and mixed evidence on effects in 2020 and 2021 depending on the identification strategy and outcome.

IV Conclusion

Overall we find little evidence of large responses by businesses and taxpayers to section 199A. The time series of potential QBI suggests no discrete change following the introduction of the deduction in 2018. In our difference-in-differences analysis, eligibility for the deduction does not appear to have substantially affected the growth of QBI (relative to AGI, or in levels) among pass-through business owners.

Narrowing in on specific income-shifting margins, we do observe some responses. Section 199A creates strong incentives for partnerships to reduce guaranteed payments (and increase profits) since labor income can face a higher tax rate than business income. We find a clear reduction in guaranteed payments paid, with larger reductions among more 199A-exposed partners. We also see a sharp increase in the fraction of partnerships that cease making guaranteed payments in 2018 and 2019.

Section 199A also creates incentives for S corporations to reduce wages (and increase profits) paid to shareholders. Following the passage of section 199A, we see suggestive evidence of small declines in wages paid to owners by S corporations generally. Among the subset of S corporations with owners whose 199A deduction is limited by the wage and capital limitation, we see the predicted increase in shareholder wages, with bunching at the precise wage level that maximizes their 199A deduction.

When we test for an increase in the number of workers who transition from employee to contractor status, we see little effects associated with Section 199A. This is a key finding of our work since many observers were concerned that 199A would accelerate a trend towards contracting and would reduce access to employer-sponsored health and retirement plans as well as the job stability associated with employee status. Similarly, we find no evidence of “real” responses to section 199A in terms of investment, employment, or the wages of non-shareholder employees in 2018 or 2019.

When we extend our baseline analyses to through 2021 to examine longer-term outcomes, we find our general conclusions unchanged. However, the results for these years provide more mixed evidence with less well-matched pre-trends between treatment and control groups, particularly when comparing across industries.

In summary, the overall responses of businesses and their owners to 199A have been modest. Our findings suggest that the deduction may not have stimulated real business activity, but that it also has not led to large shifts in income reclassification. Nonetheless the deduction has provided billions of dollars of tax reductions to millions of taxpayers.

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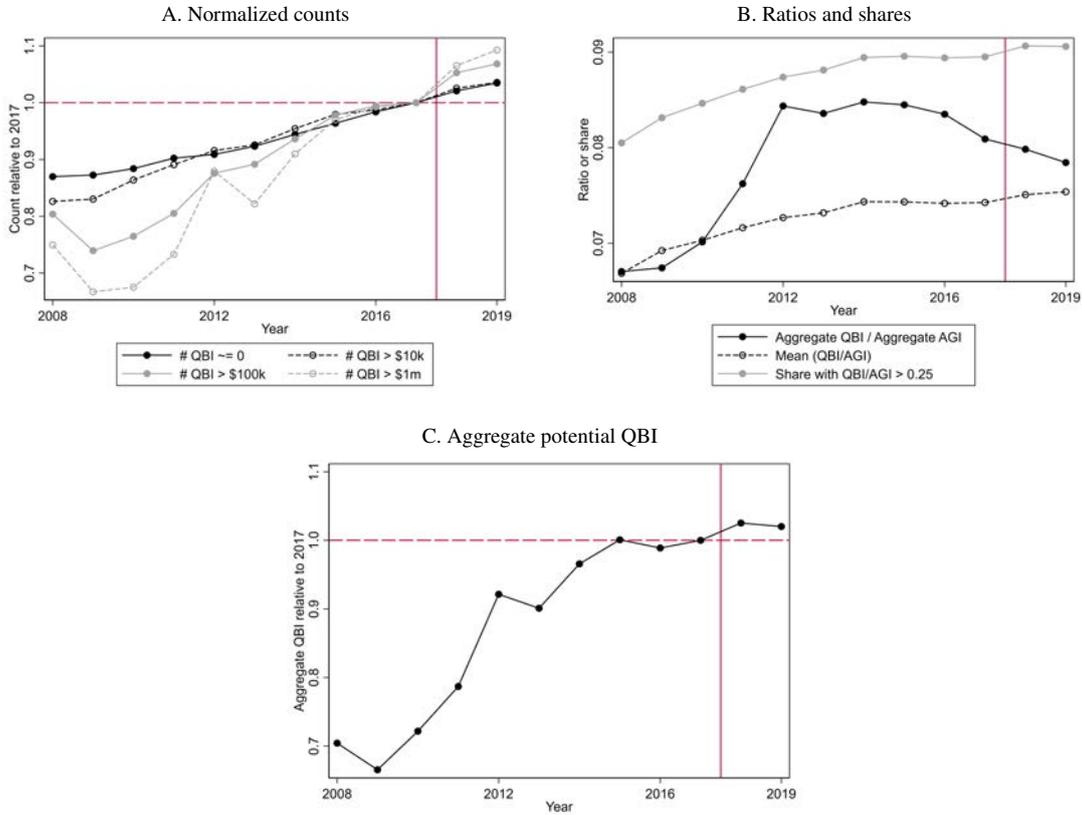
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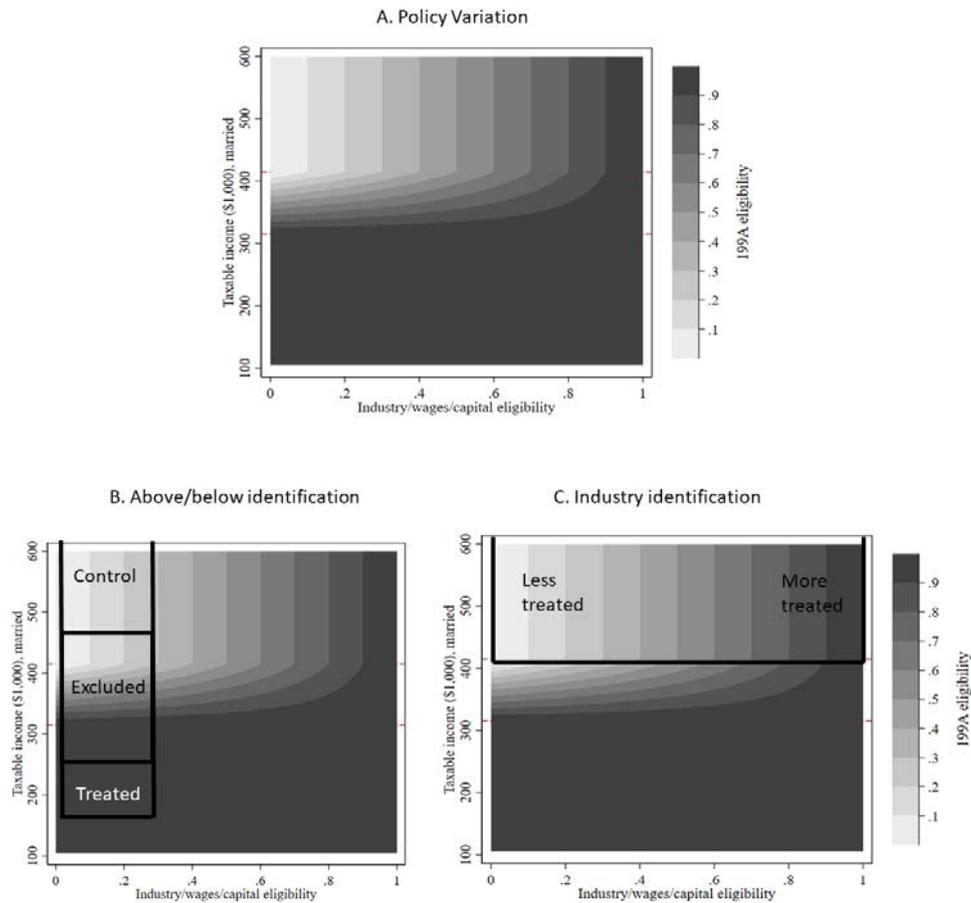
Figures and Tables

Figure 1: Potential QBI over time



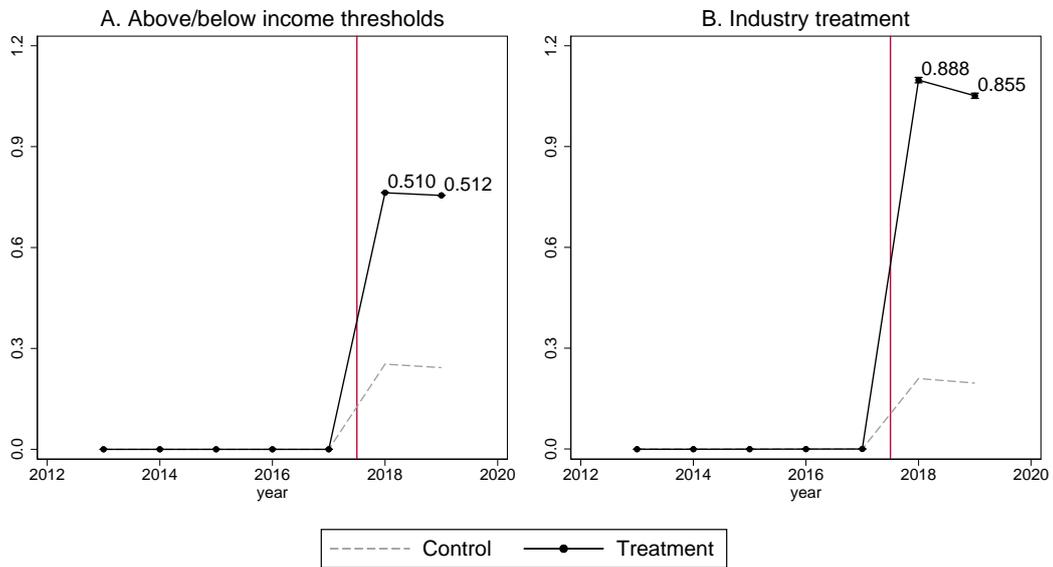
Notes: Panel A plots aggregate counts of pass-through owners satisfying various criteria relative to those counts in 2017. The solid black line counts those with non-zero potential QBI. The remaining series count those with potential QBI exceeding \$10,000, \$100,000, and \$1,000,000. Panel B plots the ratio of aggregate QBI to aggregate AGI (solid black line), the average ratio of QBI to AGI (dashed black line), and the share of taxpayers with QBI exceeding 25% of AGI (solid gray line). Panel C plots aggregate potential QBI, normalized relative to 2017. In all panels, potential QBI is as defined in the text, equal to the sum of profits/losses from sole proprietorships, partnerships, S-corporations, and Schedule F income, excluding types of income (such as guaranteed payments) ineligible for the QBI deduction. All dollar values are adjusted for inflation to 2018 values. For the average ratio of QBI to AGI and the share of taxpayers with QBI exceeding 25% of AGI, we drop taxpayers with non-positive AGI and that have AGI \leq \$2, which drops taxpayers that filed a dummy return solely in order to obtain an Economic Impact Payment. All panels were created by the authors using our sample of individual tax returns, weighted to reflect the population of tax returns.

Figure 2: Treatment effect identification examples



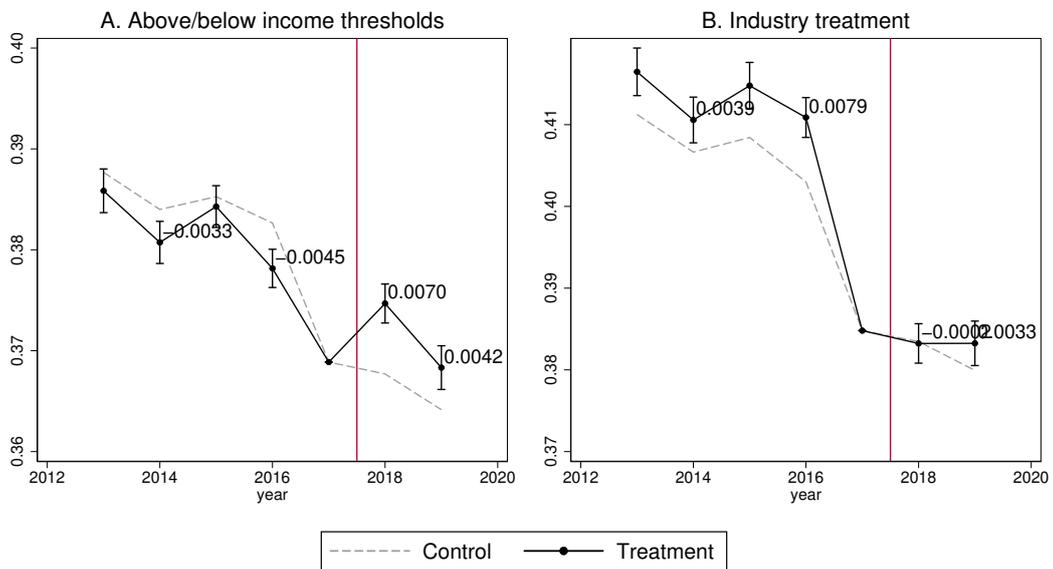
Notes: The figure depicts heat maps of Section 199A treatment intensity—that is, the share of potential QBI that is eligible for 199A. Darker colors indicate greater treatment intensity. Panel A describes the variation in treatment intensity based on owner income (assuming a married taxpayer in 2018) and the business’s industry, wages and capital. Panel B shows the same information and highlights our identification strategy that compares taxpayers below vs. above the phase-out region among taxpayers with low aggregated industry treatment proxies—i.e., those with pass-through income from entities likely to either be SSTBs or have low wage and capital employed in the business. Panel C analogously highlights our identification strategy that compares high-income taxpayers with varying aggregated industry treatment proxies—i.e., varying levels of 199A eligibility based on the industries and entity types of their pass-through businesses.

Figure 3: First-stage difference in differences: effect of section 199A treatment proxy on section 199A deduction divided by 20 percent of QBI



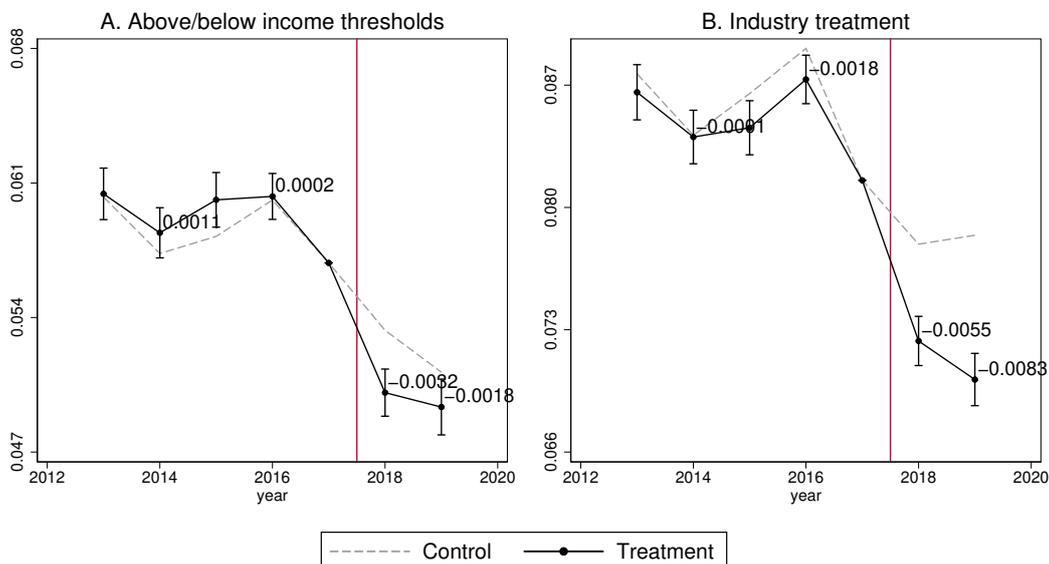
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our individual level sample. The dependent variable is the actual QBI deduction claimed (less that attributed to REIT dividends) divided by 20 percent of our potential QBI measure. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panel A, we exploit the income threshold for identification: treatment is defined as having taxable income at time $t - 2$ that is below the section 199A income thresholds at which the income limitations apply. The sample is limited to those owners with low levels of our industry treatment proxy whose $t - 2$ taxable income between 50% and 300% of the thresholds excluding those with incomes between 90% and 150%. In Panel B, we exploit differences in how the limitations affect eligibility for the deduction across industry and entity for identification. The sample is limited to those whose $t - 2$ taxable income is above the section 199A income threshold phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, main $t - 2$ entity type, and 100 bins of $t - 2$ QBI scaled by $t - 2$ AGI. The sample is restricted to those with positive AGI in $t - 2$. See Section III.A for further regression details. The dependent variable is winsorized at the 99th percentile of positive values (where the percentiles are defined among the union of the two regression samples). All panels were created by the authors using data from the population of tax returns.

Figure 4: Difference-in-differences: effect of section 199A deduction on QBI scaled by income



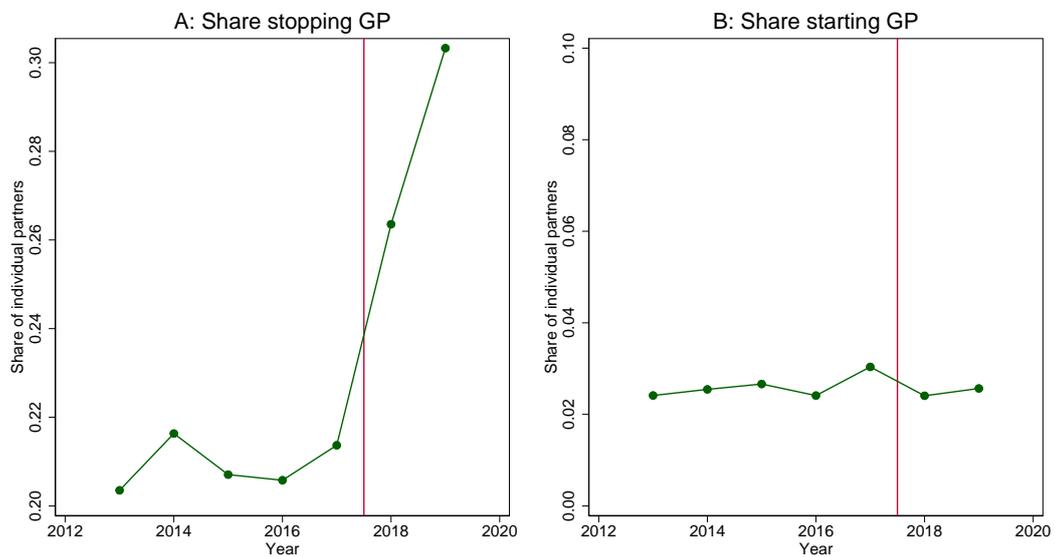
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our individual level sample. The dependent variable is the ratio of potential QBI to adjusted gross income; this ratio is censored below at zero and above at one. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panel A, we exploit the income threshold for identification: treatment is defined as having taxable income at time $t - 2$ that is below the section 199A income thresholds at which the income limitations apply. The sample is limited to those owners with low levels of our industry treatment proxy whose $t - 2$ taxable income between 50% and 300% of the thresholds excluding those with incomes between 90% and 150%. In Panel B, we exploit differences in how the limitations affect eligibility for the deduction across industry and entity for identification. The sample is limited to those whose $t - 2$ taxable income is above the section 199A income threshold phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, main $t - 2$ entity type, and 100 bins of $t - 2$ QBI scaled by $t - 2$ AGI. The sample is restricted to those with positive AGI in $t - 2$ and t . See Section III.A for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 5: Difference-in-differences: effect of section 199A deduction on guaranteed payments, scaled by AGI



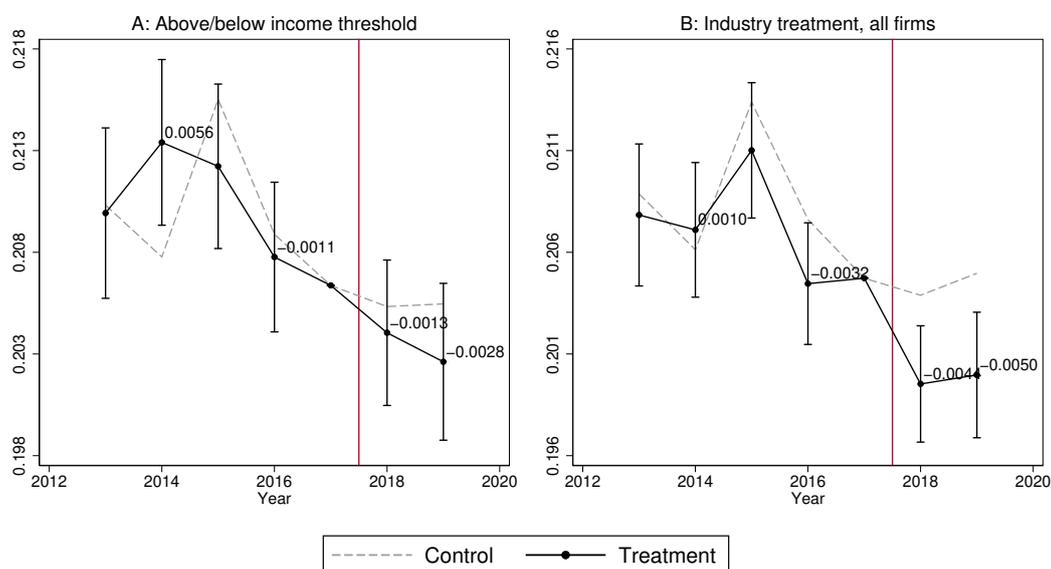
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our individual level sample. The dependent variable is the ratio of partnership guaranteed payments to adjusted gross income. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panel A, we exploit the income threshold for identification: treatment is defined as having taxable income at time $t - 2$ that is below the section 199A income thresholds at which the income limitations apply. The sample is limited to those owners with low levels of our industry treatment proxy whose $t - 2$ taxable income between 50% and 300% of the thresholds excluding those with incomes between 90% and 150%. In Panel B, we exploit differences in how the limitations affect eligibility for the deduction across industry and entity for identification. The sample is limited to those whose $t - 2$ taxable income is above the section 199A income threshold phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, main $t - 2$ entity type, and 100 bins of $t - 2$ guaranteed payments scaled by $t - 2$ AGI. The sample is restricted to those with positive AGI and non-zero partnership income (QBI or guaranteed payments) in $t - 2$ and t . The dependent variable is winsorized at the 99th percentile of positive values (where the percentiles are defined among the union of the two regression samples). See Section III.A for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 6: Starting and stopping guaranteed payments



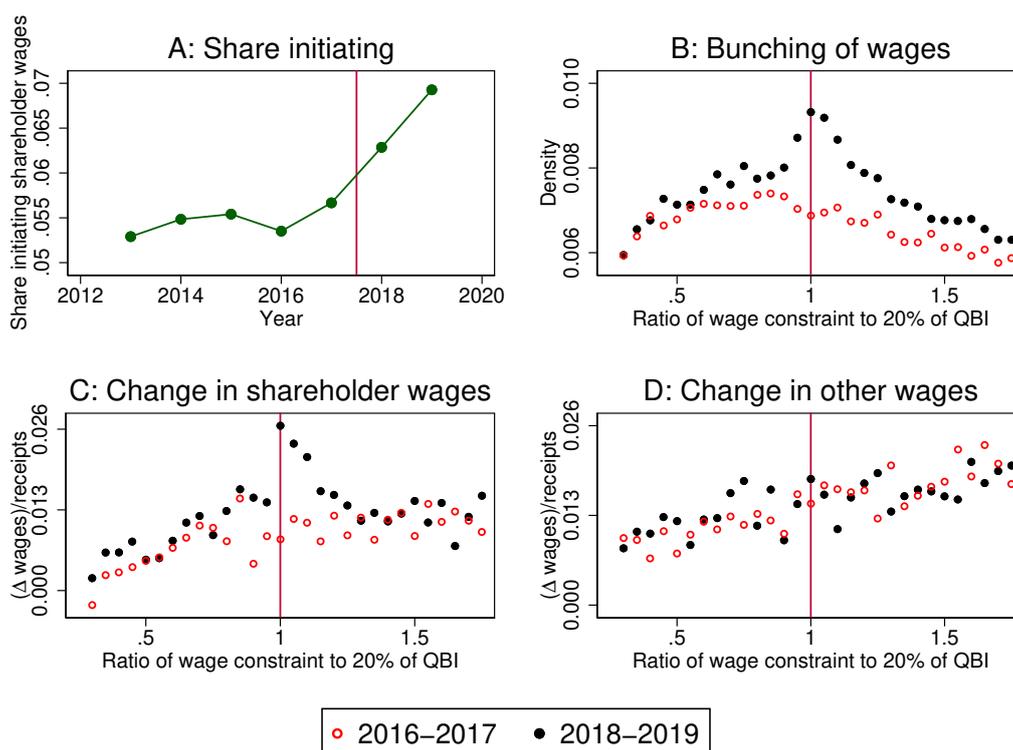
Notes: This figure uses the individual, restricted to those who are partners in a partnership in both years t and $t - 2$. Panel A plots the probability of not receiving a guaranteed payment in t , conditional on receiving a guaranteed payment in $t - 2$. Panel B plots the probability of receiving a guaranteed payment in t conditional on not receiving a guaranteed payment in $t - 2$. All panels were created by the authors using data from the population of tax returns.

Figure 7: Difference-in-differences: Wages to shareholders of S corporations



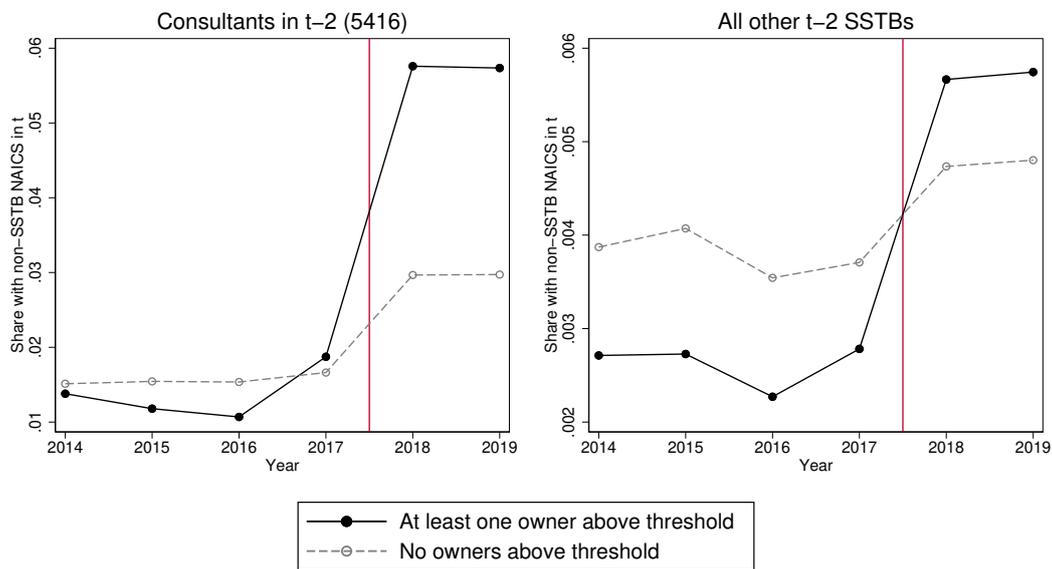
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our S corporation panel. The dependent variable is the ratio of wages paid by S corporations to their shareholders to $t - 2$ gross receipts. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panel A, we exploit the income threshold for identification: treatment is defined as the share of shareholders (weighted by ownership share) whose income at time $t - 2$ is below the bottom of the section 199A income thresholds at which the income limitations apply. The sample is limited to those firms whose industry treatment proxy is less than 0.25. In Panel B, we exploit differences in how the limitations affect eligibility for the deduction across industry for identification. The sample is limited to those firms for whom at least half of shareholders (weighted by ownership share) have income above the top of section 199A income phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, 20 bins of $t - 2$ QBI, and 20 bins of $t - 2$ wages to shareholders scaled by $t - 2$ gross receipts. The dependent variable is winsorized at the 99th percentile of positive values (where the percentiles are defined with respect to the union of the regression samples). See Section III.B.1 for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 8: S corporations and the 199A wage limitation



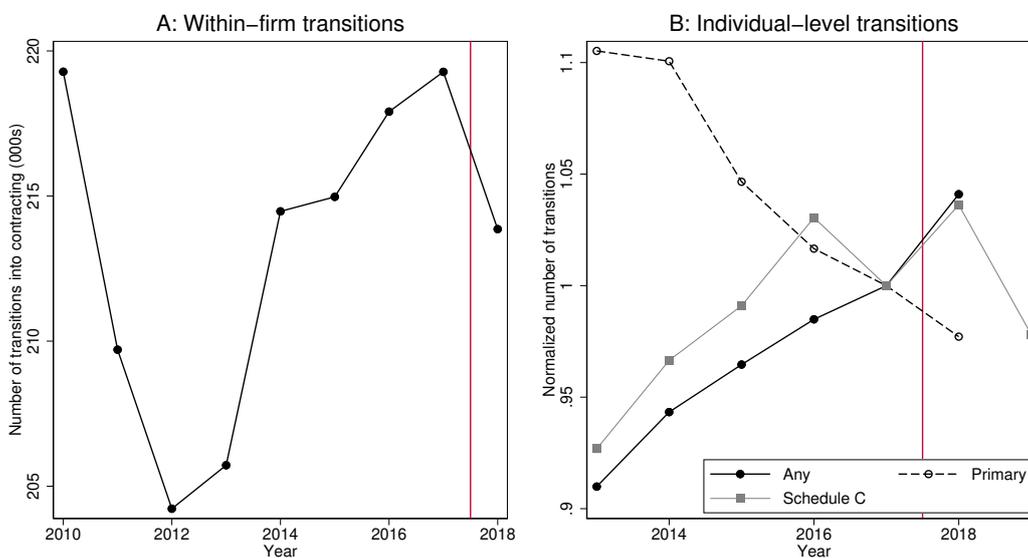
Notes: This figure uses the S corporation panel. In all panels, we restrict attention to firms that (i) were not SSTBs in $t - 2$, and (ii) had a single shareholder in $t - 2$ whose income was above the bottom of the phase-out range. In Panel A, we further restrict to firms that (iii) were bound by the wage limitation in $t - 2$, and (iv) paid zero wages to shareholders in $t - 2$. Panel A plots the share of these firms that pay a positive wage to shareholders at time t . We deem a firm to be “bound” by the wage limitation if total wages paid is less than 20% of potential QBI (hypothetically reducing the owner’s 199A deduction by at least 50%). In Panel B, for firms subject to restrictions (i) and (ii) above, we plot their density with respect to the year- t ratio of their wage constraint (50% of wages) to 20% of potential QBI. Theory predicts an excess mass of firms in 2018-2019 with this ratio approximately equal to one. In Panels C and D, we plot characteristics of firms as a function of this ratio. Panel C plots the mean change in wages to shareholders (t minus $t - 2$) scaled by $t - 2$ gross receipts. Panel D plots the mean change in all other wages (t minus $t - 2$) scaled by $t - 2$ gross receipts. These changes in wages are winsorized at the 1st and 99th percentiles of non-zero values within this sample. All panels were created by the authors using data from the population of tax returns.

Figure 9: NAICS-code switching for S corporations: moving from SSTB to non-SSTB status



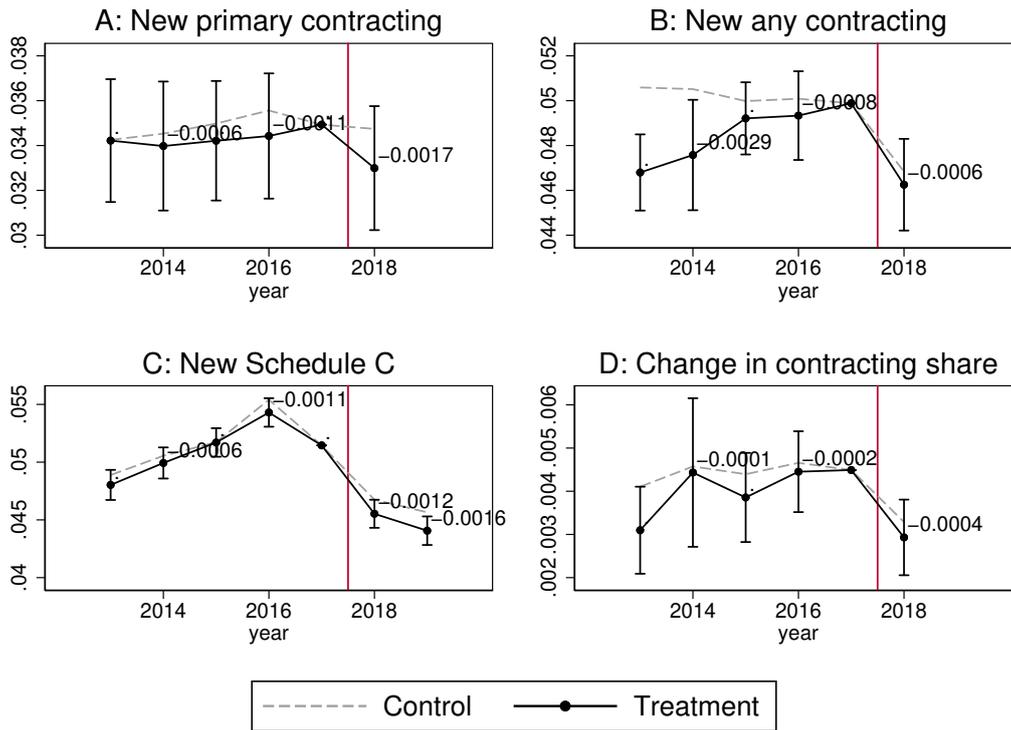
Notes: This figure uses the S Corporation panel. In each panel, we plot the probability of reporting a NAICS code in our set of SSTB NAICS codes (an “SSTB NAICS”) in year t , conditional on reporting a non-SSTB NAICS in year $t - 2$. The solid series in each panel restricts to those firms where at least one owner of the firm had income above the bottom of the phase-out range at time $t - 2$; the dashed series restricts to all other firms. The left panel restricts to those firms that reported a four-digit NAICS code of 5416 at $t - 2$, while the right panel restricts to those firms that reported some other SSTB NAICS code at $t - 2$. We stress that this list of NAICS codes is a modeling approximation. Neither the law nor the regulations define SSTB with reference to NAICS codes, but rather, based on the facts and circumstances of each business. Readers should not infer that this list of NAICS codes represents an interpretation by the Department of the Treasury regarding which businesses would be considered SSTBs. All panels were created by the authors using data from the population of tax returns.

Figure 10: Employee-to-contractor transitions



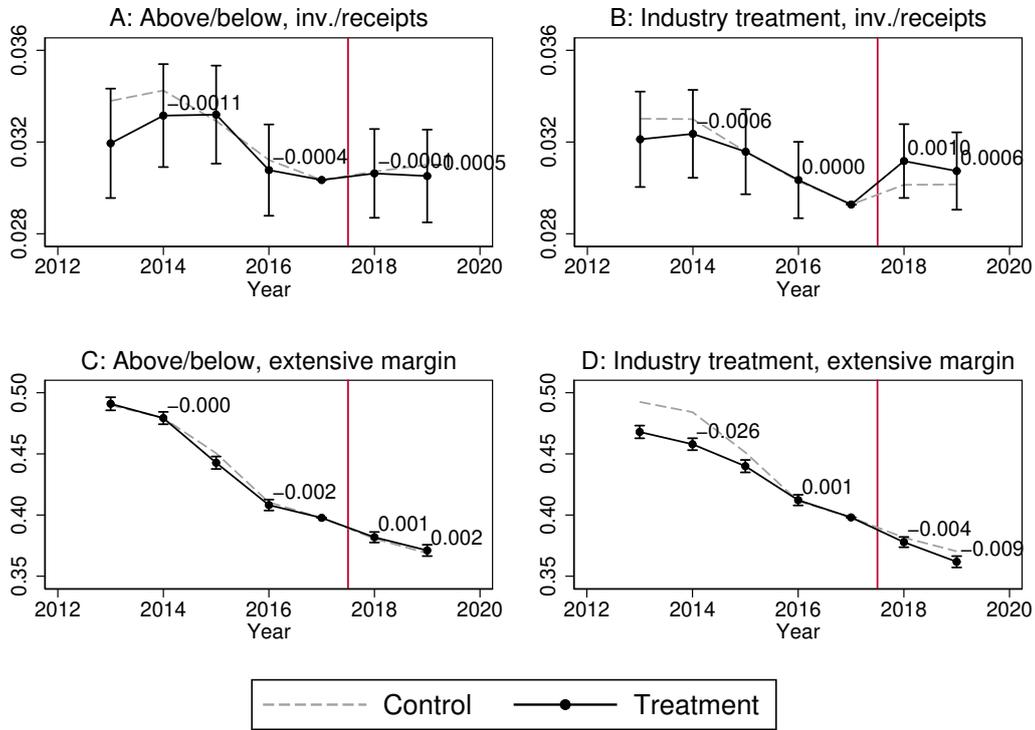
Notes: Panel A shows the total number of individuals who experience within-firm employee-to-contractor reclassifications. A within-firm employee-to-contractor reclassification occurs when an individual receives at least 60 percent of labor income from a given firm in the form of wage income in year $t - 1$ and as 1099-MISC non-employee compensation (NEC) income from the same firm in year t . Panel B uses the individual sample to plot counts of transitions into contractor status (normalized to one in 2017), without requiring that the firm providing the income is the same. We have three definitions of a transition in Panel B. A transition into receiving “any” Form 1099-MISC non-employee compensation (NEC) occurs when an individual receives positive NEC from any firm at time t and zero at time $t - 1$. A transition into “primary” NEC status occurs when NEC comprises more than 50% of labor income (NEC plus wages) at time t and less than 50% at time $t - 1$. A transition into “Schedule C” occurs when Schedule C income is zero at $t - 1$ and non-zero at t . All panels were created by the authors using data from the population of tax returns.

Figure 11: Difference-in-differences: contractor transitions, below income threshold vs. above



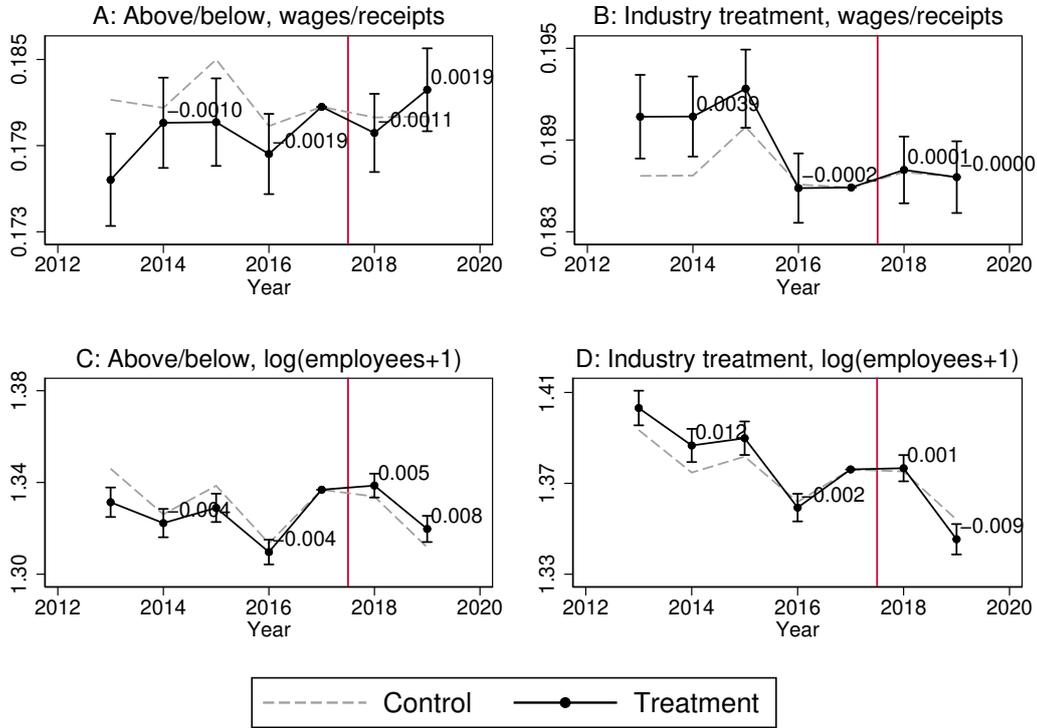
Notes: This figure plots difference-in-differences coefficients for several outcomes related to contractor transitions. We exploit the income threshold for identification: treatment is defined as having taxable income at time $t - 2$ that is below the section 199A income thresholds at which the income limitations apply. The sample is limited to those owners with low levels of our industry treatment proxy whose $t - 2$ taxable income between 50% and 300% of the thresholds excluding those with incomes between 90% and 150%. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In each regression, we control only for year fixed effects and a dummy for $t - 2$ taxable income being below the threshold. A transition into primary contracting status (the dependent variable in Panel A) occurs when Form 1099-MISC non-employee compensation (NEC) comprises more than 50% of labor income (NEC plus wages) at time t and less than 50% at time $t - 1$. A transition into any contracting (the dependent variable in Panel B) occurs when NEC is positive at time t and zero at time $t - 1$. A transition into filing Schedule C (the dependent variable in Panel C) occurs when Schedule C income is zero at $t - 1$ and non-zero at t . The dependent variable in Panel D is the first difference of the ratio of NEC to NEC plus wages. The sample is restricted to those filing a tax return in t and $t - 1$. All panels were created by the authors using data from the population of tax returns.

Figure 12: Effect of 199A exposure on S-corporation investment



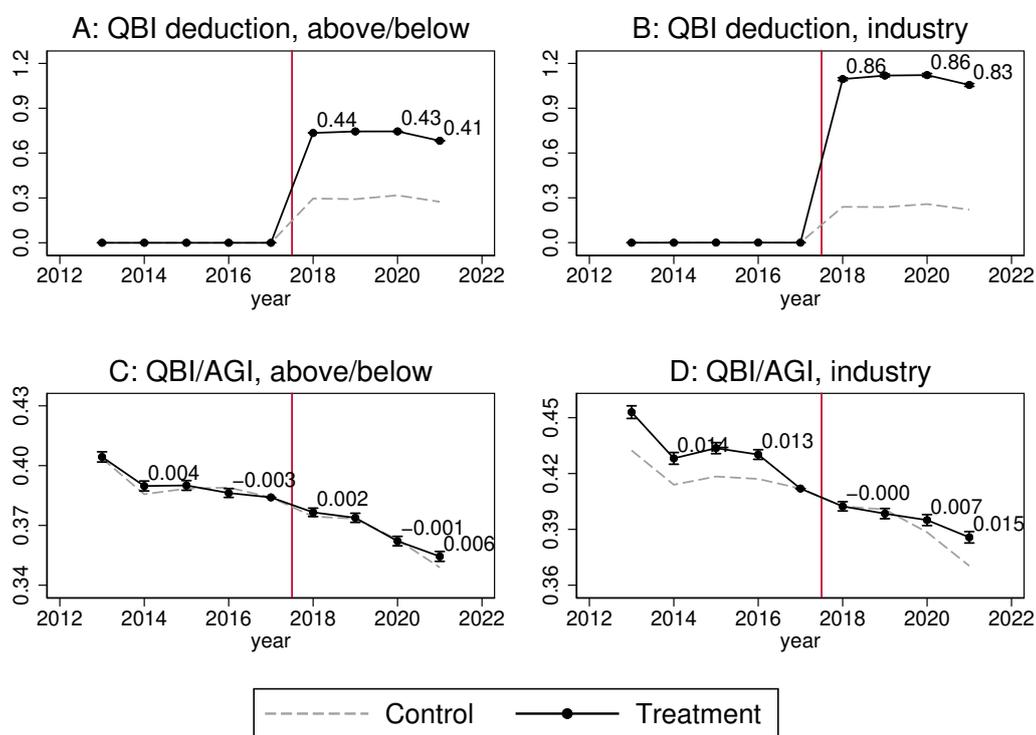
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our S corporation panel. The dependent variable in panels A and B is Form 4562 investment divided by $t - 2$ gross receipts. In Panels C and D, the dependent variable is a dummy for Form 4562 investment being positive. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panels A and C, we exploit the income threshold for identification: treatment is defined as the share of shareholders (weighted by ownership share) whose income at time $t - 2$ is below the bottom of the section 199A income thresholds at which the income limitations apply. The sample is limited to those firms whose industry treatment proxy is less than 0.25. In Panels B and D, we exploit differences in how the limitations affect eligibility for the deduction across industry for identification. The sample is limited to those firms for whom at least half of shareholders (weighted by ownership share) have income above the top of section 199A income phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, 20 bins of $t - 2$ QBI, and 20 bins of $t - 2$ investment scaled by $t - 2$ gross receipts. The dependent variable in Panels A and B is winsorized at the 99th percentile of positive values (where the percentiles are defined with respect to the union of the regression samples). The regression is restricted to those firms that e-filed in t and $t - 2$. See Section III.C for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 13: Effect of 199A exposure on S-corporation employment and wages to non-shareholders



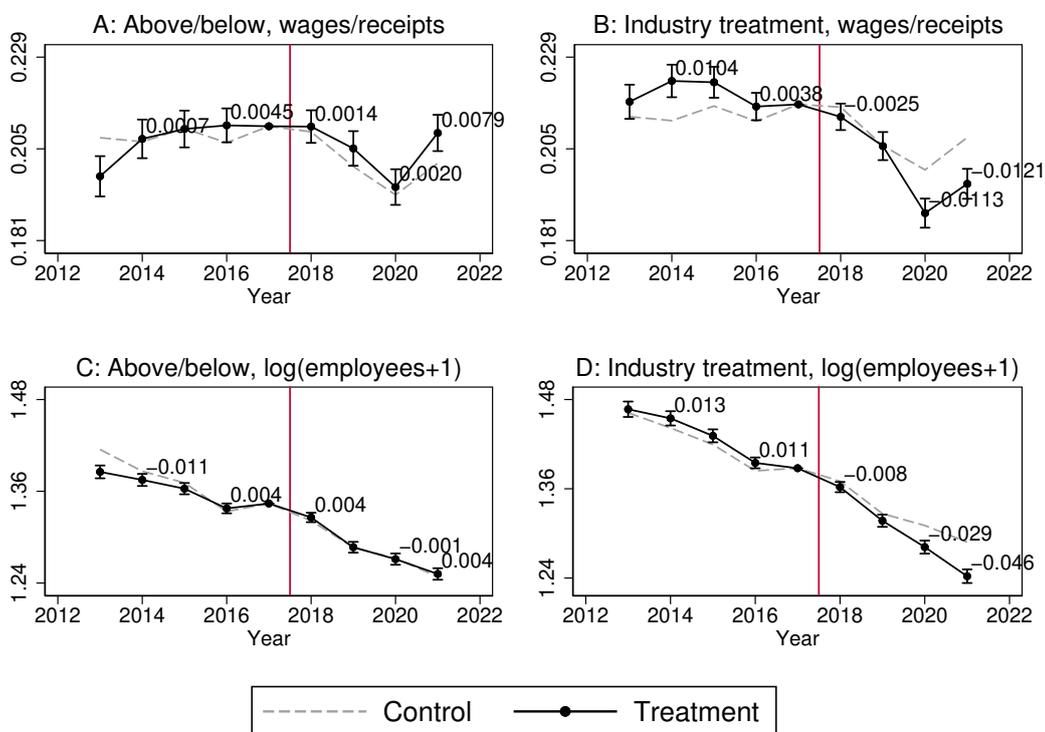
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our S corporation panel. The dependent variable in panels A and B is wages paid to non-shareholder employees divided by $t - 2$ gross receipts. In Panels C and D, the dependent variable is the log of the number of non-shareholder employees plus one. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panels A and C, we exploit the income threshold for identification: treatment is defined as the share of shareholders (weighted by ownership share) whose income at time $t - 2$ is below the bottom of the section 199A income thresholds at which the income limitations apply. The sample is limited to those firms whose industry treatment proxy is less than 0.25. In Panels B and D, we exploit differences in how the limitations affect eligibility for the deduction across industry for identification. The sample is limited to those firms for whom at least half of shareholders (weighted by ownership share) have income above the top of section 199A income phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, 20 bins of $t - 2$ QBI, and 20 bins of the lagged dependent variable; in panels A and B, this is $t - 2$ wages to non-shareholder employees divided by $t - 2$ gross receipts, while in panels C and D it is the number of $t - 2$ non-shareholder employees. The dependent variable in Panels A and B is winsorized at the 99th percentile of positive values (where the percentiles are defined with respect to the union of the regression samples). See Section III.C for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 14: Baseline difference-in-differences, extended to 2021



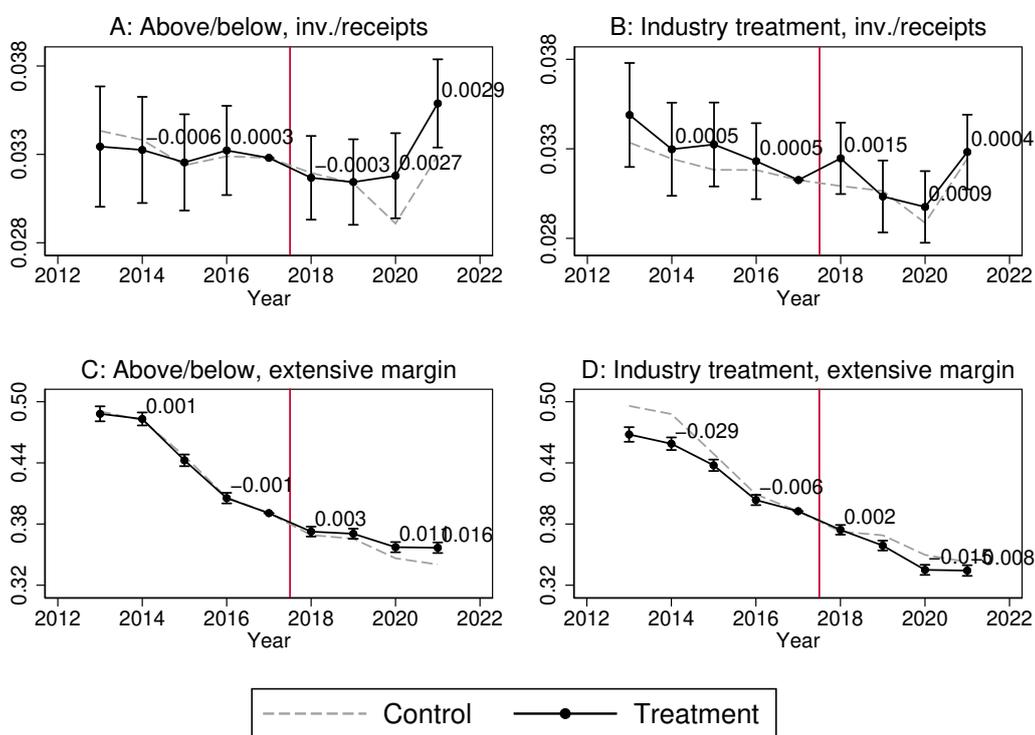
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (4) and (5) using our individual level sample. The dependent variable in Panels A and B is the actual QBI deduction claimed (less that attributed to REIT dividends) divided by 20 percent of our potential QBI measure. The dependent variable in Panels C and D is the ratio of potential QBI to adjusted gross income; this ratio is censored below at zero and above at one. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panels A and C, we exploit the income threshold for identification: treatment is defined as having taxable income at time $t - 4$ that is below the section 199A income thresholds at which the income limitations apply. The sample is limited to those owners with low levels of our industry treatment proxy whose $t - 2$ taxable income between 50% and 300% of the thresholds excluding those with incomes between 90% and 150%. In Panels B and D, we exploit differences in how the limitations affect eligibility for the deduction across industry and entity for identification. The sample is limited to those whose $t - 4$ taxable income is above the section 199A income threshold phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, main $t - 4$ entity type, and 100 bins of $t - 4$ QBI scaled by $t - 4$ AGI. The sample is restricted to those with positive AGI in $t - 4$ and t ; the sample in Panels A and B is additionally restricted to those with positive potential QBI in t . See Section III.D for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 15: Effect of 199A exposure on S-corporation employment and wages to non-shareholders, extended through 2021



Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (4) and (5) using our S corporation panel. The dependent variable in panels A and B is wages paid to non-shareholder employees divided by $t - 4$ gross receipts. In Panels C and D, the dependent variable is the log of the number of non-shareholder employees plus one. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panels A and C, we exploit the income threshold for identification: treatment is defined as the share of shareholders (weighted by ownership share) whose income at time $t - 4$ is below the bottom of the section 199A income thresholds at which the income limitations apply. The sample is limited to those firms whose industry treatment proxy is less than 0.25. In Panels B and D, we exploit differences in how the limitations affect eligibility for the deduction across industry for identification. The sample is limited to those firms for whom at least half of shareholders (weighted by ownership share) have income above the top of section 199A income phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, 20 bins of $t - 4$ QBI, and 20 bins of the lagged dependent variable; in panels A and B, this is $t - 4$ wages to non-shareholder employees divided by $t - 4$ gross receipts, while in panels C and D it is the number of $t - 4$ non-shareholder employees. The dependent variable in Panels A and B is winsorized at the 99th percentile of positive values (where the percentiles are defined with respect to the union of the regression samples). See Sections III.C and III.D for further regression details. All panels were created by the authors using data from the population of tax returns.

Figure 16: Effect of 199A exposure on S-corporation investment, extended to 2021



Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (4) and (5) using our S corporation panel. The dependent variable in panels A and B is Form 4562 investment divided by $t - 4$ gross receipts. In Panels C and D, the dependent variable is a dummy for Form 4562 investment being positive. In each panel, we plot the control means by year and the treatment “mean”, equal to the control mean plus the regression coefficient. The confidence intervals displayed are those of the regression coefficients. Some regression coefficients are labeled as text. In Panels A and C, we exploit the income threshold for identification: treatment is defined as the share of shareholders (weighted by ownership share) whose income at time $t - 4$ is below the bottom of the section 199A income thresholds at which the income limitations apply. The sample is limited to those firms whose industry treatment proxy is less than 0.25. In Panels B and D, we exploit differences in how the limitations affect eligibility for the deduction across industry for identification. The sample is limited to those firms for whom at least half of shareholders (weighted by ownership share) have income above the top of section 199A income phase-outs and treatment is defined using our industry treatment proxy. Each regression includes fixed effects for the three-way interaction of year, 20 bins of $t - 4$ QBI, and 20 bins of $t - 4$ investment scaled by $t - 4$ gross receipts. The dependent variable in Panels A and B is winsorized at the 99th percentile of positive values (where the percentiles are defined with respect to the union of the regression samples). The regression is restricted to those firms that e-filed in t and $t - 4$. See Sections III.C and III.D for further regression details. All panels were created by the authors using data from the population of tax returns.

Table 1: Summary statistics: individual sample

	Mean	Median	Standard Deviation	Fraction with nonzero value
<i>Panel A: full sample (N = 97,056,400)</i>				
Potential QBI	5,758	0	279,459	0.21
Adjusted gross income (AGI)	68,435	34,962	575,638	0.82
Potential QBI / AGI	0.08	0.00	0.23	0.18
QBI from Scheds. C and F	2,229	0	69,400	0.16
QBI from S corps/partnerships	3,529	0	270,216	0.07
Form 1099-MISC non-employee comp.	1,837	0	2,809,044	0.07
Form W-2 wages	31,151	11,365	127,924	0.63
<i>Panel B: industry treatment group (N = 2,458,400)</i>				
Potential QBI	458,711	109,154	3,911,058	0.96
Adjusted gross income (AGI)	1,458,110	665,734	6,351,818	1.00
Potential QBI / AGI	0.33	0.20	0.34	0.74
QBI from Scheds. C and F	18,690	0	303,991	0.31
QBI from S corps	332,023	0	3,553,158	0.60
QBI from partnerships	107,997	0	1,643,749	0.71
Treatment proxy ($Treat_{it}$)	0.66	0.68	0.21	1.00
<i>Panel C: industry control group (N = 2,195,100)</i>				
Potential QBI	414,610	133,687	2,231,009	0.94
Adjusted gross income (AGI)	1,291,526	643,619	6,288,873	1.00
Potential QBI / AGI	0.37	0.23	0.38	0.80
QBI from Scheds. C and F	98,832	0	597,106	0.52
QBI from S corps	106,754	0	1,315,104	0.33
QBI from partnerships	209,024	0	1,603,959	0.59
Treatment proxy ($Treat_{it}$)	0.04	0.00	0.06	0.61
<i>Panel D: above/below treatment group (N = 3,833,000)</i>				
Potential QBI	77,540	27,648	147,667	0.89
Adjusted gross income (AGI)	249,375	230,431	350,988	1.00
Potential QBI / AGI	0.31	0.14	0.36	0.73
QBI from Scheds. C and F	48,128	3,315	105,728	0.68
QBI from S corps	15,931	0	78,858	0.21
QBI from partnerships	13,481	0	83,945	0.25
Treatment proxy ($Treat_{it}$)	1.00	1.00	0.00	1.00
<i>Panel E: above/below control group (N = 1,184,200)</i>				
Potential QBI	262,771	124,963	464,796	0.94
Adjusted gross income (AGI)	691,721	611,358	846,931	1.00
Potential QBI / AGI	0.38	0.24	0.37	0.81
QBI from Scheds. C and F	83,267	0	236,440	0.53
QBI from S corps	69,393	0	300,877	0.33
QBI from partnerships	110,111	0	329,140	0.56
Treatment proxy ($Treat_{it}$)	0.04	0.00	0.06	0.59

Notes: See Section II for our sample and variable definitions. Panel A includes the entire sample, while Panels B through E restrict to the samples used the regressions underlying Figure 4. For this table only, we assign individuals in the industry sample to the treatment group (Panel B) if their aggregated industry treatment proxy is greater than 0.2, and to the control group (Panel C) if it is less than 0.2. Panels B through E are limited to observations with positive AGI. Observation counts are rounded to the nearest hundred. To protect taxpayer privacy, medians are equal to the mean of all observations between the 49.9th and 50.1th percentiles. All dollar values are adjusted for inflation to 2018 levels. Sample weights are used everywhere except for reported observation counts. The table was created by the authors using data from the population of tax returns.

Table 2: S-corporation panel: summary table

<i>Panel A: full sample</i> ($N = 31,497,400$)	Mean	Median	Standard Deviation	Fraction with nonzero value
Number of shareholders	1.55	1.00	2.21	0.97
Gross receipts	1,575,611	175,264	30,511,204	0.83
Wages to shareholders	51,520	1,141	437,358	0.50
QBI	108,814	10,521	38,067,047	0.94
Investment	46,724	0	43,681,128	0.40
Number of non-sh. employees	10	0	162	0.42
<i>Panel B: industry treatment group</i> ($N = 2,934,100$)				
Number of shareholders	1.98	1.00	2.53	0.99
Gross receipts	7,816,879	789,866	75,836,143	0.74
Wages to shareholders	138,187	0	632,824	0.49
QBI	451,082	58,082	5,484,131	0.96
Investment	157,338	0	2,469,322	0.48
Number of non-sh. employees	40	1	446	0.53
Treatment proxy ($Treat_{jt}$)	0.84	0.86	0.10	1.00
<i>Panel C: industry control group</i> ($N = 1,024,700$)				
Number of shareholders	1.57	1.00	2.29	0.99
Gross receipts	2,567,657	710,459	41,084,147	0.83
Wages to shareholders	251,845	96,124	2,005,634	0.67
QBI	324,685	86,167	8,407,327	0.96
Investment	37,981	0	786,250	0.47
Number of non-sh. employees	15	2	221	0.57
Treatment proxy ($Treat_{jt}$)	0.06	0.00	0.14	0.23
<i>Panel D: above/below treatment group</i> ($N = 4,014,900$)				
Number of shareholders	1.31	1.00	1.43	0.97
Gross receipts	565,312	182,857	8,118,875	0.88
Wages to shareholders	53,264	18,000	182,026	0.60
QBI	52,711	16,234	5,998,497	0.94
Investment	11,332	0	230,469	0.39
Number of non-sh. employees	5	0	60	0.45
Treatment proxy ($Treat_{jt}$)	0.98	1.00	0.08	1.00
<i>Panel E: above/below control group</i> ($N = 998,100$)				
Number of shareholders	1.55	1.00	2.31	0.99
Gross receipts	2,596,053	714,428	41,603,623	0.83
Wages to shareholders	254,573	97,905	2,031,384	0.67
QBI	330,715	89,300	8,517,397	0.96
Investment	38,409	0	795,771	0.47
Number of non-sh. employees	15	2	223	0.57
Treatment proxy ($Treat_{jt}$)	0.05	0.00	0.12	0.21

Notes: This table displays summary statistics from the S-corporation panel. See Section II for our sample and variable definitions. Panel A includes the entire sample, while Panels B through E restrict to the samples used in the regressions underlying Figure 7. Observation counts are rounded to the nearest hundred. For the sake of this table, the industry treatment group (Panel B) is defined as those with an industry treatment proxy greater than 0.25, while the industry control group (Panel C) is defined as all other firms that satisfy the industry sample restriction. For the sake of this table, the above/below treatment group (Panel D) is defined as those firms where at least half of $t - 2$ shareholders (weighted by ownership share) are below the top of the 199A income phase-out range, while the above/below control group (Panel E) is defined as all other firms that satisfy the above/below sample restrictions. To protect taxpayer privacy, medians are equal to the mean of all observations between the 49.9th and 50.1th percentiles. The table was created by the authors using data from the population of tax returns.

Table 3: New 2018 contractor 199A claiming

	Probability of Claiming 199A							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
New 2018 Primary Contractor (PC)	-0.082 (0.002)	-0.042 (0.001)	-0.092 (0.002)	-0.046 (0.001)	-0.041 (0.002)	-0.023 (0.002)	-0.047 (0.003)	-0.027 (0.002)
Reference group	-----PCs in 2017 and 2018-	X	-----PCs in 2017 and 2018-	X	- New PCs in 2017, continuing 2018 -	X	- New PCs in 2017, continuing 2018 -	X
Controls	All	All	Below	Below	All	All	Below	Below
Sample								
New 2018 Any Contractor Income (ACI)	-0.116 (0.001)	-0.110 (0.001)	-0.127 (0.001)	-0.124 (0.001)	-0.054 (0.002)	-0.051 (0.002)	-0.064 (0.002)	-0.061 (0.002)
Reference group	-----ACI in 2017 and 2018-	X	-----ACI in 2017 and 2018-	X	- New ACI in 2017, continuing 2018 -	X	- New ACI in 2017, continuing 2018 -	X
Controls	All	All	Below	Below	All	All	Below	Below
Sample								

Notes: This table reports coefficients from regressing an indicator for claiming the QBI deduction in 2018 on a measure of being a new contractor in 2018. Each cell is a separate regression. In the top row, the measure of being a new contractor is being a new *primary* contractor – that is, earning more than 60% of labor income from contracting in t and less than 40% in $t - 1$. The reference group is comprised of individuals who were primary contractors (earning more than 60% of labor income from contracting) in both 2017 and 2018. In the next row, the measure of being a new contractor is having *any* contracting income in 2018 but not 2017. The reference group consists of individuals who had contracting income in both 2017 and 2018. Standard errors are shown below coefficient estimates. Odd columns have no controls while even columns have controls for contractor income, taxable income, and demographic characteristics. Columns 1-4 are as described, while columns 5-8 further limit the reference groups to those who were new contractors (new primary contractors in the top row, and new any contractors in the second row) in 2017 and continued in 2018. Columns 1-2 and 5-6 make no income exclusion, while columns 3-4 and 7-8 restrict the sample to individuals with income below the 199A limitations threshold. Standard errors are robust to heteroskedasticity. This table was created by the authors using data from the population of tax returns.

A Estimating and validating SSTB status

In this Appendix, we describe and validate how we classify businesses as SSTB or non-SSTB. To distinguish SSTB vs. non-SSTB owners in year t , we use year $t - 2$ data. We first look to the business's reported NAICS code and use our best judgement to match NAICS codes to the definitions of SSTBs described in the statute and the regulations.³⁵ This inevitably results in some misclassification, as NAICS codes do not correspond cleanly with SSTB status, which depends on the facts and circumstances of the business. Moreover, one entity for tax purposes may consist of multiple trades or businesses, some of which may be SSTBs and some of which may not. Since our data are at the tax-entity level, we cannot observe this complexity. This mismeasurement of SSTB status implies that our difference-in-differences regression frameworks are slightly biased towards null results.

We assess the accuracy of our SSTB classification by examining claiming behavior in 2018 and 2019 among restricted sets of taxpayers who are potentially affected by the SSTB limitation and for whom we can cleanly identify the amount of QBI deduction attributable to a certain business. We do so for two sets of taxpayers. First, we restrict to the universe of tax units in 2018 and 2019 who (1) have contemporaneous pre-section-199A taxable income above the top of the phase-out range, (2) own exactly one pass-through business,³⁶ (3) have positive potential QBI, and (4) in the case of 2019 observations, did not experience any pass-through losses in 2018. For the individuals included in this sample, the SSTB and wage/capital restrictions are in full effect, and we can cleanly map the QBI used for the QBI deduction to a specific business.³⁷

Second, we make use of Form 8995-A, which is filed by taxpayers in or above the phase-out region to compute the section 199A deduction. Beginning in 2019, taxpayers report the necessary information – including whether the taxpayer is treating it as an SSTB – for each trade or business (or each aggregation of trades or businesses) in order to compute the deduction amount attributable to each business. Furthermore, each trade or business is identified by an EIN if it has one, which allows us to merge in reported NAICS codes from the business's tax return (e.g., Form 1120-S). We use these data to directly estimate the share of businesses in each industry that individual taxpayers report being SSTBs. However, an important limitation of this data is that taxpayers *above* the 199A phase-out region tend not to report any information about their SSTBs because such businesses are always ineligible for section 199A for these taxpayers. Therefore, we solely analyze taxpayers in the interior of the income phase-out range for this exercise.

The two columns of Appendix Table A1 show the results of the first and second exercise, respectively, by selected industries. We divide the NAICS codes into those that are likely to be SSTBs, a few that could be considered borderline or a mix of SSTB and non-SSTB businesses (but which we classify as non-SSTB throughout the rest of this paper), and a few that are likely to be non-SSTB businesses. For example, consider NAICS 523 (securities and other financial investments), the first row in the table. In column 1, we restrict to those individuals with income above the top of the income phase-out range and whose only source of pass-through income is a business from NAICS code 523. Among these

³⁵We stress that the list of SSTB NAICS codes we use – and the use of NAICS codes at all – is a modeling approximation. Neither the law nor the regulations define SSTB with reference to NAICS codes, but rather, based on the facts and circumstances of each business. Readers should not infer that this list of NAICS codes represents an interpretation by the Department of the Treasury regarding which businesses would be considered SSTBs.

³⁶This restriction requires that the tax unit either has a single Schedule C, a Schedule F, or ownership in exactly one partnership or S corporation.

³⁷There are approximately 240,000 such tax units in 2018 and 192,000 in 2019. Approximately 58% of such tax units correspond to a Schedule C, while 16% own an S corporation, 25% own a partnership, and less than 1% file a Schedule F.

individuals, we estimate that the QBI deduction was equal to 6.6% of the theoretical maximum (20% of QBI). That is, some combination of the SSTB denial and the wage and capital limitations reduced the QBI deduction by 93.4% among this group. In column 2, we restrict to taxpayers in the interior of the income phase-out range, where we can observe whether a given individual treats a given business as SSTB or not. Among such individuals, 48.4% treated their NAICS 523 business as non-SSTB (or, equivalently, 51.6% treated it as SSTB). With some exceptions, this table shows that in industries that we classify as SSTB, potential QBI tends to produce a much smaller QBI deduction (column 1), and most taxpayers indeed report such businesses as SSTBs.

Table A1: 2018 and 2019 section 199A deductions among high-income owners of exactly one business

	NAICS code	Deduction share (one business) (1)	Non-SSTB share (Form 8995-A) (2)
SSTBs			
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	523	0.066	0.573
Hospitals	622	0.049	0.313
Legal Services	5411	0.039	0.255
Accounting, Tax Preparation, Bookkeeping, and Payroll Services	5412	0.017	0.297
Management, Scientific, and Technical Consulting Services	5416	0.083	0.767
Offices of Physicians	6211	0.035	0.348
Offices of Dentists	6212	0.070	0.284
Offices of Other Health Practitioners	6213	0.096	0.491
Outpatient Care Centers	6214	0.266	0.649
Veterinary Services	54194	0.120	0.458
Borderline SSTBs			
Nursing and Residential Care Facilities	623	0.385	0.940
Performing Arts, Spectator Sports, and Related Industries	711	0.065	0.791
Motion Picture and Video Industries	5121	0.337	0.885
Architectural, Engineering, and Related Services	5413	0.573	0.961
Specialized Design Services	5414	0.314	0.934
Computer Systems Design and Related Services	5415	0.444	0.913
Home Health Care Services	6216	0.478	0.870
Other Ambulatory Health Care Services	6219	0.139	0.774
Lessors of Nonfinancial Intangible Assets	53311	0.775	0.969
Non-SSTBs			
Manufacturing	31	0.760	0.992
Wholesale Trade	42	0.590	0.988
Construction of Buildings	236	0.684	0.990
Newspaper, Periodical, Book, and Directory Publishers	5111	0.651	0.976
Restaurants and Other Eating Places	7225	0.838	0.991

Notes: Column 1 reports the section 199A claiming ratio among several industries in a restricted sample of individuals who (1) have contemporaneous pre-section-199A taxable income above the top of the phase-out range, (2) own exactly one business, (3) have positive potential QBI, and (4) in the case of 2019 observations, did not experience any pass-through losses in 2018. The section 199A claiming ratio is claimed QBI to potential QBI, where claimed QBI equals the lesser of potential QBI or the actual 199A deduction (less the REIT dividend component) divided by 0.2. We use data from 2018-2019 in column 1. Column 2 reports the share of individual-by-firm observations (weighted by potential QBI) that are treated by individuals as non-SSTB on Form 8995-A, restricting to taxpayers whose contemporaneous pre-section-199A taxable income is in the interior of the phase-out range. We use data from 2019-2021 in column 2. We divide codes into those that are likely to be SSTBs, a few that might be more borderline, and a few that are likely to be non-SSTB businesses. We stress that this list of NAICS codes is a modeling approximation. Neither the law nor the regulations define SSTB with reference to NAICS codes, but rather, based on the facts and circumstances of each business. Readers should not infer that this list of NAICS codes represents an interpretation by the Department of the Treasury regarding which businesses would be considered SSTBs. This table was created by the authors using data from the population of tax returns.

B Alternative Specifications

In this appendix, we report results under a number of alternative specifications that measure the effects of 199A. These alternative specifications yield results that are qualitatively similar to our baseline specifications.

B.1 Effect of Controls

Our baseline specifications control for a three-way interaction between lagged year, an indicator for the entity type that the individual receives the majority of their income from, and the dependent variable (the share of AGI that comes from potential QBI). Figure B1 shows the effect of sequentially adding these controls for our two specifications. Plotted are the coefficient estimates of the treatment effect where 2017 is the reference year. As Panel A suggests, adding a control for the lagged value of the dependent variable does not change the estimates much, but adding the control for the entity type increases the estimates a bit to our baseline economically small but statistically significant effects. Panel B shows that controlling for the lagged dependent value is very important for ensuring parallel pre-trends between treated and control individuals. The variation in this specification is coming from industry-level eligibility for 199A so the no-control line implies that high-income owners in industries where 199A is not likely to be limited have faster growing shares of QBI than owners in industries that are predicted to be limited. Controlling for the lagged dependent variable flattens this trend and the extra entity-type controls do not change the estimates much. Even without controls, though, 2018 and 2019 do not look very different from the pre-existing trend.

B.2 Alternative measures of pass-through income

In our baseline results, we use the share of AGI that comes from QBI as our outcome measure. Here we explore two alternative outcomes. The first is potential QBI in levels, with non-zero values Winsorized at the 1 percent and 99 percent levels. The second is a noise-reducing transformation of potential QBI known as the inverse hyperbolic sine (IHS) (Pence, 2006). For potential QBI that is positive and not close to zero, the IHS is close to the natural logarithm (plus a constant).³⁸ These alternative measures will be able to capture increases in potential QBI among individuals who receive all of their income from QBI, which our baseline specification would treat as no change. Potential QBI in levels is most transparent, but this specification has the potential to be driven by the tails of the distribution, increasing variance. The IHS specification mitigates this problem in the tails, at the cost of the results being more difficult to interpret and perhaps sensitive to the units of measurement of potential QBI.

Figure B2 shows the results of our two difference-in-differences strategies for potential QBI in levels. When we compare owners below the income threshold to those above it (Panel A), we see that the average levels of potential QBI follow each other closely before the tax law change, and we see little difference after, with tightly estimated treatment effects. In Panel B, we show the estimated effect of 199A on potential QBI, comparing high-income owners with varying aggregated industry treatment proxies. Here we see that the treated group has higher levels of QBI in the years prior 2017 and close to the same level of QBI after the tax change. The results are a bit noisy but do not suggest an increase in potential QBI among treated owners relative to the control group.

³⁸In particular, the inverse hyperbolic sine is $\ln(QBI + \sqrt{QBI^2 + 1})$, where we scale QBI in thousands of dollars.

In Figure B3, we present results for the inverse hyperbolic sine transformation of potential QBI. The difference-in-differences specification comparing owners above and below the income threshold (Panel A) shows that 2018 and 2019 changes are not statistically different from zero, and we see the two series following closely prior to 2017. In Panel B, the comparison between owners with different levels of aggregated industry treatment proxy is noisier, but the 2018 and 2019 estimates are relatively small in magnitude and negative in sign.

B.3 Alternative QBI Measure

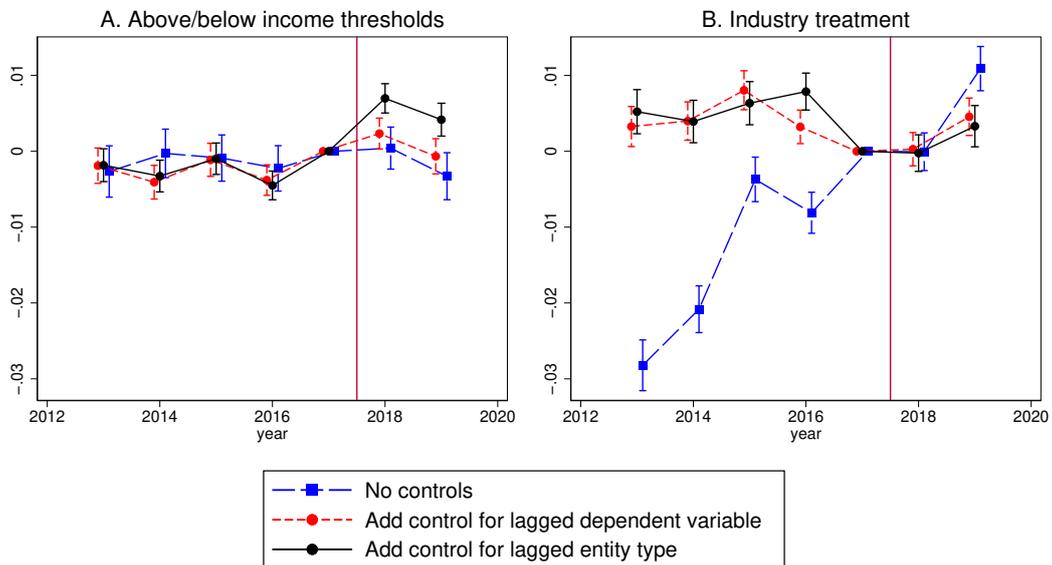
Next, we redo our original analyses using an alternative definition of potential QBI that includes Schedule E rental income. While such income may be eligible for the section 199A deduction, it has to rise to the level of a trade or business to qualify for the deduction. Our baseline QBI measures exclude Schedule E rental income, which around 22 percent of our regression samples have. If the subset of this income that is eligible for 199A is particularly responsive to the deduction, our baseline results may be biased towards finding null results. However, Figure B4 shows that our difference-in-difference results under the alternative income definition are almost identical to our baseline results.

B.4 Wages to S-corporation shareholders

Finally, we test whether section 199A's effect on S-corporation shareholder wages was greater among single-shareholder firms where it may have been less costly to adjust owner compensation.

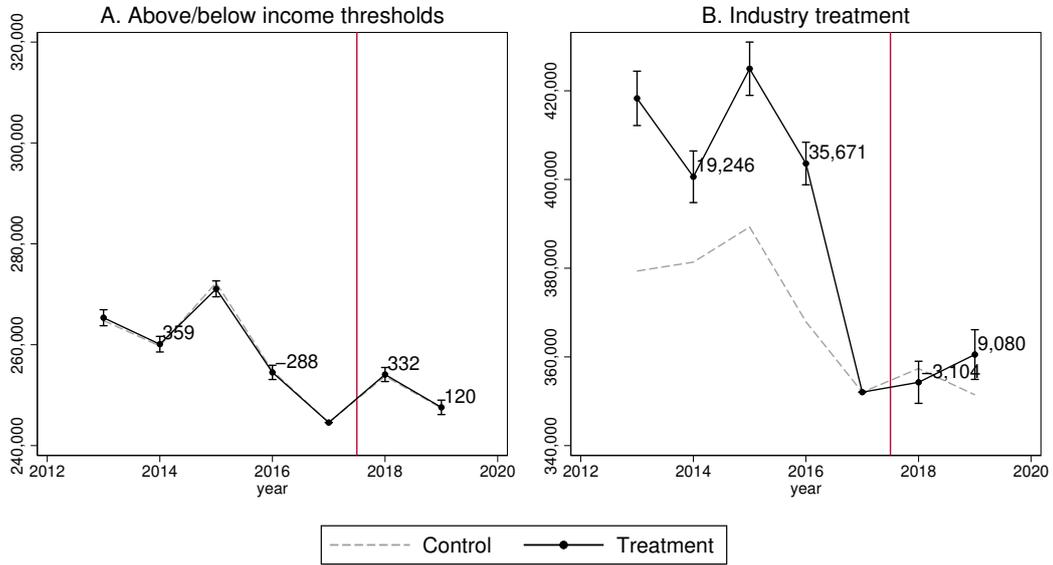
We repeat the specifications described in Section III.B.1 but limit our S-corporation sample to those with only one owner in $t - 2$. As shown in Panel A, owners with income below the income threshold were increasing the share of gross receipts paid out to their owners faster than owners of S corporations with higher incomes before 2017. The 2018 and 2019 estimates are negative but are economically small and statistically insignificant. Panel B shows a similar result with treated owners generally having lower shares of wages paid out as a share of gross receipts but no real change in 2018 or 2019. Taken together these results do not suggest that the additional incentives within 199A to reduce S-corporation owner wages had much effect on owner wages paid. As discussed in the text, owners may have already been paying themselves as little wages as they deemed possible given the rules regarding reasonable compensation.

Figure B1: Difference-in-differences: effect of section 199A deduction on potential QBI scaled by AGI, with different control variables



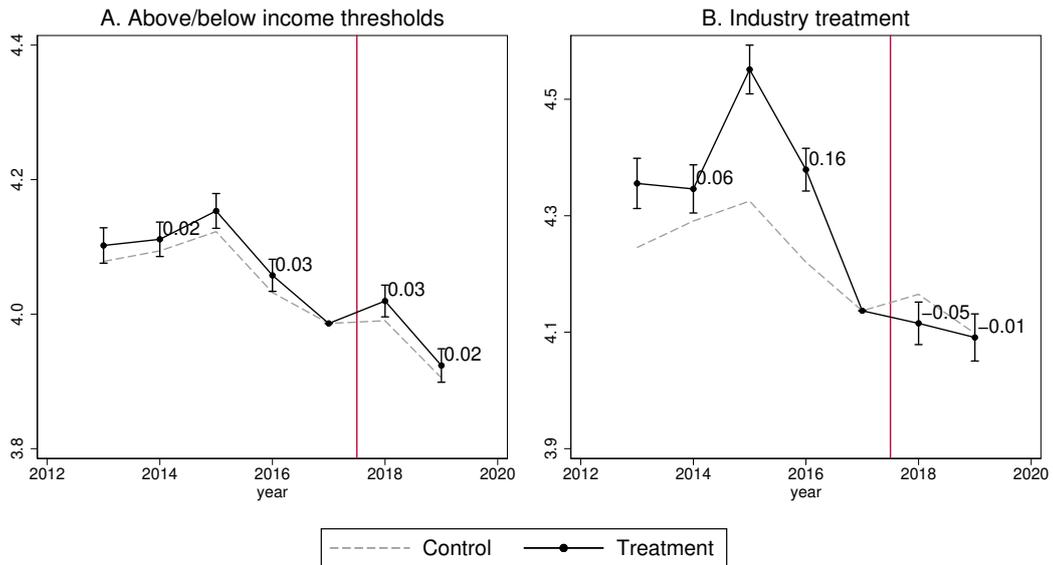
Notes: This figure presents regression estimates of the year-specific treatment effects (β_t) in equations (1) and (2) using our individual level sample. The dependent variable is the ratio of potential QBI to adjusted gross income; this ratio is censored below at zero and above at one. Each panel contains three series, each with varying levels of controls. The dashed blue series includes only a year fixed effect in X_{it} in addition to the fixed treatment variable ($Below_{i,t-2}$ or $f(z_{i,t-2}^{ABOVE})$ depending on the specification). The dotted red series replaces the year fixed effects with the two-way interaction of year and 100 bins of the lagged ($t - 2$) dependent variable. The solid black line adds an interaction with the dominant lagged ($t - 2$) entity type; this represents the specifications plotted in Figure 4. See also the notes to Figure 4. All figures were created by the authors using data from the population of tax returns.

Figure B2: Difference-in-differences: effect of section 199A deduction on potential QBI in levels



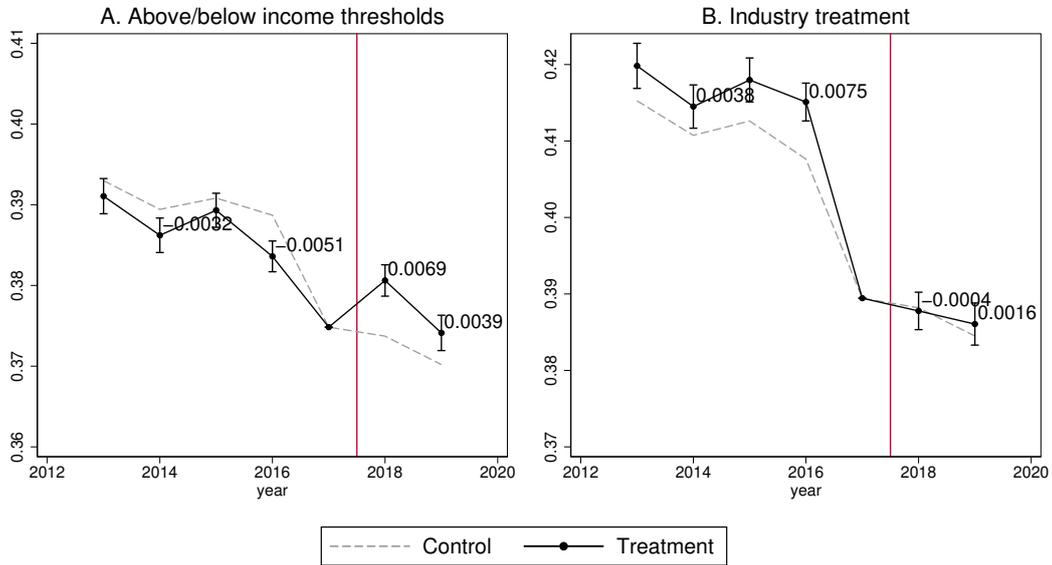
Notes: This figure presents results analogous to those in Figure 4, except that the dependent variable is the amount of potential QBI, in levels. The dependent variable is Winsorized at the 1st and 99th percentiles of non-zero values, where the percentiles are defined with respect to the union of the two regression samples. See also the notes to Figure 4. All panels were created by the authors using data from the population of tax returns.

Figure B3: Difference-in-differences: effect of section 199A deduction on potential QBI, transformed using the inverse hyperbolic sine



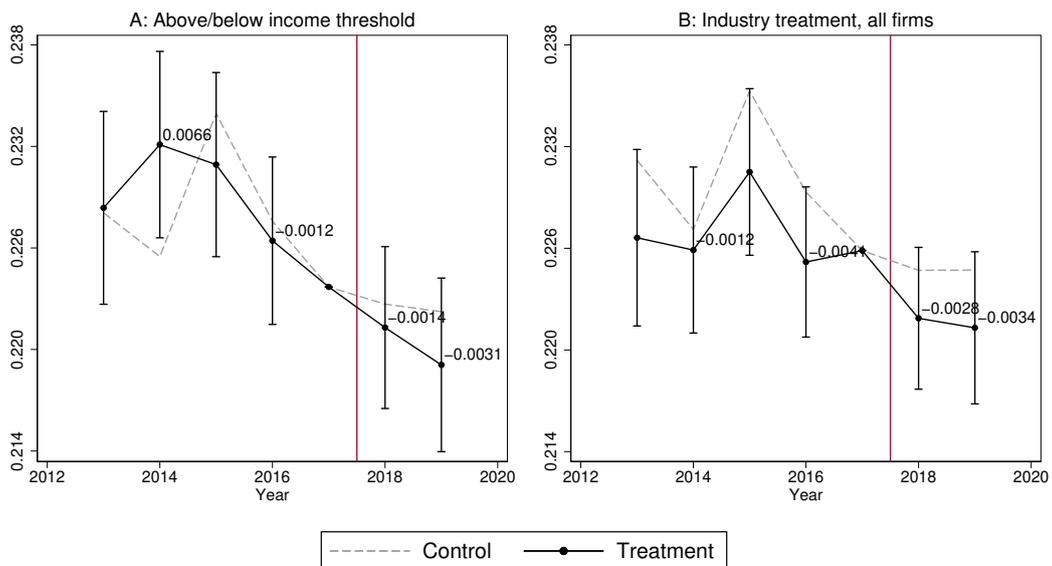
Notes: This figure presents results analogous to those in Figure 4, except that the dependent variable is the inverse hyperbolic sine of potential QBI (with potential QBI scaled in thousands of dollars). See also the notes to Figure 4. All panels were created by the authors using data from the population of tax returns.

Figure B4: Difference-in-differences: effect of section 199A deduction on potential QBI scaled by AGI, adding rents and royalties



Notes: This figure presents results analogous to those in Figure 4, except that potential QBI is defined to include Schedule E rental and royalty income in addition to the income included in the baseline measure in Figure 4. See also the notes to Figure 4. All panels were created by the authors using data from the population of tax returns.

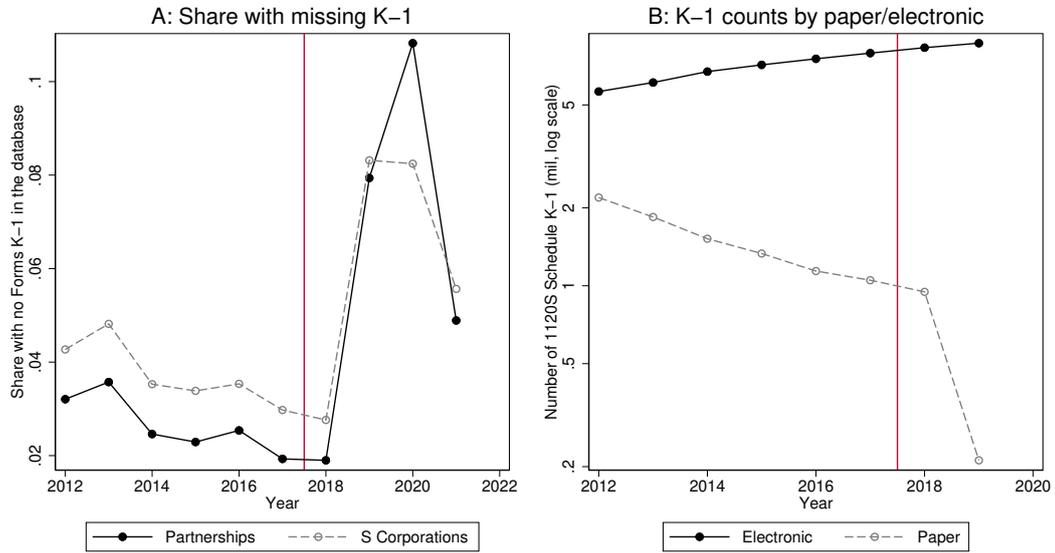
Figure B5: Difference-in-differences: Wages to shareholders of S corporations, restricting to single-shareholder firms



Notes: This figure presents results analogous to Figure 7, except that it restricts to S corporations with one shareholder at $t - 2$. See also the notes to Figure 7. All panels were created by the authors using data from the population of tax returns.

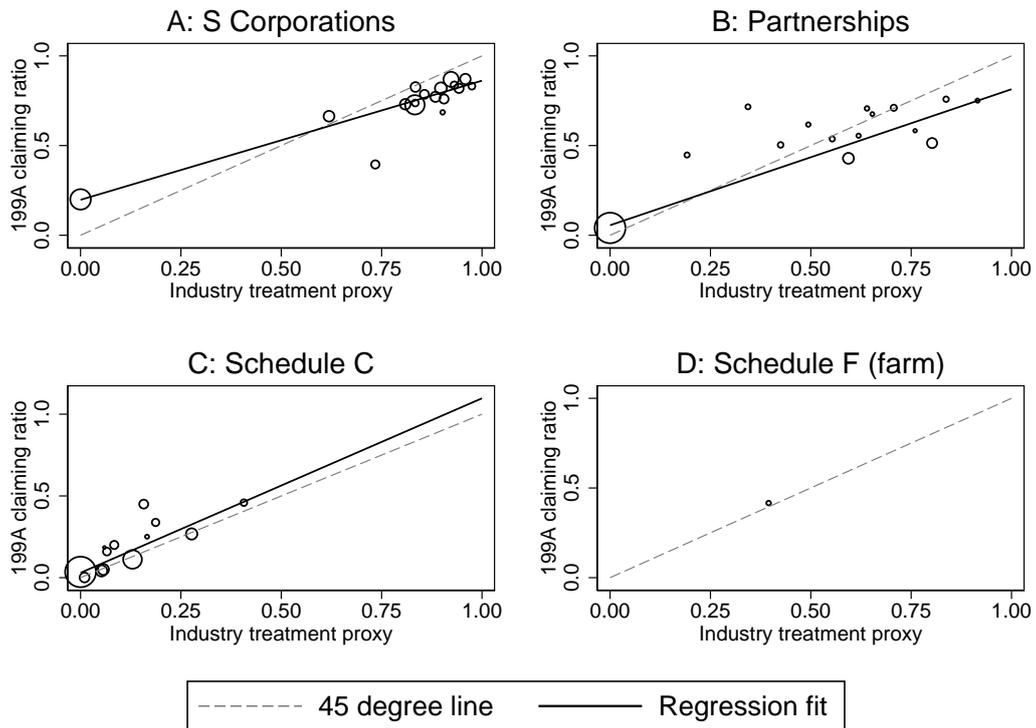
C Additional Figures and Tables

Figure C1: Share of partnerships and S corporations without Forms K-1 in the database.



Notes: Panel A plots the share of Forms 1120S (S corporations) and 1065 (partnerships) where we are unable to find any Schedules K-1 in the database of administrative tax returns. We restrict to firms whose tax year follows the calendar year. Panel B plots counts of distinct S corporations or partnerships with an electronically-filed or paper-filed Schedule K-1 in the database, by year. The y axis in Panel B uses a log scale. Note that the lack of a Schedule K-1 in the database does not imply that the firm did not file Schedule K-1. This figure was created by the authors using data from the population of tax returns.

Figure C2: Scatter of industry treatment proxy against claiming ratio in restricted sample.



Notes: This figure plots entity-type-specific binned scatter plots of the section 199A claiming ratio against the industry treatment proxy. This figure uses a restricted sample of individuals in 2018 and 2019 who (1) have contemporaneous income above the top of the section 199A phase-out range, (2) own exactly one business, (3) have positive potential QBI, and (4) in the case of 2019 observations, did not experience any pass-through losses in 2018. The 199A claiming ratio is claimed QBI divided by potential QBI, where claimed QBI equals the lesser of (a) the actual 199A deduction (less the REIT dividend component) divided by 0.2, or (b) potential QBI. In each panel we plot the 45 degree line and the (within-entity-type) regression fit. In Panels A, B, and C, observations at the 6-digit-industry level are grouped into roughly 20 quantiles based on the industry treatment estimate, using the owners' aggregate potential QBI as weights. The size of the scatter points corresponds to their potential QBI. All Schedule F filers are deemed to be in the same industry, so Panel D contains only one scatter point. All panels were created by the authors using data from the population of tax returns.

Table C1: Section 199A deductions by income group: 2018

	Returns with positive potential QBI (thousands) (1)	Total positive potential QBI (millions) (2)	Returns with 199A deduction (thousands) (3)	Total 199A deduction (millions) (4)
AGI ≤ \$0	704	32,991	1	215
\$0 < AGI ≤ \$5,000	1,500	5,556	33	17
\$5,000 < AGI ≤ \$10,000	1,762	11,444	19	23
\$10,000 < AGI ≤ \$15,000	2,720	26,574	465	173
\$15,000 < AGI ≤ \$20,000	1,897	22,037	730	512
\$20,000 < AGI ≤ \$25,000	1,383	18,006	692	716
\$25,000 < AGI ≤ \$30,000	1,167	15,744	848	980
\$30,000 < AGI ≤ \$40,000	2,001	29,096	1,511	2,570
\$40,000 < AGI ≤ \$50,000	1,754	26,518	1,342	2,926
\$50,000 < AGI ≤ \$75,000	3,735	59,867	2,879	7,819
\$75,000 < AGI ≤ \$100,000	2,997	55,130	2,345	8,070
\$100,000 < AGI ≤ \$200,000	5,963	169,030	4,910	26,457
\$200,000 < AGI ≤ \$500,000	3,169	254,765	2,680	34,440
\$500,000 < AGI ≤ \$1,000,000	755	172,280	532	15,269
\$1,000,000 < AGI ≤ \$1,500,000	191	86,346	145	8,549
\$1,500,000 < AGI ≤ \$2,000,000	80	55,369	63	5,711
\$2,000,000 < AGI ≤ \$5,000,000	120	134,445	96	15,443
\$5,000,000 < AGI ≤ \$10,000,000	31	68,594	25	8,381
AGI ≥ \$10,000,000	20	121,251	15	16,107
All taxpayers	31,949	1,365,041	19,331	154,377

Notes: This table reports section 199A claiming behavior by income group in 2018. "Positive potential QBI" for tax unit i is defined as the sum across income sources (k) of $\max(0, PQBI_{ik})$, where $PQBI_{ik}$ is the potential QBI from income source k . In this table, we consider the following as separate income sources: Schedule F, Schedule E rental income/loss, REIT dividends, each Schedule K-1, and each Schedule C. All dollar values in this table are in nominal dollars. The underlying data are derived from administrative records of individual tax returns and information returns processed by the Internal Revenue Service.

Table C2: Section 199A deductions by income group: 2019

	Returns with positive potential QBI (thousands) (1)	Total positive potential QBI (millions) (2)	Returns with 199A deduction (thousands) (3)	Total 199A deduction (millions) (4)
AGI ≤ \$0	728	35,989	1	11
\$0 < AGI ≤ \$5,000	1,790	8,224	33	26
\$5,000 < AGI ≤ \$10,000	1,818	11,268	28	22
\$10,000 < AGI ≤ \$15,000	2,712	25,498	449	721
\$15,000 < AGI ≤ \$20,000	2,072	23,148	805	527
\$20,000 < AGI ≤ \$25,000	1,469	17,998	771	747
\$25,000 < AGI ≤ \$30,000	1,278	16,154	915	1,053
\$30,000 < AGI ≤ \$40,000	2,205	28,802	1,659	2,544
\$40,000 < AGI ≤ \$50,000	1,929	26,045	1,471	2,960
\$50,000 < AGI ≤ \$75,000	4,244	60,231	3,301	7,999
\$75,000 < AGI ≤ \$100,000	3,445	55,960	2,738	8,204
\$100,000 < AGI ≤ \$200,000	6,902	169,706	5,875	26,963
\$200,000 < AGI ≤ \$500,000	3,697	256,696	3,337	35,655
\$500,000 < AGI ≤ \$1,000,000	857	175,894	700	15,960
\$1,000,000 < AGI ≤ \$1,500,000	208	86,743	177	10,018
\$1,500,000 < AGI ≤ \$2,000,000	88	55,311	75	6,003
\$2,000,000 < AGI ≤ \$5,000,000	126	133,917	110	15,924
\$5,000,000 < AGI ≤ \$10,000,000	32	67,367	28	8,504
AGI ≥ \$10,000,000	20	116,612	16	16,036
All taxpayers	35,622	1,371,562	22,491	159,877

Notes: This table reports section 199A claiming behavior by income group in 2019. "Positive potential QBI" for tax unit i is defined as the sum across income sources (k) of $\max(0, PQBI_{ik})$, where $PQBI_{ik}$ is the potential QBI from income source k . In this table, we consider the following as separate income sources: Schedule F, Schedule E rental income/loss, REIT dividends, each Schedule K-1, and each Schedule C. All dollar values in this table are in nominal dollars. The underlying data are derived from administrative records of individual tax returns and information returns processed by the Internal Revenue Service.

Table C3: Summary statistics: individual sample, additional variables

	Mean	Median	Standard Deviation	Fraction with nonzero value
<i>Panel A: full sample</i>				
Guaranteed payments (GP)	364	0	28,151	0.00
GP/AGI	0.00	0.00	0.03	0.00
Observed QBI deduction (2018+)	1,089	0	110,277	0.12
Share joint filers	0.44	–	–	–
Age	46	45	17	–
<i>Panel B: industry treatment group</i>				
Guaranteed payments (GP)	15,015	0	187,842	0.08
GP/AGI	0.02	0.00	0.10	0.08
Observed QBI deduction (2018+)	83,757	0	567,691	0.75
Share joint filers	0.81	–	–	–
Age	57	57	12	–
<i>Panel C: industry control group</i>				
Guaranteed payments (GP)	37,043	0	484,028	0.15
GP/AGI	0.03	0.00	0.14	0.15
Observed QBI deduction (2018+)	12,236	0	149,386	0.54
Share joint filers	0.82	–	–	–
Age	54	54	11	–
<i>Panel D: above/below treatment group</i>				
Guaranteed payments (GP)	4,180	0	41,595	0.05
GP/AGI	0.01	0.00	0.10	0.05
Observed QBI deduction (2018+)	10,067	0	16,342	0.68
Share joint filers	0.82	–	–	–
Age	54	54	12	–
<i>Panel E: above/below control group</i>				
Guaranteed payments (GP)	22,612	0	116,692	0.14
GP/AGI	0.03	0.00	0.14	0.14
Observed QBI deduction (2018+)	7,837	0	29,677	0.51
Share joint filers	0.83	–	–	–
Age	54	54	11	–

Notes: See Section II for our sample and variable definitions. Panel A includes the entire sample, while Panels B through E restrict to the samples used the regressions underlying Figure 4. For the sake of this table, the industry treatment group (Panel B) is defined as those with industry treatment proxy greater than 0.2, while the industry control group (Panel C) is defined as all other individuals that satisfy the industry sample restriction. Panels B through E are limited to observations with positive AGI. Observation counts are rounded to the nearest hundred. To protect taxpayer privacy, medians are equal to the mean of all observations between the 49.9th and 50.1th percentiles. All dollar values are adjusted for inflation to 2018 levels. Sample weights are used for tabulations using the individual sample. This table was created by the authors using data from the population of tax returns.

Table C4: Summary statistics for S corporations with and without missing Schedule K-1 in 2019

	K-1 found (1)	K-1 not found (2)
Gross receipts (median)	192,963	114,270
Shareholders in t-2	1.571	1.216
E-files Form 1120S	0.976	0.193
SSTB	0.157	0.141
Industry treatment measure	0.680	0.677
Income treatment measure	0.833	0.883
Number of observations	4,746,400	456,400

Notes: This table presents some summary statistics for S corporations where we do (column 1) or do not (column 2) find any Schedules K-1 in 2019. The industry treatment measure and income treatment measure refer to the treatment proxies discussed in Section 3; see text for further information. To protect taxpayer privacy, the median in row 1 is computed as the mean of the 20 observations nearest the true median. The underlying data are derived from administrative records of individual tax returns and information returns processed by the Internal Revenue Service.