The Impact of State Taxes on Pass-Through Businesses: Evidence from the 2012 Kansas Income Tax Reform*

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July 2016

Abstract

In 2012, Kansas undertook a large-scale tax reform that excluded certain forms of business income from individual taxation. In theory, these changes enhance the incentives to undertake more real economic activity such as new business formation or increases in employment or investment. But, the reform also shifted the incentives to avoid taxation by recharacterizing income sources. This paper provides evidence of these effects using federal administrative taxpayer data in difference-in-difference models, where taxpayers in bordering states serve as a control group for Kansas residents. Drawing on these data from 2010 to 2014, we present a series of regression results in an attempt to determine the extent to which the reform impacted observed outcomes, and whether these were driven by tax avoidance or real economic activity. The evidence suggests that, at both extensive and intensive margins, the behavioral responses were overwhelmingly tax avoidance rather than real supply side responses.

Keywords: Taxable income elasticity; pass-through income; business taxation; state income taxation; Kansas JEL Classification Codes: H24, I38

*We are grateful to helpful comments and suggestions from Julie Cullen, Seth Giertz, Jacob Goldin, Kenneth Kritz, David Mitchell, Joel Slemrod, Owen Zidar, and seminar participants at George Mason University, Indiana University, the National Bureau of Economic Research, and the National Tax Association. All errors and omissions are our own. The views expressed in this paper are our own and not necessarily those of the U.S. Department of the Treasury.

1 Introduction

In 2012, Kansas instituted a tax plan to in large part facilitate the growth of small businesses. By providing tax breaks to individuals, the program encouraged businesses to declare their incomes at the individual, rather than at the corporate, level. Income generated by such businesses, known as pass-through entities, has grown dramatically over the past 30 years in the US, comprising over 50% of total US net business income in 2012.[1] As pass-through businesses become more prevalent, it is of interest to policy makers to better understand how taxes influence decision making among business owners. While a large literature looks at the impact of corporate income tax rates on business activity, less is known on the effects of personal income tax rates on businesses. We exploit the unique case-study created by the Kansas experiment in order to examine this question.

To our knowledge, this paper is among the first to study the Kansas experiment. Proponents of the reform highlighted the enhanced supply side incentives for business formation and investment that would create economic growth and new employment. Critics raised concerns about the revenue losses from opportunities to recharacterize business income in order to take advantage of the state-level tax exemption of pass-through business income. These revenue losses would result from firms reorganizing into pass-through entities, increasing the pass-through portion of firm profit, and outsourcing employee tasks to individual contractors.[2] We provide evidence on the impacts of the reform by measuring the effect of marginal

[1] Pass-through entities are businesses whose profits are distributed to the business owners before being subjected to taxation at the individual level. This is distinct from other organizational structures where profits are taxed separably before being distributed to owners as income. In the United States, pass-through entities include many types of sole proprietorships, S-corporations, and partnerships. Pass-though entities also include farm proprietorships and income derived from rents and royalty income that is reported on an individual's tax return. Between 1980 and 2012, the share of net business income attributable to pass-through entities grew from 20% to over 50%. See Cooper et al. (2015); DeBacker et al. (2015) for more documentation of these trends.

[2] The owner of a pass-through may be required to pay themselves an employee salary. When profits are

tax rates on individuals' choices over the decision to earn pass-through income and how much to earn. Using administrative tax data at the federal level from 2010 to 2014, we estimate difference-in-differences models comparing taxpayers from Kansas to those in the four bordering states (Colorado, Nebraska, Missouri, and Oklahoma) who serve as a control group. To preview the results, the pattern of changes associated with the reform is most consistent with taxpayers recharacterizing income for tax savings. In particular, we present evidence that taxpayers largely appear to have shifted their sources of income in ways that take advantage of the tax-treatment of pass-through income after the Kansas reform. This shifting behavior exacerbated the revenue losses from the policy change, with our estimates suggesting an additional 1.7% in revenue loss as a result of shifting.[3] Furthermore, we find weak evidence in support of real economic responses by pass-through firms, such as increased hiring or investment.

This paper contributes to existing research by using administrative tax records to provide a comprehensive analysis of the key incentives involved in tax rate changes, including both real and reporting responses. Our study is related to three separate strands of literature. The first is a growing body of work that examines the impact of state taxation on business activity. A recent study from this line of research by Giroud and Rauh (2015) employs firm level data on C-corporations and pass-through entities. They find that C-corporations tend to be more sensitive to changes in their income taxes than are pass-through entities, as measured by existing firms' levels of employment and by the number of new establishments.[4]

taxed as individual income this is affected by differentials in payroll or self-employment taxes on the income involved. However, if pass-through profits are untaxed, then the incentives to lower the amount of income reported as the owner's salary are much stronger. Other employees can similarly gain by hiring themselves out to their firm as independent contractors. An interesting example of this is the University of Kansas basketball coach Bill Self, who contracts his services to the university through his limited liability company and reportedly pays state income taxes on just $230,000 of the LLC's $3 million annual profits after the reform went into effect Associated Press (2016).

[3]The decrease in revenue for between 2012 and 2013 was about $496 million. Our preferred estimates of the recharacterization of wages as pass-through income suggest about $8.6 million in revenue was lost from such behavior.

[4]The authors estimate corporate tax elasticities of -0.4 for C-corporations for both the extensive (number

Our paper complements this line of research by focusing on the decisions of pass-through business owners using individual level data to distinguish between tax reporting responses and real resource reallocations. Specifically, we examine whether income from the same business entity is recharacterized from wage income to pass-through income after the reform. Our results showing small real effects of business taxation follows similar findings by Serrato and Zidar (2016), Fuest et al. (2013), Yagan (2015), and Chirinko and Wilson (2008).

Second, our paper contributes to work that studies the self-employed, which are a subset of pass-through businesses, and how marginal tax rates impact their decisions on both the extensive margin (whether to be self-employed) and the intensive margin (how much to earn). In general, this strand of literature finds mixed results. Fairlie and Meyer (1999) and Moore (2004) are illustrative in that they fail to find consistent, significant impacts of marginal tax rates on the level of self-employment. By contrast, other studies (Long (1982), Moore (1983), Blau (1987), Schuetze (2000), and Parker (2003)) find that higher marginal tax rates lead to increases in levels of self-employment, which is consistent with taxpayers finding it easier to evade taxes on self-employment income due to a lack of third-party reporting, and therefore when taxes are higher they will chose to earn self-employment income. On the other hand, LaLumia (2009) finds that lower marginal tax rates due to the phase-in region of the Earned Income Tax Credit (EITC) led to an increase in the probability of reporting positive self-employment income. However, these results rely on reported income, and thus it is difficult to disentangle a real response from a reporting response, which may be one reason why results in both directions have been found amongst different sets of filers. We find positive extensive margin responses to the policy with increases in the probability of reporting income from sole proprietorships in both 2013 and 2014. Among those who had been self-employment income in the two years prior to the reform, we find that lower

of establishments) and intensive (employment at existing firms) margins. The authors find elasticities of employment on both margins of about -0.2 to -0.3 among pass-through businesses with at least 100 employees and with operations in at least two states.

marginal tax rates led to an increase in the amount of reported self-employment income.

Finally, our study is related to a much larger literature devoted to estimating the elasticity of taxable income (ETI) with respect to the net of tax share (or one minus the marginal tax rate) and the responsiveness of self-employment to tax changes. Though early estimates suggest that the ETI was quite large, often in excess of one, the more recent literature, surveyed by Saez et al. (2012), has found estimates around 0.4 for taxable income and 0.1 for broader measures of income. Several studies examine the extent to which the amount of reported self-employment income changes when marginal tax rates change. Blow and Preston (2002) find a positive relationship between the net of tax share and personal income using UK data from 1985-86 and 1995-96, though the implied elasticity is unclear. Wu (2005) estimates an elasticity of the rate of return to the net of tax share of 5 using data from the 1983-89 Surveys of Consumer Finances. Saez (2010) finds significant bunching of self-employment income around the first kink point in the EITC schedule, which would imply self-employment income elasticities around unity, though no bunching is found at other kink points in the EITC schedule, implying a much smaller elasticity. More closely related to this study, Heim (2010) estimates an elasticity of reported self-employment income to the net of tax share of 0.9 using a panel of tax returns that spans 1987-96. Heim (2010) notes that some of this response may be due to changes in misreporting of self-employment income.[5] Our findings imply an elasticity of pass-through income around 1.0, though this response appears to be predominantly due to income shifting rather than a real supply side effect.

The remainder of the paper is organized as follows. Section 2 gives detail and background on the Kansas tax reform, outlines the empirical strategy, and describes the data we use to identify the effects of the tax reform on pass-through business activity. Section 3 discusses the series of empirical findings that reveal the aforementioned pattern of behavior. We then

[5]Clotfelter (1983) and Joulfaian and Rider (1998) estimate the impact of marginal tax rates on the under-reporting of self-employment income, and find that the elasticity of the share of non-reported business income to the net-of-tax share is around 0.4 to 0.6.

summarize these findings and conclude in Section 4.

2 Institutions and Empirical Strategy

2.1 Pass-through Businesses

The Kansas tax reform was primarily focused on pass-through businesses, the income of which was exempted from state level tax following the enactment of the reform. Pass-through businesses are business entities whose income is passed through to the business owners before it is taxed. There are several types of business entities that face this tax treatment. These include sole proprietorships, partnerships, and subchapter S corporations (S-corporations).[6] Tax law distinguishes between these entity types and subchapter C corporations, which are taxed at the entity level. That is, the income earned by C-corporations is taxed before it can be distributed to the owners, where it is taxed a second time as dividend income.

Pass-through business entities are important to the policy debate. These businesses have often been treated as synonymous with small businesses. Small businesses represent a very dynamic part of the economy as a whole and the labor market in particular (see Decker et al. (2014)). Therefore, policies affecting small businesses are often thought to have great economic consequence. Indeed, this was the claimed motivation behind the Kansas reform, as we discuss below. In addition, pass-through businesses now account for more than half of all net business income. Thus, policies affecting pass-through entities affect a large part of the economy.

Our data on pass-through business income and activity come from individual income tax return data. Thus we often refer to these entities by the income tax schedule on which their income is reported. Sole proprietorship income is reported on Schedule C of Form 1040. Sole

[6]There are other legal forms of organization, such as the limited liability company (LLC). Each of the three pass-through entity types recognized by tax authorities may be organized as an LLC. LLC status affects owner's liability for various business operations, but is distinct from the tax liability that is determined by pass-through status.

proprietors are the most common form of business organization with over 26 million Schedule C filers in 2014, although the average proprietorship is relatively small. Proprietors are often termed "self-employed", and we use that convention as well. Income from partnerships and S-corporations is reported on Schedule E of Form 1040. Along with income from these two types of businesses, Schedule E includes income from rent and royalties. Since these forms of business income were also exempted from state-level tax, we consider Schedule E income as a whole. However, we will distinguish between self-employment (or Schedule C) income and Schedule E income because the types of business operations and level of organization are substantially different. In addition, we have more information about the details of the business for sole proprietorships since both income and expense items from these businesses are reported on Schedule C. In contrast, for partnerships and S-corporations, details about business expenses and the distribution of income are reported on separate information returns filed by the business entity. Thus, as we delve into effects of the reform on labor and investment demand, we turn our focus to Schedule C businesses for whom we have data. Due to the complicated business structures of partnerships in particular (see Cooper et al. (2015)), it is difficult link the businesses information return to the individuals who receive income from the business. Therefore, we leave the analysis of changes in economic activity of partnerships and S-corporations to future research and focus here on measuring the impact of the reform from economic activities gleaned from individual tax returns.[7]

2.2 The Kansas Tax Reform

The Kansas reform represents one of the largest changes to the tax treatment of pass-through businesses in the history of state income taxes. The pass-through exemption was

[7]We look at new business formation from data on individual returns, but do not explicitly look at changes in organizational form of the business entity. Yagan (2015) finds little evidence of such shifting, but we leave the analysis of such activity in the Kansas context to future work.

first proposed as part of a broader tax agenda in early 2012.[8] The tax plan went through weeks of debate and modifications via 15 amendments (Wistrom (2012)), but the elimination of pass-through business income taxation remained in the final plan that took effect beginning January 1, 2013. The reform additionally expanded the standard deduction, and compressed the previous three income tax brackets, with marginal tax rates of 3.5%, 6.25%, and 6.45%, to two brackets with marginal tax rates of 3.0% and 4.9%. Despite the extensive changes made on the individual side, the tax treatment of C corporations, which are taxed under the corporate income tax code, was left unchanged. Figure 1 personal income tax revenues in Kansas and the neighboring states between 1994 and 2015 (normalized so that revenues in 2007=100). The figure highlights the change that occurred in January 2013, after which point personal income tax receipts in Kansas drop significantly. The surrounding states show no such decline in personal income tax receipts at that time.

The Kansas reform resulted in large differences in effective marginal tax rates between residents and those outside of Kansas. Each of the neighboring states follows a system where income earned outside the filer's home state is subject to income tax in the home state, less a credit for state income taxes paid in the state where the income was earned. For out-of-state taxpayers doing business in Kansas whose credit for taxes paid in Kansas was not limited in their home state, the reform did not change the net amount of taxes owed across all states. For such taxpayers whose credit was limited, the reform could have led to a decrease in the total amount of taxes owed, but the change may be less than the amount of the reduction in Kansas taxes. Thus, while business owners in states outside of Kansas may have realized some reduction in tax liability from the Kansas reform, there is a discontinuous jump in those benefits of the reform for those tax payers residing inside Kansas by 2013.

[8]News coverage identified this event as being the first time Governor Brownback had revealed his plans for making over the state's tax code (see, for example, Cooper (2012)). Although most understood Brownback to be generally oriented towards tax reduction, the degree and specifics of his proposal were discussed as though they were a surprise and more ambitious than what had been expected. For a detailed discussion of the Kansas tax reform, see Dickson et al. (2012).

Furthermore, there were no other significant tax reforms that were targeted at small businesses in the period of interest. The closest comparable policies were Nebraska's elimination of the AMT, expanded carry forward rules (from 5 to 20 years), and elimination on capital gains taxes for companies that establish a program for employee stock options in 2014. Also, Oklahoma passed an income tax cut in 2014 that became effective in 2016 (after our sample period ends).

The reform therefore provides an opportunity to compare the behavior of Kansas residents to the residents in neighboring states for identifying the causal effects of changes in marginal tax rates on income.

2.3 Reform Incentives and Hypothesis Testing

The intention of this paper is to determine how responsive pass-through entities were to the incentives created by the Kansas tax reform. In particular, the research seeks to determine the presence of "real" responses and "shifting" responses along both extensive and intensive margin choices. On the extensive margin, the tax reform might incentivize the creation of new business in this untaxed sector by increasing the after-tax rate of return on such endeavors. For example, someone might return to the labor force or quit their existing job to become an entrepreneur. However, the reform also incentivizes changes in how the same work is reported in order to qualify as a pass-through entity. For example, a custodian could strike a deal with her employer to pay her as an independent contractor, allowing the former employer to pay less in gross while the employee (now contractor) would take home more in net. Or, less directly, firms could find that outsourcing the custodian services offers a competitive advantage over employing their in-house staff. These latter cases do not represent new economic activity, just a recharacterization of existing activity in response to the tax code.

On the intensive margin there are similar incentives at play. Existing pass-through enti-

ties could expand their operations with additional hiring and investment due to the higher return at the margin and earn greater income. However, pass-throughs may also have less incentive to increase their claimed expenses since the benefit to doing so is lessened and therefore might report larger pass-through profits.

The policy incentivized both real and shifting responses and both produce outcomes that are observationally equivalent in many respects. As a consequence, we employ a series of regression models to tease out effects along the real and reporting margins. We are aided in this by our data, which allow us to see both the returns individuals have filed as well as information returns documenting employment and contract work. This allows us a deeper view into the sources of behavior by helping us to identify where changes in income came from as well as how that income is characterized.

Our empirical strategy throughout will rely on a straight-forward difference-in-differences regression model that takes advantage of the variation in marginal tax rates provided by the Kansas reform. The general model is given by:

$$Y_{i,t} = \beta_1 KS_{i,t} + \beta_2 Post_{i,t} + \beta_3 KS_{i,t} * Post_{i,t} + \gamma_1 X_{i,t} + \delta_s + \delta_t + \phi_i + \varepsilon_{i,t}, \tag{1}$$

where $Y_{i,t}$ is the outcome of interest, $KS_{i,t}$ is an indicator for an individual living in Kansas, $Post_{i,t}$ is a vector of indicator variables for the post-treatment period (2012, 2013, 2014), and $KS_{i,t} * Post_{i,t}$ The coefficient of interest, β_3 represents the difference in unconditional means between Kansas and the control states, pre- and post-treatment. The series of indicator variables for each post-treatment year allows for the measured effects of the reform to vary over time. We include 2012 in the post-treatment period to allow for the measurement of anticipatory effects, as the reform was announced and enacted in 2012 but was effective starting in 2013.

2.4 Data

Our data come from the population of individual income tax returns filed in the US. From these files we draw a 10% random sample based on the last four digits of the primary filer's SSN of all filers who lived in Kansas or a neighboring state (Missouri, Oklahoma, Colorado, and Nebraska) in at least one of the pre-reform years, 2010-2011. We pull information from Form 1040 and related schedules for the years 2010-2014 for our random sample. We match these data to Social Security Administration (SSA) records, which allow us to identify the gender and age of the primary and secondary filers. We exclude from these data filers who reside in a U.S. territory or outside of the U.S. during one of the years between 2010-2014. This group is excluded because it is disproportionately made up of military service people and thus represent files who have different factors driving their behavior than the general population. Finally, we focus on households with primary filers ages 18 through 60.

Table 1 presents summary statistics for Kansas and the combined control states. The full estimation sample consists of almost 1.9 million tax returns, of which 280,836 come from Kansas. Around 18 percent of the sample report having Schedule C income, and 14 percent report having Schedule E income, where the fractions are comparable in Kansas to those of the surrounding states. Among those with Schedule C income, the average amount is around $9,516 while the average amount of Schedule E income conditional on having such income is $33,454.

Due to the nature of these tax data, which are unedited and not top coded, there are large outliers due to taxpayers with extremely large business gains or losses being drawn into the random sample, and due to data entry (or other) errors. This can be seen in the sample statistics for Schedule C and Schedule E income, which have unconditional means of $2,224 and $4,986 but have standard deviations of $46,248 and $104,060, respectively. In an appendix available from the authors, we show that this noise creating long tails in the distribution leads to very large standard errors in our estimates when we use the unedited

amounts reported on tax returns as our dependent variables.

To handle these extreme outliers in the tax return data, we Winsorize all continuous variables at the 95% level (at the positive end for variables bounded at zero, and at both ends for variables that can be positive or negative) in our main specifications. When the data are Winsorized in this manner, the mean unconditional amounts of Schedule C and E income change to $2,429 and $3,706, while the standard deviations of these variables fall substantially to $8,658 and $17,716. As a robustness check, we present results when we Winsorize outcomes at the 99% level in the Appendix. Although the magnitudes of these results are similar, the standard errors, as expected, are larger.

2.5 Threats to Validity

For our identification strategy to be valid, the bordering states must serve as a viable control for Kansas, where the differences between Kansas and the other states would have remained the same as in the pre-treatment period in the absence of the policy change. Figures 2 and 3, which use data from publicly available tabulations from tax returns, show that this common trend assumption is supported by the empirical evidence. In these figures, Kansas and its neighboring states followed similar trends in both the average amount of Schedule C income and the fraction of filers reporting Schedule C income between 1997 and 2012.

To further ensure that the neighboring states are appropriate controls, we also ran pre-trends tests, estimating the effect of a placebo reform in Kansas in the years 2005-2012 comparing Kansas to the surrounding states. These tests show that the trends in the fraction of taxpayers with Schedule C income and the amount of Schedule C income were not statistically significantly different in Kansas in the years leading up to and through the reform.[9] In addition, we've considered the mix of production industries across these five states in Table 2 and found the shares of employment in each major sector to be similar across

[9]While not reported here in the interest of space, these tests are available from the authors upon request.

states. Thus, we find strong support for using Kansas' neighbors as a control group in our analysis.

The identifying assumptions could also be violated if migration is substantively influenced by the tax reforms, and those who are most sensitive to marginal tax rates move to Kansas. Of course, one motivation behind the reform in part was to encourage individuals to move to and start businesses in the state of Kansas. However, supplemental analyses suggested that the reform had little effect on locational choices. [10] Nevertheless, for our main analysis, we focus on individuals who did not change states at any point between 2010 through 2014. This restriction excludes roughly 4% of our sample. The results for the full population, presented in an Appendix available from the authors, show that including movers does not substantively change our findings.

3 Results

Table 4 presents estimates of the broadest possible conception of behavioral response to the Kansas reform by estimating Equation 1 on the change in taxpayer reported incomes across different types of income: income from sole proprietorships (Schedule C), income from partnerships and S-corporations (Schedule E), and wage and salary income (Form 1040). By examining total changes in incomes on these forms, the estimated behavioral response includes both extensive and intensive margins. The result that would be most consistent with the finding of real effects would be increases in all three categorizations, but even observing declines in wages could be consistent with people switching away from wage occupations in order to begin new ventures of real activity in pass-through entities. However, the results imply that Kansas taxpayers demonstrate no statistically significant change in

[10] For this, we used Census migration data from the American Community Survey (ACS) to estimate difference-in-differences models comparing migration into and out of Kansas to the control states around the time of the policy change. These specifications found no significant change in migration into or out of Kansas in the post-reform period. While not reported here in the interest of space, these tests are available from the authors upon request.

either Schedule C or Schedule E incomes, but do demonstrate reductions in reported wages and salaries.

The results to follow will decompose the outcomes into extensive margin responses by estimating changes in the probability of reporting income of a particular type, and intensive margin responses by estimating changes in reported amounts among taxpayers who always reported these types of income. Each margin will be further investigated by splitting samples to further probe whether any response is likely due to real activity or due to the recharacterization of income.

3.1 Extensive Margin: Probability of Reporting Income Type

Table 5 reports estimates of the impact of the Kansas reform on the probability of reporting Schedule C, Schedule E, and wage and salary income. The difference-in-differences estimates are presented with different sets of covariates in each column to inform the reader of sensitivity in point estimate and statistical significance. However, most of our analysis will emphasize the fully specified model in Column (3). We find the Kansas reform is associated with a 0.5 percentage point increase in the probability of reporting self-employment income in the two years after the reform (2013 and 2014), and this finding is similar across all three specifications. In contrast, we find a small decline in the probability of reporting Schedule E income whose statistical significance is sensitive to the inclusion of taxpayer fixed effects. The probability of reporting wage income is similarly sensitive to the inclusion of taxpayer fixed effects, albeit statistical significance is retained for the second year of the reform with a point estimate of -0.2 percentage points. Looking across panels within Columns (2) and (3), the probability estimates are directly comparable, as they follow the same sample over time. These results, then, suggest that the effect of the reform on the extensive margin was to cause increases in sole proprietorships (Schedule C filers) while reducing the fraction reporting schedule E income or wages and salaries. In column (2), the point estimates indicate

that this was approximately 100% substitution in 2013 and 2014. In Column (3), more new schedule C's are reported than the combined reduction in wage and schedule E reporters.

The findings thus far can be consistent with new economic activity or recharacterization. The reduced marginal tax rate on pass-through income may have encouraged new sole proprietors among Kansas residents who left their previous wage occupations or joint ventures. This could also be recharacterization through a new work status with employers. In particular, an employee working for a firm may prefer to receive their labor income, which would typically be reported on Form W-2, as contract labor income, which is reported on Form 1099-MISC. Those who receive contract labor income are required to file a Schedule C, which would look as though a new self-employment business was created when in fact income was merely recharacterized to take advantage of tax preferences.

To explore this consideration, we attempt to distinguish between a new business and recharacterization as contracting in two ways in Table 6. First, we follow Knittel et al. (2011) and define a "small business" as sole proprietor with Schedule C total expenses greater than $5,000.[11] While the comparable specification for Schedule C filers from Column 3 of Table 5 showed there to be a 0.5 percentage point increase in the reporting of schedule C income, Table 6 demonstrates that essentially none of these sole proprietorships have $5,000 in expenses. In addition, Table 6 investigates whether there was a change in the propensity of an individual to switch from receiving a W-2 from a firm in one year to receiving a 1099-MISC from the same firm (i.e., a firm with the same employer identification number) in the next year, which would imply a shift from employee to contractor. Table 6 indeed reports an increase in this phenomenon within Kansas after the reform. Taken together, these results are most consistent with recharacterizing labor income, rather than leaving a wage occupation to start-up a new business.

[11] Knittel et al. (2011) also use Schedule C with net income greater than $15,000 as a small business definition, but this would not be informative for our purposes if income was simply being recharacterized from other forms that were over $15,000.

3.2 Intensive Margin: Increases in Reported Pre-Tax Income

The analysis now turns from exploring the probability of reporting income of a particular type, to conditioning on taxpayers according to the presence of income of a particular type during the pre-treatment period (2010 and 2011) and estimating the effect of the treatment on that type of income. For these intensive margin results, we return to the data source and pull the full universe of taxpayers that resided in Kansas or the control states and reported Schedule C income in 2010 or 2011. This group will form the sample for our intensive margin results with respect to changes in self-employment income. We then form an analogous sample for Schedule E filers. Going beyond our 10% sample when focusing on changes in income for those who report business income improves the precision of the estimates improves considerably.

First explored in Table 7 is partnership, S-corporation, rent, and royalty income reported on Schedule E. Column (1) conditions on the taxpayer having reported Schedule E income prior to the reform, in both 2010 and 2011. This is refined further in Column (2) by restricting the sample to only those who reported positive Schedule E income in both pre-treatment years. The intuition for this restrictions is that firms making positive profits have the most to gain from the reform. The expectation is that the impact of the reform on reported income should be positive, though this could be due to a real supply side response like additional economic activity or due to recharacterization of wage income as pass-through income. Columns (3) and (4) extract further subsamples from the group in Column (1). These subsamples represent groups with different abilities to engage in shifting in order to gain insight on the division of this response. Column (3) only includes taxpayers who had Schedule E income but no wage income in both pre-treatment years, which is a group for whom it might be more difficult to recharacterize wages as pass-through income. In contrast, Column (4) only includes taxpayers that had both wage and Schedule E income in both pre-treatment years, and therefore presumably had greater ability to recharacterize wages as

pass-through income.[12]

Column (1) of Table 7 reports that the overall intensive margin response to the tax reform was to increase pre-tax Schedule E income by $772 and $652 in the two years after the reform, which would imply elasticities of Schedule E income of 1.1 and 0.9.[13] However, column (2) finds less evidence of significant positive responses following the reform. The positive responses to the reform from the sample of Schedule E files could be driven by either real or shifting responses, so we turn to our subsamples in columns (3) and (4). The results for taxpayers most capable of shifting between wages and Schedule E income, presented in Column (4), reveal that there were large and statistically significant responses that are slightly larger than the overall response in Column (1). In addition, taxpayers without wage income (Column (3)) showed no response to the tax reform. Of course, these groups likely differ in other respects if they report no wage income, but this pattern of evidence is largely supportive of a tax shifting response rather than a real supply side effect.

Table 8 repeats the specifications in Table 7 on the sample of sole proprietors filing Schedule C. Like Schedule E filers, sole proprietors show a positive overall response to the reform, with effects in Column (1) of $357 and $438 in the two years after the reform implying elasticities of 0.9 and 1.1.[14] . However, in the case of Schedule C filers, the response is robust in both Columns (1) and (2). Again, these findings can be the result of either shifting or real supply responses, so subsamples of the Column (1) data are drawn conditional on whether or not they reported wage income during the pre-treatment period is reported. In these

[12]The sample sizes in columns (3) and (4) do not add up to that of (1) in Table 7 because the omitted group had wage income in one of the pre-treatment years.

[13]The mean amount of Schedule E income among those with Schedule E income was $10.439, implying increases of 6.2% and 7.4%. Taxable income among those with Schedule E income averaged around $70,000, which would generally put them in the 15% bracket for federal taxes and the 6.25% bracket for Kansas income taxes before the reform, resulting in a net of tax share of 1-15%-6.25%+(15%*6.25%) = 0.067. Eliminating the Kansas tax increases the net of tax share to .85, which is a 6.7% increase.

[14]The mean amount of Schedule C income among those with Schedule C income was $5,803, implying increases of 6.1% and 7.6%. Taxable income among those with Schedule C income averaged around $50,000, which would generally put them in the 15% bracket, implying the same 6.7% increase in the net of tax share as for Schedule E filers.

estimates the group with no wage income has a small negative and statistically insignificant response to the reform (Column 3). The group reporting both wage and Schedule C income, representing the filers most capable of shifting, accounts for the full magnitude of the increase in Schedule C income. Again, there are likely other differences between the groups, but the pattern of evidence remains consistent with income recharacterization. The next subsection seeks to take further advantage of the richness of the Schedule C data on business expenses.

3.3 Evidence on Real Business Activity Among Sole Proprietorships

In this section, we focus on reported expenses that are available in the administrative records on sole proprietorships (Schedule C filers) to better understand whether the reform had an impact on the real economy through a proprietor's investment and employment decisions. We again use the population data on all Schedule C filers in 2010 and 2011 who resided in one of our sample states. Although we are unable to observe actual investment and hiring decisions, we find proxies for each from expenses reported on Schedule C. Firms that purchase equipment may take an annual deduction for the wear and tear of the property. Section 179 expensing further allows firms to deduct the full cost of certain property in the first year of use. Thus, we view depreciation and Section 179 expenses as lower bound for the proprietor's total investment. For hiring decisions, wage expenses represent the total wage bill that proprietors pay to employees. Changes in the wage bill could include changes to wage rates, changes in the number of workers, or changes in the number of hours worked. Furthermore, wage expenses also do not include amounts paid to contract labor, which is a separate line item deduction and not included in our data.

Table 9 gives results for changes in depreciation and wage expenses. We find no statistically significant effect of the reform on depreciation expenses in 2012 or 2013, and find statistically significant declines in depreciation expenses in 2014 for several of our subsamples. The latter effects run counter to the proposition that the reform led to an increase in

investment, though the magnitudes are small. For wage expenses, we estimate small increases across all groups in the post-reform period, with statistically significant effects among those who had positive income in both years of the pre-treatment period. These results would be consistent with the reform leading some sole proprietors to increase employment.

Although a bit contradictory, these are the results most consistent with the Kansas reform having some real supply side effects. The effect does not appear in terms of new capital investment in response to the new higher after-tax rate of return, but rather is manifested in additional employment.

4 Conclusion

This paper utilizes a state-level tax reform along with a large dataset of federal tax returns to identify the impact of marginal tax rates on the behavior pass-through businesses. Along extensive and intensive margins, the pattern of findings overwhelmingly points in the direction that the responses were recharacterizations of income into tax advantaged forms rather than the result of real supply side activity.

On the extensive margin of pass-through formation, the magnitude of the probability increase in the likelihood of reporting sole proprietorship income was roughly equal to a combined loss in the probabilities of reporting income from wage occupations, partnerships, and S-corporations. Furthermore, the increase in Schedule C filers appears to be among sole proprietorships with less than $5,000 in expenses, and there was an increase in taxpayers who were receiving income through 1099-MISC forms instead of through W-2's from the same employer. Both of these responses are consistent with the recharacterization of wage income as contract labor. Our estimates suggest that this behavior accounted for about 1.7% of the total revenue lost from the reform.

On the intensive margin, increases in pass-through income appear to come from taxpayers who were drawing both wage and pass-through income. There is no evidence of an increase in

pass-through income from those without wage income. Similar patterns of shifting income between wages and business income were found amongst small businesses in the U.K. in response to changes in the corporate rate structure in the late 1990's and early 2000's (Adam et al. (2010)).

While none of these findings can conclusively prove that there was no real supply response, the pattern of responses across the collection of results suggests that the primary effect of the policy was to induce taxpayers to recharacterize income as pass-through business income, which was tax-preferred after the reform. The best evidence we find for a real response to the Kansas reform is in the increases in wages paid among sole proprietorships, suggesting the possibility of an increase in hiring as a result of the reform.

The small effects on real economic activity we find may not align with the priors of many researchers and policy makers, but some qualifications are in order. Kansas experienced a loss of general fund revenue of about 8% due to the tax cut, and an estimated 16% loss in the five years to come Leachman and Mai (2014). If tax filers believe that these tax cuts make the current state budget unsustainable, and therefore believe that the future will entail tax increases, then they may be less likely to exhibit large real responses to a transitory change in after-tax income. In addition, our data allow us to observe only the first three years after the tax reform. We intend to continue to study how small businesses in Kansas evolve in the wake of this significant tax reform.

References

Adam, Stuart, Tim Besley, Richard Blundell, Stephen Bond, Robert Chote, Malcolm Gammie, Paul Johnson, Gareth Myles, and James M. Poterba, *Dimensions of Tax Design* Sep 2010.

Associated Press, "KU coach Bill Self, other LLCs avoid taxes under Kansas law," May 17 2016. Retrieved July 25, 2015.

Blau, David M., "A Time-Series Analysis of Self-Employment in the United States," *Journal of Political Economy*, 1987, *95* (3), pp. 445–467.

Blow, Laura and Ian Preston, "Deadweight loss and taxation of earned income: evidence from tax records of the UK self-employed," IFS Working Papers W02/15, Institute for Fiscal Studies July 2002.

Chirinko, Robert S. and Daniel J. Wilson, "State investment tax incentives: A zero-sum game?," *Journal of Public Economics*, December 2008, *92* (12), 2362–2384.

Clotfelter, Charles T, "Tax Evasion and Tax Rates: An Analysis of Individual Returns," *The Review of Economics and Statistics*, August 1983, *65* (3), 363–73.

Cooper, Brad, "Kansas Gov. Brownback Outlines Sweeping Tax Plan," January 2012. Retrieved April 20, 2015.

Cooper, Michael, John McClelland, James Pearce, Richard Prisinzano, Joseph Sullivan, Danny Yagan, Owen Zidar, and Eric Zwick, "Business in the United States: Who Owns it and How Much Tax Do They Pay?," in "Tax Policy and the Economy," Vol. 30 of *NBER Chapters*, National Bureau of Economic Research, Inc, March 2015.

DeBacker, Jason, Vasia Panousi, and Shanthi Ramnath, "A Risky Venture: Income Dynamics within the Non-Corporate Private Business Sector," Technical Report 2015.

Decker, Ryan, John Haltiwanger, Ron Jarmin, and Javier Miranda, "The Role of Entrepreneurship in US Job Creation and Economic Dynamism," *Journal of Economic Perspectives*, Summer 2014, *28* (3), 3–24.

Dickson, Martin B., Stephen W. Mazza, and Michael R. Keenan, "The Revolutionary 2012 Kansas Tax Act," *Kansas Law Review*, 2012, *61*, 295–340.

Fairlie, Robert W. and Bruce D. Meyer, "Trends in Self-Employment Among White and Black Men: 1910-1990," NBER Working Papers 7182, National Bureau of Economic Research, Inc June 1999.

Fuest, Clemens, Andreas Peichl, and Sebastian Siegloch, "Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany," Technical Report 2013.

Giroud, Xavier and Joshua Rauh, "State Taxation and the Reallocation of Business Activity: Evidence from Establishment-Level Data," NBER Working Papers 21534, National Bureau of Economic Research, Inc September 2015.

Heim, Bradley T., "The responsiveness of self-employment income to tax rate changes," *Labour Economics*, December 2010, *17* (6), 940–950.

Joulfaian, David and Mark Rider, "Differential taxation and tax evasion by small business," *National Tax Journal*, December 1998, *51* (4), 675–687.

Knittel, Matthew, Susie Nelson, Jason DeBacker, John Kitchen, James Pearce, and Richard Prisinzano, "Methodology for Identifying Small Businesses and Their Owners," OTA Technical Paper 4, U.S. Department of the Treasury 2011.

LaLumia, Sara, "The Earned Income Tax Credit and Reported Self-Employment Income," *National Tax Journal*, June 2009, *62* (2), 191–217.

Leachman, Michael and Chris Mai, "Lessons for Other States from Kansas' Massive Tax Cuts," March 27 2014. Retrieved August 11, 2016.

Long, James E., "The Income Tax and Self-employment," *National Tax Journal*, March 1982, *35* (1), 31–42.

Moore, Kevin, "The effects of the 1986 and 1993 tax reforms on self-employment," Technical Report 2004.

Moore, Robert L., "Self-employment and the Incidence of the Payroll Tax," *National Tax Journal*, December 1983, *36* (4), 491–501.

Parker, Simon C., "Does Tax Evasion Affect Occupational Choice?," *Oxford Bulletin of Economics and Statistics*, 07 2003, *65* (3), 379–394.

Saez, Emmanuel, "Do Taxpayers Bunch at Kink Points?," *American Economic Journal: Economic Policy*, August 2010, *2* (3), 180–212.

_ , Joel Slemrod, and Seth H. Giertz, "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review," *Journal of Economic Literature*, March 2012, *50* (1), 3–50.

Schuetze, Herb J., "Taxes, economic conditions and recent trends in male self-employment: a Canada-US comparison," *Labour Economics*, September 2000, *7* (5), 507–544.

Serrato, Juan Carlos Surez and Owen Zidar, "Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms," *American Economic Review*, September 2016, *106* (9), 2582–2624.

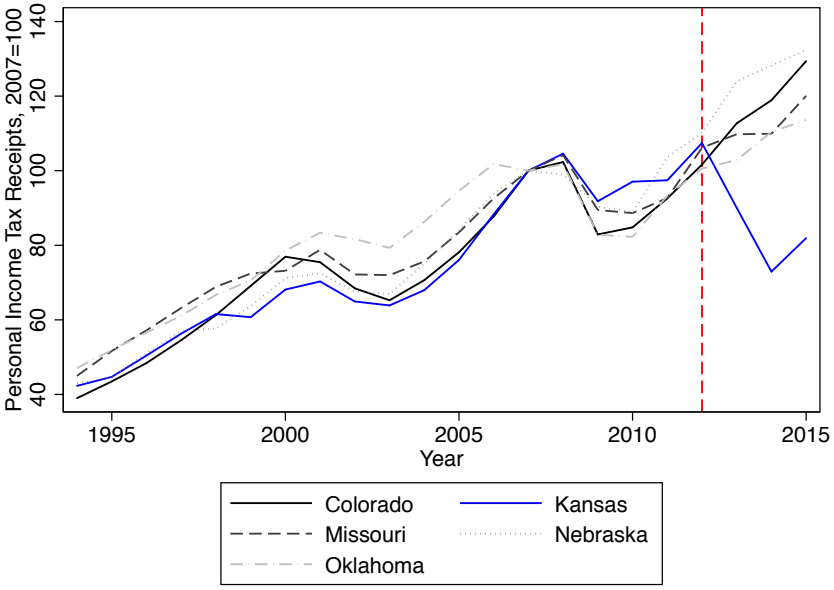
Wistrom, Brent D., "House Passes Plan to Cut Income Taxes, Abolish Sales Tax on Groceries," March 2012. Retrieved April 20, 2015.

Wu, Shih-Ying, "The Tax Effect on Taxable Income from Privately Held Businesses," *Southern Economic Journal*, April 2005, *71* (4), 891–912.

Yagan, Danny, "Capital Tax Reform and the Real Economy: The Effects of the 2003 Dividend Tax Cut," *American Economic Review*, December 2015, *105* (12), 3531–63.

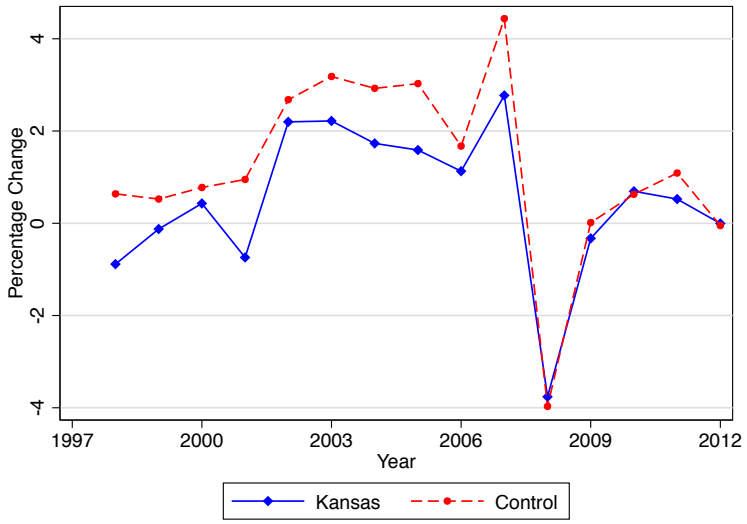
Figures

Figure 1: Personal Income Tax Revenue, Kansas and Surrounding States, 1994-2015

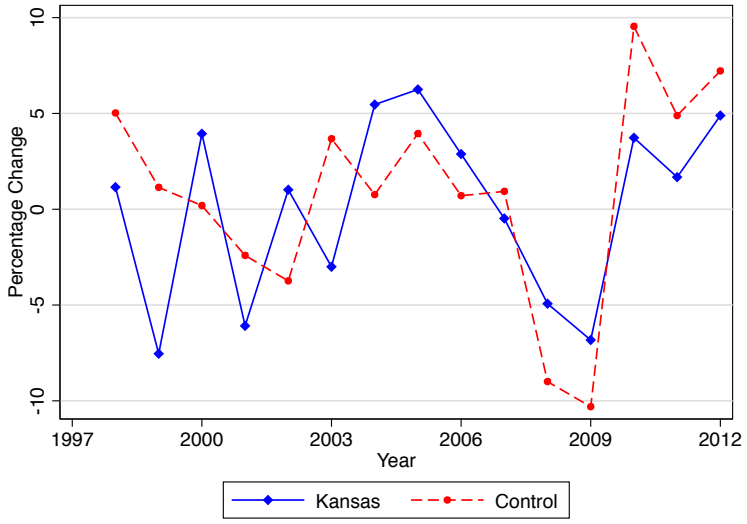


Source: Nelson A. Rockefeller Institute of Government, State Government Tax Revenue by State: 1994-2016

Figure 2: Pre-Treatment Trends

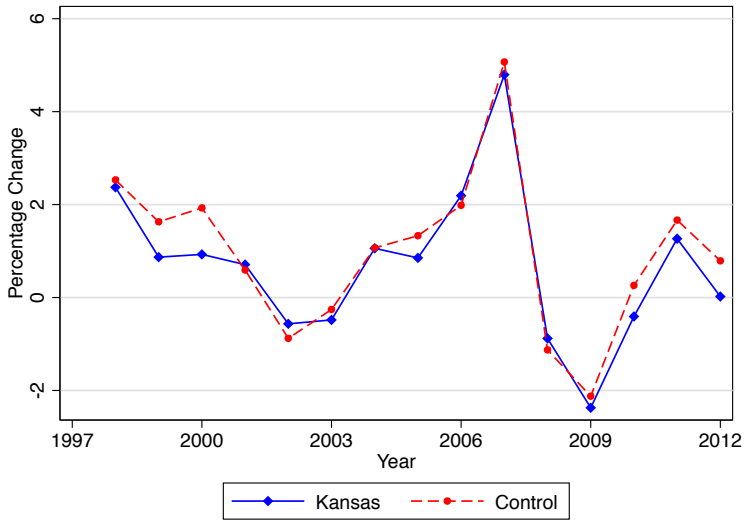


(a) Change in Number of Filers with Business Income

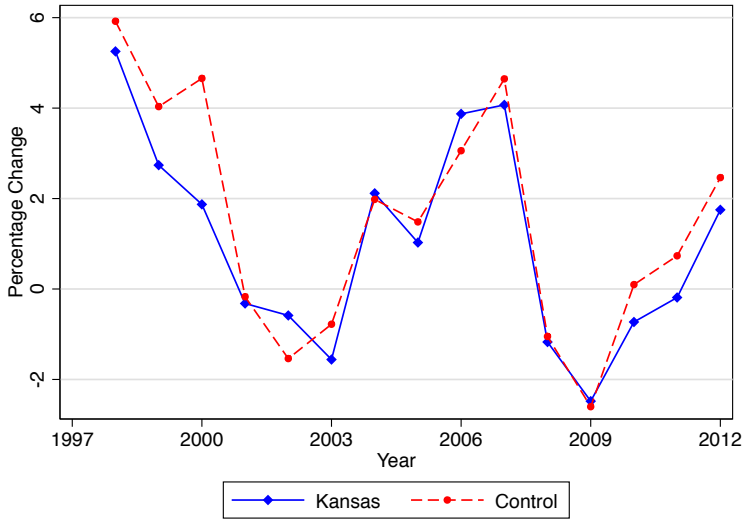


(b) Change in Business Income

Figure 3: Pre-Treatment Trends



(a) Change in Number of Filers with Wage Income



(b) Change in Wage Income

Tables

Table 1: Summary Statistics, 2010-2014

	Random Sample		Self-Employed	
	Kansas	Control	Kansas	Control
Total Income	71,762	71,308	85,540	80,009
Has C	0.18	0.19	0.73	0.72
Has E	0.14	0.14	0.24	0.23
Has Wage	0.95	0.94	0.86	0.83
Schedule C Income	2,249	2,220	10,179	9,412
Schedule C Income (95% Winsorized)	2,287	2,452	10,194	9,933
Schedule E Income	4,986	4,988	7,373	8,845
Schedule E Income (95% Winsorized)	3,542	3,735	6,145	5,845
1040 Wages	58,159	57,675	58,925	55,339
1040 Wages (95% Winsorized)	52,869	52,133	52,106	48,761
Mean Age of Primary Filer	42	42	44	44
Fraction Married Filing Joint	0.53	0.49	0.70	0.65
Observations	280,836	1,593,278	649,214	4,145,638

Notes–
a) Random sample refers to the 10% sample of all filer who lived in KS and control states from 2010-2014. The self-employed sample is constructed as the population of filers who resided in KS or the control states at some point from 2010-2014 and who reported Schedule C income in at least one of the pre-treatment years (2010-2011).
b) Total income is reported on Form 1040, Line 22. Schedule C income is proprietorship or self-employment income. Schedule E income is business income from partnerships, S-corporations, rent, and royalties. 1040 wages are wages and salaries reported on Form 1040, Line 7.
c) Means of income variables include filers who report zero income for that particular income source.

Table 2: Average Sector Share of Employment (2010-2011)

Industry	Oklahoma	Nebraska	Missouri	Colorado	Kansas
Agriculture	0.1%	0.1%	0.1%	0.1%	0.1%
Mining, Oil, Gas	3.6%	0.1%	0.2%	1.2%	0.8%
Utilities	0.7%	0.0%	0.7%	0.5%	0.6%
Construction	5.1%	4.9%	4.6%	6.1%	4.9%
Manufacturing	9.8%	11.5%	10.5%	5.9%	13.9%
Trade, Transp, Warehouse	4.6%	5.1%	5.2%	4.6%	5.4%
FIRE, Professional	23.3%	27.3%	25.2%	32.3%	23.4%
Education Services	1.5%	2.4%	3.2%	2.2%	1.7%
Health Care	16.8%	15.4%	16.7%	12.9%	16.8%
Leisure, Hospitality, Other	17.5%	14.8%	16.7%	18.9%	15.1%

Source– BLS Quarterly Census of Employment and Wages

Table 3: Migration In and Out of Kansas

	Migration In	Migration Out
KS*Post	-0.0004	0.0006
	(0.0021)	(0.0027)
Post Reform	-0.0006	-0.0005
	(0.0009)	(0.0012)
KS	-0.0058***	-0.0004
	(0.0012)	(0.0012)
MO	-0.0132***	-0.0077***
	(0.0011)	(0.0012)
NE	-0.0112***	-0.0053***
	(0.0011)	(0.0012)
OK	-0.0084***	-0.0071***
	(0.0011)	(0.0012)
Constant	0.0393***	0.0329***
	(0.0008)	(0.0008)
Observations	45	40

Source– American Community Survey, US Census

Table 4: Changes in Total Income by Schedule Type

	Sched C	**Sched E**	**Wages**
KS*2012	-16.174	89.141	-129.956*
	(34.126)	(62.125)	(68.036)
KS*2013	24.176	46.187	-305.628***
	(39.068)	(68.831)	(86.298)
KS*2014	46.439	37.715	-490.029***
	(42.529)	(76.967)	(100.027)
Demographics	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes

Notes–
a) Sample size is 1,724,534 in all specifications, derived from 10% sample discussed in Section 2.4.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)

Table 5: Probability of Income Reporting by Schedule Type

	(1)	(2)	(3)
	Sole Proprietorships (Schedule C)		
KS*2012	-0.001	0.000	0.001
	(0.001)	(0.001)	(0.001)
KS*2013	0.004***	0.004***	0.005***
	(0.001)	(0.002)	(0.001)
KS*2014	0.005***	0.005***	0.005***
	(0.001)	(0.002)	(0.002)
	Partnership or S-Corp (Schedule E)		
KS*2012	-0.004***	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
KS*2013	-0.000	-0.002**	-0.001
	(0.001)	(0.001)	(0.001)
KS*2014	0.001	-0.003**	-0.002
	(0.001)	(0.001)	(0.001)
	Wage Income (Form 1040)		
KS*2012	0.007***	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
KS*2013	-0.003***	-0.003***	-0.002**
	(0.001)	(0.001)	(0.001)
KS*2014	-0.013***	-0.002*	-0.001
	(0.001)	(0.001)	(0.001)
Demographics	No	Yes	Yes
State and Year Fixed Effects	No	Yes	Yes
Individual Fixed Effects	No	No	Yes
Observations	2,634,215	1,724,534	1,724,534

Notes–
a) Observations derived from 10% sample discussed in Section 2.4.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)

Table 6: Probability of Reporting Income as Contractor

	Schedule C & total expenses > $5K	W2 to 1099 MISC
KS*2012	0.001	0.000
	(0.001)	(0.001)
KS*2013	-0.001	0.001
	(0.001)	(0.001)
KS*2014	-0.000	0.002**
	(0.001)	(0.001)
Demographics	Yes	Yes
State and Year Fixed Effects	Yes	Yes
Individual Fixed Effects	Yes	Yes
Observations	1,724,534	1,724,534

Notes–
a) Observations derived from 10% sample discussed in Section 2.4.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)

Table 7: Change Pre-Tax Income Among Schedule E Filers

	Pre-Treatment Restrictions			
	(1) 2010, 2011 Sched E	(2) Positive Sched E	(3) No Wage Income	(4) Wage and Sched E
KS*2012	1,106.258***	312.747**	1,009.230**	1,095.387***
	(139.730)	(143.039)	(486.053)	(147.566)
KS*2013	771.668***	104.000	467.162	768.345***
	(153.983)	(165.226)	(528.831)	(163.071)
KS*2014	651.989***	-376.484**	498.899	644.475***
	(167.544)	(185.892)	(585.104)	(176.829)
Demographics	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,427,851	1,360,553	53,382	462,728

Notes–
a) Observations derived from full population of Schedule E filers discussed in Section 3.2.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)

Table 8: Change Pre-Tax Income Among Schedule C Filers

	Pre-Treatment Restrictions			
	(1)	(2)	(3)	(4)
	2010, 2011 Sched C	Positive Sched C	No Wage Income	Wage and Sched C
KS*2012	163.621***	138.592**	-132.147	202.138***
	(57.171)	(54.002)	(132.707)	(65.323)
KS*2013	356.599***	354.485***	-108.427	384.394***
	(64.244)	(64.264)	(156.141)	(72.898)
KS*2014	438.312***	385.121***	-139.616	471.778***
	(69.618)	(72.109)	(171.294)	(78.852)
Demographics	Yes	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes	Yes
Observations	3,008,306	2,058,022	579,650	2,196,622

Notes–
a) Observations derived from full population of Schedule C filers discussed in Section 3.2.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)

Table 9: Change in Reported Expenses by Schedule C Filers

	Pre-Treatment Restrictions		
	(1) None	(1) 2010, 2011 Sched C	(2) Positive Sched C
	Reported Depreciation Expenses		
KS*2012	10.572	-2.565	2.147
	(9.581)	(12.773)	(15.254)
KS*2013	-2.681	-4.701	-12.287
	(10.776)	(14.503)	(17.116)
KS*2014	-27.978**	-43.359***	-31.292*
	(11.812)	(15.864)	(18.749)
	Reported Wage Expenses		
KS*2012	18.936	30.135	43.841
	(29.517)	(37.222)	(44.319)
KS*2013	9.995	85.331*	86.246
	(38.130)	(47.769)	(57.586)
KS*2014	22.719	121.068**	151.381**
	(44.851)	(56.812)	(67.624)
Demographics	Yes	Yes	Yes
State and Year Fixed Effects	Yes	Yes	Yes
Individual Fixed Effects	Yes	Yes	Yes
Observations	4,524,096	3,008,306	2,058,022

Notes–
a) Observations derived from full population of Schedule C filers discussed in Section 3.2.
b) Cluster-robust standard errors reported in parentheses.
c) $p \leq 0.01$ (***), $p \leq 0.05$ (**), and $p \leq 0.10$ (*)