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## State Bankruptcy Law and Entrepreneurship: Evidence from a Border Analysis

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**State Bankruptcy Law and Entrepreneurship:  
Evidence from a Border Analysis**

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**Abstract**

This paper examines how differences in state bankruptcy laws, specifically the amount of the homestead exemption, affect business location decisions. We expand upon the literature by narrowing the geographic scope and focus on the amount of entrepreneurial activity within a few miles of the state boundary. By including only these border areas, we are more effectively able to control for unobserved local attributes, which are important determinants of business location decisions. Findings indicate that an increase in a state's homestead exemption attracts new businesses to that locality. Specifically, we find that if a state increases its homestead exemption by \$500,000, an entrepreneur is approximately 4.11 percentage points more likely to locate in that state. In addition, we do not find that a more generous homestead exemption has a negative impact on existing businesses. Our results suggest that bankruptcy law is an important policy tool that state governments can use to attract new businesses, without experiencing an adverse effect on existing enterprises.

## **I. Introduction**

State and local policy makers strive to attract new and small businesses, since these establishments are crucial components to the U.S. economy. In 2007, small businesses accounted for approximately half of all employment in the U.S.<sup>1</sup> Small firms are also the primary source of new employment, accounting for between 60 and 80% of net new jobs (Gates & Leuschner, 2007). Local governments work to create an environment that attracts business start-ups to their area, hoping that these establishments become drivers of future growth. This idea, known as “economic gardening,” is emphasized by Neumark et al. (2007) who state that “new firms contribute substantially to job creation.”

While there are numerous advantages of small businesses, these firms have a lower success rate compared to larger establishments. According to the U.S. Small Business Administration (SBA), the average turnover rate of small businesses is approximately 10% each year.<sup>2</sup> In order to protect and encourage entrepreneurs while accounting for the risks, the U.S. government established a bankruptcy procedure. Bankruptcy is a legal process through which financially distressed individuals can resolve their debt while protecting some assets through exemptions. The types and amount of each exemption varies across states, but the largest is typically the homestead exemption, which shelters an individual’s primary owner-occupied housing unit. In this paper, we analyze how variation in the generosity of bankruptcy law, specifically the homestead exemption, affects entrepreneurs’ business location decisions. Furthermore, we look at the impact of the homestead exemption on existing businesses. If a more generous homestead exemption simply causes new businesses to replace existing enterprises, then policy makers should be cognizant of this off-setting effect.

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<sup>1</sup> [http://archive.sba.gov/advo/research/us88\\_07.pdf](http://archive.sba.gov/advo/research/us88_07.pdf)

<sup>2</sup> <http://www.sba.gov/sites/default/files/sbfaq.pdf>

Entrepreneurs face liquidity constraints when starting a company (Evans & Jovanovic, 1989; Holtz-Eakin et al., 1994), causing personal bankruptcy law to have two effects on new businesses. First, bankruptcy discharges unsecured debt, creating wealth insurance if the enterprise fails (supply-side effect). Research has found that by providing more insurance if a business is unsuccessful, a state can attract new enterprises (Fan & White, 2003; Armour & Cumming, 2008). However, bankruptcy law affects the cost of capital through interest rates (demand-side effect). With higher exemptions, a failed business will pay back less of its debt. This mechanism drives financial institutions to charge higher interest rates on small business loans, thus discouraging entrepreneurs (Berkowitz & White, 2004; Scott & Smith, 1986).

To study the effect of bankruptcy law on entrepreneurship, the standard approach is to estimate the effect of a more generous homestead exemption on new businesses, where the geographic unit is the state (Fan & White, 2003; Mathur, 2005; Paik, 2010). This strategy assumes that all individuals within a state are affected uniformly by the policy. However, the urban economics literature has found that local attributes, many of which are unobserved, are important determinants in a business' location decision (Rosenthal & Strange, 2003; Arzaghi & Henderson, 2008). Therefore, using state-level data that does not account for local activity may produce biased estimates.

Our identification strategy focuses on business activity near the state border and compares activity just on either side of the state boundary. This approach restricts the comparison areas to those which likely have similar local attributes, but are located in states with different homestead exemptions. By including fixed effects to control for unobserved local characteristics, we are able to obtain consistent estimates of the impact of bankruptcy exemptions on entrepreneurs. Since the areas included in our sample are small relative to the entire state, we

argue that these areas are not driving changes in state policy, making activity in these areas exogenous to changes in the homestead exemption.

We use data from the Dun and Bradstreet (D&B) MarketPlace Files, which has two advantages over the data used in earlier studies. First, the D&B data is collected directly from businesses, while the previous literature has tended to use reported business income by individuals as a proxy for entrepreneurship. By using data obtained from the individual business instead of self-reported income, we mitigate concerns related to self-reporting measurement error. Second, the D&B data has information on both new and existing businesses. This information allows us to determine if a more lenient personal bankruptcy law creates new businesses on net, or if the new enterprises are simply replacing those establishments that went out of business. In other words, we are able to examine the impact of a more generous homestead exemption on the creation of new firms, as well as the failure rate of existing firms.

Using our preferred specification, we find that a more generous homestead exemption attracts new businesses (businesses that are less than a year old) to that state. In particular, we find that within 0 to 1 mile of the state border, an increase in the homestead exemption of \$500,000 increases the likelihood that an entrepreneur will locate in that state by 4.63 percentage points in the short-term (2004 to 2006). In the long-term (2004 to 2009), we find that an increase in the homestead exemption of \$500,000 increases the probability an entrepreneur locates in a given state by 4.11 percentage points. For businesses that have been in operation for 2 to 3 years, we do not find a statistically or economically significant effect of a more generous homestead exemption. Furthermore, for those businesses that have been open for four or more years, we find that a larger homestead exemption results in a higher probability of having one of

these existing establishments. Together, our results suggest that a more generous homestead exemption attracts new businesses, but not at the cost of losing existing enterprises.

We also stratify our sample by ownership structure (sole proprietorships versus corporations), by the level of agglomeration in the area, and by the size of the establishment. We find that the homestead exemption has a strong, positive effect on sole proprietorships, but no statistically significant effect on corporations. This finding is consistent with our priors, since sole proprietorships merge personal and business assets while corporations separate the two. In addition, this finding suggests that the estimated effects are due to changes in the homestead exemption, which only affects sole proprietorships, and not to other state business policies, which would affect corporations as well. We also find that the homestead exemption has a stronger effect in the more agglomerated areas. This result is consistent with the urban economics literature, which finds that entrepreneurs prefer to locate in areas with existing business activity. Finally, our results indicate that small businesses are more likely to locate in the area with a higher homestead exemption.

The rest of the paper will proceed as follows. Section II will provide more information on bankruptcy law in the United States. Section III describes our identification strategy and Section IV describes the data sets that will be used in the analysis. Results are presented in Section V, with an alternative specification presented in Section VI. The final section summarizes our results and discusses the policy implications.

## **II. Bankruptcy Law**

The federal Bankruptcy Code of 1978 created a uniform procedure for bankruptcy filing across the U.S. The one exception was that states were allowed to set their own exemption levels. As a

result, there is variation across states and over time in the types of exemptions available, such as equity in the individual's primary owner-occupied housing unit (homestead exemption), cars, cash, furniture, and clothing, as well as the amount protected under each exemption. In most states, the homestead exemption is, by far, the largest exemption. The size of the homestead exemption varies from zero in Delaware and Maryland to unlimited in eight states, including Florida and Texas. The federal government also has its own exemptions, but the states are allowed to choose whether or not their residents can utilize the federal exemptions.

Prior to 2005, when an individual filed for bankruptcy, he was allowed to file under the Chapter 7 procedure or Chapter 13. Chapter 7 requires debtors to pay back loans using all assets above the exemption levels. However, these individuals are not required to use future earnings towards past debts, giving debtors a "fresh start" after bankruptcy. Chapter 13 does not require a debtor to give up any assets immediately, but the individual must propose a multi-year plan to repay part of his debt from future earnings. If the debtor follows the repayment plan, then any unpaid portions of the remaining debt are discharged. Due to the fact that Chapter 13 required individuals to use future earnings to repay debts, most individuals filed under Chapter 7.

In 2005, the federal government passed new legislation, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA), which enacted several changes to the bankruptcy procedure. The most significant change was that debtors were no longer allowed to choose between Chapter 7 and Chapter 13. To file under Chapter 7, there is a "means test," which requires an individual's income and assets are below a certain level to file under Chapter 7. Anyone above the cutoff must file under Chapter 13. The 2005 reform also introduced a variety of administrative costs, hoping that higher costs would discourage individuals from declaring bankruptcy. In addition, BAPCPA increased the amount of time that must pass before

an individual can file under Chapter 7 a second time and placed restrictions on moving and the use of the homestead exemption (Li et al., 2011). Overall, the law created a system that was much less favorable to debtors. As can be seen in Figure 1, there was a dramatic decrease in the number of bankruptcy filings following the 2005 reform (White, 2006).

The Chapter 7 procedure is preferred by entrepreneurs because it gives them a fresh start, removing them from the obligation to use future earnings to repay past debts. The fresh start is an important feature of Chapter 7 for small business owners, since many initially unsuccessful entrepreneurs eventually start another successful business (Primo & Green, 2008). Filing under Chapter 13 hampers the individual's ability to receive credit for a future enterprise because the individual must use future earnings to repay past debts. Given this fact and the importance of small businesses in the U.S. economy, BAPCPA allowed individuals to file under Chapter 7 as long as the majority of the debt was from a failed business.

We compare the long-term and short-term effects of the homestead exemption to see if entrepreneurs needed time to learn about BAPCPA and adjust before reaching the new equilibrium. Even though BAPCPA imposed the same restrictions on all states, there may be different effects based on the exemptions available. For example, if a state has an unlimited homestead exemption, it still may be worthwhile to overcome the additional costs imposed after the reform, but if the exemption is zero, the new costs may now outweigh the benefits.

### **III. Empirical Model**

To identify the causal effect of bankruptcy law on business location decisions, we draw upon variation over time in the difference in the homestead exemption between adjacent states. Additional determinants of the location decisions of new businesses that we need to control for



can be categorized into three groups: time-varying attributes that affect both areas,  $\mu_t$ ; area-specific time-invariant attributes,  $\gamma_j$ ; and area-specific attributes that vary over time,  $\theta_{jt}$ .

A differencing strategy can be used to eliminate unobserved characteristics that may create correlation between the exemption level and economic outcomes. Differencing across adjacent areas in a given year eliminates attributes that are common to both areas in that year that may affect new and existing businesses ( $\theta_{jt}$ ). For example, an area's access to production inputs, such as the local labor market, will affect a business' costs and hence the likelihood an individual starts a new business. We obtain the following expression that determines the likelihood an entrepreneur will locate his business on side 2 of a state border:

$$I_{it} = \theta_1(Bank_{2t} - Bank_{1t}) + \gamma_j + \mu_t. \quad (1)$$

In this expression,  $I_{it}$  equals 1 if entrepreneur  $i$  chooses side 2 of the state border and 0 if he chooses side 1. The term  $Bank_{2t} - Bank_{1t}$  is the cross-border difference in the homestead exemption corresponding to the border along which establishment  $i$  is located. The subscript  $t$  represents the year in which the company makes its location choice.

We control for the time-invariant attributes (such as proximity to a body of water) with border-segment fixed effects,  $\gamma_j$ . Note that the border-segment fixed effects also control for any time-varying determinants that affect both sides of the state boundary. We control for the time-variant attributes that are common across the country (such as business cycle shocks) using year fixed effects,  $\mu_t$ . Given the fixed effects and differencing strategy, any remaining characteristics that may affect business location decisions are likely to be in an idiosyncratic error term and would be uncorrelated with where an individual chooses to establish his business. We estimate the above equation using a linear probability model.

## IV. Data

### 4.1. Bankruptcy Data

Our data on the homestead exemption level for each state in 2002, 2004, 2006, and 2009 were obtained from the appendix of How to File Chapter 7 Bankruptcy by Elias, Renauer, and Leonard. Since we do not have information on the marital status, age, and disability status of business owners, we use the state homestead exemption for married individuals for all observations. Table 1 lists each state's homestead exemption level in 2004, 2006, and 2009. Note that some states offer an unlimited homestead exemption. For these observations, we follow the existing literature and set the exemption level equal to the highest exemption level in our sample, which is \$550,000.<sup>3</sup>

The federal government also has its own homestead exemption, but each state chooses whether or not to allow its citizens to claim it. Approximately one-third of all states allow their residents to use the federal exemption.<sup>4</sup> We documented the federal exemption in each year, as well as which states allowed their residents to file using the federal exemptions. If a state allows its citizens to choose between the state and federal exemptions, we set the effective exemption level to be the higher of the two.

One potential concern is that the homestead exemption is endogenous. Berkowitz & White (2004) and Fan & White (2003) argue that the homestead exemption is exogenous because each state essentially determined its exemption in 1983, as most changes after that reflected inflation adjustments. Therefore, since most states set their exemptions in the 1980s, we treat the exemption level as exogenous. Furthermore, we focus on small areas that are close to the state

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<sup>3</sup> We have experimented with setting this exemption level to other values and our findings are robust. Given the differencing in our identification strategy, it is important that we have a dollar amount for these observations.

<sup>4</sup> None of the states changed their policy to allow their citizens to use the federal homestead exemption during our sample period.

boundary. We assume that these areas are small relative to the overall state and therefore are not large enough to drive changes in state policy.

#### *4.2. Creation of Establishment Level Data*

Data on business activity was obtained from the Dun and Bradstreet (D&B) Marketplace files for the second quarter of 2002, 2004, 2006, and 2009. D&B provides information on different types of establishments aggregated to the ZIP code level. Using this data, we are able to measure counts of existing establishments (2 to 3 year old and 4+ year old businesses) and newly created establishments (those that have been in operation for less than one year) as well as the type of industry through the 2-digit Standard Industrial Classification (SIC).

Although the data is aggregated to the ZIP code level, we convert the data into establishment level observations. We know how many companies are present for a given 2-digit SIC/ZIP code, denoted as  $x$ . We create  $x$  observations for that 2-digit SIC/ZIP code. We then use GIS software to create 1 and 10 mile buffer zones on each side of all state borders in the continental U.S. We overlay on that map a 20-by-20 mile square grid. For each such grid square, we restrict the area of interest to the portion that lies within the buffer zone. That portion is then divided into two wedges on opposite sides of the state border and the wedges are matched as a “wedge pair.” In Figure 2, the grey area around the state boundaries reflects each side of the wedge pair.<sup>5</sup> Only ZIP codes that intersect a wedge are retained in the sample. All business counts in each ZIP code are allocated to the intersecting wedge. If a ZIP code intersects more than one wedge, then the counts are allocated to the wedge with the greatest degree of overlap to ensure that each business is only counted once.

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<sup>5</sup> For more information on the creation of the wedge pairs, see Rohlin (2011) and Rohlin, Rosenthal, & Ross (2012).

Our sample is an improvement over what has been used in the literature for several reasons. First, we create a panel data set, with data before and after the 2005 reform, allowing us to control for time-invariant, unobserved attributes. Our panel also allows us to compare the short-term and long-term effects of the 2005 policy change. Second, we have data at the local level. Previous research has tended to draw upon data that has information on the individual's state of residence. When using state level data, there are likely to be unobserved local attributes that vary across the state which may bias the estimates. By using data at a smaller level of geography, we are better able to control for unobserved characteristics. Finally, our data is collected directly from businesses. The previous literature has tended to determine if there was a new business by using reported business income. This method could be problematic for a variety of reasons, such as if the individual fails to report business income.

Table 2 reports the total number of newly established businesses in our sample for each buffer zone (0 to 1 mile and 0 to 10 miles), each side of the state border (sides 1 and 2), and each of our four survey periods (2002, 2004, 2006, and 2009). Note that the number of new establishments in our sample grows between 2002 and 2009. Also, note that there are more arrivals on side 2 than on side 1. Side 1 and side 2 were assigned alphabetically, which is likely to be random and uncorrelated with the location decisions of entrepreneurs. Given the random assignment of a state as side 1 or side 2 of the pair, this difference reflects either a tendency for grid squares that intersect a state border to be centered on side 2 of the border, or for the areas designated as side 2 to be more densely developed.<sup>6</sup>

Summing all the new business arrivals associated with each buffer zone, we have a total of 291,116 new establishments in ZIP codes extending into the 0 to 1 mile buffer, and 121,641,805 new establishments in ZIP codes in the 0 to 10 mile buffer. We discuss the results

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<sup>6</sup> For instance, New York (including New York City) was randomly assigned to side 2.

from the two samples, which as we show in the next section, are quite similar. Additionally, to get an idea of where these businesses are located along state borders, we created a thematic map of the U.S. Figure 3 displays the amount of new business employment in 2002 along all the borders used in this paper. As expected, the majority of the business activity is located near the east and west coast as well as the Midwest region.

## **V. Results**

### *Bankruptcy and Entrepreneurship*

Table 3 presents results using an indicator variable that equals one if the new business located on side 2 of the border as the dependent variable. Panel A contains our cross-sectional results, which examine how cross-border differences in the homestead exemption impacts the likelihood that a new business locates on side two of the border in 2002, 2004, 2006, and 2009. Panel B presents estimates using our differencing approach, which utilizes changes in the cross-border difference in the homestead exemption for the short-term (2004 to 2006) and long-term (2004 to 2009) after the 2005 overhaul in bankruptcy law. The first four columns present results for new business activity within 0 to 1 mile of the border and the next four columns contain estimates within 0 to 10 miles from the state border. All regressions include 2-digit industry fixed effects to capture industry specific differences in entrepreneurship. Standard errors, reported in parenthesis, are clustered at the state-pair level (i.e. New York and Pennsylvania border) since we expect that the propensity of new business activity to locate on a specific side of the border is correlated along the border between the two states.

Looking at the results in Panel A, we see the evolution of the effect of differences in the homestead exemption before and after the 2005 Bankruptcy Reform on business location

decisions. The patterns are similar for both the 0 to 1 mile sample and the 0 to 10 mile sample, so we focus on the 0 to 1 mile sample. In 2002, a higher homestead exemption decreased the likelihood that a new business located on a given side of the border. This effect is significant at the 10% level and indicates that the negative effect of credit rationing outweighed the positive effect of wealth protection. In 2004, if a state had a larger homestead exemption, there was a negative but statistically insignificant impact on the propensity that a business locates on side two of the border, while in 2006 this effect became positive but still was not statistically significant. However, in 2009, we find that a state with a larger homestead exemption was more likely to have an entrepreneur locate on its side of the border, indicating that the benefit of the wealth protection outweighed the costs of credit constraints. This increase is statistically significant at the 5% level. One explanation for this pattern is that entrepreneurs became increasingly cognizant of the benefits of the homestead exemption as the U.S. economy entered a recession, increasing the probability of filing for bankruptcy.

Also, note that in column 4, the coefficient on the homestead exemption squared variable is negative and statistically significant at the 5% level. This negative coefficient suggests that the positive effect of the homestead exemption is increasing at a decreasing rate. In other words, entrepreneurs value the homestead exemption, but the exemption plays a less significant role as the difference in exemption levels between the adjacent states becomes larger.

One concern with the cross-sectional model is that there may be time-varying, area-specific characteristics that influence entrepreneurship biasing the estimates. Panel B of Table 3 presents the differencing results which compare adjacent areas on either side of a state border over time. This differencing approach allows us to remove time-invariant area characteristics

that could bias our estimates. Columns 1 and 2 of panel B present short-term results (2004 to 2006) while columns 3 and 4 display the long-term estimates (2004 to 2009).

The short-term results for businesses within one mile of the border indicate that increases in the state's homestead exemption had a positive effect on the number of new establishments that located on that state's side of the boundary. The coefficient on the homestead exemption variable suggests that an increase in the homestead exemption of \$500,000 would increase the likelihood that an entrepreneur locates on that state's side of the border by 4.63 percentage points ( $0.0926/2$ ). With a standard error of 0.0521, this effect is statistically significant at the 10 percent level. An increase of \$500,000 is approximately the equivalent of going from a state with the lowest homestead exemption to a state with the highest exemption. We find that the effect of the homestead exemption over a 5 year period (the long-term results) has a slightly more modest effect on entrepreneurs, with an increase of \$500,000 improving the likelihood of locating in that state by 4.11 percentage points ( $0.0822/2$ ) with a standard error of 0.0409. This effect is significant at the 5% level. The negative coefficient on the squared term indicates that the marginal benefit to entrepreneurs of locating in the state with the higher homestead exemption diminishes as the cross-border difference increases.

If we focus on those areas within ten miles of the border, we find a larger impact of bankruptcy law on entrepreneurs and obtain more precise estimates. Specifically, we find that a \$500,000 increase in the homestead exemption leads to an increase in the likelihood of an entrepreneur locating in that state of approximately 8.12 percentage points ( $0.1623/2$ ) in the short-run and 5.48 percentage points ( $0.1096/2$ ) in the long-run. The short-term effect is statistically significant at the 1% level, while the long-term effect is statistically significant at the 5% level. Given the similarities of the estimates for the two distance bands, we focus on activity

within 0 to 1 mile of the state boundary, so that we are able to more effectively control for local unobserved variables.<sup>7</sup>

### *Bankruptcy Law and Business Turnover*

While local governments may appreciate that more generous bankruptcy exemptions attract new businesses, there is a concern that the increase in business start-ups could be driven by increased turnover in older establishments. If this is occurring, then the positive effect on new businesses would be mitigated by the loss of existing establishments. In other words, bankruptcy law may not create overall growth in the local economy but may simply create more business turnover. We examine this concern by focusing on existing businesses that have been in operation for 2 to 3 years, as well as those that have been open for 4 or more years.

Panel A of Table 4 analyzes the probability that a 2 to 3 year old business locates on one side of the border, while panel B focuses on the probability that a business with 4 or more years of service locates on that side of the state boundary. Table 4 presents results for both the short-term and long-term for the 0 to 1 mile border.<sup>8</sup> The results in panel A suggest that an increase in a state's homestead exemption increases the likelihood of 2 to 3 year old businesses locating on that side of the border, but none these estimates are statistically different from zero at conventional levels. A similar pattern holds for the estimates of the long-term effect. Our findings suggest that a more generous homestead exemption does not have a statistically significant effect on enterprises that have been in operation for 2 to 3 years.

The analysis of businesses with 4 or more years of service suggests a small positive effect of a more generous bankruptcy exemption. The short-term and long-term magnitudes range

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<sup>7</sup> Results for the 0 to 10 mile sample are available from the authors upon request.

<sup>8</sup> Cross-sectional estimates from 2002 to 2009 are available from the authors upon request.



from a 0.7 to 1.7 percentage point increase in the probability of having an existing establishment after an increase in the homestead exemption of \$500,000. Once we adjust for the non-linear effects of the policy, all of the coefficients are statistically significant at least at the 10% level. Overall, our findings provide evidence that bankruptcy law does not create business turnover, but actually has a positive impact existing establishments. One explanation is that a more generous bankruptcy exemption encourages individuals who have the ability to start a successful business to incur the risk. By encouraging innovators, states with a higher homestead exemption are able to attract more successful enterprises to the local economy.

### *Bankruptcy Law and Ownership Structure*

A potential concern with the above analysis is that the effects we have found may be caused by other differences in state policy, such as differences in the minimum wage or right-to-work laws (Rohlin, 2011; Holmes, 1998). So long as these other policies are exogenous to the homestead exemption, we will still obtain the causal effect of bankruptcy law on entrepreneurship. To address this concern and show other state policies are uncorrelated with the homestead exemption, we break up the sample into sole proprietorships and corporations. One important aspect of bankruptcy law is that there are differences between corporate bankruptcy and personal bankruptcy procedures. Many small businesses are sole proprietorships. For these enterprises, business assets and personal assets are treated the same during bankruptcy. Therefore, unlike other state policies that affect businesses, only sole proprietorships will be affected by changes in the personal bankruptcy law. If states are enacting “pro-business” policies along with changes to the homestead exemption, then we would see a positive effect on corporations. Likewise a

negative effect of the homestead exemption on corporations would occur if state policymakers enact “anti-business” policies with changes in homestead exemptions.

To test the impact of the homestead exemption across different ownership structures, we rerun the preferred model in equation (1) separately for sole proprietorships and corporations. The D&B data allows for this flexibility, as it identifies establishments as sole proprietors, corporations, and limited liability partnerships. The long-term results for the 0 to 1 mile border area are presented in Table 5.<sup>9</sup>

The results in Table 5 suggest that entrepreneurs operating sole proprietorships are more likely than corporations to locate in the state with the higher homestead exemption. Specifically, we find that a half a million dollar increase in the homestead exemption increases the likelihood of locating in that area by 5.91 percentage points ( $0.1181/2$ ) for sole proprietorships, with a standard error of 0.0669, which is statistically significant at the 10% level. However, for corporations the increase is only 0.81 percentage points ( $0.0162/2$ ) and, with a standard error of 0.0601, is not statistically significant at conventional levels. Given that the positive coefficients found for all firms is largely explained by sole proprietorships, it is unlikely that the positive effect we find for the full sample is driven by another difference state policy. This result supports the argument in the literature that changes in state homestead exemptions occur intermittently as inflationary adjustments and are not done as a part of a broad change in state business policy.

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<sup>9</sup> The long-term and short-term regressions produce similar results. To simplify the discussion, we focus on the long-term results for the rest of this section, to allow for the fact that entrepreneurs may need some time to learn about the policy before a new equilibrium is achieved. The short-term results are available from the authors upon request.

### *Bankruptcy Law and Urbanization*

Does the positive impact of bankruptcy law have different effects in urban and rural areas? To answer this question, we determine how much existing business activity each wedge pair had in 2004 and designate areas as either heavily or lightly developed based on if the area has more than 52,000 existing businesses, the median amount of existing businesses in the sample. We then run separate regressions for new businesses in heavily and lightly developed areas. The long-term results for the 0 to 1 mile from the border sample are presented in Table 6.

The results in Table 6 indicate that a state's homestead exemption has a positive and disproportionately stronger influence on entrepreneurship in urbanized areas. More specifically, in the 0 to 1 mile range, we find that a \$500,000 increase in the homestead exemption increases the likelihood of an entrepreneur locating in that state by 11.62 percentage points ( $0.2324/2$ ) in heavily developed areas. However, in lightly developed areas we do not find a statistically significant effect of a higher exemption at conventional levels.

These findings provide evidence that the benefit of allowing entrepreneurs to protect their assets through the homestead exemption is more valuable in areas with existing business activity. This result supports the evidence from the agglomeration literature (see Duranton et al (2004), Rosenthal & Strange (2004), Glaeser & Gottlieb (2009), Combes et al (2010), and Bleakely & Lin (2011)) that entrepreneurs prefer to locate in areas with existing business activity. Therefore, we conclude that policies which support entrepreneurship, such as increasing the homestead exemption, will be most useful in agglomerated areas.

### *Bankruptcy Law and Establishment Size*

Policy makers are interested in attracting and encouraging the birth and growth of small businesses with the hope that these enterprises will become a driving force for revitalization in the area. The evidence presented thus far suggests that bankruptcy law plays an important role in the location decisions of entrepreneurs. Next, we test whether there is variation in the impact of the homestead exemption based on the size of the establishment. Using the number of employees to measure the size of a firm, we run separate regressions for establishments with 1 to 9 employees and establishments with 10 or more workers. We chose this cutoff because fewer than 9 employees is the smallest cutoff available in the D&B data. To separate the businesses with more than 10 employees further would result in significantly fewer observations.<sup>10</sup>

Table 7 presents the results stratified by the number of employees four years after the 2005 reform for the 0 to 1 mile band. The results for establishments with 1 to 9 employees indicate that the strong positive effect of the homestead exemption on the location decision of all new establishments is driven largely by the smaller enterprises. In the long-term, a \$500,000 increase in the homestead exemption results in an increase in the probability that a new establishment locates in that state by 12.81 percentage points. The estimates for enterprises with 10 or more employees have no discernible pattern, with negative but statistically insignificant point estimates. These results suggest that state policy makers should consider increasing the homestead exemption if the goal is to attract small businesses.

### **VI. Extension – Share Model**

Our goal has been to analyze how bankruptcy law affects the sorting of entrepreneurs when two

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<sup>10</sup> The Dun and Bradstreet data set identifies the number of employees for most but not all businesses. Therefore, the number of observations in Table 6 does not equal the number of observations in our All Firms results.

adjacent areas are competing for the new enterprise. In this spirit, instead of using the probability a business locates on one side of the border, we could use the share of new establishments to determine whether bankruptcy law affects the spatial pattern of business activity. In this alternative model, the dependent variable is the share of new business activity in the wedge pair that locates on a given side of the border, taking the form:

$$Y_{i,year} = \frac{Y_{2,year}}{Y_{2,year} + Y_{1,year}}. \quad (2)$$

Panel A of Table 8 presents the cross-sectional analysis for the years 2002, 2004, 2006 and 2009 for new establishment activity 0 to 1 mile from the state border. The results in column 1 indicate that a state with a homestead exemption than the adjacent state will receive more of the new business activity. Similar to the results in Table 3, we find that the effect of the homestead exemption on new business activity becomes increasingly positive over the 2002 to 2009 period. The squared term in 2009 suggests that the marginal benefit of the homestead exemption grows as the difference becomes larger.

However, as discussed earlier, the cross-sectional analysis is subject to concerns that time-varying area characteristics are biasing the results. Therefore, we move to our preferred specification which uses a differencing approach. In the double-difference specification using the share model, the dependent variable is created by calculating the total number of new establishments in the entire wedge pair for each time period. Then, we calculate the percentage of new businesses on a given side of the wedge pair is for both years. Finally, we difference the ratio to determine the change in the share of new business activity in the wedge pair that located on side 2. Thus, the dependent variable takes the form:

$$Y_n = \frac{Y_{2,post}}{Y_{2,post} + Y_{1,post}} - \frac{Y_{2,pre}}{Y_{2,pre} + Y_{1,pre}}. \quad (3)$$

Note that this specification requires that there is some business activity in the wedge pair. While this approach reinforces the idea that the areas are competing with each other, a downside is that it treats areas with different levels of new business activity the same. Also, it is difficult to interpret the coefficients of the share model compared to the establishment model. Therefore, we only discuss the sign of the coefficients, not the magnitudes.

The double difference results for the share model are presented in panel B of Table 8 and indicate that increases in the homestead exemption have a positive effect on the share of new business arrivals an area receives. For both distance bands, we find a larger effect in the short-term compared to the long-term. The findings from the share model support the result that the homestead exemption promotes entrepreneurship and that the exemption is a valuable tool for policy makers who wish to attract new businesses to their state.

## **VI. Conclusions and Policy Implications**

In this paper, we analyzed the impact of differences in the level of the homestead exemption on where an entrepreneur chooses to locate his business. One of our key contributions is the improvements in our analysis due to our data set. Prior research has tended to draw upon cross-sectional data, state-level data, or used reported business income as the measure of entrepreneurship. With our sample, we are able to create a panel at the local level (approximately 1 or 10 miles from the border). We use a border approach to control for unobserved local attributes that influence the location decisions of entrepreneurs. We also have a direct measure of business activity and can more accurately measure if an individual is an entrepreneur. Finally, we have data on existing establishments, allowing us to determine if more

generous exemptions result in more businesses on net or if the new enterprises are simply replacing businesses that shut-down.

We find that increasing the homestead exemption in one state increases the probability that an individual opens a new establishment on that side of the state boundary. We do not find that this increase in new businesses comes at the cost of existing establishments. In addition, we find that the effect is particularly pronounced for sole proprietorships, in the more agglomerated areas, and for small businesses (fewer than nine employees).

Our findings have several implications for policy makers. First, our results suggest that states can attract new businesses by providing more protection to entrepreneurs if the endeavor is unsuccessful. This wealth insurance is the main reason bankruptcy law exists and we find it does fulfill its intended purpose. However, we do not find that these new businesses are simply replacing old enterprises. This result is encouraging because it suggests that the overall net effect of a more generous homestead exemption on business activity is positive. The wealth insurance created by the exemption does not just encourage any individual to start a business, but encourages the individuals who are more capable of running a successful business to incur the risks. In addition, we find that in the most developed areas, offering additional wealth insurance if an enterprise fails attracts more new businesses to the area, which is consistent with the agglomeration literature. This finding suggests that policy makers in the more urbanized areas should be cognizant of the homestead exemption, as the wealth insurance is more valuable in heavily developed localities.

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**Figure 1: Total Bankruptcy Filings**

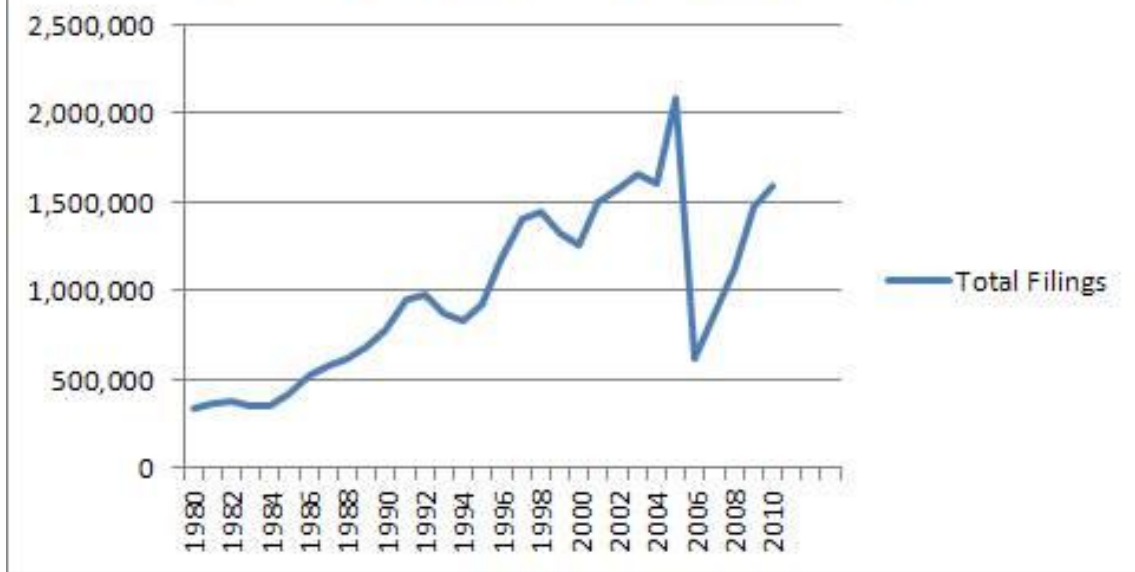


Figure 2: Visual example of the GIS process.

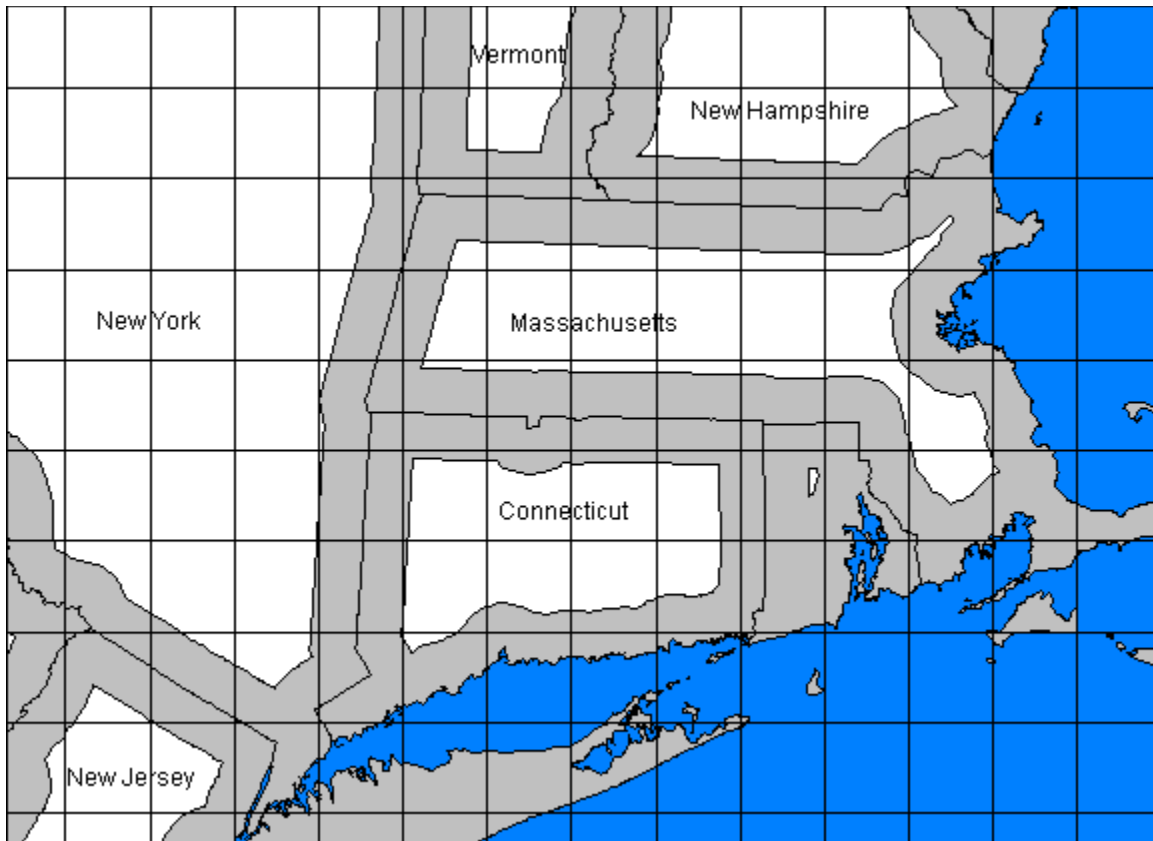


Figure 3: Thematic map displaying how much new business employment is along all state borders in 2002.

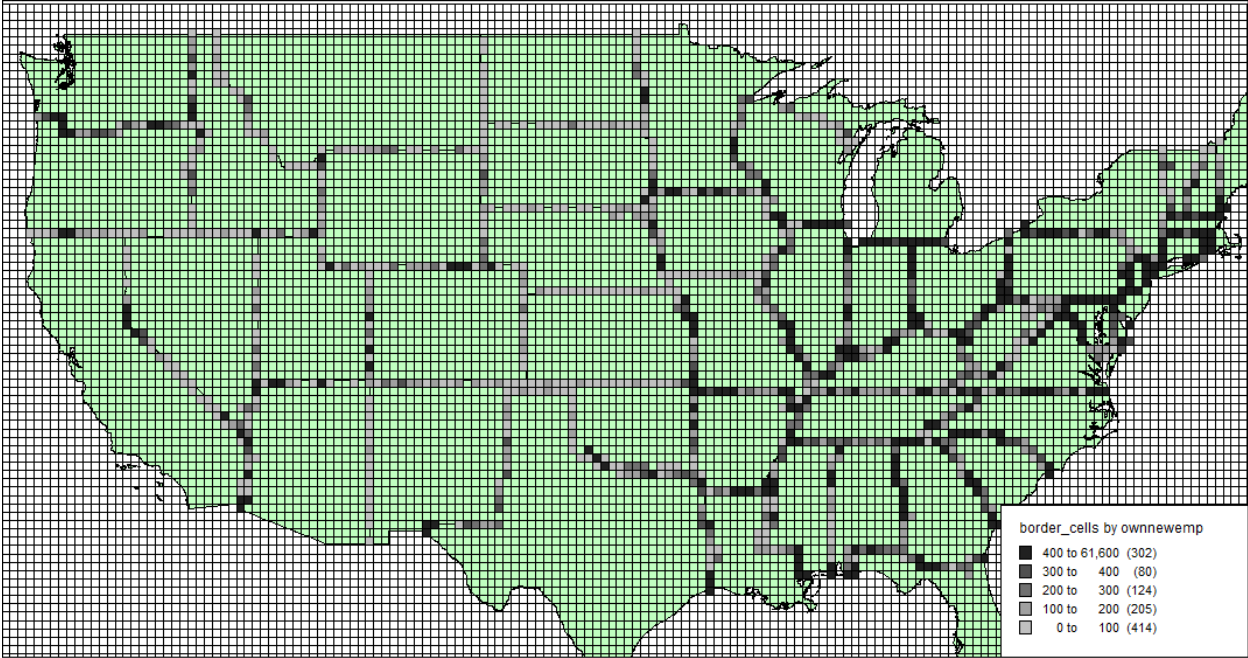


Table 1. Homestead Exemption Levels				
State	2004 Homestead Exemption	2006 Homestead Exemption	2009 Homestead Exemption	Federal Exemption
Alabama	10000	10000	10000	No
Alaska	64800	67500	67500	Yes
Arizona	100000	150000	150000	No
Arkansas	Unlimited	Unlimited	Unlimited	Yes
California	75000	75000	75000	No
Colorado	90000	90000	120000	No
Connecticut	150000	150000	150000	Yes
Delaware	0	50000	50000	No
District of Columbia	Unlimited	Unlimited	Unlimited	Yes
Florida	Unlimited	Unlimited	Unlimited	No
Georgia	20000	20000	20000	No
Hawaii	20000	20000	20200	Yes
Idaho	50000	50000	100000	No
Illinois	15000	30000	30000	No
Indiana	15000	30000	30000	No
Iowa	Unlimited	Unlimited	Unlimited	No
Kansas	Unlimited	Unlimited	Unlimited	No
Kentucky	10000	10000	10000	No
Louisiana	25000	25000	25000	No
Maine	70000	70000	70000	No
Maryland	0	0	0	No
Massachusetts	300000	500000	500000	Yes
Michigan	18450	31900	34450	Yes
Minnesota	200000	200000	300000	Yes
Mississippi	150000	150000	150000	No
Missouri	15000	15000	15000	No
Montana	200000	100000	500000	No
Nebraska	12500	12500	60000	No
Nevada	200000	350000	550000	No
New Hampshire	200000	200000	200000	Yes
New Jersey	18450	18450	20200	Yes
New Mexico	60000	60000	120000	Yes
New York	20000	100000	100000	No
North Carolina	20000	37000	37000	No
North Dakota	80000	80000	80000	No
Ohio	10000	10000	10000	No
Oklahoma	Unlimited	Unlimited	Unlimited	No
Oregon	33000	39600	39600	No
Pennsylvania	18450	18450	20200	Yes
Rhode Island	150000	200000	300000	Yes
South Carolina	10000	10000	100000	No
South Dakota	Unlimited	Unlimited	Unlimited	No
Tennessee	7500	7500	7500	No
Texas	Unlimited	Unlimited	Unlimited	Yes
Utah	40000	40000	40000	No
Vermont	150000	150000	150000	Yes
Virginia	10000	10000	10000	No
Washington	40000	40000	125000	Yes
West Virginia	50000	50000	50000	No
Wisconsin	40000	40000	40000	Yes
Wyoming	20000	20000	20000	No

**Table 2: Total Number of New Business Arrivals**

Variable	2002 Side 1	2002 Side 2	2004 Side 1	2004 Side 2	2006 Side 1	2006 Side 2	2009 Side 1	2009 Side 2	Total
0 up to 1 Mile	21,109	29,343	19,440	22,907	34,901	43,625	53,919	65,872	291,116
0 up to 10 Miles	4,332,972	11,842,507	5,053,924	10,064,864	8,777,084	23,867,392	16,597,746	41,105,316	121,641,805

Table 3: Effect of Bankruptcy on Entrepreneurs – Establishment Level Data (standard errors in parenthesis)

<i>Panel A: Cross Sectional Analysis</i>								
	<i>0-1 Mile</i>				<i>0-10 Miles</i>			
	CS-2002	CS -2004	CS – 2006	CS - 2009	CS-2002	CS -2004	CS – 2006	CS - 2009
Cross-Border Difference in Homestead Exemption	-0.3597* (0.2016)	-0.0736 (0.2256)	0.1523 (0.1923)	0.3561** (0.1645)	-0.5039*** (0.1846)	-0.2068 (0.2178)	0.0708 (0.2046)	0.3440* (0.1841)
Cross-Border Difference in Homestead Exemption Squared	0.6128 (0.3925)	0.0955 (0.4395)	-0.3892 (0.3549)	-0.6753** (0.3047)	0.8393** (0.3659)	0.2740 (0.4266)	-0.2880 (0.3799)	-0.7046** (0.3345)
Observations	46,750	39,089	58,744	93,985	62,793	53,878	79,420	130,160
R <sup>2</sup>	0.471	0.457	0.448	0.475	0.507	0.505	0.488	0.514
<i>Panel B: Differencing Models</i>								
	<i>0-1 Mile</i>				<i>0-10 Miles</i>			
	DD - Short	DD - Short	DD - Long	DD - Long	DD - Short	DD - Short	DD - Long	DD - Long
Double Difference in Homestead Exemption	0.0936* (0.0539)	0.0926* (0.0521)	0.0617 (0.0385)	0.0822** (0.0409)	0.1656*** (0.0635)	0.1623*** (0.0584)	0.0917** (0.0437)	0.1096** (0.0488)
Double Difference in Homestead Exemption Squared	- -	-0.0002 (0.0002)	- -	-0.0001* (0.0001)	- -	-0.0001 (0.0002)	- -	-0.0001 (0.0001)
Observations	144,583	144,583	179,824	179,824	196,091	196,091	184,107	184,107
R <sup>2</sup>	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Notes: All Differences are in \$1 Million								

Table 4: Effect of Bankruptcy on Existing Businesses for 0 to 1 Mile Buffer (standard errors in parenthesis)

<i>Panel A: Differencing Models for Businesses with 2 to 3 years of service</i>				
	DD - Short	DD - Short	DD - Long	DD - Long
Double Difference in Homestead Exemption	0.04882 (0.0355)	0.0467 (0.0351)	0.0091 (0.0201)	0.0072 (0.021)
Double Difference in Homestead Exemption Squared	- -	-0.0001 (0.0000)	- -	0.0001 (0.0000)
Observations	36,165	36,165	558,971	558,971
R <sup>2</sup>	0.007	0.007	0.005	0.005
<i>Panel B: Differencing Models for Businesses with 4 or more years of service</i>				
	DD - Short	DD - Short	DD - Long	DD - Long
Double Difference in Homestead Exemption	0.0131 (0.0082)	0.0171* (0.0106)	0.0337*** (0.0112)	0.0304*** (0.0097)
Double Difference in Homestead Exemption Squared	- -	0.0001* (0.0000)	- -	0.0001* (0.0000)
Observations	2,573,278	2,573,278	3,228,992	3,228,992
R <sup>2</sup>	0.003	0.003	0.003	0.003
Notes: All Differences are in \$1 Million				



Table 5: Long Term Regression Results by Ownership Structure for 0 to 1 Mile Buffer (standard errors in parenthesis)

	All Firms	Sole Proprietorships	Corporations
Double Difference in Homestead Exemption	0.0822** (0.0409)	0.1181* (0.0669)	0.0162 (0.0601)
Double Difference in Homestead Exemption Squared	-0.0001* (0.0001)	-0.0002* (0.0033)	-0.0002* (0.0001)
Observations	133,145	33,491	72,837
R <sup>2</sup>	0.467	0.002	0.003

Notes: All Differences are in \$1 Million

Table 6: Long Term Regression Results by Level of Development for 0 to 1 Mile Buffer (standard errors in parenthesis)

	All Firms	Lightly Developed Area	Heavily Developed Area
Double Difference in Homestead Exemption	0.0822** (0.0409)	0.0314 (0.0366)	0.2324* (0.1358)
Double Difference in Homestead Exemption Squared	-0.0001* (0.0001)	-0.0001 (0.0001)	-0.0004 (0.0002)
Observations	179,824	115,863	63,961
R <sup>2</sup>	0.001	0.001	0.004

Notes: All Differences are in \$1 Million

Table 7: Long Term Regression Results by Size of Firm for 0 to 1 Mile Buffer  
(standard errors in parenthesis)

	All Firms	Small Firms 1 to 9 Emp.	Large Firms 10 + Emp.
Double Difference in Homestead Exemption	0.0822** (0.0409)	0.2598*** (0.0603)	-0.1257 (0.4326)
Double Difference in Homestead Exemption Squared	-0.0001* (0.0001)	-0.0003** (0.0001)	-0.0008 (0.0007)
Observations	179,824	115,863	1,393
R <sup>2</sup>	0.001	0.001	0.058
Notes: All Differences are in \$1 Million			

Table 8: Effect of Bankruptcy on Entrepreneurs – Share of Activity Data for 0 to 1 Mile Buffer (standard errors in parenthesis)

<i>Panel A: Cross Sectional Analysis</i>				
	CS-2002	CS -2004	CS – 2006	CS - 2009
Cross-Border Difference in Homestead Exemption	0.1371** (0.0655)	0.1695** (0.0667)	0.2443*** (0.0632)	0.2530*** (0.0569)
Cross-Border Difference in Homestead Exemption Squared	-0.1591 (0.1616)	-0.2709 (0.1703)	0.2972* (0.1657)	0.3380** (0.1581)
Observations	35,609	29,835	36,728	37,986
R <sup>2</sup>	0.007	0.008	0.010	0.011
<i>Panel B: Differencing Models</i>				
	DD - Short	DD - Short	DD - Long	DD - Long
Double Difference in Homestead Exemption	0.3870*** (0.0871)	0.3858*** (0.0876)	0.1973*** (0.0433)	0.1687*** (0.0415)
Double Difference in Homestead Exemption Squared	- -	0.1210 (0.6474)	- -	0.4607*** (0.1469)
Observations	22,752	22,752	23,321	23,321
R <sup>2</sup>	0.008	0.008	0.008	0.008
Notes: All Differences are in \$1 Million				