**The Effect of Insurance Premium Taxes on Interstate Differences in the Size of the Property-Casualty Insurance Industry\***

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**Abstract**

States levy insurance premium taxes, which are essentially gross receipt taxes on premiums, with insurance companies paying the higher of the tax rate in the state in which the company is domiciled and the state in which the policy is written. Using a state-level panel data set from 1996-2010 for the property-casualty insurance industry, we explore the effect of insurance premium tax rates on interstate differences in property-casualty insurance industry employment and other measures of industry size. While the estimated elasticities of industry size with respect to the tax rate differ across models, we find that the insurance premium tax has a large, negative and economically significant effect on the size of the insurance industry in a state.

**1. Introduction**

State taxation of insurance companies differs from state taxation of other corporations in that states levy premium taxes, which are essentially gross receipt taxes on premiums written by insurance firms. However, there is a unique feature of premium taxes, namely that insurance companies pay the higher of the tax rate in the state in which the company is domiciled and the state in which the policy is written. Furthermore, there are substantial differences across states in the tax rates imposed on insurance firms. These features of premium taxes provide a strong incentive for an insurance firm to locate in the state with the lowest premium tax rate among the states in which it writes premiums. But, while the literature on the effect of taxation on employment and business location is quite large (Wasylenko 1997) there is little research that addresses the location of the insurance industry across states. This paper presents estimates of the effect of state insurance premium taxation on interstate differences in the size of the property-casualty insurance industry.

Although recent research generally finds a negative relationship between state taxes and employment, there is no existing evidence of the effect of taxes on the size of a state’s insurance industry. Yet state tax policy should be informed in part by how responsive the industry is to changes in the insurance premium tax rate. The insurance industry is seen as a desirable target for economic development since it is a clean industry with salaries well above average and because employment in the insurance industry is significant, comprising two percent of private nonfarm employment. For crafting economic development policy, a state needs to understand the factors, particularly those under the control of the state such as the insurance premium tax, that affect the location of insurance companies. Knowing the likely effect that a tax rate change would have on the size of the state’s insurance industry would be important in deciding whether to adopt such a policy.

This paper contributes to the literature on the effect of taxes on industry size in several ways. First, we consider an industry that has not been the subject of much previous research on location decisions. In addition, we address several methodological and data problems that have been identified as weaknesses in other studies of the effect of taxation on the location of industries generally, including studies of employment (Bartik 1991).

First, one of the difficulties with many of the existing studies is that they typically focus on the relationship between the corporate income tax or the individual income tax and employment in a state across all industries or all manufacturing sectors. This is problematic for several reasons, but in particular, as pointed out by Papke (1987), since not all industries are structured similarly, the reaction to variations in these general tax measures may differ by industry. Unless the industrial composition is controlled for, which is generally not done, the results are weak and exhibit contradictory analytic findings.[[1]](#footnote-1) Focusing on a single homogenous industry ameliorates this issue.

Second, both individual and corporate income taxes are complex and vary greatly in their application across states. Modeling these taxes correctly and properly accounting for factors such as apportionment of corporate income is challenging and requires more data than is generally available. Because the tax applicable to insurance companies is a gross receipts tax and is not subject to apportionment, many of the complexities associated with modeling the corporate income tax are avoided. Furthermore, our data allow us to construct effective insurance premium tax rates that take into account the various provisions of the tax on insurance companies. Few studies had the available data to construct effective tax rates.

Third, we can control for possible tax rate endogeneity, that is, for the possibility that the size of the insurance industry in a state could affect the tax rate. The combination of these improvements to the rigor of the research results in increased clarity and confidence in the findings compared to previous work on this subject.

There has been little written on the economic effects of taxes as they relate specifically to the insurance industry. McNamara et al. (2006) consider the effect of a firm’s relocation on the firm’s premium taxes. Wheaton (1986) considers the impact of state taxes on the asset growth rates over the 1966-1981 period of the 77 largest life insurance companies. Grace and Yuan (2012) update the Wheaton paper looking at the entire life insurance industry for a more recent time period and find similar results. Petroni and Shackelford (1995) consider the effect of state premium taxes and regulation on the choice of organizational form of property and casualty insurers. Finally, Grace et al*.* (2009) provide a descriptive analysis of the relationship between property-casualty employment and the premium tax rate.

In this research we calculate the effective tax rate on premiums written by domestic insurers and identify the statutory tax rate for premiums written by foreign insurers for each state and year for the period 1996-2010.[[2]](#footnote-2) We estimate the effect of the insurance premium tax rate on several measures of industry size, including employment, using multiple models. Our estimates do differ across the various models we estimate and measures of industry size. However, the empirical results imply that the insurance premium tax on property-casualty insurance companies has a large negative effect on state-level measures of the size of the property-casualty insurance industry, including employment.

The remainder of the paper proceeds as follows. The next section contains a description of the insurance premium tax and a theoretical framework of the incentive effect of the premium tax on the location of firms in the industry. Section 3 discusses our empirical approach to the issue. Section 4 contains a discussion of the data used, and section 5 presents the empirical results. Concluding comments finish the paper.

**2. Taxes on Insurance Premiums**

Insurance companies writing policies in a state are generally not subject to the state corporate income tax, but instead are taxed on the value of premiums written in that state.[[3]](#footnote-3),[[4]](#footnote-4) The premium tax is a gross receipts tax levied as a fixed percentage of the value of the premiums written in the state less a deduction for any premiums returned or dividends paid to the policyholder.

Unlike other industries, state level taxes on the insurance industry are imposed under unique circumstances.[[5]](#footnote-5) First, states are able to discriminate against out-of-state commerce by imposing higher tax rates on out-of-state carriers.[[6]](#footnote-6) Thus, a state can, but typically does not, impose a higher foreign tax rate compared to its domestic tax rate. The foreign tax rate applies to insurance policies written in a state by firms that are not domiciled in the state, while the domestic tax rate applies to domestic firms. Second, states employ defenses to these discriminatory taxes in the form of so-called retaliatory taxes.[[7]](#footnote-7)

Retaliatory taxes are taxes imposed by a state on insurance providers chartered in states with higher premium tax rates.[[8]](#footnote-8) For instance, if a Tennessee company, which faces a premium tax rate of 2.50 percent, writes a policy in Georgia, which has a total (state plus local) foreign premium tax of 4.75 percent, then the company faces a premium tax of 4.75 percent on the policies written in Georgia.[[9]](#footnote-9) On the other hand, if a Georgia company writes a policy in Tennessee, then the Georgia company faces the 2.50 percent Tennessee tax rate plus a retaliatory tax of 2.25 percent, i.e., the difference between the Tennessee tax rate of 2.50 percent and the Georgia tax rate of 4.75 percent, for a combined tax rate of 4.75 percent. In effect then the company pays the higher of the foreign premium tax rate in the state in which the insurance policy is written and the state in which the company is domiciled. More formally, the retaliatory tax imposed by a state on out-of-state insurers is the greater of zero and the difference between the foreign tax rate imposed by the insurer’s state of domicile and the foreign tax rate imposed by the state in which the out-of-state insurer is selling the insurance policy. Thus, the retaliatory tax operates so that the lowest tax rate an insurer will face among the states in which it sells policies is the rate in its home state. This provides an obvious incentive for insurance companies to locate in states with a low tax rate and for states to attract more insurance companies to domicile in their state by lowering the tax rate.

In addition to the difference in foreign and domestic tax rates levied by states, states also implement tax policies that further alter the tax rate for domestic companies operating within the same state. These differences in tax policies toward domestic and foreign companies are often in the form of tax credits for investments in the state or deductions for the number of employees in the state.

Consider somewhat more formally the location incentives introduced by the retaliatory tax system. Assume that an insurance firm is deciding in which of two states, denoted *A* and *B*, it should be domiciled and that the firm expects to write policies in both states. If the domestic and foreign tax rates are the same within each state but differ across states, then because of the retaliatory tax an insurance firm can never do better in terms of the taxes paid than locating in that state with the lowest tax rate from among the states in which it sells insurance.

However, if the foreign and domestic rates are not equal, then the incentives are more complicated. Let the domestic and foreign premium tax rate for state *A* (*B*) be denoted  and  ( and ), respectively. Let *rA* (*rB*) denote the retaliatory tax imposed by state *A* (*B*) on firms domiciled in state *B* (*A*), where and Thus, if the firm locates in state *A*, the tax liability would be equal to , while if the firm locates in state *B* the taxes would be , where *PA* and *PB* are the value of premiums it expects to write in the two states.

In order to minimize its tax liability, the firm should locate in state *B* if . Rearranging terms, this inequality can be rewritten as

[1]

The first and second terms of expression 1 illustrate the influence of the intra-state differences between the foreign and the domestic rates and the difference in the value of premiums written in each state. The third and fourth terms depend on the retaliatory taxes, which depend on the relative values of and . Assuming the following relationship between the domestic and foreign rates in the two states, , expression 1 becomes

[2]

The left hand side of expression 2 is more likely to be greater than zero: the larger the value of *PB*; the larger the value of , since if we disregard the retaliatory tax, the tax on *PB* falls by if the firm locates in state *B* rather than state *A*; the smaller the value of *PA*; and the smaller is , since the tax on *PA* rises by if the firm locates in state *B*; the larger the value of , that is, the larger the retaliatory tax.

All of the terms in parentheses in expression 2 are positive given the assumption regarding the tax rates. If *PB* > *PA* and if intra-state tax rate difference in state *A* is small as compared to the interstate difference in the foreign tax rates (which is the case in reality), then the firm should locate in state *B*. But if *PA* is larger than *PB*, then the firm would locate in state *A* if the second term in expression 2 is large enough to offset the other two terms. This would require large values of *PA* and/or of the intra-state tax difference in state *A*.

If we consider state *A* to be a small state and state *B* as representative of the rest of the U.S., expression 2 implies that a firm that sells to the entire U.S. would locate in state *B*, while a firm that writes policies mainly in state *A* would locate in state *A*. This infers that we should expect that most insurance firms would locate in the state with the lowest foreign tax rate among the states in which it sells policies. However, if a state has a domestic tax rate that is lower than its foreign tax rate, we would expect that the state would attract some firms that write policies relatively heavily in that state. This implies the following hypothesis: the size of the industry in a state will be larger the smaller the foreign tax rate and the greater the difference between its foreign and domestic tax rates. In practice, the within state tax differentials are usually zero or very small, which suggests that the effect of the typical tax differential on location decisions will be small. Thus, we expect the between-state differentials in the foreign tax rate will have the larger influence on the location decision.

In the above example we assumed that the total volume of premiums written is independent of the tax rate. However, allowing for the volume of premiums written to be dependent on the tax rate, and assuming the responsiveness to the tax does not differ by state, does not change the basic conclusion.

While the above framework suggests that the size of the insurance industry is negatively related to the foreign tax rate, it is possible that the effect could be zero. The premium for a property-casualty insurance policy will likely differ across jurisdictions based on differences in the risk that have to be covered. But within a jurisdiction if the property-casualty industry is competitive, meaning there is one price in the market, then a firm facing a higher tax rate in a jurisdiction because of the retaliatory tax will have a lower net return. However, if individual property-casualty firms have substantial monopoly power and demand is inelastic, then much of the relatively higher tax rate resulting from locating in a state with a high foreign tax rate could be offset by increases in its premium. In that case, interstate tax differentials may have little effect on the location of property-casualty firms. We calculated a Herfindahl index for each state and find that the industry is not concentrated; the values of the indices range from 0.009 to 0.084.

While we measure the size of the industry in several ways, we are primarily interested in the effect of the tax on the number of employees associated with the presence of an insurance company headquarter. The policy question that states are likely to be most interested in concerns the effect of the tax rate on employment, not just the number of firms domiciled in the state since the principal economic development goal for states is assumed to be increased employment. We assume that employment in a state is directly associated with the location of insurance firms in that state. However, a firm domiciled in one state could potentially locate its employees in another state. If this is a common practice we would expect to find more insurance companies domiciled in states with lower foreign tax rates, but with possibly no effect of the lower tax rate on employment.

In summary, if a firm’s employment is tied to where it is domiciled and if the market for property-casualty insurance is competitive, then we expect to find greater employment in states with lower foreign insurance premium tax rates and with larger differences between the foreign and domestic tax rates. But, if those conditions are not met, then employment may not be affected by tax rate differentials.

**3. Empirical Methodology**

We assume that the size of the property-casualty insurance industry in each state in each year is in equilibrium, meaning that given tax rates and other factors firms do not want to relocate either their headquarters or employees, and that equilibrium depends on factors that reflect the attractiveness of a state as a location. Our regression models are estimated using the panel data set described in the next section. As noted below we measure industry size in several ways, but for this discussion consider size as being measured by employment in the industry. Our hypothesis is that employment will be negatively related to the state’s foreign tax rate and positively related to the difference between the state’s foreign and domestic tax rates.

Our basic regression model is given by

*Ets = β0 +* *+ + ∑ βiXts + µt +εts* [3]

where *Ets* is a measure of employment in the property-casualty insurance industry in year *t* in state *s*, *T* is the foreign insurance premium tax rate, *D* is the foreign tax rate less the effective domestic tax rate, *X* is a set of industry and state control variables, *µ* is a set of year dummies, and *ε* is an error term. We use year dummies in order to control for factors such as the state of the economy that vary over time but not across states. A model using state fixed effects is presented in section 5.2.

Nearly all studies of the effect of taxes on state level economic activity such as employment assume that tax rates are exogenous; Gupta et al. (2009) is an exception. The insurance premium tax rate could be endogenous if, for example, insurance firms lobbied the state to lower the tax rate and the success of such lobbying was dependent on the size of the insurance industry in the state. While, as explained below, our priors are that the foreign tax rate is exogenous, we consider the possibility that it is not. To address this possible endogeneity issue we first use lagged tax rates, but then also specify a simultaneous equation model that is estimated using 2SLS.

**4. Data**

Our data consists of a panel for the 50 states plus D.C. for each year 1996 to 2010. There are missing data for some years for some states, which reduces our sample size from 765 to 755.[[10]](#footnote-10) Our focus in this paper is specifically on the property-casualty insurance industry, in part because it is possible to obtain information about the taxes paid by each insurer writing insurance in a state for this industry. This level of detail for state taxes is not available for the life insurance industry.

We constructed state-specific effective domestic tax rates, denoted *DRate using* data from the National Association of Insurance Commissioners*, Annual Statement*, *State Page* (various years).[[11]](#footnote-11) These data contain a state-by-state enumeration of premiums, losses, expenses, commissions, and taxes for each company writing business in a state in a given year. Specifically, the data contain the amount paid in a given year for premium taxes, licenses, and fees, as well as any credits received. Total net taxes are the sum of premium taxes, licenses, and fees less any credits. Thus, our tax variable reflects state-specific institutional provisions of the premium tax. The effective domestic tax rates are calculated by dividing total direct net taxes paid to state *s* by property-casualty insurance companies domiciled in state *s* by the premiums written in state *s* by insurance companies domiciled in state *s*.

The foreign tax rate, denoted *FRate,* is measured by the statutory foreign tax rate, obtained from NAIC’s Retaliation Tax Guide (various years).[[12]](#footnote-12) Petroni and Shackelford (1995) estimated effective foreign tax rates by summing total net taxes paid to state *s* by foreign firms divided by the premiums written in state *s* by foreign firms. However, the taxes paid to a state by a foreign firm are based on whether the state in which the premiums are written or the state of domicile has the higher foreign tax rate. Thus, Petroni and Shackelford measure the state’s effective foreign tax rate as a mix of the state’s foreign tax rate and the foreign tax rates in states of domicile, and thus is not an accurate measure of the effective foreign tax rate. Nonetheless, we also calculated the effective foreign tax rate using Petroni and Shackelford’s procedures. The resulting effective foreign tax rates and the statutory tax rates are highly correlated, and using the effective foreign tax rates rather than the statutory foreign tax rates yield very similar empirical results.

Because the foreign and domestic tax rates are highly correlated, it is not appropriate to include both rates in a regression equation. Thus, for both theoretical and econometric reasons we include the foreign tax rate and the difference between the foreign and domestic rates in the regressions. Therefore, we created *DifRate,* which equals *FRate-DRate*. On average, the foreign tax rate is greater than the domestic tax rate. However, over the period of our data the average domestic and foreign tax rates fell, with the foreign tax rates falling by more. Thus, the average difference between the two rates fell from 4 percent of the mean foreign rate in 1996 to one-half of one percent in 2010.

Our principal dependent variable is employment in thousands in the property-casualty industry in a state in a given year, denoted *Emp*. The property-casualty employment data come from the Bureau of the Labor Statistics (Quarterly Census of Employment and Wages Program) and is for the industry defined as NAICS series 524126. This NAICS series captures employment specifically related to the underwriting and risk assessment services associated with the property-casualty insurance industry and excludes agents and other insurance industry employment. We also consider several other measures of the size of the insurance industry, as discussed below.

We include two industry control variables. To control for the stringency of the state’s regulatory environment we employ an indicator variable, denoted *Reg*, which equals one if the state regulates price changes with “prior approval” and zero if it allows companies to set prices subject to an *ex post* oversight of rates.[[13]](#footnote-13) Prior approval states require the insurer to submit its rates for approval from the regulator prior to their use in policy contracts. This prior approval indicator variable is based upon Harrington (2002) and was updated by the authors to be consistent with our panel. This is a crude but commonly employed variable to describe the state’s regulatory environment. It could be that strict price regulation reduces the output of insurers and this reduces the demand for labor. Or, it could be that strict regulation increases employment in order to better comply with the state’s regulations. However, our prior is that more strict regulation will reduce insurance industry employment within a state.

“Prior approval” regulation applies to both domestic and foreign firms. We would have preferred to have a variable that measured a state’s regulatory power solely over domiciled firms. However, such a measure is not available, so we must assume that such regulatory authority is reflected in *Reg*.

To reflect industry cost differences between states, we use the state average annual agent wage, denoted *Wage,* obtained from the Quarterly Census of Employment and Wages.  This follows other studies that frequently use the wage in manufacturing to reflect labor costs across industries. We believe that this variable accurately reflects the interstate wage differential for the property-casualty industry; it reflects an occupation that is uniform over time and across states and that reflects the wage of an occupation that is common in the insurance industry. As will be discussed more thoroughly below, wages for several other occupations were tried with similar empirical results.

To this set of variables we add a set of state control variables that reflect factors which might affect the location and employment of property-casualty firms. We expect that insurance companies are more likely to locate in metropolitan areas, so we include the percentage of the population in metropolitan areas, denoted *Metro*. This was obtained from various issues of the *Statistical Abstract*, although we had to interpolate the values for some years. Some studies of the effect of taxes on employment include a set of fiscal variables, including both revenue and expenditure (see Helms 1985). However, the premium tax is the principal tax paid by property-casualty firms, and thus most other government revenue sources are not relevant to the location decision. However, we do include income tax revenue per dollar of personal income, denoted *PIT,* and sales tax revenue per dollar of personal income, denoted *ST*, since income taxes and sales taxes might affect the executive decision of where to locate the firm. Individual income tax and sales tax revenue were obtained from the Census Bureau and personal income came from the Bureau of Economic Analysis (BEA). We do not include government expenditure variables since we do not expect insurance firms to be responsive to interstate differences in government expenditures.[[14]](#footnote-14) The percentage of the population with at least a college degree, denoted *BA,* (from the Census Bureau) is included as a measure of the labor force the industry is likely to draw from in a state.

The percentage of the population 65 and over, denoted *Over65*, (from the Census Bureau), the percent employed in manufacturing, denoted *MFG, (*from the Bureau of Labor Statistics), and income per capita (in thousands), denoted *PCInc*, (from the BEA), are included as additional measures of state characteristics that may be important to an insurance company’s location decision. We include *Over65* to allow for the possibility that a larger elderly population might be reflective of other state characteristics, for example, perhaps the attitude or policies toward business, that affect location decisions. We include *MFG* as a control for industrial differences across states, on the assumption that insurance firms might be more attracted to states that are less industrial. Higher per capita income might suggest the state has greater amenities that an insurance firm might value. In addition, these variables might reflect differences in the demand for insurance across states. However, given that only about 6 percent of premiums are written by firms operating in less than 10 states, we expect that location decisions involving most employment are not based on the size of the state’s market. We do not have strong priors regarding the sign of the coefficients on these three control variables, but we expect the coefficient on *PCInc* to be positive and the coefficients on *MFG* and *Over65* to be negative.

We also included a state-level Herfindahl Index, denoted *HI.*  To calculate *HI* we used the market share in the state for each insurance firm writing policies in the state. We include *HI* to control for the degree of monopoly power in the state. The ability to shift the burden of the tax on to consumers in the state is expected to be positively related to the degree of monopoly power and consequently positively related to the Herfindahl Index. In states where insurance firms have monopoly power it is anticipated that the tax rate would have less effect on employment. Finally, we include year dummies.

Table 1 presents descriptive statistics for the entire period. For our panel the average foreign tax rate is 2.27 percent, while the average effective domestic rate is 2.3 percent. There is a large variation in tax rates, with the foreign rate ranging from near zero for Michigan which had a single business tax rate based upon premiums to 4.75 percent in Georgia. In turn, the average within state difference between the foreign statutory and domestic effective rates is approximately 0.02 percent (ranging from -5.9 percent to 3.7 percent) reflecting a great deal of heterogeneity among the states.

[Insert Table 1 here]

1. **Results**
   1. ***Basic Results***

Table 2 presents the basic panel OLS regressions results, without accounting for possible endogeneity of *FRate*, using total property-casualty employment (in thousands) as the dependent variable.[[15]](#footnote-15) These results are from models with robust standard errors; we do not report the coefficients on the year dummies. We report regressions without and with the state control variables in order to illustrate how our basic results are affected by the inclusion of the state controls. The first column of Table 2 gives the results with no state control variables included. The coefficient on the foreign tax rate (*FRate*) is negative and statistically significant, consistent with the basic hypothesis. The implied elasticity at the sample means is -0.494. The elasticities of *Emp* with respect to *FRate* are calculated assuming the *DRate* is fixed, so that *δ*(*Emp)/δ*(*FRate)* is the sum of the coefficients on *FRate* and *DifRate*. The elasticity is at the mid-point of the range of tax elasticities reported by Bartik (1992) and Phillips and Goss (1995), who conclude from their literature reviews that the elasticity of interstate economic activity with respect to taxes ranges from -0.15 to -0.85.

[Insert Table 2 here]Our theoretical framework implied that employment should be positively affected by the difference between the foreign and domestic tax rates (*DifRate*), given the foreign tax rate. Consistent with the hypothesis, the coefficient on *DifRate* is positive and statistically significant. The size of the coefficient is small in terms of the variable’s economic importance.

The coefficient on the regulatory variable (*Reg*) is positive, but statistically insignificant. This is a rather crude measure of the regulatory environment, and as noted earlier could possibly have either a positive or negative effect on employment. The coefficient on *Wage* (state average annual agent wage) is positive and statistically significant, contrary to expectations. One possible explanation is that insurance firms are not particularly sensitive to the cost of labor, for example, they may hire from the national market and thus are not affected by interstate wage differences. Two other possibilities are that the wage variable used does not accurately reflect relevant labor cost for insurance firms or is reflective of other state conditions that positively affect employment in the industry.

We substituted the wage rates for four other occupations for the wage variable: compensations and benefits manager; secretary and administrative assistance (except legal, medical, and executive); financial analysis; and insurance claims and policy processing clerks. In all four cases the coefficient was positive. This leads us to conclude that the cause of the positive coefficient is not that the wage is an inappropriate measure of labor costs, but rather that either insurance firms are not sensitive to interstate differences in wage rates or that the wage level reflects state conditions that are beneficial for the firms.

Column 2 of Table 2 contains the results when we include the state control variables. The coefficient on *FRate* is still negative and statistically significant, and is somewhat larger in absolute value than in column 1. The implied elasticity of *Emp* with respect to FRate is -0.662, which is towards the upper end of the range reported by Bartik (1992) and Phillips and Goss (1995). We experimented with different combinations of the control variables and in all cases the coefficients on the foreign tax rate was of about the same magnitude and always statistically significant.

The coefficient on *DifRate* is still positive and statistically significant, and slightly larger. The coefficient on the tax difference is always positive regardless of which state control variables are included and almost always statistically significant.

The coefficient on the regulatory variable (*Reg*) is negative but still statistically insignificant. The coefficient on the wage variable is still unexpectedly positive and statistically significant.

In terms of the state control variables, the percent metro population (*Metro*) has the expected positive coefficient and is statistically significant. However, the coefficients on several of the other state control variables have unexpected signs. For example, the coefficient on the income tax variable (*PIT)* is positive and statistically significant. Although the coefficient on the sales tax variable is negative, it has a very large standard error. The percent college educated (*BA*) has an unexpected negative coefficient, which is statistically significant. The coefficients on the percent over 65, the percent manufacturing, and per capita income are all negative, with the coefficients on *Over65* and *PCInc* being statistically significant; we had no strong *a priori* expectation as to the sign of these three coefficients, although we expected *PCInc* to have a positive coefficient and *MFG* and *Over65* to have negative coefficients. The coefficient on *HI* is negative and statistically significant, suggesting the more concentrated the industry in the state the lower the employment, a result that is contrary to expectations.

As noted in section 3, a possible concern is that the tax rate could be endogenous. While we hypothesize that the premium tax will affect the level of employment in the state, the size of the industry could affect the tax rate. For example, it is possible that with larger insurance industry employment the industry places greater pressure on the state to lower the insurance premium tax rate. However, our priors are that endogeneity is not a problem. First, given the size of the property-casualty industry, the industry may not be able to exert sufficient political pressure to lower the tax rate. In addition, the changes in tax rates do not appear to be driven by the size of or the change in the industry’s employment. We regressed the change in the tax rate over the period separately against the initial and the annual level of employment; the coefficient on these employment measures had very large standard errors. However, a Hausman test and a Durbin-Wu-Hausman test of endogeneity imply that we cannot reject the hypothesis that the foreign tax rate is endogenous. To deal with the possibility of endogenous tax rates we employ two methods – estimating the regressions directly using lagged tax rates and using 2SLS. While it is also possible that the domestic tax rate and employment may be endogenous, a test of endogeneity between the difference in the tax rates and employment suggests that *DifRate* is not endogenous.

First, we used lagged values of the foreign tax rate with lags up to five years since current employment cannot affect previous tax rates. (While current employment cannot affect the lagged tax rate, we recognize that this may not solve the endogeneity problem if the covariance of the lagged tax rate and the error term is not zero.) The results are very similar to those reported in Table 2 regardless of the length of the lag; given the similarities in results and in the interest of space we do not report the results here.

For the second approach we used a simultaneous equation model estimated using 2SLS. There is relatively little research that has attempted to explain interstate differences in tax rates. Fletcher and Murray (2008) explore the determinants of state personal income tax features, including the top marginal tax rate. Gupta et al. (2009), as part of an effort to explain corporate income tax revenue, estimate a first stage regression that attempts to explain the corporate tax rate.[[16]](#footnote-16) Both Fletcher and Murray (2008) and Gupta et al. (2009) find that variables that measure political party control are significant factors. Other variables that are included and that are statistically significant seem particularly tied to the specific tax under consideration. Related to political control, Reed (2006) finds that taxes in a state with a Democrat controlled legislature are three to five percent higher than with a Republican controlled legislature. Alt and Lowry (1994) also find the Democratic controlled states are more likely to increase taxes in the face of a budget shortfall. These results lead us to suggest that Democratic control of the state would lead to higher insurance premium tax rates.

We specify a foreign tax rate equation with the following four instrumental variables. Based on existing research, as noted above, we expect that a state with a strong Democratic control over time is likely to have a higher insurance premium tax rate. It is not expected that the size of the property-casualty insurance industry could affect the political control of the state so that this variable is expected to be uncorrelated with employment. We include two political variables that reflect the level of Democratic control of state government. The first is a political index, denoted *PolIndex*, which reflects historic control. To construct the index we determined the number of years between 1958 and 1979 that Democrats controlled the upper house, the lower house, or the governor’s office.[[17]](#footnote-17) We divided the sum of these by 3 times the total number of years in the period; the index can thus vary from one to zero. Thus, if Democrats controlled both houses and the governor’s office every year, the index would be equal to one. The data on legislative control came from Dubin (2007) and the data on governor’s control came from various issues of the *Statistical Abstract*.[[18]](#footnote-18) The argument for using *PolIndex* is that the current tax rate is driven by political considerations but that the tax rate is not likely to change significantly in any one year. Thus, we argue that the current tax rate is a reflection of the effect of both historic and current political control. The simple correlation coefficient between *PolIndex* and the *FRate* is 0.482, while the correlation with *Emp* is -0.0005. This suggests that the political index is a good instrumental variable.

The second political variable is a dummy variable, denoted *Dem*, which equals 1 in any year if the Democrats control both legislative bodies and the governor’s office, and zero otherwise.[[19]](#footnote-19) The correlation coefficient between *Dem* and the *FRate* is 0.0953, and is -0.034 between *Dem* and *Emp*. This is a weaker instrument than *PolIndex*.

The third instrumental variable is a measure of the corporate tax rate. We argue that a high corporate income tax rate is a reflection of the tendency of the state to impose high taxes on businesses. To create this variable, denoted *CIT*, we divided corporate income tax revenue for each state for each year by state personal income. The correlation between *CIT* and the foreign tax rate is -0.036 and is -0.030 with *Emp*.

Finally, we allow for differences by geographic area. We divided the U.S. into two areas and created a variable denoted *East,* which equals one if the state is in one of the following census regions: New England, Middle Atlantic, South Atlantic, or East South Central. *East* is highly correlated with *FRate* (correlation coefficient equals 0.220) but has essentially a zero correlation with property-casualty employment (correlation coefficient equals -0.015). The simple correlation coefficients suggest that this is a strong instrument. While *East* appears to be a strong instrument on technical grounds, we do not have a robust intuitive story for why *East* should affect *FRate* but not *Emp*. However, one possible explanation is that the insurance industry started in the east, with states setting high premium tax rates. As other states established insurance premium taxes other revenue sources were available so those states did not impose as high a premium tax rate. While tax rates have changed over time, the east has retained relatively higher premium tax rates.

Table 3 contains the first-stage results of the 2SLS regressions and Table 4 contains the second-stage results for the model equivalent to column 2 in Table 2. In the case of the first-stage results, the coefficients on three of the instrumental variables, *East*, *PolIndex* and *Dem* have the expected positive sign and are statistically significant. The coefficient on *CIT* has an unexpected negative sign, but is statistically significant. (Excluding *CIT* yields second state results that the same as reported in Table 4).

The instruments pass the underidentification test (i.e., the Kleibergen-Paap rk LM statistic test and the Kleibergen-Paap Wald F statistic test), implying that we can reject the hypothesis that our instruments are weak.[[20]](#footnote-20) Model 2’s diagnostics statistics for under-identification (Kleibergen-Papp) and orthogonality (Hansen’s J) suggest that the instruments used in the first stage are acceptable.

The second-stage results (column 1 of Table 4) are generally similar to those in column 2 of Table 2. However, the coefficients on *FRate* and *DifRate* are much larger than those in Table 2. The elasticity of employment with respect to *FRate* is -1.402 in column 1 of Table 4 compared to -0.662 in column 2 of Table 2. There is some change in the size of the coefficients on the state control variables, the coefficients on *Reg* and *MFG* become statistical significant, and the coefficient on *ST* changes sign.

[Insert Table 3 here]

[Insert Table 4 here]

The results from Tables 2 and 4 provide evidence that the insurance premium tax rate has a negative effect on state employment in the property-casualty insurance industry. Overall, the estimated elasticity of *Emp* with respect to *FRate,* which varies depending on the model, provides evidence the premium tax rate has a relatively large negative effect on industry employment. The elasticity of -0.662 reported in column 2 of Table 2 implies that a 10 percent reduction in a state’s foreign tax rate, or 0.27 percentage points of the average value of *FRate*, would increase state employment in the property-casualty industry by 6.6 percent. Given average state employment in the industry of 9,700, the implication is that employment would increase by 1,409 employees for the average state.

Property-casualty employment is not normally distributed. To account for this we estimated the model using log of *Emp* (column 2 of Table 4). We also estimated the model excluding the 5 states with the smallest property-casualty employment since there is a bunching of observations near zero employment (column 3 of Table 4). These results are consistent with the results in columns 1, although the elasticity is smaller in the log *Emp* regression,

***5.2 Additional Results***

*Additional Measures of Industry Size*

Employment is an important measure of the size of the property-casualty industry in a state, but only one possible measure. In addition to employment, we used several other dependent variables that are reflective of the size of the property-casualty industry in a state, all of which we expect will be negatively affected by the foreign tax rate.

First, we use the share of national property-casualty employment in a given state in a given year, denoted *EmpShare*. Since employment in all states is divided by the same national total, for any year using the share will produce regression results that are equivalent to using total state employment. However, by using the share for each year for the panel we are in effect netting out the change in total U.S. employment in the industry.

Second, we use the log of the number of property-casualty firms domiciled in the state each year, denoted *Domcos*. Because the total number of property-casualty firms in the U.S. did not change much over this period, we do not use the state’s share of total U.S. firms as a dependent variable.

Third, we use the annual volume of property-casualty premiums (in millions) written by firms domiciled in the state. We measure this in three ways: total premiums written in other states, denoted *Export,* which is a measure of the industry’s “exports” from the state; total premiums written in and outside the state, denoted *Output,* which is a measure of the industry’s output in the state, and; the state’s share of total U.S. premiums written, denoted *PremShare*.

Finally, we use the number of insurance agents employed in a state in a given year, denoted *Agents,* where employment is that reported for the industry defined as NAICS series 5242. Agents may sell property-casualty and/or life and health products and thus the number of agents in a state is assumed to be driven in large part by the size of the insurance market in the state. Agents are the sales force for insurers and can be directly employed by an insurer to act as an agent within a state, operate as employees of a “franchise”, or operate as agents of independent contractors. Further, they can sell any type of insurance for which they have a license, including property-casualty and life insurance products. While we are not able to control for the effect of the states’ life insurance premium tax policy, we do know that the tax rates are generally the same and changes in the rates are often undertaken at the same time for both industries. Thus, we do expect to find a statistically significant effect of the premium tax rate on agent employment. In the interest of space Table 5 only reports the coefficients on the two tax variables and elasticities with respect to the foreign tax rate; these are 2SLS regressions that include the industry and state control variables; full regression results are available from the authors. The coefficients on the *FRate* are negative and statistically significant in all of the regressions, while the coefficients on the *DifRate* are positive and statistically significant in all of the regressions. These results provide additional support for the hypothesis that higher insurance premium tax rates are associated with a reduction in the size of the property-casualty industry in a state. We do note that the elasticity for agents is smaller than for the other measures of industry size, which is not unexpected given the likelihood that the number of agents is related to state’s market size and not to the state of domicile of insurance firms. However, the elasticities for the other measures of industry size are large.

[Insert Table 5 here]

There are a number of possible reasons why our estimated elasticity is greater than those typically reported in other studies. First, the insurance premium tax generally imposes a larger tax burden than implied by the typical state corporate income tax (Neubig et al. 2002), and thus insurance companies may be more responsive to interstate differences in tax rates. The structure of the tax, that is, that all of the company’s premiums are subject to the higher of the tax rate in the state of domicile or the state in which the premiums are written, makes the decision of where to locate more important in terms of total taxes than for multi-state firms facing state corporate income taxes, for which the firm’s profit is apportioned to the states in which the firm has nexus. It is also possible that the insurance industry is more mobile than firms in industries such as manufacturing and utilities. Finally, our measures of the tax rates are likely to be measured with less error than the measures of tax rates used in other studies. This could possibly lead to larger coefficients than those obtained in other studies, which could suffer from errors-in-variables problems.

Of particular interest is the tax elasticity with respect to total premiums, *Output*, which we consider a measure of the total output of the state’s insurance industry. The reported elasticity of -3.74 is much larger than the elasticity with respect to employment (column 2 of Table 4). The implication of the estimated elasticities is that there are economies of scale; see Cummins and Weiss (2001) for other evidence of economies of scale in the insurance industry. As noted above, two possible concerns with using employment to measure industry size is that insurance firms could be domiciled in one state but their employment could be in another state, and that *Emp* includes employment in district offices. *Output* does not suffer from these two possibilities, and thus the large negative tax rate elasticity for *Output* provides support for the elasticity estimates based on *Emp*. *Exports* has the advantage that it should not depend on the size of the market in the state of domicile.

One interesting observation is that states had historically believed that they could protect their domestic companies from foreign competition by having a high foreign tax rate. This was likely the real rationale in setting a discriminatory tax on foreign insurers. However, the results in column 1 of Table 5 provide some evidence that the discriminatory policy was counter effective given the negative relationship between the share of employment in a state and the foreign tax rate.

*Controlling for Size of the State*

The regressions reported above follow the common practice of prior research in that the dependent variable is measured in levels and there is no control variable that reflects the size of the state. The size of the state measures the size of its market, but given that only 6 percent of premiums are written by firms that are located in 10 or fewer states, local market size should not be a significant causal factor in determining the state’s insurance industry employment. However, it is possible that insurance firms have a preference for locating in larger states in order to have access to a larger labor pool or certain amenities, or in smaller states in order to have greater influence on premium tax rates and access to a different set of amenities. Given these possibilities we estimated models equivalent to that in column 1 of Table 4 but include state population (in millions), denoted *Pop* (Table 6).

[Insert Table 6 here]

The coefficient on *Pop* is positive and significant. The effect of adding population is to reduce the size of the coefficient on the foreign tax rate as compared to Table 4, but it remains negative and statistically significant. The coefficient on *DifRate* is still positive and statistically significant. The elasticity between *Emp* and *FRate* is -0.845, which is smaller than reported in column 1 of Table 4, but still large. Including *Pop* does change the magnitude, sign, and statistical significant level of several control variables.

We also ran regressions equivalent to those reported in Table 4 but for which the dependent variable was employment per capita. The results of this regression (which are not reported here) are consistent with the regression presented in Table 4 and yield an elasticity estimate of -0.941.

*State Fixed Effects*

Since we have a panel data set, it would seem natural that we would include state fixed effects, as well as year dummies, since unobserved state characteristics could be correlated with the explanatory variables. Thus, we estimate such a fixed effects model, the results of which are presented in Table 7. In this model, the coefficient on *FRate* is positive and statistically insignificant, while the coefficient on *DifRate* is still negative, but is statistically insignificant.

[Insert Table 7 here]

We believe these results are driven by the low within-state variation in the premium tax rates. While the foreign tax rates (*FRate*)are not constant, the changes in the rates are small and infrequent. Over the 15 year period, only 11 states changed their foreign tax rate; four of those states changed their rate once while most of the others phased in a change over 3 years. This is seen by the small variance in the difference between the states’ minimum and maximum foreign tax rates over the period of 0.0002, and the rather large correlation of 0.84 between the states’ minimum and maximum *FRate*. The result is that state dummies are highly collinear with the tax rate, so that the results in Table 7 are subject to multicollinearity.[[21]](#footnote-21) As is well known, when the key explanatory variable is essentially constant or rarely changing, a fixed effects model cannot be used (Wooldridge 2002). This is not an uncommon issue; see the papers in the “Symposium on Fixed-Effects Vector Decomposition” in the Spring 2011 issue of *Political Analysis* and the citations in Plümper and Troeger (2007). This is not an issue for most other papers that explore the relationship between taxes and the level of economic activity because of how tax rates are measured in those papers, for example, by using the ratio of tax revenue to state gross domestic product. While the nominal tax rate could be constant over time, measuring the tax rate by the ratio of tax revenue to GDP introduces variation into the tax rate variable.

When there are time invariant or slowly changing independent variables it is sometimes suggested that a random effects model be estimated; see, for example, Wooldridge (2009, 493). However, a random effects model is appropriate only if the common effects are uncorrelated with the regressor, an assumption that Greene (2011) suggests is “rarely palatable.” We conducted a Hausman test for the use of fixed effects versus random effects and it rejects the assumptions underlying the random effects model at the 0.01 level. Despite this, we did estimate a random effects model; the results are essentially equivalent to those in Table 7, and therefore are not reported here.

Because we ultimately reject the results using the fixed effects model, it is important to note that we included in the regressions that are reported above a large set of state control variables.[[22]](#footnote-22) However, even with the large set of control variables it is still possible that there are unobserved state effects that bias the coefficients. While we cannot conclusively rule out this possibility, we do not believe that the results of the fixed effects model, namely that the tax rates have no effect on insurance industry employment model, are an accurate measure of the effect of the insurance premium tax on employment. While not accounting for the unobserved heterogeneity means that the estimated coefficients reported in Tables 4 and 5 could be biased, we believe our results do imply that the foreign tax rate does have a large and negative effect on the size of the insurance industry in a state.

**6. Summary and Conclusions**

This paper examines the effect of state insurance premium taxation on the employment, and other measures of industry size, in the property-casualty industry, a well-defined industry with significant firm specific tax and operational information provided by insurance regulators. Together with state data on employment of direct employees of the property-casualty insurance companies we were able to examine the effect of state insurance premium tax policy on insurance industry employment and other measures of industry size. We were further able to create separate tax rates for the domestic and foreign companies operating within a state. We consider an industry in which the definition of the tax base is similar across states (gross premiums written) and for which there are significant differences in effective tax rates across states.

We provide substantial evidence that the size of a state’s property-casualty insurance industry, measured in multiple ways, is negatively affected by the level of the foreign tax rate. Furthermore, our results are robust to alternative specifications, although there are differences in the size of the coefficients across models. To illustrate the magnitude of the effect, we estimate using the 2SLS results that the elasticity of employment in the property-casualty industry with respect to the foreign tax rate is between -0.428 and -1.45, which compares to the range of elasticities reported by Bartik (1992) and Phillips and Goss (1995) of -0.15 to -0.85.

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| --- | --- | --- | --- | --- |
| **Table 1. Descriptive Statistics** |  |  |  |  |
| **Variable Description** | **Name** | **N** | **Mean** | **Std Dev** |
| Property Casualty Industry Employment (in 000s) | *Emp* | 755 | 9.70 | 11.017 |
| Statutory Foreign Tax Rate | *FRate* | 755 | .0228 | 0.008 |
| Effective Domestic Rate | *DRate* | 755 | .0225 | 0.011 |
| Difference between Foreign & Domestic Rates | *DifRate* | 755 | 0.0044 | 0.011 |
| Regulatory Stringency Indicator | *Reg* | 755 | 0.466 | 0.499 |
| Average Agent Wage (in $000) | *Wage* | 755 | $46.225 | $13.409 |
| Percentage in Urban Areas | *Metro* | 755 | 70.89% | 19.493 |
| Ratio of State Income Taxes to State Income | *PIT* | 755 | 0.020 | 0.011 |
| Ratio of Revenues from Sales Taxes to State Income | *ST* | 755 | 0.020 | 0.010 |
| Percent of Population with Bachelor’s Degree or More | *BA* | 755 | 25.42% | 5.311 |
| State Herfindahl Index | *HI* | 755 | 0.0230 | 0.0085 |
| Percentage of Population over 65 | *Over65* | 755 | 12.58% | 1.813 |
| Percent of Employment in Manufacturing | *MFG* | 755 | 13.42% | 5.599 |
| Per Capita Income (in 000s) | *PCInc* | 755 | $32.434 | 7.617 |
| Control by Democratic Party | *Dem* | 755 | 0.2119 | 0.414 |
| Dummy Variable for East Census Region | *East* | 755 | 0.430 | 0.496 |
| Democratic Party Control for 1958-1979 | *PolIndex* | 755 | 0.649 | 0.279 |
| Ratio of State Corporate Income Taxes to State Income | *CIT* | 755 | 0.004 | 0.003 |
| Agent Employment (in 000s) | *Agents* | 745 | 12.354 | 13.423 |
| Number of Domestic Companies | *Domcos* | 755 | 50.501 | 49.869 |
| Share of National PC Industry Employment in State | *EmpShare* | 755 | 1.987 | 2.254 |
| Domestic Sales + Exports (in $ billions) | *Output* | 755 | $13.532 | $25.918 |
| Percent Share of Output | *PremShare* | 755 | 1.986 | 3.790 |
| Exports of Premiums (in $ billions) | *Export* | 755 | $5.757 | $12.159.0 |
| Population of State (in millions) | *Pop* | 755 | 5.741 | 6.349 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 2. Year Fixed Effects Estimates**  **Dependent Variable: *Emp*** | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | (1) | | | |  | | | | | | (2) | | | | | | | |
| **Variable** |  | | | ***Emp*** | | | |  | | | | | | ***Emp*** | | | | | | | |
| *FRate* |  | | -366.821 | | | \*\*\*\*\*\* | | | |  | | | | | -450.072 | | | \*\*\* | | | | | | |
|  |  | | | (45.610) | |  |  | | | | | | (53.885) | | | | |  | | |
| *DifRate* | 156.273 | | | | | \*\*\* | | | |  | | | | | 168.097 | | | \*\*\* | | | | | | |
|  |  | | | (24.828) | |  |  | | | | | | (27.778) | | | | |  | | |
| *Reg* | 0.052 | | | | |  | | | |  | | | | | -0.423 | | |  | | | | | | |
|  |  | (0.742) | | | |  |  | | | | | | (0.684) | | | | |  | | |
| *Wage* | 0.420 | | | | | \*\*\* | | | |  | | | | | 0.474 | | | \*\*\* | | | | | | |
|  |  | (0.058) | | | |  |  | | | | | | (0.066) | | | | |  | | |
| *Metro* |  | | | | |  | | | |  | | | | | 0.256 | | | \*\*\* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (0.021) | | | | |  | | | | |
| *PIT* |  | | | | |  | | | |  | | | | | 77.339 | | | \*\*\* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (39.279) | | | | |  | | | | |
| *ST* |  | | | | |  | | | |  | | | | | -8.504 | | |  | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (25.408) | | | | |  | | | | |
| *BA* |  | | | | |  | | | |  | | | | | -0.748 | | | \*\*\* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (0.1401) | | | | |  | | | | |
| *Over65* |  | | | | |  | | | |  | | | | | -0.354 | | | \* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (0.2107) | | | | |  | | | | |
| *MFG* |  | | | | |  | | | |  | | | | | -0.015 | | |  | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (0.069) | | | | |  | | | | |
| *PCInc* |  | | | | |  | | | |  | | | | | -0.490 | | | \*\*\* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (0.140) | | | | |  | | | | |
| *HI* |  | | | | |  | | | |  | | | | | -343.826 | | | \*\*\* | | | | | | |
|  |  |  | | | | | | |  |  | | | | | (58.785) | | | | |  | | | | |
| *Intercept* | -1.417 | | | | |  | | | |  | | | | | 26.004 | | | \*\*\* | | | | | | |
|  |  | (2.524) | | | |  | | | | |  | | | | | (3.544) | | |  | | | |
| Elasticity with respect to *FRate* | | | | | -0.494 | \*\*\* | | | | | |  | | | | | -0.662 | | \*\*\* | | | |
| Std Error of Elasticity |  | (0.101) | | | |  |  | | | | | | (0.115) | | | | |  | | |
|  |  |  | | | |  |  | | | | | |  | | | | |  | | |
| Number of Observations | 755 | | | | |  | | | |  | | | | | 755 | | |  | | | | | | |
| R2 |  | 0.216 | | | |  |  | | | | | | 0.466 | | | | |  | | |
|  |  |  | | | |  |  | | | | | |  | | | | |  | | |
| Note: Robust standard errors in parentheses. | | | | | | | | | | | | | | | | | | | | | | | | | |
| \* denotes significance at the .10 level | | | | | | | | | | | | | | | | | | | | | | | |
| \*\* denotes significance at the .05 level | | | | | | | | | | | | | | | | | | | | | | | |
| \*\*\* denotes significance at the .01 level | | | | | | | | | | | | | | | | | | | | | | | |

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| **Table 3. First Stage Results** | | | | |
| **Variable** |  | **Coefficients** | |  |
| *DifRate* |  | 0.242 | \*\*\* |  |
|  |  | (0.021) |  |  |
| *Reg* |  | -0.001 | \*\*\* |  |
|  |  | (0.0004) |  |  |
| *Wage* |  | 0.0003 | \*\*\* |  |
|  |  | (0.0000) |  |  |
| *Metro* |  | -0.0001 | \*\*\* |  |
|  |  | (0.00001) |  |  |
| *PIT* |  | 0.149 | \*\*\* |  |
|  |  | (0.023) |  |  |
| *ST* |  | 0.164 | \*\*\* |  |
|  |  | (0.023) |  |  |
| *BA* |  | -0.0001 | \*\*\* |  |
|  |  | (0.0001) |  |  |
| *Over65* |  | -0.001 | \*\*\* |  |
|  |  | (0.0001) |  |  |
| *MFG* |  | -0.0006 | \*\*\* |  |
|  |  | (0.0000) |  |  |
| *PCInc* |  | -0.008 | \*\*\* |  |
|  |  | (0.0001) |  |  |
| *HI* |  | -0.013 |  |  |
|  |  | (0.028) |  |  |
| *Dem* |  | -0.001 | \*\* |  |
|  |  | (0.0005) |  |  |
| *East* |  | 0.004 | \*\*\* |  |
|  |  | (0.0005) |  |  |
| *PolIndex* |  | 0.007 | \*\*\* |  |
|  |  | (0.0008) |  |  |
| *CIT* |  | -0.116 | \*\* |  |
|  |  | (0.061) |  |  |
| Number of Observations |  | 755 |  |  |
| Kleibergen-Paap rk LM statistic (underidentification test) |  | 131.57 | \*\*\* |  |
| R2 |  | 0.59 |  |  |
| Note: Robust standard errors in parentheses. | | | | |
| \* significance at the .10 level; \*\* significance at the .05 level; \*\*\* significance at the .01 level | | | | |

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| **Table 4. 2SLS Second Stage Panel Instrumental Variables Estimates with Year Fixed Effects**  **Dependent Variable: *Emp*. FRate is Endogenous** | | | | | | |
|  |  |  |  |  |  |  |
| **Variable** | ***Emp*** | | **Log of *Emp*** | | ***Empa*** | |
|  |  |  |  |  |  |  |
| *FRate* | -889.202 | \*\*\* | -61.248 | \*\*\* | -888.100 | \*\*\* |
|  | (104.371) |  | (13.104) |  | (102.738) |  |
| *DifRate* | 279.004 | \*\*\* | 39.751 | \*\*\* | 307.588 | \*\*\* |
|  | (35.231) |  | (5.727) |  | (37.511) |  |
| *Reg* | -2.059 | \*\*\* | -0.2938 | \*\*\* | -1.995 | \*\*\* |
|  | (0.740) |  | (0.0768) |  | (0.7795) |  |
| *Wage* | 0.7027 | \*\*\* | 0.04172 | \*\*\* | 0.8306 | \*\*\* |
|  | (0.0837) |  | (0.0118) |  | (0.0850) |  |
| *Metro* | 0.2170 | \*\*\* | 0.0530 | \*\*\* | 0.2022 | \*\*\* |
|  | (0.0208) |  | (0.0040) |  | (0.0245) |  |
| *PIT* | 151.063 | \*\*\* | 12.851 | \*\* | 104.039 | \*\*\* |
|  | (46.843) |  | (5.954) |  | (44.900) |  |
| *ST* | 53.603 |  | -3.218 |  | 38.584 |  |
|  | (32.850) |  | (5.430) |  | (34.846) |  |
| *BA* | -0.8189 | \*\*\* | 0.0893 | \*\*\* | -0.5691 | \*\*\* |
|  | (0.1421) |  | (0.0249) |  | (0.1623) |  |
| *Over65* | -0.7370 | \*\*\* | 0.1074 | \*\*\* | -0.5195 | \* |
|  | (0.2231) |  | (0.0367) |  | (0.2900) |  |
| *MFG* | -0.2806 | \*\*\* | 0.1153 | \*\*\* | -0.3165 | \*\*\* |
|  | (0.0927) |  | (0.0150) |  | (0.0973) |  |
| *PCInc* | -0.9361 | \*\*\* | -0.1847 | \*\*\* | -1.162 | \*\*\* |
|  | (0.1499) |  | (0.0214) |  | (0.2000) |  |
| *HI* | -339.042 | \*\*\* | -41.807 | \*\*\* | -337.308 | \*\*\* |
|  | (61.839) |  | (7.285) |  | (67.120) |  |
| Elasticity with respect to *FRate* | -1.432 | \*\*\* | -0.489 | \*\*\* | -1.365 | \*\*\* |
| Std Error of Elasticity | 0.194 |  | 0.232 |  | 0.195 |  |
|  |  |  |  |  |  |  |
| Hansen J statistic (overidentification test of all instruments): | 0.290 |  | 1.788 |  | 5.886 |  |
|  |  |  |  |  |  |  |
| Number of Observations | 755 |  | 755 |  | 690 |  |
| R2 | 0.415 |  | 0.603 |  | 0.424 |  |
| Note: Robust standard errors in parentheses.  *a*. Excludes five states with the smallest PC insurance industry employment  \* significance at the .10 level; \*\* significance at the .05 level; \*\*\*significance at the .01 level | | | | | | |

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| **Table 5. 2SLS Panel Instrumental Variables Estimates with Year Fixed Effects**  **Dependent Variable: Other Measures of Industry Size** | | | | | | | | | | | | | |
|  | **[1]**  ***EmpShare*** | | **[2]**  **Log of *Domcos*** | | **[3]**  ***Exports*** | **[4]**  ***Output*** | | | **[5]**  ***PremShare*** | | | **[6]**  ***Agents*** | |
| *FRate* | -182.038 | \*\*\* | -87.852 | \*\*\* | -1203.552 | \*\*\* | -2702.478 | \*\*\* | -390.122 | \*\*\* | -766.735 | | \*\*\* | |
|  | (21.305) |  | (9.612) |  | (177.558) |  | (365.857) |  | (51.465) |  | (124.839) | |  | |
| *DifRate* | 57.208 | \*\*\* | 23.131 | \*\*\* | 201.335 | \*\*\* | 475.947 | \*\*\* | 72.305 | \*\*\* | 265.836 | | \*\*\* | |
|  | (7.209) |  | (3.772) |  | (46.418) |  | (97.392) |  | (15.705) |  | (42.934) | |  | |
| Elasticity with respect to *FRate* | -1.431 | \*\*\* | -1.483 | \*\*\* | -3.950 | \*\*\* | -3.743 | \*\*\* | -3.649 | \*\*\* | -0.933 | | \*\*\* | |
|  | (0.201) |  | (0.181) |  | (0.578) |  | (0.508) |  | (0.479) |  | (0.181) | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| R2 | 0.416 |  | 0.462 |  | 0.206 |  | 0.233 |  | 0.212 |  | 0.449 | |  | |
| Number of Observations | 755 |  | 755 |  | 755 |  | 755 |  | 755 |  | 755 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Hansen J statistic (overidentification test) | 0.310 |  | 2.177 |  | 4.893 |  | 3.272 |  | 2.507 |  | 0.898 | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  | |  | |
| Note: Robust standard errors in parenthesis. Regressions are estimated with insurance controls, state controls, and year fixed effects. | | | | | | | | | | | | | |
| \* denotes significance at the .10 level  \*\* denotes significance at the .05 level  \*\*\* denotes significance at the .01 level | | | |  |  |  |  |  |  |  |  | |  | |
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| **Table 6. 2SLS Second Stage Panel Instrumental Variables Estimates with Year Fixed Effects**  **Dependent Variable is Emp. Foreign Rate is Endogenous** | | | |
|  |  |  | |
| **Variable** | | ***Emp*** | |
| *FRate* | | -484.094 | \*\*\* |
|  |  | (58.717) |  |
| *DifRate* | | 137.934 | \*\*\* |
|  |  | (16.947) |  |
| *Reg* | | -0.0654 |  |
|  |  | (0.3437) |  |
| *Wage* | | 0.1844 | \*\*\* |
|  |  | (0.0421) |  |
| *Metro* | | 0.0340 | \*\*\* |
|  |  | (0.0111) |  |
| *PIT* | | 25.007 |  |
|  |  | (20.711) |  |
| *ST* | | 18.876 |  |
|  |  | (18.779) |  |
| *BA* | | -0.0298 |  |
|  |  | (0.0569) |  |
| *Over65* | | 0.0710 |  |
|  |  | (0.0955) |  |
| *MFG* | | -0.0373 |  |
|  |  | (0.0435) |  |
| *PcInc* | | -0.2400 | \*\*\* |
|  |  | (0.0813) |  |
| *HI* | | -29.869 |  |
|  |  | (26.103) |  |
| *Pop* | | 1.382 | \*\*\* |
|  |  | (0.056) |  |
| Elasticity with respect to *FRate* | | -0.812 | \*\*\* |
|  |  | (0.119) |  |
| Number of Observations | | 755 |  |
| R2 | | 0.837 |  |
|  |  |  |  |
| Note: Robust standard errors in parentheses. | | |  |
| \* denotes significance at the .10 level | |  |  |
| \*\* denotes significance at the .05 level | |  |  |
| \*\*\* denotes significance at the .01 level | |  |  |

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| **Table 7. 2SLS Second Stage Panel Fixed Effects Estimates Dependent Variable is Emp. *FRate* is Endogenous. Fixed Effects are for Both State and Year.** | | | | | |
|
|
| **Variable** | |  |  | ***Emp*** | |
| *FRate* | |  | | 102.969 |  |
|  |  | |  | (243.636) |  |
| *DifRate* | |  | | -26.851 |  |
|  |  | |  | (31.700) |  |
| *Reg* | |  | | 0.191 |  |
|  |  | |  | (0.306) |  |
| *Wage* | |  | | -0.040 |  |
|  |  | |  | (0.029) |  |
| *Metro* | |  | | 0.041 |  |
|  |  | |  | (0.0350) |  |
| *PIT* | |  | | -57.287 | \*\* |
|  |  | |  | (25.450) |  |
| *ST* | |  | | 4.129 |  |
|  |  | |  | (32.192) |  |
| *BA* | |  | | -0.138 |  |
|  |  | |  | (0.087) |  |
| *Over65* | |  | | -0.443 | \*\*\* |
|  |  | |  | (0.115) |  |
| *MFG* | |  | | 0.082 | \* |
|  |  | |  | (0.043) |  |
| *PCInc* | |  | | 0.096 | \*\* |
|  |  | |  | (0.037) |  |
| *HHI* | |  | | -27.606 | \*\* |
|  |  | |  | (11.663) |  |
| *Pop* | |  | | 0.199 |  |
|  |  | |  | (0.530) |  |
|  | |  | |  |  |
| Elasticity with respect to *FRate* | | | | 0.179 |  |
|  | |  | | (0.5007) |  |
| Number of Observations | | | | 755 |  |
| *R2* | | | | 0.9889 |  |
|  |  |  |  |  |  |
| Note: Robust standard errors in parentheses. | | | | | |
| \* denotes significance at the .10 level | | | |  |  |
| \*\* denotes significance at the .05 level | | | |  |  |
| \*\*\* denotes significance at the .01 level | | | |  |  |
|  |  |  |  |  |  |

1. Papke (1987) is a notable exception. [↑](#footnote-ref-1)
2. Foreign firms are defined to include all firms operating in a state but domiciled in another. Firms operating in the state in which they are domiciled are defined as domestic firms. [↑](#footnote-ref-2)
3. While almost every state has a premium tax, some have both a premium tax and an income tax (e.g. New York). However, because the premium tax is always greater than the income tax (and the income tax is creditable against the premium tax), in this paper we refer to the premium tax as the method of taxing the insurance industry. Oregon presents an exception as it only has an income tax. We estimate an effective “premium tax” rate for Oregon as the taxes paid by foreign companies as a percent of premiums. Excluding Oregon from the analysis does not change the results we report. [↑](#footnote-ref-3)
4. Neubig and Vlaisavljevich (1992) provide a thorough review of the non-federal taxes facing insurance companies. While insurance premium tax rates are in the 2.5 percent range, Neubig et al. (2002) estimate that the premium tax is almost twice what a life insurance company would pay if it were subject to the state corporate income tax. [↑](#footnote-ref-4)
5. Congress granted the states broad authority to tax and regulate the insurance industry free from typical commerce power restrictions in the McCarran-Ferguson Act in 1945. See for example, Kimball and Boyce (1958) for a description of the law and how it affected insurance regulation. [↑](#footnote-ref-5)
6. The commerce clause generally restricts states from taxing out-of-state companies at differentially higher rates. See *Bacchus Imports v. Dias,* 468 U.S. 263 (1984). However, the Supreme Court held in *Metropolitan Life Insurance Co. v. Ward* 470 U.S. 869 (1985) that states could discriminate against foreign companies, but only if they had a rational basis for doing so. In the *Ward* case, the court held that Alabama had failed to provide a rational basis for discrimination. As a result many states changed their tax laws over time to reduce the discrimination between foreign and domestic companies. [↑](#footnote-ref-6)
7. The Supreme Court upheld the use of retaliatory taxation by the states in *Western & Southern Life Insurance Company v. State Board of Equalization* 451 U.S. 648 (1981) based on the notion that Congress gave power to the states to tax and removed commerce power restrictions. [↑](#footnote-ref-7)
8. Insurance companies can be chartered (domiciled) in only one state. [↑](#footnote-ref-8)
9. Georgia has a state premium tax rate of 2.25 percent and a local premium tax rate of 2.5 percent, for a total of 4.75 percent. [↑](#footnote-ref-9)
10. Employment level was not disclosed in some years for the District of Columbia and Wyoming. [↑](#footnote-ref-10)
11. One other item to note is that the data underlying the effective tax rate includes premium taxes, retaliatory taxes, as well as other fees and assessments. The fees tend to be relatively small as they are charges for regulatory reviews and licenses. Assessments can be relatively large and occur when a bankrupt insurer has liabilities greater than its assets. In almost every state, the remaining insurers are assessed an amount based on market share to cover any shortfall caused by an insurer’s bankruptcy. Some portion of this assessment each year is often deductible (or creditable) against the premium tax. [↑](#footnote-ref-11)
12. The NAIC’s Retaliation Guide provides the foreign tax rates imposed by state governments. However, some states, for example Georgia, also impose a local tax. The local rates were obtained from various sources. For states in which the local rate varies across jurisdictions, we examine each state’s local premium tax rate and add that to the statutory rate. For example, in Georgia we would use the state’s foreign rate (2.25%) and the local rate (2.5%) to arrive at the 4.75% overall rate. [↑](#footnote-ref-12)
13. States also regulate the solvency of insurers, but one does not observe much heterogeneity in the approach to solvency regulation. This is, in part, due to the fact that many companies operate in more than one state and are potentially subject to solvency regulation from every state where they do business and that since the mid 1990s each state has adopted a model act that has the tendency to make solvency regulation more uniform across the states. In contrast, there is no such uniformity requirement for price regulation. See Klein (1995) for an overview of insurance regulation. [↑](#footnote-ref-13)
14. We did include a set of fiscal variables in some preliminary regressions. The coefficients on these variables were almost uniformly statistically insignificant. [↑](#footnote-ref-14)
15. Stata routines xtreg and xtivreg2 were used to produce all estimates; see Schaffer (2005). [↑](#footnote-ref-15)
16. Brett and Pinkse (2000) and Decker and Wohar (2007) also explore tax rate differences. [↑](#footnote-ref-16)
17. The period 1958 to 1979 was chosen to include periods of growth and recession and approximately equal number of years of Democratic and Republican control of the Presidency. [↑](#footnote-ref-17)
18. Nebraska’s legislature is unicameral and non-partisan. For the index of Nebraska we used the political composition of its U.S. Representatives and Senators. For D.C. we used the make-up of its council and mayor. [↑](#footnote-ref-18)
19. We thank Robert Buschman for providing these data. [↑](#footnote-ref-19)
20. See Kleibergen (2004). [↑](#footnote-ref-20)
21. The R2 for a regression of foreign statutory tax rate against the set of state dummies is 0.93. [↑](#footnote-ref-21)
22. As an alternative procedure, we could have estimated equation 3 for just one year, which is common practice in this literature. Although the variation in the tax rate and industry size over time is small, estimating equation 3 with just one year of data would remove that source of variation in the data. In fact, we did estimate equation 3 using just annual observations and the results are similar to those we report in Table 4. [↑](#footnote-ref-22)