# Taxpayer Responses to Third-Party Income Reporting: Preliminary Evidence from a Natural Experiment in the Taxicab Industry

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## 1. Introduction

The reporting by employers to the Internal Revenue Service (IRS) of the wage and salary income they paid to their employees has proved to be an effective tax compliance tool, resulting in 99 percent of such income being properly reported and taxed, while the compliance rate for income not subject to such "third-party" reporting is only 44 percent (Internal Revenue Service (2016)). To improve tax compliance by small business, the United States Congress enacted a law in 2008 (implemented starting in 2011), whereby processors of credit and debit cards such as Visa and MasterCard and electronic payment systems such as PayPal were required to report to the IRS the gross receipts of businesses accepting these forms of payment. A new information report called Form 1099-K was introduced to facilitate reporting. However, income received in cash was not affected by the Form 1099-K, and expenses are still not reported by third parties, which leaves room for tax evasion through underreporting of cash income or overreporting of expenses.

This paper proposes a novel method of estimating the causal impact of third-party reporting on small-business tax compliance. We exploit the natural experiment created by the interaction of the introduction of Form 1099-K in 2011 and the introduction of laws requiring taxicabs to install credit card readers in various cities in the U.S. We use a difference-in-differences research design in which we compare the trends in the receipts, expenses, and the ratio of the receipts and expenses of the taxi services who operate in cities with mandatory credit card laws (i.e., the treated group) to the taxi services who operate in cities without mandatory credit card laws' (i.e., the control group) before and after the treatment. We combine data on when credit card laws were implemented with administrative tax return data for the taxicab industry extracted from Form 1040 Schedule C and Form 1099-K.

Our research is among the first to systematically evaluate the effects of the Form 1099-K on small-business tax compliance. It builds upon the work by Slemrod, Collins, Hoopes, Reck, and Sebastiani (2015) by providing causal evidence on the impact of third-party reporting. Our results are preliminary, but they suggest that taxpayers respond to third-party information reporting in offsetting ways; that is, firms reported more revenue after the introduction of Form 1099-K, but the increase in reported revenue was accompanied by an offsetting increase in reported expenses.

## 2. The Natural Experiment

In the last decade, more than 25 cities have passed laws requiring taxicabs to install credit card readers in their vehicles, referred to as "credit card laws." These credit card laws were passed to improve the riding experience of the public. We compiled a list of all cities that introduced credit card laws from 2004 to 2016 by referring to various legal sources (e.g., Municode[1] and the American Legal Publishing Corporation[2]), local government websites, and articles from the local press. Table 1 lists the cities with credit card laws, the date of adoption,

[1] See https://www.municode.com/library/.

[2] See http://www.amlegal.com/code-library/.

and the effective date of implementation. In 2004, New York was the first city to pass the credit card law, and Seattle and Philadelphia followed suit the following year. These credit card laws are plausibly exogenous to the introduction of Form 1099-K because they were passed as a measure to improve the quality of taxi services and not because of any fiscal or tax compliance reasons, providing a source of variation comparable to those obtained via randomization.[3]

**TABLE 1. Adoption of Taxicab Credit Card Laws in U.S. Cities, by Order of Effective Date**

| City | State | Adoption Date | Effective Date |
|---|---|---|---|
| Seattle | Washington | Feb 2005 | Jul 2005 |
| Philadelphia | Pennsylvania | 2005 | 2006 |
| New York | New York | Mar 2004 | Dec 2008 |
| Boston | Massachusetts | Aug 2008 | Jan 2009 |
| Indianapolis | Indiana | N/A | 2011 |
| Minneapolis | Minnesota | N/A | Jun 2012 |
| Charlotte | North Carolina | Jul 2011 | Jul 2012 |
| San Francisco | California | Jun 2012 | Jul 2012 |
| New Orleans | Louisiana | Apr 2012 | Aug 2012 |
| Chicago | Illinois | Jul 2012 | Jan 2013 |
| Washington | District of Columbia | May 2013 | Sep 2013 |
| Columbus | Ohio | Jul 2013 | Jun 2014 |
| Fort Worth | Texas | Aug 2014 | Aug 2014 |
| Baltimore | Maryland | N/A | Dec 2014 |
| Houston | Texas | Aug 2014 | Feb 2015 |
| Miami | Florida | Jan 2014 | Jan 2016 |
| Kansas City | Missouri | Apr 2015 | N/A |
| Atlanta | Georgia | Sep 2015 | N/A |

NOTE: N/A denotes that the credit card law was adopted but that the precise date could not be obtained.

SOURCE: Municode (https://www.municode.com), eLaws.us (http://www.elaws.us), and American Legal Publishing (http://www.amlegal.com).

## 3. Data, Sample Selection, and Methodology

We examine city-level aggregate data for the hundred largest cities in the U.S. from 2006 to 2014. These data come from the Form 1040 Schedule C and Form 1099-K filed with the IRS, which were accessed via the Compliance Data Warehouse (CDW), the IRS research repository of tax return data. The information reports from credit card and other payment processing companies were matched to the income details from 1040 Schedule C using Taxpayer Identification Numbers (TINs).

The taxicab industry was identified using the North American Industry Classification System (NAICS) code 485300. Although the tax return data from the IRS are of very high quality, there are still some issues with the data. Some errors are caused by errors in filing and others by unsuccessful matching of the TINs when combining Form 1099-K and 1040 Schedule C. Thus, we clean the data of outliers and data errors that create implausible numbers. First, the amount of receipts reported on Form 1099-K should be lower than the total receipts reported in Schedule C for most taxpayers since Form 1099-K reports only amounts received through credit card and electronic payment systems. Accordingly, we remove individual taxpayers for whom the ratio of receipts from Form 1099-K to Schedule C is greater than 1.1.[4] Second, there were some cases where the reported expenses were implausibly high, so we removed the top 1 percentile of filers with "excessive" expenses (or expenses exceeding $124,156).

[3] For instance, New Orleans and Indianapolis implemented credit card in taxi laws in the year that they hosted the Super Bowl, so as to improve the quality of the city's taxi services.

[4] There are a number of reasons why the Form 1099-K amount could exceed reported receipts. For example, consider merchandise returns or cash back services on card purchases provided by merchants. The full amounts of these transactions would be included in the payment processor and thus in the Form 1099-K amount, but these amounts would not all add to actual revenues for the merchants.

Since we do not have a direct measure of tax underreporting, we infer the effect on underreporting from the data on taxpayer reports, using a "traces-of-evasion" approach (Slemrod and Weber (2012)). To that end, we examine the changes in three important outcomes around the treatment: receipts reported, expenses reported, and the ratio of expenses to receipts.

Figure 1 presents the trends in the log of total receipts from 2006 to 2014. The horizontal axis contains relative years from treatment; that is, Year 0 indicates the first year when both Form 1099-K was implemented and the credit card law was in effect for the particular city. There is a clear jump in the receipts reported in Year 0 and forward, suggesting that the treatment increased reported revenue. Similarly, we notice a clear jump in Figure 2, which plots the trends in the log of total expenses reported. Since we find that both reported revenue and reported expense increased after the treatment, it is difficult to separately identify whether the increase in expense was a result of more income being reported and thus more expense associated with that income being reported as well, or whether the taxi services shifted from evading taxes by underreporting income to overreporting expense, as expenses are not yet subject to third-party reporting. One possible way to investigate this is to examine the ratio of expenses to receipts. Figure 3 presents the trend in the ratio of expenses to receipts around the treatment year. Figure 3 suggests a modest increase in the ratio of expenses to receipts.

These simple trends suggest that Form 1099-K implementation was associated with higher reported receipts, but also higher reported expenses and higher expenses for each dollar of reported revenue. However, we need to account for omitted variables that might be correlated with the Form 1099-K introduction and taxpayer filing behavior; we also need to account for any national trends in tax filing behavior or credit card usage that may confound the results. The next section presents our framework for disentangling the impact of Form 1099-K on taxpayer behavior.

**FIGURE 1. The Trend in Log of Total Receipts of Taxi Services in the Treated Cities Around the Treatment Year**

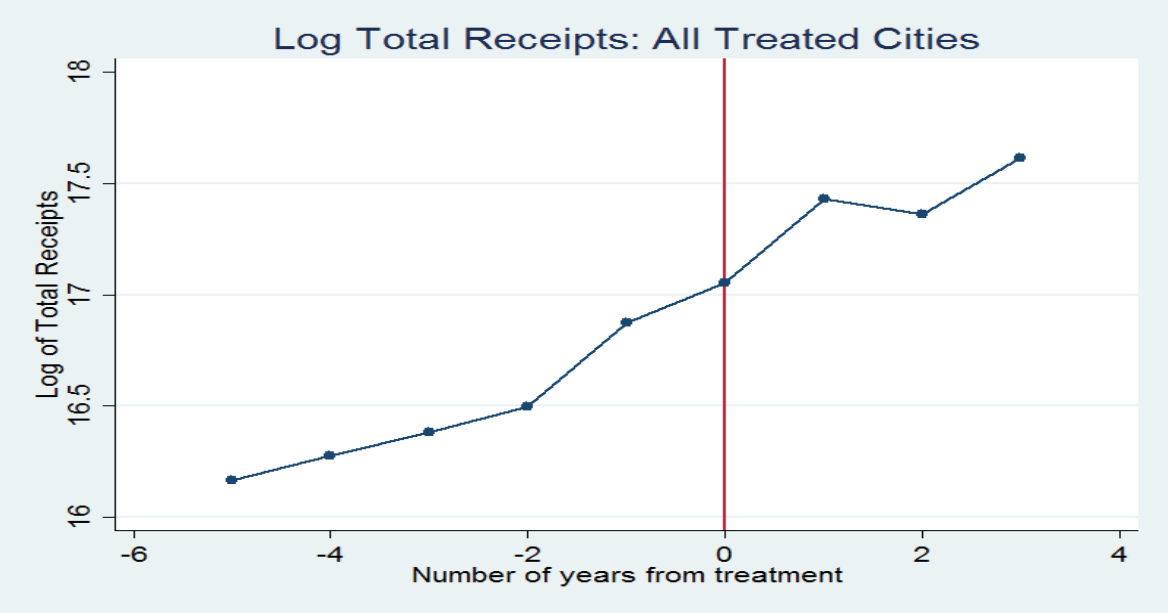


**FIGURE 2. The Trend in Log of Total Expenses of Taxi Services in the Treated Cities Around the Treatment Year**

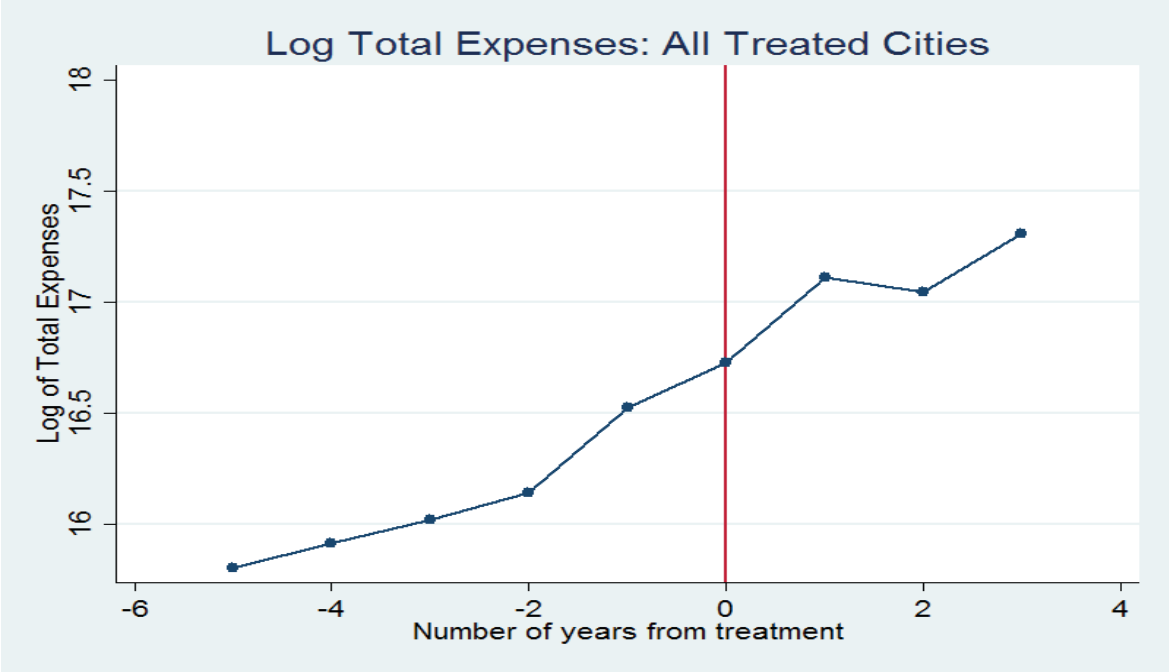
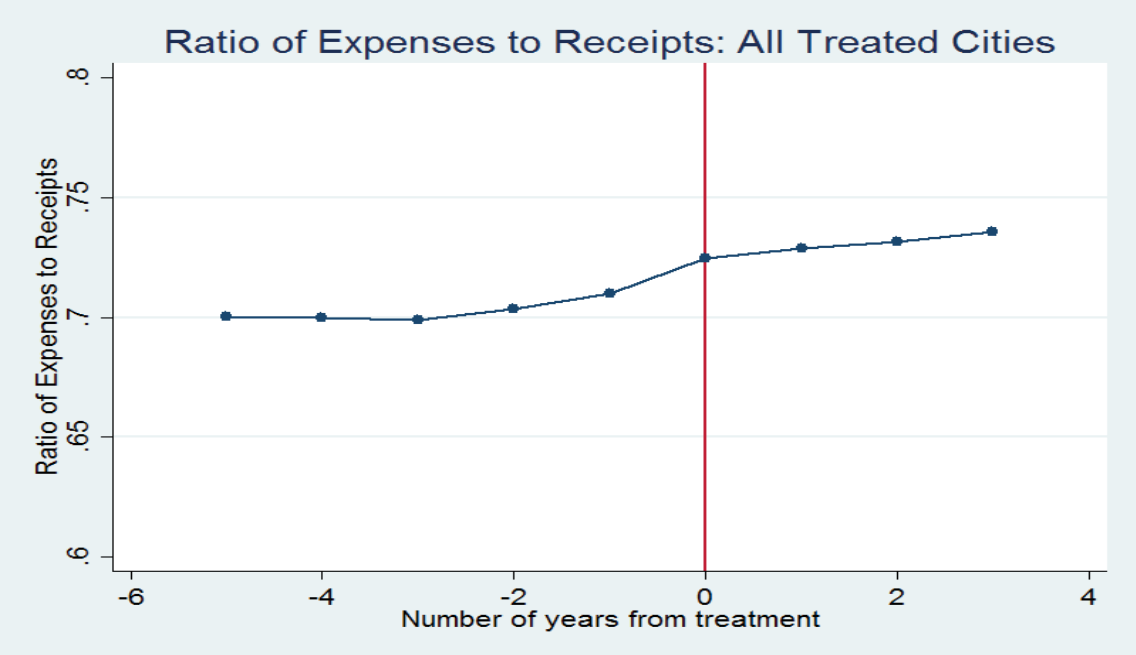



**FIGURE 3. The Trend in the Ratio of Total Expenses and Total Receipts for Taxi Services in the Treated Cities Around the Treatment Year**



Our methodology exploits the natural experiment created by the interaction of the introduction of Form 1099-K in 2011 and the introduction of laws requiring taxicabs to install credit card readers in various cities in the U.S. We use a difference-in-differences research design where we compare the trends in the receipts, expenses, and the ratio of expenses to receipts of the taxi services who operate in cities with mandatory credit card laws (i.e., treated group) and the taxi services who operate in cities without mandatory credit card laws (i.e., control group) before and after the treatment. Our rationale is that the introduction of credit card machines in taxicabs discontinuously increases the share of revenue from credit cards reported in the Form 1099-K. Thus, taxi services operating in cities with such laws will be affected by the third-party reporting more than those operating in cities without such laws. The baseline difference-in-differences specification is given by:

$$Y_{ct} = Treatment_{ct} + FE_c + FE_t + \varepsilon_{ct},$$

where $Y_{ct}$ represents the dependent variable (e.g., receipts, expenses, or the ratio of expenses to receipts for taxi services) in city $c$ and year $t$, city fixed effects are represented by $FE_c$ to capture time-invariant differences across cities, and year fixed effects are represented by $FE_t$ to capture changes common to all cities in the same year. We are interested in estimating the coefficient on the indicator variable $Treatment_{ct}$, which equals 1 if cities have implemented mandatory credit card laws and if Form 1099-K is effective (i.e., Tax Year ≥2011). Standard errors are clustered at the city level.

Note that we also evaluate the dynamic nature of the treatment effects by running an event study difference-in-differences methodology, given by:

$$Y_{ct} = \sum_{t=-5}^{t=4} Treatment_{ct} + FE_c + FE_t + \varepsilon_{ct},$$

where $\sum_{t=-5}^{t=4} Treatment_{ct}$ denotes 5 leads before the treatment and 4 lags after the treatment. This specification also allows us to test for the "parallel trends" assumption, which is the identifying assumption of difference-in-differences research design. These results are not presented here.

## 4. Preliminary Results

Table 2 presents the causal impact of Form 1099-K on receipts, expenses, and the expenses/receipts ratio from our basic difference-in-differences specification. We find an economically meaningful and statistically significant impact on all of the outcomes. The total receipts reported increases by 16 percentage points in the cities with credit-card-in-taxicab laws compared to similar cities without such laws, and the estimate is significant at the 1-percent level. We find even larger and statistically significant responses for expenses (20 percentage points). Note, however, that the increase in expenses more than offsets the increase in receipts, which implies that Form 1099-K was not successful in improving overall tax compliance in the taxicab industry. Similarly, we find that the ratio of expenses to receipts increased by 2 percentage points in cities with credit card laws compared to similar cities without such laws. This represents a shift in the share of expense for each dollar in receipts after Form 1099-K was introduced.

Preliminary results for the dynamic effects of Form 1099-K on receipts, expenses, and the expenses/receipts ratio are broadly similar, again suggesting that Form 1099-K affected both reported receipts and reported expenses. These estimates also largely support the parallel trend assumption of the difference-in-differences models. These results are preliminary and are not reported here.

**TABLE 2. Difference-in-Differences Results for Taxicab Services in the Top 100 U.S. Cities**

| | Receipts | Expenses | Expenses/Receipts Ratio |
|---|---|---|---|
| Treatment (Post-1099-K X Post-2011) | 0.160***<br>(0.03) | 0.198***<br>(0.04) | 0.024*<br>(0.01) |

NOTES: All specifications included year and city fixed effects. Standard errors are in parenthesis and are clustered at the city level. * p < 0.1 and *** p < 0.01.

## 5. Conclusions

In this paper we analyze taxpayer responses to the introduction of Form 1099-K. We exploit a unique natural experiment in the taxicab industry using a difference-in-differences research design, where we compare the trends in the receipts, expenses, and the ratio of the receipts and expenses of taxi services that operate in cities with mandatory credit card laws (i.e., the treated group) to the taxi services that operate in cities without mandatory credit card laws (i.e., the control group) before and after the treatment. We find that firms report more receipts after the introduction of Form 1099-K. However, we also find that the increase in reported revenues was accompanied by an offsetting increase in expenses. Thus, we conclude that taxpayers respond to information reporting, but in offsetting ways.

## 6. References

Internal Revenue Service. 2016. Federal Tax Compliance Research: Tax Gap Estimates for Tax Years 2008–2010. https://www.irs.gov/pub/irs-soi/p1415.pdf.

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