Tax reform, wages, and employment: Evidence from Ohio

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Abstract

This paper evaluates the incidence of a natural experiment entailed by the 2005 Ohio tax reform. The policy reduced the corporate and personal income taxes over the period 2006-2010. I observe several cross-sections of the Current Population Survey and compare individuals in Ohio to similar individuals in Pennsylvania. Using a triple difference identification approach, I conclude that the reform significantly boosted labor force participation for women, specifically those with 5-year-old children and increased reported self-employment taxable earnings. However, it does not seem to have had a positive impact on corporate wages in the short-run.

JEL Classifications: H20, H24, H25

Keywords: Tax incidence, Income tax, Corporate tax, Self-employment, Wages, Employment

1. Introduction

Over the last few decades, the integration of the world economy enabled an unprecedented deepening of trade and international financial flows. One direct implication of this expansion of globalization has been the rise of the bargaining power of capital owners at the expense of public governments. To reduce tax inefficiencies while remaining competitive on the global stage, many jurisdictions lower their tax rates (Tanzi 1995). This paper observes individual records of the Current Population Survey to study the impact of the 2005 Ohio tax reform on labor market outcomes. The reform significantly reduced the corporate tax and the personal income tax over the period 2006-2010. I conclude that the personal income tax reduction significantly boosted (i) labor force participation for women specifically those with 5-year-old children and (ii) reported self-employment taxable income, consistent with income shifting behavior in response to variations of marginal tax rates. In contrast, the corporate tax cut does not seem to have had a positive effect on corporate wages. These findings are robust to the inclusion of heterogeneous trends across states.

Like national tax jurisdictions, local public governments engaged in a race to attract private firms. In the U.S., this competition features a decrease in corporate and personal income tax rates as well as the adoption of investment tax credits and other instruments to reduce costs to businesses. Average state corporate income tax rates increased from 3.7 percent in 1960 to a high of 7.0 percent in 1992 and have since fallen to 6.2 percent by 2014, the lowest it has been since 1981. The average state personal income tax rate increased from 5.3 percent in 1970 to a maximum of 6.2 percent in the mid-1980s before hitting an all-time low of 5.1 percent in 2010. Additionally, many U.S. states introduce incentives to promote a more attractive business environment. The average state investment tax credits rate rose from 0.2 percent in 1970 to 2.0 percent by 2010.

One of the most recent comprehensive state tax reforms designed to spur growth and employment was adopted by the state of Ohio in 2005. The magnitudes of the cuts are staggering relative to other state tax changes. The reform eliminated property taxes on capital investment and machinery and abolished taxes on the sales of goods and services to customers outside of Ohio. It also set up a 0.95 percentage point reduction in personal income taxes and replaced the pre-existing Corporate Franchise Tax (CFT) of 8.6 percent by a Commercial Activity Tax (CAT) of 0.26 percent. These changes were gradually phased-in over the period 2006-2010.

There is an abundance of empirical studies that have explored the incidence of tax reforms on economic activity or labor market outcomes. Most of this literature focus on specific taxes such as the payroll or the personal income tax (Gruber 1997, Cruces et al. 2009). Few papers explored the incidence of extensive reforms that involve several simultaneously implemented tax changes. In this case, economic scholars generally focus on national tax reforms like the U.S Federal Tax Reform Act of 1986 and use general equilibrium models (Altig et al. 2001, Auerbach & Kotlikoff 1987, Fullerton et al. 1993) to simulate the incidence of different tax schemes on wages and employment. Alternatively, others measure this incidence with econometric models (Kubik 2006).

Unfortunately, no such empirical work has been done at the U.S. state level. Unlike federal taxes, state tax systems which are more likely to be influenced by the political or business cycles, are overhauled regularly. This offers a unique opportunity to investigate the benefits of such policies in the short-run considering the forgone revenue for state governments. One should expect the incidence to differ from single tax changes, due to the interrelationships between several aspects of the tax code.

This could also serve as a valuable benchmark for the incidence of the newly adopted "Tax Cuts and Jobs Act" of 2017. Even though the rate changes differ in magnitude, the reform in Ohio is comparable to the new federal tax code along one dimension. Both policies reduced the corporate and personal income tax rates simultaneously. However, they also differ in the sense that the federal "Tax Cuts and Jobs Act" adopted a provision that features a different treatment for income earned by pass-through entities like self-employed individuals.

This paper studies the impact of the 2005 Ohio tax reform. Specifically, I exploit the Public Use Microdata Survey from the Current Population Survey (CPS) to explore the effects of these substantial rate cuts on the Ohio workforce. I observe separate cross-sections of individuals over the period 2000-2015. The identification strategy is akin to a triple difference which compares wages, self-employment earnings and labor force participation for individuals living in Ohio to similar individuals in Pennsylvania. I consider several specifications, one of which controls for different economic trends across states, and capture selection into the labor force with a Heckman type methodology.

My findings suggest that the personal income tax reduction significantly boosted participation for women, specifically those with 5-year old children and seems to have impacted self-employment earnings. The latter result is consistent with a literature (Clotfelter 1983, James Long 1982, Richard Goode 1976) that underscores a negative relationship between marginal tax rates and taxable income when tax filings involve some degree of compliance as is the case for self-employed individuals. These economic agents are more sensitive to tax rates because income earned is partly determined by voluntary cooperation and the possibility of retaining profits within the firm favors intertemporal income shifting. In contrast, I did not notice any significant positive effect of the corporate tax cut on wages.

The rest of the paper is organized as follows. Section 2 describes the policy context with a detailed exposition of the tax reform. Section 3 briefly reviews the relevant literature, with a focus on the impact of comprehensive tax reforms. Section 4 presents a theoretical illustration, designed to highlight the challenges when measuring the tax incidence in this context. Section 5 describes the identification methodology and empirical strategy, while section 6 presents the data. Section 7 analyzes the main results while section 8 presents the limitations and explores the avenues for future research on the incidence of comprehensive tax reforms.

2. Policy context: Tax reforms in Ohio over 2005-2009

2.1 Phase-in of the Commercial Activity Tax (CAT)

The Corporate Franchise Tax (CFT) which is imposed on the activities of corporations operating in Ohio before the 2005 reform represents a flat rate of 8.6 percent applicable to the profits generated within the state. Beginning in 2006, the Corporate Franchise Tax (CFT) was progressively phased out up until 2010, when it was completely replaced by a Commercial Activity Tax (CAT) of 0.26 percent.

Apart from the differential in rates, the new tax features an important distinction with regards to the taxable base. It is levied on all businesses irrespective of their legal form of organization and applies to gross receipts as opposed to the CFT which targets profits. During the phase-out period, corporations respectively paid 80 percent in 2006, 60 percent in 2007, 40 percent in 2008 and 20 percent in 2009, of the pre-existing corporate franchise tax due. Additionally, the new CAT rate has been gradually phased-in from an initial rate of 5.6 percent in 2006 to its final full rate of 0.26

percent by 2010. The corporate tax cut is designed to reduce the cost of capital for entrepreneurs and unleash capital investment and productivity.

The literature on corporate tax incidence has long defended that the impacts of business tax reform on wages in the long-run depend on (1) the degree of capital mobility across sectors, (2) the elasticity of substitution between capital and labor in production, (3) the elasticity of substitution between products in consumption, (4) the factor intensities in production and (5) the elasticity of demand with regards to the corporate output (Harberger 1962, Martin & Davidson 1985, Raveendra 1975, and Gravelle 2006). Assumptions regarding these parameters determine the distribution of the corporate tax burden between workers, capital owners, and consumers.

In the short-run, the tax effects are primarily driven by market imperfections (Felix et al. 2006, Arulampalam 2010 and Liu & Altshuler 2013). This builds on a rather heterodox tradition which emphasizes the role played by labor and product market institutions in the analysis of tax incidence. It is important to note that these studies do not measure the classical general equilibrium effects of the corporate tax on wages through investment. Instead, they seek to evaluate the effect of the tax inherent to differences in bargaining power between workers and firm owners, or the presence of market power that enables the shifting of the tax to consumers and workers.

Also, a few papers have suggested that the incidence of corporate tax changes might be asymmetric (Ljungqvist 2014, Fuest et.al 2017) and tax cuts do not necessarily boost employment and wages in the short-run. However, given that the magnitude of the CFT reduction in Ohio is substantially higher than previous rate cuts, the anticipated incidence is uncertain at best.

2.2 Phase-out of the property tax and investment credits on equipment and machinery

Another significant change that was introduced in the Ohio tax code through the 2005 tax reform relates to the removal of the state property tax on equipment and machinery. Under the new tax code, manufacturing machinery and equipment are exempt from property taxation beginning in 2006. The property tax on existing machinery and equipment, furniture and fixtures, and inventory is phased out starting in the tax year 2008 and ending with no tax due in 2009. This policy is designed to induce more investments specifically in manufacturing. However, the state also eliminated tax credits on machinery and equipment investments in 2009.

The few empirical works that have explored the incidence of investment subsidies on growth and employment did not observe any substantial effects (Gravelle & Hungerford 2010). Other works studied the incidence of tax-induced changes in the user cost of capital on investments. The user cost of capital reflects the present discounted value of the marginal cost of a unit of investment. It accounts for the future stream of net returns associated with an asset including interest payments, property taxes, and credits on investment expenditures. Policy changes with regards to investment tax credits and the property tax on productive assets affect the user cost of capital. Chirinko and Wilson (2008) noted that corporate tax-induced changes in the user cost of capital affect state investment dynamics. The combined effect of these two offsetting changes on wages and employment will depend on the response elasticities of capital formation with respect to both instruments.

2.3 Reduction of the personal income tax

On top of the changes highlighted above, the Ohio legislature introduced a reduction by 21 percent of the personal income tax rate over the period 2006-2010. The initial rate of 7.2 percent is scheduled to be reduced in five annual increments (around 0.25 percentage point each), resulting

in a tax rate of 6.2 percent by 2010 and an overall reduction of 0.95 percentage point. The personal income tax reduction targets to induce higher household savings, incite labor participation and promote economic growth.

There is a wealth of research (Eissa 2005, Gordon et al. 2007, Henrekson et al. 2007) on the incidence of personal income taxation on labor supply decisions. Most works observe labor market outcomes for individuals around policy reforms affecting the marginal income tax rate. The empirical consensus defends that marginal tax rates on personal income affect the supply of labor especially for individuals with a low attachment to the labor market such as married women. The behavioral response to the personal income tax could be investigated across several dimensions such as hours worked, wages, participation in the labor force or employment. I choose to explore the incidence of the Ohio tax reform on all these aspects (results on hours worked described in the Appendix).

3. Relevant literature

The literature on the economic effects of tax reforms could be divided into two main categories. Applied general equilibrium models adopt a theoretical framework where the incidence of alternative tax schemes is studied, and the most efficient structure is discussed (Altig et al. 2001, Auerbach & Kotlikoff 1987, Fullerton et al. 1993, Auerbach 2002, and Nickell 2003). The critical challenge here relates to the specification of several elasticity parameters for calibration.

In contrast, empirical works exploit reduced-form models to investigate the impacts of tax changes on employment and wages. Using various identification approaches, these papers analyze variations in wages or employment around tax reforms (Gruber 1997, G. Cruces et al. 2009 and Jeffrey Kubik 2006). Many of these works consider specific reforms targeted at the taxation of labor or capital earnings, with a focus on national or federal reforms.

The methodological challenge relates to the endogeneity of policy reforms. Tax changes could be motivated by pre-existing economic conditions that also affect current dynamics of wages and employment. To circumvent that shortcoming, scholars adopt identification strategies ranging from the "Narrative approach[1]" (Romer & Romer 1989, 2004, and Ramey & Shapiro 1998) to the "Structural Vector Regression method" (Blanchard & Perotti 2002). The main goal is to isolate the components of policy changes that vary exogenously from economic outcomes by exploiting political speech materials or the institutional design of tax collections. But recovering archival qualitative data is a daunting task[2] especially at the state level and adopting the Structural Vector Approach requires the use of high-frequency time series on public finance aggregates that are not available for most states. For these considerations, this paper will not adopt such identification strategies.

Other studies observe panels of individuals or firms and treat national tax reforms as exogenous policy changes from the perspective of these units (Gruber 1997, Cruces et al. 2009 and Kubik 2006). This empirical approach compares variations in labor earnings and employment status of individual workers around tax reforms. The difference in difference approach that is usually adopted, requires the choice of an appropriate control group which would be observed over the same period to capture counterfactual developments. Gruber (1997) compare Chilean manufacturing firms around the dramatic payroll tax change of 1981 while Cruces et al. (2009)

[1] The Narrative Approach exploits speech materials by policymakers to identify exogenous policy reforms.
[2] This would require collecting speech materials from state policymakers prior to the reform.

studied the relationship among payroll taxes, wages and employment inherent to policy-driven geographical variations within Argentina over the period 1995-2001. The critical challenge relates to the choice of a control group. The existence of potential heterogeneous trends in wages and employment across individuals or firms warrants the adoption of a methodology that captures pre-existing dynamics across the observed units. I address this consideration in part by presenting results with state-specific time trends.

Plus, most papers study national policy reforms and very few works examine comprehensive tax reforms. When they do, these papers focus on specific taxes within the overall reform. The most notable case relates to Jeffrey Kubik (2006) who studied the U.S Federal Tax Reform Act (TRA) of 1986 to examine the short-run effects of the change of labor taxation on the wage structure of several skills. The author utilizes the differential impact of the TRA on median marginal tax rates across several skills to analyze the incidence of the reform on labor supply. This approach might be problematic because of the interdependency between several aspects of the tax code. The measured impacts could just reflect the general equilibrium incidence of the overall tax reform. Other changes in the TRA might have affected the behavior of the control individuals which would bias the estimated tax effect.

4. Conceptual framework

The analytical model presented below considers the equilibrium in the labor market. I seek to demonstrate that the labor supply elasticity to the personal income tax cut cannot be measured in this context if one does not impose further assumptions on other key parameters. First, assume that production is carried out using capital and labor with respective prices r and w. Let τ_c and τ_f be the corporate and the personal income tax rates respectively. For simplicity, I do not include the tax τ_e on equipment and machinery, even though that does not alter the qualitative implications of the model. Considering that the statutory corporate tax is paid by the firm[3] as a user of capital, equilibrium on the labor market is defined by the following equation:

$$D\left[w, \mathrm{r}(1+\tau_c)\right] = S\left[w(1-\tau_f)\right] \tag{1}$$

where D measures the demand for labor by the corporate sector and S refers to the supply of labor by households. Next, consider r to be the numeraire and set it equal to one, implying that w should be interpreted as the pre-tax relative price of labor. Total differentiation of the equilibrium condition (1) results in:

$$\frac{\partial D}{\partial w}\mathrm{d}w + \frac{\partial D}{\partial \mathrm{r}_e}\mathrm{d}r_e = (1-\tau_f)\frac{dS}{dw_e}\mathrm{d}w - w\frac{dS}{dw_e}\mathrm{d}\tau_f \tag{2}$$

where $w_e=w(1-\tau_f)$ and $r_e=r(1+\tau_c)$ represent respectively the net of tax wage rate and the gross of tax cost of capital for the firm. Dividing condition (2) by dw yields:

$$\frac{\partial D}{\partial w} + \frac{\partial D}{\partial \tau_c}\frac{\mathrm{d}\tau_c}{\mathrm{d}w} = (1-\tau_f)\frac{dS}{dw_e} - \frac{w}{\mathrm{d}w}\frac{dS}{dw_e}\mathrm{d}\tau_f \tag{3}$$

Multiply and divide equation (3) by w and D respectively while assuming $D=S$ results in:

[3] Theory of tax incidence suggests that this hypothesis does not matter for the distribution of the burden.

$$\frac{\partial D}{\partial w}\frac{w}{D}+\frac{\partial D}{\partial \tau_c}\frac{\mathrm{d}\tau_c}{\mathrm{d}w}\frac{w}{D}=(1-\tau_f)\frac{dS}{dw_e}\frac{w}{S}-\frac{w}{dw}\frac{dS}{dw_e}\frac{w}{S}\mathrm{d}\tau_f \quad (4)$$

Before proceeding, it is worth highlighting the forces at play in equation (4). There are two main effects to be distinguished here. First, there is the direct effect of a tax on labor demand or supply. This relates to changes in the gross of tax price of a factor in equilibrium. The corporate tax, for instance, increases the gross of tax price of capital if one assumes away behavioral changes to the rate of interest in response to the tax. However, tax rate modifications usually generate general equilibrium effects on market outcomes i.e. dw with respect to (dτ_c or dτ_f). An increase in the corporate income tax will likely push net of tax interest rates downwards due to lower demand for capital by firms. Given these considerations, and after some basic mathematical manipulations (use dw_e=(1-τ_f)dw, remember that r=1and dr_e=dτ_c and), equation (4) could be rewritten as:

$$\eta_L^D+\eta_K^D\frac{1}{1+\tau_c}\frac{\partial\log(1+\tau_c)}{\partial\log w}=\eta_L^S+\eta_L^S\frac{\partial\log(1-\tau_f)}{\partial\log w} \quad (5)$$

where η_j^S and η_j^D represent the uncompensated supply and demand elasticities of labor with respect to the price of factor j. After renaming the wage elasticities with respect to the corporate tax and the personal income tax (uncompensated) as ε_c and ε_f respectively, equation (5) becomes:

$$\eta_L^D+\eta_K^D\frac{1}{1+\tau_c}\frac{1}{\varepsilon_c}=\eta_L^S+\eta_L^S\frac{1}{\varepsilon_f} \quad (6)$$

It could be noticed that the two main parameters of interest in this context ε_c and ε_f cannot be estimated without imposing additional restrictions on other key elasticities. Consider for instance the partial equilibrium when only one of the personal income or the corporate tax is changed. Equation (6) reduces respectively to the familiar versions:

$$\varepsilon_f=\frac{\eta_L^S}{\eta_L^D-\eta_L^S} \text{ and } \varepsilon_c=\frac{\eta_K^D}{\eta_L^D-\eta_L^S}\frac{1}{1+\tau_c} \quad (7)$$

This derivation carries significant implications for empirical works trying to measure the incidence of the personal income tax (or corporate income tax) when several taxes are altered simultaneously. If, as is generally the case, one considers a panel dataset of individuals around the reform and some of these individuals were employed in the corporate sector prior to the reform, the estimated wage elasticities will be confounded by developments on the demand side of labor. This can be addressed by focusing on individuals that are only affected by the tax under consideration while assuming minimal general equilibrium effects.

For these reasons and owing to the fact that I am only able to exploit repeated cross sections, I do not intend to measure any of the elasticities in equation (6). This approach would be problematic given that the reform in Ohio affected both the personal and corporate tax rates simultaneously. Instead, I seek to evaluate the combined effect of all these changes on labor market choices and outcomes for different groups of individuals namely self-employed, females and females with 5-year-old children.

By focusing on self-employed individuals, my goal is to get a sense of the incidence of the personal income tax on taxable income, given that this group of individuals is not directly impacted by the corporate tax and is generally considered to be sensitive to rate changes. In contrast, the choice of

females and females with young children is designed to capture the impact of the policy reform on individuals' labor market choices. This group of economic agents is usually very sensitive to marginal income tax rates. I also look at variations in wages paid to individuals employed by large firms (with more than 250 employees) in Ohio around the reform to capture the demand side incidence of the reform. Theory and recent evidence on the association between union bargaining and the effects of corporate tax changes (Arulampalam, Devereux, and G. Maffini 2010) suggest that the dramatic corporate tax cut in Ohio could translate into higher wages in the short-run.

5. Data

This paper studies the impact of the 2005 Ohio tax reform on labor market outcomes in Ohio by observing individuals between the ages 25 and 64 over the period 2000-2015. I pooled several annual cross-sections obtained from IPUMS-CPS, an integrated dataset of the randomly-sampled March Current Population Survey (CPS). The CPS data provide information on employment status, wages, industry, sociodemographic attributes, occupation affiliation and additional characteristics of the employer such as the size of the firm or incorporation status. The overall dataset contains 1,667,068 individuals. However, the samples of interests cover 485,721 persons.

Dependent variables: My primary outcome variables are wages, self-employment earnings, and labor force participation status. The survey measures wages as the total nominal pre-tax wage and salary income that is, money received as an employee over a calendar year. I use consumer price index adjustment factors to convert this information into real employee compensation. The survey also indicates for every working-age individual whether the person was in the labor force and, if so, whether they were currently unemployed. I use this information to construct a dummy variable for a person's labor force participation status.

Individual characteristics: Given that the dataset does not provide the number of years of schooling. I impute this information from the nine categories of educational attainment used by the CPS. Following the tradition established by Mincer (1974), I compute work experience (*exper*) as the difference between age and the years of schooling minus six ($exper_i = age_i - s_i - 6$). This approach features some limitations but represents a good approximation of experience if one considers groups of individuals with a strong attachment to the labor market.

Sociodemographic characteristics include marital status, age, number of children younger than 5 years old, number of children between the ages of 6 and 20, gender and race. Other economic variables used in this analysis are the employment status, the occupation category of employment, annual wages, non-work income as well as the metropolitan status of the individual's residence. Table A4 in the Appendix describes some summary statistics of the sample used in this analysis.

6. Methodology

6.1 Samples of interest

The objective of tax reform is to boost economic activity in the state of Ohio. The policy change impacts labor supply decisions by individual workers and the demand for labor by firms. First, I focus on individuals between the ages 25 and 64. These are prime age workers with a strong attachment to the labor market. I excluded students and those working in the armed forces. In some regressions, I compare changes in wages paid by large (more than 250 workers) firms around the tax cuts in order to capture the labor demand side incidence of the reform. Large firms are predominantly incorporated and observing wages paid by these units might potentially shed some light on the impact of the corporate tax cut. I also compare the effect of the policy on self-employed

individuals relative to others. This group of persons, generally treated as pass-through entities for the purpose of taxation are very sensitive to marginal tax rates. The possibility of retaining income in the business favors intertemporal income shifting to minimize tax liabilities.

Last, I compare labor force participation for women and women with 5-year old children to others around the reform. Labor market participation is one of the key goals of the policy change in Ohio and as secondary earners, women and married women specifically are known to react swiftly to marginal rate changes. I choose here to focus on women with 5-year old children who face trade-offs similar to those of married women in general but feature a higher opportunity cost of market work.

6.2 Identification strategy

The primary goal of this analysis is to study the impact of these policy reforms on individual earnings and labor participation in Ohio. The policy context is akin to a natural experiment which lends itself to a difference in difference methodology. First, I compare individuals living in Ohio with those living in Pennsylvania the policy reform. Next, I add a triple difference through the respective comparison between self-employed, women and women with young children and others. To obtain consistent estimates, it is important to control for the different confounding factors unfolding over time which affect labor market outcomes at the state and national level. This is crucial when one considers that the policy reform covers a period which features other remarkable shocks not only in the state of Ohio (other policy changes) but also at the national level (Great Recession).

I compare individuals in Ohio to their peers in Pennsylvania, which is the only neighbor of Ohio that did not witness a reshaping of its political landscape or a tax-related policy reform over and after the treatment period. This state is expected to provide a better control for trends in wages, and labor force participation in Ohio due to geographic proximity. However, Pennsylvania could also be contaminated by the reform under consideration because of cross-border movements of goods and people.

Figure 1: Growth of output in Ohio and Pennsylvania

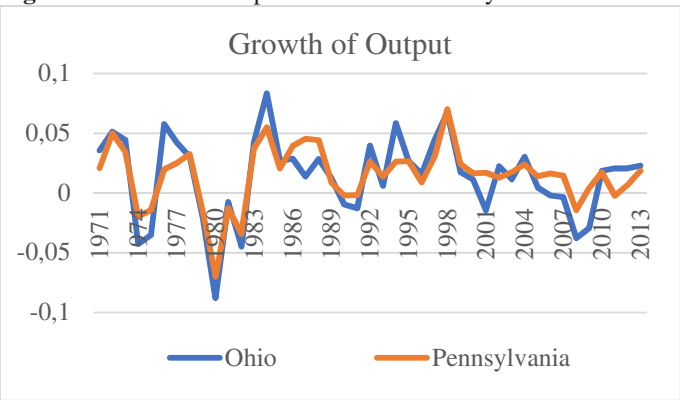


Figure 1 plots the growth rate of output in Ohio relative to the control state of Pennsylvania. The dynamics of the Gross State Product (GSP) are relatively similar across these two states. The resemblance is noticeable between Ohio and Pennsylvania. Considering that these two states are part of the U.S "Manufacturing Belt", the graph suggests that they share similar trends in economic activities. It also supports the belief that adverse sectoral shocks that affect Ohio might translate

into lower output growth in neighboring Pennsylvania due to population, good and business cross-border movements. I discussed below the extent to which spatial interactions of this nature would influence the estimates described in this paper.

Difference-in-differences specifications assume that the treated and control region have the same trends in the absence of the policy (parallel trends assumption) and will generally fail to produce consistent treatment effect estimates if this assumption is not true. Table 2 describes the characteristics of individuals between the ages 25 and 64 living in Ohio relative to similar individuals in Pennsylvania prior to the tax reform. This comparison reveals important similarities regarding socioeconomic characteristics. To further justify the choice of the control group, I present in the Appendix graphs describing the trends of socioeconomic variables between the two states prior to the reform in Ohio.

Table 2: Characteristics of sub-samples (controls and treated) over the period 2000-2005

	OHIO		PENNSYLVANIA	
	MEAN	**S.D.**	**MEAN**	**S.D.**
Age	43.05	10.34	43.42	10.20
Male (%)	0.47	0.50	0.47	0.50
White (%)	0.84	0.36	0.87	0.33
Married (%)	0.68	0.47	0.69	0.46
Years of schooling	13.44	2.46	13.52	2.65
In the labor force (%)	0.81	0.39	0.80	0.40
Employed (%)	0.95	0.21	0.95	0.20
Self-employed (%)	0.09	0.29	0.10	0.29
Living in a metropolitan area (%)	0.87	0.33	0.88	0.32
With a salary employment (%)	0.72	0.45	0.73	0.44
Number of children	1.17	1.24	1.19	1.22
Number of children less than 5 y.o.	0.22	0.54	0.22	0.53
Wage earnings ($ 1000)	39.16	39.82	42.04	47.80
Number of Obs.	21,732		24,379	

It is important to be cautious regarding the parallel trend assumption given that the state of Ohio experienced a dismal economic growth relative to Pennsylvania in the years leading up to the reform[4] and may have been slightly more impacted by the 2008 Great recession due to the relative importance of manufacturing in its economic structure[5]. I address the presence of a potential time-variant heterogeneity across states by including state-specific trends in some regressions.

6. Empirical strategy

6.1 Selection bias

Approximately one-fifth of the observations in my sample have missing wages because the individual is not in the labor force and is not working as a result, presenting a typical sample

[4] Over 2001-2005, the average growth of output stands at 1.0% in Ohio vs. 1.7% in Pennsylvania.
[5] Over 2000-2007 manufacturing represents 22% of private GDP in Ohio vs. 17% in Pennsylvania.

selection problem. The sample of working individuals might not be random, and the unobserved factors that determine wages are likely to be correlated with the unobservables that influence a person's decision to supply labor. It is well known that a simple OLS regression on the sample of individuals employed would yield biased and inconsistent estimates for the wage regressions.

To correct for the sample selection bias, I adopt a Heckman-type methodology and add a first-stage selection equation. Participation in the labor force and employment for individual *i* in state *s* over period *t* (emp_{ist}) depends on the individual's nonwork income ($nwinc_{ist}$), education ($educ_{ist}$), marital status ($married_{ist}$), number of children younger than 5 ($child5_{ist}$), age of youngest child ($yngch_{ist}$), gender ($female_{ist}$) and an error term (u_{ist}).

$$emp_{ist} = \begin{cases} 1 \text{ if } \delta_1 nwinc_{ist} + \delta_2 educ_{ist} + \delta_3 child5_{ist} + \delta_4 yngch_{ist} + \delta_3 married_{ist} + \delta_4 female_{ist} + \delta_5 female.child5_{ist} + u_{ist} > 0 \\ 0 \text{ otherwise} \end{cases} \quad (8)$$

This first-stage is identified by the variables "nonwork income" and "number of children younger than 5 years old" which are expected to affect incentives related to labor force attachment without altering potential wage earnings across individuals. In other words, these variables are excluded from the second-stage specification but help induce some variation in the probability of being employed according to equation (1).

I also explore the incidence of the policy reform on an individual's participation in the labor force. Given that the reform affects the marginal tax on labor earnings, it is expected to alter participation in the labor force at the margin particularly for females and females with young children by increasing the opportunity cost of unemployment. The policy reform represents an exogenous shock from the perspective of an individual and the period dummies help to identify the tax effects. The following equation is estimated using a linear probability model (LPM).

$$lfp_{ist} = \begin{cases} 1 \text{ if } \delta Z_{ist} + \theta_0 dohio_{it} + \theta_1 d0610_{is} + \theta_2 d2011_{is} + \theta_3 dohio_{it}.d0610_{is} + \theta_4 dohio_{it}.d2011_{is} + u_{ist} > 0 \\ 0 \text{ otherwise} \end{cases} \quad (9)$$

This choice is motivated by the consideration that the LPM lends itself to a straightforward interpretation of the parameters as marginal effects on the probability of being on the labor market. The standard errors are clustered at the state level and robust to the presence of heteroscedasticity. In addition to the set of controls Z_{ist} which refers to the right-hand side variables in specification (8), specification (9) includes a set of period and state dummies chosen to measure the incidence of the tax reform on labor force participation in Ohio. These include period dummies broken into three groups i.e. *d2006* for period 2000-2005, *d0610* for period 2006-2010, and *d2011* for period 2011-2015) and an indicator for the state of Ohio which equals one if the individual resides in Ohio. The period dummies are defined as such to reflect the timing of the policy.

I consider a pre-treatment period (before 2006 which is the excluded period), a treatment period –*d0610* – (2006-2010) and a post-treatment period –*d2011*– (after 2010). This specification captures average differences in wages between Ohio and Pennsylvania before the policy, over the policy period and after the adoption of the policy. The pre-treatment dummy ensures that any pre-existing heterogeneity in average wage differentials between the two states is controlled for. In the robustness analysis, I introduce two pre-treatment periods –2001-2003– and –2004-2005– in order to test the plausibility of the parallel trend assumption.

I could have used a lead-lag[6] difference in difference structure with several year dummies however, I believe that the way the policy reform unfolded warrants the methodology described above. The fact that the schedule of the tax cuts over 2006-2010 where all announced ahead of time indicates that economic agents should have optimized labor market choices over and after the treatment period in response to the full policy package. Of interests are the slopes of the interaction terms which measure the wage difference between individuals with similar characteristics living in Ohio and those in Pennsylvania over and after the policy reform period relative to the pre-policy period. Other specifications include state-specific trends.

I am aware of the consideration that the comprehensive reform would affect both the demand and the supply of labor. The analysis carried out in this paper should be interpreted as a reduced form exercise that seeks to measure the impacts of the full policy package on labor market outcomes. The design and timing of the reform does not allow me to distinguish the labor supply response from the labor demand effects, though the self-employment, women, and women with young children results are likely tied to the labor supply component of the reform, whereas the large firm wage results represent a valuable insight with regards to the labor demand side of the policy.

6.2 Second-stage: wage regressions

The second stage of the regression studies wages and self-employment earnings for individuals living in Ohio who were targeted by the reform compared to similar individuals in other states. I control for the traditional determinants of labor market outcomes at the micro level i.e. education ($educ_{ist}$), experience (exp_{ist}), marital status ($married_{ist}$), a dummy variable indicating whether the individual lives in a metropolitan area ($metro_{ist}$), the occupation of the individual ($occup_{ist}$), and sociodemographic characteristics like gender ($female_{ist}$) and race ($white_{ist}$).

This set of control variables is chosen to compare labor market outcomes between individuals with similar sociodemographic characteristics before and after the Ohio reform. The regression is akin to a matching estimator, which compares earnings across different cells of the covariates across states and over time. The standard errors are clustered at the state-year level to capture the fact that individuals living in the same state are subject to identical policy upheavals. Depending on the specification, I also include, a general time trend and a state-specific pre-policy trend. The dependent variable y_{ist} represents wages while the control variables are included in the matrix X_{ist} according to the following equation.

$$\log(y_{ist}) = \beta X_{ist} + \alpha_0 \text{dohio}_{it} + \alpha_1 \text{d0610}_{is} + \alpha_2 \text{d2011}_{is} + \alpha_3 \text{dohio.d0610}_{it} + \alpha_4 \text{dohio}_{it}.\text{d2011}_{is} + v_{ist} \qquad (10)$$

I chose to control for occupation rather than industry for a few reasons. First controlling for both is problematic (Joshua Angrist and J.S. Pischke 2002). Second, even though they are both endogenous, the response elasticity of industry of work to economic shocks is generally higher than that of occupation. Unlike industry, occupation which is highly correlated with the sector of work is more likely to remain unchanged in the face of policy shocks that alter wage incentives across industries especially in the short-run. The rest of the variables are period dummies broken into three groups (before 2006, between 2006-2011 and after 2010) and an indicator for the state of Ohio which equals one if the individual resides in Ohio.

The period dummies are defined as such to reflect the timing of the policy. I consider a pre-treatment period (before 2006), a treatment period (2006-2010) and a post-treatment period (after

[6] I do present in the appendix a parsimonious exposition of the results with a lead-lag difference in difference structure.

2011). Given that the treatment period covers the Great Recession of 2008 which represents an adverse shock to the U.S. economy in general, this specification captures average differences in wages between Ohio and Pennsylvania before the policy, over the policy period and after the adoption of the policy. The pre-treatment dummy ensures that any pre-existing heterogeneity in average wage differentials across states is controlled for.

7. Main results and Discussion

7.1 Effects on wages

Table 3 reports the results of the second-stage Heckman regression for all specifications.. The first three columns (columns 1-3) compare individuals living in Ohio to similar peers in a control set of 14 states carefully selected, while the last two columns (columns 4-5) considers as control for Ohio the neighboring state of Pennsylvania. The first column describes the results of the baseline model with state or year fixed effects. The coefficients of the interaction terms suggest that the state tax reform of 2005 did not translate into substantial wage gains for prime-age workers in Ohio. The negative and statistically significant estimate of the post-reform interaction parameter reflects the widening wage differential for workers living in Ohio relative to their peers in other states. On average, over the period 2011-2015, the wage differential between an employed prime age individual living in Ohio and a comparable individual living in the set of control states was 5.0 percent lower than it was over the pre-reform period of 2000-2005. The estimates of the coefficients on the individual socioeconomic characteristics included to control for systematic differences in wage variations, which are not reported in table 3 are highly significant in all specifications. This parameter remains negative even when one considers as controls, individuals living in Pennsylvania (column 4). It should also be noticed that over the treatment period, the estimated coefficient is negative with the inclusion of state and year fixed effects, regardless of the control group considered.

In contrast, when including state-specific time trends (columns 3 and 5), the parameter of interest turned positive and significant, signaling a meaningful impact of the tax reform on wages. The estimated effects range from 3% to 5% depending on the specification adopted. This finding reinforces the hypothesis that U.S. states feature different trends in wages due to a heterogeneity in growth opportunities. It also lends support to the belief that the state of Ohio was on a different possibly higher wage growth trajectory prior to the reform. The estimate implies that relative to trend, individuals living in Ohio did not experiment a drop in wages after the reform. This result also confirms that the estimated negative effects of the previous specification might be misleading because wages were moving in a different direction in the state of Ohio relative to other states prior to the reform. Relatedly, I also notice that the negative wage differential between Ohio and the controls over the treatment period 2006-2010, disappears with the introduction of state-specific trends, even though the estimated coefficients are highly imprecise in this latter scenario.

Column 3 presents a specification with region effects to capture the existence of time-invariant unobservables at the regional level. The estimated coefficient remains positive and significant with the addition of state-specific trends. This specification seeks to control for regional heterogeneity. Notice that state fixed effects cannot be identified when regional time-invariant effects are accounted for. Similar to the results from the specification above, the measured effects imply a significant increase of 3% in wages after the policy package was adopted for individuals living in Ohio relative to comparable peers in the control states.

Table 3: Main results: Effects on wages

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ohio indicator	0.04***	0.09***	0.08	0.004***	0.06***
	(0.00)	(0.00)	(0.07)	(0.001)	(0.00)
2006-2010 indicator	-0.02	-0.01	-0.01**	-0.03	-0.05***
	(0.01)	(0.00)	(0.00)	(0.03)	(0.00)
2011-2015 indicator	-0.01	-0.04***	-0.04***	-0.02	-0.08***
	(0.01)	(0.00)	(0.01)	(0.03)	(0.00)
Ohio x 2006-2010 indicator	-0.05***	0.00	0.00	-0.04***	0.03***
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Ohio x 2011-2015 indicator	-0.05***	0.03**	0.03***	-0.06***	0.07***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		354,569			89,132

Notes: the dependent variable is the log average real wage for individuals between the ages 25-64. Standard errors are in parentheses and clustered by state. [(*)] Sociodemographic controls include gender, marital status, race, experience, experience squared, education, the metropolitan status of residence, and occupation. These characteristics were all significant at 1%. [(a)] Control set includes Pennsylvania and [(b)] control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated using a Heckman type selection model with a first-stage equation of selection.

7.2 Effects on wages for large-firm employees

The measured effects in the previous section can only be interpreted as reduced-form parameters and should not be directly associated to any specific tax change in the policy package. As discussed in the conceptual framework, given that the reform targeted both the corporate and the personal income tax, it is necessary to consider units that are only affected by either one of these taxes if one intends to relate the measured effect to a specific tax instrument. I do so, by considering individuals working for large firms that employ more than 250 employees. These enterprises are predominantly incorporated, and observing wages paid to this group of individuals could provide valuable insight with regards to the incidence of the corporate tax cut in Ohio.

Excluding self-employed entrepreneurs, a substantial portion of businesses operating in the U.S. are registered as Corporations (Subchapters C and S). In 2010, they represent 69% of all firms according to statistics provided by the Census Bureau and employ about 70% of the national workforce. A break-down of the statistics of incorporation by size offers some useful insights with regards to the appropriate sample to be studied for the analysis of the corporate tax. Of the businesses that employ more than 250 workers, 85% are incorporated employing about 92% of the corporate workforce, which suggests that this sample of firms would better represent corporate firms in general.

Besides, a recent strand of the corporate tax literature (See Arulampalam et al. 2010) highlights the direct incidence of the corporate tax operating through the bargaining process between workers and entrepreneurs. According to this line of thought, the corporate tax cut in Ohio should entail higher wages in the short-run. I investigate this possibility with a triple difference which compares wages paid to individuals employed by large firms (predominantly incorporated), relative to all other employees before and after the policy between Ohio and the control geographies. The results described in table 4 do not support the hypothesis of a sharing of the extra corporate profits induced

by the rate cut with workers. This finding holds true both during and after the policy unfolded. The coefficients of interests (Last 2 rows with the triple interactions in table 4) are negative for the treatment period regardless of the specification, indicating that employees of large firs in Ohio actually experienced a higher drop in wages relative to other employees in the state over the period 2006-2010. In contrast, this difference varies widely depending on the specification and is not quite conclusive over the post-treatment period 2011-2015.

Table 4: Main results: Effects on wages for big firms' employees[7]

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Big firm indicator	0.171***	0.165***	0.171***	0.200***	0.208***
	(0.014)	(0.014)	(0.015)	(0.004)	(0.001)
Big firm x Ohio indicator	0.064***	0.060***	0.054***	0.016***	0.003***
	(0.015)	(0.015)	(0.016)	(0.001)	(0.001)
Big firm x 2006-2010 indicator	-0.003	0.015*	0.011	-0.000	-0.010***
	(0.010)	(0.008)	(0.009)	(0.012)	(0.000)
Big firm x 2011-2015 indicator	0.006	0.002	-0.007	0.009	-0.016***
	(0.011)	(0.010)	(0.012)	(0.007)	(0.000)
Big firm x Ohio x 2006-2010 indicator	-0.037***	-0.029***	-0.025***	-0.017***	-0.010***
	(0.009)	(0.009)	(0.010)	(0.001)	(0.000)
Big firm x Ohio x 2011-2015 indicator	-0.020**	-0.010	-0.002	-0.016***	0.010***
	(0.011)	(0.010)	(0.010)	(0.001)	(0.000)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		354,569		89,132	

Notes: the dependent variable is the log of wages for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, and occupation. These characteristics were all significant at 1%. [(a)] Control set includes Pennsylvania and [(b)] control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated using a Heckman type selection model with a first-stage equation of selection.

7.3 Effects on self-employment earnings

The policy reform in Ohio affected both the taxation of personal and corporate income but to different magnitudes. The personal income tax has been reduced by 21% over the period 2006-2010. This change might affect incentives related to the reporting of earnings, particularly for self-employed individuals. This hypothesis is consistent with a wealth of empirical findings (James Long 1982, Richard Goode 1976, Saez 2010, le Maire & Schjerning 2013) that have suggested that taxable income is sensitive to marginal income tax rate especially for self-employed individuals for whom taxation involves some degree of voluntary compliance. The argument implies that a reduction of the income tax rate might induce a higher reporting of self-employment income.

I explore this possibility by comparing self-employment earnings of individuals living in Ohio to similar individuals in the control geographies. To do so, I use a triple difference identification

[7] Define O, D_1, D_2 and B as dummy variables for Ohio, period 2006-2010, 2011-2015, and large firm employee respectively. X represents the matrix of individual characteristics as previously defined. The triple difference specification is the following:
$$\log(y_{ist}) = \beta X_{ist} + \alpha_0 O + \alpha_1 B + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 O.D_1 + \alpha_4 O.D_2 + \alpha_5 O.B + \alpha_6 B.D_1 + \alpha_7 B.D_2 + \alpha_8 O.B.D_1 + \alpha_9 O.B.D_2 + v_{ist}$$

strategy that compares changes in wages paid to self-employed individuals to wages paid to all other workers around the reform between Ohio and the controls states. The triple difference allows me to control for other unobservable confounding factors that affect wages dynamics in treated and control states. I found strong evidence in support of a short-term increase in income reported by self-employed businesses in Ohio over the period 2006-2010 when the income tax cut unfolded. The coefficient of the treatment period interaction term carries a positive value which is statistically significant at the one percent level in all specifications. The results in table 5 (Columns 1-5, last 2 rows) imply a 12% increase in income reported by self-employed economic agents during the period 2006-2010. This parameter is robust to the inclusion of state-specific trends as well as the consideration of alternative control sets. However, the positive effect shrinks over the post-treatment period 2011-2015 and remains significant only when individuals living in Pennsylvania are used as controls. There is a clear indication that small businesses which are predominantly treated as pass-through entities for the purpose of taxation reported a higher income[8] in the immediate aftermath of the tax cut in Ohio. This can be done by shifting taxable profits across time periods and exploiting a number of tricks that allow these firms to retain earnings within the business. For instance, some expenditures that are deductible can be made in a given year but claimed in a different year to minimize tax liabilities. Unfortunately, this paper could not clearly identify the accounting mechanics at the source of this result. Doing so would require additional details on the balance sheet and operating costs of self-employed businesses, which is not provided by the CPS dataset.

Importantly, the result also suggests that the benefit of the tax cut on taxable income was temporary and did not last through the post-treatment period (or waned down slowly). This finding is consequential for the debate on the benefits of tax breaks. The implications are twofold. First, if the argument in favor of rate reductions is motivated by efficiency concerns, there is considerable reason (from theory and empirical evidence) to believe that such a goal can be achieved. However, if the goal is to promote a higher collection of tax revenue, it remains to be proved that this target can be reached in the long-run. The explanation for such patterns may very well lie within the field of behavioral economics. Plus, the short-lived nature of the spike in reported taxable income is associated with an increase in hours worked, though substantially limited in comparison to the earning rise.

[8] This increase in reported income does not seem to be due to a higher activity. I tested that possibility by looking at hours worked.

Table 5: Main results: Effects on self-employment earnings[9]

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Self-emp. indicator	0.00	0.00	0.00	0.06***	0.04***
	(0.05)	(0.05)	(0.05)	(0.00)	(0.00)
Self-emp. x Ohio indicator	-0.08	-0.08	-0.08	-0.12***	-0.12***
	(0.05)	(0.05)	(0.05)	(0.00)	(0.00)
Self-emp. x 2006-2010 indicator	-0.03	-0.03	-0.02	-0.02***	-0.03***
	(0.03)	(0.03)	(0.03)	(0.00)	(0.00)
Self-emp. x 2011-2015 indicator	-0.00	-0.01	0.00	-0.06***	-0.06***
	(0.04)	(0.04)	(0.04)	(0.00)	(0.00)
Self-emp. x Ohio x 2006-2010 indicator	0.12***	0.12***	0.12***	0.12***	0.12***
	(0.04)	(0.04)	(0.03)	(0.00)	(0.00)
Self-emp. x Ohio x 2011-2015 indicator	0.01	0.01	0.00	0.07***	0.07***
	(0.03)	(0.03)	(0.03)	(0.00)	(0.00)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		354,569		89,132	

Notes: the dependent variable is the log of wages for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, and occupation. These characteristics were all significant at 1%. [(a)] Control set includes Pennsylvania and [(b)] control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated using a Heckman type selection model with a first-stage equation of selection.

7.4 Effects on labor force participation

The results in Table 5 describes the probability of participating in the labor market for individuals living in Ohio relative to others (i.e. equation 9) around the reform. The dependent variable is a dummy variable that equals 1 if the person is in the labor force and 0 otherwise. This is a Linear Probability Model (LPM) with robust standard errors. In addition to the socioeconomic determinants of an individual's wage earnings present in the wage regressions, I included several controls affecting labor force participation such as the number of kids aged 5 years old or less and non-work income. Controlling for systematic determinants of earnings allow me to compare individuals with identical wage potentials. The choice of the LPM specification is motivated by the need to facilitate the interpretation of the coefficients of interests. The results in table 5 (last two rows of columns 1-5) do not seem to support the hypothesis of a positive boost of labor force participation in Ohio.

Compared to similar peers in the control states, prime age individuals in Ohio actually experienced a drop in labor participation by 0.1% (columns 1,2,4) using a specification that accounts for state and year fixed effects. This decline is even more pronounced when state-specific trends are controlled for, with a range of estimates that vary between -1 and -3% depending on the control set. These estimates indicate that the difference in labor participation between the state of Ohio and the control states is 1-3% lower during and after treatment relative to the pre-treatment period

[9] Define O, D_1, D_2 and S as dummy variables for Ohio, period 2006-2010, 2011-2015, and self-employed respectively. X represents the matrix of individual characteristics as previously defined. The triple difference specification is the following:
$\log(y_{ist}) = \beta X_{ist} + \alpha_0 O + \alpha_1 S + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 O.D_1 + \alpha_4 O.D_2 + \alpha_5 O.S + \alpha_6 S.D_1 + \alpha_7 S.D_2 + \alpha_8 O.S.D_1 + \alpha_9 O.S.D_2 + v_{ist}$

2000-2005. This finding lends support to the hypothesis that labor force participation was heading to a different direction in the state of Ohio.

The result presented above is not dramatically at odds with the literature of the incidence of marginal tax rates on labor participation for prime-age workers. Nonetheless, when the focus is directed to specific groups such as married or educated women, the evidence tilts in favor of a significant relationship between labor supply and tax rates. I consider this possibility in the next two sections by exploring the effect of the policy reform on labor force participation for women and women with young children (less than 5 years old) who feature a much higher opportunity cost of employment due to the increased attention required for home education.

Table 5: Main results: Effects on labor force participation

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ohio indicator	-0.001***	0.025***	-0.006	0.001	0.015**
	(0.000)	(0.002)	(0.007)	(0.000)	(0.002)
2006-2010 indicator	-0.002***	0.015***	0.015***	0.004	0.011***
	(0.000)	(0.003)	(0.003)	(0.002)	(0.003)
2011-2015 indicator	-0.003***	0.013***	0.012***	0.004*	0.003***
	(0.000)	(0.003)	(0.003)	(0.001)	(0.003)
Ohio x 2006-2010 indicator	-0.001***	-0.015***	-0.015***	-0.001**	-0.011***
	(0.000)	(0.003)	(0.003)	(0.00)	(0.000)
Ohio x 2011-2015 indicator	-0.001***	-0.030***	-0.030***	-0.001*	-0.021***
	(0.000)	(0.003)	(0.004)	(0.000)	(0.000)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations	390,281			97,007	

Notes: the dependent variable is a dummy variable for employment status for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, occupation, non-work income and number of children less than 5 years old. [(a)] Control set includes Pennsylvania and [(b)] control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated with a LPM specification.

7.4.1 Labor participation for women

Economic theory defends that the relationship between marginal tax rates and labor force participation is mediated by the opportunity cost of unemployment. In other words, the labor supply response to personal income tax cuts varies across socioeconomic groups depending on the trade-off at the center of labor market choices. There is widespread evidence in support of the hypothesis that married and highly educated women tend to respond swiftly to marginal tax reductions (Mincer 1962). Indeed, during the pre-treatment period, 2000-2005, labor force participation for women varies within the range 74-75% both in Ohio and the overall sample compared to 88-89% participation rate for men. A more than plausible explanation to this disparity can be found in the trade-off between home and market production, which women, in general, have to consider while optimizing labor participation choices.

I explore the impact of the policy reform on women's participation with a triple difference that compares variations of labor force participation for women living in Ohio to other prime-age

individuals around the reform. The results in table 6 support the presumption that the reform boosted labor force participation for women by 0.3-0.4% after the treatment period. However, this finding does not hold true during the treatment period. This might just reflect an information bias related to the fact that individuals are not immediately aware of the change. It certainly highlights the fact that women, in general, might not represent the appropriate sample to be considered when analyzing the extensive response of labor supply to changes in the opportunity cost of unemployment. In the next section, I reduce the analysis to women with young children who face a flatter slope of the supply curve due to child care costs.

Table 6: Main results: Effects on labor force participation for women[10]

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Female indicator	-0.004***	-0.004***	-0.004***	-0.003**	-0.003**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Female x Ohio indicator	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Female x 2006-2010 indicator	0.001	0.001	0.001	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female x 2011-2015 indicator	0.001	0.001	0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Female x Ohio x 2006-2010 indicator	0.001	0.001	0.001	-0.007**	-0.007**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Female x Ohio x 2011-2015 indicator	0.003***	0.003***	0.003***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations	390,281			97,007	

Notes: the dependent variable is a dummy variable "In the labor force for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, occupation, non-work income and number of children less than 5 years old. [(a)] Control set includes Pennsylvania and [(b)] control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated with a LPM specification.

7.4.2 Labor participation for women with young children

A significant portion of the literature on the labor supply response of women to marginal tax rates focus on married women (Mincer 1962, Connelly 1992), young women (Hayghe 1997) or educated women (Mincer 1962). Very few empirical works focused on women with young children who face a flatter slope of the supply curve due to childcare costs that reduce the benefits of market work. To illustrate this point consider the following stylized facts from the sample used in this paper. Over the period 2000-2005 (prior to the tax reform in Ohio) labor force participation for women with children between the ages 0 and 5, was about 65%, well below the 82% rate for the rest of prime-age individuals. In Ohio, the participation rate of these women equals 68% compared to 81% for the rest of the sample over the same period. Focusing on this group presents two main

[10] Define O, D_1, D_2 and F as dummy variables for Ohio, periods 2006-2010, 2011-2015, and female respectively. X represents the matrix of individual characteristics as previously defined. The triple difference specification is the following:

$$lfp_{ist} = \beta X_{ist} + \alpha_0 O + \alpha_1 F + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 O.D_1 + \alpha_4 O.D_2 + \alpha_5 O.F + \alpha_6 F.D_1 + \alpha_7 F.D_2 + \alpha_8 O.F.D_1 + \alpha_9 O.F.D_2 + u_{ist}$$

advantages. First, it enables the inclusion of single mothers with young kids who are the target of several public programs and policies. Second, since about 75% of women with young children are married, the former sub-sample basically sums up the response of the latter group to the policy change.

There is a wealth of empirical works and discussions on the range of policies that can be used to promote higher labor participation women and married women in particular (Mincer 1962, Connelly 1992). Though subsidized or publicly provided childcare is generally presented as better policy targets, marginal tax rates are part of an arsenal of instruments at the disposal of policymakers. I study in this section, the effects of the tax reform on labor force participation for women with 5-year old children with the triple difference approach I have been using so far. The results in table 7 indicate that the reform boosted labor participation for this group by 1.0-1.2% over the treatment period and 0.9-1.4% post-treatment. This result complements previous findings on married women.

Table 7: Main results: Effects on labor force participation for women with young children[11]

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Fem 5. indicator	-0.000	-0.000	-0.000	0.003	0.003
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Fem 5. x Ohio indicator	-0.008***	-0.008***	-0.008***	-0.009***	-0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)
Fem 5. x 2006-2010 indicator	0.002	0.002	0.002	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)
Fem 5. x 2011-2015 indicator	0.001	0.001	0.001	0.006**	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Fem 5. x Ohio x 2006-2010 indicator	0.010***	0.010***	0.010***	0.011***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fem 5. x Ohio x 2011-2015 indicator	0.014***	0.014***	0.014***	0.009***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations	390,281			97,007	

Notes: Fem. 5 represents a dummy for women with less than 5 years old children. The dependent variable is a dummy variable "In the labor force" for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, occupation, non-work income and number of children less than 5 years old. ([a]) Control set includes Pennsylvania and ([b]) control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated with a LPM specification.

8. Limitations and avenues for future research

This paper observes several snapshots of middle age individuals between the ages 25-64 over the period 2000-2015. Given that the analysis does not feature a longitudinal study of working age

[11] Define O, D_1, D_2 and F_5 as dummy variables for Ohio, periods 2006-2010, 2011-2015, and female with 5 y.o. kids respectively. X represents the matrix of individual characteristics as previously defined. The triple difference specification is the following:

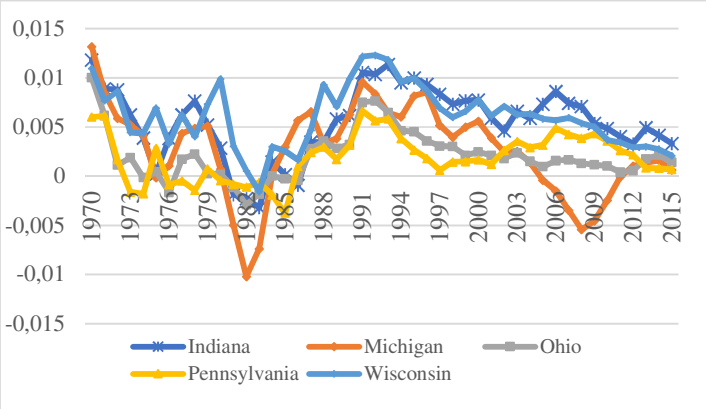
$$lfp_{ist} = \beta X_{ist} + \alpha_0 O + \alpha_1 F_5 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 O.D_1 + \alpha_4 O.D_2 + \alpha_5 O.F_5 + \alpha_6 F_5.D_1 + \alpha_7 F_5.D_2 + \alpha_8 O.F_5.D_1 + \alpha_9 O.F_5.D_2 + u_{ist}$$

persons exposed to the policy, the results described here are confounded by changes to the structure of the workforce in Ohio. This could occur if the policy intervention spurs a higher inflow of individuals to the state. To the extent that the resulting in-migration flow does not alter the composition of workers across different cells of the socioeconomic controls, these estimates provide a valuable approximation of the effects of the tax reform on labor market outcomes.

The negligible estimated effect of the tax change on labor force participation and wages might just reflect a population inflow that reshapes the composition of the labor market of Ohio. Unfortunately, there is no continuous series of cross-state migration flows over an extended period. However, the Census Bureau through the State to state migration flow tables provides net migration statistics over five-year periods for each state. Over the period 2005-2010, the state of Ohio actually featured a negative net migration of 170,470 individuals equivalent to 1.5 percent of its 2005 population. This implies that the in-migration of population that would bias the estimated effects probably did not occur.

To provide additional support to this conclusion, I also analyze the dynamics of population growth in the state around the policy reform. Figure 3 which plots the growth of population in the state of Ohio relative to its neighbors over the period 1970-2015, confirm this hypothesis. I consider the possibility of minimal population growth in Ohio being associated with an upsurge in the migration of working age individual as a highly unlikely scenario since it would imply a restructuring of the age composition of the state's residents.

Figure 3: Growth of population in Midwestern states



Considering that the reform changed several taxes simultaneously, I was not able to relate the estimated effects to a particular tax, which limits the opportunity to draw meaningful conclusions for other policy considerations. I tried to avoid analyzing equilibrium outcomes that are determined by several moving parts especially if those separate components are affected by the reform. I rather directed my attention to specific groups and outcomes, for which observed variations can be plausibly associated with specific instruments in the policy package. This methodology is not without flaws, even more so if one assumes that general equilibrium effects are not negligible. The absence of a significant change in the wages paid to employees of large firms, for instance, points clearly to the nonexistence of a meaningful direct impact of the corporate tax cut on wage earners. However, if the labor supply response induced by the personal income rate reduction is large enough to disrupt the labor market, it would be difficult to capture the incidence of the corporate tax cut. Using a triple difference identification strategy cushions in part against this limitation since

any labor market disruptions would also affect other groups of workers in Ohio. The same discussion is valid for the results on self-employment earnings which would have been contaminated by other developments on the productive side, had it not be for the triple difference method that captures these factors.

Last, the ideal set-up would require using a longitudinal dataset of individuals and observe how incentives to work and earnings are changed by the policy. This would not only allow me to control for individual heterogeneity but also to observe annual variations in labor market outcomes for the treated population relative to the appropriate control group. The relevance of my results rests upon the hypothesis that the reform did not dramatically alter the composition of the Ohio workforce with regards to unobservable individual characteristics. The only publicly accessible longitudinal dataset I could have used is the Panel Study of Income Dynamics (PSID). I learned with a quick examination that this dataset is not representative at the state level and features a non-negligible rate of cross-state migration over time.

9. Conclusion

Secular stagnation and ever-decreasing levels of corporate tax collections around the globe contributed to the re-emergence of a widespread interest in tax reform. Both ideologies of the political spectrum in the U.S favor some changes to the current tax system. The unsatisfactory empirical evidence which does not usually provides room for an asymmetrical response to tax changes limits the scope for policy interventions. There is a good reason to believe that tax increases and reductions do not trigger the same behavioral reactions from economic agents and that dramatic reforms are more likely to cause significant upheavals in labor market outcomes. This paper explores the economic incidence of state tax cuts by studying the impact of the 2005 Ohio tax overhaul on wages, self-employment earnings, and labor force participation for women and women with young children.

I observe several cross-sectional random samples interviewed through the microdata survey of the Current Population Survey (IPUMS-CPS) over the period 2000-2015 and compare groups of individuals in Ohio to similar individuals in (i) a set of control states and (ii) Pennsylvania, before, during, and after the reform.

My preferred specification with state-specific trends suggests that the reform significantly boosted wages by 3-7%. It also seems to have increased the average reported self-employment earnings by 7-12% depending on the specification. This finding is consistent with a literature (Long 1982, Goode 1976, Le Maire and Scherjning 2013) that defends that the degree of voluntary compliance involved in the taxation of self-employment returns reflects on the sensitivity of this type of income to tax differentials. As a comparison, the self-employment taxable income elasticity found by Le Maire and Scherjning 2013 is 14-20%. In addition, the large-firm employee wage results complement the conclusion that corporate tax cuts do not systematically boost wages as evidenced by other empirical works (Ljungqvist and Smolyansky 2014, Fuest et al. 2017). The results described in this paper imply that in the short-run the windfall of a corporate tax cut is not necessarily shared with employees. However, the extra revenue could be reinvested or used to repurchase shares (Chetty and Saez 2003). Unfortunately, I am not able to explore these dimensions for the Ohio reform. I also noticed that the reform increased participation on the labor market especially for women with young children by 0.9-1.4%, consistent with previous empirical findings on the topic.

One major caveat of this analysis is that since I am not able to observe a longitudinal dataset, the relevance of my results rests upon the hypothesis that the reform did not dramatically alter the composition of the Ohio workforce with regards to unobservable individual characteristics. To circumvent this shortcoming, I could have used an alternative source of data such as the Panel Study of Income Dynamics (PSID). However, a brief investigation reveals that this dataset is not representative at the state level and features a substantial rate of cross-state migration over time. Additionally, this paper did not explore the extent to which the Ohio tax reform affected hours of work supplied by individuals due to the poor quality of this variable in the dataset. That intensive margin of the response might be more meaningful than the extensive margin investigated here.

Importantly, the measured wage effects only relate to short-run impacts and cannot be extrapolated to other contexts. The long-run incidence might be higher than what is reported in this analysis, and one should expect investment patterns to react to the dramatic corporate tax cut over a longer time frame. It would also be misleading to automatically relate the findings in Ohio to other policy considerations at the federal level especially with regards to the recently adopted tax code. Nonetheless, the self-employment results suggest that any federal reform that alters the tax treatment of different sources of income would likely induce a higher reporting of certain earnings in the short-run. Finally, the timing of the reform did not enable me to disentangle the separate effects of the corporate tax cut from the personal tax and the property tax reductions since the changes were introduced simultaneously.

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Appendix A: Tables

Table A1: Effects on hours worked

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ohio indicator	-0.016***	-0.019***	-0.003	0.005***	0.012***
	(0.000)	(0.004)	(0.002)	(0.001)	(0.003)
2006-2010 indicator	-0.036***	-0.044***	0.005**	-0.020***	-0.016***
	(0.005)	(0.005)	(0.002)	(0.001)	(0.000)
2011-2015 indicator	-0.027***	-0.037***	0.009**	-0.013	-0.010
	(0.006)	(0.007)	(0.004)	(0.012)	(0.008)
Ohio x 2006-2010 indicator	0.000	-0.004	-0.002	-0.008***	0.002***
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)
Ohio x 2011-2015 indicator	-0.002	-0.005	-0.002	-0.010***	0.007***
	(0.004)	(0.005)	(0.004)	(0.000)	(0.000)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		354,569		89,132	

Notes: the dependent variable is the log of hours worked. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, occupation, non-work income and number of children less than 5 years old. ([a]) Control set includes Pennsylvania and ([b]) control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated using a Heckman type selection model with a first-stage equation of selection.

Table A2: Effects on employment

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Ohio indicator	-0.011***	-0.008***	-0.002**	0.003***	0.003***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
2006-2010 indicator	-0.043***	-0.003	-0.003	-0.032**	0.014***
	(0.005)	(0.003)	(0.003)	(0.003)	(0.000)
2011-2015 indicator	-0.022***	0.011***	0.010***	-0.018**	0.026***
	(0.003)	(0.003)	(0.003)	(0.001)	(0.000)
Ohio x 2006-2010 indicator	-0.001	0.003	0.003	-0.013***	-0.013***
	(0.003)	(0.002)	(0.002)	(0.000)	(0.000)
Ohio x 2011-2015 indicator	0.005*	0.012***	0.013***	-0.004**	-0.003***
	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		390,281		97,007	

Notes: the dependent variable is a dummy variable for the individual's employment status. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, occupation, non-work income and number of children less than 5 years old. ([a]) Control set includes Pennsylvania and ([b]) control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama. Model estimated with a LPM specification.

Table A3: Effects on hours worked for self-employed individuals

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Self-emp. indicator	0.070***	0.070***	0.070***	0.087***	0.087***
	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Self-emp. x Ohio indicator	0.005	0.005	0.005	-0.011**	-0.011**
	(0.008)	(0.008)	(0.008)	(0.005)	(0.005)
Self-emp. x 2006-2010 indicator	-0.045***	-0.045***	-0.045***	-0.009***	-0.009***
	(0.006)	(0.006)	(0.006)	(0.001)	(0.001)
Self-emp. x 2011-2015 indicator	-0.054***	-0.054***	-0.055***	-0.001	-0.001
	(0.009)	(0.009)	(0.009)	(0.003)	(0.003)
Self-emp. x Ohio x 2006-2010 indicator	0.013**	0.013**	0.013**	-0.024***	-0.023***
	(0.006)	(0.006)	(0.006)	(0.000)	(0.000)
Self-emp. x Ohio x 2011-2015 indicator	0.026***	0.027***	0.027***	-0.029***	-0.029***
	(0.009)	(0.009)	(0.009)	(0.006)	(0.006)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		390,281		97,007	

Notes: the dependent variable is the log of hours worked for individuals between the ages 25-64. Standard errors are in parentheses. [(*)] Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, and occupation. These characteristics were all significant at 1%. ([a]) Control set includes Pennsylvania and ([b]) control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama.

Table A4: Effects on hours worked for women with young children[12]

	Control set 1 [(a)]			Control set 2 [(b)]	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Fem 5. indicator	-0.008	-0.008	-0.008	-0.018***	-0.018***
	(0.016)	(0.017)	(0.018)	(0.002)	(0.002)
Fem 5. x Ohio indicator	-0.000	-0.000	-0.000	0.035***	0.036***
	(0.018)	(0.018)	(0.018)	(0.000)	(0.000)
Fem 5. x 2006-2010 indicator	0.041***	0.041***	0.041***	0.032***	0.032***
	(0.015)	(0.015)	(0.015)	(0.005)	(0.005)
Fem 5. x 2011-2015 indicator	0.043***	0.043***	0.043***	0.067***	0.067***
	(0.017)	(0.017)	(0.017)	(0.015)	(0.015)
Fem 5. x Ohio x 2006-2010 indicator	-0.036***	-0.036***	-0.036***	-0.016***	-0.016***
	(0.012)	(0.012)	(0.012)	(0.000)	(0.000)
Fem 5. x Ohio x 2011-2015 indicator	-0.015**	-0.015**	-0.015**	0.012***	0.012***
	(0.006)	(0.006)	(0.006)	(0.000)	(0.000)
State fixed effects	Yes	Yes	No	Yes	Yes
Year fixed effects	Yes	No	No	Yes	No
State-specific trends	No	Yes	Yes	No	Yes
Region fixed effects	No	No	Yes	-	-
All sociodemographic controls [(*)]	Yes	Yes	Yes	Yes	Yes
Observations		390,281		97,007	

[12] Define O, D_1, D_2 and F_5 as dummy variables for Ohio, period 2006-2010, 2011-2015, and female with 5 y.o. kids respectively. X represents the matrix of individual characteristics as previously defined. The triple difference specification is the following:
$lfp_{ist} = \beta X_{ist} + \alpha_0 O + \alpha_1 F_5 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 O.D_1 + \alpha_4 O.D_2 + \alpha_5 O.F_5 + \alpha_6 F_5.D_1 + \alpha_7 F_5.D_2 + \alpha_8 O.F_5.D_1 + \alpha_9 O.F_5.D_2 + u_{ist}$

Notes: Fem. 5 represents a dummy for women with less than 5 years old children. the dependent variable is the log of hours worked for individuals between the ages 25-64. Standard errors are in parentheses. (*) Sociodemographic controls include gender, marital status, race, experience, education, the metropolitan status of residence, and occupation. These characteristics were all significant at 1%. (a) Control set includes Pennsylvania and (b) control set includes Alabama, Colorado, Delaware, Florida, Georgia, Louisiana, Maine, Missouri, Montana, New Hampshire, Rhode Island, South Dakota, Tennessee. Excluded state from the regression is Alabama.

Table A4: Description statistics of the overall sample

	MEAN	S.D.
Age	44	11
Male (%)	49.9	50.0
White (%)	80.9	39.3
Married (%)	65.4	47.6
Years of schooling	14	3
In the labor force (%)	79.8	40.1
Employed (%)	94.7	22.4
Self-employed (%)	12.0	32.5
Living in a metropolitan area (%)	76.1	42.6
With a wage and salary employment (%)	67.8	46.7
Number of children	1.1	1.2
Number of children less than 5 years old	0.2	0.5
Wage earnings ($)	43,412	50,244
Number of Obs.	1,667,068	

Appendix B: Figures

Figure B1: Corporate Franchise Tax (CFT) and Personal Income Tax (PIT) in Ohio

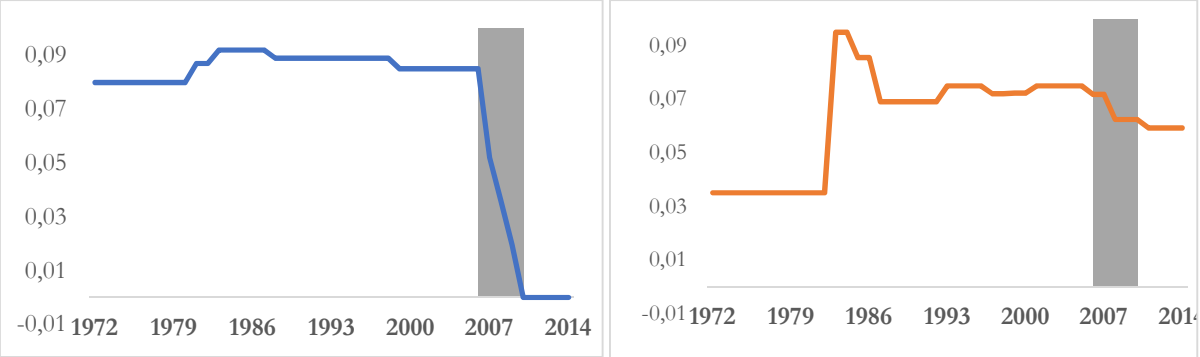
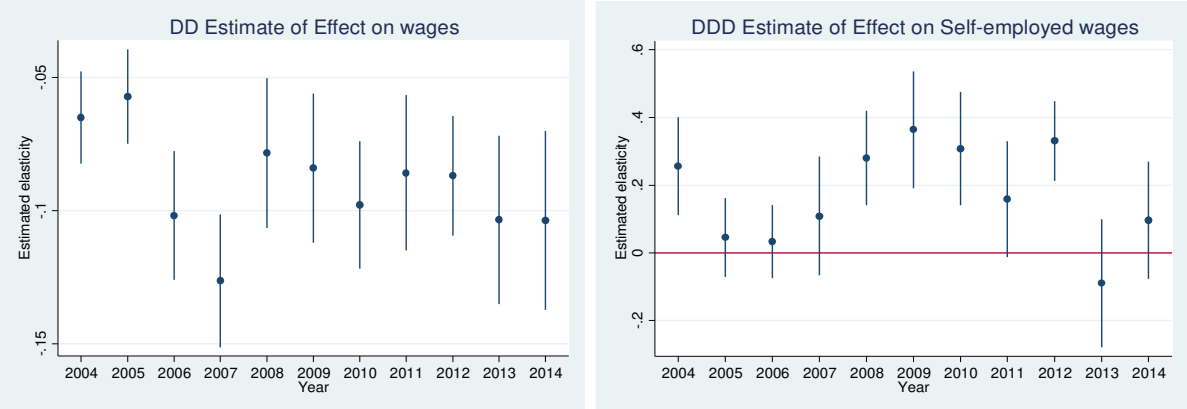


Figure B2: Estimated effects with a lead-lag specification (with extended control set)

Fig (a) Fig(b)



Notes: DD and DDD estimates relative to the excluded year 2000. These estimates are obtained using a specification that abstracts from aggregating treatment and non-treatment periods. Instead, the model interacts the dummy for Ohio with year dummies (Fig a) and year + self-employed dummies (Fig b). The goal is to provide an idea of the information that is missed with the approach adopted in this paper, consisting of breaking the time frame into three sub-periods (pre, during and post-treatment). The results presented on the graph relate to the extended control set (13 states). The model is estimated like all wage regressions in this paper with a Heckman type methodology.