Working Paper

High Wage Job Growth and Tax

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Abstract

Economists have devoted limited attention to understanding the effect of state level fiscal policies on the growth of high wage jobs. Over the last two decades, high wage jobs in the U.S., particularly high tech jobs, grew faster than lower wage jobs. Understanding what drives high wage job growth is an important issue for economic development and for designing state development policies aimed at influencing the growth of high wage jobs. Using state level panel data from 1997 to 2012 this paper investigates the link between subnational taxes and the growth of high wage employment. In particular, we relate job growth over the period across states to interstate differences in tax and expenditure policies and other factors thought to be associated with state job growth. We present a simple equilibrium model on which to base our empirical analysis. The model considers workers of different skill levels and with different preferences for public services and amenities and allows for spillover effects on the productivity of other workers. (Note that we are in the process of expanding the data set to cover the time period 1977 to 2012).

Introduction

There is a long standing interest in the effect of state fiscal policy on state economic growth. Since employment growth plays an important role in overall economic growth, much of the research on this topic has focused on the location of firms and the resulting job growth. Researchers have found mixed results regarding the relationship between state fiscal policy and state job growth. Some researchers argue that traditional state tax policies are ineffective in promoting state job growth because state and local taxes are too small a percentage of business cost to affect firms' location decision and employment decisions. On the other hand, others argue that due to the development of technology and transportation facilities, businesses and workers have become more mobile, which has increased the effect of state and local taxes on business location decisions (Bartik, 1992). Most recent studies, for example, Romer and Romer (2010), Barro and Redlick (2011) and Mertens and Ravn (2013), find that the level of taxes and economic growth are negatively related. However, the literature that explores the effect of interstate differences on job growth provides mixed results.

The existing research has focused on the effect of taxes on total employment growth without regards to how that effect might differ by skill or wage level. While states generally welcome any new job, states are especially interested in attracting new high wage jobs since such jobs are thought to produce more revenue than the costs of the services provided. Therefore, high wage job growth is an important issue for economic development and state development policies that may have an influence on their growth.

The general approach to the question of the effect of taxes on employment and economic growth starts with the premise that higher taxes are a disincentive to employment. However, it could be that low taxes and the associated low expenditure levels are attractive to firms that hire low wage workers but not to firms that hire high wage workers.

The principal aim of this paper is to address the questions: what is the impact of state-local taxes on high wage job growth? Also to be explored is how the job growth is influenced by economic conditions, focusing in particular on the recent recession.

Although the literature on the effect of taxation on economic growth[1] is quite large, no research has been conducted that examines the impact of taxes on high wage job growth at the

[1] Economic growth is measured by income growth, employment growth, investment, business location etc.

state level. Thus, this paper contributes to the literature by considering the effect of state taxes on the growth of high-wage jobs industries. We also consider the effect of taxes on overall job growth and examine whether lowering taxes can help to mitigate the economic recession.

This paper analyzes the relationship between state and local taxes and high wage job growth from 1997 to 2012. (We are in the process of extending the data to cover the period 1977 to 2012.) The data used for this analysis are taken from Current Population Survey (CPS). Using a simple model with government budget constraint identity, the paper estimate a fixed effect panel data model where high wage employment growth is a function of fiscal policy variables and other non-policy, e.g., natural amenities, market structures, resource endowment variables.

The remainder of this paper proceeds as follows. The next section contains a review of literature that addresses the relationship between state taxes and state economic growth. Section three discusses the theoretical framework and empirical method. Section four contains data description and summary statistics, while section five presents the preliminary empirical results.

Literature Review

Research on the effect of taxes on economic growth is inconclusive. Most of the studies conclude that taxes have small, negative effects on economic activity if the tax revenue is used to fund transfer payments. On the other hand, taxes lead to growth if it is used for productive purposes (Helms, 1985; Phillips and Goss, 1995; Miller and Russek, 1997; Wasylenko, 1997; and Bania, Gray and Stone, 2007). Moreover, other studies observe a negative effect of tax on growth (Mullen and Williams, 1994; Besci, 1996; Reed, 2008. Some studies also find a weak effect of taxes on growth (Romans and Subrahmanyan (1979); Wasylenko and McGuire 1985); Stokey and Rebelo (1995); Lucas Jr. (1990); Tomljanovich (2004); Reed and Rogers (2004); Gale et.al. (2015).

A seminal paper by Helms (1985) found positive effects from raising public service expenditures financed by lowering transfer payments, and negative effects of raising taxes to increase transfer payments. Helms (1985) used data for 48 states for the period 1965 to 1979 and estimated weighted least squares and least squares calibration. In his study, Helms controlled for state and local expenditure policies in order to identify the effect of state and local taxes on state personal income. For tax variables, he used property taxes, other taxes, user fees, and federal

source revenues. The spending variables include health, highways, local schools, higher education, and other expenditures[2].

More recently, in a thorough and robust study, Reed (2008) examined growth across states from 1970 to 1999 and found a negative effect of the tax burden on state economic growth. He estimates the model for different time periods, different geographical regions and uses various estimation techniques. Results from all the estimations showed that raising total taxes to fund non-welfare expenditure exerts a negative effect on growth, both in long run and short run. Reed did not, however, distinguish between the types of taxes, nor the types of non-welfare spending.

Using different types of taxes may also have different impact on the economy, and hence on growth. Investment and capital formation are mostly affected by corporate taxes whereas income taxes affect individual labor supply and savings behavior. Both of these taxes impose taxes on future consumption. Numerous studies have found that the type of taxes that can reduce economic growth more than others are corporate and personal income taxes (Holcombe and Lacombe 2004, Lee and Gordon, 2005). Consumption taxes and property taxes also have some negative impact on economic growth. Using fixed effects, Russek (1997) investigated the effects of tax and expenditure structures on state GDP from 1978-92. He found that government overuses sales taxes and under uses corporate income taxes. Furthermore, he observed negative relationships between growth and education, transportation, and public safety. Stokey and Rebelo (1995) showed that a consumption tax does not affect the return on capital, and, thus, does not affect investment, output and productivity. In addition, they also showed that property taxation lowers the return on reproducible physical capital and on non-reproducible land. Therefore, increases in property tax rates that lower the return on capital will reduce growth. In another study, Kneller, Bleaney and Gemmell (1999) distinguished between distortionary taxes (defined as taxes on income and property) and non-distortionary taxes which include consumption taxes. They concluded that while the former reduces growth, the latter does not. Additionally, they find that productive government spending benefits economics growth. Similar results were observed by Widmalm (2001), and Gemmell, Kneller and Sanz (2006). On the other hand, using a one-year lag structure for the fiscal variables, Brown, Hayes and Taylor (2003) found corporate taxes to be underutilized, sales and property taxes to be over utilized

[2] To deal with collinearity issue, Helms omits the transfer payments variable.

between 1977 and 1997. They also find welfare spending to enhance growth if funded by corporate income taxes, but to diminish growth if funded by sales taxes.

Several studies also employed different measures of tax. Theoretically, marginal tax rates (MTR) distort relative prices resulting in a welfare loss. However, it is difficult to observe MTR for the entire economy. Therefore, studies also use average tax rates (Engen and Skinner, 1992). Mullen and Williams (1994) used gross state product as a measure of economic growth and analyzed US state level data from 1969 to 1986. The study used both average tax rate and marginal tax rates and showed that both tax rates lower state economic growth. The paper addressed the endogeneity issue.

A few studies have focused on nonlinear effects of taxes on economic growth. Bania et al. (2007) used Barro-style models of endogenous growth. Using five-year interval data from 1962 to 1997, they estimated nonlinear effects of taxes. They observed non monotonic impact of tax financed expenditure on growth. They concluded that taxes increase growth at the beginning but once government fiscal policies crowds out private investment, growth falls.

Most of the studies examining the effect of tax on economics growth are biased due to endogeneity issue. The reverse causality arises because economic conditions affect the level of state government taxes and expenditure, while taxes and expenditures also affect economic conditions. To deal with this, several papers use lagged variables techniques, first different method, federal tax changes as instrumental variables (Yamarick 2000, Barro, Redlick 2009, Bania et al. 2007). In a more recent study, Srithongung and Kriz (2014) used Panel vector Autoregressive method to solve the endogeneity issue. They used 48 continental state level data from 1970 to 2010 and found negative impact of tax on state income growth in the short run. They also found that public capital spending affects income growth both in the short run and long run.

Several papers also examine the effect of taxes on employment growth; particularly analyze firm's location decision. McGuire (1985) focused on the impact of taxes on firm's location decision. Using 119 communities in Minneapolis area over 6-year period, she found that the extent of impact of tax rates is unclear and it varies by community depending on local institutional structures and various assessment policies. In a similar type of study, Wheat (1986) found insignificant impact of taxes on manufacturing employment growth. He further noted that

the most important factors are markets, state amenities, unionization, etc. Later, Mofidi and Stone (1990) studied the effects of tax burden and expenditures on investment and employment. Like Helms, they omit transfer payments and find that transfers have a negative effect, while expenditures on health, education, and infrastructure have positive effects. In a more micro level study, Dalenbergh and Partridge (1995) used data for 28 metropolitan areas for 15 periods to analyses micro economic interactions. They measure the effect of taxes on total employment and on some disaggregate level of employment (manufacturing employment). Using ordinary least squares, they found that taxes are negatively related to employment growth after controlling for government budget constraint. On the other hand, Reed and Rogers (2004) study the effect of 30 percent reduction in personal income taxes over period 1994 and 1996 in New Jersey and find that there is no significant difference in employment between New Jersey and other states. More specifically, using difference-in-differences method, an increase in employment in New Jersey compared to other states is not significantly different from zero.

Similarly, Goff, Lebedinsky, and Lile (2012) examine the effect of tax revenues on per capita gross state product (GSP) growth from 1997 to 2005. Using matched paired analysis of cross sectional data, they find that reduction in corporate taxes do not increase employment and wages. However, an increase in corporate taxes results in lower employment and wages. In a most recent study, Gale, Krupkin and Rueben (2015) use Reed's (2008) model and estimate the impact of tax revenues and income tax rates on economic growth and on employment level. However, they find insignificant impact of either tax revenue or top income tax rates on economic growth and on employment across states over period 1997 to 2006. They further claim that the results are sensitive to time period.

Despite a large and important literature on economic growth and taxes, the effect of taxes on high-wage job has gone unnoticed. Previous studies on employment growth focused on the overall level of employment and how taxes and expenditure affect firm's location decision and employment growth.

In summary, empirical evidence from previous studies attempting to uncover the relationship between tax and economic growth, and tax and employment growth in particular, is very large. Mixed results are observed. Moreover, in case of employment growth, studies have focused on total employment or just manufacturing employment. There exists no evidence to

address the issue of high wage job growth and state and local taxes. Therefore, it is of interest to consider the impact of state taxes on employment in high-wage jobs.

Theoretical Framework

Roback (1982) presents a model of sorting of workers across jurisdictions that differ in terms of their amenities. For her basic theoretical results she assumes that amenities cannot be changed and there is only one type of worker. Since in equilibrium utility has to be the same across all jurisdictions, wage rates and land rental rates adjust to bring that about, while still ensuring that labor demand equals labor supply in all jurisdictions. We modify Roback's model by allowing governments to change the quantity of amenities and by allowing worker preferences to differ. While Roback's analysis focuses on cities, we focus on states. The following is a preliminary presentation of our theoretical model and derivation of results.

We adopt Roback's basic set of model assumptions. Capital and labor are mobile across states, but land is not, workers provide one unit of labor, and capital has the same price in all jurisdiction. Roback allows production to depend on amenities, but for simplicity we assume that production does not depend on the amenities. Given that the price of capital is the same in all states, following Roback we specify that the production function for the uniform good X is a constant returns to scale function of labor and land. Thus the price of X is one in all jurisdictions. Workers maximize utility, which is a function of the produced good, land consumed, and amenities.

We make two modifications to Roback's model. First, we assume that amenities are tax-public services packages that are set by the state government. These public services are financed by taxes, which includes a tax on labor. We assume that each state has a fixed tax base, and thus the base does not depend on the tax rate. This assumption is obviously inconsistent with empirical evidence that the size of a tax base depends on the tax rate, but is made to make the model more tractable. This assumption is not quite as restrictive as it appears, since the condition we need to derive our results is that at the margin the tax base does not change as labor and capital migrate to or from the state. This assumption means that we do not have a general equilibrium model.

Given the tax base, the tax rate determines the level of the public services that can be provided; thus, an increase in the tax rate will increase the level of public services. Given the

fixed tax base and assuming constant cost of producing public services, it follows that the relationship between the tax rate and the amount of public services is linear.

In this formulation, Roback's amenities are tax-public service packages. Since each worker supplies one unit of labor, the tax is a negative amenity since it reduces the amount of *X* and land the worker can consume, and thus reduces utility. We assume that public services are a positive amenity that increase utility. Thus, the tax-public service package in any state could be a net positive or net negative amenity.

Under Reback's assumption that workers are identical, and assuming that states differ in the tax-public service packages they provide, we get Roback's basic result that wage rates and land rental prices will differ across states in order to bring about an equilibrium. In particular, the wage rate will be lower and the land rental rate will be higher in states in which the tax-public service package generates a higher level of utility.

Our second modification of Roback's model is to allow workers to differ. In particular, we assume that workers differ in their skill level, and thus the wage they earn. We also allow preferences for public services to differ. We assume that workers of different skill levels are perfectly substitutable, so that labor supply equals the sum of workers weighted by their skill level. Thus in any state, wage rates for any skill levels equals the wage rate for the lowest skilled worker times the worker's skill level. The task is to determine how workers of different skill levels will sort themselves across states with different tax rates, given that wage rates and land rental rates will adjust as workers move between states.

To formalize the analysis, assume that there is a continuum of worker types that differ in terms of skill level and preferences for the public service. Let utility for worker *s* in state *j* be given by

$$U_{sj} = X_{sj}^{\alpha} l_{sj}^{(1-\alpha)} + G_j^{\lambda_s} \qquad [1]$$

where *X* is the private good, *l* is land, and *G* is the public service. Furthermore, assume that the skill level and λ_s are positively correlated and that $\lambda_s > 0$. The relationship between public service level and the tax rate in state *j* is given by

$$G_j = t_j B_j \qquad [2]$$

where *t* is the tax rate, and *B* is the tax base, assumed to be constant. We take the price of *X* to be the numeraire, and thus the individual maximizes utility subject to the following budget constraint,

$$(1 - t_j)w_{sj} = X_{sj} + r_j l_{sj} \quad [3]$$

where *w* is the wage rate for worker of skill *s* and *r* is the land rental rate. The relationship between skill level and the wage rate is given by

$$w_{sj} = s \cdot w_{1j} \quad [4]$$

where s is an index of skill level and w_{1j} is the wage in state *j* for workers with the lowest skill level. Substitute [2] into [1] and maximize [1] subject to [3] to get the demand for *X* and *l*. Substitute the demand into [1] to get the indirect utility function.

Given equation 1, the indirect utility function can be expressed as

$$V_s = (1 - t)V_s^1(w, r; s) + V_s^2(t; \lambda_s) \quad [5]$$

We are interested in how V_s varies with *t*. Given *w* and *r*, the first term in equation 5 is decreasing in *t*, while the second term is increasing in *t*. Assume that for all skill types V_s reaches a maximum at a tax rates on the interval $0 < t < 1$. Without imposing further conditions, we cannot say whether the tax rate at which V_s is a maximum is larger or smaller for higher skilled workers than for less skilled workers. Denote the tax rate at which V_s is a maximum for a worker with skill level *s* as t_s^*. Assume that t_s^* is increasing in *s*. This implies that for given *w* and *r*, skilled workers would prefer a higher tax rate than low skilled workers.

To simplify, suppose that there are 3 skill levels with equal number of workers at each level and that there are two jurisdictions of equal size. Assume that $t_B > t_A$ and that initially the wage rate and land rental rate are the same in the two jurisdictions. If $t_B < t_s^*$, a worker of skill level *s* prefer State B. But if $t_B > t_s^*$, it is possible that the worker would prefer State A. Assume that $t_B < t_s^*$ for the higher skilled workers and that $t_A > t_s^*$ for the least skilled workers. In this case high skilled worker will reside in State B and low skilled worker will reside in State A.

The middle skill workers could reside in either depending on the relationship between the tax rates and the tax rate at which V_s is a maximum. Suppose these workers are all located in State B. This can't be an equilibrium since given that two states are equivalent, the larger work force in State B is not consistent with equal wage and land rental rates in the two states. So, wages in State B must be lower than in State A, while land rents must be higher. Assuming an interior solution in which the middle skill class is divided between the states, wages in State B have to be higher than in State A, and just the opposite for land rental prices.

These results depend on a number of assumptions, particularly regarding how the preferences of workers differ by skill level. Altering these assumption can lead to the opposite

result, that is, that skilled workers reside in the low tax state. Thus, the theoretical result in ambiguous, and therefore it is an empirical question whether higher skilled worker reside in low or high tax states.

As noted above, the model is still in the development stage. The next step is to develop the above results more formally and to drop the assumption of a fixed tax base so we will have a general equilibrium model.

Data and Methodology

The analysis uses a panel data set consisting of the 50 U.S. states from year 1997 to 2012. The primary variable of interest is employment in high wage jobs, defined as one with wages equal to or greater than the wages at the 75 percentile. Using employment data from the Current Population Survey (CPS) we determine the earnings at the 75 percentile level for individuals 16 years of age and over who have positive annual earnings greater than $100 and create a high-wage dummy variable that is equal to one if the individual's earnings are greater than or equal to the 75 percentile wage. The 75 percentile wage varies with time period. For example, for 1997 it is $50,000 or more and for 2012 it was $56,000 or more[3]. High wage job growth is measured by changes in total employment in high wage jobs.

For fiscal policy variables, we include both state and local taxes and expenditures. State – local taxes and expenditures were collected from Tax Policy Center's state and local finance initiative[4]. Total taxes, property tax, general sales tax, total income tax, and corporate net income tax, all measured per capita terms are used as the tax variables. To incorporate expenditures, we use state education expenditure, health expenditure, and infrastructure expenditure (in particular highways expenditure). We define the above three spending as productive spending. Furthermore as a part of social spending, we include expenditure on public welfare, unemployment compensation, and other insurance trust expenditures[5]. However, there are missing values for the fiscal policy variables for years 2001 and 2003 for all states. In order to

[3] The value is slightly higher than census value.
[4] http://slfdqs.taxpolicycenter.org/pages.cfm
[5] In order to avoid perfect multicollinearity in the balanced budget restriction, we exclude other expenditure like government administrative and financial expenditure, utility expenditure, intergovernmental expenditure etc. (Srithongrung &Kriz, 2014).

have a continuous data set, the average of previous and current year is used for missing values. All the expenditure variables are measured as per capita expenditure.

As a series of controls, we included state level characteristics, labor skill, cost of labor, cost of energy, state amenities as well as market characteristics. A state with more skilled labor should promote more growth for high wage job. On the other hand, higher cost of production, e.g., labor cost, energy cost, etc. will reduce growth in the production (Dalenbergh and Partridge, 1995). Labor skill is measured by average years of education (in particular, it is measured by percent's of bachelor degree or more) for persons 25 and over in a state. The data is collected from US Census.

Labor cost is measured by wage rate, specifically, it is measured by average hourly wage in manufacturing sector in a state in those years. Bureau of Labor Statistics data are used to calculate labor cost in each state.

For energy cost, the average price of electricity to industrial users are used. The data are taken from U.S. Energy Information Administration.

Several state characteristics, such as climate, temperature, natural resources also affect job growth rate. In terms of high wage job growth rate, factors like cost of living, better school facilities, natural amenities, etc. play an important role. Better school facilities can be explained by state government expenditure on education. In their study, Wasylenko and McGuire (1985) use average daily high temperature and average daily low temperature as state amenities. In this paper, heating degree days, highest elevation in feet, and crime rate per capita are used as a proxy for amenities. The data are collected from U.S. Energy Information Administration, U.S. Department of Justice[6], and U.S. Geological Survey.

Finally, measurement of market potential for a good produced by skilled workers is also important for growth of employment. Markets characteristics such as state population density and, per capital state income are used as a measurement of market potentiality. The data are from U.S. Bureau of the Census and the Bureau of Economic Analysis.

Based on the theoretical model we assume that high wage job growth in a state is a function of both fiscal policy and non-policy variables. Assume that employment in high wage jobs in each state is in equilibrium and equilibrium employment depends on both policy and non-policy variables. The hypothesis is that changes in high wage employment will be affected by

[6] http://www.ucrdatatool.gov/Search/Crime/State/StatebyState.cfm

state tax rates and positively related to state government expenditure. The basic regression equation is as follows

$$\Delta Eit = \beta 0 + \beta 1\, \Delta Tit + \beta 2\, \Delta Git + \sum \beta i Xit + \mu t + V_s + \epsilon it \quad (6)$$

Where Eit is defined as employment high wage jobs in state i in year t, Tit is the taxes per capita , Git is the state–local government expenditure per capita, X is a set of non-policy variables, μ is a set of year dummies , V is a set of fixed state dummies and ϵ is the error term. Δ represents change in variables between year t-1 and t and also between year t-4 and t. Year dummies are used to control for factors such as business cycle, population, and change in federal policies, etc. that vary over time but not across states. State dummies are used to control for state specific factors like climate, availability of inputs, etc. In this model, one year as well as five year interval data are used and observations are spread out over these years. This will make serial correlation and measurement error less severe[7]. We estimate equation (6) by OLS as well as by fixed effect model using one year change and five year change in employment and fiscal policy variables. Fixed effect model is preferable because it can control unobserved heterogeneity across different states.

Even after ruling out within state time invariant difference through individual fixed effect, theoretically there is a possibility of reverse causality and hence endogeneity here. Economic growth will affect fiscal policy decisions which also in turn will influence growth. To control for this we use a two stage least square method and use two types of instrumental variables that have been used in previous literature. The first is the state government political characteristics. It is expected that liberal government will spend more than conservative government (Merrifield 2000, Reed 2006, Krause, Lewis and Douglas 2013). Moreover, empirically it is confirmed that when Democrats control the state legislation, tax burden is higher (Reed, 2006). Here we include a categorical variable for whether the state's governor is from the Democratic party or not. Furthermore, we also use percentage of legislative seats held by Democratic party. Both of these variables are used as instruments for state fiscal policy variables. Data on political variables are collected from Dubin (2008). The second type of instrumental variable comes from state demographic characteristics. States with higher proportion of school going children are likely to

[7] Reed (2008) mentioned that annual revenue data sensitive to measurement error and five years lag can help to reduce the error.

demand more public schools (therefore more productive expenditure). On the other hand, states with higher proportion of elderly people have higher demand for public facilities like health care facilities, welfare programs, etc. (Bunch 1993, Painter and Bae 2001, Bae and Moone 1997). The data on demographic characteristics are taken from U.S. Census Bureau. The IV model takes the following form

$$\Delta Fit = \alpha 0 + \alpha 1\, \mathrm{Z}it + \sum \alpha i \quad Xit + \mu t^{f} + V_{s}^{f} + \cup it \quad (7)$$

$$\Delta Eit = \beta 0 + \beta 1\, \widehat{\Delta Fit} + \beta 2\, \Delta Git + \sum \beta i Xit + \mu t^{S} + V^{S}{}_{s} + \epsilon it \quad (8)$$

Equation (7) gives first stage regression while equation (8) is the second stage regression. $\mathrm{Z}it$ indicates instrumental variables. Using the instruments requires that the instruments do not affect change in high wage employment through any pathways other than fiscal policies. We estimate the model both with and without state fixed effect. The IV-FE model account for endogeneity bias even more than the IV model as it controls for unobserved heterogeneity in state levels. To test this, we use Sargan Test Statistics[8]

Empirical Analysis

Summary Statistics are provided in Table 1. Different taxes may have different impact on high wage job growth. Therefore, tax variable includes property tax per capita, income tax per capita, corporate net income tax per capita, general sales tax per capita along with total taxes per capita. The mean value for property tax per capita is higher than all the other types of taxes. On expenditure side, mean value for productive spending (education, health and infrastructure spending) per capita is two times higher than social spending. Across different states, on average 26 percent of labor has bachelor degree or more education. And the average hourly wage for workers in the manufacturing sector is $68 (the value varies from state to state).

We test the hypothesis that fiscal policies have some effect on high wage employment. We plot simple correlation between fiscal policy variables and high wage employment in Table 2 as a heuristic test. From 1997 to 2012, total taxes, property taxes, and income taxes exhibit positive

[8] A detailed test of the endogeneity issue and validity of the instrument is included in the appendix.

correlation (however, values lies between 0.20-0.40). We further see that other taxes and all types of spending's have low rates of correlation with high wage employment level. The presence of simple correlation indicate that policy makers may not have changed fiscal policies in a significant way in order to encourage high wage job growth.

Results

Table 4 shows the effect of different taxes on high wage employment for the years 1997 to 2012. The specification has no other X variables and all the variables are measured one year changes and five year changes, respectively. The first two columns report OLS estimates which confirms no significant impact of several taxes on high wage employment. In order to control for heterogeneity, we also estimate the model by using fixed effect (FE) estimation-both state and year effects are taken into account. The results are shown in column 3, 4 in Table 4. Fixed effect estimates show that three taxes-total taxes, property taxes, and income taxes have negative impact on high wage employment. On average, one dollar increase in property tax per capita reduces high wage employment growth by a cumulated 0.06 percent over one year and 0.21 percent over five years. Moreover income tax per capita has more effect on high wage job growth than total taxes (both reduces high wage job growth). Including all of the fiscal policy variables (both tax and expenditure by state-local government) makes total taxes and income taxes lose statistical significance while property tax still has significant negative impact on job growth (Table 5). This may reflect the issue of omitted variable bias.

In Tables 6 and 7 we included several variables in order to control the bias. Only property tax per capita has negative impact (0.07 percent) on high wage job growth. Among other control variables, labor skill, which is measured by education level, has significant positive impact on high wage job growth. An increase in the education level raises the job growth of high skilled workers across states. Moreover, in case of five years interval, the coefficient on property tax, corporate net income tax is negative as suggested in previous literatures, and statistically significant[9]. In addition, productive spending has a significant impact along with property tax variables. On average, a one dollar increase in productive spending (e.g. education spending, health, and infrastructure spending) raises high wage job growth by 0.04 percent over five years.

[9] Larger time period reduces the measurement error (Reed 2006)

Differences in state geographic characteristics may also result in difference in job growth. Geographic characteristics influences amenities which also influences state job growth. In our model, we used heating degree days, highest elevation in feet as proxy for amenities, although none of the variables seem to have any significant impact on job growth. Besides these, in Tables 8 and 9 we also controlled for region dummies. With this, general sales tax has positive impact while income tax has negative impact on job growth. However, none of the amenity variables has any significant impact.

Moreover as mentioned in the methodology section, we cannot rule out the possibility of endogeneity here. We tested the presence of endogeneity by using Szroeter test (1978). Besides, the general sales tax, all the important fiscal variables are correlated with OLS residuals. Therefore OLS cannot solve the endogeneity issue[10]. Tables 10 and 11 shows results from 2SLS method. Here we take care of state dummies. In case of one-year interval, only property tax per capita has negative impact on employment. Other significant variables are labor skill and state personal income. However in case of five-year intervals property tax still has negative impact but corporate income tax, income tax, and general sales tax has positive impact. We also test the sensitivity of the result by using two years, three years interval and get similar impact of taxes on employment like one year interval. We used Sargans (1958) and Basmann's (1966) in order to test the validity of the instruments and found that our instruments are valid. A detailed result is shown in the appendix.

We expected the coefficient on the productive spending variables to be positive, but in most of the cases the coefficient is insignificant. With corporate income tax, the coefficient is negative. One possibility for that is that high wage workers may not be as responsive to state level fiscal policies as other workers.

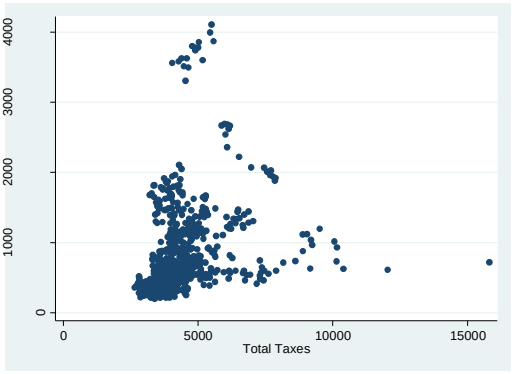
Therefore, the two major outcomes are: the sign of the tax variable is sensitive to time interval, and productive spending does not have significant impact on growth of high wage employment.

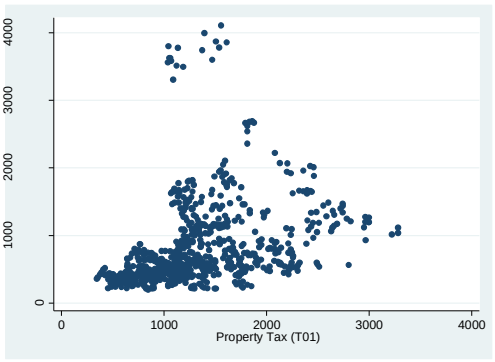
[10] Detailed results are shown in Appendix.

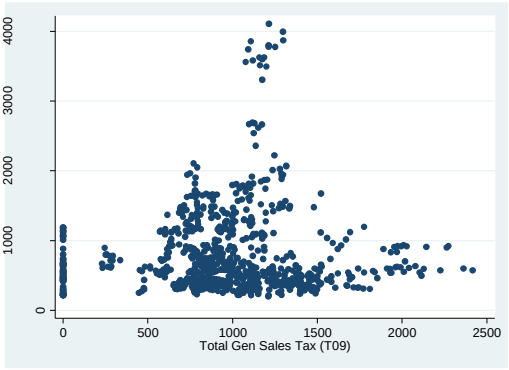
In subsequent work, we are planning to extend the data set from 1977 and will determine the impact of state fiscal policies on high wage job growth from 1977 to 2012. This may help us to reduce any measurement error and to achieve true impact.

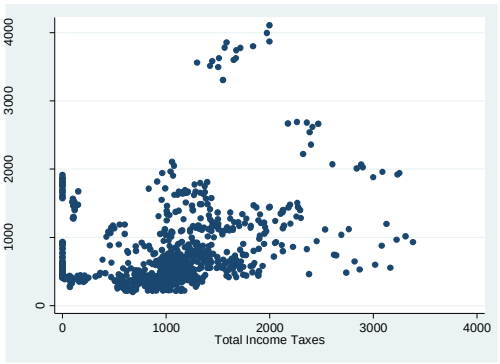
Appendix

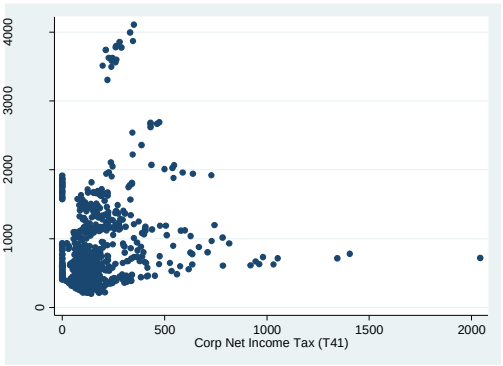
Graph 1: Correlation between High Wage Employment and Fiscal Variables

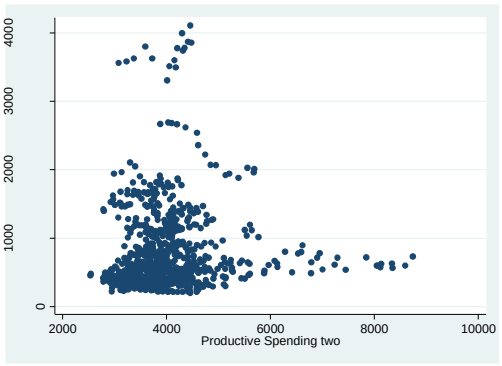












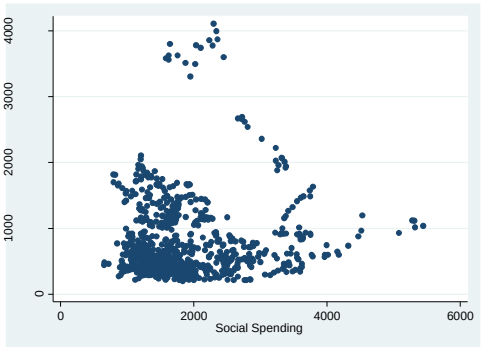


Table 1: Overall Summary Statistics

Variables	Mean	Standard Deviation
Total Tax Per Capita	4276.05	1256.60
Property Tax Per Capita	1293.45	556.75
Corporate Tax per capita	169.85	170.71
General Sales Tax Per capita	963.58	436.20
Income Tax Per capita	1064.11	629.16
High ways expenditure per capita	512.542	261.755
Productive Spending	4001.65	823.21
Social Spending	1877.68	773.14
Labor Skill (measured by education)	26	5.5
Average Price of electricity	7.02	2.88
Crime Rate	275.29	148.89
Percent's of urban Population	72.65	15.21

Source: CPS, BLS

Table 2: Endogeneity Test for OLS

Variables	χ^2	df	P
Total Tax	97.02	1	0.000
Productive Spending	2.92	1	0.262
Social Spending	2.60	1	0.320
Property Tax	68.08	1	0.000
Productive Spending	2.81	1	0.281
Social Spending	2.62	1	0.316
General Sales Tax	1.01	1	0.948
Productive Spending	2.80	1	0.282
Social Spending	2.79	1	0.284
Income Tax	55.26	1	0.000
Productive Spending	2.75	1	0.291
Social Spending	2.73	1	0.294
Corporate Net Income Tax	25.26	1	0.000
Productive Spending	2.69	1	0.303
Social Spending	2.68	1	0.302

Note: Null hypothesis is variance of error term is not related independent variables. Alternative hypothesis is variance of error term is related to independent variables.

Table 3. Over Identification Test of Instrumental Variables

Variables	Score χ^2	P value
Total Tax	0.094	0.758
Property Tax	0.629	0.427
General Sales Tax	7.731	0.005
Income Tax	4.990	0.035
Corporate Net Income Tax	1.090	0.295

Note: The test verifies two points: whether instruments are uncorrelated with error term or not and equation is correctly specified or not.

Table 4: Regression Results (1997-2012) without any other control variables

VARIABLES	OLS (One Year Interval)	OLS (Five Year Interval)	FE (One Year Interval)	FE (Five Year Interval)
Total Tax	0.0002	0.005	-.009**	-0.033**
	(0.001)	(0.005)	(0.003)	(0.008)
Property Tax	-0.0003	0.017	-0.063**	-0.214**
	(0.004)	(0.012)	(0.044)	(0.034)
Income Tax	0.001	0.008	-0.016	-0.093**
	(0.003)	(0.0.01)	(0.017)	(0.039)
Corporate Income Tax	0.010	-0.040	-0.041	-0.234
	(0.014)	(0.039)	(0.034)	(0.076)
Sales tax	-0.002	-0.009	-0.023	-0.006
	(0.005)	(0.015)	(0.023)	(0.054)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression Results (1997-2012) Using Only Fixed effect model (with only fiscal variables)

VARIABLES	FE (One Year Interval, FI)	FE (One Year Interval, FI)	FE (One Year Interval, FI)	FE (One Year Interval, FI)	FE (One Year Interval FI)
Total Tax	-0.0004				
	(0.004)				
Property Tax		-0.0524**			
		(0.020)			
Income Tax			-0.0007		
			(0.018)		
Corporate Income Tax				-0.014	
				(0.035)	
Sales tax					0.0263
					(0.026)
Productive Spending	-0.0214**	-0.009	-0.0217**	-0.0213	-0.0243**
	(0.008)	(0.008)	(0.0072)	(0.0072)	(0.007)
Social Spending	-0.0029	0.004	-0.0030	-0.0028	-0.0051
	(0.010)	(0.011)	(0.0107)	(0.0107)	(0.010)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression Results (1997-2012) Using OLS Method (One Year Interval) and including all controls

VARIABLES	OLS FI	OLS FI	OLS FI	OLS FI	OLS FI
Total taxes	-0.0013				
	(0.0051)				
Productive spending	0.0020	0.0127	-0.0002	0.0013	0.0018
	(0.0105)	(0.0106)	(0.0103)	(0.0098)	(0.0098)
Social spending	-0.0011	-0.0008	-0.0024	-0.0010	-0.00118
	(0.0119)	(0.0118)	(0.0121)	(0.0119)	(0.0119)
Crime rate	-0.0102	-0.0334	-0.0219	-0.0101	-0.0057
	(0.0748)	(0.0736)	(0.0765)	(0.0743)	(0.0744)
Heating degree days	-0.0109	-0.0121	-0.0107	-0.0110	-0.0112
	(0.0087)	(0.0087)	(0.0087)	(0.0087)	(0.0087)
Education	3.280*	3.769*	3.284*	3.319*	3.317*
	(1.954)	(1.950)	(1.954)	(1.956)	(1.953)
Urban Population	-0.953	-1.541	-0.885	-0.921	-1.003
	(1.511)	(1.505)	(1.498)	(1.498)	(1.503)
State population	1.50e-06	3.02e-06	1.64e-06	1.56e-06	1.60e-06
	(7.67e-06)	(7.64e-06)	(7.67e-06)	(7.67e-06)	(7.66e-06)
Average hourly wage	-1.932**	-1.802*	-1.877*	-1.969**	-1.957**
	(0.950)	(0.946)	(0.959)	(0.956)	(0.951)
Electricity price	-2.497	-1.688	-2.355	-2.572	-2.628
	(1.862)	(1.855)	(1.858)	(1.880)	(1.864)
State Personal Income	-37.33	-23.37	-40.45	-36.99	-35.86
	(30.95)	(30.63)	(30.53)	(30.75)	(30.58)
Elevation	-0.0051	-0.0031	-0.0057	-0.0068	-0.0058
	(0.0124)	(0.0123)	(0.0125)	(0.0132)	(0.0124)
Property Tax		-0.0753***			
		(0.0263)			
General Sales Tax			0.0112		
			(0.0286)		
Income Tax				-0.0076	
				(0.0195)	

Corporate Net Income Tax					-0.0286 (0.037)
Constant	864.8* (483.8)	710.0 (476.9)	906.3* (477.6)	866.9* (478.8)	843.3* (479.0)
Observations	750	750	750	750	750
R-squared	0.153	0.162	0.153	0.153	0.153

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression Results (1997-2012) Using OLS Method (Five-year Interval) and including all controls

VARIABLES	OLS FII	OLS FII	OLS FII	OLS FII	OLS FII
Total taxes	0.00126				
	(0.0109)				
Productive spending	0.0197	0.0443*	-0.0039	0.0215	0.0234
	(0.0237)	(0.0243)	(0.0235)	(0.0225)	(0.0224)
Social spending	0.0206	0.0268	6.75e-05	0.0229	0.0222
	(0.0296)	(0.0294)	(0.0299)	(0.0296)	(0.0294)
Crime rate	-0.109	-0.163	-0.307	-0.0791	-0.0424
	(0.198)	(0.195)	(0.203)	(0.198)	(0.198)
Heating degree days	-0.0142	-0.0158	-0.0105	-0.0148	-0.0148
	(0.0193)	(0.0192)	(0.0191)	(0.0193)	(0.0192)
Education	3.449	5.112	4.016	3.732	3.999
	(5.244)	(5.256)	(5.197)	(5.254)	(5.237)
Urban Population	-6.824	-9.776	-6.941	-7.278	-7.663
	(8.180)	(8.162)	(8.052)	(8.137)	(8.115)
State population	3.59e-05*	3.76e-05*	3.71e-05*	3.53e-05	3.61e-05*
	(2.17e-05)	(2.15e-05)	(2.14e-05)	(2.16e-05)	(2.16e-05)
Average hourly wage	-0.172	0.225	0.402	-0.264	-0.238
	(2.008)	(2.002)	(1.997)	(2.011)	(2.002)
Electricity Price	-6.510*	-4.974	-5.519	-7.122*	-7.494*
	(3.894)	(3.902)	(3.849)	(3.943)	(3.897)
State Personal Income	-370.7***	-323.9***	-389.3***	-356.7***	-348.4***
	(81.93)	(81.22)	(79.19)	(81.17)	(80.25)
Elevation	-0.0387	-0.0246	-0.0478	-0.0442	-0.0401
	(0.0468)	(0.0468)	(0.0464)	(0.0473)	(0.0466)
Property Tax		-0.151**			
		(0.0607)			
General Sales tax			0.203***		
			(0.0637)		

Income Tax				-0.0317	
				(0.0427)	
Corporate net Income tax					-0.139*
					(0.0788)
Constant	6,859***	6,246***	7,091***	6,679***	6,512***
	(1,208)	(1,191)	(1,167)	(1,191)	(1,185)
Observations	600	600	600	600	600
R-squared	0.514	0.519	0.523	0.514	0.516

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Regression Results (1997-2012) Using OLS Method (one-year Interval) and region dummies

VARIABLES	OLS FI	OLS FI	OLS FI	OLS FI	OLS FI
Total taxes	0.00300				
	(0.00376)				
Productive spending	-0.00827*	-0.00565	-0.00593	-0.00582	-0.00281
	(0.00467)	(0.00428)	(0.00362)	(0.00363)	(0.00398)
Social spending	-0.00613	-0.00579	-0.00677	-0.00528	-0.00624
	(0.00453)	(0.00456)	(0.00452)	(0.00453)	(0.00449)
Crime rate	-0.0458*	-0.0464*	-0.0460*	-0.0463*	-0.0349
	(0.0249)	(0.0255)	(0.0249)	(0.0249)	(0.0255)
Heating degree days	-0.00359	-0.00354	-0.00213	-0.00355	-0.00307
	(0.00400)	(0.00403)	(0.00406)	(0.00400)	(0.00400)
education	2.936***	3.052***	3.415***	3.161***	3.169***
	(0.716)	(0.741)	(0.733)	(0.732)	(0.710)
Urban Population	-0.130	-0.0646	-0.138	-0.0645	-0.0830
	(0.291)	(0.284)	(0.283)	(0.281)	(0.281)
State population	5.99e-07	6.29e-07	7.94e-07	5.75e-07	7.98e-07
	(7.51e-07)	(7.58e-07)	(7.54e-07)	(7.52e-07)	(7.55e-07)
Average hourly wage	-2.776***	-2.811***	-2.791***	-2.884***	-2.878***
	(0.770)	(0.770)	(0.767)	(0.774)	(0.768)
Electricity Price	-1.450	-1.452	-1.943*	-1.372	-1.708*
	(1.018)	(1.042)	(1.049)	(1.020)	(1.026)
State personal income	-15.53***	-15.65***	-17.80***	-15.09***	-16.96***
	(5.426)	(5.429)	(5.523)	(5.474)	(5.458)
elevation	-0.000827	-0.00118	-0.00294	-0.00137	-0.00318
	(0.00298)	(0.00298)	(0.00309)	(0.00298)	(0.00314)
propertytaxt		-0.00115			
		(0.00909)			
General sales tax			0.0131**		
			(0.00667)		
Income tax				-0.00377	
				(0.00516)	

Corporate net income tax					-0.0371*
					(0.0195)
Constant	473.7***	476.6***	496.2***	470.5***	497.6***
	(94.97)	(94.96)	(95.23)	(95.26)	(95.36)
Observations	750	750	750	750	750
R-squared	0.089	0.088	0.093	0.089	0.093

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Regression Results (1997-2012) Using OLS Method (five-year Interval) and region dummies

VARIABLES	OLS FII	OLS FII	OLS FII	OLS FII	OLS FII
Total taxes	0.0110				
	(0.00944)				
Productive spending	-0.0317**	-0.0266**	-0.0227**	-0.0213**	-0.00665
	(0.0123)	(0.0109)	(0.00911)	(0.00925)	(0.0100)
Social spending	-0.0247**	-0.0213*	-0.0296**	-0.0209*	-0.0260**
	(0.0119)	(0.0120)	(0.0118)	(0.0119)	(0.0117)
Crime rate	-0.204***	-0.193***	-0.206***	-0.208***	-0.146**
	(0.0673)	(0.0690)	(0.0665)	(0.0674)	(0.0683)
Heating degree days	0.000981	0.000237	0.00889	0.00133	0.00388
	(0.0104)	(0.0105)	(0.0105)	(0.0104)	(0.0103)
Education	13.90***	13.81***	16.34***	14.88***	15.04***
	(1.900)	(1.971)	(1.929)	(1.947)	(1.869)
Urban Population	0.0951	0.236	-0.0289	0.340	0.207
	(0.763)	(0.748)	(0.736)	(0.740)	(0.732)
State population	3.40e-06*	3.22e-06*	4.39e-06**	3.22e-06*	4.32e-06**
	(1.93e-06)	(1.96e-06)	(1.93e-06)	(1.94e-06)	(1.93e-06)
Average hourly wage	-6.061***	-6.160***	-5.910***	-6.203***	-6.248***
	(2.054)	(2.061)	(2.030)	(2.057)	(2.032)
Electricity price	-6.677***	-6.101**	-9.341***	-6.206**	-7.899***
	(2.574)	(2.624)	(2.639)	(2.579)	(2.568)
State Personal Income	-87.38***	-87.22***	-99.14***	-84.78***	-93.83***
	(14.40)	(14.41)	(14.53)	(14.56)	(14.34)
Elevation	-0.0120	-0.0126	-0.0230***	-0.0141*	-0.0238***
	(0.00780)	(0.00778)	(0.00804)	(0.00778)	(0.00815)
Property tax		0.0171			
		(0.0233)			
General sales tax			0.0673***		
			(0.0170)		
Income tax				-0.0166	
				(0.0135)	
Corporate net income tax					-0.182***

					(0.0481)
Constant	1,840***	1,829***	1,941***	1,781***	1,919***
	(269.0)	(268.9)	(267.1)	(271.4)	(266.9)
Observations	600	600	600	600	600
R-squared	0.237	0.236	0.255	0.237	0.253

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Regression Results (1997-2012) Using 2SLS Method (one -year Interval) and state dummies

VARIABLES	2SLS FI	2SLS FI	2SLS FI	2SLS FI	2SLS FI
Total taxes	0.0316				
	(0.0609)				
Productive spending	-0.0384	0.158	0.0185	0.0224	0.115*
	(0.111)	(0.106)	(0.0155)	(0.0197)	(0.0671)
Crime rate	-0.0273	-0.384*	-0.0849**	-0.0900**	-0.112**
	(0.118)	(0.230)	(0.0362)	(0.0393)	(0.0555)
Social spending	-0.0104	-0.0666*	-0.0220**	-0.0240	-0.0525**
	(0.0202)	(0.0379)	(0.00921)	(0.0158)	(0.0250)
Heating degree days	-0.00395	-0.0141*	-0.00716**	-0.00629*	-0.00653
	(0.00610)	(0.00805)	(0.00338)	(0.00349)	(0.00484)
education	1.929**	6.970*	3.327**	1.416	2.122*
	(0.957)	(3.878)	(1.588)	(2.368)	(1.261)
Urban Population	-1.027	2.658	-0.129	0.0660	0.955
	(2.127)	(1.992)	(0.379)	(0.317)	(0.739)
State population	-1.49e-08	3.88e-06	5.78e-07	1.90e-07	1.53e-06
	(8.20e-07)	(3.11e-06)	(9.48e-07)	(8.38e-07)	(1.47e-06)
Average hourly wage	-1.989	-5.413**	-3.416***	-3.260***	-6.347***
	(2.940)	(2.153)	(0.902)	(1.061)	(2.309)
Electricity Price	-1.881	-8.081*	-3.602**	-2.789	-6.474**
	(1.491)	(4.680)	(1.800)	(1.744)	(3.165)
State Personal income	-10.58*	-23.05*	-17.06*	-11.98	-20.24*
	(5.831)	(13.74)	(9.296)	(7.316)	(10.55)
Elevation	-0.00138	0.00656	-0.00451	-0.00229	-0.0136
	(0.00351)	(0.00825)	(0.00354)	(0.00285)	(0.00826)
Property tax		-0.232			
		(0.171)			
General Sales tax			0.0377		

			(0.0421)		
Income Tax				0.0161	
				(0.0494)	
corpnetincometaxt41					-0.326
					(0.213)
Constant	411.3***	592.7***	498.1***	416.5***	513.0***
	(104.5)	(226.6)	(142.7)	(106.7)	(165.4)
Observations	750	750	750	750	750

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Regression Results (1997-2012) Using 2SLS Method (five -year Interval) and state dummies

VARIABLES	2SLS FII	2SLS FII	2SLS FII	2SLS FII	2SLS FII
Total taxes	-0.286				
	(0.291)				
Productive spending	0.736	0.534**	0.130**	0.145**	0.448**
	(0.624)	(0.254)	(0.0511)	(0.0645)	(0.187)
Crime rate	-1.141	-1.379**	-0.475***	-0.486***	-0.583***
	(0.733)	(0.578)	(0.123)	(0.130)	(0.219)
Social spending	-0.229*	-0.247**	-0.124***	-0.128**	-0.222***
	(0.136)	(0.0971)	(0.0307)	(0.0580)	(0.0766)
Heating degree days	-0.0317	-0.0364*	-0.0247**	-0.0207*	-0.0146
	(0.0249)	(0.0212)	(0.0102)	(0.0111)	(0.0176)
education	10.56	24.85**	14.57***	6.741	10.51**
	(6.468)	(10.56)	(5.091)	(8.816)	(4.805)
Urban Population	10.57	7.711*	0.0931	0.874	3.212
	(10.12)	(4.410)	(1.164)	(1.002)	(2.075)
State Population	-3.11e-06	8.32e-06	1.62e-06	-9.24e-08	2.53e-06
	(6.37e-06)	(7.13e-06)	(3.05e-06)	(2.91e-06)	(4.63e-06)
Average hourly wage	-14.64*	-9.129*	-8.315***	-8.171***	-14.08**
	(8.837)	(5.298)	(2.702)	(2.935)	(5.518)
Electricity Price	-7.571	-19.85**	-14.82***	-10.75*	-18.33**
	(7.696)	(8.822)	(5.474)	(5.610)	(7.327)
State personal income	-10.36	-62.49	-77.79**	-54.74**	-64.43*
	(60.03)	(39.47)	(30.59)	(27.86)	(35.06)
elevation	-0.0363	0.00925	-0.0282**	-0.0184*	-0.0581**
	(0.0263)	(0.0238)	(0.0112)	(0.00950)	(0.0252)
Property tax		-0.666*			
		(0.388)			
General sales			0.158		

tax					
			(0.128)		
Income tax				0.0560	
				(0.184)	
Corporate income tax					-1.019*
					(0.536)
Constant	-464.8	801.4	1,564***	1,228***	823.1
	(1,887)	(800.5)	(512.6)	(463.8)	(704.0)
Observations	600	600	600	600	600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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