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Economic Impact of State Corporate Taxes on Business Creation

by

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Abstract: Theoretical and econometric models suggest that a high federal corporate tax can inhibit business creation. There is, however, a dearth of research on the impact of state corporate tax rates, although state tax policy can have important effects on business formation via similar mechanisms as for federal taxes. Individuals can decide not to start business if after-taxes profits are too low, or they can relocate to a location with lower tax rates. I exploit the variation of state tax policy across the U.S. to examine the relationship between taxes and business creation. There are two main empirical challenges in this thesis. First, economic conditions in high tax states are different from those in low tax states, which make it difficult to rely on the results from OLS regression analyses. Second, higher taxes can induce business to operate below the legal radar making it difficult to distinguish between the actual and reported rates of business formation. This thesis makes an attempt to overcome these issues via uncovering non-linear (or heterogeneous) effects of state tax policy by using disaggregated and multi-level data. First, I take the narrative approach of Romer and Romer (2012) to uncover the source of tax change. I find that the most common impetus for a tax increase was to correct for budget shortfalls and the most common justification for a tax decrease was to stimulate the economy, confirming that tax policy is driven in part by the underlying economic conditions. Second, I put together data on a national demand shock, tax rates, and additional control variables, containing 125,000 observations, each of which is defined by a year (1998-2005), state (50 states), and sector (250 sectors, as defined by North American Industry Classification System, or NAICS codes). Exploiting this rich multi-level data set, I estimate a series of panel data regression models to measure the impact of state taxes on business formation I find that a one percent increase in the corporate tax is associated with a 1.6 to 2.1% lower rate of business creation. Moreover, for some industries, like mining and healthcare, that are relatively immobile, the corporate rate has no impact on business creation, while other industries, such as manufacturing and finance, are more responsive to taxes, suggesting that business mobility might be an intervening factor. Next, I create a similar model to study changes in business creation for each county in the U.S. from 1996 to 2005. I find that the corporate tax rate is an insignificant predictor of business creation when using the entire sample. However, when I restrict my sample to those counties situated near a state border (and thus share similar observable and more importantly unobservable characteristics), I find a corporate tax increase has statistically significant and economically important effects on business creation. In particular, counties within 25 miles of a state border that have a higher tax than the adjacent state, have an average business creation rate of .61%, while counties that are within 25 miles of a border on the low tax side have an average business creation rate of .93%. In addition, I divide counties into groups, each of which consists of four counties- a low tax border county, a high tax border county, a low tax hinterland county (which is contiguous with the low tax border county, but is not contiguous with the state border), and a high tax hinterland county. I then regress the rate of business creation on a dummy variable for a high tax border county, a dummy variable for a low tax border county, and a

fixed effect for each group. I find evidence that low tax border counties have higher rates of business creation, while non-border low tax counties have close to average rates of business formation. This suggests that a high state corporate tax can benefit businesses in adjacent low tax states since individuals may choose to take advantage of the tax discontinuity in border regions.

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Chapter 1

Introduction

Business creation is often lauded as the engine for economic growth by economists and politicians alike. Research has shown that young startups are responsible for as much as two thirds of job creation in the United States (Strangler and Litan, 2009). For this reason the subject of entrepreneurship is a crucial part of the debate between American political parties on the merits of competing tax plans.. Democrats and Republicans agree that business creation helps fuel job growth, but they debate how to design fiscal policy in a way to encourage entrepreneurs to invest into their businesses. In the 2012 presidential election Mitt Romney has repeatedly called entrepreneurs "job creators," while Obama prefers the term "the engine of our economy." The topic of choosing an optimal tax rate to maximize job growth is more contentious. President Obama recently suggested a plan for corporate tax reform that would eliminate tax subsidies and lower the rate from 35% to 28%. Romney is a proponent of a 25% corporate tax rate, while Rick Santorum supports a 17.5% tax and Ron Paul supports a 15% tax. The controversy of choosing an appropriate corporate tax rate is compounded by the fact that a number of prominent businesses claim that taxes are too high and inhibit their ability to expand. One survey of manufacturing companies found that 33.4% of firms consider taxes a major problem (Area Development Magazine, 2010).

The economic literature suggests that there are three chief mechanisms for how high corporate tax rates can stifle entrepreneurship. A high corporate tax rate can

discourage an entrepreneur from forming a business by reducing expected profits. Business formation is inhibited by taxes because higher rates distort incentives and decrease entrepreneurs' desire to take risks. This distortion is especially large when the corporate tax rate is inconsistent with the personal income tax. Individuals who start businesses consider other alternatives, such as salaried employment, as they frequently switch sources of incomes. In 2010, 22 million Americans reported self-employment income on their tax returns, out of which two million were for the first time (National Association for Self Employed). The movement of individuals between self and salaried employment suggests that entrepreneurs may pursue other opportunities if taxes are too high. Further, only 25% of businesses survive for at least five years. A high state tax rate may make it even harder for young, struggling businesses to succeed.

Most individuals only consider their current city as a potential site for their business, and do not compare the cost benefits of establishing their company in a different region (Schmenner, 1978). Larger businesses, however, often relocate to take advantage of a lower tax rate in a nearby state. As there are few regulatory barriers in moving labor and capital across state lines, a large tax differential between one's current state and an adjacent state may be especially enticing. Research suggests that major companies consider multiple sites for branches when they expand their operations (Schmenner, 1981). Surveys of business owners provide another means for analyzing business location decisions. These surveys have found that when selecting between competing regions, companies compare government regulations, including tax rates (Premus, 1982, and Blair and Robert, 1987). A

consulting industry even revolves around aiding in site selection for large companies that specializes in comparing state regulations. This anecdotal evidence is supported by econometric studies of the determinants of location choices that have found that foreign companies are less likely to build plants in states with high tax rates (Coughlin and Segev, 2000, and Woodward, 1982). A study of U.S. firms found that 5% of companies relocate their headquarters in any given year and that the corporate tax rate has a significant impact on location choices (Strauss-Kahn and Vives, 2009). The literature on site selection suggests that corporate taxes can influence the region where a firm is located. This evidence suggests a second mechanism for how high tax rates can inhibit business formation.

Tax avoidance behavior is more prevalent when taxes are higher. The IRS found that sole proprietorships failed to report $68 billion of income in 2010 (TIGTA-2010-70). Guttmann (1977) found that not only is income unreported, but that some small businesses may operate under the legal radar. Further, a large number of legal businesses that pay federal taxes do not register with a state tax authority (Unregistered Business Study, 2007). In Washington in 2004, 99,000 unregistered businesses avoided paying $225 million in taxes. It is likely that a high proportion of businesses that do not pay taxes are not counted in business surveys. Unregistered businesses would not receive the business survey, and partially registered businesses may avoid filling out information about their operations because of concern of legal repercussions. Tax avoidance may artificially deflate business creation, as it decreases the number of businesses reported in official data. As higher

taxes lead to more tax avoidance, this can affect our ability to estimate the true economic impact of tax policy on business formation.

Results from regression analyses support the theory that the corporate tax rate impedes business formation to varying degrees (Bartik, 1995; Blair and Robert, 1997; Carlton, 1983; Caroll, 1988; and Case, 1993). Much of the literature on taxes, though, has neglected the impact of state tax rates, as they are considered marginal in comparison to federal taxes.[1] Although the federal government collects the majority of taxes, state and local authorities also impose taxes on corporate and personal income, as well as on property and capital gains. For any given type of tax, one state may choose a rate of 10%, while another state has a rate of 1%. This variation at the state level of government provides an ideal setting to study the impact of taxes on the rate of business creation. The magnitude of state tax rates, combined with the considerable variation in rates, suggests that individuals are likely to account for tax differences when making business decisions.

The rest of the thesis is organized as follows. The second chapter contains an extensive literature review of several topics, including the elasticity of labor to taxes, tax avoidance behavior, and how taxes influence business location decisions. The third chapter summarizes the current status of state corporate and personal tax rates. I then track the motivation for all state tax changes during the period 1996 to 2005. The most common impetus for a tax increase was to correct for budget shortfalls and

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[1] In 2010 the federal government collected $896 billion in personal income taxes, while state governments collected $236 billion. The average individual thus pays 26% of their total income taxes to the state government; this percent varies significantly among states. Some states have no personal income taxes, while in others, state income taxes amount to 40% of their federal tax burden. Corporations pay $191 billion to state authorities, which is 20% of their total tax payments.

the most common justification for a tax decrease was to stimulate the economy. Tax hikes and cuts are often predictable as they are preceded by campaign promises or lack of fiscal discipline. These results suggest that tax policy may be endogenous with the economic conditions in a state.

In the fourth chapter I model the determinants of business creation rates in 250 industry sectors as defined by the North American Industry Classification System at the state level. Business creation is defined as the percent change in the number of businesses for a specific geographic region and industry from one year to the next. Campbell (1996) developed a regression model that quantified the role of a number of factors in business formation for the manufacturing sector that serves as the foundation for my analysis. I adapt Campbell's paper with a number of improvements. I include personal and corporate taxes separately to isolate their different effects. Additionally, I separately examine 21 different industries, rather than just the manufacturing sector. As a result my sample size is much larger than the number of observations used by Campbell. Additionally, I add a variable to proxy the national demand shock to each industry. This variable, called the Bartik variable, measures the change in national employment for each sector. The Bartik variable provides a baseline for how fast business formation should occur, if growth at the state level is the same as the national average. The other independent variables then measure the derivations that occur from this uniform state. By testing an OLS regression model that covers a 10 year period and over 100,000 observations I find evidence that a higher corporate tax rate decreases the rate of business creation, while the personal income tax rate has ambiguous effects. Industries are affected unevenly

by tax rates. Industries such as agriculture and mining that are location dependent are not affected by higher corporate tax rates, while manufacturing and finance business creation rates are more elastic.

In the fifth chapter, I construct a similar model that focuses on the county rather than the state, with particular focus on the discontinuity in tax rates as one crosses a state border from a high tax state to a low tax state. Adjacent counties that are in different states share unobservable factors as a result of their common locality, but vary in the regulations and taxes applied to business profits. I use several methods to test that a discontinuity in business creation exists when moving from a high tax border county to a low tax border county. Three papers have taken advantage of discontinuities across state borders. Most famously, Card and Krueger compared changes in employment at fast food restaurants between New Jersey and Pennsylvania after New Jersey increased its minimum wage in 1992 (1993). Huang (2008) developed a methodology for comparing outcomes after state bank deregulation for which he matched each border county with its adjacent pair. A paper by Holmes (1998) examined borders where one state had right to work laws, and the other did not. He found that border counties with right to work laws have more manufacturing activity, than adjacent border counties without these laws.

In this thesis I synthesize Huang and Holmes' approach. First, I match each border county in the U.S. with its adjacent county across the border. Each border county is also matched with its adjacent hinterland county, which is defined as a county that is separated from the state border by one other county (Map 3 in Appendix C illustrates how hinterland and border counties are defined). Each set of

four counties -- high tax border county, low tax border county, high tax hinterland county, and low tax hinterland county --is grouped together. I then regress the business formation rates on a dummy variable for high tax border county, low tax border county, and high tax hinterland county, including a fixed effect for each group to capture unobservable similarities within each group of four counties. This approach provides weak evidence that high tax border counties have low rates of business creation, while high tax hinterland counties have average rates of business creation. Further, I find that high tax border counties within 25 miles of the border had business creation rates of .61%, while low tax border counties within 25 miles of the border had business creation rates of .93%. As one moves away from the border into a high tax state business formation rates increase, while the opposite effect holds as one moves further into a low tax state. These results suggest that taxes primarily inhibit business creation near tax borders where two tax codes meet.

The conclusion reiterates some of the results from the paper and offers broad policy recommendations. The primary finding of this paper is that higher corporate tax rates discourage business creation, although such effects are conspicuously absent in sectors such as agriculture and mining that are location specific. This effect is magnified in border regions where there is a discontinuity in tax rates.

In this paper I offer an unexplored explanation for how state corporate tax rates may inhibit business creation. I find that border counties in high tax states have noticeably lower rates of business creation than adjacent counties in low tax states. For non-border counties though, the corporate tax rate has only a marginal effect on business creation. When tax rates vary geographically within a country it is easy for

individuals to account and take advantage of these differences, because of the ease in transporting capital and labor to regions with different tax rates. These results suggest that state tax rates do not by themselves pose an overly burdensome cost to businesses, but rather the presence of lower tax rates nearby can attract businesses and give them an edge over businesses that operate in regions with less friendly tax codes. The literature on taxes has largely ignored the ease with which individuals can move their inputs to regions with more favorable tax policy. My research suggests that, for U.S. states, businesses take advantage of the discontinuity in tax rates to enhance their profits. These results likely apply to any region that allows free flow of capital and labor where profits are taxed at different rates by lower levels of government.

Chapter 2

Literature Review

In this section I review the literature on a number of tax related subjects. This review sets the foundation for the following chapters.

I. Taxes and the Elasticity of the Labor Supply

A number of papers explore the relationship between tax rates and the labor supply. One widely cited paper estimates the labor supply function for men and women in Sweden during the 1980s (Blomquist and Hansson-Bruswitz,1990). During this period Sweden experienced a large expansion in the size of its government, and in its tax revenue, which provides a useful dataset for studying wage elasticity. The authors find that for men, the wages elasticity is around .08, while for women it is around 0.4. This implies that a five percent decrease in the marginal tax rate leads to a 0.4-1.5% increase in the number of hours worked for males. As women are often the secondary income earner in a household the amount of labor that they supply is more responsive to wages. A progressive income tax system decreases the labor supply more than an equivalent proportional tax. If the Swedish tax code was replaced by a revenue-neutral proportional tax the labor supply would increase by 7% for males and 10% for females. A progressive tax code has a larger deadweight loss than a proportional tax. The Tax Reform Act of 1986 in the U.S. provides a natural experiment for examining taxpayers' response to a tax increase. The Reform Act of 1986 decreased the progressivity of the tax code by lowering the

top tax rate from 50% to 28%. One paper examined the sensitivity of taxable income to the tax rate by matching 4000 tax returns from the same taxpayers before and after the tax changes (Feldstein and Feenberg, 1993). This panel data was analyzed using a differences-of-differences approach by looking at the changes between the 1985 and 1988 tax returns. This comparison shows that during this period individuals in the top income bracket had a 10.8% increase in salary income, while other taxpayers had only a 2% increase in the salary. The findings suggest that high income individuals work and earn when the tax rate is lower, while lower income individuals do not have this same incentive (because their tax rate did not change).[2] One problem with this paper is that it focuses on the elasticity of salaries, rather than of the labor supply. It is possible that rich individuals are not supplying any greater amount of labor, but because of other factors are receiving higher wages. An alternative explanation is that income is underreported when the tax rate is higher because of greater prevalence of questionable accounting techniques or outright tax avoidance.

During the interwar years in the U.S. the federal income tax was changed frequently and unevenly across income groups. A paper by Romer and Romer (2012) used these frequent changes to examine how marginal tax rates distort incentives. The elasticity of taxable income with respect to one minus the marginal tax rate (the percentage of money that one keeps after taxes) was found to equal .2. Further, while the authors found no evidence that higher income taxes decreased investment, higher marginal tax rates did lower business formation. In this era the top corporate tax rates were only 10%, so business creation was responsive to the personal income tax. It is

[2] Feldstein later uses this analysis to criticize the proposed tax increase in 1993, as this research suggests it would lead to a decrease in taxable income making it revenue neutral, while increasing deadweight loss (Feldstein, 1991).

unclear though that taxes affect incentives the same way they do today as they did 80 years ago. Also, the paper does not address the issue of tax avoidance.

II. Relationship of Business Creation and Personal Income Tax

There is ambiguous evidence that a high personal tax rate can inhibit business formation. Carroll, et al. (1998) looked at the tax returns of a number of sole-proprietors for changes in how much they invested into their businesses after the Tax Reform Act of 1986. An increase in the personal tax rate both reduces cash flow, which imposes a liquidity constraint, and also increases the user cost from investing present resources. The authors find that a marginal tax increase of five percent decreased investment by 9.9%. A high personal tax rate also decreases the cash flow and increases the user cost for entrepreneurs who are deciding whether or not they want to form a company.

Entrepreneurs are generally risk takers who often invest their own money in the hopes of realizing large gains. When taxes are asymmetrical for different outcomes, the progressivity of the tax code may discourage people from starting companies. Studies have indicated that taxes that are designed to redistribute income, either by a progressive tax code or welfare payments, are negatively correlated with growth (Romans and Subrahmanyam, 1979). Although few business owners will ever earn enough money to qualify in the top tax bracket, their optimistic confidence of upward mobility may fuel their entrepreneurship. Gentry and Hubbard (2004) found that a progressive tax code causes different rates of entrepreneur entry for households in different income groups. Households in the lowest and highest income groups are most likely to form businesses. This may be because middle

income households face the prospect of having additional income charged at a higher rate, while high income households will continue to have additional income taxed at the current rate. It is also possible that a progressive tax code discourages the marginal entrepreneurs with the greatest chance of failures, and has no effect on those more likely to succeed. Hamilton (200) found that over 10 years of self employment median wages were 35% less than if the individual instead sought a paid job. The wage gap is even greater when including non-salary benefits, such as health care and retirement plans. These findings suggest that there are non-pecuniary benefits arising from self-employment. Individuals may gain utility from "being your own boss," which justifies lower wages. It is possible that these benefits could soften the negative impact of high tax rates.

A number of people who start businesses were previously wage-and-salary workers. For these individuals the difference in tax rates between being a wage and self employed worker may be more important than the actual tax rate. Even if an individual has to pay a high tax rate on business income, this may be a lower rate than if he earned his income in a different manner. In the case that a high percentage of entrepreneurs previously had wage-and-salary employment, one needs to consider the difference in tax rates between the two types of work. The tax rate differential between self-employment and wage-and-salary employment may make either type of employment artificially more attractive. Long (1982) found that a 10% increase in the personal income tax increases the number of self employed males by 7.4%.

Changes in the tax code often affect salary workers and the self-employed asymmetrically. Salary workers pay a percentage of their income as a social security

tax that is matched by the employer. Before 1984, self-employed individuals paid the government one and a half times the social security tax rate paid by salary workers (while the government collected double the tax rate for salary workers, due to employer contributions). This meant that the government collected less money for social security from self-employed workers. Long (1982) found that during this period a 10% increase in the payroll tax lead to a five to eight percent increase in self-employment. However, from 1984 to 1990 the tax on self earners was gradually raised to equal two times the rate at which salary workers contributed. During this period more restrictions were also added to what qualified as a business related deduction. These changes shifted the tax differential between self-employed and salary employees, as they removed some of the tax advantages associated with starting a business.

If individuals pay more attention to tax differentials than to the actual tax rate, a decrease in the income tax could actually decrease entrepreneurial activity. In fact, a paper by Cullen and Gordon (2002) found that a five percent drop in income tax decreases the rate of transitions to self employment from salary employment by up to 30%. All people, regardless of the source of their income, are subject to the income tax, so when this tax is already low, entrepreneurship becomes a less favorable option. A decrease in the income tax also lowers the tax savings from deducting business losses. Self-employment makes it easier to use creative accounting or defraud the government of taxes. If the tax rates are especially high people may seek self employment as a way to avoid paying taxes. Herb (2000) found that a 30% increase in taxes leads to a 4.8 to 11.1% increase in the business creation rate for

males for U.S. states and Canadian provinces. However, Gius and Frese (2002) found that a high personal income tax rate has a negative impact on job creation. One explanation for the discrepancy is that this paper limits its dependent variable to the number of people transitioning from wage-and-salary employment to self-employment within a specific region. A number of people forming startups are excluded by this criterion as they operate multiple businesses, or previously had no source of employment. These groups of people are likely more concerned with the absolute tax rate, than the differential. An individual may also migrate from a region with a high tax rate to a region with a lower tax rate. In this case the absolute tax rate of the region would cause them to migrate rather than the differential tax rate.

III. Relationship of Business Formation and Corporate Tax

Cross country studies have shown that high taxes have an adverse impact on business creation. Robert Barro (1991) found that when the size of government increases, private investment decreases. However, this paper does not directly link the size of government to the tax rate. A more pertinent study looked at the corporate tax rate as measured by the marginal tax rate for a mid-sized firm for 85 countries worldwide (Djankov, et al,. 2010). By looking at the effective tax rate for a firm of set size the authors are able to correct for differences in the progressivity of different tax codes. A 10% increase in the corporate tax rate decreases the investment to GDP ratio by two percent and the business entry rate by 1.4%. The same 10% tax increase increases the size of the informal economy by two percent, as more people decide to evade taxes. The statutory tax rates were not significant. This suggests that entrepreneurs make decisions based off of how much they are actually taxed, rather

than the advertised tax rate. Countries with a higher sum of business license taxes, property taxes, and capital taxes have lower business investment rates, while labor taxes have no adverse effects. Further, there was no evidence that the corporate tax rate is influenced by the origin of the laws of a country.

Rin, et al. (2011) examined how corporate taxation affects the rate of business entry for 17 European countries. The tax rate is modeled as an endogenous policy that responds to the current business climate, rather than as an exogenous variable. Unlike the Djankov paper, the marginal tax rate is measured for a variety of business sizes, rather than for just mid-sized firms. These changes in specifications lead to the finding that the adverse impact of corporate taxation is not linear, but is instead convex. A decrease in the corporate tax rate from the European median (30.08%) to the first quartile (27.57%) increases business entries by .88%. When taxes were originally very low or very high a change that moved them further to an extreme had a smaller impact on business creation. Further, a decrease in the corporate tax rate as tool to increase business creation is most effective for countries with strong institutions (Rin, et al., 2011). For countries with weak institutions the rate of business creation is less elastic in regard to the tax rate, as it is easier to evade taxes.

In Switzerland, the federal corporate tax rate is only 8.5%, although the individual cantons often tax corporate income at a higher rate. This creates wide differences in corporate tax burdens between cantons, leading to a greater incentive for companies to consider the tax rate of their location within the country than in the U.S. As a result a high corporate tax rate leads to a decrease in the number of large firms in a canton (Feld and Kirchgassner, 2001). Small and middle sized firms are

only affected by a high corporate tax rate if they experience large returns. As taxes are assessed on profit, and not revenue, these companies are more concerned with how much taxes they will have to pay. Cantons with higher tax rates have fewer firms, because either firms physically relocate, shift profits to other cantons, or evade taxes (Feld and Kirchgassner, 2001). Government spending has a positive impact on the number of firms.

IV. Taxes, the Informal Sector, and Tax Avoidance

A survey in Quebec City asked questions about individuals' socioeconomic background, as well as on their work in the regular and informal sector (Lemiux, et al., 1994). People of lower income were found more likely to work in the informal sector. The results suggest that workers who are not currently employed in the underground sector are unlikely to seek employment there in response to a higher tax rate, while workers who are partially employed in the informal sector are likely to increase the hours they work in this sector in response to higher tax rates. These findings suggest that an increase in the tax rate will lead to a decrease in employment in the formal sector (and possibly other tax avoidance behaviors), which will decrease tax revenue. If this behavior was true for not just workers, but also business owners, this could also lead to a decrease in business formation in the formal sector in response to higher tax rates. Business owners who already operate at the edge of the legal system may fail to officially report their business to avoid paying taxes. This behavior is one way that an increase in tax rates could lead to a decrease in tax revenue.

There is a large literature on how high tax rates lead to tax avoidance behavior. Peter Gutmann (1977) found that 9.4% of M1 currency in the United States is used for illegal purposes. He also found that as taxes increase, more of the economy enters the underground sector. The Internal Revenue Service issued a report in 1976 that estimated that 9% of revenue went unreported. Businesses that are especially reliant on cash transactions are more likely to enter the informal economy in response to high income taxes. In 1977, Gutmann highlighted car washes, garages, bars, restaurants, and small retail shops as types of businesses that are likely to avoid taxes. In the more than 30 years since then the U.S. economy has become more regulated, making it in some ways more difficult to operate a business in the informal sector. These changes in regulation are countered by a massive increase in illegal immigration. In 1975 the undocumented immigrant population as a percentage of the total population in the United States was 0.5%. Currently this figure is closer to four percent. It is difficult for these illegal immigrants to operate their businesses within the legal sphere, so they are often forced into the informal economy. These illegal immigrants have a lower elasticity of labor supply to the tax rate, as they have few options for providing their labor within the formal sector. However, regional variations and temporal fluctuations of illegal immigrants could still bias the business creation rate for a state. States that have an increasing number of illegal immigrants may have fewer formal businesses that are recorded in official data, as more businesses may operate underground. Clotfelter (1983) found that the elasticity of unreported income with respect to tax rates is 0.5 to 3.0.

Tax avoidance decreases the official rate of business creation when it affects what firms are counted in official data. The dataset that I use in this paper counts the number of businesses by tabulating surveys sent to business owners in the U.S. and by using administrative records. These data are subject to "nonsampling" errors due to missing data. Tax avoidance affects the official rate of business creation, if these errors are correlated with the tax rate (and tax avoidance served as the mechanism for this correlation). The previous papers provide some evidence that taxes do affect the size of the informal sector.

V. Determinants of Location Choices for New Plants

There is a growing literature on the determinants of plant location. Business owners who open a new plant consider factors ranging from human capital needs to incentives offered by local government. Some regions of the country, such as Silicon Valley, are well known for their entrepreneurship and attract investors from around the world. Economists have tried to separate the importance of location choice factors, such as market access, human capital, and business attitudes. Early literature on location focused on the cost of transporting intermediate goods to a plant for processing and the cost of moving the goods to their final market. Before the U.S. had a well developed national infrastructure transportation costs were paramount in making location decisions. Energy prices also had larger variation between regions, and so were considered a major cost factor. Since World War II these cost factors have been overtaken in importance at an aggregate regional level by state government and regulatory factors.

Research suggests that major companies consider multiple sites for branches before making a final decision (Schmenner, 1981). One of the first papers to examine the determinants of business location was by the economist Dennis Carlton (1983). He developed a model where each firm chooses a location for its plant that maximizes its profit. Industries, as defined by Standard Industrial Codes, were included that were not involved in local demand and supply. This condition limits the dataset to manufacturing firms. The paper models this data by examining the location choice of plants for each sector by narrowly defined geographic regions that it links to employment changes. Taxes were found to have no effect on employment, while energy costs were more significant. Human capital was also found to be important for plants that require special technical expertise, but not for less complex plants.

The expansion of foreign direct investment starting in the 1980s increased interest in how foreign firms choose where to locate their facilities in the U.S. A number of papers quantify this location decision with locational logit models. Coughlin and Arromdee (1991) found that states with larger manufacturing density and higher per capita GDP received more foreign direct investment. Higher wages were a major deterrent with an elasticity of -4.4, while states with higher unemployment rates had an advantage in attracting investment. The results suggest that states with higher unionization rates were favored by investors, although most other papers have found otherwise. It is possible that a high unionization rate serves as a signal of the strength of the manufacturing sector (as a high percentage of unionization takes place within manufacturing). The authors use two approaches to measure the impact of taxes: the first measures the tax burden per capita and the

second as a percentage of per capita income. In neither case were taxes a deterrent. State economic assistance programs that offer firms tax credits for relocation were found effective in attracting businesses.

Much of the literature on business location decisions focuses on foreign direct investment. Foreign investors have even more freedom than domestic companies when choosing the location of a manufacturing plant as they are less likely to have ties to a specific region. In 1995, one in nine U.S. manufacturing employees worked for an international company, which was up from one in 20 in 1980. Coughlin and Segev (2000) model the location choice of new foreign plants built in each state divided by state GDP. Strong transportation infrastructure, high manufacturing densities, and an educated labor force boost the chance that a location was chosen for a new plant, while a high marginal tax rate deters foreign investment. A one percent increase in the taxes collected by a state as a percentage of its GDP decreases the chance of a state building a plant there by 20%. One problem with this research is that it fails to consider that foreign firms are able to rearrange the accounts of subsidiaries to reduce their tax burden as part of Foreign Tax Credit Laws. Foreign firms often pay well below the state tax rate (if they pay them at all), so they are less influenced by taxes than domestic companies. Other factors that were hypothesized to impact business creation, such as unionization and unemployment rate were insignificant. This paper supports the idea that the tax rate has a negative impact on business creation, but only examines a small subset of companies over a specific period.

Woodward (1982) looked at the plant location choice for Japanese firms in the 1980s. Although this paper has a narrower dataset than the Coughlin and Segev paper, there are several advantages to limiting the analysis to Japanese firms. Japan had little presence in the U.S. in the 1980s, so it had few regional ties to consider when choosing a plant site. The Japanese companies also preferred to build their own factories, rather than use existing assets, which was the approach taken by most non-Japanese firms. The results indicate that Japanese firms were not generally deterred by a high state tax rate, but did avoid states that have unitary tax methods.[3] During the 1980s, 12 states assessed the taxes of international companies in this fashion. The importance of a unitary tax suggests that international firms are successful at avoiding state taxes that are non-unitary. It also suggests that companies consider state taxes when choosing a location, but because of different tax laws foreign investors use different criteria to minimize their tax burden. Japanese companies avoided states with high unionization and higher total employment, and displayed a preference for states that had a Japanese trade office and strong markets.

VI. Surveys on Business Location Choices

Surveys of business owners provide another avenue for examining how location decisions are made. One problem with this approach is that these surveys can only include existing firms, which introduces a survivor bias as they do not include feedback from people who were deterred from launching startups in the first place. Surveys are useful though as they offer a means to substantiate some of the findings from econometric models on business location. Some factors, such as

[3] Under a unitary tax system states impose a tax on a percentage of firms' total profits (including profits from overseas) equal to the percentage of the firm's activities that take place within that state.

"quality of life" are also difficult to quantify in a meaningful manner in regression analyses (Blair, 1987). A review of 16 surveys from the 1940s and 50s that asked questions about location decisions found that access to markets was considered most important, followed by access to labor and raw materials. Only one of the surveys found that taxes are the most significant factor for location decisions and every survey found that financial incentives offered by states are of little significance.

More recent surveys are available that track how companies choose sites when expanding. Area Development Magazine conducts an annual survey of executives that asks questions about the size of respondents' firms, their business sentiment for the upcoming year, their plans for expansion, and their priorities during the site selection process. In 2010, 158 executives answered the survey, out of which two thirds represented manufacturing firms. 65% of respondents found that highway accessibility was very important when choosing a site, the most of any other factor. However, as most regions have locations that meet this criterion, this influences location decisions within a geographic area rather than between competing areas. Labor costs, weak unions, and availability of skilled labor were also ranked as very important. Up from 20% in 1990, over 40% of executives considered the corporate tax rate, tax exemptions, and state and local incentives very important in 2010.

In fact, there is a whole consulting industry that revolves around aiding in site selection for large companies. About one third of Fortune 500 companies use consulting firms, such as Fantus and Alexander Grant, to carry out field analysis on potential sites (Blair and Robert, 1987). Mid-sized firms likely hire consultants at even greater rates, as they lack the in-house expertise to make decisions on where to

build new sites. The first stage of the site selection process is for a company to choose between several regions that are suggested by the consulting firm as meeting the general criteria. After a specific region is chosen, attention is paid to the more specific qualities of a particular site. The consulting firm IO.INC advertises on its website that it will "identify, evaluate, and prioritize countries, states, and regions," and then connect "clients with government…and other groups that bring value to the new or expanded operation." The existence of this consulting industry suggests that companies are cognizant about regional differences in government and that firms consider these differences in profit maximizing decisions.

There are also consultants that produce rankings of regions by their business climate. Consulting company Alexander Grant releases an annual study called *General Manufacturing Climates* (Blair and Robert, 1987). The survey weights 22 factors that make up the industrial climate of a state in order to rank regions. The relevant weights for each factor are derived from surveys of each state's manufacturing association. In past years the Dakotas have received the highest ranks, while the Midwest states have been near the bottom. Alexander Grant offers to personalize theses studies for companies that want more guidance in selecting a region.

Different industries use different criteria when selecting regions. While manufacturers' value access to cheap energy, this is less important for technology companies. The Congressional Joint Economic Committee conducted a survey of 692 technology executives asking questions about how they selected their region (Premus, 1982). Like manufacturers they valued access to skilled labor, but also

looked for low taxes and proximity to universities. These companies place higher value on quality of life factors, such as local transportation, proximity to recreation, and strong schools. Less importance was placed on cost issues than for traditional companies, and more was placed on the quality of the community. Anecdotal evidence from companies such as Google and Facebook that invest heavily in work space confirms the importance of quality of life issues. The quality of life in a community is partially the result of the local and state government investment in the region, and the money spent on programs, such as policing. While technology companies try to avoid excessive tax rates, they also place a premium on the goods that these taxes provide. Companies whose most valuable product is research also have more to gain by being in close proximity to similar companies, as there is a greater need to share ideas and an advantage to being in a general intellectual climate. This may lead to the agglomeration of technological companies, as seen in the Silicon Valley.

The evidence from surveys helps confirm the role of factors that influence location choices for businesses. Surveys have several problems though, that can be improved with econometric analysis. The greatest problem is that the surveys are about the location choices of existing companies, rather than explicitly about business creation. These two subjects are related and likely influenced by similar factors, but are distinct topics. Surveys further only cover large businesses that are a small subset of all companies. Smaller companies may value other criteria, and for the smallest businesses the decision is not on where to locate, but on whether to start a business or pursue other economic activities. Surveys ask questions on where the companies

would build plants, rather than on how they chose their current location. While Company A may decide to build its newest factory in South Dakota as the state has no taxes, the low tax rate is not enticing enough for it to relocate its headquarters. This thesis is more interested in how the company came to be located in its current location, than how it chooses subsequent locations for expansion. Additionally, for surveys there is a size bias as only the most successful companies are included that tend to belong to the same couple of industries. Successful companies may choose locations differently than less successful companies, as specific regions produce more Fortune 500 companies than others. As previously discussed there is also large variation between industries in how locations are chosen. Results from surveys will inform the model in my thesis, but the literature on location site selection is a distinct topic from business creation.

VII. Business Relocation and Tax Rates

Early literature on regional business location decisions found that firms were not affected by local tax rates. A survey of the literature in 1978 by the economist W. H. Oakland found no conclusive proof that businesses are affected by tax policy. While there was a lack of empirical evidence on the impact of fiscal policy, he found that the differentials in property taxes between counties were as large as 10% of total profits for a business. A study published in 1980 improved on past research by excluding municipalities that used zoning laws to limit the land available for industrial use (Wasylenko, 1980). The results indicated that property taxes are a determinant for manufacturing and wholesale trade firm relocations. However, the

results were not significant for other industries. Further, the paper only examined the Milwaukee region, so it is uncertain if the results would hold for a broader sample.[4]

Charney (1983) looked specifically at manufacturing firms that relocated within the metropolitan Detroit region. This area contains three counties, each having a different property tax rate. A model that included changes in both demand and supply was able to explain 80% of the location choices for relocating firms. The most significant variable was the distance from the original manufacturing site. The operators of companies are more familiar with their surrounding areas, making them more likely to relocate there. Companies that relocate also want their employees to move with them, which is more viable over short distances. Small firms are more likely to move to dense areas that have existing structures that they can use to manufacture their goods. Larger companies are less likely to use an existing building, so they have more freedom when choosing a site, but are consequently more aware of construction costs.

The property tax was insignificant for small companies, but had a negative impact on attracting large firms. Property taxes are viewed as a liability as they are owed even in years when companies have negative profits. The local income tax was found to be insignificant. Local income taxes assessed by counties are very low and less than five percent of the costs of property taxes. State income taxes are much higher, so the income taxes have a greater impact at the state level. The author found

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[4] The residents of a city derive direct utility from the quality of life in the community. A higher quality of life in a community may also attract businesses to the area. If these businesses are industrial in nature they may reduce the environmental quality of a region and detract from the quality of life. In order to maximize the quality of life some governments may choose to pass zoning laws that limit industry. The inclusion of local governments that zone against industry can then bias results.)

that companies were attracted to cities with a higher percentage of their land covered with sewer and water lines. Government spending can counteract the negative impact of taxes on businesses, if it is used to provide services that businesses value.

Gabe and Bell (2004) investigated the importance of local government expenditures for attracting businesses in Maine by looking at a sample of 3,786 new businesses. By focusing on the municipality level the authors were able to highlight the impact of local spending. The authors found that school subsides per student from the state and federal government had a negative impact on business openings. However, spending that was financed locally had a positive impact on business investment for a region. A 10% increase in local spending led to a 3.5% increase in business creation. These results suggest that there is no reason for municipalities to participate in tax competition, despite their tendency to do so. Federal and state taxes are used to fund bureaucratic agencies and large-scale projects that often have little impact on the average citizen. Only a small percentage of these funds trickle down to local communities. Further, if a community pays more than its share in state taxes there is no guarantee that it will receive an equivalent share of services. Conversely, local taxes are directly used to fund services within the community, and so have a greater impact on the tax payer. These taxes are small in comparison to state and federal taxes, which explains why businesses may be willing to pay additional taxes in order to receive greater public goods. However, for larger cities companies will benefit unevenly from the local tax rate, as there is greater opportunity for local redistribution and waste. It is possible that in a state like Maine, which has no major

cities, that an increase in taxes to finance public goods could have a positive impact on business investment, while in more urban states the same finding would not hold.

Entrepreneurs do not make business location decisions in the same way as large multinational firms. Instead of carefully considering a variety of possible locations throughout the U.S. and making a profit maximizing decision, they generally just consider their current city as a potential business site (Schmenner, 1978). An entrepreneur who wants to start a restaurant near his home in Los Angeles is unlikely to move to Vermont, where he can pay a lower tax rate. For entrepreneurs factors such as a high tax rate may deter them from starting a business in the first place. Entrepreneurs are thus not strict profit maximizers, as they place a premium on factors that do not have explicit economic value, such as their current location. The large firm makes a decision on where to locate a branch, while the entrepreneur decides whether or not he should start a business.

This process of business formation is modeled in a paper by Bartik (1989) for 19 manufacturing sectors using business microdata at the state level. The strongest predictor of the number of startups is market demand, which is proxied by comparing population changes to the current size of the industry. A 10% increase in population as a ratio of industry employment was found to increase the startup rate by around 10%. These figures suggest that the average firm size does not increase in response to a demand shock, but rather the surplus demand is met by new businesses. In this thesis I use a similar method to measure demand shocks, which I will expand upon in the next chapter.

Property taxes were found to have a strong negative impact on business creation (Bartik, 1989). Corporate taxes are levied as a percentage of profit and can be written off for past losses. However, property taxes are paid regardless of the financial health of a company. It generally takes small businesses several years to reach profitability, and they may own property for a period before there is any revenue. For these reasons property taxes are especially burdensome for new firms, and may be large enough to deter formation. As corporate taxes are only paid on the condition of profit they should have a lesser impact on business creation decisions. It is possible though that a higher corporate tax rate could decrease expected future profits enough to make entrepreneurs reevaluate their decision to open a business. A second hypothesis is that although state corporate tax rates make up a relatively small tax burden that they serve as a signal as to the business attitude of the state. States with higher corporate tax rates may be viewed as tough on businesses for other non-measurable reasons. Bartik found that higher per capita spending on fire services and education has a positive effect on business creation (a 1% increase in spending increases business startups by 1%). This suggests that higher taxes could be beneficial for business under specific conditions. Some types of spending, such as for policing, have no impact on startups, while welfare spending has a negative effect.

Financial markets create an entry barrier for businesses when it is difficult to access credit at a reasonable interest rate (Bartik, 1989). When it is difficult to borrow money a demand shock may lead to an increase in the size of existing businesses, with few new entries into the market. Bartik found that states that had

laws permitting statewide banking (the data is from the 1970s and 80s) had business creation rates 14% greater than states that only permitted regional banking.

Multiple papers have found that high unionization rates make a region a less favorable location for business owners (Bartik, 1989, and Gius and Freese, 2002). Strong union power can push wages above market rates, leading to work disruptions from conflict between union leaders and management. These issues are especially important for manufacturing firms, because the industry is highly unionized. Further, companies that are opening an additional plant can expect their workers to unionize in the manner that regional laws allow. Few start-ups, even in the manufacturing industry, will reach the critical size needed for their employees to unionize. For these reasons a study found that a 10% increase in the unionization rate decreases new plant construction by 30 to 40% (Bartik, 1985). However, a paper that focused on startups found that unionization was statistically insignificant (Bartik, 1989).

VIII. Tax Competition

There is ample evidence that countries compete to have the lowest tax rates. The worldwide open economy makes it easy for companies to relocate between countries to decrease their tax burden and maximize profits. Countries want to have a high tax rate to generate revenues, but they need to strike a balance so that companies do not relocate because of prohibitive tax burdens. Altshuler and Godspeend (2003) found that European countries compete with each other to have the lowest corporate taxes, but not for the lowest income tax. Companies are more concerned with the tax they pay on their profits, than the tax that their employees pay, so this is a logical action for countries to take. The same study found that following the Tax Reform Act

of 1986, European countries have treated the United States as a tax leader by changing their own rates in response to fiscal changes in the U.S. The Tax Reform Act of 1986 increased the corporate tax rate in the United States, which was soon followed by tax increases in European countries.

One strand of research on state tax rates has focused on competition with adjacent states to have the lowest rates and to offer tax incentives to attract major companies. Individuals often look to the tax policies of neighboring states to judge whether a tax change in their own state is reasonable or not. As 30% of gubernatorial defeats are due to tax policy, governors pay special heed to the fiscal policy of neighboring states (Beyle, 1983). Indeed, a study found that a one dollar increase in taxes in a state leads to a 50 cent increase in contiguous states (Case, 1993). This research focuses on how states look to their neighbors as an indicator for acceptable fiscal policy. It makes sense that Arizona would be more cognizant of the tax rates in California, than tax rates in Maine when making fiscal decisions. Charney (1983) found that companies relocating within the Detroit area were much more likely to choose a location close to their present location. Companies are more likely to consider relocation to a lower tax rate zone when the moving distance is small. This greater possibility of relocation provides a second incentive for states to compete with their neighbors on tax rates. To take these effects into account my thesis will pay special attention to the tax rates of contiguous states.

IX. Relationship of Taxation and Migration

There is some evidence that a high tax rate can induce migration to regions with lower tax rates. Feld and Kirchgassner (2001) examined labor and capital

mobility between the 26 cantons in Switzerland. The tax differentials between the cantons were shown to lead to labor migration between cantons, which are of a small geographic size. However, it is unclear if the migration occurs because companies first relocate (as cantons with low labor tax rates, generally also have low corporate tax rates), and then attract workers, or because people move to take advantage of lower labor taxes.

During the 1960s and 70s economic activity in the United States was transferred to south and southeast regions as the region's population grew disproportionately quickly. Much of this population growth was a result of migration from other regions within the United States. Some hypothesize that people moved to the region as a result of decreasing personal and corporate tax rates in the south, and increasing tax rates in the Mid-Atlantic. A regression analysis that looked at the relationship between tax rate changes and migration gave credence to this hypothesis (Newman, 1983). This paper, unlike others looking at business location choice, directly links tax rates to migration. It is possible that a low corporate tax rate may originally induce entrepreneurs to relocate to the region, and that this first wave of migration leads to an increase in employment opportunities that would attract a second, larger wave of migration. A high national unemployment rate would likely enhance the size of this migration phenomenon. The occurrence of relocation to a region with lower tax rates by people who had the intention of forming a business upon arrival provides an additional reason for why lower tax states would have higher rates of business creation.

In some states a high tax rate is justified by higher wages or other factors that contribute to the quality of living. However, if a state tax rate is out of line with wages people may migrate from the state to a region where they can enjoy a higher standard of living. Wallace (2002) found that in most regions of the country states with high tax rates enjoy higher than average wages. However, the states in the northeast have a wide variety of fiscal policies; for instance, people living in Vermont have a very different tax burden than those in Connecticut. For this region, a high personal tax rate is more likely to induce outward migration.

Vedder (2003) found that from 1990 to 2000 high tax states lost 890,000 people, while low tax states gained 2.05 million people as a result of domestic migration. High tax states were defined as the 25 states with the greatest personal tax burden. This trend continued from 2000 to 2002 with low tax states gaining 729,000 people from higher tax states. Further, a large percentage of this migration was to states with no personal income taxes. Vedder hypothesizes that a high personal tax rate is one factor that determines the quality of living for a region. An increase in taxes decreases the quality of living leading to outward migration.

This thesis examines how the rate of business creation per capita is affected by state taxes. The fact that taxes are causing people to migrate from high to low tax states does not by itself explain why an increase of the personal tax rate would decrease the business creation rate. When more people move to a state the business creation per capita rate only changes if these migrants have a special propensity or aversion for forming businesses. Slemrod (2004) found that high income individuals and retirees were especially likely to change their state of residence because of high

tax rates. High income individuals have more money to invest that they may choose to use in the community of their residence, and so may have an especially positive effect on business creation. Entrepreneurs are by definition business and profit minded. These individuals will likely pay special heed to how their incomes are affected by personal tax rates and may choose to move if they find the tax burden prohibitive.

In summary, a high tax rate can lead to decreased reported rates of business formation rate in at least five ways. One, it can lead to people supplying less labor and decreased motivation to form businesses, because of smaller expected profit. Two, the actual business formation rate can remain the same, but more companies will operate below the legal radar and will not be counted in official statistics. Three, companies may relocate to regions with lower tax rates or build plants in low tax regions. Four, entrepreneurs may decide to work as a salaried worker, rather than form a business if the corporate tax rate is prohibitive. Five, entrepreneurs may migrate to low tax regions before forming a business. The combination of these factors should lead to the tax rate having a significant effect on business creation.

Chapter 3

Survey of State Tax Rates

The first section of this chapter discusses some of the research on state taxes and then summarizes the current status of state tax rates. I then explore why states change their income tax rates, and how the motivation for these changes may affect research on tax policy and business creation. There is currently a surprising dearth of research on states tax rates. One of the reasons is that state tax rates are often considered too small in relation to federal tax rates to affect individual behavior. In this thesis I investigate this claim and find evidence to the contrary.

I. State Tax Rates

U.S. states established their right to tax labor and profits when Wisconsin added the first corporate and personal income taxes in 1911. Since then, each state has developed its own tax code and is free to tax each form of income at the rate and progressivity of its choice (see Figure 1 and Map 1 in Appendix C). Six states have no income tax: Nevada, Washington, Wyoming, South Dakota, Texas, and Florida. An additional six states have a flat income tax: Colorado, Illinois, Indiana, Massachusetts, Michigan, Pennsylvania, and Utah. The remaining states have progressive tax schedules with between two and six brackets. There are also large differences for the income where the top rate comes into effect- for some states it is only $9,000, while for others it is two million. Several states, such as Hawaii, California, and Oregon, have a top tax rate over 10%. Approximately one third of states have a marginal tax rate under four percent, another third have a rate between

four and six percent, and the remaining third has a rate over six percent. This variety in income tax provides an ideal dataset for studying the impact of tax rates on outcome variables, such as business creation and GDP growth. State tax rates are relatively small compared to federal rates. States within the U.S. have a shared culture, as well as similar economies with relatively comparable wealth. State borders are also unregulated allowing labor and capital flow freely though out the country. For these reasons it is advantageous to look at differences between states, rather than between countries, for deciphering the impact of tax rates.

The data on marginal state income rates used throughout the remainder of this thesis comes from the program Tax Simulation (TAXSIM) published by the National Bureau of Economic Research. To calculate the marginal tax rate the amount of statewide deductions is applied to total tax liabilities. Income is then increased by 1% and the tax is recalculated. The marginal tax rate is the ratio of this additional tax to the increase in income. The marginal tax rate does not accurately reflect the amount of taxes that state residents actually pay. An alternative way to calculate the tax rate is dividing total tax revenue by state GDP. This figure is the rate at which the average dollar earned within a state is actually taxed. On average only 35% of the marginal tax rate is actually collected with a standard deviation of approximately 10%. As most state tax codes are progressive, different income distributions can lead to variations among states in how much money is actually collected in relation to the marginal rate. Impoverished people generally pay no income taxes, so states that have more equal income distributions will generally collect greater revenues. Other

factors, such as special tax exemptions and tax avoidance behavior, also add variance to state revenues.

In 2010, $236 billion was collected in individual income tax at the state level, while $896 billion was collected at the federal level. The average U.S. citizen pays 26% of their income taxes to state authorities. Due to the variation in state tax rates, for some states this figure is close to 50%, while for others it is zero percent. Rational decision makers should take these differences into account when determining how many hours to work, where to live, and the cost benefits of tax avoidance.

For these reasons, the rate at which taxes are collected may be a better indicator of the tax burden. One concern with using the rate of tax collection is that revenues are positively cyclical with the state of the economy, while the marginal income tax is more stable. If dependent outcome variables are too strongly correlated with the tax revenues, results may be biased. For this reason I divide collected tax revenues by state GDP, which should correct for cyclicality if it is linear. It is likely, though, that it is not linear, and that as the economy grows, tax revenues grow at a faster rate. This effect will occur because individuals will be pushed up to higher tax brackets and for some people tax avoidance will no longer be worth the risk. For these reasons the coefficients of the tax rates are likely biased downwards when using tax revenues, and the negative impact of taxes is underestimated.

States levy a tax on corporate income earned within a state. These taxes are applied to any corporation that has sufficient connections in a state, even if it has international headquarters. For a company to be taxed by a state, a nexus has to be

met as defined by four tests. The tax cannot discriminate against interstate commerce; it has to be fairly assessed; there needs to be an equitable relationship between government services provided and the tax; and the corporation needs to have a physical presence in the state. These standards are interpreted differently on a state-by-state basis. Income from state corporate tax is distributed by using a formula that considers the property, payroll, and sales of all the corporations within each jurisdiction. Corporations that are headquartered within a state also pay taxes on nonbusiness income. Data on state corporate tax rates is from from the Tax Foundation.

Most states have a flat corporate tax rate, which averages 6.5%. Five states have no corporate income tax-Washington, Nevada, Wyoming, Texas, and South Dakota. Corporate tax is assessed on income after paying federal taxes. Iowa is the only state with a tax above 10%, with a corporate tax rate of 12%. After paying the 35% federal corporate tax, businesses in Iowa owe an additional 6.6% in taxes. The average state corporate tax after deducting the federal income tax is just under 4%. According to the IRS, on an aggregate level the 50 states collected $36.8 billion in corporate taxes in 2010, compared to $191.4 billion collected at the federal level. Corporations on average pay 20% of their taxes to state authorities. Note that this rate is greater than the marginal tax rate would suggest, due to tax credits and other accounting loopholes. Few corporations pay the full federal tax, while companies receive fewer subsidies from state governments. Although the majority of corporate taxes are paid at the federal level, the state tax burden is sufficient to affect business strategy. As two states may have as much as a 10% difference in their corporate tax

rate, profit maximizing entities will take this information into account when choosing a location.

There is some spatial correlation of tax rates between states located within the same region. I find that two states chosen at random have personal income tax rates that are on average 2.3% apart. Two contiguous states have a 2% difference in the personal income tax rate on average. The difference in the corporate tax rate between two contiguous states is 1.6%, while the difference between two randomly chosen states is 1.4%. The economic literature on this subject suggests that there is a correlation between tax rates between states, as states compete to have the lowest tax rate (Case, 1993). However, this comparison of randomly chosen and adjacent states suggests that there are minimal similarities in taxes between adjacent states, and that for the corporate tax rate that the correlation is even negative. This information is contained in Table 1.

II. Motives for State Income Tax Changes

Romer and Romer examined the cause of all federal tax changes since World War II (2012). They found that all changes in tax policy were motivated by one of four factors, which are: a budget deficit, a desire to stimulate the economy, structural changes in the economy, or a change in spending. I follow a similar approach to catalog all state tax changes between 1996 and 2005. During this period there were 28 significant changes in state tax rates, of which half were increases and half decreases. The most common impetus for a tax increase was to correct for budget shortfalls and the most common justification for a tax decrease was to stimulate the economy. In nearly half of these cases the tax change was preceded by a shift in

political power and was initiated by a newly elected governor fulfilling a campaign promise. Tax hikes and cuts are often predictable as they are preceded by campaign promises or lack of fiscal discipline. I find that some tax changes are rooted in economic conditions, while others are a result of politics.

From the data on marginal tax rates, I create a variable that measures the change in the tax rate for each state between two consecutive years. I then generate a list of all incidences (28 in total) between 1996 and 2005 when a state decreased or increased its tax rate by at least five percent; these were evenly split between tax cuts and tax hikes. Next, I examine the motives and conditions of each tax change, which are reported in Table 2. The next section discusses some of my findings.

The largest income tax change in one year was a 23% increase in Louisiana in 2003. This tax increase, however, was part of a plan to replace sales tax income with a higher personal tax income, so it did not increase the tax burden for the average individual. Only five states during the five year period increased taxes by more than 10% in one year. 10 out of the 14 tax increases occurred from 2001 to 2006, while 10 out of the 14 tax decreases occurred from 1996 to 2000. From 1996 to 2000 the national economy was growing at nearly 4% a year, which allowed states to decrease taxes without cutting spending. After 2000, the national recession counteracted this trend leading to states increasing taxes in order to avoid large spending cuts. Out of the 14 tax increases, seven were a result of a budget crisis. Two were part of tax reform plans that shifted how states collected money; four were designed to increase spending; and one was a result of a temporary tax decrease the following year.

A number of the states that had significant tax increases also had significant tax decreases. In the 1990s, the governor of New Jersey decreased taxes by 10% for three years as part of a campaign promise. This led to long-term budget shortfalls, forcing the state to increase taxes in 1997, 2000, 2003, and 2005. Colorado decreased taxes in 2000, because of large surpluses, but was forced to revert back to the old tax rate the next year. Virginia also experimented with a tax cut in 2004, but raised taxes by 11% the next year to increase spending. Delaware cut taxes in 1996, 1999, and 2000 as growth in its economy allowed the governor to decrease taxes without lowering spending. Six out of 14 of the tax cuts were a result of strong economic growth, seven were accompanied by spending cuts (and were generally the result of a campaign promise), and one was a result of unexpected revenues. The largest tax cut in any one year was 12.5%, instituted after Mike Huckabee was reelected as the governor of Arkansas as part of a campaign promise. At least five of the tax cuts later led to financial woes that were accompanied by either tax increases or spending cuts.

Conventional wisdom suggests that Democrats increase taxes and Republican cut taxes. 25 of the tax changes were initiated by the governor of the state, but in several cases they were legislated by the state senate or voted into law by the people (such as in Louisiana). In only one case was a tax change totally nonpartisan (the tax increase in Virginia in 2005). Tax changes were most often prompted by a shift in political power (as from a campaign promise by an elected governor or by one political party gaining power of the state Senate) or mandated by the economic conditions. Seven tax increases were initiated by Republicans and six by Democrats. However, three out four of the tax hikes that were made to increase spending were by

Democrats. Tax increases by Republicans were often preceded by tax drops that led to unbalanced budgets. Nine of the tax cuts were by Republicans and four by Democrats. Although this is a small sample size, the data suggests that Republicans are more likely to cut taxes, but just as likely as Democrats to increase taxes. During this 10 year period the number of Democratic and Republican governors was roughly equal.

Much of tax policy is the result of elections and politics, and qualifies as a relatively exogenous shock. In other cases though tax hikes are passed in order to make up for budget shortfalls or taxes are cut as a result of unexpected economic growth. For these reasons states with high taxes may be structurally different from states with low taxes. In chapter 5 I create a model to account for the existence of these differences.

Chapter 4

Determinants of Business Creation Using State Level Analysis

I. Background

In this chapter I examine industry growth as a function of state tax rates, based on a standard panel data analysis as done in Deutsch (1975), Chappell et al. (1990), Kessides (1990), MacDonald (1986), and Rosenbaum and LaMort (1992).[5] All of these papers, however, limited their analysis to manufacturing industries because this data was more readily available at a detailed level. The creation of the County Business Patterns dataset by the Census in 1986 has made it possible to look at any industry at an in depth level. Campbell looked at business formation at the state level for multiple industries using macroeconomic dependent variables (1996). He found that the average state tax rate, as defined by the sum of personal and corporate tax income divided by state GDP has a negative impact on business formation. The number of existing firms, percentage of people living in an urban area, unemployment rate and state GDP growth has a positive impact on firm creation, while higher hourly earnings were associated with lower business creation. I use a number of these same variables, but improve upon this approach by adding a variable to measure demand

[5] Most of these papers have limited their analysis to microeconomic variables, such as barriers to entry and profits. A paper by Deutsch examined business entry in 134 census defined industries in the period 1958 to 1963 (1975). The price-cost margins were found as a significant predictor of firm entry, while the growth in demand and industry diversification was insignificant. Papers by Chappell et al. (1990), Kessides (1990), MacDonald (1986), and Rosenbaum and LaMort (1992) also used a regression model of firm creation on microeconomic industry level variables.

shocks, extending the sample period (1998 to 2005), and separating the effects of different taxes.

Prior papers have defined business creation as the net change in the number of firms in an industry from one year to the next. It is important to note that this is distinct from the number of firm entries, as net entry is a product of firms both exiting and entering. I adopt this dependent variable in my thesis.

Changes in business creation for each sector in each state are influenced by how fast each sector is growing at the national level. When the demand for the goods provided by a sector increases, entrepreneurs will create firms to meet the excess demand. If all states are considered equal by entrepreneurs, and they all experience equal increases in demand, the national demand shock would be a perfect predictor of state business formation. As local economies differ from the national economy and because entrepreneurs consider regulatory variations between states, the national demand shock is an imperfect estimator. However, it provides a starting point for how fast an industry would grow in a specific state if it kept up with the national rate. All of the other independent variables in the regression measure the derivations from the demand shock.

The national demand shock is defined as the percent change in employment between two consecutive years for a specific industry. In economic literature this variable is sometimes referred to as a Bartik shock. The Bartik variable is often used to calculate how fast a local economy should grow as a function of the size of the industries that make up the economy and their national growth rates. Others have regressed business formation on the Bartik variable (e.g. Westhead, 1994), as I do in

this thesis. The formal definition of the Bartik variable is

$\frac{National\ employ_{t,j} - National\ employ_{t-1,j}}{National\ employ_{t-1,j}}$, where j is the sector.

In response to a positive demand shock entrepreneurs will form more businesses as the size of the market increases. For industries where the place of production is independent from the point of demand, there is a great deal of freedom in picking a location. Manufacturing meets this criterion as when transportation costs are not prohibitive (which they now rarely are), goods can be shipped to wherever demand exists. Thus, for these industry types entrepreneurs may consider regulatory differences between states and their prospective tax burdens when starting a business. Established businesses may choose to relocate to another state if taxes are too high to conduct business. When a business moves from state A to state B, this is recorded in the dataset as a business growth for state B and a business reduction for state A. In recent years, California has experienced an exodus of businesses, as the advantages of basing operations in the state, for some, no longer justifies the higher tax rates. A high tax rate can lead to a net business decrease by discouraging entrepreneurs and by scaring away existing firms.

Most corporations examine several states when deciding where to build a new plant. However, in practice most entrepreneurs only consider their current region as a possible site for their business. Further, some industries, such as retail stores and restaurants have no choice but to locate where customer demand exists (Schmenner, 1978). In these cases entrepreneurs are not directly including the tax rates of nearby states in their decision process. However, if they project that the tax rate is too high

and will decrease their profits below the breakeven level, they may decide not to form a firm, and instead pursue a job as a salaried employee.

The literature on taxes indicates that a high corporate tax rate will lead to a decrease in business formation. Historically countries with high tax rates have often experienced high growth rates (and subsequently high business formation rates), even though traditional economics suggests high tax rates should stymie growth. This suggests that high tax states may systematically differ from low tax states. To explain this paradox some authors have searched for alternative explanations of the role of tax rates. One strand of research focuses on how the corporate tax rate compares to the personal tax rate. Roger Gordon (1998) found that when personal tax rates are higher than corporate rates, entrepreneurs have a greater incentive to form businesses and organize them as a corporation. However, when personal tax rates are low, the opposite effect may hold true. An individual making $50,000 a year from his job may project that he could make the same amount by forming a business. If neither activity has a tax advantage it makes sense for him to continue in his salaried position. If however, corporate income is taxed at a lower rate, it may make sense for him to instead form a business (Although income from proprietorships is not taxed at corporate rates, the corporate tax rate may still influence entrepreneur behavior). In this way a high personal tax rate could encourage business formation, especially in the case that it is greater than the corporate rate.

II. Data and Methodology

Industries are divided into 21 broad groups by the North American Industry Classification System. Each of these industries, which range from mining to

manufacturing, is defined by a two digit code. NAICS also provides codes up to six digits long that corresponds to an increasingly more specific definition of an industry. For example, manufacturing (sector 31) includes 764 sub-industries. 311 refers to food manufacturing, 3112 is grain and oilseed milling, 31121 is flour milling and malt manufacturing, and 311212 is rice milling. The coding system makes it possible to define establishments by a sector code ranging from two to six digits depending on the specificity required. For this section I use four digit codes, as this generates a large number of observations, while also guaranteeing that there are a sufficient number of businesses within each sector to record meaningful change year to year.

The County Business Patterns dataset provides data on the number of businesses that fall within each sector at the national, state, and county level. This dataset has been published by the U.S. Census since 1986. This section of the paper focuses on changes in the number of establishments for each four-digit sector between consecutive years at the state level. One important thing to note is that this data records the number of physical establishments rather than the number of businesses. One business may operate multiple establishments, so could appear multiple times in this dataset. The data also includes the annual payroll and number of employees for each sector, and breaks down each sector by company size. The Bartik shock was calculated using the national version of this dataset by looking at the change in employment within each sector between two consecutive years.

In the regression analysis I add a fixed effect for each two digit sector code to adjust for the differences between sectors. I also run the basic regression equation for each of the 21 separate sectors. It is likely that each sector is influenced differently

by variations in tax rates and government imposed regulations. For example, a manufacturing firm may take the local minimum wage into account when building plants, while a finance company does not. Right to work laws, which weaken unions, should also have a greater impact on manufacturing firms. Some industries are more tied to location than others, and have less freedom when making location choices. Mining requires access to rare resources in the earth, so tax rates should have little impact on location. Some industries like healthcare are tied to a location by their clientele and are not easily substituted for alternative goods. On the other hand manufactured goods can be produced in nearly any jurisdiction, provided that there is a trained workforce available.

The Census suppresses data on employment and annual payroll to counter confidentiality concerns for sectors that contain below a certain number of establishments. The suppression of this data has no impact on my analysis, as these observations would be omitted from my analysis because they generally contain less than 20 establishments (and so the annual changes are overly volatile). Further, most of the suppression occurs for the more specific six-digit sector codes that are not used in this paper. Starting in 2007 the County Business Patterns adds random noise to the data as large as five percent to minimize disclosure concerns. This randomness makes it impossible to conduct precise analysis on annual changes; for this reason years after 2006 are not included in my analysis.

Taxes are used to fund services and investments that may make a state more attractive for job seekers and entrepreneurs. Although taxes pose a burden on business owners, if they are used to fund programs such as infrastructure

improvements, education, and policing, it is possible that they could have a net benefit for a state. In this section government is measured in two ways. The first looks at federal grants per capita that each state receives. The benefit of this method is that federal grants are independent of state taxes. The second method simply looks at state expenditures per capita.

The data on unemployment rates is from the Bureau of Labor Statistics. I use the unemployment rate at the beginning of each year, to ensure that it does have an artificially positive coefficient from reverse causation with business formation. Literature on the role of unemployment for business formation is ambiguous. One line of thought is that because most businesses are short lived entrepreneurs are more likely to experience unemployment shocks. Thus, when unemployment increases a disproportioned number of these people will have a propensity for starting a business. This theory was advanced by David Evans and Linda Leighton (1990) who looked at survey data of U.S. households in the 1960s. Others suggest that when people lose their jobs they turn to self-employment as an alternative. On average self-employment pays 10% less than a salaried job and has considerably more risk. When people lose their jobs they may be forced to turn to self-employment as a less desirable substitute. Risilia (2002) found a positive linear relationship between unemployment and firm formation by looking at national unemployment in Finland. Another paper confirmed these findings, but suggested that the relationship between firm formation and unemployment is non-linear, and that the rate of business creations starts to decrease when unemployment hits 20% (Hamilton, 1987). However, others disagree on the effect of unemployment. If unemployment is merely

a barometer of the strength of the economy and there are low rates of entrepreneurship for laid off workers the relationship may instead be negative. The literature on firm entry suggests that there is a positive correlation between unemployment and business formation. Papers by Highfield and Smiley (1987) and Hudson (1989) found that the unemployment rate is positively correlated with firm formation at a significant level.

The basic equation used in this section is:

$$\boldsymbol{Business\ formation = B_1(Bartik\ Shock) + B_2(Tax\ Rates) + B_3(Demographics)}$$

with fixed effects for year and sector. In the first form of the regression I cluster by state to account for regional correlations. In the second form I instead group states into regions and add a region fixed effect. Other papers that have looked at business creation using NAICS sector data have used the second approach. To my knowledge, this thesis is the first paper to cluster by state. In total there are 124,760 observations. This equation expresses the same basic theoretical approach as Campbell's paper with significant modifications to better capture the individual effects of taxes.

III. Discussion

The Bartik shock was a very strong predictor of business formation. A one percent increase in employment in a sector was associated with a .25% increase in business creation. The coefficient of income tax as calculated from collected revenue was significant at the one percent level in all cases, but varied in sign. When only variables for the tax rates were included as derived from collected revenue, the coefficient of the income tax was -.08 (regression one, table eleven). However, when the marginal tax was used instead the coefficient became slightly positive (Regression 2, Table 4). When the model did not cluster by states, the coefficient was always

negative, significant, and comparable to similar papers that did not cluster (Table 5). Bartik found that the coefficient of the marginal income tax rate was -2.7, which is 15% smaller than what I found. Campbell found that a one percent increase in taxes decreases the firm entry rate by approximately 2.6%, but as he combined the corporate and income tax rate, his results are not directly comparable. I then substitute the top personal tax rate for the marginal income tax rate as some papers found that the top rate has a greater impact on individuals' behavior. I found the top rate was significant at the one percent level, but the coefficient was only -.06. The variation in the significance and sign of the personal income tax rate makes it impossible to make any conclusions on it role in business creation. There is literature that suggests that a high personal tax rate boosts business creation because it alters the tax incentives for forming a business. This subject is further touched on in the next chapter.

When states are clustered a one percent increase in the corporate tax rate decreases business creation by 1.6 to 2.1% (Table 3). In Table 4 a fixed effect was added for each state, instead of using state clustering. For the region fixed effect analysis a one percent increase in collected corporate taxes is associated with a 4.7 to 8.6% decrease in business formation, which is significant at the one percent level. An increase in the corporate income tax deters business formation more than an equivalent increase in the personal income tax. However, the top corporate income and marginal corporate income rates are insignificant predictors of business formation.

State license, pension, and dividend taxes were also found to decrease business formation, while taxes on interest led to greater business formation, all significant at the one percent level. License taxes are levied on specific industries to ensure that employees and owners meet regulatory guidelines. These taxes are generally a lump sum, rather than a percent, so have a disproportionate effect on new business, especially for those that have negative profits. The amount of license taxes collected may also serve as an indicator of the amount of regulations in state, which may hamper business growth by additional means. For these reasons license taxes have a negative impact on business formation.

When an extra percent of state GDP is devoted to state expenditures, the business formation rate increases by .74% (significant at the one percent level). My findings suggest that if the corporate tax is raised by one percent and all of that money is used to increase state expenditures that business creation will decline by approximately one percent (rather than two percent from when the effect of government spending is excluded). If the corporate tax is raised by one percent the rate of business formation decreases by around three percent. Previous research suggests that state expenditures can have a negative or positive impact on business creation depending on how they are used. Some types of expenditures likely have a much greater impact on business formation, while others have a negative impact. By increasing spending that qualifies under the former, it is likely possible to design a tax increase that has a net benefit for business formation.

A state minimum wage of one dollar over the federal minimum wage decreases business formation by .45%. Many start-up businesses are in the retail,

manufacturing, or restaurant sectors, which generally pay employees at close to minimum wage. If entrepreneurs know in advance that they will have to pay their employees more, they will account for the effect on their expected profits, which will influence their decision of whether or not to form a business. Larger businesses benefit from economies of scale, and are better able to pay their employees higher wages. A higher minimum wage may lead to businesses growing in size to meet demand shocks, rather than the formation of new businesses.

The Small Business and Entrepreneurship Council releases annual rankings of how friendly states are towards small businesses. The rankings take into account 38 government-imposed costs including corporate taxes, gas tax, state tort liability cost, and paid family leave. Each state receives a cumulative score that is lower for more business friendly states. South Dakota received the lowest scored in the most recent rankings (28.6), while New Jersey was considered the last business friendly (86.8). For Regression 6, Table 3 the SBSI score was included to determine if it was an accurate predictor of state business attitudes. I find that an extra SBSI point decreases business formation by -.1%, which is significant at the one percent level. However, when only data from 1998 were included, it was insignificant.

Each sector has a varying amount of constraints when choosing business sites (as determined by how close production needs to be located to demand) leading to differences in how they are affected by tax rates. In order to isolate the factors that influence each sector, I re-ran the same basic regression equation for each sector individually (Tables 5 and 6). I found that seven industries had negative coefficients for corporate taxes significant at the one percent level, two were positive and

significant at the one percent level, and five were insignificant. Manufacturing, finance, retail trade, construction, administrative and support, science and technical, and educational have positive tax coefficients. The majority of these industries have minimal geographical ties to consumers of their goods. Although construction is location specific, construction companies are more likely to operate in the informal market and evade taxes when taxes are higher.

Mining, health care, management, real estate, and agriculture have insignificant corporate tax coefficients. Mining and agriculture are tied to a specific location as determined by the availability of natural resources. Further, both industries receive a large amount of tax subsidies. For these reasons these industries are not affected by corporate taxes. Demand for real estate, health care, and management are similarly inelastic to prices (and consequently tax rates) and substitutes are not readily available. Accommodations, food, arts and entertainment have positive tax coefficients. Both of these industries are made up of primarily luxury goods. It is possible that the coefficient is positive because richer states have slightly higher tax rates and also have greater demand for luxury goods.

The results suggest that corporate, dividend, pension, and license taxes have a negative impact on business formation. This effect is greater for industries for which there is greater elasticity to price and which are not limited to a specific location. The next chapter of the paper will further investigate the impact of taxes by comparing outcomes between contiguous counties that are on opposite sides of a state line.

Chapter 5

Determinants of Business Creation Using County Level Analysis

Adjacent counties share a number of unobservable factors, even when they are in different states. By directly comparing outcomes in paired border counties with different tax rates I find more compelling proof of the impact of tax rates on business creation. In this chapter, I match each county in the U.S. with the closest out of state county. I also add a dummy variable to indicate whether a county is on a state border or co-contiguous with a state border. This approach helps account for potential endogeneity problems.

I. Background

Several papers have taken advantage of the discontinuity between adjacent counties on opposite sides of state lines. The economists David Card and Alan Kruger were the first to investigate this topic in a paper examining the effects of New Jersey's increase in minimum wage (1994). They created a model to compare growth in the restaurant sector between New Jersey and Pennsylvania (which share New Jersey's longest border) after the minimum wage increased. After comparing outcomes throughout both states, they narrowed the Pennsylvania sample to counties along the New Jersey border. The counties geographically closer to New Jersey are more culturally and economically similar than the economies on the other side of Pennsylvania, so focusing on these groups helps isolate the impact of regulatory

changes. A regression based on this form of comparison found that the minimum wage has no impact on employment in the restaurant sector.

A paper by Huang outlines a more direct methodology to compare outcomes in contiguous counties (2008). The study compares economic outcomes for states after they deregulated banks. Historically states have limited the expansion of banks, and until the 1970s all states had restrictions limiting banks to geographic sections of a state. These restrictions were lifted at the state level starting in 1975 and ending in 1990, which some economists speculate led to higher growth. To test this hypothesis Huang used 23 borders consisting of a pair of two states each, where one state deregulated at least three years before the other. Each county along the border was paired with an adjacent county across the state border to generate 285 county pairs. The county matching process provides a treatment and control group that is highly homogenous and that likely share a number of unobservable factors. The author created a second group of control counties called the hinterland counties to measure spillover effects. These counties are adjacent to the border counties that were late to regulate, but are on the same side of the border (and are separated from the border by one county). The hinterland counties are also each matched to a border county. I adopt the term hinterland in this section to refer to counties co-contiguous with a state border.

Huang devised a difference-in-differences methodology to compare GDP growth between the control and treatment groups during the period when both states were regulated and after one state was regulated. For banking regulation there are only two possible outcomes -- a state is regulated or deregulated. In this thesis, I

examine the impact of state tax rates, which can have a large number of different values. I am less interested in changes over time (although I will include these) than the absolute differences in taxes across borders. For these reasons the methodology in the remainder of Huang's paper diverges from what is possible to replicate in the context of state tax rates.

A third paper examines the role of state regulatory differences in determining the location of manufacturing activity by comparing outcomes across borders where one state has right to work laws and the other does not (Holmes, 1998). Right to work laws weaken the power of unions by prohibiting union security agreements that make it mandatory to join unions. Holmes argues that beyond the direct effects of a right to work law that these laws also serve as an indicator that a state is pro-businesses, while the lack of a right to work law indicates a state is anti-business. Counties are classified by the distance of their population centroid from the closest state border. Pro and anti business states were separately grouped into four buckets depending on their distance from the border (0-25, 25-50, 50-75, and 75-100 miles). Holmes next found the mean growth rate and share of manufacturing activity for each group. A large discontinuity exists at the border with an indexed growth rate of 100.7 on the pro-business side and 62.4 on the anti-business side. As one moves further away from the pro-business border the manufacturing growth rate decreased, while the growth rate increases as one moved further from the anti-business border. This methodology was replicated comparing outcomes across each border separately. Out of the 17 state borders where one state is pro business and the other is anti business, 15 have higher manufacturing growth on the pro business side. Next, a simple

regression model was run of the manufacturing share on a dummy variable for a county being pro business. The results also suggest that manufacturers are more attracted to states with right to work laws.

Huang and Holmes excluded counties from the eleven western states in the U.S. The reason for doing this is that the counties in the west are often drawn unevenly compared to the counties in the east and as a result it is difficult to match them into county pairs. Further, these counties are geographically large and sparsely populated. For these reasons I also exclude these states.

II. Methodology

The first section of this chapter replicates the methodology from Chapter 4 with several modifications. The new model is at the county level, rather than the state level. In Chapter 4, business formation was by sector, as well as by year and geographical unit. As each county is a relatively small area, business formation is not divided by sector. Instead I look at total business formation in each county for all sectors between two consecutive years. I made this modification because at the county level there are not enough businesses within most sectors to provide meaningful data on changes between years. The sector level data also contain white noise to protect the confidentiality of businesses. The model contains 10 years of data, stretching from 1996 to 2005.

There is a large variation between states in the number of businesses per capita and in business formation rates. Smaller, more urban states tend to have fewer businesses per capita as denser states experience greater economies of scale. Vermont has .037 businesses per capita, while Tennessee has only .019 businesses

per capita. On average, there are .024 businesses per capita in the U.S. Delaware has the fastest business creation rate at 4.3%, while West Virginia has a business creation rate of only .35%. Some states, like Delaware, advertise their tax code as friendly to corporations, attracting out of state entrepreneurs. Tables 7 and 8 contain information on business per capita and business creation rates for all states.

The basic equation used in this section is:

$$\boldsymbol{Outcome\ variable = B_1(Taxes) + B_2(Regulatory\ Variables) + \beta_3(Macroeconomic\ Variables) + B_4(Demographic\ Variables)}$$

with year fixed effects and clusters by state. Business creation is not the only variable that is influenced by the tax rate. I add several other outcome variables that economists have suggested are affected by taxes. These variables include GDP growth, employment growth, and per capita GDP.

Each county in the U.S. was paired with its closest county on the opposite side of a state line. Thomas Holmes produced a dataset that contains the population center of each county in the United States as defined by a pair of latitude and longitude coordinates. I use the Stata program distmatch to match each county with its closest county in the next state (Wada. 2009). The program was also used to find the distance between each county pair. After finding the closest county to each county in a neighboring state, I add the adjacent personal and corporate tax rate to each observation. There is a complete list of county pairs in Appendix A. There are 2950 counties in the U.S. after removing the 11 western states. 1004 of these are border counties and 763 are hinterland counties.

The Census publishes a dataset called the U.S. City and County Book on a semi-regular basis. Data on demographics and the number of farmers, manufacturers, and bankers per capita are from this source. As the book is only published in 10 year increments, the data are all from the year 2007. The demographics of a region are relatively constant over a short period, so this should not have a major impact on the results.

Variables were added to model the structural employment makeup of a county, as these variables are often included in growth equations. Different sectors grow at different rates, so if a county has a large percentage of its employment in low-growth sectors, such as farming or manufacturing, it will have lower growth prospects. The predicted impact of including bankers per capita is ambiguous. This variable is a proxy for the number of banks in a county, and thus the access to capital. Therefore, it is possible that counties with more bankers will provide more credit to borrowers, which will fuel growth. However, economies with more bankers are generally more developed. As economies become more advanced their growth slows, because they approach their long term steady growth state.

Another set of variables captures the demographics of a county. The percentage of people of working age measures the percentage of productive members in a county, who contribute to growth. The average education is measured by the percentage of high school graduates. Per capita GDP and the percentage of people below the poverty line are used to adjust for differences in wealth. Finally, variables are added for the percentage of African-American and Latino individuals, as well as males, in a county. Table 9 contains a correlation matrix of key variables.

III. Discussion

The first regression is of business formation on tax rates using all counties in the sample (which over 10 years is 29500 observation). The corporate and income tax rates are non significant predictors of business formation, unlike in Chapter 4 (Table 10). Next, I reran the regression only including border counties. It is possible that taxes only have a major effect when one has access to lower tax rates. For border counties a one percent increase in the corporate tax decreases business creation by 1.6 to 2.2%, which is significant at the one percent level (Table 11). When the data were clustered by state the general model was a weak predictor of GDP growth, per capita GDP, employment growth, and businesses per capita and taxes were a non significant predictor of outcomes (Tables 12 and 13). When regional fixed effects were used instead of clusters the model was significant with signs in the predicted direction. The results generated by using regional fixed effects are located in Appendix B. The corporate and personal income tax rate of the adjacent state was not significant.[6]

[6] For the regional fixed effect analysis the income tax was a non significant predictor of per capita businesses, growth in wages, and employment change. The income tax was a significant predictor of business formation; however, it had a positive coefficient ranging from 4.5 to 8.7. As previously described, there are papers that suggest that a higher personal income tax increases business formation, because it shifts the trade off incentive of working as a salaried employee versus starting a business. It is unclear though why for the regression model at the state level in chapter two that the coefficient was negative. A variable was also included that measured the change in the marginal income tax rate between the current year and the previous year. The change in the tax rate was negative and significant for all dependent variables except businesses per capita. As businesses per capita is not a change, but a level that is the product of a large number of years there is no reason that is should be affected by the change in tax rates in the previous years. The results suggest that while the level of the income tax rate does not affect growth in wages or employment changes, and positively effects business creation, that a change temporarily hurts an economy. Due to the lack of the significance of the personal income tax rate level, this negative impact is likely short-lived.

The results suggest that a state with right to work laws has as much as 30% greater business formation rates than states that offer greater protections for unions. This could be an overestimation of the effect of right to work laws, as most of the states that have them are regionally grouped in the southern United States. Many of these states have had fast growth rates over the last 20 years, but it is unclear that causation exists. As hypothesized, the minimum wage decreases business formation rates (a dollar premium over the federal minimum wage decreased business formation by 10%). When the dependent variable is switched to the change in employment, the negative effect of a state minimum wage was even greater, albeit only significant in one out of two cases. These results contradict those from the paper by Card and Krueger.

My results from this section suggest that the corporate tax has an adverse impact on business creation, but only when the analysis is limited to border counties. This suggests that it is not the level of the corporate tax that affects business creation, but the proximity to a closer tax. This effect can exist for three reasons. First, businesses on the low tax side of the border may have a competitive advantage from larger profit margins that allows them to outperform businesses on the high tax side. Second, individuals on the high tax side may form businesses on the low tax side instead of in their home state. Third, the tax rate could serve a signal for how business friendly a state is. There may be other regulatory factors that are correlated with the tax rate that also influence business creation.

It is also possible that states are not the best geographic unit for clustering. I found that adjacent counties on opposite sides of state borders have an average

difference in per capita GDP of $2,977, while adjacent counties in the same state have an average difference in per capita GDP of $2,640 (randomly chosen counties have an average difference of $5,548). This difference is marginal, especially when considering that the distance between population centers of adjacent counties on opposite sides of a state border was 21 miles, while the average distance is only 16 miles for adjacent counties in the same state. These facts suggest that at least for per capita GDP there is not a large discontinuity when crossing a state border. As state borders are more of a physical than an economic division, clustering by state may not be totally appropriate.

IV. Comparison of Adjacent Counties

I now compare outcomes of adjacent counties along state borders. I find the mean for a number of outcome variables for counties grouped into buckets by distance from state line and their comparative tax rate. The means were weighted by the population of counties. Counties with a corporate tax rate lower than their neighbor and within 25 miles of a state line have an average business creation rate of .93% (Tables 14-16). Counties with a corporate tax rate higher than their neighbor and within 25 miles of a state line have an average business creation rate of only .61%. As one moves further away from a border in a high tax state this rate increases, while as one moves further away from a border in a low tax state this rate decreases. When one only considers state borders where there is a two percent difference in the corporate tax rate, the differences in business creation are even greater. A high tax state within 25 miles of the state line has a business creation rate of only .28%. Despite these differences high and low tax states have nearly identical rates of

business creation when all counties are included. This fact suggests that it is not the high tax rate that is inhibiting business creation, but the opportunity to form a business across a state border where the tax is lower. Figure 3 displays the discontinuity in business creation rates for the 100 miles on either side of a border where there is a tax differential of at least two percent.

The number of businesses per capita did not vary with changes in the distance from the border or the tax rate. This variable is a result of business creation over a county's entire history, while the corporate tax rate changes more frequently. It is also possible that a county reaches an equilibrium point for businesses per capita and that annual changes only have a marginal effect on annual levels. The personal income tax rate was also found to have no effect on business creation rate. This finding is consistent with the regression analyses.

The summary statistics only offer a rough way to estimate differences in outcomes for counties on opposite sides of tax borders. It is possible that what I am capturing is a result of regional spatial correlations. One problem with the previous methodology is that I am not directly comparing adjacent counties, but rather the mean of all adjacent counties. An alternative way to compare border counties is to subtract the business creation rate in county A from the business creation rate in the adjacent county B that is across a state line. The advantage of this technique is that it compares adjacent counties, rather than aggregate mean outcomes along state lines. The average difference in business creation rates between two random adjacent counties is zero, as the difference between counties can either be positive or negative (and for each positive difference there has to be an equal negative difference). I find

that for counties with a corporate tax rate greater than the corporate tax rate of the adjacent county that the business creation rate from the low tax county subtracted from the business creation rate from the high tax county is indistinguishable from zero. This same procedure is replicated just using borders where there is a large difference in corporate tax rates between two states. When the corporate tax rate differential is at least one percent the business creation rate is on average .026% higher on the low tax side, when the corporate tax rate differential is at least two percent the business creation rate is on average .058% higher on the low tax side, and when the corporate tax rate differential is at least three percent the business creation rate is on average .076% higher on the low tax side (Table 17). This comparison suggests that not only does the distance from a border matter, but also the magnitude of the differnce in the corporate tax rate when crossing the border. I also regressed the business creation rate on a dummy for a border county with a higher corporate tax rate than its adjacent out-of-state county, with clustering for state and year fixed effects (Table 18). The regression is run four times; each time the dummy variable is redefined for a different corporate tax rate border differential (for the last regression the dummy is for border counties with a corporate tax rate four percent greater than their neighbors). After adjusting for year and region, high tax border dummies have even lower business creation rates compared to their low tax neighbors.

The evidence from comparing adjacent counties is consistent with the results from the OLS regressions. I offer one additional technique for comparing border county pairs. I design a regression equation that is a modification of the one developed by Holmes, with an equation of:

$$\boldsymbol{Business\ creation = B_1(High\ tax\ border\ dummy) + B_2(Low\ tax\ border}$$

$\boldsymbol{dummy}) + \boldsymbol{B_3}(\boldsymbol{High\ tax\ hinterland\ dummy}) + \boldsymbol{group\ fixed\ effects},$

with year dummies. In this regression only border and co-contiguous border counties are included. These counties can be classified in four ways: high corporate tax border county, high corporate tax hinterland county, low corporate tax border county, and low corporate tax hinterland county (Map 3 in Appendix C clarifies the definition of border and hinterland counties). Hinterland counties are included to provide a second control group. These counties may have spillover effects from their relative proximity to the state border, but are not in direct contact with a tax border. Each set of four counties (one of each type), where each county is contiguous with one or two other counties in the group, is sorted into a group. The number of county groups is equal to the number of border county pairs. A fixed effect is then added for each group. This fixed effect is an addition to the regression equation developed by Holmes. It creates a baseline for how each group of counties should be growing and captures unobservable factors that are shared regionally. This method is used to correct for spatial correlations.

Before running a regression including the fixed effect, I run a simple regression of business creation on a dummy variable for whether a county has a lower tax than the closest out-of-state county. Without correcting for spatial correlation I find that the business creation rate for a low tax county is 23% greater than for a high tax county (Table 19). Next, I add a fixed effect for each group of contiguous counties (Regression 1, Table 20). I find no significant difference for the high tax or low tax border dummy. Next, I redefine the dummy variable to only include borders where the corporate tax rate changes by at least two percent. There is greater incentive for businesses to account for taxes at borders where there is a larger

difference in the corporate tax rate between both states. About 40% of border county pairs have corporate tax rates that differ by at least two percent. The low tax border dummy variable now has a coefficient of .12, and the high tax border dummy variable has a coefficient of -.05, both significant at the 10% level (Regression 2, Table 20). The high tax hinterland dummy variable is insignificant. These results provide some evidence that business creation in border counties is adversely affected by high corporate tax rates, while hinterland counties are unaffected. As one moves farther away from a state border the difference in business creation rates between a low and high tax state starts to equalize. Like the earlier regressions, these results support the theory that high corporate tax rates lower business creation. It is likely that tax policy is endogenous with the economic conditions of a state. In this case high tax states may be systematically different from low tax states. I correct for this potential problem by comparing adjacent counties across state borders that share unobservable characteristics. By comparing differences in border and hinterland counties I also shed some light on how high taxes inhibit business creation, which is discussed at greater lengths in the conclusion.

Chapter 6

Elasticity of Marginal Tax Rate and Tax Revenue

An across-the-board 10% decrease in the tax rate does not necessarily correspond to a 10% increase in the marginal tax rate. This is because the marginal tax rate is also a product of tax credits and write-offs that remain the same or are changed unevenly during tax reform. For example, a 15% tax cut in Iowa in 1998, decreased the average marginal rate by 9.45%. A 10% tax cut in New Jersey decreased the marginal tax rate by 11%, while a 10% tax cut in Minnesota decreased the marginal rate by only 8%. The relationship between the marginal tax rate and collected revenue is even more ambiguous. When taxes increase, tax avoidance behavior also increases, decreasing the rate at which taxes are collected. In this section I explore this relationship by running a rough regression of the rate at which taxes are collected on the marginal tax rate.

Traditionally economists thought that the reduction in reported incomes in response to a tax increase was a result of a decrease in labor supply. Recent research has further found that when personal income taxes increase, individuals shift their incomes to other forms, such as corporate or deferred compensation (Slemrod, 1998). The incentive to shift income is especially large when different forms of income are taxed at different rates. The Tax Reform Act of 1986 disproportionally decreased taxes on higher earners. As a result, there was a large increase in reported income for top earners who shifted taxable income from corporate profits. Companies that are organized as partnerships or proprietorships may choose to reorganize as a

corporation in response to a personal income tax increase so that their income is taxed at corporate rates. An increase in the personal income tax rate thus may have the indirect effect of boosting corporate tax incomes. Studies have also shown that the income of individuals in the top tax bracket is especially elastic to tax changes. These individuals take greater advantage of tax credits and exemptions to decrease their tax burden.

In the case that individuals are able to predict a tax increase they may make changes to ensure that they realize more income in the year before the tax increase takes effect. A number of papers found that the timing of taxable income was shifted in response to the tax increases on high earners promised by Bill Clinton during his presidential campaign (Parcell, 1995 and Feenberg, 1996). If tax changes were easily predictable tax incomes could decrease in the year after a tax hike. This problem would be greater for progressive tax systems that place a larger burden on the rich, as these individuals are more attune to the tax code and more able to temporally shift their income. My review of state tax changes found that a number of tax changes are predictable as they are a result of changes in political power or compounding state budget deficits. Further, a number of tax decreases and increases are later reversed as a result of shifts in political power or changing economic conditions. If individuals predict that tax hikes will later be reversed, they may defer income until the tax cut is realized. State taxes are more volatile than national taxes, so this effect would be more dominant at the state level.

Feenberg and Poterba (1993) found that the income reported by the top one percent closely follows the top marginal top rate. The income reported by the top one

percent started to increase in 1981 when top marginal tax rates started to decline. Reported income jumped higher between 1986 and 1988, during the time when top tax rates were again decreased by the Tax Reform Act of 1986. Throughout this period the reported income by the next highest nine percent of earners steadily increased at a linear rate. This evidence strengthens the claim that elasticity of reported income to a tax increase is different for the top one percent than for other individuals. Saez, Slemrod, and Giertz (2009) found, by comparing Treasury tax returns, that elasticity of income to tax rates for the top one percent was .6 in the early 1980s. After the Tax Reform Act, the elasticity increased to 1.36, and after the 1993 tax reforms it was .45. Throughout this period the elasticity for the other 99% of individuals was around 0.

I devise a rough method to determine how state tax income responds to tax reforms. States are divided into three groups of approximately equal size by their marginal tax rate. The low tax states have taxes under 4%, the middle tax states have taxes 4-6%, and the high tax states have taxes 6-8%. Next I ran a simple regression of collected revenue on the marginal tax rate from the period 1996 to 2005 with one observation for each state in each year. The regression equation has the form, $\frac{\boldsymbol{TR}}{\boldsymbol{GPDP}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}(\boldsymbol{MT})$, where TR is total revenue over state GDP and MT is the marginal personal income tax rate. The paper by Saez, Slemrod, and Giertz used reported income, rather than collected tax revenue. This method uses collected revenue in place of reported income as these data are more readily available. As collected tax revenue is a direct function of reported income this change should not influence the results. For states with low taxes the coefficient was .44, while for

middle and high tax groups it was .32, all significant at the one percent level. Because a state with marginal tax rate of zero collects no taxes the intercept was approximately zero. These results suggest that low tax states are able to capture a higher percentage of taxed income. When taxes increase above a certain level individuals may find the risk of getting caught not paying taxes worth the monetary reward of not paying them. Figure 4 plots the marginal tax rate against collected revenue as a percentage of state GDP for all states from 1996 to 2005. From this graph, it is evident that while states with higher marginal tax rates collect more revenue, there are diminishing returns to increasing taxes.

The marginal tax rate was then separated into parts to determine how changes in the tax code affect revenues. The first part is equal to the marginal tax rate the previous year. The second part is equal to the change in the marginal tax rate between the current year and the previous year. Note that both of these variables sum to the current tax rate. This equation has the form

$$\frac{TR}{GPDP} = \beta_0 + \beta_1(MT) + \beta_2(MT\ in\ year\ t - MT\ in\ year\ (t-1)).$$

If individuals treat an increase in the tax in the same way that they treat the existing tax rate, the coefficients on both should be the same and equal to the coefficient of the marginal tax rate from the original regression. However, this was not the case. The tax rate from the previous year was significant at the one percent level and equal to the coefficient of the current marginal tax rate for all tax groups. The change in the tax rate was not significant for the states with taxes greater than four percent. This finding suggests that a tax increase or decrease does not increase revenues the year following the increase. The results can be found in Tables 21 through 23.

This same procedure was replicated for two, five, ten, and fifteen years before the current year. For each regression the dependent variable is collected revenue and there are two independent variables that add up to the current marginal tax rate. The second variable always measures the change in the tax rate over t number of years, while the first variable is the tax rate t years ago. One would expect that as t becomes greater that the coefficient of the second variable should approach the coefficient of the marginal income tax, which was found in the initial regression. For states with a tax below 4%, this was the case starting 10 years after the initial tax change. The coefficient of the tax change over the last 10 years was .27, while the coefficient of the tax rate ten years ago was .42. When the regression was rerun with t equal to 15 the coefficient of the tax change was .36, while the coefficient of the tax rate ten years ago was .43. These findings suggest that even 15 years after a tax change, the new tax is not collected at the rate of the older established tax.

States that have lower taxes are more responsive to tax changes as a tax hike is less likely to trigger tax avoidance behavior. Middle and high tax states do not collect any greater revenues in response to an increase in the marginal tax rate. In fact, for the regressions where time was equal to two years, the coefficient of the tax change was negative and significant at the one percent level. The marginal tax rates from 10 and 15 years ago remained strong predictors of how much tax money was currently collected. High tax states are less responsive to a tax change than lower tax states.

The lack of response in tax revenue to tax changes could either be a result of a decrease in income or an increase in behavior to avoid taxes. I test the hypothesis

that income decreases in response to a tax increase with a rough regression. The equation is:

$$\boldsymbol{\Delta GDP\ growth\ from\ year\ t\ to\ (t-1) = \beta_0 + \beta_1(\Delta MT\ from\ year\ t\ to\ (t-1)).}$$

The dependent variable compares how GDP growth changes from GDP growth in the previous year in response to a change in the marginal tax rate. The coefficient of β_1 was approximately zero and not significant. This implies that an increase in a state personal income tax does not lower income, but does trigger behavior designed to decrease ones' tax burden. These results are in Table 24.

One criticism of this line of research may be that because the marginal tax rate can move in either direction, changes over a 15 year period may not accurately reflect changes in the tax rate over this period. For example, if the rate increased for 14 years and was then dramatically decreased in the 15th year so the net tax change was zero, the previous movement in the tax rate is not reflected in the data. This problem is partially countered by rerunning the same regression for a number of different years. I also compare the percentage of the marginal tax rate that is collected between states that increased taxes over the last five years and states that decreased taxes over the last five years. States that increased taxes have an average tax rate of 5.3%, while states that decreased taxes have a statistically identical average tax rate of 5.4%. However, the states that increased taxes collected taxes at a rate that was only 48% of the marginal tax rate, while states that decreased taxes collected taxes at a rate that was 61% of the marginal tax rate. These results are found in Table 25.

The Laffer curve is a graph of the relationship between government revenue and tax rates that has an inverted u shape. At both extremes -- a tax rate of 0% and a tax rate of 100% --government revenues are postulated to equal zero. The theory

suggests that a point exists at which raising taxes further is counterproductive as revenues will actually decrease. Revenues decrease beyond a certain tax rate because it is no longer worthwhile for people to work as much and there is greater incentive to misreport income. The Laffer curve is notoriously hard to directly predict, but there is some evidence of its existence. Tax revenues increased by 4.2% a year when the top federal income tax bracket in the U.S. was decreased from 73% to 24% between 1921 and 1929 (Romer, 2012). Some economists have created models to predict the revenue maximizing rate, but estimates range from 34% to 65% (Pecorino, 1995, and Hsing, 1996).

There is evidence that the revenue maximizing tax may be much lower for states than at the national level. One reason why this may be the case is that it much easier for companies and people to relocate capital or labor to another state than to another country. The diversity in tax rates between the 50 states and their shared national identity also provides an ideal natural experiment for finding the maximum of the Laffer curve. Stinesprin (2009) found that from 1996 to 2002 the revenue maximizing corporate tax rate was around nine percent, but since then has declined to seven percent. Prior to 2002 eight states taxed above the optimal rate, but the decrease in the optimal rate meant that, in 2007, 22 states taxed on the right side of the Laffer curve. For these states the high tax rate decreases investment, so that the state paradoxically generates less money than if it lowered the corporate rate. Further, the prohibitive tax rates likely lead to business relocation to regions with lower tax rates. The Laffer curve offers an alternative method for measuring the negative impacts of a high corporate tax rate.

The methodology from this section does not offer a way to directly find the revenue maximizing tax rate, but suggests that it is may be quite low. The evidence suggests that states with taxes greater than four percent do not enhance revenue from taxes increases. States with higher taxes do collect greater revenues. However, the research from this chapter suggests that it may take over 15 years for a tax increase to boost state coffers. Additional research on this subject could help elucidate the Laffer curve for state personal income taxes. One last thing to note is that just because the coefficient of the tax change is not significant does not mean that a state does not gain any income from a change in the tax rate. A state may experience increases in collected corporate taxes, as a result of income shifting.

The corporate tax rate changes less frequently than the personal income rate. This makes it difficult to replicate my analysis for the corporate tax. The politicization of corporate tax policy, and the tendency for tax rates to change immediately following elections, suggests that in some cases that tax changes are a result of the economic conditions in a state.

Chapter 7

Discussion and Conclusion

By comparing outcomes in adjacent counties I find that high tax counties have lower rates of business formation than low tax counties, but similar rates of GDP growth. Out of all 502 county pairs across the 10 year sample period, 54% of the time the low tax county had more businesses per capita than the high tax adjacent county. When counties were limited to those with at least a one percent difference in the corporate tax rate, 59% of the low tax counties had more businesses per capita. The same procedure was repeated just using counties within 25 miles of the border. In this case, 62% of counties had more businesses per capita than their high tax pair. These results strongly suggest that low tax states have more businesses per capita.

One mystery is why the corporate tax rate has a negative effect on business formation, but not on GDP growth. There is a .35 correlation between businesses per capita and GDP growth, but only a .11 correlation between business growth and GDP growth. A possible explanation is that high taxes favor growing a business in size over starting a new one. This would be the case if taxes were a greater burden for young, small businesses. Income taxes are assessed on profits, so new businesses that are not yet profitable do not pay any income taxes. Some taxes, such as property and license taxes, are not based off of profits, and are often correlated with income tax rates. Further, larger businesses benefit from economies of scale that raise their profit rates. Every company needs to make some level of break-even profits to stay in business; small firms may find the state tax rate makes it noticeably harder to meet

this goal. Although high tax rates may not lead to businesses going bankrupt, it is likely they lead to individuals avoiding forming companies in the first place. This effect is accentuated when a high corporate tax rate is accompanied by other onerous regulations.

It is important to make a distinction between the levels and growth of a variable. The results from Chapter 5 suggest that the tax rate is not a significant determinant of businesses per capita. In fact, there is a small negative correlation between the level and growth of businesses per capita. Business formation may decrease after it passes a certain level and approaches a steady growth state. All of the states over the last 10 years had a positive rate of business formation, but is it possible, in the future, that equilibria will be reached, as the rate of entering firms approaches the rate of exiting firms. The large variation in businesses per capita between states suggests that this equilibrium point varies regionally, and may be a product of the shared culture of a state and its population density. This long term equilibrium level is likely only marginally affected by tax rates. Tax rates change over time, while the number of businesses per capita is a result of potentially hundreds of years of business creation. For these reasons business formation is more responsive to the tax rate than businesses per capita. The tax rate is likely more important in regions that are experiencing high rates of population growth than in more settled regions that are closer to equilibrium.

States provide a number of services that make it easier to conduct business and that increase the quality of life of a region. Businesses need laws that guarantee the safety of their property, roads to transport their goods, police and fire safety, and

in some cases an educated workforce. To a lesser extent businesses benefit from defense and health care spending. On the other hand, studies have found that welfare spending shrinks the labor force leading to a net negative effect for businesses (Bartik, 1989). In Chapter 4, I included state expenditures per capita in my model for predicting business formation. I found that an extra dollar of state spending increases business formation by .74%. A tax increase may actually be beneficial for business formation. It would not make sense for legislators to design a tax rate to maximize business creation (as other outcomes, such as jobs and GDP are more important), but it would be possible to spur business formation, while raising taxes.

In Chapter 3, I find that changes in the personal income tax do not correspond to higher rates of revenue. One potential criticism of this analysis is that taxes are often raised when the economy is performing poorly. Tax revenues may decrease because GDP contracts and not because of greater tax avoidance behavior. The fact that GDP growth is not influenced by tax rate changes helps rebuke this line of criticism. This phenomenon persists 15 years after a tax change, further suggesting the failure of states personal income tax hikes to increase tax revenue. An increase in the personal income tax rate may, however, increase corporate or capital gain tax revenues as people shift the source of income. Although this result may sound outlandish, the little research on the subject suggests that the state revenue maximizing tax is less than 10%. The state revenue maximizing tax could be much lower than the federal revenue maximizing tax (which is generally estimated at over 50%), because of the ease in moving income and labor across state borders.

In the fifth chapter I use a methodology based on papers by Huang (2008) and Holmes (1998) to exploit the discontinuity that exists at the border of two states. After matching adjacent counties I add a fixed effect for each group of a high tax border county, low tax border county, high tax hinterland county, and low tax hinterland county. Each group of four counties should share unobservable characteristics as a result of their common location. I then ran a regression to measure how high tax counties diverge from this baseline. This procedure offers additional support that high tax counties have lower rates of business creation. It also helps corrects for the possibility that tax rates are endogenous with the economic condition of a state. This is the first paper to use this form of analysis. Some of the analysis derived from matching adjacent counties has potential uses in other contexts. Adjacent border counties are a useful tool for analysis as they share unobservable characteristics from their proximity, but have different treatments applied to them by their respective state governments. Studies on the effects of other forms of government regulations that vary among states could benefit from using this approach.

The majority of businesses in the U.S. are legally organized as corporations. The exact percentage varies by industry; 80% of manufacturing companies are corporations, while only 60% of agricultural companies are corporations. Business income from sole proprietorships is taxed at the personal income rate, instead of at the corporate tax rate. Throughout this thesis this distinction was largely ignored, as the data does not exist to separate business creation into components by how companies are organized. It is likely though that business formation rates for

corporations drop by greater than two percent when the corporate tax increases by one percent, while for sole proprietorships the business rate is unaffected (or even rises). When the state corporate tax rate is lower than the personal income tax rate, more individuals may choose to form proprietorships than other business types to lower their expected tax burden. Starting in 2008 the County Business Patterns has released how many businesses fall under each form of legal organization for each sector at the country level. However, this data is not yet available at the state level. An alternative hypothesis is that the corporate tax rate serves as a signal for the business friendliness of a state. In this case a higher corporate tax rate may be accompanied by other onerous regulations that discourages creation for all business types. If this were the case a high corporate tax rate may be associated with lower rates of business creation for corporations, as well as sole proprietorships.

This thesis has several implications regarding discussions on tax policy. A ten percent raise of the marginal personal income tax rate will not raise revenues by ten percent. My results suggest that some states may already be close to their revenue maximizing tax rate. States with higher taxes do collect more revenue; however, an increase in the tax rate does not appear to increase revenues. For this reason, other forms of taxes, such as the sales tax, may provide a better way to generate revenues that incomes taxes. A state with a corporate tax of six percent has a business creation rate that is on average 1.8 to 2.2% lower than a state with a corporate tax of five percent. Other regulations, such as right to work laws and state minimum wages, are also associated with lower rates of business creation. A governor that wanted to spur business creation would cut corporate taxes and raise the personal income tax rate.

In this way, revenue-neutral tax reform would incentivize individuals to form businesses. Tax reforms that increased revenues (and subsequently spending), while keeping the corporate tax rate constant, may also increase the rate of business spending. The results from Chapter 3, suggest that an extra dollar of government spending may increase business creation by .74%. The literature suggests that not all forms of spending are equal; a dollar spent on policing or education is more beneficial than money spent on welfare.

A governor considering a change in the corporate tax rate should also consider the tax policy of neighboring states. If the corporate tax is higher in neighboring states, it may make sense to raise the corporate tax. However, if the corporate tax is already higher than in neighboring states, it makes more sense to lower the corporate tax and look for other revenue sources. My research suggests that it is more important to consider how a tax compares with the tax in adjacent states, than with the average state tax in the U.S. A state with a high percentage of its population within 50 miles of a state border may do better following the tax policy of its neighbors. A state with only a small percentage of its population near borders can operate more independently.

In Chapters 1 and 2 I suggest several mechanisms for how corporate tax rates may inhibit business creation. In Chapter 5 I present evidence that business creation rates are comparably lower in the border regions of a high tax state, than in the interior. This evidence is consistent with the theory that businesses and entrepreneurs planning to launch a business may choose to relocate to a state with lower tax rates. When deciding to relocate one needs to balance the expected increase in profits from

paying a lower tax rate with the costs of relocating. It costs money to relocate a company and scout for viable location. Further, a business owner may put a premium on his current location for quality of life reasons. As a result it is cheaper to relocate to a nearby city, than to a faraway region. Relocation is especially cheap when an individual can keep his current home, while moving his business across a state border. An alternative explanation is that companies in border regions are in direct competition and that businesses on the low tax side have a competitive advantage. This competitive advantage from paying a lower tax rate, translates to higher profits, and a greater chance that the business will survive in the long term. In Chapter 2 I summarize literature that suggests that tax avoidance could bias business creation rates as high tax rates lead to tax avoidance behavior that may affect official data (as business operating at the legal fringe are unlikely to be counted in the Business Patterns Survey). There is no viable explanation for why tax avoidance would occur at greater rates near state border. For this reason I can reject tax avoidance as a primary cause for lowering business creation rates.

Chapter 3 Tables

Figure 1: Variation in Personal Income Tax Rates for 50 States

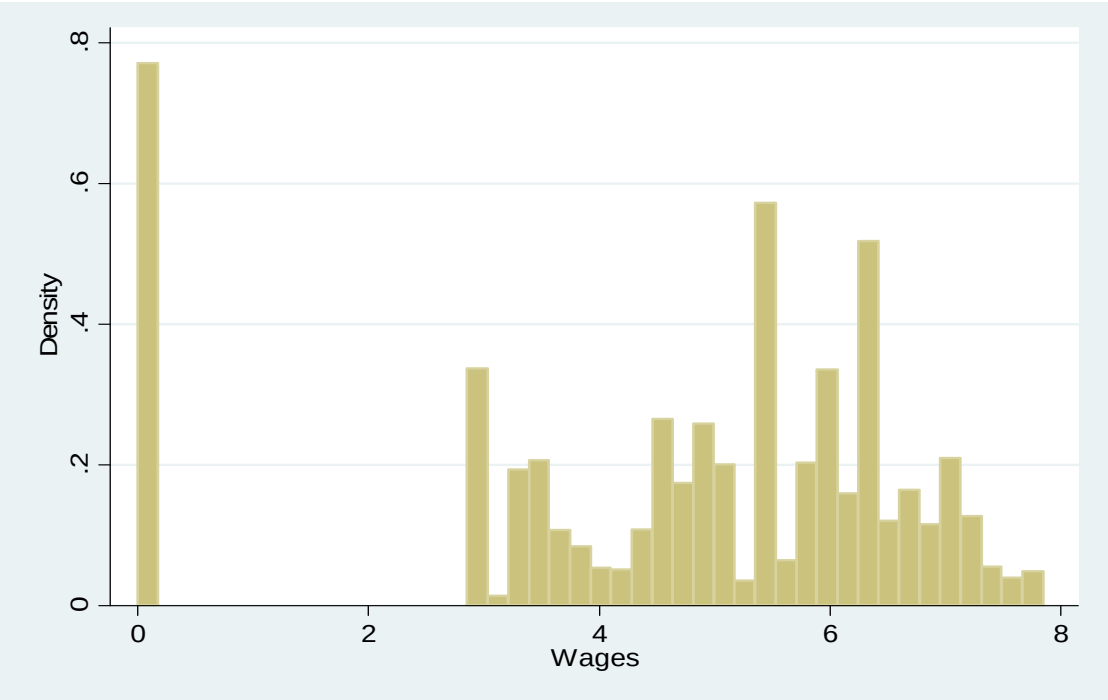

Figure 2: Variation in Corporate Tax Rates for 50 States

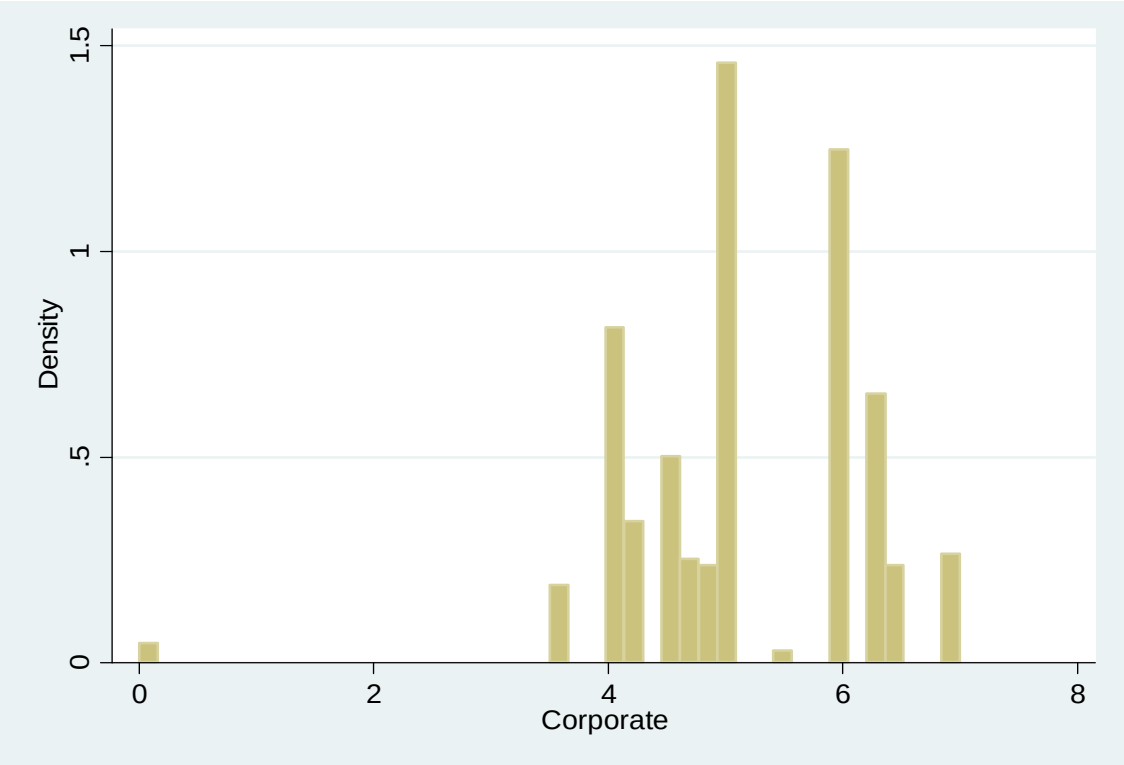

Table 1: Spatial Correlation of Tax Rates

Average Diff in Tax Rates:	Personal	Corporate	Property
Btwn Two Contiguous States	1.99	1.55	4.63
Btwn Two Randomly Chosen States	2.31	1.37	6.25

Table 2: Motivations of Tax Changes

State	Year	% Change	Tax rate	Party	Motivation
Louisiana	2003	23.48%	4.26	R	The Stelly Plan was pushed by a Republican representative as a revenue neutral plan replaced sales tax with income tax on middle and high earners.
Arkansas	2002	19.41%	6.89	R	Supported by a Republican governor as a partial solution to a budget shortfall.
New Jersey	2003	15.76%	4.48	D	Taxes increased by Dem governor to correct revenue shortfall from previous tax cuts.
Virginia	2005	11.43%	5.36	D/R	Compromise between Repub senate and Dem governor to fund increased spending.
Pennsylvania	2004	10.54%	3.25	D	Tax hike proposed by Democratic governor as a way to increase financing for public schools, decrease property taxes, and stimulate the economy.
New Jersey	2000	9.86%	4.01	R	Taxes increased by governor to correct revenue shortfall from previous tax cuts.
Colorado	2003	9.66%	5.45	R	Taxes increased by governor as a result of national recession.
Ohio	2001	9.00%	5.45	R	Taxes increased by Republican governor to increase revenues during recession.
New Jersey	2005	8.28%	4.71	R	Taxes increased by Dem governor to correct revenue shortfall from previous tax cuts.
Virginia	2002	6.70%	5.73	D	Income tax increased in north Virginia by Dems to fund education and transportation.
New Jersey	1997	6.47%	3.62	D	Taxes increased by governor to correct revenue shortfall from previous tax cuts.
Colorado	2001	6.34%	4.36	D	Taxes were reduced temperarily in the previous year to reduce surpluses.
Virginia	1997	5.59%	5.48	R	Taxes decreased on poor and increased on rich by Republican governor.
Nebraska	1997	5.35%	5.91	D	Taxes increased by Democratic governor.
Arizona	1997	-5.07%	3.56	R	Republican governor cut taxes as economy grew.
New Mexico	2004	-5.91%	5.89	R	Taxes decreased by Republican governor as a plan to decrese spending.
New York	1997	-5.92%	6.36	R	Taxes cut by Republican governor on middle and upper class as economy grew.
Delaware	2000	-7.10%	4.71	D	Taxes cut by Democratic governor as economy expanded. Spending was not cut.
Colorado	2000	-7.45%	4.1	D	Taxes decreased to reduce surpluses that were a resuls of an earlier tax hike.
Delaware	1996	-8.15%	5.75	D	Taxes cut by Democratic governor as economy expanded. Spending was not cut.
Minnesota	1999	-8.16%	7.09	R	Taxes decreased by Republican governor by 10% later leading to financial woes.
Iowa	1998	-9.45%	4.79	R	Taxes decreased by 15% by Republicans after they gained control of the Senate.
Delaware	1999	-10.90%	5.07	D	Taxes cut by Democratic governor as economy expanded. Spending was not cut.
New Jersery	1996	-11.23%	3.4	R	Decreased as part of a campaign promise to decrease taxes 10% for 3 years.
Hawaii	1999	-11.45%	7.89	R	Republican governor decreased taxes putting state into financial crisis.
Virginia	2004	-11.90%	4.81	D	Taxes decreased by Democratic governor.
New Mexico	2005	-12.22%	5.17	R	Taxes decreased by Republican governor as a plan to decrese spending.
Arkansas	2003	-12.48%	6.03	R	Republican governor cut taxes as part of a campaign promise.

Chapter 4 Tables

Table 3: Business Creation with Clusters by State

VARIABLES	(1)	(2)	(3)	(4)	(5)
Bartik	0.25***	0.25***	0.23***	0.24***	0.23***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Income Tax Rate (Collected)	-0.08***			-0.35***	0.75***
	(0.012)			(0.014)	(0.015)
Corporate Tax Rate (Collected)	-1.72***			-2.12***	-1.61***
	(0.147)			(0.145)	(0.148)
Marginal Income Tax		0.04***			
		(0.006)			
Corporate Tax		-.15			
		(0.111)			
Top Personal Income Tax			0.23***		
			(0.006)		
Top Corporate Income Tax			-0.84***		
			(0.008)		
Income Tax Adjacent				-0.66***	
				(0.014)	
Corporate Tax Adjancet				0	
				(0.017)	
Unemployment Rate					0.14***
					(0.021)
Per Capita GDP					0.16***
					(0.004)
GDP Growth					-0.07***
					(0.010)
Right to Work					-4.18***
					(0.041)
State Minimum Wage					1.23***
					(0.033)
Expenditures Per Capita/					1.69***
Per Capita GDP					(0.051)
Grants Capita					-1.52***
					(0.310)
SBSI					-0.13***
					(0.008)
Constant	-2.88***	-4.41***	0.83***	2.29***	-10.22***
	(0.339)	(0.336)	(0.321)	(0.350)	(0.384)
Observations	124,740	124,740	124,740	124,740	124,740
R-squared	0.28	0.28	0.33	0.29	0.34

Table 4: Business Creation with Region Fixed Effects

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Bartik Shock	0.21***	0.15***	0.23***	0.21***	0.22***	0.23***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Income Tax (from revenue)	-1.17***			-1.05***	-1.44***	-1.06***
	(0.045)			(0.046)	(0.048)	(0.053)
Corporate Tax (from revenue)	-4.71***			-4.50***	-8.06***	-7.34***
	(0.991)			(0.997)	(0.996)	(1.105)
Marginal Income Tax		-3.14***				
		(0.083)				
Corporate Tax		3.15				
		(0.082)				
Top Personal Tax			-0.06***			
			(0.012)			
Top Corporate Income Tax			-0.03			
			(0.022)			
Unemployment Rate				-0.05**	-0.70***	-0.49***
				(0.021)	(0.027)	(0.028)
Per Capita GDP				-0.33***	-0.85***	-0.65***
				(0.017)	(0.021)	(0.023)
GDP Growth				0.06***	0.07***	0.03***
				(0.008)	(0.008)	(0.008)
State Minimum Wages				-0.44***	-0.45***	-0.45***
				(0.094)	(0.095)	(0.094)
State Gov Expenditures/Capita					1.88***	1.74***
					(0.050)	(0.051)
Grants/Capita					-2.66***	-2.52***
					(0.192)	(0.195)
License Taxes						-0.06***
						(0.001)
Pension Taxes						-1.32***
						(0.036)
Dividend Taxes						-0.26***
						(0.036)
Interest Taxes						0.74***
						(0.048)
SBSI Ranking						-0.11***
						(0.018)
Constant	5.31***	-1.90***	-1.16***	16.38***	27.20***	26.51***
	(0.370)	(0.262)	(0.319)	(0.722)	(0.646)	(1.011)
Observations	155,122	183,138	155,122	155,122	155,122	155,122
R-squared	0.47	0.38	0.47	0.47	0.48	0.49

Table 5: Regressions with Data Grouped by NAICS Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
VARIABLES	Agric ulture	Mining	Const ruction	Manu facturing	Retail Trade	Finance	Real Estate	Science and Tech	Manage ment	Admin & Support	Educ ational	Health Care	Arts and Entertain	Accom & Food
Bartik	0.57***	0.16***	0.41***	-0.06***	-0.10***	0.13***	0.27***	0.26***	1.13***	0.28***	0.36***	0.22***	0.22***	0.30***
	(0.061)	(0.038)	(0.007)	(0.009)	(0.006)	(0.010)	(0.018)	(0.006)	(0.179)	(0.005)	(0.015)	(0.010)	(0.009)	(0.010)
Income Tax	**0.34**	**0.13**	**0.13****	**-0.38*****	**0.60*****	**0.06**	**-0.1**	**-0.38*****	**-0.19**	**-1.70*****	**-1.21*****	**-1.96*****	**-0.52*****	**0.32*****
	(0.392)	(0.434)	(0.065)	(0.053)	(0.045)	(0.074)	(0.121)	(0.055)	(0.309)	(0.043)	(0.082)	(0.040)	(0.025)	(0.041)
Corporate Tax	**-6.11**	**1.8**	**-2.51*****	**-1.76*****	**-2.50*****	**-2.46*****	**-1.37**	**-9.32*****	**-0.31**	**-2.77*****	**-25.85*****	**-0.17**	**1.19****	**1.50*****
	(3.854)	(3.829)	(0.426)	(0.615)	(0.456)	(0.585)	(0.914)	(0.432)	(1.882)	(0.482)	(0.406)	(0.488)	(0.531)	(0.357)
Unemployment	-0.26	0.41	0.04	1.13***	-0.20***	-0.02	0.50***	-0.01	-0.45	-1.23***	-0.19**	-1.65***	0.36***	0.66***
	(0.298)	(0.309)	(0.058)	(0.034)	(0.052)	(0.072)	(0.111)	(0.045)	(0.318)	(0.032)	(0.075)	(0.038)	(0.051)	(0.045)
Per Capita GDP	-0.02	0.26***	0.14***	0.11***	0.03***	0.03*	0	0.12***	-0.07	-0.02*	0.27***	-0.23***	-0.16***	0.05***
	(0.081)	(0.085)	(0.011)	(0.011)	(0.009)	(0.015)	(0.023)	(0.012)	(0.064)	(0.012)	(0.015)	(0.011)	(0.011)	(0.005)
GDP Growth	0.14	0.06	-0.02	0.38***	0.45***	0.05	0.13**	0.23***	-0.01	-1.18***	0.63***	-1.52***	0.32***	-0.12***
	(0.169)	(0.155)	(0.028)	(0.025)	(0.021)	(0.042)	(0.056)	(0.030)	(0.143)	(0.020)	(0.033)	(0.016)	(0.032)	(0.024)
Constant	-1.71	-11.34**	-6.65***	-8.52***	-7.34***	-1.41	-2.38*	-1.70***	5.1	19.88***	-4.26***	33.36***	4.10***	-5.44***
	(4.574)	(5.002)	(0.688)	(0.503)	(0.548)	(0.894)	(1.339)	(0.634)	(3.804)	(0.532)	(1.053)	(0.628)	(0.520)	(0.408)
Observations	223	291	4,675	15,061	13,498	3,767	2,083	7,839	181	13,480	5,249	19,391	8,346	6,606
R-squared	0.31	0.11	0.44	0.15	0.12	0.05	0.1	0.47	0.25	0.57	0.76	0.44	0.12	0.22

Table 6: Summary of Corporate Tax Coefficients by Sector

NAICS Code	Sector	Corporate Tax Coefficient	% of Companies in Sector that are Corporations
61	Educational	-25.85***	47.03%
54	Science and Technical	-9.32***	73.15%
56	Administrative and Support	-2.77***	71.17%
23	Construction	-2.51***	72.40%
44-45	Retail Trade	-2.50***	77.73%
52	Finance	-2.46***	72.99%
31-33	Manufacturing	-1.76***	81.24%
72	Accomodations and Food	1.50***	64.98%
71	Arts and Entertainment	1.19**	56.09%
21	Mining	1.8	76.79%
62	Health Care	-0.17	55.78%
54	Management	-0.31	73.15%
53	Real Estate	-1.37	65.97%
11	Agriculture	-6.11	60.84%

Chapter 5 Tables

Table 7: Businesses per Capita by State

Businnesses Capita	State	Per Capita GDP	GDP Growth	Business Creation
0.37	VT	$27,695	0.49%	0.66%
0.34	ND	$26,547	0.56%	1.25%
0.34	SD	$27,397	0.52%	0.87%
0.32	ME	$27,261	0.46%	1.89%
0.31	NH	$32,830	0.39%	1.52%
0.30	IA	$27,312	0.45%	0.84%
0.29	RI	$30,205	0.45%	1.04%
0.29	CT	$45,759	0.44%	0.37%
0.29	ID	$20,687	0.22%	2.73%
0.28	MA	$37,217	0.49%	2.45%
0.28	KS	$28,741	0.41%	0.90%
0.27	NY	$34,825	0.41%	1.08%
0.27	NE	$28,117	0.48%	1.85%
0.27	DE	$30,958	0.44%	4.30%
0.27	MN	$32,094	0.48%	2.33%
0.26	NJ	$36,622	0.46%	0.53%
0.25	LA	$24,551	0.45%	1.35%
0.25	WI	$29,187	0.42%	1.29%
0.24	MO	$24,504	0.42%	1.35%
0.24	WV	$22,568	0.39%	0.35%
0.24	OH	$28,104	0.36%	0.85%
0.24	PA	$29,722	0.41%	1.59%
0.23	IL	$31,706	0.39%	0.96%
0.23	MI	$28,882	0.33%	0.95%
0.23	MD	$34,142	0.48%	1.90%
0.23	FL	$26,232	0.51%	3.43%
0.23	AR	$23,253	0.40%	1.67%
0.23	AL	$25,414	0.48%	1.92%
0.22	KY	$23,707	0.44%	0.90%
0.22	IN	$27,639	0.36%	0.55%
0.22	VA	$29,657	0.46%	2.13%
0.22	OK	$24,432	0.48%	1.08%
0.22	UT	$21,318	0.39%	4.29%
0.21	MS	$23,937	0.44%	1.22%
0.21	NC	$27,389	0.40%	2.33%
0.21	SC	$24,546	0.41%	2.49%
0.19	TX	$29,724	0.43%	2.62%
0.19	TN	$28,359	0.40%	0.83%

Table 8: Business Formation by State

Business Creation	State	Businnesses Capita	Per Capita GDP	GDP Growth
4.30%	DE	0.27	$30,958	0.44%
4.29%	UT	0.22	$21,318	0.39%
3.43%	FL	0.23	$26,232	0.51%
2.73%	ID	0.29	$20,687	0.22%
2.62%	TX	0.19	$29,724	0.43%
2.49%	SC	0.21	$24,546	0.41%
2.45%	MA	0.28	$37,217	0.49%
2.33%	MN	0.27	$32,094	0.48%
2.33%	NC	0.21	$27,389	0.40%
2.13%	VA	0.22	$29,657	0.46%
1.92%	AL	0.23	$25,414	0.48%
1.90%	MD	0.23	$34,142	0.48%
1.89%	ME	0.32	$27,261	0.46%
1.85%	NE	0.27	$28,117	0.48%
1.67%	AR	0.23	$23,253	0.40%
1.59%	PA	0.24	$29,722	0.41%
1.52%	NH	0.31	$32,830	0.39%
1.35%	LA	0.25	$24,551	0.45%
1.35%	MO	0.24	$24,504	0.42%
1.29%	WI	0.25	$29,187	0.42%
1.25%	ND	0.34	$26,547	0.56%
1.22%	MS	0.21	$23,937	0.44%
1.08%	OK	0.22	$24,432	0.48%
1.08%	NY	0.27	$34,825	0.41%
1.04%	RI	0.29	$30,205	0.45%
0.96%	IL	0.23	$31,706	0.39%
0.95%	MI	0.23	$28,882	0.33%
0.90%	KY	0.22	$23,707	0.44%
0.90%	KS	0.28	$28,741	0.41%
0.87%	SD	0.34	$27,397	0.52%
0.85%	OH	0.24	$28,104	0.36%
0.84%	IA	0.30	$27,312	0.45%
0.83%	TN	0.19	$28,359	0.40%
0.66%	VT	0.37	$27,695	0.49%
0.55%	IN	0.22	$27,639	0.36%
0.53%	NJ	0.26	$36,622	0.46%
0.37%	CT	0.29	$45,759	0.44%
0.35%	WV	0.24	$22,568	0.39%

Table 9: Correlation of Key Variables

	Per Capita GDP	GDP Growth	Business Formation	Business/ Capita	Employ Growth	Wages Growth	Sales Tax	Income Tax	Corp Tax
Per Capita GDP	1.00								
GDP Growth	0.10	1.00							
Business Formation	0.11	0.12	1.00						
Businesses/Capita	0.35	0.07	-0.05	1.00					
Employment Growth	0.07	0.13	0.34	-0.02	1.00				
Wages Growth	0.06	0.18	0.27	-0.01	0.79	1.00			
Sales Tax	0.14	-0.03	0.03	0.01	0.01	0.00	1.00		
Income Tax	-0.01	-0.05	-0.04	0.05	-0.03	-0.04	0.57	1.00	
Corporate Tax	-0.05	0.04	0.02	-0.11	0.00	0.00	-0.10	-0.22	1.00

Table 10: Determinants of Business Creation for All Counties

VARIABLES	(1)	(2)	(3)	(4)
Marginal Income Tax	-0.24	0.24	0.21	0.53*
	(0.476)	(0.430)	(0.396)	(0.288)
Corporate Tax	-0.75	-0.94	-0.4	-0.48
	(0.993)	(0.875)	(0.830)	(0.797)
Income Tax Change		-4.51	-8.84	-5.23
		(8.112)	(8.007)	(6.573)
Bankers Capita		-200.74***	-191.65**	-98.6
		(69.673)	(89.435)	(84.590)
Manufacturers/Capita		-19.36	-12.89	-50.39***
		(18.923)	(13.529)	(10.647)
Farmers/Capita		-0.63***	-0.57***	-0.48***
		(0.115)	(0.105)	(0.077)
Right to Work			0.98	-0.93
			(2.681)	(2.418)
State Minimum Wage			-0.36	0.16
			(1.703)	(1.996)
% Working Age				-0.08
				(0.105)
% Black				0.77
				(5.382)
% Latino				16.66*
				(8.271)
Males				-23.26*
				(12.501)
Poverty				-1.31***
				(0.260)
High School Graduate				-0.41***
				(0.137)
Per Capita GDP		0.99***	1.20***	0.54**
		(0.216)	(0.206)	(0.255)
Constant	23.15***	10.15	2.76	89.33***
	(5.866)	(8.276)	(8.316)	(19.413)
Observations	29,068	22,060	16,744	16,744
R-squared	0.08	0.17	0.22	0.25

Table 11: Determinants of Business Creation for Border Counties

VARIABLES	(1)	(2)	(3)	(4)
Marginal Income Tax	0.33	0.82	0.74	0.69
	(0.453)	(0.552)	(0.495)	(0.510)
Corporate Tax	-2.17***	-2.21**	-1.59*	-1.62*
	(0.674)	(0.946)	(1.125)	(1.132)
Income Tax Change		-3.77	-9.98	-8.58
		(7.120)	(10.933)	(11.169)
Bankers Capita		-328.86***	-294.08***	-232.54**
		(85.796)	(85.693)	(87.749)
Manufacturers/Capita		-30.62	-35.62**	-47.28***
		(18.774)	(16.224)	(14.398)
Farmers/Capita		-0.50***	-0.43***	-0.38***
		(0.098)	(0.084)	(0.083)
Right to Work			-3	-3.74
			(2.615)	(2.987)
State Minimum Wage			1.28	1.16
			(2.330)	(2.767)
% Working Age				0.04
				(0.110)
% Black				9.54
				(7.144)
% Latino				10.93
				(15.665)
Males				18.94**
				(8.200)
Poverty				-1.12***
				(0.367)
High School Graduate				-0.19
				(0.231)
Per Capita GDP		1.02***	1.24***	0.66**
		(0.262)	(0.226)	(0.292)
Constant	27.13***	16.27*	10.42	30.67
	(4.131)	(8.500)	(8.877)	(21.956)
Observations	8,969	6,777	5,007	5,007
R-squared	0.05	0.12	0.14	0.15

Table 12: Determinants of GDP Growth for Border Counties

VARIABLES	(1)	(2)	(3)	(4)
Marginal Income Tax	0	0	0	0
	(0.006)	(0.005)	(0.004)	(0.004)
Corporate Tax	0	0.01	0	0.01
	(0.009)	(0.009)	(0.009)	(0.009)
Income Tax Change		-0.12**	-0.04	-0.07
		(0.058)	(0.111)	(0.118)
Bankers Capita		-2.02*	-1.78	-2.51**
		(1.126)	(1.114)	(1.053)
Manufacturers/Capita		-0.81***	-0.73***	-0.49***
		(0.179)	(0.167)	(0.117)
Farmers/Capita		0.00**	0.00**	0
		(0.001)	(0.001)	(0.001)
Right to Work			0.03	0.04
			(0.030)	(0.027)
State Minimum Wage			0	0
			(0.026)	(0.029)
% Working Age				0
				(0.001)
% Black				-0.35***
				(0.073)
% Latino				-0.46**
				(0.180)
Males				-0.08
				(0.101)
Poverty				0.03***
				(0.005)
High School Graduate				0
				(0.003)
Per Capita GDP		0.01***	0.01***	0.02***
		(0.004)	(0.003)	(0.006)
Constant	0.41***	0.19	0.22*	-0.36
	(0.078)	(0.120)	(0.118)	(0.317)
Observations	8,969	6,777	5,007	5,007
R-squared	0.12	0.16	0.17	0.2

Table 13: Determinants of Businesses per Capita for Border Counties

VARIABLES	(1)	(2)	(3)	(4)	(5)
Marginal Income Tax	0.47	0.45	0.44*	0.3	0.19
	(0.540)	(0.531)	(0.259)	(0.288)	(0.218)
Corporate Tax	-0.95	-1.09	-0.6	-0.63	-0.18
	(0.666)	(0.670)	(0.427)	(0.405)	(0.375)
Income Tax Change		-1.15	-1.22	2.14	1.68
		(1.626)	(1.247)	(2.451)	(1.947)
Bankers Capita			288.52***	224.44***	206.35***
			(63.936)	(59.292)	(51.096)
Manufacturers/Capita			-1.27	-4.19	10.59
			(10.242)	(8.522)	(6.256)
Farmers/Capita			0.36***	0.36***	0.35***
			(0.065)	(0.074)	(0.068)
Right to Work				0.2	0.34
				(1.655)	(1.331)
State Minimum Wage				-1.19**	0.73
				(0.532)	(0.636)
% Working Age					-0.10***
					(0.026)
% Black					-12.07**
					(4.559)
% Latino					-8.43
					(12.136)
Males					(4.020)
					(3.974)
Poverty					0.64***
					-0.214
High School Graduate					0.39***
					-0.09
Per Capita GDP			0.40***	0.45***	0.44***
			-0.087	-0.089	-0.135
Constant	27.19***	31.47***	11.01***	11.24***	-22.17**
	-4.301	-5.753	-3.021	-2.945	-9.4
Observations	8,969	8,969	6,777	5,007	5,007
R-squared	0.03	0.04	0.33	0.35	0.45

Table 14: Differences in Business Creation with Distance from State Lines for Low and High Corporate Tax States

	Distance (Miles)	Business Creation	Businesses/ Capita
Low Tax State	75-100	0.44%	0.13
	50-75	0.44%	0.13
	25-50	0.40%	0.13
	<25	0.47%	0.13
High Tax State	<25	0.31%	0.12
	25-50	0.35%	0.13
	50-75	0.38%	0.12
	75-100	0.38%	0.13

Table 15: Differences in Business Creation with Distance from State Lines for Border with at least 2% Corporate Tax Difference

	Distance (Miles)	Business Creation	Businesses/ Capita
Low Tax State (2%< Than Neighbor)	75-100	0.33%	0.12
	50-75	0.42%	0.13
	25-50	0.44%	0.13
	<25	0.41%	0.13
High Tax State (2%> Than Neighbor)	<25	0.14%	0.12
	25-50	0.15%	0.12
	50-75	0.24%	0.11
	75-100	0.27%	0.11

Table 16: Differences in Business Creation with Distance from State Lines for Low and High Income Tax States

	Distance (Miles)	Business Creation	Businesses/ Capita
Low Tax State	75-100	0.35%	0.12
	50-75	0.36%	0.12
	25-50	0.37%	0.12
	<25	0.37%	0.13
High Tax State	<25	0.40%	0.12
	25-50	0.42%	0.12
	50-75	0.43%	0.12
	75-100	0.43%	0.12

Figure 3: Discontinuity at Border

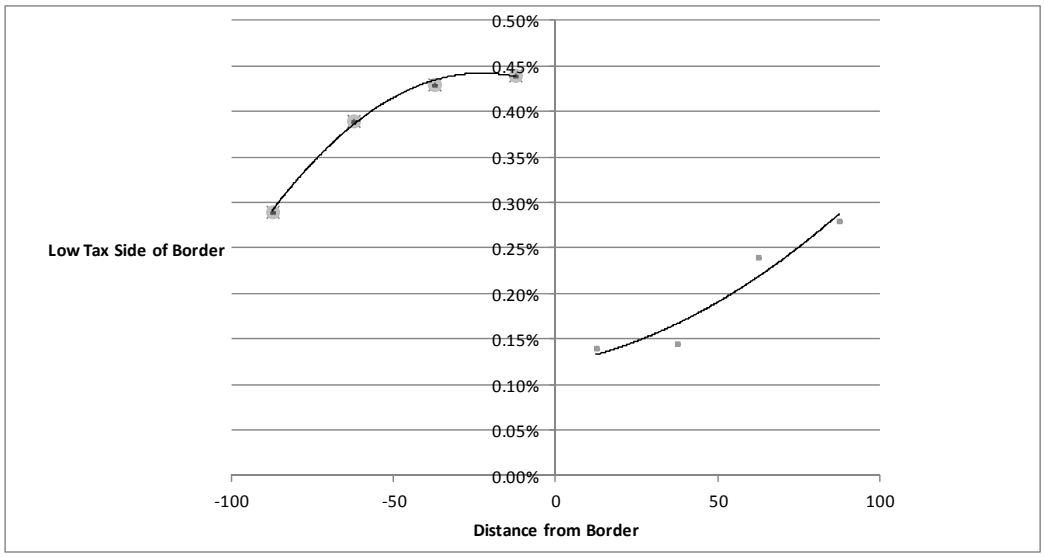

Table 17: Differences in Business Creation Rate for Adjacent Counties on Borders

Tax Rate Differential	Business Creation-Business Creation Adjacent
Corporate Tax>Corporate Tax Adjacent	0.008
by at least 1%	-.026***
by at least 2%	-.058***
by at least 3%	-.076***
by at least 4%	-.076***

*Greater than 0 at 10% significance, ** greater than 0 at 5% significant,
* greater than 0 at 1% significance

Table 18: Regression of Business Creation-Business Creation Adjacent on Dummies for High Tax States

VARIABLES	Business Creation-Business Creation Adjacent			
Tax>Adjacent Tax	-.014			
	(.016)			
Tax>(Adjacent+2)		-.048*		
		(.027)		
Tax>(Adjacent+3)			-.082***	
			(.035)	
Tax>(Adjacent+4)				-.082***
				(.034)
Constant	0.043	0.045	0.045	0.045
	(.042)	(.038)	(.001)	(.051)
Observations	28621	28621	28621	28621
R Squared	0.01	0.01	0.01	0.01

Table 19: Regression of Business Formation on Border Dummies

VARIABLES	All	All	Border	Border	Non-Border	Non-Border
Dummy for High Tax State	-.044***		-.261***		.010***	
	(.019)		(.027)		(.0025)	
Dummy for Low Tax State		.015***		.231***		-.216***
		(.053)		(.064)		(.089)
Constant	0	0	0	0	0	0
Observations	24968	24968	8959	8959	16009	16009
R Squared	0.08	0.08	0.16	0.16	0.07	0.07

Table 20: Regression of Business Formation on Border Dummies

VARIABLES	(1)	(2)
Low Tax Border County	-0.23	
	(.24)	
High Tax Border County	-0.56	
	(.43)	
Hinterland High Tax County	0.08	
	(.06)	
Very Low Tax Border County		.12*
		(.07)
Very High Tax Border County		-.05*
		(.03)
Hinterland Very High Tax County		-0.01
		(.01)
Observations	8216	8216
R Squared	0.21	0.22

Table 6 Tables

Figure 4: Plot of Marginal Tax Rate and Collected Revenue for U.S. States

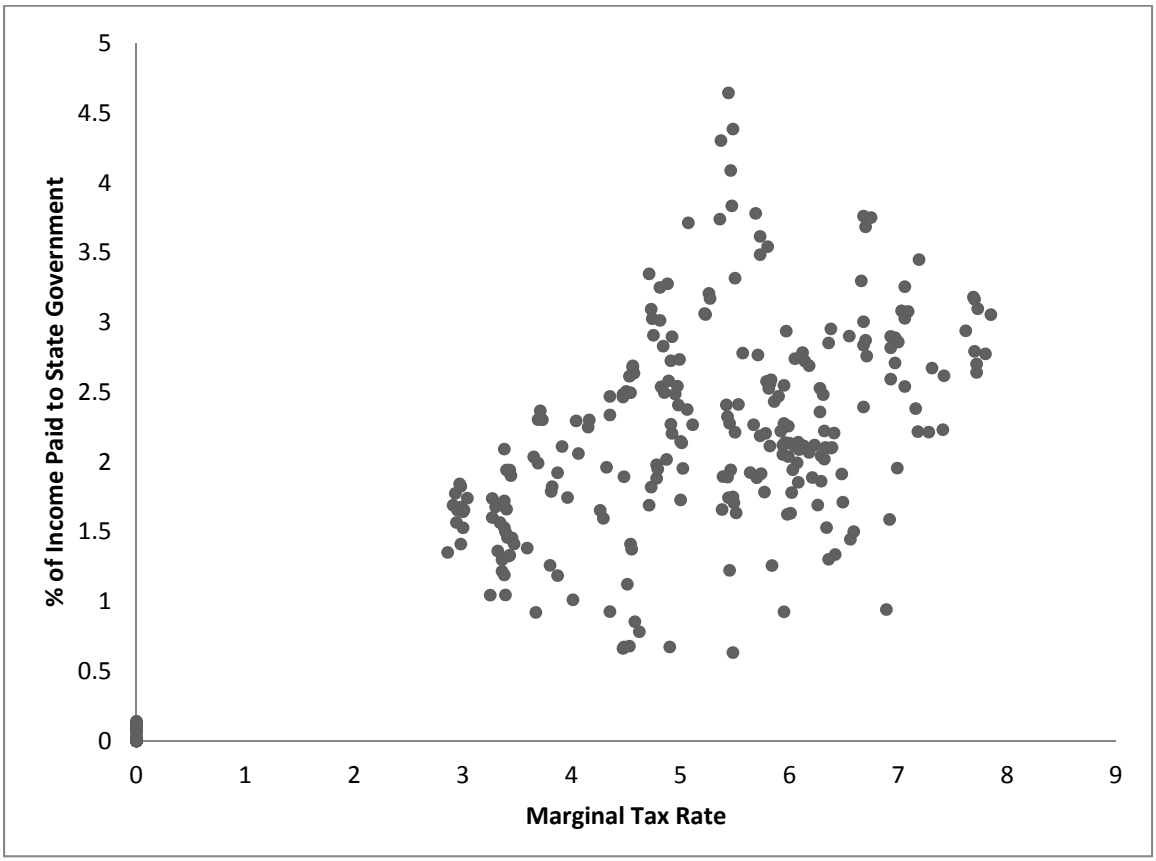

Table 21: Collected Taxes on Marginal Tax Rate for States with Tax 0-4%

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	0.44***					
Tax Rate t-1		0.44***				
Δ Tax Rate Last Yr		0.36				
Tax Rate t-2			0.44***			
Δ Tax Rate Last 2 Yrs			0.13			
Tax Rate t-5				0.42***		
Δ Tax Rate Last 5 Yrs				-0.34		
Tax Rate t-10					0.42***	
Δ Tax Rate Last 10 yrs					0.27*	
Tax Rate t-15						0.42***
Δ Tax Rate Last 15 yrs						0.27*
Observations	51	51	51	51	51	51
Constatn	0.96	0.96	0.96	0.96	0.96	0.96

Table 22: Collected Taxes on Marginal Tax Rate for States with Tax 4-6%

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	0.31***					
Tax Rate t-1		0.30***				
Δ Tax Rate Last Yr		-0.61				
Tax Rate t-2			0.29***			
Δ Tax Rate Last 2 Yrs			-0.58**			
Tax Rate t-5				0.30***		
Δ Tax Rate Last 5 Yrs				-0.33		
Tax Rate t-10					0.30***	
Δ Tax Rate Last 10 yrs					0.04	
Tax Rate t-15						0.23***
Δ Tax Rate Last 15 yrs						-0.04
Observations	119	119	119	119	119	119
Constatn	0.91	0.91	0.91	0.91	0.91	0.91

Table 23: Collected Taxes on Marginal Tax Rate for States with Tax 6-8%

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Tax Rate	0.31***					
Tax Rate t-1		0.32***				
Δ Tax Rate Last Yr		-0.55				
Tax Rate t-2			0.30***			
Δ Tax Rate Last 2 Yrs			-0.63**			
Tax Rate t-5				0.32***		
Δ Tax Rate Last 5 Yrs				-0.14		
Tax Rate t-10					0.37***	
Δ Tax Rate Last 10 yrs					-0.04	
Tax Rate t-15						0.34***
Δ Tax Rate Last 15 yrs						0.08*
Observations	78	78	78	78	78	78
Constatn	0.96	0.96	0.96	0.96	0.96	0.96

Table 24: Change in GDP Growth on Tax Changes

VARIABLE	Change in GDP Growth
Tax Change	-0.03
	(.11)
Constant	-.09
	(.01)
Observations	3289
R-squared	0

Table 25: Taxes Collected for States that Changed Tax Rate

	Tax Rate	Taxes Collected	TR/TC	Observations
Taxes in Last 5 years:	5.34%	2.56%	47.94%	162
Taxes in Last 5 years:	5.42%	3.28%	60.52%	85

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Appendix A: List of Border County Pairs

State	County	Income Tax	Corp Tax	Neighbor State	Neighbor County	Distance Btwn Counties	Income Tax Adj	Corp Tax Adj
AL	Baldwin	3.67	4	FL	Escambia	29	0	6
AL	Covington			FL	Holmes	49		
AL	Escambia			FL	Santa Rosa	40		
AL	Geneva			FL	Holmes	17		
AL	Lauderdale	3.67	4	TN	Wayne	29	0	6
AL	Limestone			TN	Giles	26		
AL	Madison			TN	Lincoln	25		
AR	Ashley	5.74	4.63	LA	Morehouse	27	3.34	4
AR	Columbia			LA	Claiborne	32		
AR	Union			LA	Union	32		
AR	Baxter	5.74	4.63	MO	Ozark	20	4.91	4.225
AR	Benton			MO	McDonald	22		
AR	Boone			MO	Taney	27		
AR	Carroll			MO	Stone	25		
AR	Clay			MO	Dunklin	18		
AR	Craighead			MO	Dunklin	48		
AR	Fulton			MO	Oregon	24		
AR	Greene			MO	Dunklin	31		
AR	Marion			MO	Ozark	27		
AR	Randolph			MO	Ripley	25		
AR	Sharp			MO	Oregon	31		
AR	Chicot	5.74	4.63	MS	Washington	18	4.51	7
AR	Desha			MS	Washington	36		
AR	Lee			MS	Tunica	25		
AR	Phillips			MS	Coahoma	23		
AR	Crittenden	5.74	4.63	TN	Shelby	19	0	6
AR	Mississippi			TN	Lauderdale	26		
AR	Lafayette	5.74	4.63	TX	Bowie	39	0	6.25
AR	Little River			TX	Bowie	18		
AR	Miller			TX	Bowie	13		
DE	Kent	4.71	0	MD	Caroline	23	4.56	5
DE	Sussex			MD	Wicomico	24		
DE	New Castle	4.71	0	NJ	Salem	14	4.01	6
IA	Clinton	4.73	5	IL	Carroll	24	2.98	6.25
IA	Des Moines			IL	Henderson	10		
IA	Dubuque			IL	Jo Daviess	24		
IA	Jackson			IL	Jo Daviess	23		
IA	Louisa			IL	Mercer	30		
IA	Muscatine			IL	Mercer	27		
IA	Sioux	4.73	5	SD	Union	34	0	4

ID	Cassia	7.63	5	UT	Box Elder	104	6	4.75
ID	Franklin			UT	Cache	25		
ID	Oneida			UT	Cache	38		
IN	Benton	3.38	5	IL	Iroquois	31	2.98	6.25
IN	Gibson			IL	Wabash	16		
IN	Knox			IL	Lawrence	16		
IN	Lake			IL	Cook	30		
IN	Newton			IL	Kankakee	27		
IN	Sullivan			IL	Crawford	20		
IN	Vermillion			IL	Edgar	17		
IN	Vigo			IL	Edgar	21		
IN	Warren			IL	Vermilion	21		
KS	Atchison	5.96	4.9	MO	Buchanan	23	4.91	4.225
KS	Bourbon			MO	Vernon	22		
KS	Cherokee			MO	Jasper	17		
KS	Crawford			MO	Barton	23		
KS	Doniphan			MO	Buchanan	14		
KS	Johnson			MO	Jackson	17		
KS	Leavenworth			MO	Platte	15		
KS	Linn			MO	Bates	24		
KS	Miami			MO	Cass	25		
KY	Ballard	5.44	6	IL	Pulaski	14	2.98	6.25
KY	Crittenden			IL	Hardin	15		
KY	Graves			IL	Massac	30		
KY	Livingston			IL	Massac	20		
KY	McCracken			IL	Massac	10		
KY	Union			IL	Gallatin	19		
KY	Boone	5.44	6	IN	Ohio	13	3.38	5
KY	Breckinridge			IN	Perry	23		
KY	Daviess			IN	Spencer	19		
KY	Gallatin			IN	Switzerland	10		
KY	Hancock			IN	Perry	11		
KY	Henderson			IN	Vanderburgh	12		
KY	Jefferson			IN	Clark	12		
KY	Meade			IN	Harrison	21		
KY	Oldham			IN	Clark	15		
KY	Trimble			IN	Jefferson	11		
KY	Carlisle	5.44	6	MO	Mississippi	23	4.91	4.225
KY	Boyd	5.44	6	OH	Lawrence	8	5	5
KY	Bracken			OH	Brown	19		
KY	Campbell			OH	Hamilton	11		
KY	Greenup			OH	Lawrence	15		
KY	Kenton			OH	Hamilton	12		
KY	Lewis			OH	Adams	22		
KY	Mason			OH	Adams	22		
KY	Allen	5.44	6	TN	Macon	18	0	6
KY	Bell			TN	Claiborne	14		

KY	Calloway			TN	Henry	21		
KY	Christian			TN	Montgomery	19		
KY	Clinton			TN	Pickett	10		
KY	Cumberland			TN	Clay	18		
KY	Fulton			TN	Obion	10		
KY	Hickman			TN	Obion	20		
KY	Logan			TN	Robertson	26		
KY	McCreary			TN	Scott	18		
KY	Monroe			TN	Clay	14		
KY	Wayne			TN	Pickett	25		
KY	Whitley			TN	Campbell	29		
LA	Beauregard	3.34	4	TX	Newton	28	0	6.25
LA	Bossier			TX	Harrison	44		
LA	Caddo			TX	Harrison	36		
LA	Calcasieu			TX	Orange	37		
LA	Cameron			TX	Orange	41		
LA	De Soto			TX	Shelby	31		
LA	Sabine			TX	Sabine	24		
LA	Vernon			TX	Sabine	39		
MA	Hampden	5.73	5	CT	Tolland	22	4.84	6
MA	Essex	5.73	5	NH	Rockingham	22	0	0
MA	Middlesex			NH	Hillsborough	33		
MD	Carroll	4.56	5	PA	Adams	24	3.04	6
MD	Harford			PA	York	37		
ME	Oxford	7.7	5.5	NH	Coos	41	0	0
ME	York	7.7		NH	Strafford	20		
MI	Berrien	4.15	6	IN	St. Joseph	23	3.38	5
MI	Branch			IN	Steuben	19		
MN	Faribault	6.97	6.5	IA	Winnebago	27	4.73	5
MN	Fillmore			IA	Howard	24		
MN	Freeborn			IA	Worth	21		
MN	Jackson			IA	Dickinson	19		
MN	Martin			IA	Emmet	22		
MN	Mower			IA	Mitchell	23		
MN	Nobles			IA	Osceola	17		
MN	Rock			IA	Lyon	18		
MN	Clay	6.97	6.5	ND	Cass	9	3.41	5
MN	Kittson			ND	Pembina	37		
MN	Marshall			ND	Grand Forks	39		
MN	Norman			ND	Cass	36		
MN	Polk			ND	Grand Forks	28		
MN	Wilkin			ND	Richland	12		
MN	Big Stone	6.97	6.5	SD	Grant	17	0	4
MN	Lac qui Parle			SD	Grant	30		
MN	Lincoln			SD	Brookings	27		
MN	Pipestone			SD	Moody	19		

MN	Traverse			SD	Roberts	22		
MN	Yellow Medicine			SD	Deuel	41		
MN	Carlton	6.97	6.5	WI	Douglas	25	6.75	5
MN	Chisago			WI	Polk	22		
MN	Dakota			WI	Pierce	30		
MN	Goodhue			WI	Pierce	23		
MN	Houston			WI	La Crosse	15		
MN	Pine			WI	Burnett	27		
MN	Wabasha			WI	Pepin	23		
MN	Washington			WI	St. Croix	17		
MN	Winona			WI	Buffalo	25		
MO	Clark	4.91	4.23	IA	Lee	19	4.73	5
MO	Harrison			IA	Decatur	29		
MO	Mercer			IA	Decatur	24		
MO	Nodaway			IA	Taylor	30		
MO	Putnam			IA	Appanoose	19		
MO	Schuyler			IA	Davis	22		
MO	Scotland			IA	Van Buren	23		
MO	Cape Girardeau	4.91	4.23	IL	Union	22	2.98	6.25
MO	Jefferson			IL	Monroe	17		
MO	Lewis			IL	Adams	20		
MO	Lincoln			IL	Calhoun	18		
MO	Marion			IL	Adams	16		
MO	Mississippi			IL	Alexander	21		
MO	Perry			IL	Randolph	24		
MO	Pike			IL	Pike	24		
MO	Ralls			IL	Adams	26		
MO	Scott			IL	Alexander	18		
MO	St. Charles			IL	Calhoun	24		
MO	Ste. Genevieve			IL	Randolph	21		
MO	Pemiscot	4.91	4.23	TN	Lake	20	0	6
MS	Clarke	4.51	7	AL	Choctaw	27	3.67	4
MS	George			AL	Mobile	28		
MS	Greene			AL	Washington	30		
MS	Itawamba			AL	Marion	33		
MS	Jackson			AL	Mobile	34		
MS	Kemper			AL	Sumter	29		
MS	Lauderdale			AL	Sumter	29		
MS	Lowndes			AL	Lamar	24		
MS	Noxubee			AL	Pickens	30		
MS	Tishomingo			AL	Franklin	31		
MS	Wayne			AL	Washington	32		
MS	Adams	4.51	7	LA	Concordia	12	3.34	4
MS	Claiborne			LA	Tensas	20		
MS	Walthall			LA	Washington	23		

MS	Warren			LA	Madison	21		
MS	Alcorn	4.51	7	TN	McNairy	19	0	6
MS	DeSoto			TN	Shelby	14		
MS	Marshall			TN	Fayette	27		
MS	Tippah			TN	Hardeman	32		
NC	Anson	7.06	4	SC	Chesterfield	20	6.36	5
NC	Brunswick			SC	Horry	44		
NC	Cleveland			SC	Cherokee	16		
NC	Columbus			SC	Horry	37		
NC	Gaston			SC	York	20		
NC	Mecklenburg			SC	York	21		
NC	Polk			SC	Spartanburg	23		
NC	Richmond			SC	Marlboro	22		
NC	Robeson			SC	Dillon	25		
NC	Rutherford			SC	Cherokee	23		
NC	Scotland			SC	Marlboro	15		
NC	Transylvania			SC	Pickens	28		
NC	Union			SC	Lancaster	19		
NC	Ashe	7.06	4	TN	Johnson	20	0	6
NC	Avery			TN	Carter	22		
NC	Haywood			TN	Cocke	32		
NC	Madison			TN	Unicoi	25		
NC	Mitchell			TN	Unicoi	20		
NC	Swain			TN	Sevier	31		
NC	Watauga			TN	Johnson	18		
NC	Alleghany	7.06	4	VA	Grayson	10	5.44	3.5
NC	Caswell			VA	Franklin	51		
NC	Currituck			VA	Chesapeake	29		
NC	Gates			VA	Suffolk	23		
NC	Granville			VA	Mecklenburg	37		
NC	Person			VA	Mecklenburg	42		
NC	Rockingham			VA	Patrick	33		
NC	Surry			VA	Patrick	26		
NC	Vance			VA	Mecklenburg	25		
NC	Warren			VA	Mecklenburg	22		
ND	Adams	3.41	5	SD	Perkins	27	0	4
ND	Bowman			SD	Harding	39		
ND	Dickey			SD	Marshall	41		
ND	Emmons			SD	Campbell	32		
ND	McIntosh			SD	McPherson	29		
ND	Sargent			SD	Marshall	27		
NE	Burt	6.05	5	IA	Monona	24	4.73	5
NE	Cass			IA	Mills	20		
NE	Dakota			IA	Woodbury	6		
NE	Douglas			IA	Pottawattamie	14		
NE	Otoe			IA	Fremont	22		
NE	Sarpy			IA	Pottawattamie	15		

NE	Thurston			IA	Woodbury	24		
NE	Washington			IA	Harrison	21		
NE	Franklin	6.05	5	KS	Smith	30	5.96	4.9
NE	Furnas	6.05	5	KS	Norton	30	5.96	4.9
NE	Gage			KS	Marshall	34		
NE	Harlan			KS	Phillips	27		
NE	Hitchcock			KS	Rawlins	28		
NE	Jefferson			KS	Washington	27		
NE	Pawnee			KS	Nemaha	24		
NE	Red Willow			KS	Decatur	28		
NE	Richardson			KS	Brown	22		
NE	Thayer			KS	Republic	25		
NE	Webster			KS	Jewell	33		
NE	Nemaha	6.05	5	MO	Atchison	21	4.91	4.225
NE	Boyd	6.05	5	SD	Charles Mix	22	0	4
NE	Cedar			SD	Clay	23		
NE	Cherry			SD	Todd	32		
NE	Dawes			SD	Shannon	40		
NE	Dixon			SD	Union	22		
NE	Knox			SD	Bon Homme	24		
NE	Sheridan			SD	Shannon	34		
NJ	Burlington	4.01	6	PA	Philadelphia	16	3.04	6
NJ	Camden			PA	Philadelphia	11		
NJ	Gloucester			PA	Delaware	17		
NJ	Hunterdon			PA	Northampton	24		
NJ	Mercer			PA	Bucks	17		
NJ	Sussex			PA	Pike	23		
NJ	Warren			PA	Northampton	17		
NY	Dutchess	6.66	4	CT	Litchfield	34	4.84	6
NY	Putnam			CT	Fairfield	23		
NY	Columbia	6.66	4	MA	Berkshire	27	5.73	5
NY	Rensselaer			MA	Berkshire	27		
NY	Bronx	6.66	4	NJ	Bergen	10	4.01	6
NY	New York			NJ	Hudson	6		
NY	Orange			NJ	Sussex	31		
NY	Rockland			NJ	Bergen	15		
NY	Westchester			NJ	Bergen	16		
NY	Allegany	6.66	4	PA	Potter	28	3.04	6
NY	Broome			PA	Susquehanna	22		
NY	Cattaraugus			PA	McKean	25		
NY	Chautauqua			PA	Warren	28		
NY	Chemung			PA	Bradford	25		
NY	Delaware			PA	Susquehanna	49		
NY	Steuben			PA	Tioga	32		
NY	Sullivan			PA	Pike	31		
NY	Tioga			PA	Bradford	23		

NY	Clinton	6.66	4	VT	Grand Isle	13	5.9	5
NY	Essex			VT	Addison	27		
NY	Washington			VT	Bennington	27		
OH	Darke	5	5	IN	Randolph	21	3.38	5
OH	Defiance			IN	DeKalb	31		
OH	Mercer			IN	Jay	23		
OH	Paulding			IN	Allen	28		
OH	Preble			IN	Union	18		
OH	Van Wert			IN	Adams	21		
OH	Williams			IN	Steuben	24		
OH	Fulton	5	5	MI	Lenawee	24	4.15	6
OH	Lucas			MI	Monroe	18		
OH	Ashtabula	5	5	PA	Crawford	35	3.04	6
OH	Mahoning			PA	Lawrence	19		
OH	Trumbull			PA	Mercer	22		
OK	Adair	6.29	4.5	AR	Washington	30	5.74	4.625
OK	Le Flore			AR	Sebastian	24		
OK	McCurtain			AR	Sevier	29		
OK	Sequoyah			AR	Sebastian	24		
OK	Alfalfa	6.29	4.5	KS	Barber	40	5.96	4.9
OK	Beaver			KS	Seward	23		
OK	Craig			KS	Cherokee	38		
OK	Grant			KS	Harper	35		
OK	Kay			KS	Cowley	30		
OK	Nowata			KS	Montgomery	25		
OK	Ottawa			KS	Cherokee	18		
OK	Washington			KS	Chautauqua	31		
OK	Woods			KS	Barber	32		
OK	Delaware	6.29	4.5	MO	McDonald	24	4.91	4.225
OK	Beckham	6.29	4.5	TX	Wheeler	42	0	6.25
OK	Bryan			TX	Grayson	27		
OK	Choctaw			TX	Lamar	24		
OK	Cimarron			TX	Sherman	38		
OK	Cotton			TX	Wichita	29		
OK	Ellis			TX	Lipscomb	33		
OK	Jackson			TX	Hardeman	33		
OK	Jefferson			TX	Clay	30		
OK	Love			TX	Cooke	22		
OK	Marshall			TX	Grayson	27		
OK	Tillman			TX	Wilbarger	25		
RI	Washington	6.12	7	MA	Bristol	26	4.84	6
RI	Bristol			MA	Bristol	11		
RI	Kent			MA	Bristol	21		
RI	Providence			MA	Bristol	18		
VA	Arlington	5.44	3.5	MD	Prince George's	12	4.56	5

VA	Loudoun			MD	Montgomery	21		
VA	Scott			TN	Sullivan	15		
VT	Caledonia	5.9	5	NH	Coos	36	0	0
VT	Orange			NH	Grafton	24		
VT	Windham			NH	Cheshire	18		
VT	Windsor			NH	Sullivan	17		
WI	Crawford	6.75	5	IA	Allamakee	22	4.73	5
WI	Grant			IA	Dubuque	24		
WI	Green			IL	Stephenson	24		
WI	Kenosha			IL	Lake	18		
WI	Lafayette			IL	Jo Daviess	19		
WI	Rock			IL	Winnebago	24		
WI	Walworth			IL	McHenry	29		
WI	Ashland			MI	Gogebic	38		
WI	Forest			MI	Iron	39		
WI	Iron			MI	Gogebic	12		
WI	Marinette			MI	Menominee	15		
WI	Vilas			MI	Gogebic	39		
WV	Mingo	5.71	6	KY	Martin	31	5.44	3.5
WV	Wayne			KY	Boyd	73		
WV	Hampshire			MD	Allegany	32		
WV	Mineral			MD	Allegany	12		
WV	Preston			MD	Garrett	75		
WV	Cabell			OH	Lawrence	81		
WV	Hancock			OH	Jefferson	154		
WV	Jackson			OH	Meigs	22		
WV	Marshall			OH	Belmont	123		
WV	Mason			OH	Gallia	108		
WV	Ohio			OH	Belmont	12		
WV	Pleasants			OH	Washington	111		
WV	Tyler			OH	Monroe	106		
WV	Wetzel			OH	Monroe	107		
WV	Wood			OH	Washington	122		
WV	Monongalia			PA	Greene	89		
WV	Morgan			PA	Fulton	34		
WV	Greenbrier			VA	Craig	31		
WV	Hardy			VA	Shenandoah	40		
WV	Jefferson			VA	Clarke	22		
WV	McDowell			VA	Tazewell	17		
WV	Mercer			VA	Bland	14		
WV	Monroe			VA	Giles	15		
WV	Pendleton			VA	Highland	23		

Appendix B: Determinants of Outcome Variables with Regional Fixed Effects at County Level

Table 1: Determinants of Employment Growth with Regional Fixed Effects

VARIABLES	(1)	(2)	(3)	(4)	(5)
Income Tax	-1.51	0.28	0.98	0.94	0.74
	(1.38)	(1.56)	(1.67)	(2.11)	(2.10)
Corporate Tax	-7.06***	-6.59***	-3.79**	-3.02***	-3.44**
	(1.81)	(1.84)	(1.77)	(0.86)	(1.51)
Income Tax Change		-3.95**	-6.93***	-11.53***	-11.23***
		(1.68)	(1.80)	(2.61)	(2.60)
Bankers/Capita			-193.61***	-205.50***	-160.98***
			(35.74)	(39.73)	(40.84)
Manufacturers/Capita			-57.69***	-76.51***	-74.31***
			(5.67)	(6.56)	(6.93)
Farmers/Capita			-0.48***	-0.56***	-0.48***
			(0.04)	(0.04)	(0.04)
Per Capita GDP			0.01***	0.01***	0.01***
			0.00	0.00	0.00
Border, High Tax County		-1.14*	-1.04	-0.03	-0.38
		(0.65)	(0.72)	(0.82)	(0.82)
Right to Work State				-10.31	49.51***
				(13.47)	(7.48)
Minimum Wage				-2.62	-23.27***
				(3.14)	(3.93)
Poverty					-0.15
					(0.14)
Black					-3.58
					(3.45)
Latino					6.68
					(5.28)
Males					22.17***
					(4.37)
% Working Age					1.59***
					(0.21)
High School Graduates					0.34***
					(0.09)
Constant	40.88***	32.81***	4.24	-5.11	-122.42***
	(9.77)	(10.47)	(10.84)	(3.62)	(23.22)
Observations	24,723	24,723	18,445	13,754	13,754
R-squared	0.07	0.07	0.12	0.13	0.14

Table 2: Determinants of Business Formation with Regional Fixed Effects

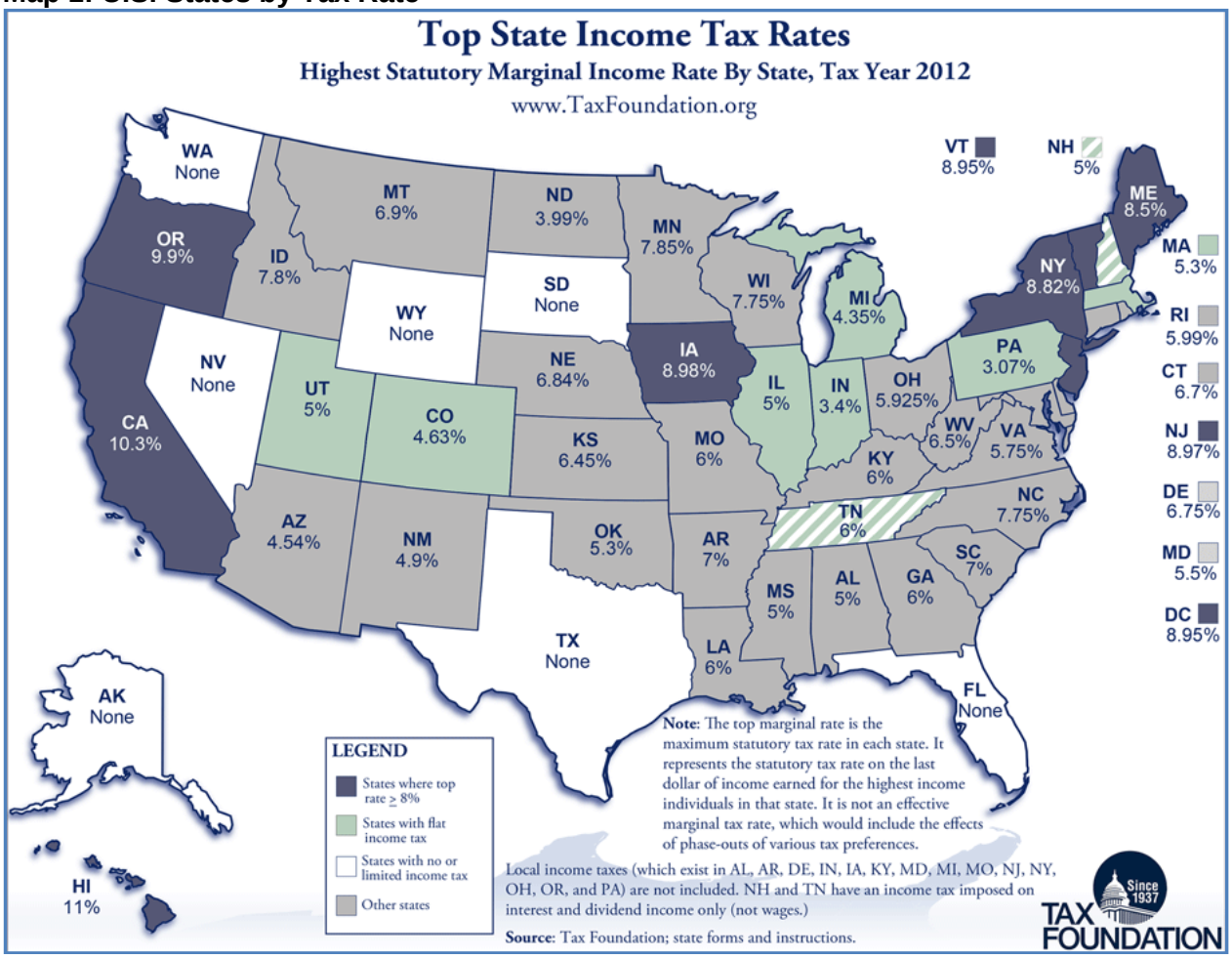
VARIABLES	(1)	(2)	(3)	(4)	(5)
Income Tax	-2.32	1.52	-0.05	-3.45	-3.49
	(2.07)	(2.34)	(2.44)	(3.18)	(3.18)
Corporate Tax	-8.95***	-7.57***	-4.98*	-4.99***	2.43
	(2.71)	(2.75)	(2.59)	(1.30)	(2.28)
Income Tax Change		-8.82***	-13.26***	-22.23***	-21.98***
		(2.51)	(2.63)	(3.94)	(3.93)
Bankers/Capita			-362.18***	-395.61***	-317.54***
			(52.27)	(59.95)	(61.74)
Manufacturers/Capita			-86.10***	-107.93***	-112.35***
			(8.29)	(9.89)	(10.48)
Farmers/Capita			-0.54***	-0.63***	-0.63***
			(0.05)	(0.06)	(0.07)
Per Capita GDP			2.16***	2.17***	1.99***
			(0.11)	(0.12)	(0.17)
Border, High Tax County		-0.42	0.05	1	0.8
		(0.98)	(1.05)	(1.24)	(1.24)
Right to Work State				0.95	33.01***
				-20.322	-11.311
Minimum Wage				-3.92	-27.34***
				-4.735	-5.939
Poverty					-0.26
					(0.21)
Poverty					-5.26
					(5.22)
Black					7.34
					(7.98)
Latino					35.97***
					(6.61)
Males					1.59***
					(0.31)
% Working Age					-0.07
					(0.13)
High School Graduates	96.71***	77.35***	49.13***	28.92***	-31.11
	(14.63)	(15.68)	(15.86)	(5.46)	(35.10)
Observations	24,723	24,723	18,445	13,754	13,754
R-squared	0.07	0.07	0.12	0.12	0.12

Table 3: Determinants of Businesses per Capita with Regional Fixed Effects

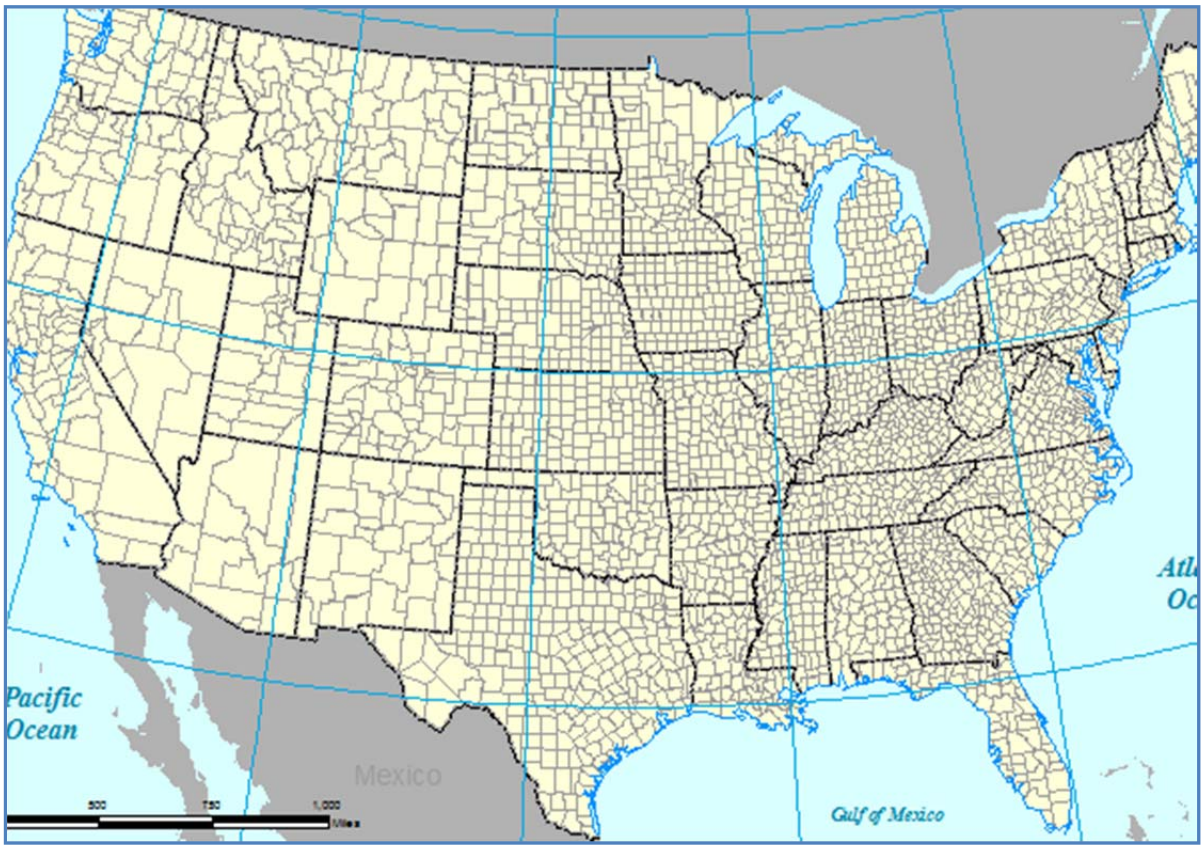
VARIABLES	(1)	(2)	(3)	(4)	(5)
Income Tax	-0.36	-0.45	-0.76***	-0.47	-0.27
	(0.26)	(0.29)	(0.28)	(0.35)	(0.32)
Corporate Tax	-0.80**	-0.74**	-0.51*	-1.84***	-2.89***
	(0.34)	(0.35)	(0.29)	(0.14)	(0.23)
Income Tax Change		0.13	0.41	1.04**	0.73*
		(0.32)	(0.30)	(0.43)	(0.40)
Bankers/Capita			217.56***	204.85***	167.51***
			(5.93)	(6.58)	(6.29)
Manufacturers/Capita			5.09***	2.66**	7.99***
			(0.94)	(1.09)	(1.07)
Farmers/Capita			0.22***	0.20***	0.17***
			(0.01)	(0.01)	(0.01)
Per Capita GDP			0.21***	0.20***	0.58***
			(0.01)	(0.01)	(0.02)
% Working Age					-1.00***
					(0.03)
Black					-7.15***
					(0.53)
Latino					-1.29
					(0.81)
Males					-6.18***
					(0.67)
Poverty					0.51***
					(0.02)
High School Graduates					-0.01
					(0.01)
Constant	24.94***	24.93***	12.97***	21.74***	66.93***
	(1.84)	(1.97)	(1.80)	(0.60)	(3.58)
Observations	24,723	24,723	18,445	13,754	13,754
R-squared	0.41	0.41	0.52	0.5	0.57

Appendix C: Illustrative Maps

Map 1: U.S. States by Tax Rate

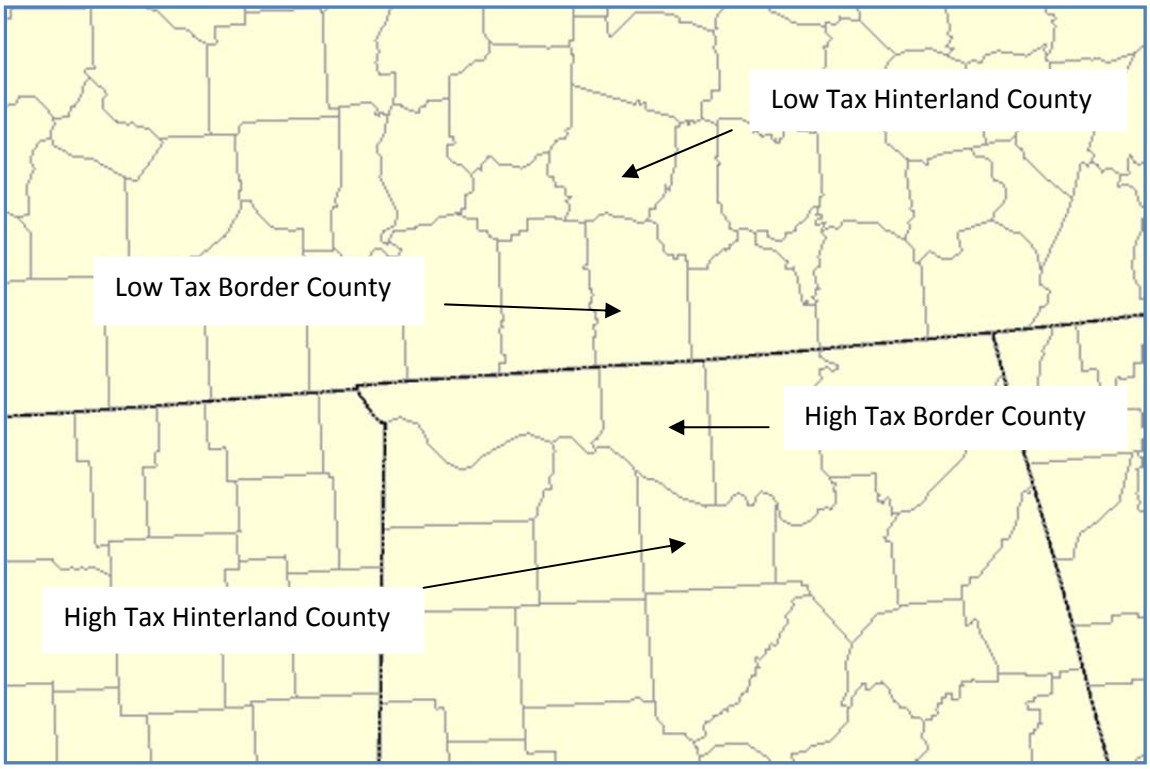


Map 2: U.S. Counties



Map 3: Border and Hinterland Counties

Kentucky (5% Corporate Tax)



Alabama (6.5% Corporate Tax)