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Small Business Tax Compliance under Third-party Reporting

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Abstract

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Keywords: Tax enforcement, Information reporting, Tax evasion, Small businesses, Administrative data
JEL codes: H25, H26, H32

Small Business Tax Compliance under Third-party Reporting

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I. Introduction

According to the Internal Revenue Service (IRS) estimates, the "voluntary compliance rate" averaged 83.6 percent over the period 2011-2013, resulting in a loss of more than \$450 billion annually to the U.S. government (IRS, 2019). However, this average voluntary compliance rate masks a great deal of heterogeneity. Almost all wage and salary income (99 percent) is reported correctly to the IRS, but only 45 percent of farm income, rents and royalties, and non-farm proprietor income is correctly reported.[1]

What causes such a significant gap in tax compliance among different types of income? A growing literature attributes most of this gap to the presence (or absence) of third-party income reporting. Third-party reporting requires sources such as employers and banks to report taxable income earned by the individuals directly to the government, thereby allowing the government to verify tax returns against these sources.[2] Income that is not subject to third-party reporting is less likely to be detected by tax authorities. Consequently, individuals with income subject to third-party reporting are more likely to be tax compliant than individuals not subjected to third-party reported income (IRS, 2019). The gap in the rate of voluntary tax compliance between different types of income is not limited to the United States. Similar compliance gaps have been found in other advanced economies (Kleven et al., 2011; Kleven, 2014), in developing economies (Pomeranz, 2015; Best et al., 2015; Brockmeyer and Hernandez, 2019; Naritomi, 2019), and in laboratory experiments (Alm, Deskins and McKee, 2009).

The United States Congress and the IRS are aware of the potential for third-party income reporting to increase voluntary tax compliance (IRS, 2019), and Congress

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[1]The voluntary compliance rate is defined as the amount of taxes paid voluntarily and timely relative to total taxes legally due (or "total true tax"), expressed as a percentage. See Internal Revenue Service (1996, 2006, 2012, 2016a) for earlier estimates of the voluntary compliance rate and the "tax gap", or the difference between what taxpayers pay voluntarily in a timely manner and what they should pay if they complied fully with the tax laws.

[2]For examples of different kinds of third-party income reporting and their impact on tax compliance see Kopczuk and Slemrod (2006), Kleven et al. (2011), Phillips (2014), Pomeranz (2015), Best et al. (2015), Alm, Clark and Leibel (2016), Carrillo, Pomeranz and Singhal (2017), and Almunia and Lopez-Rodriguez (2018).

has enacted legislation to subject various types of income to third-party reporting. For example, by the mid-1970s, wage and salary income, interest income, investment income, and miscellaneous non-employee income were all third-party reported using Form W-2 or one of the various Form 1099s. However, subjecting business income to third-party reporting is more challenging because businesses earn income by providing services to millions of final consumers, and there is no easy or obvious way to use consumers as third-party reporters.

Partly in response to this dilemma, Congress enacted Internal Revenue Code section 6050W, effective in 2011. This law required entities that process payment card transactions (e.g., credit cards, debit cards, and gift cards) and electronic transactions (e.g., PayPal, Airbnb, and Uber) to send information on gross receipts to the taxpayer and to the IRS using newly introduced Form 1099-K. Consequently, Form 1099-K made business receipts through payment cards visible to the IRS, which can increase compliance by decreasing the under-reporting of payment card receipts. Nonetheless, it still leaves room for non-compliance through under-reporting of cash income or over-reporting of deductions, margins of behavior that are not subject to third-party reporting requirements. Therefore, the degree to which Form 1099-K generally improves tax compliance for small businesses is an empirical question.

In important work, Slemrod et al. (2017) examined the impact of Form 1099-K on tax compliance.[3] They compare the changes in reporting between those 1099-K recipients that were not covered by any information reporting prior to 2011 (their treatment group) to those 1099-K recipients that received a 1099-MISC prior to 2011 and were already under partial information reporting (their control group).

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[3]In addition to the published paper by Slemrod et al. (2017), Brockmeyer and Hernandez (2019) and Adhikari et al. (2020) are contemporaneous working papers to this study that analyze the influence third-party reporting of payment cards. Brockmeyer and Hernandez (2019) study the changes in tax compliance by retailers in Costa Rica before and after they start accepting payment cards from consumers while using retailers that do not accept payment cards as the comparison group. They find that firms increase reported revenue by 25 percent after the first information report by a payment card company is sent to the tax authority. However, since firms can choose when to install payment card readers, this approach cannot fully control for the biases caused by firm selection. Adhikari et al. (2020) study the impact of Form 1099-K on the taxicab industry using a difference-in-differences (DiD) framework where taxicabs filing as sole proprietors in municipalities with mandatory payment card reader laws belong to the treatment group and taxicabs filing as sole proprietors in the rest of the municipalities belong to the control group. They find an increase in reported receipts by 6.7 percent after third-party reporting but almost fully offsetting responses on less verifiable margins such as deductions.

They do not find any impacts on receipts or deductions in their full sample of firms. However, they find significant increases in receipts but largely offsetting increases in deductions when analyzing the small subset of firms (around 10 percent) that reported total revenue very close to the amount reported in their Form 1099-Ks in 2011, implying small or no change in taxable income.

In this paper, we build upon this literature by using a new method of estimating the impact of third-party reporting via Form 1099-K on small-business tax compliance by exploiting granular and detailed geographic variation in the use of payment cards. We argue that firms operating in localities where consumers' use of payment cards is high are more likely to have a significant share of the firm's revenue collected through payment cards and thus a larger share of that firm's revenue reported to the IRS via Form 1099-K. Using data from various tax returns and information reports (i.e., Forms 1099-K, 1040, 1065, 1120, and 1120-S), we construct an index of payment card use intensity at the commuting zone level. We then employ a difference-in-differences (DiD) research design in which we compare the trends in receipts, deductions, and various other outcomes between firms located in the high payment card use areas and firms located in the low payment card use areas for several years surrounding the introduction of Form 1099-K.

We find that the implementation of third-party information reporting via Form 1099-K led to a modest but economically meaningful and statistically significant increase in reporting by small businesses that received a 1099-K. When we consider all of the small businesses together that received a 1099-K, we find that firms in the commuting zone with 10 percent more payment card use reported a 0.32 percent increase in receipts after 1099-K implementation relative to firms in the commuting zone with 10 percent less payment card use. We do not find a significant impact on deductions on aggregate, indicating that Form 1099-K increased overall tax compliance.

We also find substantial heterogeneity in the responsiveness of businesses to Form 1099-K across business types. Partnerships show a relatively large increase in reported receipts (i.e., partnerships in commuting zone with 10 percent more payment

card use reported a 0.63 percent increase in receipts) that is significant at the 1 percent level, whereas the increase in receipts for sole proprietors and S-corporations are modest and statistically significant at the 10 percent level. The results indicate that there is not a statistically significant response for C-corporations.

Our study extends the literature on third-party reporting via Form 1099-K in several important ways. First, we expand the scope of the analysis to include not only sole proprietors but also S-corporations, C-corporations, and partnerships. In particular, partnerships and S-corporations have received much public scrutiny recently, but research on them is relatively limited (Drucker and Hakim, 2021; Geithner et al., 2021; U.S. Treasury, 2021). Partnerships and S-corporations account for over half of business income, while sole proprietors only account for less than 15 percent of business income in the U.S (Cooper et al., 2016). Therefore, our sample significantly improves the external validity of previous research.

In addition to their importance in terms of income, analysis of these additional business types is important due to differential audit rates, the magnitude of the estimated tax gaps, and the potential impact of improved tax compliance on income inequality. Partnerships and S-corporations are audited the least by the resource-constrained IRS because their tax returns are complex and opaque, so they require specialized auditors and longer audits (Cooper et al., 2016; Sarin, 2020; Guyton et al., 2021). For context, only 0.4 percent of partnerships and S-corporations were audited in 2010, which is the same audit rate for very small C-corporations that report zero assets and one-third of the audit rate of very small sole proprietors that report less than \$25,000 in gross receipts (IRS, 2011). At the same time, the estimated tax gap for partnerships, S-corporations, and C-corporations add up to more than \$63 billion annually, which is about the same size as the estimated tax gap for sole proprietors (IRS, 2016a).[4] Our finding that partnerships are the most responsive to Form 1099-K is particularly meaningful given the difficulties of

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[4]Income under-reporting of partnerships and S-corporations are likely to be underestimated since the randomized audit data used to estimate tax gap statistics fails to detect the full extent of sophisticated tax evasion by partnerships and S-corporations (Cooper et al., 2016; Guyton et al., 2021).

increasing tax compliance through auditing and the size of the estimated tax gap. Furthermore, given that the income of partnerships and S-corporation is highly concentrated among the top 1 percent of taxpayers, Form 1099-K potentially serves to increase tax compliance by the wealthy and decrease income inequality (Cooper et al., 2016; Guyton et al., 2021).

Second, our results contribute to the literature by providing a more complete picture of which firms responded to the implementation of Form 1099-K (in addition to the difference by business types). Slemrod et al. (2017) primarily found that the impact of the third-party reporting was limited to sole proprietors that report receipts close to the 1099-K amount, and they argue that these *bunching firms* are most likely to respond to the introduction of Form 1099-K. Consistent with this finding, we find that these bunching firms play an important part in our aggregate results of increased reported receipts. However, we also find that, even after excluding the bunching firms, there is still a meaningful treatment effect for partnerships and several business-to-consumer industries, suggesting a more widespread response than previously found.

Relatedly, our subgroup analysis further contributes to the fuller understanding of the impact of Form 1099-K. We find that smaller firms respond more to Form 1099-K than larger firms. We also find that the business-to-consumer sector, especially firms from accommodation services, arts and entertainment, and real estate sectors, respond more to Form 1099-K. In contrast, business-to-business firms do not respond to Form 1099-K. Finally, the subset of responsive firms also reported a statistically significant but offsetting increase in deductions. However, the increase in deductions is generally less than the increase in receipts, implying a modest increase in tax compliance even among the offsetting firms. In comparison, the previous literature finds much larger offsetting increases in deductions, implying little or no increase in tax compliance.[5]

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[5]For instance, Slemrod et al. (2017) find that among sharp bunchers, a 20.3 percent increase in receipts from 2010 to 2011 is accompanied by a 16.7 percent increase in deductions. Similarly, among diffuse bunchers, they find that a 15.6 percent increase in receipts from 2010 to 2011 is accompanied by a 15 percent increase in deductions.

Third, our research design uses local-level variation in the use of payment cards as its source of identification instead of relying on individual firm's reported exposure to Form 1099-K, as in Slemrod et al. (2017), which could be endogenous. Since small individual firms cannot exert meaningful influence in the local payment card use, our approach reduces the concerns of bias from endogeneity. Moreover, using local variation provides a direct link between the use of payment cards and the change in tax compliance at the locality level due to Form 1099-K implementation. Our findings—using this research design—suggest that Form 1099-K will be more effective over time, given the rising trend towards using electronic payment methods. Our results also suggest that encouraging payment card use by consumers and businesses by providing tax incentives like in Argentina, Greece, South Korea, or Uruguay could increase tax compliance by increasing the effectiveness of third-party reporting like Form 1099-K.[6]

Fourth, as most of the third-party reporting laws were adopted before the availability of tax-return data to researchers, the existing studies on the effects of information reporting mostly rely on variation created by randomized "threat of audit" letters (Kleven et al., 2011; Pomeranz, 2015), small-scale random audits (Kleven et al., 2011; Phillips, 2014), "notice of discrepancies" letters (Carrillo, Pomeranz and Singhal, 2017), or selection of firms into existing information reporting (Brockmeyer and Hernandez, 2019). Therefore, we are one of the few to use quasi-experimental variation created by an actual introduction of information reporting regime to study its impact at scale.[7] We therefore contribute not only to the research on 1099-K but also more broadly to the literature on information reporting. Indeed, our results are directly relevant to the Biden administration's push to introduce deduction reporting and expand the coverage of Forms 1099-INT and 1099-K to include annual outflows and inflows of funds from taxpayers' bank accounts (U.S. Treasury, 2021).

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[6]Argentina and Uruguay offer VAT discounts for card payments. Uruguay also provides a tax credit to firms for installing payment card readers. Greece provides a 22 percent discount on spending using electronic payments up to a threshold and South Korea provides a lump-sum refund if the total payment card use exceeds a certain percentage of an individual's gross income (Williams, 2014).

[7]Other recent introductions of third-party information reporting in the U.S. are Reports of Foreign Bank and Financial Accounts (FBAR) and Foreign Account Tax Compliance Act (FATCA), both of which are targeted to curb the use of offshore accounts for tax evasion.

II.   Institutional Detail

In this section, we first describe the institutional features of Form 1099-K and then provide some context on the different ways businesses can be organized and taxed in the U.S.

A.   Form 1099-K

The U.S. Congress enacted Internal Revenue Code section 6050W in 2008 (with its implementation starting in 2011) as a part of larger legislation titled Housing and Economic Recovery Act of 2008. Section 6050W introduced a new information report called Form 1099-K (Payment Card and Third Party Network Transactions) and it required entities who make payments in settlement of payment card transactions (e.g., American Express), third-party-settlement entities such as electronic payment systems (e.g., PayPal), and other online platforms (e.g., Uber) to send information reports on gross receipts to the taxpayer, the IRS, and some state tax agencies. Form 1099-K contains the following information: the gross value of transactions, the value of transactions for each month of the tax year, the gross number of payment transactions, and any federal or state income tax withheld.

Any payments received through payment settlement entities are required to be reported on Form 1099-K, but payments made through third-party-settlement entities are only required to be reported when the annual gross amount of transactions of a business is greater than $20,000, and the total number of transactions is greater than 200. Form 1099-K replaced 1099-MISC reporting for some payments, most notably payments by a business to an independent contractor exceeding $600 and transacted through payment card transactions or third-party-settlement entities. However, Form 1099-K significantly expanded the scope of information reporting as it covered new and important sources of income that were not covered by 1099-MISC. For instance, 1099-MISC is not required to be filed by consumers purchasing goods or services for final consumption, and it is only required to be filed by businesses purchasing services (i.e., trade in goods are exempted) from unincorporated

businesses (i.e., trade with corporations are exempted), all of which are covered by Form 1099-K if transacted electronically or via payment cards.

However, Form 1099-K only affects firms accepting payment cards or digital payments (e.g., credit cards, debit cards, and gift cards). Therefore, with Form 1099-K, the IRS only partially observes a firm's income, which makes Form 1099-K different than W-2, 1099-DIV, or 1099-INT where IRS observes almost all of the true income. Even before the introduction of Form 1099-K, these transactions left an electronic paper trail, and they were likely to be more truthfully reported to the IRS than cash receipts. Nevertheless, in the absence of Form 1099-K, the IRS could access the card transactions and bank records only during in-person audits by requesting such information from the firm being audited. Therefore, firms could still not fully report all such transactions or they could refuse to cooperate. If the IRS wanted card transactions data from the financial institutions directly, they would need a court order. Thus, Form 1099-K allows the IRS to easily and directly cross-check information without conducting an audit or obtaining documents through additional legal measures. However, Form 1099-K does not require third-party reporting of cash receipts or deductions, so it still leaves room for non-compliance by under-reporting cash income or over-reporting deductions.

B.   Taxation of Business Income

Businesses organize in various ways in the U.S. depending on their need for limited liability protection, raising capital, flexibility in distributing income or loss, and taxes. For tax purposes, businesses are largely categorized into four types: sole proprietors, partnerships, S-corporations, and C-corporations.

C-corporations face an entity-level tax on their profits. Shareholders of these corporations pay additional taxes when the income is distributed through dividends or when the shareholders sell their equity stakes. However, there are various advantages of organizing as a C-corporation as this form has no limit on the number of shareholders, the citizenship of shareholders, and the classes of stock offered. A C-corporation can also retain its profits within a firm to delay the owner-level tax

and access the stock market to raise capital, which the other business types cannot do.

The profits of sole proprietors, partnerships, and S-corporations are typically not taxed at the entity level. Instead, they are passed through to owners and taxed at their individual income tax rates.[8] S-corporations are corporations that elect to pass corporate income and losses to their shareholders to avoid double taxation. However, S-corporations are more restrictive in terms of the number of shareholders, the citizenship of shareholders, and the classes of stock offered compared to C-corporations.

Partnerships are entities where two or more partners organize to do business together and each partner shares in the profit and loss of the business. Partnerships allow for less public transparency, do not have limitations on the types of partners, and allow for much more flexibility in distributing income or loss to their owners than corporations. For instance, partnerships can create complex structures using tiered partnership arrangements where one pass-through entity is owned by one or more partnerships or corporations. However, such complex structures make it difficult to trace how much income is earned, who earned it, who is responsible for reporting it, and whether income is truthfully reported. Therefore, it can provide an incentive for taxpayers to create complex tiering structures to disguise non-compliance.

Sole proprietors are those who are the only owner of an unincorporated business. It is the easiest business structure to form and operate since owners do not need to register with the state government or submit annual reports to operate. The owner can simply report their profit or loss on Schedule C of the individual income tax return. It is also easy to exit the business as a sole proprietor. However, it has some drawbacks, key among them being the lack of limited liability protection that other business types offer.

The tax treatment of business income and the associated organizational form have

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[8]Given that the U.S. has a progressive income tax and household level taxation, the same amount of income from the pass-through entities can be taxed at a very different rate based on household income, number of children, and other sources of incomes and deductions of the household.

significant implications for understanding and interpreting the trends in aggregate productivity (Dyrda and Pugsley, 2018), labor share of income (Smith et al., 2021), income inequality (Cooper et al., 2016; Auten and Splinter, 2019; Kopczuk and Zwick, 2020), tax administration (Internal Revenue Service, 2012), and tax compliance at the top of the income distribution (Auten and Splinter, 2019; Guyton et al., 2021). We add to this literature by studying how small businesses of different types respond to the introduction of the 1009-K.

III. Data and Index

How third-party reporting may, in theory, affect compliance has been developed and analyzed in detail elsewhere, so we focus on the empirical analysis. We start with a discussion of the data and construction of the sample, we then describe the construction of our index of payment card use, and we end the section with some summary statistics.[9]

A. Data

We construct a sample of sole proprietors, S-corporations, C-corporations, and partnerships using various tax and information returns for tax years 2007 to 2014. These forms include Forms 1040, 1040 Schedule C, 1120-S, 1120, 1065, W-2, and 1099-K.[10]

The purpose of our analysis is to study changes in tax compliance of *businesses* subject to Form 1099-K. Consequently, our first sample selection criterion requires that the taxpayer be characterized as a business. We apply two tests to separate taxpayers into business and non-business groups following Prisinzano et al. (2016). The first test is the *De Minimis Test*, which requires that businesses have either total income or total deductions greater than $10,000 or that their sum exceed $15,000.

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[9]For example, see Kleven et al. (2011), Phillips (2014), Alm, Clark and Leibel (2016), Carrillo, Pomeranz and Singhal (2017), and Almunia and Lopez-Rodriguez (2018). The basic predictions from this framework are that agents will increase their reporting of items subject to third-party reporting (e.g., receipts) and that agents are likely to offset—at least partially—any increase in taxes resulting from third-party reporting by adjusting other items not subject to third-party reporting (e.g., deductions).

[10]All identifying information is masked to the researchers to protect taxpayer privacy.

The second test is the *Business Activity Test*, which requires businesses to have total deductions greater than \$5,000. If a taxpayer meets both requirements, then it is classified as a business. As the analysis focuses primarily on reported receipts, we also limit the sample to those firms reporting positive receipts. Overall, there are 14,669,872 businesses in 2011 that fit these criteria.

For our analysis, we also focus on the response of *small* businesses that are more likely to be influenced by the policy change. Form 1099-K presumably has a smaller influence on large businesses as they are more likely to be audited, and they also have reporting requirements to the public, regulators, or the owners, making it harder or more costly to under-report income. Another reason we limit our analysis to small businesses is that we use local variation in the payment card use by consumers to identify the model. Unfortunately, the tax data do not allow us to separately identify each establishment of a business that operates in many localities. For example, a large company that operates in several states would only file a single tax return with one address, usually where its headquarter is located. Consequently, the payment card use intensity in various locations would influence the reporting of a single multi-location firm, which would potentially confound the analysis. Therefore, we also choose to focus on small businesses since they are more likely to operate in a single commuting zone than large businesses.

We classify a business as being small if the sum of gross receipts, rents, and any portfolio income reported by the firm is less than \$10 million and total deductions are less than \$10 million, once again following the criteria described in Prisinzano et al. (2016).[11]This restriction reduces the main sample from 14,669,872 businesses

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[11]There is no consensus on what makes a business "small". The most commonly used measures are gross receipts and number of employees. However, taxpayers do not need to report the number of employees on their tax returns. Therefore, Prisinzano et al. (2016) use the total income threshold to classify a business as a small business. To determine the small business threshold value, they analyze various provisions in the U.S. tax code that give preferential treatment to small businesses, even though small business definitions vary in most of these cases. They conclude that the \$10 million in gross income is a reasonable threshold to define a small business. This threshold is consistent with other definitions of small business as well. For instance, the average revenue standard used to determine the small business across many industries by the Small Business Administration was \$9.4 million in 2010, according to the data collected by Denes, Duchin and Hackney (2019). Similarly, the IRS has a separate division called Large Business and International to monitor businesses with more than \$10 million in assets. Finally, a business is exempt from the alternative minimum tax if it had annual gross receipts of \$7.5 million or less for three years before 2010.

to 14,493,305 small businesses in 2011. Overall, firms classified as small account for 98.8 percent of business (but only 9.0 percent of receipts).[12]

While limiting the firm size likely reduces the prevalence of firms that operate in multiple locations in our sample, there are likely still firms that operate in more than one location in the sample. Consequently, we use the information on employee location derived from Form W-2 for tax year 2011 to identify firms that operate in multiple locations. If we require that all employees reside in the same commuting zone as the business, we will inevitably exclude firms that should be included (e.g., a firm on the border of a commuting zone).[13] Alternatively, if we do not exclude firms with significant shares of employees who reside in other localities, then we will likely analyze business activity that does not correspond to the firm's location, as identified by the tax returns data. In our main specification, we exclude firms that have more than a quarter of their employees residing in a different commuting zone than the business's filing location as it is suggestive that the business is operating in multiple localities. In the robustness section, we show that the main findings are not sensitive to this minor sample restriction.

As our analysis uses local-level variation, we exclude firms whose primary earnings are through remote sales (i.e., online sales, phone sales, or catalog sales) because these firms seem unlikely to be influenced primarily by payment card use in their filing location. To do so, we use the information available on Form 1099-K that separates the total 1099-K receipts into payments using payment card readers, third-party networks, and a "card not present." We exclude firms from the analysis whose third-party network transactions or "card not present" transactions constituted greater than half of their reported receipts.[14]

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[12]Respectively, 99.96, 97.6, 96.6, 95.4 percent of sole proprietors, S-corporations, partnerships, and C-corporations that are businesses are classified as small with 91.2, 39.2, 15.0, 2.5 percent of receipts coming from small businesses respectively by filing types.

[13]Commuting zones are aggregations of contiguous counties constructed based on commuting patterns in the 1990 U.S. Census. There are 741 commuting zones in the U.S., which are widely used as measures of local labor markets. They are conceptually similar to metropolitan statistical areas but they cover the entire U.S., unlike metropolitan statistical areas that only cover urban areas (Chetty et al., 2016).

[14]"Card not present" refers to the payments where the card was not present at the time of the transaction or the card number was keyed into the terminal. Typically, this relates to online sales, phone sales, or catalog sales. Although Form 1099-K includes this information since 2012, "card not present" transaction amounts were only recorded in the IRS research database starting in 2014. Consequently, this exclusion is derived

We also exclude firms with a ratio of 1099-K receipts to total receipts of greater than 1.3 because these observations likely represent erroneous reporting. The total amount of receipts reported on Form 1099-K should be lower than the total receipts for most taxpayers because Form 1099-K reports only the amount received through payment cards and electronic payment systems.[15] Since we use industry code in our empirical specifications, we also require that the business report a non-missing and valid NAICS code (at the two-digit level).[16] Finally, we exclude observations for firms that move between commuting zones as a move likely represents other significant changes in business activity that could confound the analysis.

B. Payment Card Use Index

The ideal analysis would include a random assignment of firms that were subject to third-party reporting and firms that were not. However, Form 1099-K was uniformly implemented in 2011 across all firms in the U.S. that accepted payment cards. Thus, we use variation derived from differences in payment card use across localities to identify the impact of third-party reporting.

Using the sample described above, we construct a measure of payment card use, as defined by equation (1):

$$(1) \qquad Index_j = \frac{\sum_i Payment\ Card\ Receipts_{ij}}{\sum_i Total\ Receipts_{ij}}$$

where $Payment\ Card\ Receipts_{ij}$ is calculated using the sum of the gross amount of payment card transactions reported in line item 1a on Form 1099-K for firm i in

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from information contained in 2014 tax year data.

[15]In some circumstances, the amount reported on Form 1099-K can exceed total receipts reported by taxpayers. For instance, in cases of merchandise returns or cashback services provided by merchants, the full amounts of these transactions would be included in the payment processor and thus in the 1099-K amount. However, these amounts would be excluded by the taxpayer when reporting total receipts to the IRS. Because we are focusing on local businesses and cash use is still common for these businesses, we do not expect the ratio of receipts to be close to 1, so this restriction removes outliers without being overly restrictive.

[16]Note that this sample selection criteria is not very restrictive because invalid or missing NAICS codes only constitute 3.6 percent of the restricted sample of small businesses in 2011 after using reported industry codes from multiple tax years. However, NAICS codes are self-reported on tax forms, so they are subject to errors in reporting, especially at the more disaggregated level. Our use of 2-digit NAICS code mitigates, though it does not eliminate, this issue.

locality j (commuting zone), restricted to small businesses that received at least one 1099-K and whose 1099-K indicated "payment card" receipts.[17] *Total Receipts*$_{ij}$ includes total receipts less returns and allowances as reported on Form 1040 Schedule C, Form 1120-S, Form 1120, or Form 1065 for small businesses in locality j that received a Form 1099-K.[18] We exclude receipts via third-party network transactions in both the numerator and denominator of the index to exclude amounts that do not represent local transactions.

We would like to calculate an index of payment card use intensity using data one year before the implementation of Form 1099-K. However, because payment card use data at the commuting zone level are not readily available for this (prior) time period, and because there is likely to be a strong year-to-year correlation in local payment card use, we construct an index of the intensity of payment card use at the commuting zone level using 2012 tax data from Form 1099-K and also from various tax returns and information reports (i.e., Forms 1040, 1065, 1120, and 1120-S).[19] To test the year-to-year correlation in local payment card use, we also calculate the index using data from 2013 and 2014. The correlation between our baseline index from 2012 and indices created using data from 2013 and 2014 is 0.96 and 0.95, respectively. The high correlations between the 2012 index and the other post-Form 1099-K period indices provide support for the assumption of stable payment card use, even though it does not eliminate the possibility that payment card use changed due to the implementation of Form 1099-K.[20]

We use an index of payment card use intensity derived from receipts of businesses

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[17]This restriction to payment card transactions is applied as third-party network transactions (e.g., PayPal) likely represent remote sales outside of the local geographical area.

[18]We use net receipts (i.e., receipts less returns and allowances) as the data does not report gross receipts for S-corporations back to the beginning of our sample period. Since the data contain net receipts for S-corporation as well as all other business types, we use net receipts to be consistent.

[19]Tax year 2011 did not include information that differentiated third-party network transactions, which is necessary for calculating the index.

[20]Note that, even if payment card use changed after the implementation of Form 1099-K, this would only bias our estimates if the change in payment card use was correlated with our payment card use index. There is no easy way to test this because we do not have information on the numerator of our index (i.e., payment card use) for 2010. However, we have information on the denominator of our index (i.e., total revenues) for 2010. Therefore, we construct an index of payment card use using total receipts from 2010 in conjunction with payment card receipts from 2012. We find that the correlation between this index and our main index is 0.88.

that receive at least one Form 1099-K (i.e., a conditional index) as opposed to an unconditional index that includes receipts from *all businesses* irrespective of whether they receive Form 1099-K or not. We interpret the conditional index as the proportion of receipts received through payment cards by businesses that accept payment cards. We use this metric because Form 1099-K only affects businesses that accept payment cards. If a business does not accept payment cards, its receipts will not be reported to the IRS via Form 1099-K, making them effectively untreated even if they are located in the high payment card use area.[21]

Figure 1 illustrates the spatial variation in the index across the U.S., where the darker shades on the map represent higher payment card use. There is substantial dispersion in payment card use across localities. While some of the variation in payment card use occurs at a broad regional level (e.g., payment card use is greater in coastal cities), there is considerable variation even within nearby areas. The index ranges from 8.9 percent for the commuting zone that includes Littlefield City, Texas, to 56.8 percent for the commuting zone that includes Moab City, Utah.

C. Analysis Sample and Summary Statistics

For the main analysis, we use an 8-year balanced panel of firms that received at least one Form 1099-K in 2011. The balanced panel requirement leads to a more homogeneous group of firms and insulates the results from the influence of entry or exit during the sample period.[22] We focus our analysis on firms receiving Form 1099-K for two reasons. First, firms not receiving Form 1099-K are not affected by

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[21]To illustrate, consider a hypothetical situation with two areas, A and B. Suppose that in area A, all businesses received a Form 1099-K and that third-party reported receipts accounted for 20 percent of total receipts. In area B, suppose that only 10 percent of businesses received a Form 1099-K, but each of the businesses that received a Form 1099-K received 100 percent of their receipts via payment cards. The unconditional index would indicate that area A was more intensely treated (20 percent) than area B (10 percent). On the other hand, the conditional index would correctly conclude that firms that received payment cards in area A were less intensely treated (20 percent) than area B (100 percent). Because we are interested in finding what percent of receipts a firm receives via Form 1099-K reported sources, we argue that a conditional index serves as a better measure of treatment intensity compared to an unconditional index.

[22]In Appendix Figure A1, we present the main results for an unbalanced panel of small businesses. While the point estimates change, the main qualitative results are similar. The increase in receipts is greater than the offsetting increase in deductions, but in the unbalanced panel specification, the responses in deductions are statistically significant.

the intensity of payment cards in their locality. Indeed, we leverage this fact and use firms not receiving Form 1099-K to conduct placebo tests. Second, there can be significant differences in observable and unobservable characteristics (including income under-reporting tendencies) between firms that receive a Form 1099-K and those that do not (Slemrod et al., 2017). Therefore, instead of using firms that do not receive Form 1099-K as a control group, we use firms in localities that received a smaller share of total receipts via Form 1099-K as a control group.

Figure 2 describes the final sample of small businesses that received Form 1099-K. Figure 2a plots the median receipts by filing type for years 2010 and 2011 for comparison. The receipts increase from 2010 to 2011 for all filing types. C-corporations had the largest median receipts ($583,000), and sole proprietors had the lowest median receipts ($147,000).[23] A similar increase is shown for deductions from 2010 to 2011 with deductions representing approximately half of receipts. Figure 2c plots the ratio of 1099-K receipts to total receipts, K/R. For the combined sample, 26.1 percent of their receipts are reported via Form 1099-K, with C-corporations receiving the lowest percent (19.1 percent) and partnerships receiving the highest proportion of 1099-K receipts (29.2 percent). Lastly, Figure 2d illustrates the composition of the final sample of 1.11 million firms. As shown, S-corporations and sole proprietors represent the majority of the sample.

IV. Main Empirical Analysis

In this section, we present our empirical specifications and several sets of results. We start by providing evidence in support of the parallel trends assumption required for the DiD analysis. We then present our main results, which demonstrate the effects of Form 1099-K on the receipts and deductions of small businesses using the DiD estimations.

[23]To protect confidentiality, the median numbers are rounded to the nearest $1,000.

A. *Evidence in Support of Parallel Trends*

The identifying assumption underlying our research design is that the outcomes of firms in high and low payment card use areas would have trended similarly in the absence of Form 1099-K implementation. We conduct three different tests to inspect the validity of this identifying assumption. Even though the main outcome of interest is receipts, it is also possible that firms responded by increasing deductions to mitigate the increased tax liability induced by third-party reporting (Carrillo, Pomeranz and Singhal, 2017; Slemrod et al., 2017).[24] Therefore, we test the validity of this identifying assumption for deductions as well.

Figure 3a illustrates the change in receipts over the sample period stratified by the payment card use index quartile. There are differences in levels of receipts across the quartiles of the payment card use index, but the quartiles have similar trends before the implementation of the Form 1099-K, which suggests that the parallel trends assumption is satisfied. There does not appear to be any noticeable difference in the trends of unconditional means following the implementation of Form 1099-K. Figure 3b presents the same information but for deductions. We again find differences in levels of deductions but similar trends across the quartiles of the payment card use index.[25]

Next, we present binned scatter plots to show the relationship between the payment card use index and the growth in receipts and deduction in pre-1099-K and post-1099-K. In Figure 4a, we do not find any correlation between percent changes in receipts and the index prior to the implementation of Form 1099-K (the change

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[24]Note that any increase in deductions could either be fraudulent over-reporting or legitimate increases in deductions to offset the increased reported receipts. Firms can achieve their desired level of taxable income by either under-reporting revenue or over-reporting deductions, but under-reporting revenue gives the added benefit of reducing the detection probability because larger firms usually have a higher audit probability. Similarly, a high share of deductions relative to receipts can suggest tax non-compliance and increase the probability of an audit. Thus, in the absence of any third-party reporting, firms are likely to under-report revenue as well as their true deductions in order to appear smaller on paper than they are in reality.

[25]The differences in the dollar amount of receipts and deductions in the year before 1099-K implementation are also similar between the top quartile and the bottom quartile of the payment card use index. For instance, the median receipts at the top quartile is $373,000 and the median receipts at the bottom quartile is $381,000. Similarly, the median deduction at the top quartile is $199,000 and the median deduction at the bottom quartile is $181,000. We also explore the composition of industries across the payment card use index quartiles in Appendix Figure A2 and find that the composition of industries is generally quite similar, with some notable differences in the retail sector.

from 2009 to 2010), implying that there were no differential trends in the growth of receipts across low payment card use areas and high payment card use areas. However, from 2010 to 2011, we find that high payment card use areas experienced a greater increase in receipts than low payment card use areas, implying that Form 1099-K increased receipts in localities where we would anticipate the third-party reporting to have more of an effect. Figure 4b presents the same information but for deductions. There is no strong correlation (i.e., a small negative relationship, if any) between the payment card use index and change in deductions pre-1099-K. However, we find a modest positive correlation between the payment card use index and the deduction growth post-1099-K, implying that Form 1099-K increased deductions in localities where we would anticipate the third-party reporting to have more of an effect. Nonetheless, the differences in the changes in deductions are not as pronounced as the differences in receipts following the implementation of Form 1099-K.

Finally, we estimate an event study model given in Equation (2) to evaluate the parallel trends assumption more formally:

$$(2) \qquad Log(Y_{ijt}) = \sum_s \eta_s HighPC_j \times 1[s = t] + \theta_1 Unemp_{jt} + \alpha_i + \gamma_t + \varepsilon_{ijt}$$

The dependent variable, Y_{ijt}, is either *Receipts* or *Deductions* depending on the specification for firm i in commuting zone j in tax year t. $HighPC_j$ is a time-invariant indicator variable equal to one for a locality in the top quartile for payment card use based on the index for payment card use intensity and zero otherwise. $Unemp_{jt}$ is the commuting zone unemployment rate, included to control for changes in the local economy. It is important to control for the local economic condition in our study as our outcome variable used to measure tax compliance is the change in firms' reported receipts. Since there are large differences in local economic conditions across the U.S., these conditions may affect the receipts received by firms.[26]

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[26]The Appendix Figure A3 reports the results excluding the control for commuting zone unemployment rate. The upper panel shows the event study for this specification. We see very similar patterns as before: there are no statistically significant pre-trends at the 5-percent level but there is an increase in reported

Firm fixed effects (α_i) and time fixed effects (γ_t) are also included to control for unobserved time-invariant firm characteristics and national time trends, respectively. Standard errors are clustered at the commuting zone and the two-digit industry level (Cameron, Gelbach and Miller, 2011).[27]

This event study specification amounts to an annual DiD estimator in which we compare the difference in outcomes between firms in treatment and in control commuting zones in each year relative to the baseline difference in a year before treatment (Dolls et al., 2018). If we fail to reject the hypothesis that $\eta_a = 0 \; \forall a < 2011$, then it increases our confidence that endogeneity issues do not pose a significant threat to the research design. The coefficients after 2011 describe the dynamic treatment effects of Form 1099-K in years following its implementation relative to the impact before the implementation.

Figure 5 presents the results for the event study specifications, which define treated areas as commuting zones in the highest quartile of the payment card use index and control areas as those in the lowest quartile. Figure 5a presents the results for the outcome of log receipts. The point estimates before Form 1099-K implementation are all statistically insignificant at the 5-percent level. Thus, the null hypothesis of no trends before the implementation of Form 1099-K cannot be rejected, supporting the parallel trends assumption. All estimates from 2011 onwards are positive and statistically significant at the 5-percent level, indicating that Form 1099-K increased reported receipts. The dynamic treatment effects of Form 1099-K on receipts range from 0.87 percent higher for firms in the treated commuting zones versus the control commuting zones in the year of treatment to 3.16 percent higher 3 years after the implementation. A possible reason for the lagged response is that there was some confusion at the start of Form 1099-K itself on how third-party reporters and taxpayers should comply with the new form (Slemrod et al., 2017). Related to

receipts in the treatment group compared to the control group after Form 1099-K implementation. The lower panel shows the DiD results. The point estimates are broadly similar but slightly smaller, leading to a statistically insignificant effect for the full sample. Nonetheless, the results still indicate that partnerships significantly increased receipts in response to the introduction of Form 1099-K.

[27]For consistency and to fill in missing values for industry codes, we take the modal two-digit industry code for each firm across the sample years. Consequently, there is no variation in industry code by firm.

this point, for third-party reporting to work properly, firms need to understand the ramifications of new information reporting, and this understanding can take some time to achieve, which would also contribute to a lagged response. Furthermore, if Form 1099-K facilitated better targeting of audits, any increased compliance from these audits could take time to influence the actual reporting of firms.[28]

Figure 5b presents the results for deductions, which again shows no evidence of differential pretrends. While the point estimates are positive following the implementation of Form 1099-K, they are smaller than those for receipts (max of 1.86 percent increase) and only the point estimates from 2013 and 2014 are statistically significant at the 5-percent level. Nonetheless, the event study does provide some evidence of an offsetting effect from firms increasing reported deductions.[29]

B. The Effects of Form 1099-K on Receipts and Deductions

In addition to the event study analysis, we also estimate a discrete DiD regression as specified in Equation (3) to determine the influence of Form 1099-K on receipts and deductions.

$$(3) \qquad Log(Y_{ijt}) = \beta_1 Post_t \times HighPC_j + \beta_2 Unemp_{jt} + \alpha_i + \gamma_t + \varepsilon_{ijt}$$

where $Post_t$ is an indicator variable that equals one starting in 2011 when Form 1099-K was implemented and zero otherwise. The main coefficient of interest is β_1, the DiD estimator of the treatment effect. If $\beta_1 > 0$, then the introduction of Form 1099-K increased reported amounts more in areas with high payment card use compared to areas with low payment card use. For the receipts specification, $\beta_1 > 0$ would suggest that firms were under-reporting income before third-party reporting was expanded and that the introduction of Form 1099-K increased tax compliance

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[28]The lagged response to policy changes is not uncommon. For instance, see Chetty, Friedman and Saez (2013) on the spread of the knowledge of EITC over time. Indeed, Slemrod et al. (2017) also find that the effects of Form 1099-K are increasing from 2011 to 2012 (their sample ends in 2012) for both receipts and deductions.

[29]The event study results for both receipts and deductions are not sensitive to the choice of using the highest quartile of payment card use as the treatment group. In Appendix Figure A4, we present results for two alternative definitions of treatment group—firms in localities that lie above and below the median payment card use index and for firms in the highest tercile relative to the lowest tercile of payment card use.

via greater reporting of firms' receipts.

Our preferred DiD regression specification is a continuous DiD model, which allows us to more fully exploit the variation captured in the payment card use index and take advantage of the entire estimation sample. The continuous DiD model is given by Equation (4):

$$(4) \qquad Log(Y_{ijt}) = \delta_1 Post_t \times Log(Index_j) + \delta_2 Unemp_{jt} + \alpha_i + \gamma_t + \varepsilon_{ijt}$$

where $Index_j$ is the continuous index for payment card use and the other variables are as previously defined. Under this specification, δ_1 can be interpreted as the index elasticity of receipts (deductions); that is, δ_1 indicates the percentage change in reported receipts (deductions) after Form 1099-K implementation between firms located in commuting zones with one percent higher payment card use index. If δ_1 is positive, then areas with higher levels of payment card use, as measured by the index, have larger increases in receipts (deductions) following the implementation of Form 1099-K reporting compared to areas with lower payment card use. In the specification with log receipts as the dependent variable, $\delta_1 > 0$ would indicate increased tax compliance. For the deductions specification, $\delta_1 > 0$ indicates that firms increased deductions to at least partially offset increased receipts in response to the third-party reporting.

Figure 6 presents the results for both the discrete and continuous DiD specifications stratified by business filing type. The overall findings are generally consistent across the discrete and continuous specifications; given the similarities, we focus on the continuous DiD model for the reasons detailed above. For the combined sample, the estimated index elasticity of receipts is 0.032. For context, the payment card index has a mean of 0.241 and a standard deviation of 0.065, which means that one standard deviation from the mean would represent a 27 percent change in the index and a 0.86 percent increase in receipts. Separate regressions based on filing type indicate positive and statistically significant responses for all pass-through businesses (e.g., sole proprietors, S-corporations, and partnerships), but a statistically

insignificant response for C-corporations. Although the impact is only marginally significant for sole proprietors and S-corporations (and statistically insignificant in the discrete specifications), the influence is statistically significant at the one percent level for partnerships. Furthermore, partnerships have the largest effect with an index elasticity of receipts of 0.063, which is nearly twice the estimate for the combined sample.

Figure 6 also shows the results of the influence of Form 1099-K on deductions, which could offset some of the increases in receipts. For each of the regressions reported, the point estimate for the treatment variable is not statistically significant at conventional levels. Nonetheless, the continuous DiD specification for partnerships only narrowly misses being classified as significant at the 10-percent level (p-value=0.109). The estimated index elasticity of deductions for partnership is relatively large at 0.037, while the elasticities are close to zero for the combined sample as well as all other business types.

V. Heterogeneity Analysis

This section analyzes the existence of heterogeneous responses by industry and firm size and further explores the causes of the heterogeneous responses previously shown by business filing type.

A. The Effects of Form 1099-K across Industries

The impact of Form 1099-K depends on the share of total revenue that a firm generates from payment cards, and firms that deal directly with consumers are likely to be more affected by Form 1099-K because final consumers use payment cards more frequently than businesses. Furthermore, business-to-business (B2B) transactions are likely to be more visible in audits, and so these transactions are less likely to be under-reported relative to business-to-consumer (B2C) transactions. Consistent with these priors, the influence of Form 1099-K on reported receipts for non-B2C firms is non-existent, with an estimated index elasticity of receipts of 0.0003 (p-value of 0.99). Consequently, in this section, we focus on the impact of Form 1099-K on

firms from B2C industries (Federal Reserve System, 2013; Liu et al., 2020).[30]

The first row of Figure 7 presents the results from restricting the sample to B2C industries. The index elasticity of receipts is slightly larger (0.043) when the analysis is restricted to B2C industries, while the index elasticity of deduction remains small in size and statistically insignificant. Investigating further, we separately analyze the 8 two-digit industries that are classified as B2C. The remaining rows of Figure 7 present the results. We find significant heterogeneity in the impact of Form 1099-K across B2C industries. There are statistically significant increases in revenue at the 5-percent level in 4 out of the 8 industries, including Arts, Entertainment, Recreation (71), Accommodation and Food Services (72), Real Estate, Rental Leasing (53), and Health Care and Social Assistance (62), and at the ten percent level in Educational Services (61), with the rest of the B2C industries having statistically insignificant increases in receipts.

Figure 7 also shows how deductions change as a result of the implementation of Form 1099-K. Even though the overall estimate for the influence of the third-party reporting on deductions is statistically insignificant, we find that some of the industries with the largest elasticity for receipts also have statistically significant responses for deductions (e.g., Accommodations and Food Services). The index elasticity of deductions is consistently smaller than receipts, except for the Educational Services industry, which has a slightly larger elasticity of deduction. Note that even if the point estimate for the deduction specification is larger than in the receipts specification, it does not imply that deductions increased more than receipts in *levels* given that deductions represent approximately half the dollar amount of receipts.

Overall, we find that the influence of Form 1099-K varies quite significantly by industry and industries with the largest response for receipts also have statistically significant increases in deductions, implying a smaller change in taxable income.

[30]We define B2C industries at the two-digit NAICS codes using data from input-output tables provided by the Bureau of Economic Analysis and following the approach of Almunia and Lopez-Rodriguez (2018) and Liu et al. (2020). Specifically, we calculate the share of the total output of an industry that final consumers consume and if that share is greater than 50 percent, and then we classify that industry as a B2C industry. According to this definition, Manufacturing (31), Retail Trade (44-45), Real Estate, Rental, Leasing (53), Educational Services (61), Health Care and Social Assistance (62), Arts, Entertainment, and Recreation (71), Accommodation and Food Services (72), and Other Services (81) are classified as B2C industries.

B. The Effects of Form 1099-K by Firm Size

In this subsection, we analyze the impact of Form 1099-K by firm size. To do so, we divide the firms in our sample into 5 equal quintiles based on their gross income in the year before the implementation of Form 1099-K.[31] Each quintile contains roughly 222,370 firms. Figure 8 presents the impact of Form 1099-K across business size. We find that the index elasticity of receipts is larger for the firms with less gross income. Only the estimate for the smallest two quintiles of firms are significant at the 10 percent level for the receipts specification.

Figure 8 also reports the influence of Form 1099-K on deductions by income quintile. While the point estimates for deductions follow a similar pattern as the impacts on receipts by income quintile, the point estimates remain statistically insignificant at conventional levels.

C. What Explains the Differential Response across Business Type?

As reported earlier, the responses to the implementation of Form 1099-K vary significantly by business filing type, with the largest response in receipts occurring for partnerships. In this subsection, we analyze two potential reasons for the differences in responses by filing type: industry composition and differences in firm size.

Industries with the largest index elasticities of receipts constitute a larger share of partnerships in the sample relative to sole proprietors, S-corporations, and C-corporations. For instance, as seen in Appendix Figure A5, out of 20 two-digit industries, about 40 percent of all partnerships in our sample belong to one of the 5 most responsive industries: Arts, Entertainment, and Recreation (71), Accommodation and Food Services (72), Educational Services (61), Health Care and Social Assistance (62), and Real Estate and Rental Leasing (53). In comparison, only about 15 percent of all C-corporations in our sample belong to these 5 most responsive industries. To see if these differences explain the differential responses by business filing type, we reweight the subsamples using entropy weighting such that

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[31] The breaks between the gross income quintiles are \$112,598, \$269,346, \$542,291, and \$1,165,888, with a maximum amount of \$10,000,000.

each business type has the same industry composition as partnerships, the filing type with the largest response (Hainmueller, 2012). Figure 9 provides the baseline results for each filing type for comparison, and then reports the results after the reweighting. The point estimates for S-corporations and C-corporations increase slightly in response to the reweighting to match the partnership industry composition, while the point estimate for sole proprietors remains roughly the same. These results suggest that industry composition can explain some—but not all—of the differences in the baseline point estimates, since the estimate for partnerships is still larger than sole proprietors and S-corporations even after the reweighting. The estimate for partnerships is about the same size as C-corporations after the industry reweighting, but the C-corporations coefficients remain statistically insignificant.

Next, given the findings in Figure 8 that larger firms tend to respond less to the implementation of Form 1099-K, we also reweight the sole proprietors, S-corporations, and C-corporations to match the firm size composition of partnerships.[32] If differential firm size across business types reported in Figure 2 can explain the differences in responsiveness to Form 1099-K across business types, then we would expect the point estimate for sole proprietors to decrease since median sole proprietors are smaller than median partnerships. Similarly, we would expect the point estimate for S-corporations to remain the same as they are similar in size to partnerships, and the point estimate for C-corporations should increase because C-corporations are larger than partnerships. The results presented in Figure 9 are consistent with these priors. The increase in the point estimate for C-corporations does bring it closer in line with the point estimate for partnerships, but even so, the estimate for C-corporations remains statistically insignificant at the 10 percent level.

Lastly, we reweight sole proprietors, S-corporations, and C-corporations to match both the industry composition and firm size composition of partnerships. These results are also presented in Figure 9. Overall, the reweighting seems to explain the difference in point estimates between partnerships and C-corporations (even

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[32]We use entropy weighting to match the first three moments for receipts.

though the point estimate for C-corporations remains statistically insignificant), while the reweighting only partially explains the difference between S-corporations and partnerships. If anything, the reweighting illustrates a larger difference between the behavior of partnerships and sole proprietors even after accounting for variation in these two dimensions. Thus, we conclude that although industry and firm size explains some of the differential response by filing type, under-reporting tendencies still vary by filling type.

VI. The Effects of Form 1099-K on Other Outcomes

In this section, we explore additional outcomes that could be affected by Form 1099-K, such as net income and the decision to adopt or discontinue payment card readers.

A. Net Income

The overall increase in receipts due to the implementation of Form 1099-K suggests that Form 1099-K increased tax compliance by increasing reported receipts generally while only increasing deductions in some instances. This subsection analyzes the influence of third-party reporting on the difference between receipts and deductions, a measure of net income that allows us to directly analyze the combined change in receipts and deductions.[33]

Since net income can be negative, we cannot use a log transformation when analyzing net income without dropping a nontrivial portion of our sample. Therefore, we use the inverse hyperbolic sine transformation, which is very similar to a log transformation but which allows for negative net income values. As shown in Figure 10, the inverse hyperbolic sine of net income increased across all business types in response to the introduction of Form 1099-K, with an index elasticity of net income of 0.30 for the combined sample.[34] These estimates are statistically significant

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[33]We use the difference between receipts and deductions as a measure of net income rather than the metrics reported in the tax forms because these latter metrics include different measures of income and deductions across business types, which makes the net income reported in tax forms not comparable across business types.

[34]The estimated elasticity is larger than the index elasticity of receipts. Nonetheless, the dependent

across all business types, with the largest response for C-corporations (0.56).

This analysis using inverse hyperbolic sine transformation is informative, but it incorporates both the influence of extensive and intensive margins into the estimate. Consequently, we also present results from an analysis that uses an indicator for positive net income as the dependent variable, following a similar approach as Pomeranz (2015). The results are reported in Figure 10b, and they indicate that Form 1099-K also influenced the likelihood of reporting positive net income. The full sample estimate implies that areas with a 10 percent higher payment card use index in 2011 experienced a 0.11 percentage point increase in the likelihood of reporting positive net income from the implementation of Form 1099-K (from a mean of 92.5 percent).

Both these alternative outcomes indicate that Form 1099-K had a significant influence on the tax reporting behavior of businesses that were subject to third-party reporting. Nonetheless, the event studies (as reported in Appendix Figure A6) indicate possible violations of the parallel trends assumption, and consequently, the results should be interpreted with caution.

B. Decision to Accept Payment Cards

Our payment card use index is created using tax information following the implementation of Form 1099-K. If companies strategically and systematically decreased acceptance of payment cards on the intensive margin, then using the K/R ratio (i.e., the share of total receipts reported in Form 1099-K) at the firm level after Form 1099-K implementation as a proxy for the ratio before the implementation of Form 1099-K would underestimate the true proportion and potentially bias our estimates. To alleviate such concerns, we use an index aggregated at the commuting zone level, which is not significantly affected by the K/R ratio of a few individual firms. Moreover, if there are sufficient tax-compliant firms, then the lack of an endogenous response by those firms dilutes the overall influence of the endogenous

variable is smaller by construction, implying that the same level change would cause a larger percentage increase.

behavior of strategic firms on the commuting zone index score. However, if there are many strategic firms in any commuting zone, then the aggregate K/R ratio in this commuting zone would be smaller than the true K/R ratio of this commuting zone. While we cannot test this directly given the lack of payment card use data before Form 1099-K implementation, we present information in Figure 11 on the trajectory of the K/R ratio stratified into four quartiles of commuting zones based on our baseline K/R ratio.

Figure 11 indicates that the K/R ratios follow similar trends across all four quartiles in the years after the implementation of Form 1099-K, a result that is consistent with the argument that areas with a higher payment card use index did not significantly change their acceptance of payment cards due to third-party reporting.

If firms stopped accepting payment cards altogether to avoid receiving a Form 1099-K, then this behavior could also influence the index. However, we believe that the magnitude of such an extensive margin response (i.e., accepting any payment cards) would be negligible given the incentives faced by the businesses; that is, firms that receive a small share of receipts via payment cards can still significantly reduce taxable income by under-reporting cash income, while firms that receive a large share of receipts via payment cards should be hesitant to stop accepting payment cards because doing so may alienate customers who constitute a majority of their business.

Unfortunately, we cannot test this hypothesis directly due to the absence of information on payment card use before Form 1099-K. However, we are able to analyze the behavior of firms following the implementation of Form 1099-K in an attempt to gauge any lagged extensive margin response to the Form 1099-K implementation. To do so, we analyze small businesses from 2011 to 2014, years in which we have information on payment card use, to see if there is a differential entry or exit in accepting payment cards based on the payment card use index quartile. Table 1 presents the results. The first column indicates no differential trend in the net acceptance of payment cards for areas in the highest quartile of payment card use compared to areas in the lowest quartile of payment card use. The second column

restricts the sample to firms that received a Form 1099-K in 2011 to determine if there is differential discontinuation of payment card acceptance. The results for 2013 and 2014 are statistically insignificant from zero; the estimate for 2012 is positive and significant at the 5-percent level but small in magnitude. These results indicate that, if anything, firms in the lowest quartile of payment card use were more likely to forgo receiving payment cards in 2012 than firms in the highest quartile of payment card use. The last column analyzes firms that did not accept payment cards in 2011, and shows no differential new acceptance of payment cards in the following years based on the index quartile. Overall, it does not appear that firms were differentially encouraged or discouraged from accepting payment cards on the extensive margin. Nonetheless, due to data limitations, this analysis does not capture any adjustments that occurred in 2011.

VII. Robustness and Placebo Tests

To probe the robustness of the main results for the influence of Form 1099-K on receipts, we perform a series of robustness and placebo tests.

A. Robustness to Sample Selection Criteria

As detailed in the data section, we use a number of sample selection criteria to arrive at a sample of "small" businesses that we deem appropriate for our identification strategy. In this subsection, we explore the sensitivity of the results to the various sample selection criteria. Figure 12a reports the main specification with log receipts as the dependent variable removing various sample selection criteria. For reference, we report the results using our preferred sample selection criteria in the same figure. As illustrated, the "small" restriction on firms (i.e., receipts and deductions less than $10 million) generally has a minimal influence on the point estimates for the full sample and most of the business types. Nonetheless, removing the restriction causes the point estimate for S-corporation, which was statistically significant at the 10 percent level, to become marginally smaller and statistically insignificant. Similarly, allowing firms with a significant share of employees who re-

side in different commuting zones (based on W-2 information) does not significantly impact the main estimates.

The last regression results presented in Figure 12a drops both of these criteria along with restrictions requiring the K/R ratio to be less than 1.3, the maximum amount of Form 1099-K receipts to be less than $10 million, the non-mover status requirement to be present, and the restriction that firms cannot receive more than half of their receipts via third party networks to be present. In short, we remove all sample selection criteria except the balanced panel requirement, the business requirement, and a requirement that the firms have non-missing and valid industry and zip codes. The main results for the full sample and partnerships are insensitive to these criteria, with only some variability in sole proprietors, S-corporations, and C-corporations.

B. Robustness to the Inclusion of Different Fixed Effects

We also analyze the sensitivity to the inclusion of industry-by-year fixed effects in Figure 12b. The main result decreases slightly with the inclusion of industry-by-year fixed effects, and becomes statistically insignificant at the 10-percent level.

One possible explanation for the decrease is that the industry-by-year fixed effect is picking up the treatment effect itself. In other words, the implementation of Form 1099-K caused receipts to increase for certain industries, which were correlated with a high payment card index. To investigate this hypothesis, we estimate the effect of the industry-by-year linear trend on log receipts using data only from the years *preceding* the implementation of Form 1099-K. We then use the estimated coefficients to generate residuals for the entire sample period, and we use those residuals as the dependent variable in our regression (Kleven et al., 2014). This approach precludes the possibility that the estimated industry-by-year trend is the result of the implementation of Form 1099-K. When we do this, the point estimate and standard error on the DiD coefficient are nearly identical to those from our main model that does not include industry-by-year fixed effects.[35] This finding supports

[35]The estimated treatment effect from merely adding industry-by-year linear trends is nearly identical to

the hypothesis that the decrease in the point estimate was at least in part the result of the industry-by-year fixed effects absorbing some of the treatment effect.

Figure 12b also shows the influence of state-by-year fixed effects. The inclusion of state-by-year fixed effects both decreases the standard errors and increases the point estimates. Similarly, the inclusion of both types of fixed effects together also decreases the standard errors and increases the point estimates.

Finally, as seen in Figure 12b, the overall findings are also robust to the inclusion of industry-by-year and state-by-year fixed effects for various definitions of discrete treatment effects, rather than the main continuous DiD specification.

C. Robustness to the Removal of Bunching Firms

Slemrod et al. (2017) argue that firms with receipts approximately equal to gross Form 1099-K amounts represent firms that were likely underreporting receipts before the implementation of Form 1099-K. Their analysis showed that these *bunching firms* increased reported receipts due to the new third-party reporting. In contrast to the bunching analysis presented in Slemrod et al. (2017), our results are derived from estimation from a broad sample of small businesses using geographical variation in payment card use.

Here, we analyze the sensitivity of our results to the exclusion of these bunching firms that are the most likely evaders. Figure 13 reports both the main results for comparison and the estimation results from a sample excluding sharp and diffuse bunchers (i.e., firms with $K/R \geq 0.95$) stratified by business type and industry. As illustrated, removing the bunching firms from the analysis decreases the point estimate in almost all of the specifications, indicating that bunching firms contain businesses that likely underreported receipts prior to implementing Form 1099-K. Nonetheless, the point estimates continue to be statistically significant and economically meaningful for partnerships and industries where the increases in receipts were the most pronounced. Altogether, these results indicate that the influence of Form

the point estimate from the specification that uses industry-by-year fixed effects. Thus, it does not appear that the more parametric *linear* trend is the difference.

1099-K was not exclusively due to changes in behavior by bunching firms.[36]

D. Placebo Tests

As a placebo test, we estimate the impact of Form 1099-K by using the same geographic variation in payment card use as the main analysis, but using firms that *do not* accept payment cards. Since firms that do not accept payment cards should not be affected by Form 1099-K, this experiment provides us with the placebo treatment effects. If we find that these placebo effects are statistically significant from zero, then it suggests that our identifying strategy is weak. However, if these placebo effects are statistically insignificant, then it strengthens the argument of our identification strategy.

Table 2 presents the results analyzing firms that did not receive a Form 1099-K in the sample period. We do not find any statistically significant increase in receipts either in the full sample or across all business types analyzed in the full sample. Therefore, these findings further support our identification strategy used in the main analysis.

VIII. Conclusions

In this paper, we analyze the impact of Form 1099-K on small business tax compliance by exploiting geographic variation in consumers' use of payment cards. In expectation, firms in localities where the use of payment cards by consumers is high receive a greater share of their revenue through payment cards and thus have a greater share of revenue reported to the IRS via Form 1099-K. We develop an index of the intensity of payment card use at the commuting zone level using the information available on Form 1099-K and various tax returns and information reports. We then estimate various DiD models in which we compare the trends in receipts, deductions, and net income between firms located in the high payment card use

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[36] Analysis conducted excluding firms with $K/R \geq 0.85$ (i.e., earliest point where Slemrod et al. (2017) detect some bunching responses) yield very similar results with the point estimates only marginally decreased in comparison to the analysis presented in Figure 13.

areas and firms located in the low payment card use areas based on the index, for several years before and after the introduction of Form 1099-K.

Overall, we find that firms in the commuting zone with 10 percent more payment card use reported a 0.32 percent increase in receipts after Form 1099-K implementation. Generally, we do not find evidence of statistically significant increases in deductions to counter the increased receipts. Our results show that Form 1099-K is more effective than previously found in the pathbreaking analysis by Slemrod et al. (2017). These differences in results are likely explained by several factors.

Recall that there are two main types of analysis in Slemrod et al. (2017). The first one is the aggregate impact of 1099-K, where they compare the changes in reporting between those 1099-K recipients that did not receive a 1099-MISC prior to 2011 to those that received a 1099-MISC prior to 2011. However, as discussed in section II.A, there is minimal overlap between 1099-K and 1099-MISC, and 1099-MISC does not cover significant sources of business revenue. Consequently, many firms in their control group are likely to be very similar to those in their treatment group, which could attenuate the results and explain their economically and statistically insignificant findings.

In addition, the bunching design of Slemrod et al. (2017) focuses exclusively on the most likely evaders. They find economically large and statistically significant but largely off-setting responses, a result that seems plausible because those who are the most likely evaders seem also likely to respond aggressively by reporting an off-setting increase in deductions. In contrast, our results study the full spectrum of firms affected by 1099-K. Using this larger sample, we find a modest but significant impact on receipts but no impact on deductions in the aggregate; the former result is similar to Slemrod et al. (2017), while the latter result is different. Of note, we also find substantial heterogeneity in the size of responsiveness of businesses, results that are consistent with Slemrod et al. (2017) as we find that the most responsive subgroups (e.g., partnerships and many business-to-consumer industries) show significant off-setting responses. Our results are highly robust across multiple specifications, including specifications in which we exclude all bunching firms from

the analysis. This implies that our design was able to uncover the positive impact of Form 1099-K on many businesses across the spectrum of the K/R ratio, the suggestive evidence of which can also be visually detected in the binned scatter graphs in Figure 4a. Nevertheless, the increase in deductions is less than the increase in receipts, implying a modest increase in tax compliance even among the off-setting subgroups.

We conclude that third-party information reporting can often be an effective tool for improving tax compliance, but with substantial heterogeneity in its effectiveness. We hope that our new results give encouragement—and guidance—to governments interested in expanding third-party information programs to increase tax compliance.

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Figure 1. The Payment Card Use Intensity Index Map

(.29,.57]
(.25,.29]
(.22,.25]
(.18,.22]
[.09,.18]
N<100
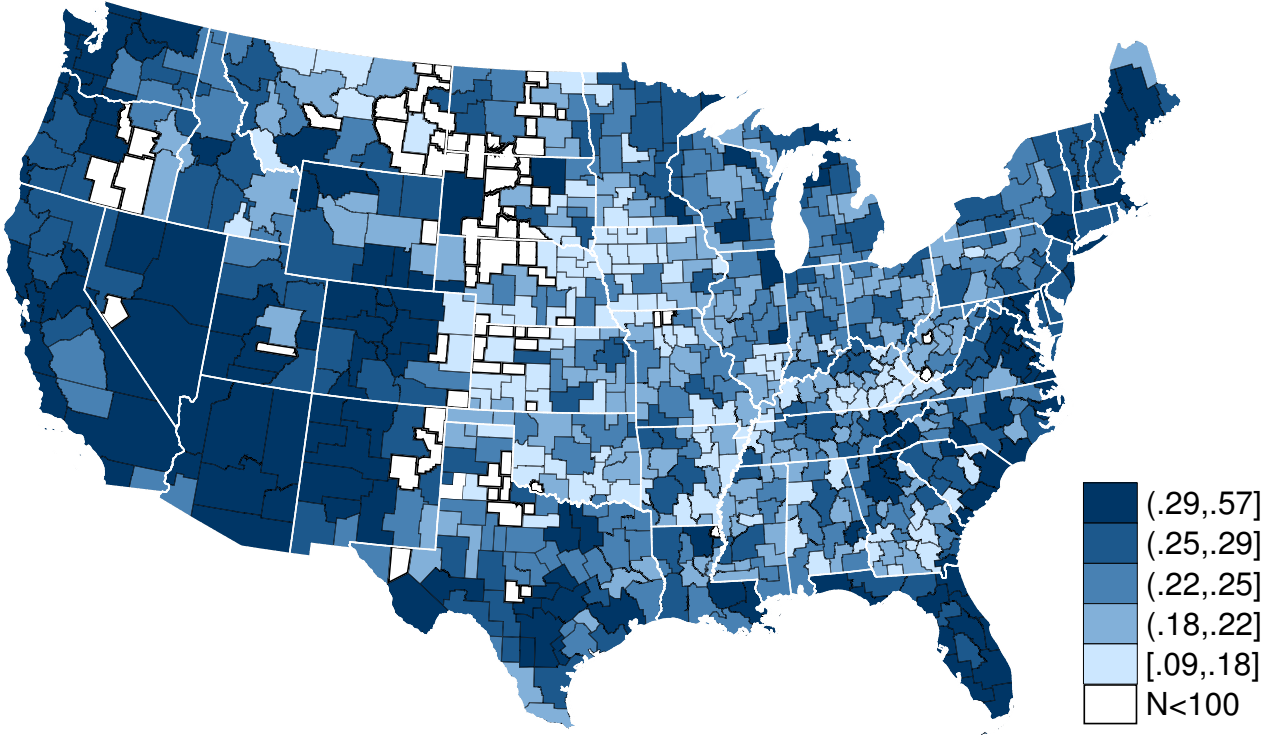
Note: The index is calculated as the share of receipts reported on Form 1099-K (i.e., from payment cards) to the total amount of receipts reported on income tax forms at the commuting zone level in 2012. The darker shade of blue indicates higher payment card use. We require at least 100 taxpayers in the commuting zone to calculate the index, which meant there were some commuting zones, shown in white, with insufficient data for the calculation.

Figure 2. Summary Statistics
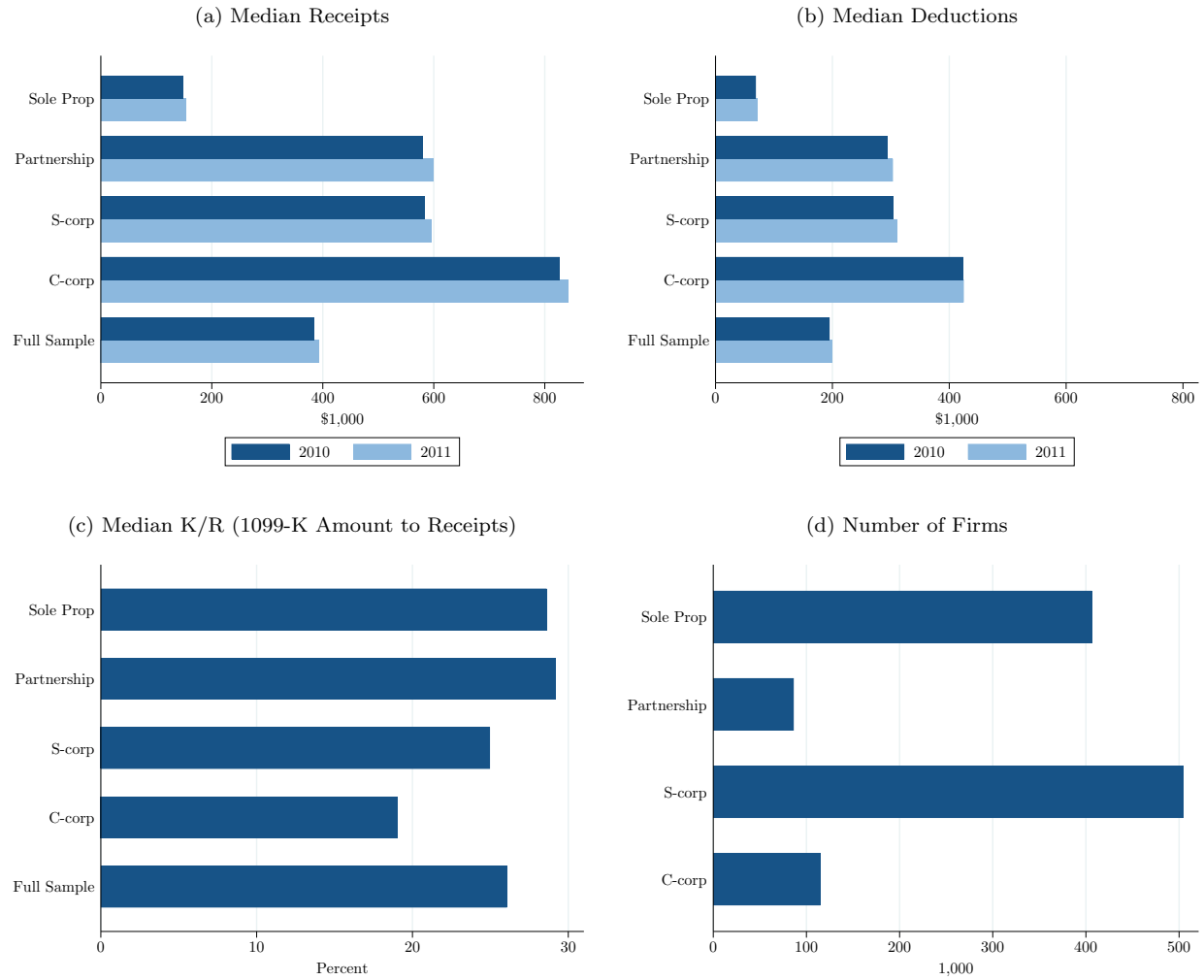
(a) Median Receipts

(b) Median Deductions

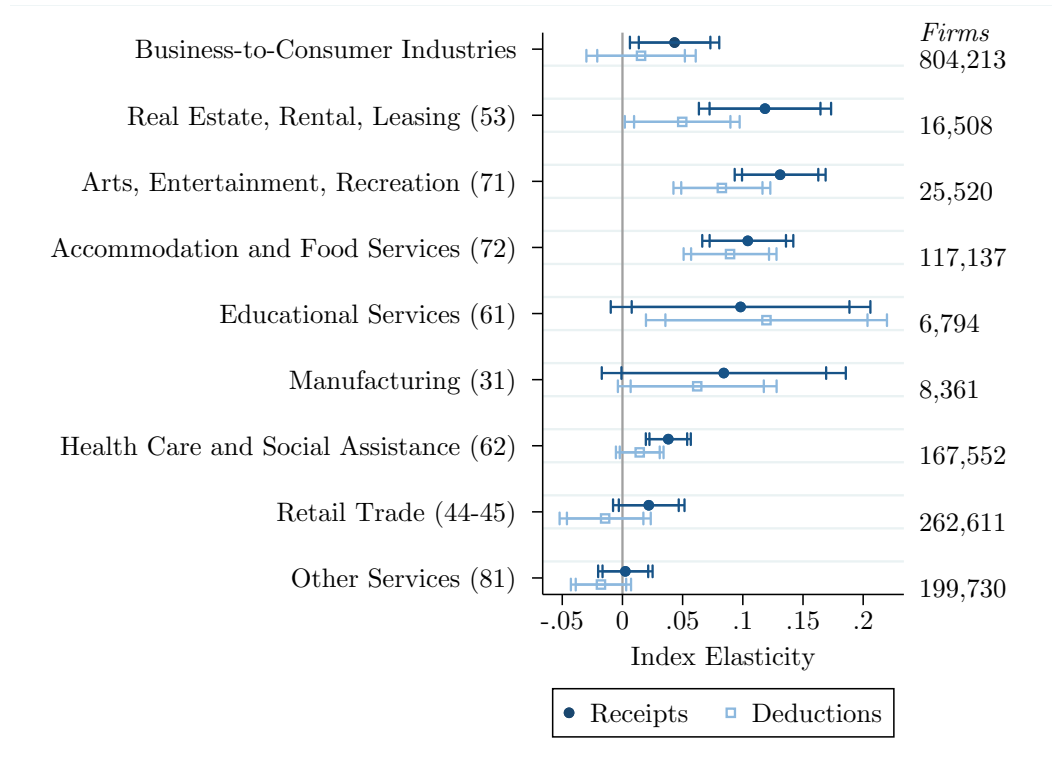### (c) Median K/R (1099-K Amount to Receipts)

(d) Number of Firms

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed from 2007 to 2014 and received at least one Form 1099-K in 2011.

Figure 3. The Trend in Log Receipts and Deductions by Payment Card Use Index Quartile around Form 1099-K Implementation in 2011

(a) Receipts
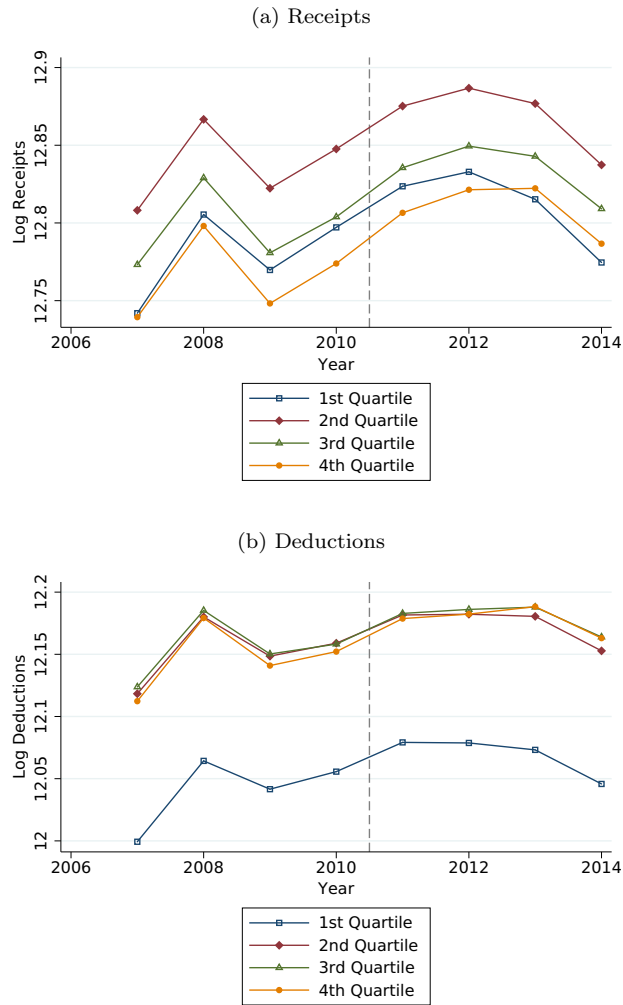
(b) Deductions

Note: The figure plots the average of log receipts and deductions by quartile using a sample of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011.

Figure 4. The Changes in Receipts and Deductions Before and After the Implementation of Form 1099-K
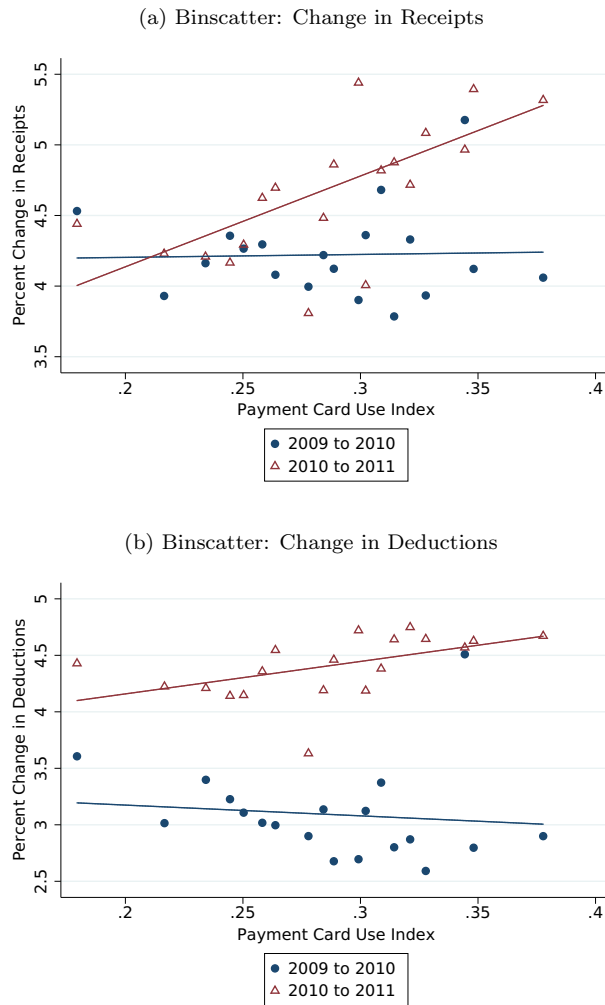
(a) Binscatter: Change in Receipts

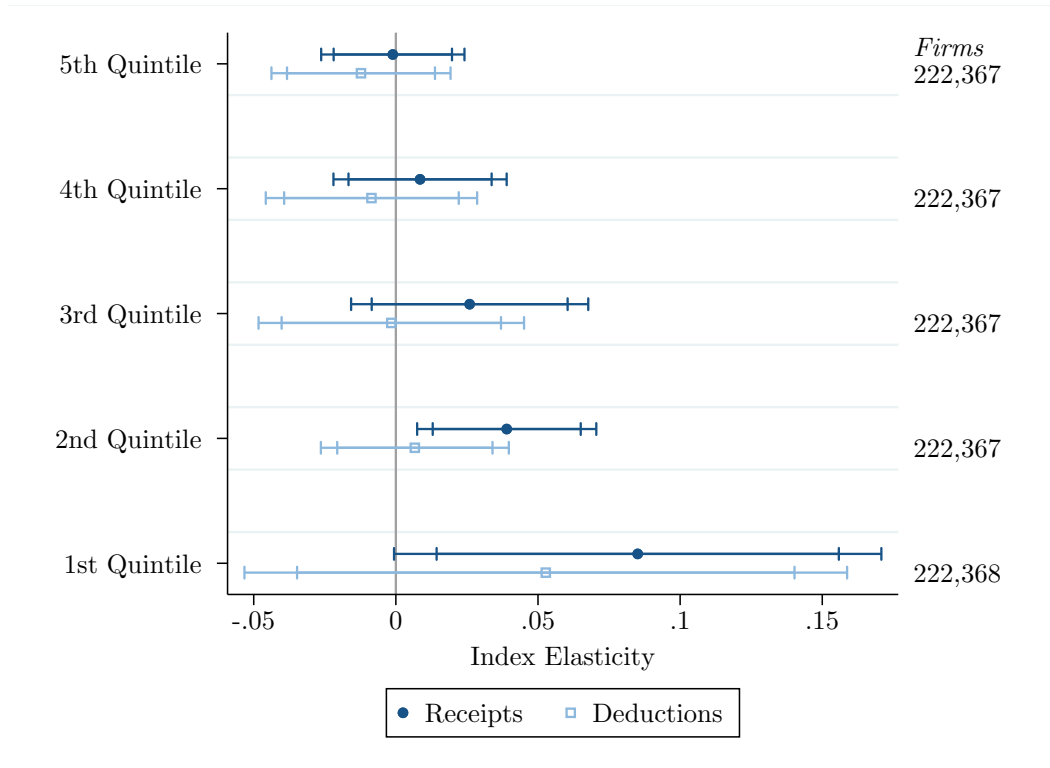(b) Binscatter: Change in Deductions

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. We exclude a few outlier observations with percentage changes greater than 200 percent (roughly the top 1 percent). The scatter plot does not take into account any control variables.

Figure 5. Event Study: The Impact of Form 1099-K on Log Receipts and Deductions

Treatment: Highest Quartile of Payment Card Use
Control: Lowest Quartile of Payment Card Use
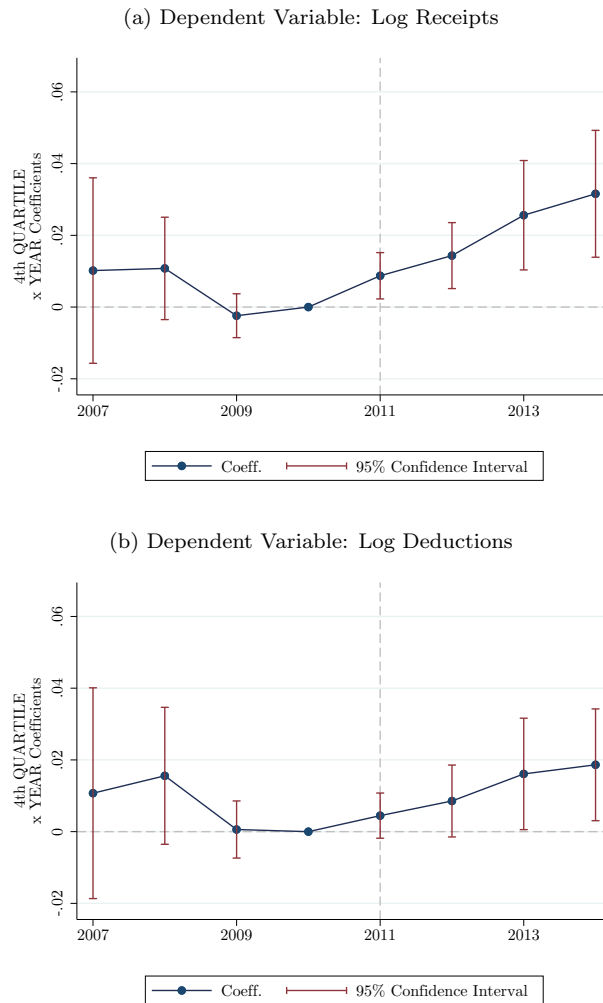
(a) Dependent Variable: Log Receipts
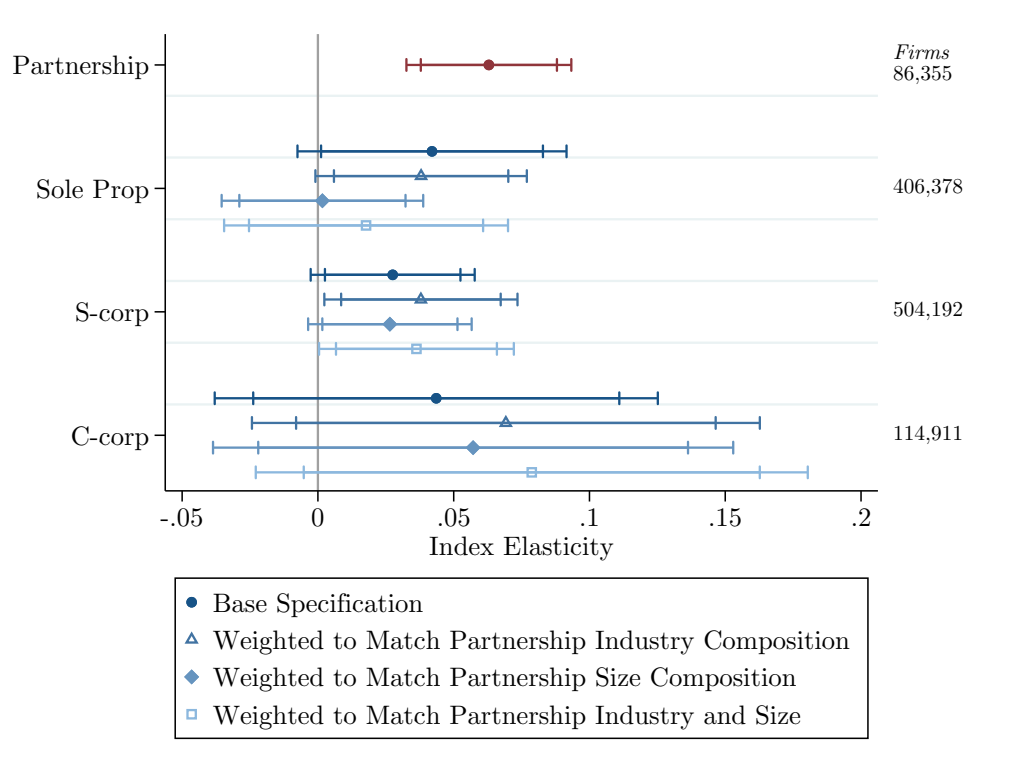

(b) Dependent Variable: Log Deductions

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011 and that were in localities in the top or bottom quartile of payment card use. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level.

Figure 6. The Impact of Form 1099-K on Log Receipts and Deductions
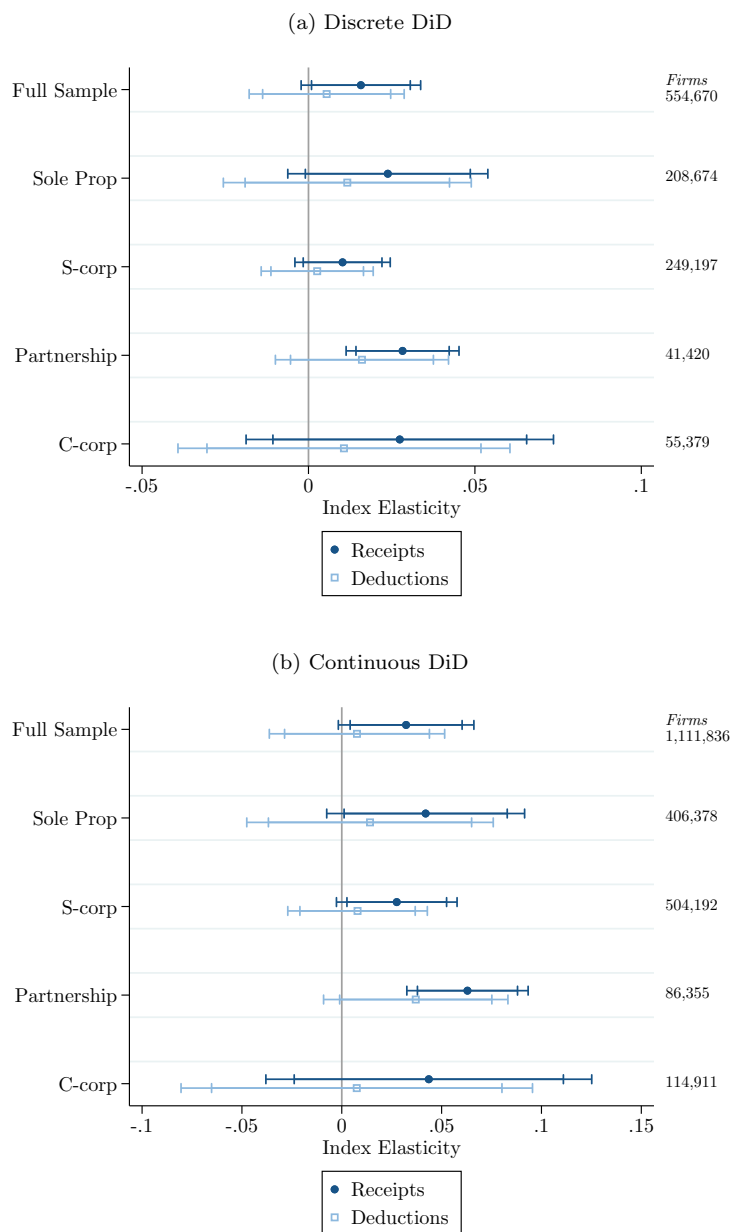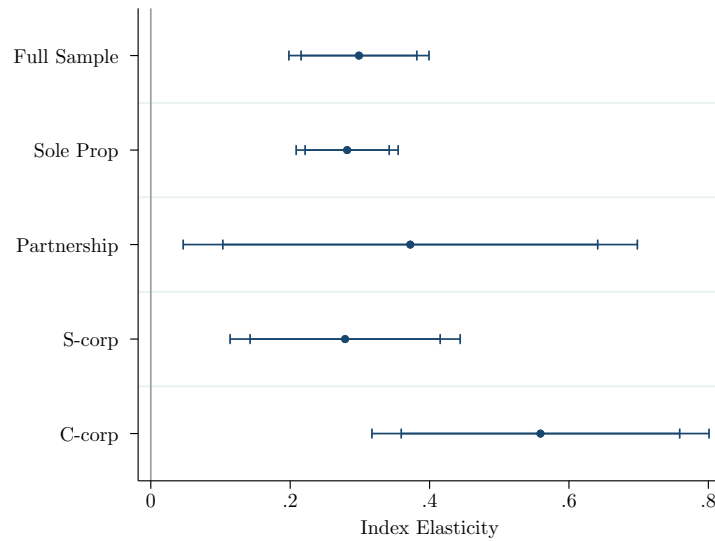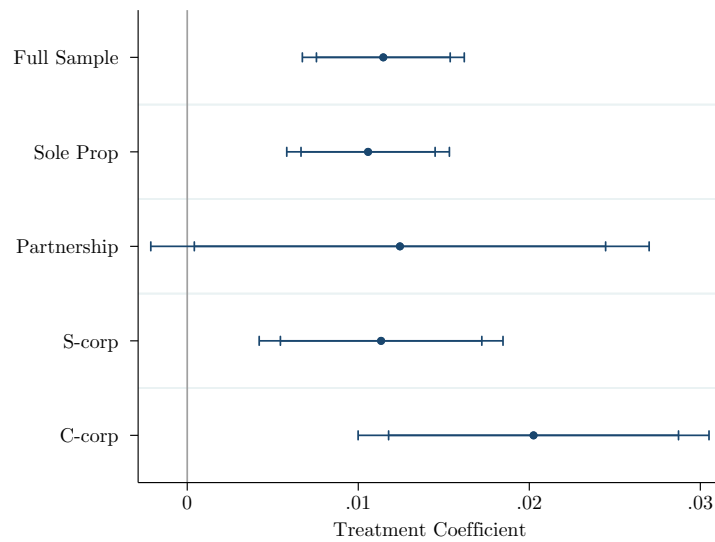
(a) Discrete DiD

(b) Continuous DiD

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. The horizontal bars represent 95% and 90% confidence intervals. In the discrete DiD, the treatment group consists of firms located in the commuting zone belonging to the top quartile of payment card use and the control group consists of firms located in the commuting zone belonging to the bottom quartile of payment card use.

Figure 7. The Impact of Form 1099-K on Log Receipts and Deductions by Industry
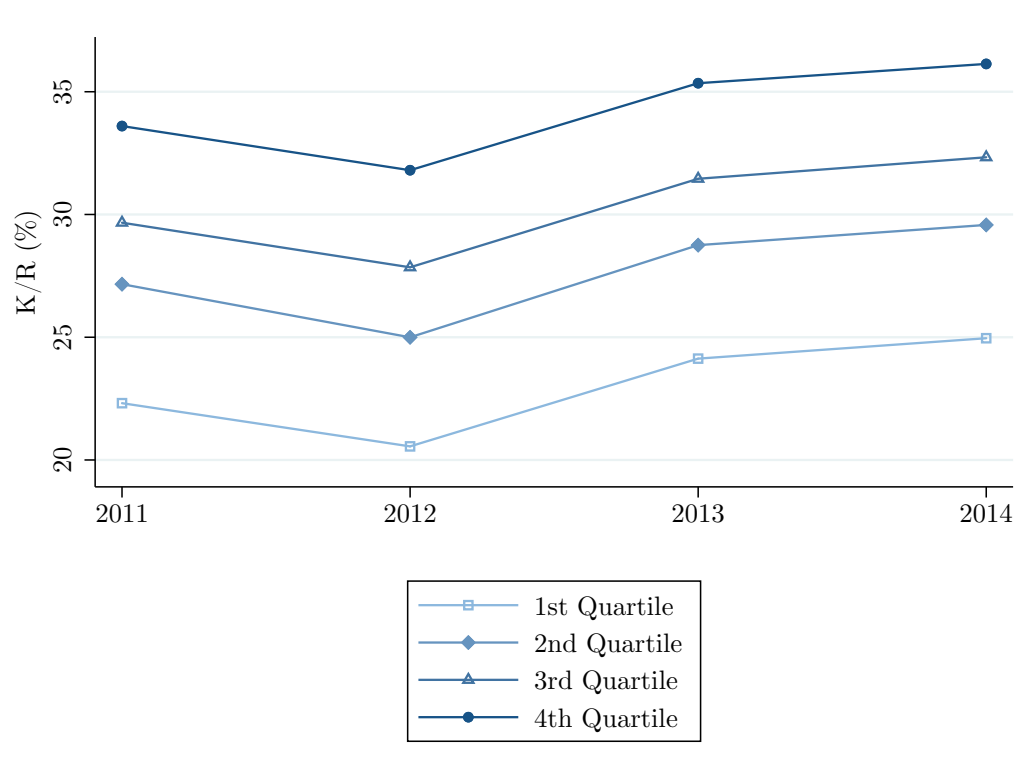

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone level. The horizontal bars represent 95% and 90% confidence intervals.

Figure 8. The Impact of Form 1099-K on Log Receipts and Deductions by Firm Size

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. The breaks between the gross income quintiles are $112,598, $269,346, $542,291, and $1,165,888 , with a maximum of $10,000,000. The horizontal bars represent 95% and 90% confidence intervals.

Figure 9. The Regression Analysis that Match the Industry and Firm Size Composition of Each Business Types to Partnerships using Entropy Weights
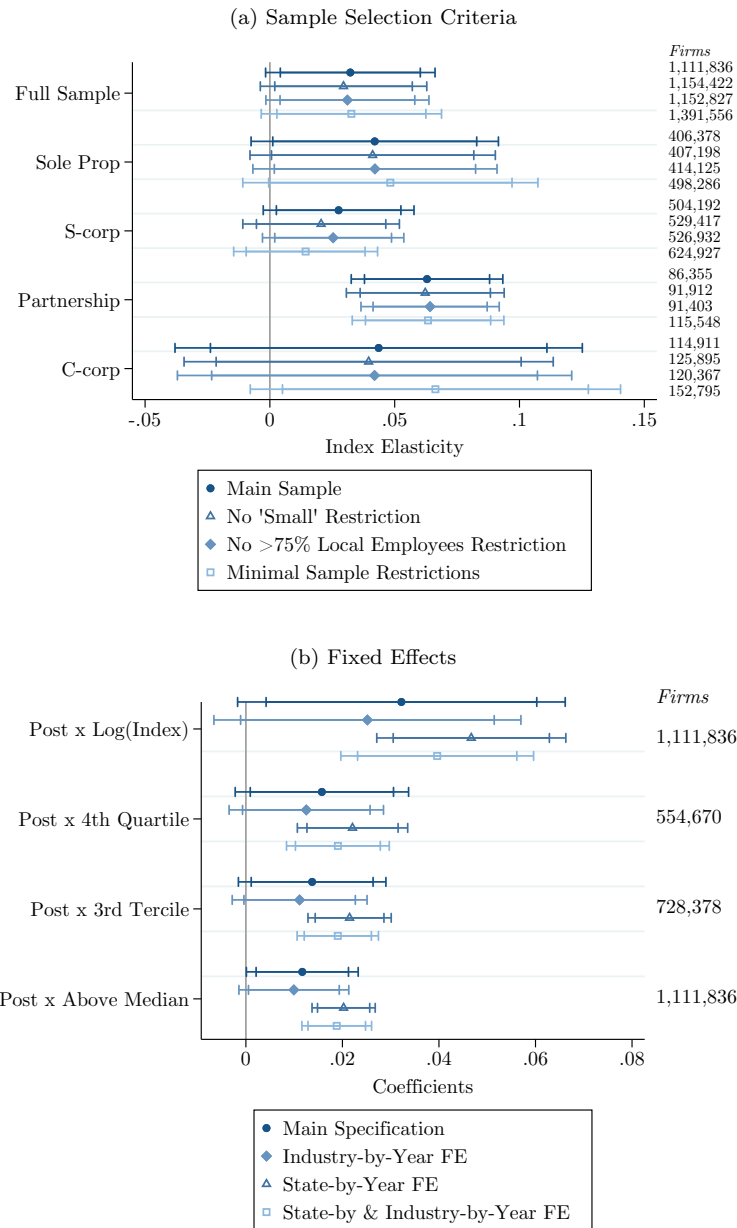

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. We used the *ebalance* package in Stata (Hainmueller and Xu, 2013) to reweight the business types to match the industry composition (matched on the first moment) and size composition (matched on the first three moments) to that of partnerships, the filing type with the largest response. The horizontal bars represent 95% and 90% confidence intervals.

Figure 10. The Impact of Form 1099-K on Net Income

(a) Dependent Variable: $asinh(Receipts - Deductions)$

(b) Dependent Variable: $I(Receipts - Deductions > 0)$
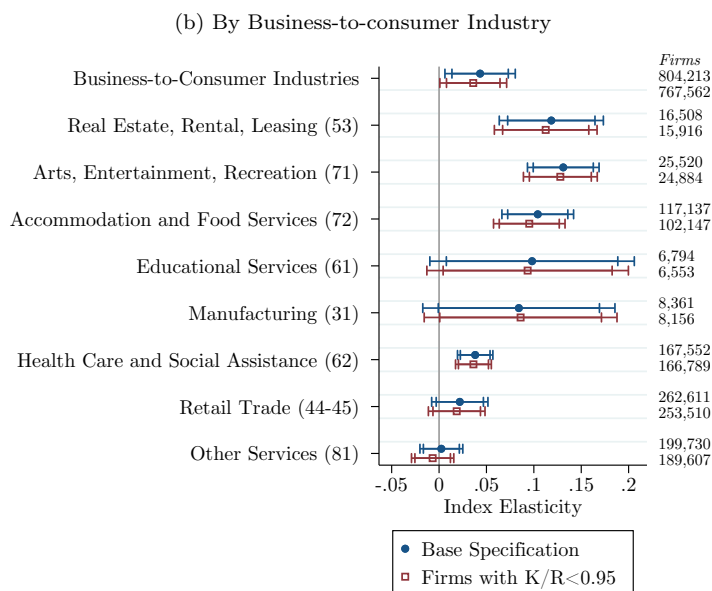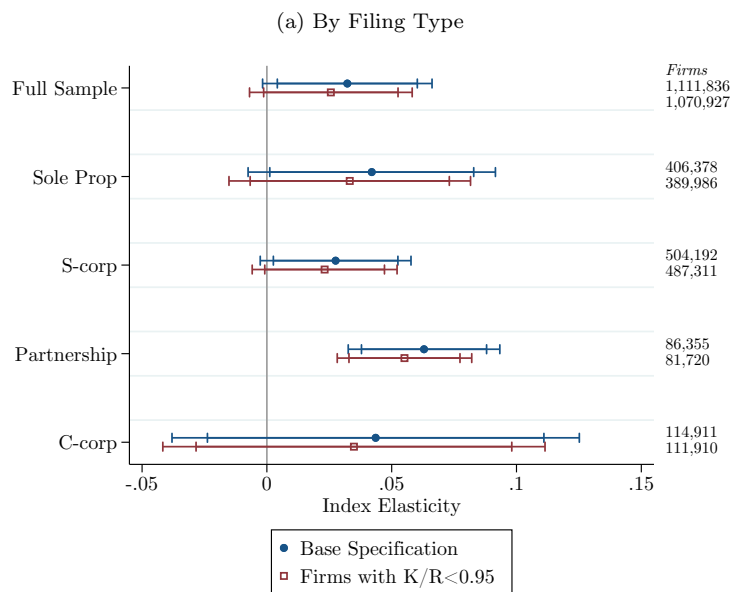

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. The horizontal bars represent 95% and 90% confidence intervals.

Figure 11. The Trend in the Share of 1099-K Receipts to Total Receipts (K/R)

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011.

Figure 12. Robustness to Sample Selection Criteria and Different Fixed Effects

Dependent Variable: Log Receipts

(a) Sample Selection Criteria

(b) Fixed Effects

Note: The sample consists of businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in each of the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. The horizontal bars represent 95% and 90% confidence intervals. "Minimal Sample Restrictions" include the balanced panel of businesses with valid data for zip codes and NAICS codes.

Figure 13. The Influence of Form 1099-K on Receipts without *Bunching Firms*
(Exclude firms with $K/R \geq 0.95$)

(a) By Filing Type

(b) By Business-to-consumer Industry

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. The baseline results are presented in blue for reference. The results presented in red further restrict the sample to firms with a ratio of 1099-K receipts to reported receipts less than 0.95 in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level.

Table 1—<u>The Impact of 1099-K on the Probability of Accepting Payment Cards</u>

		Status in 2011	
	Full Sample	Received 1099-k	No 1099-k
4th Quartile ×			
2012	0.003	0.017**	0.002
	(0.002)	(0.006)	(0.003)
2013	0.001	0.001	0.004
	(0.002)	(0.008)	(0.004)
2014	0.003	−0.002	0.009
	(0.004)	(0.010)	(0.007)
Observations	12,348,166	3,147,774	9,200,392
Firms	3,108,554	802,542	2,306,012

Note: The sample consists of small businesses (sole proprietorships, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2011 to 2014. The second specification is limited to firms that received a 1099-K in 2011 and the third specification is limited to firms that did not receive a 1099-K in 2011. All specifications are restricted to firms in localities in the top or bottom quartile of payment card use. Firm and year fixed effects were included but not reported here. Standard errors are clustered at the commuting zone and industry (two-digit NAICS code) levels and are shown in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 2—Placebo Tests: The Impact of 1099-K on Log Receipts of Firms Not Receiving a 1099-K

	Full Sample	Sole Prop	S-corp	Partnership	C-corp
$\text{Post}_t \times \text{Log}(\text{Index}_j)$	−0.016	0.000	−0.024	−0.025	−0.030
	(0.029)	(0.031)	(0.029)	(0.029)	(0.062)
Observations	22,273,288	14,286,864	5,773,992	1,097,976	1,114,456
Firms	2,784,161	1,785,858	721,749	137,247	139,307

Note: The sample consists of small businesses (sole proprietorships, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and that did not receive a 1099-K. Firm and year fixed effects along with the commuting zone unemployment rate were included but not reported here. Standard errors are clustered at the commuting zone and industry (two-digit NAICS code) levels and are shown in parentheses *** p<0.01, ** p<0.05, * p<0.1.
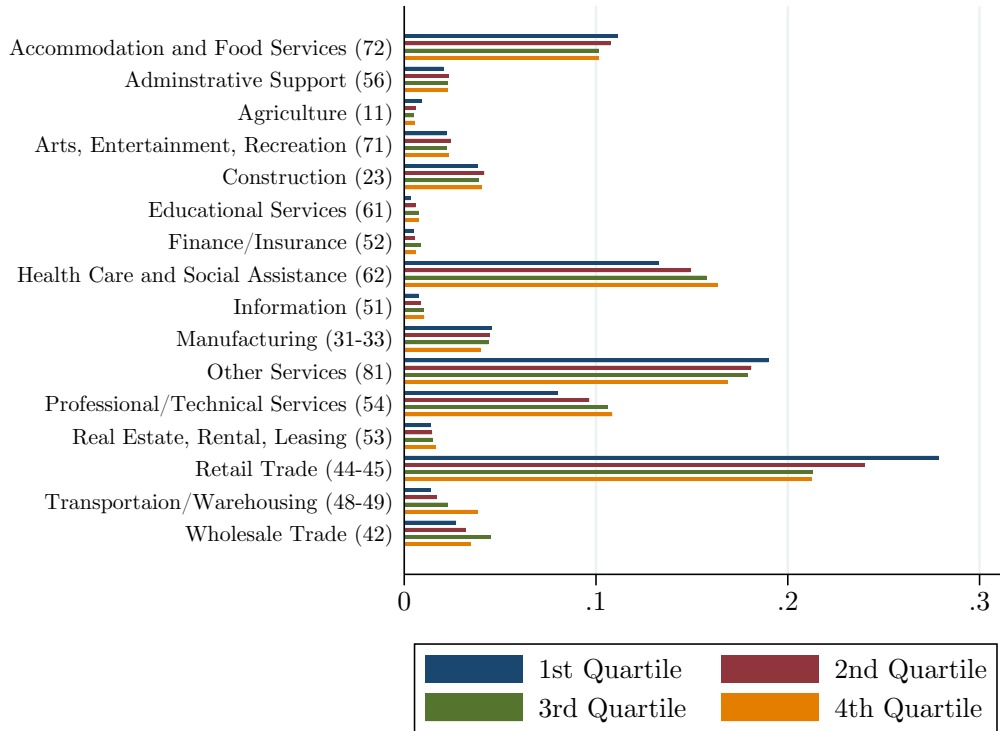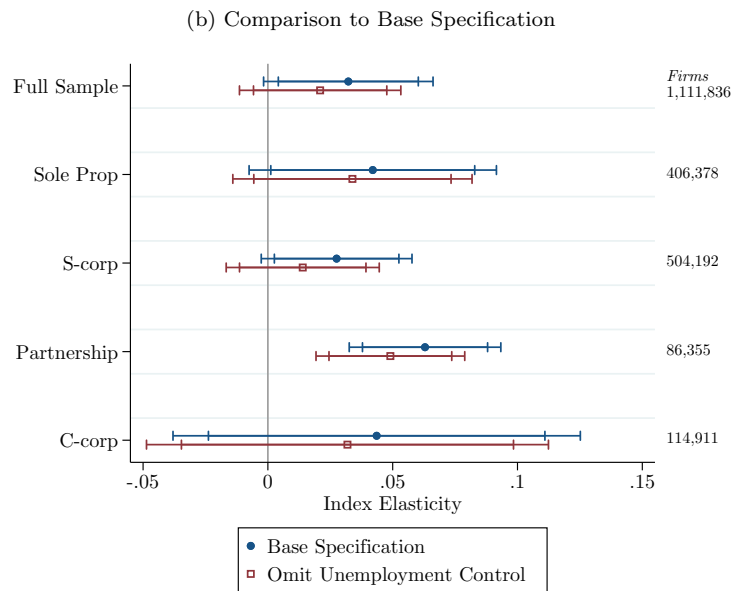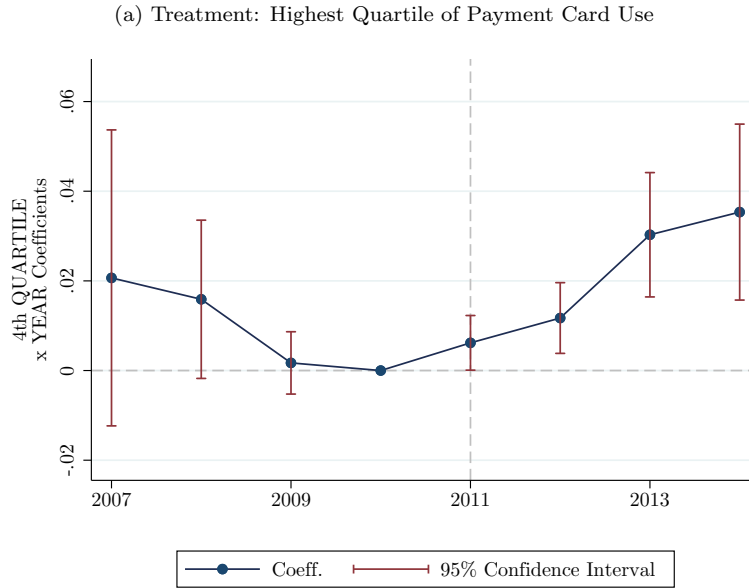
Online Appendix: Not for Publication

Figure A1. The Main Results for Unbalanced Panel
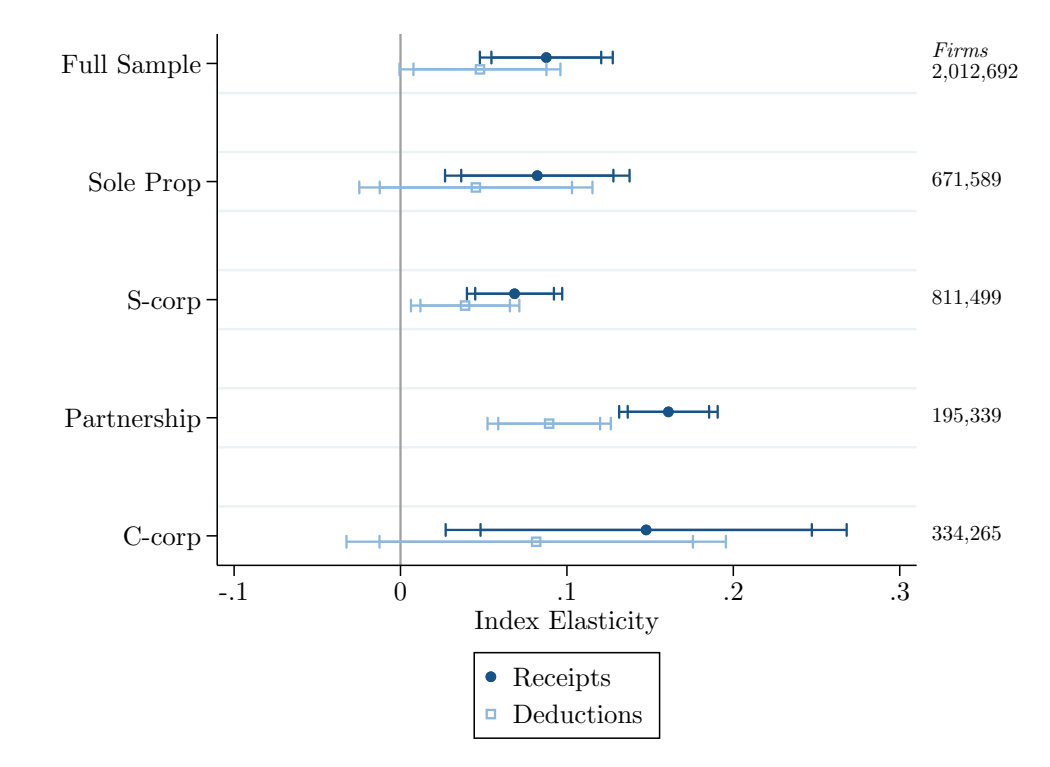
Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level.The horizontal bars represent 95% and 90% confidence intervals.

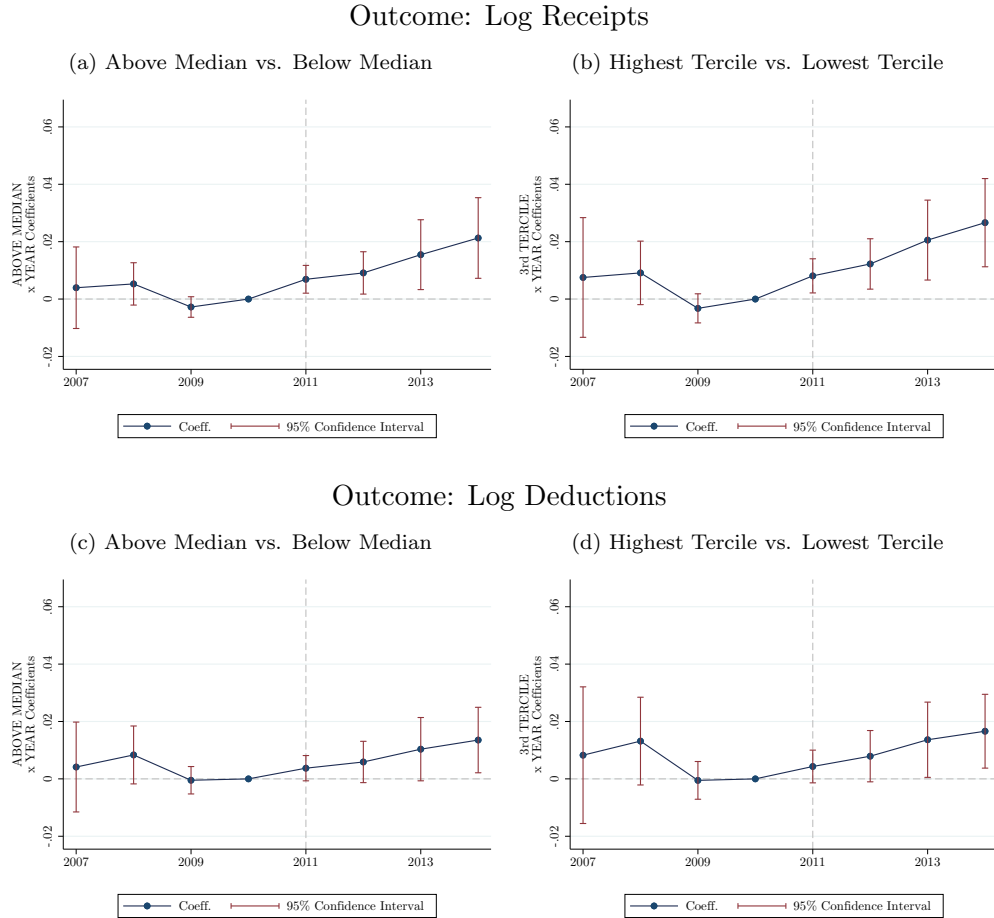Figure A2. Industry Composition by Index Quartile

Note: The figure shows the distribution of firms within a particular payment card use quartile (i.e., the sum of all of the bars for a particular quartile is one). The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. For presentation purposes only, the following 2-digit industries were not presented as they represent extremely small shares across all business types: Mining (21), Utilities (22), Management (55), and Public Administration (92).

Figure A3. Event Study: The Impact of Form 1099-K on Log Receipts without Unemployment Control
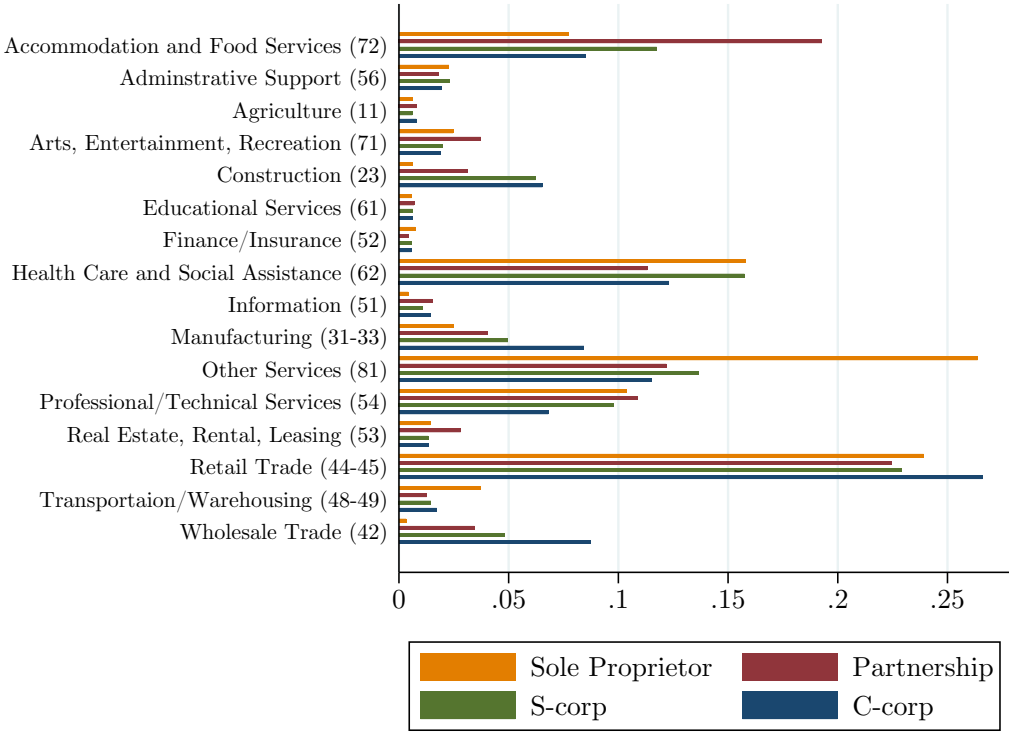
(a) Treatment: Highest Quartile of Payment Card Use

(b) Comparison to Base Specification

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. In Panel (a) the sample is further restricted to localities in the top or bottom quartile of payment card use. Firm and year fixed effects were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level. In Panel (b), the horizontal bars represent 95% and 90% confidence intervals.

Figure A4. Event Study: The Impact of Form 1099-K on Log Receipts and Deductions

Outcome: Log Receipts

(a) Above Median vs. Below Median

(b) Highest Tercile vs. Lowest Tercile

Outcome: Log Deductions

(c) Above Median vs. Below Median
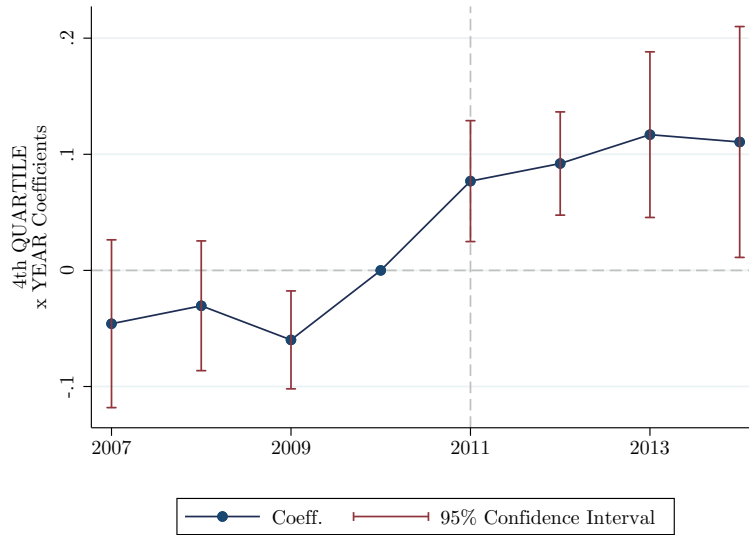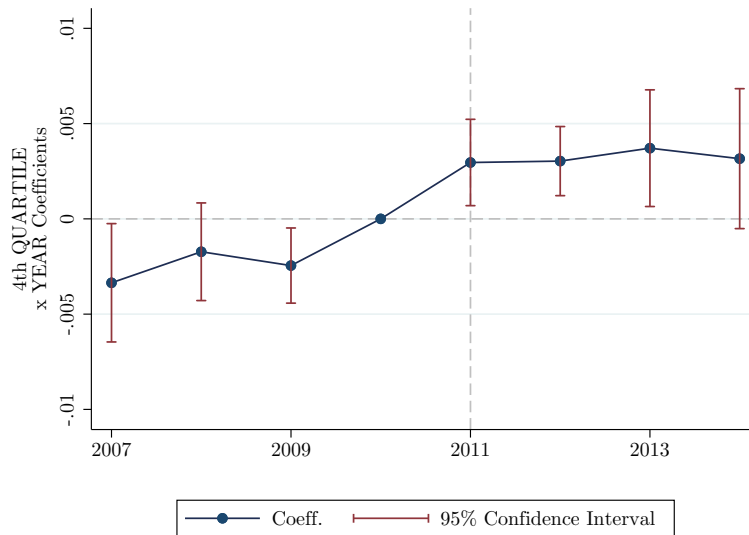
(d) Highest Tercile vs. Lowest Tercile

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011 and that were in localities in the top or bottom quantile of payment card use respectively for median and tercile. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level.

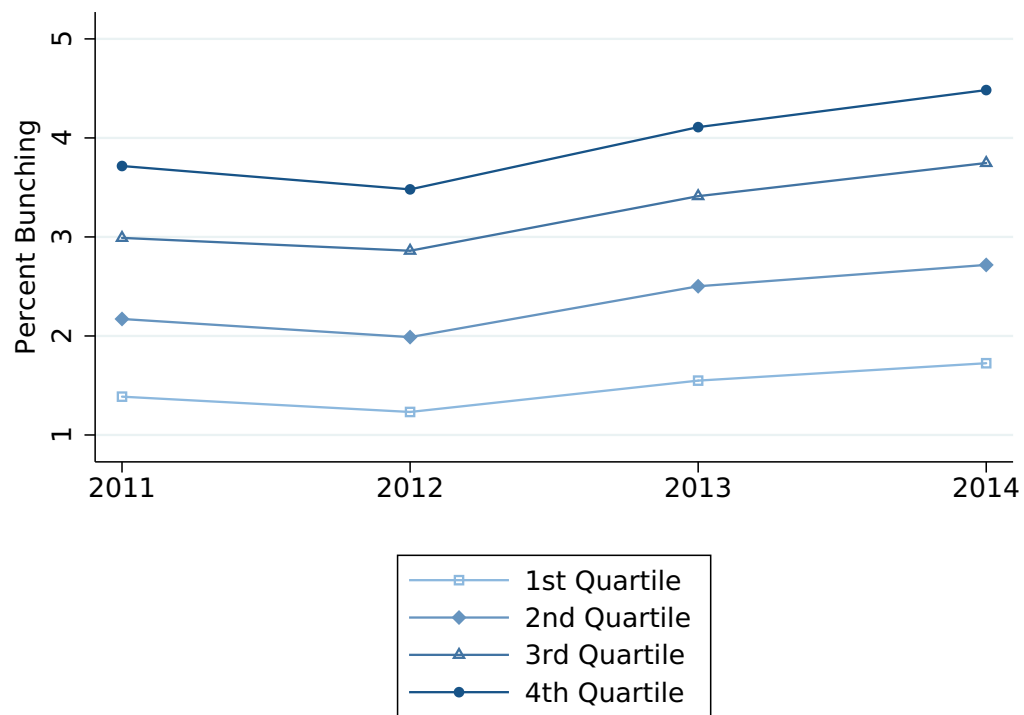Figure A5. Industry Composition by Filing Type

Note: The figure shows the distribution of firms within a particular business type (i.e., the sum of all of the bars for a particular business type is one). The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. For presentation purposes only, the following 2-digit industries were not presented as they represent extremely small shares across all business types: Mining (21), Utilities (22), Management (55), and Public Administration (92).

Figure A6. Event Studies for Alternative Outcomes

(a) Dependent Variable: $asinh(Receipts - Deductions)$

(b) Dependent Variable: $I(Receipts - Deductions > 0)$

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011. Firm and year fixed effects along with commuting zone unemployment rate were controlled for in the empirical specification, and standard errors were clustered at the commuting zone and two-digit NAICS code level.

Figure A7. The Trend in the Share of Bunching Firms ($K/R \geq 0.95$)

Note: The sample consists of small businesses (sole proprietors, partnerships, S-corporations, and C-corporations) that consistently filed tax returns from 2007 to 2014 and received at least one Form 1099-K in 2011.