

Do State Business Climate Indicators Explain Relative Economic Growth at State Borders?

Georgeanne Artz

Department of Economics, Heady Hall, Iowa State University, Ames, IA 50011

E-mail: gartz@iastate.edu

Kevin Duncan

Department of Economics, Heady Hall, Iowa State University, Ames, IA 50011

E-mail: kdduncan@iastate.edu

Arthur Hall

Center for Applied Economics, School of Business, University of Kansas, Lawrence, KS 66045

E-mail: arthall@ku.edu

Peter F. Orazem

Department of Economics, Heady Hall, Iowa State University, Ames, IA 50011

E-mail: pfo@iastate.edu

Abstract

This study submits eleven business climate indexes to tests of their ability to predict relative economic performance on either side of state borders. Our results show that most business climate indexes have no ability to predict relative economic growth regardless of how growth is measured. Some are negatively correlated with relative growth. Many are better at reporting past growth than at predicting the future. In the end, the most predictive business climate index is the Grant Thornton Index which was discontinued in 1989.

JEL Codes: O4, R1

Acknowledgements: We thank Matthew Orazem and Liesl Eathington for research assistance and three anonymous reviewers and the editor for helpful comments on the manuscript. We gratefully acknowledge partial funding for this research from the Koch Foundation.

1. INTRODUCTION

Numerous organizations produce rankings of states and localities on relative business climate. States and localities tout the indexes on which they rank highly in their efforts to attract new or expanding businesses. Politicians use them to demonstrate the success of their policies or to denigrate the policies of incumbents. Indexes are widely disseminated in print and electronic media, often treated as accurate measures of actual economic performance. However, few of the indexes are subject to systematic tests of their predictive power.

Two recent studies by Anderson (2012) and Kolko, Neumark and Mejia (2013) reviewed the attributes and performance of many of these business climate indexes. Our study builds on their work in several ways. The most important addition is that we examine whether these business climate indexes can predict relative economic growth on either side of state borders rather than looking at whether they can predict overall state growth. Our presumption is that a state's business climate may matter most in locations with the lowest cost of migrating to another state with a different business climate. Second we assess long-term (five year) growth rate responses as opposed to one year responses as these indexes aim to measure a state's friendliness to long term business outcomes such as investment as opposed to short-term growth¹. Finally, we place the business climate assessment problem into a difference-in-differences, regression discontinuity framework that we will argue can best sidestep the criticism that state business climate indexes are endogenous and jointly determined with state economic growth.

Our focus on state borders can be viewed as a quasi-experiment where alternative state policy regimes are applied to common market conditions. An area's comparative advantage is unlikely to differ on either side of a state boundary, so it is reasonable to assume that firms would be equally successful in either state, other things equal. Furthermore, ease of migration of capital and labor from one side of the border to the other should equalize the marginal products of capital and labor so that productivity shocks

in one state would be transmitted quickly to the other. However, states can dampen the forces that would tend to equalize growth to the extent that capital or labor flows respond to state policies. For example, states differ dramatically in the types of taxes imposed, marginal tax rates, training programs, government regulations, support for infrastructure, investments in the arts or education, recreational amenities, or any number of policies that have been alleged to affect business climate. If these differences affect incentives to invest or live in one state relative to another, they can disrupt the free flow of labor and capital across the borders and create gaps in economic performance. As aggregators of the presumed positive and negative effects of these policies, business climate indicators should signal which side of the border has the more favorable prospects for growth.

On the other hand, firms located in the interior of the state have the benefit of distance to moderate the benefits or adverse consequences of less or more favorable policies afforded their competitors in neighboring states. In addition, almost all states have multiple borders, meaning that the same business climate can be tested against the variety of competing business climates of their neighboring states. Because states may have an advantage in business climate on one border, but a disadvantage on another, the effect at the state level is an average of relative advantages and disadvantages relative to its neighbors. Consequently, the state level effect may not be as responsive to differences in business climate indexes as would the border county corollaries. Our results should not be viewed as representative of state economic growth, but only growth in the state's border regions.

We impose several tests. The first examines the ability of each index to predict relative economic growth at the border over the next five years relative to its ability to explain relative growth over the past five years. This will tell us whether the index is focused on prediction or simply ranking based on past performance. The second examines whether an index has predictive power in any five year period between 1970 and 2010 regardless of when the index was published. If business climate persists, we

may find that predictive power persists as well. Finally, we allow the various business climate indexes to compete against one another in predicting relative economic growth over the 2005-2010 period regardless of when the index was published. Various measures of growth were employed, including changes in aggregate income, per capita income, labor productivity, employment, wages, and population.

Our results show that most business climate indexes have no ability to predict relative economic growth regardless of how growth is measured. Some are negatively correlated with relative growth. Many are better at reporting past growth than at predicting the future. In the end, the most predictive business climate index is the Grant Thornton Index which was discontinued in 1989.

2. BACKGROUND ON BUSINESS CLIMATE INDICES

In 1975, the Fantus Corporation prepared a one-time ranking of state business climates for the Illinois Manufacturers Association. The report was based on Fantus' subjective assessment of 33 different indicators that were believed to affect manufacturing locations. That study was followed in 1979 by the first of a series of annual reports by Grant Thornton that used a weighted aggregation of 18 to 22 factors, with the weights determined by a survey of representatives of various manufacturer's associations. Both studies represented attempts to characterize a state's overall environment for business success, including tax policy, regulatory structure, labor force quality, and quality of life.

Since then, a variety of business climate indexes have been created. State rankings have been published on numerous criteria such as quality of life, cost of living, school quality, tax competitiveness, labor force quality, entrepreneurship, and green jobs. The ranking business has been extended to the metropolitan level. These rankings are reproduced by local newspapers, Chambers of Commerce, and Economic Development Commissions.

The indexes clearly view themselves as in competition with one another. The Corporation for Enterprise Development (CED, 1987, p. 2) stated that, “the Grant Thornton index does not measure the factors important to business success in today’s economy. The index and the traditional business climate definition it perpetuates are relics from another time, another economy—an economy based on routine mass production where cheap, low skilled labor is the key to success.” In contrast, the CED (1987, p. 3) asserted that its index, “provides a more accurate and more comprehensive picture of how state economies are doing in today’s economy and, thus, how ‘attractive’ they *really* are for business development.” Twelve years later, the Progressive Policy Index justified its creation of the State New Economy Index on similar grounds. “Unlike some other reports which assess state economic performance or state economic policies, this report focuses more narrowly on a simple question: to what degree does the structure of state economies match the ideal structure of the New Economy?” (Atkinson and Stewart, 2012).

The two early business climate indexes produced by Fantus and Grant Thornton received some attention from academics.² However, since Grant Thornton discontinued its index in 1989, its successors have rarely been subjected to academic scrutiny. Anderson (2012) provided a descriptive analysis of seven leading business climate indexes and tested the ability of one index, the National Tax Foundation’s State Business Climate Index, to explain economic conditions. Kolko, Neumark and Cuellar Mejia (2013) analyze the predictive power of eleven business climates indexes. Using aggregate state measures of output, employment and wages, they conclude that indexes that focused on simpler tax structures and smaller welfare states tended to perform better in predicting relative state growth. However, business climate indexes had only modest explanatory power in explaining relative state economic growth compared to factors beyond policy influence such as weather, proximity to a major waterway, industrial mix, and population density.

Missing from previous studies of business climate indexes is an effort to control for the endogeneity of government policies concerning growth. As noted by Kolko et al. (2013), due to locational, climactic and geological advantages and disadvantages, states will have natural differences in their sectoral comparative advantages and disadvantages. However, governments may alter their tax rates, expenditures and economic development policies to build on these advantages and mitigate disadvantages. Analogously, private investors and financial intermediaries will adjust their strategies in response to perceived local opportunities. Moreover, a state may alter its policies in response to its neighbor's actions. A low marginal income tax rate may have particularly positive impacts when the neighboring state has high marginal rates, but it may have little impact if the neighbor matches the low rate³. As a result, cross sectional data on government policies and business will reflect their local environments. The same policy may prove effective in one location due to geoclimatic conditions and a neighbor's policies and detrimental in another. A cross-sectional analysis that relates state-wide economic growth to state policies without considering these local circumstances may yield unreliable inferences.

For that reason, we conduct our analysis of these business climate indexes where they should have the greatest impact -- on opposite sides of state borders. On either side of the border, naturally occurring comparative advantage should be roughly equivalent. Moreover, policy set at the state level may not reflect the particular local advantages or disadvantages faced on one border versus another. Finally, this strategy will allow us to gauge the success of a state's policies in the context of each of its neighbor's policies. Because most states will have multiple borders, we will be able to test its business climate against multiple alternative states, adding to our ability to identify a particularly good business climate measure.

We list the business climate indexes evaluated in this study in Appendix Table 1. The list includes 11 indexes released between 1975 and 2004. We chose 2004 as our last year so that we have sufficient time to evaluate each index's predictive power for at least five years after release. All of the included indexes were nationally prominent. We only included indexes that provided sufficient detail for us to certify that they were based on objective criteria as opposed to subjective evaluations, and we focused on indexes based on structural measures (e.g. tax policies, factor endowments, or environmental amenities) as opposed to performance measures (e.g. the level or growth of production)⁴. We view performance measures as reflective of the outcomes of, rather than the inputs to, the business climate. For example, we exclude the *Inc.* magazine ranking of state economies published annually in its October edition through the 1980s.⁵ That ranking was heavily based on growth outcomes such as job growth, business starts, and the percent of fast-growing companies, measures that clearly reflect the past rather than predicting future growth.

The indexes are reported in two ways. Some release explicit scores so that one can assess the magnitude of the business climate gap between states. Others just report a ranking. Either reporting method should predict which state has better conditions for growth at the border. The indexes do not consider the same factors. Many consider various aspects of quality of life, quality of labor or capital inputs, and quality of state or local fiscal and regulatory policies. All also include idiosyncratic factors not considered by other indexes and all place their own explicit or implicit weights on these factors. As information technologies have improved, the indexes have become more complex, both in the number and variety of variables considered and in the statistical methods used to aggregate these variables into a single index.

The business climate indexes break down into three types. The earliest and most common indexes deal with a relatively small number of factors focusing on tax, regulatory and fiscal policies that might affect the cost of doing business. Those include Fantus (FT), Grant Thornton (GT), the Small

Business Survival Index (SB), the CED policy index (CEDpi), and the Tax Foundation State Business Tax Climate Index (TF). Another set concentrates on economic freedom, including the Fraser Economic Freedom indexes (FrN, FrS) and the Clemson-Pacific Research Institute Economic Freedom Index (PRI). These also depend on taxes but place greater emphasis on regulatory restrictions on individual decisions. The third are comprehensive measures that generally give positive value to government industrial policies aimed at stimulating business. Those include the New Economy Index (NE), the remaining two CED indexes on economic development policies (CEDdp) and economic capacity (CEDc), and the Beacon Hill Metro and State Competitiveness Report (BH).

To the extent that structural elements used in these indexes change only slowly, we would expect that the indexes have stable rankings of states. Indeed, the inter-temporal correlation between repeated editions of the same index demonstrate a great deal of persistence.⁶ Of five indexes that we observe with a four year gap or more, the smallest inter-temporal correlation is 0.71, consistent with their presumed use of a consistent world view and methodology. However, there is little agreement between indexes about a state's economic climate. Table 1 reports the cross-correlations between indexes.⁷ Almost two-thirds of the correlations are negative! Half of the remaining correlation coefficients are very small. If business climate were a well-defined statistical measure, we would expect unbiased measures of business climate to be positively correlated. Clearly these indexes are measuring different things.

The exceptions to the rule are the Grant Thornton, Fantus and Pacific Research indexes which are quite highly correlated despite almost a quarter century elapsing between the Fantus and Pacific Research indexes. The New Economy, Center for Enterprise Development: Development Policy and perhaps the Beacon Hill indexes form a second group sharing similar assessments. The two Fraser Economic Freedom indexes represent a third cluster that suggests perhaps they should be just one index.

3. BUSINESS CLIMATE INDEXES AND RELATIVE GROWTH AT THE BORDER

The ultimate test of a business climate index is its ability to explain relative economic performance across states. However, states can adjust their tax, expenditure and infrastructure policies in reaction to the state's natural comparative advantages in production, making the business climate index endogenous to state economic outcomes. This problem is diminished at the border because the comparative advantages of producing at a given location will not differ from one side of the border to the other. Consequently, we would expect similar economic performance on either side of the border unless there is some outside influence limiting economic opportunity. A properly measured business climate should reflect all the possible barriers that could limit economic outcomes. Moreover, businesses in the center of the state will be somewhat insulated from competition from firms in other states, but firms at the border cannot avoid competition. As a result, if relative business climate matters for business success, it should be most apparent at state borders.

Numerous studies have exploited the variation in state fiscal and regulatory policies at state borders to identify the effects of those policies on economic activity. Studies of relative tax rates include Fox (1986) who found that retail sales grew more slowly on the side of the border with higher sales tax rates; Holcombe and Lacombe (2004) who found per capita income grew faster on the side with lower income tax rates; and Duranton, et al. (2011) who found that higher local tax rates reduced manufacturing establishment employment growth. The most famous application of the border methodology to regulation was Holmes' (1998) analysis of how manufacturing employment grew in border counties that differed on whether they were in right-to-work states. He found that the positive impact of right-to-work status on employment growth was largest at the border and dissipated as distance from the border increased. McKinnish (2005; 2007) found that dependent population and welfare participation grew faster in the border counties with the more generous state benefit programs.

All of these studies found effects that were as large or larger than what was typically found in areas farther removed from the border. A contrasting finding was reported by Dube, Lester and Reich (2010) who found insignificant restaurant employment responses to relative minimum wages at state borders⁸. A second reason to focus on relative growth at the state borders is that a state's economic policy should matter most in relation to its neighbors rather than to the country as a whole. With the state as the unit of observation in a cross-sectional analysis, the effect of one state's economic policy is measured against the average policies across all other states. However, by comparing state economic performance relative to its immediate neighbor's growth, we focus on relative economic policy for those two states. It is possible that even a poor economic policy will function well if the neighboring state imposes even poorer policies. On the other hand, relatively enlightened state policies may not have the same effect if the neighboring state is even more enlightened.

The use of relative economic performance at the border can be justified as a variation of regression discontinuity design (Lee and Lemieux, 2010). Land on either side the border is subject to a sudden change in business climate. Property owners cannot move the land to take advantage of the favorable economic climate on the other side of the border. Therefore, examining the economic activity on either side of the border will reflect the impact of location-specific business climates on economic decisions using land on either side of the border, land that otherwise would be equally productive. As shown by Lee and Lemieux (2010), regression discontinuity also resolves the concern that the business climate index may be endogenous to state economic outcomes. Even if policies are set endogenously, if the policies are not set by the assignment variable, in our case distance from the border, then the conditions for randomized local control around the limit of the cutoff are met. The cutoff in our case is the state border. Our border analysis is consistent with the 'complete control' case where agents cannot control state policy as distance from the border changes⁹.

We begin by identifying all counties in the U.S. that border another state. In total there are 107 borders including all 48 states of the continental United States. These border counties account for approximately one third of total U.S. employment, income and population.

Let $\ln(Y_{ijt})$ be the natural log of an observation on a specific economic outcome in county i , state j and time t . Similarly, let $\ln(Y_{pj't})$ be the corresponding measure for neighboring county p in state j' .

$$(1A) \quad \ln(Y_{ijt}) = \alpha_t + \beta b_j + \varphi_{ij} + \tau_{ipt} + \theta_{ijt}$$

$$(1B) \quad \ln(Y_{pj't}) = \alpha_t + \beta b_{j'} + \varphi_{pj'} + \tau_{ipt} + \theta_{pj't}$$

where α_t is a common macroeconomic shock, b_j and $b_{j'}$ are the corresponding business climate indexes in the two states, τ_{ip} are common attributes shared by the counties on either side of the border, and θ_{ijt} and $\theta_{pj't}$ are random error terms. Differencing these from t to $t+T$, we get

$$\ln(g_{ijt}) = (\alpha_{t+T} - \alpha_t) + (\tau_{ipt+T} - \tau_{ipt}) + \beta \ln(b_j) + (\theta_{ijt+T} - \theta_{ijt})$$

$$\ln(g_{pj't}) = (\alpha_{t+T} - \alpha_t) + (\tau_{ipt+T} - \tau_{ipt}) + \beta \ln(b_{j'}) + (\theta_{pj't+T} - \theta_{pj't})$$

letting $g_{ijt} = \left(\frac{Y_{ijt+T}}{Y_{ijt}}\right)$ be the ratio of economic outcomes in period $t+T$ relative to base period t for

county i in state j and $g_{pj't} = \left(\frac{Y_{pj't+T}}{Y_{pj't}}\right)$ be the corresponding ratio for neighboring county p in state

j' . We then difference these again to get

$$(2) \quad \ln\left(\frac{g_{ijt}}{g_{pj't}}\right) = \beta \ln(b_j / b_{j'}) + \varepsilon_{ijpj't},$$

where $\varepsilon_{ijpj't} = ((\theta_{ijt+T} - \theta_{ijt}) - (\theta_{pj't+T} - \theta_{pj't}))$ is a random error. The test of the predictive power of the business climate index is based on equation (2). With this specification, all the fixed factors, including

local labor market conditions, climate and proximity to markets, are differenced away. This allows us to isolate the relative change in growth across state borders that are correlated with the differences in the business climate index. A finding that $\beta > 0$ indicates that the business climate index has power to explain relative growth across states with β being the elasticity of relative border growth with respect to the relative business climate. The index's power to explain the variance in relative growth at the border across states will be measured by the R^2 statistic¹⁰.

One might suspect that these business climate indexes do little more than report past growth rather than predicting future growth. We can test that by reversing the specification in 1) to be

$$(3) \quad \ln \left(\frac{g_{ij-t}}{g_{pj-t}} \right) = \beta \ln(b_j/b_{j'}) + \varepsilon_{ijpj-t}$$

where the left-hand-side is the relative growth from period $t-T$ to period t . If the business climate index were truly forward looking, it should have more positive predictive power in (2) than in (3). If the business climate index is backward looking, it will do better at explaining the past than the future.

A complication is that the borders for county i in state j will rarely coincide exactly with the borders of county i in state j' . More typically portions of county i in state j will border two or three counties in state j' . Furthermore, borders will differ in the number of counties, leading to overweighting of long borders or borders with small counties. To prevent problems of double counting counties with multiple neighbors and of overweighting of borders with more counties, we used the strategy illustrated in Figure 1.

Let the total length of the border between the two states be $L_{jj'}$. The total border length can be divided into unique, non-overlapping border segments. For example, if county i in state j borders counties 1, 2, and 3 in state j' , there will be three corresponding non-overlapping border segments with respective lengths of $\ell_{i1j'}$, $\ell_{i2j'}$, and $\ell_{i3j'}$. These three lengths sum to ℓ_{ij} , the total border length of county

i in state j . Each of the three segments enters regression (1): $\ln(g_{ijt}/g_{1jt})$ with weight (ℓ_{i1j}/L_{jj}) ; $\ln(g_{ijt}/g_{2jt})$ with weight (ℓ_{i2j}/L_{jj}) ; and $\ln(g_{ijt}/g_{3jt})$ with weight (ℓ_{i3j}/L_{jj}) . The weights add up to 1, so each border enters with a cumulative weight of one, whether there is a single county or twenty counties.¹¹ In practice, we found that the weighted regressions yielded estimates similar to a regression that used a correction for clustering on the border which also results in each border entering with the same weight in the regression. Because the cluster correction was more straightforward, we opted to report those results.

We use eight different measures of growth, all available from the Bureau of Economic Analysis' Regional Economic Accounts.¹² The use of multiple growth measures addresses concerns that different business climate indexes might be focusing on different aspects of economic success. Four measures reflect elements of total output: aggregate income which includes returns to proprietors as well as compensation, aggregate nonfarm income, income per capita and population. If the state's business climate enhances prospects for profit or productivity growth, it should attract more firm entry and expansion. Personal income is the best available measure of aggregate local output, although it will miss profits that go to nonresident investors and it will include income derived from other areas. Personal income can be decomposed into population and income per capita. Nonfarm income removes the receipts from farms. Because about one-third of U.S. farmland is rented with rental income and government transfer payments going to non-proprietors, farm income may cloud our estimate of local output.

A concern is that wage and salary income for residents may be derived from businesses that are located across the border. To address this concern, the remaining four growth indicators are more closely related to the local labor market and worker productivity: average wage per job, output per worker, the county wage bill, and total employment. The county wage bill is the sum of all wages and

salaries paid to employees plus the cost of employer provision of benefits such as pensions and insurance, plus the cost of the federally mandated social insurance programs. These are reported by place of work rather than by place of residence, and so these data will include workers commuting from a neighboring state. The wage bill is the largest component of gross state product, representing about 60 percent of the total. Consequently, growth in the wage bill is the closest approximation to growth in county output attributable to labor. Wage bill can be decomposed into its two elements, employment and compensation per job. Absent any restrictions on commuting, wages should equalize on either side of a state border with the more productive side having more employees and faster job growth than its less productive neighbors. Therefore, employment should be more responsive than per worker compensation to relative business climate.¹³ We also have the option of deriving a measure of output per worker by combining wage and salary earnings with proprietor's income and then dividing by employment plus proprietors. As with wages, mobile labor should equalize labor productivity growth across the state border and so we would not anticipate that the business climate indexes would be able to predict relative productivity growth. Including outcomes that should equalize across state borders is a measure of the 'dumb luck' lower bound of predictive power for a business climate index. By chance, an index may be able to explain some of the variation in equilibrating outcomes that should not differ across borders in the long run, but they should have greater ability to explain relative growth in cases where theory predicts differences can arise.

4. PREDICTIVE PERFORMANCE OF RELATIVE BUSINESS CLIMATE INDEXES

We summarize the results of our estimation of equations 1) and 2) in Table 2.¹⁴ Our dependent variables are the eight growth measures applied to the five years preceding the release date of each index and the five years following the release date. These results are reported in the columns labeled "Backcast" and "Forecast" respectively. The five year elapsed time should be sufficient to allow private investment to

respond to favorable government policies and to insure that our results are not overly clouded by temporary business cycles.¹⁵ In addition, because the same national business cycle would be occurring on both sides of the state border, results should not be altered because of shocks to the national economy. For indexes with multiple editions, we report the average across all releases. For example, with 7 Grant Thornton editions released between 1980 and 1986, we report how many times out of the 7 the coefficient on relative business climate was positive ($\beta_I > 0$), how many times it was significantly positive ($\beta_I \gg 0$), how many times it returned a significant negative coefficient ($\beta_I \ll 0$), and the average of the coefficient which we define as the business climate index elasticity ϵ'_I . We also report the average R^2 from the regressions to indicate how much of the variation in relative economic growth at the border can be explained by relative values of the business climate index. All results correct for clustering at the state border.

Across all the 5-year forecast regressions across 8 different indicators of economic performance, it is apparent that none of the 11 business climate indexes can explain much of the variation in relative growth at state borders. The best business climate index can explain at most 3 percent of the variation in relative growth over the next five years. Perhaps growth is primarily driven by fundamentals such as factor endowments and locational comparative advantage and not business climate, or perhaps these measures of business climate are just not that good.

That said, some of the indexes seem better than others. The Grant Thornton index generates the expected positive effect of relative business climate on relative growth over the following five years in 49 of 56 possible cases in the Forecast column including 28 significant positive effects against no significant negative effects. Grant Thornton performs particularly well where an index should be able to predict outcomes, namely growth in aggregate income, wage bill, employment, and population, and it performs less well on relative wages and productivity which should grow similarly on either side of the

border. Moreover, the index appears to be truly forward looking in that it performs much better in forecasting than in backcasting. Grant Thornton generated only 12 significant positive effects on growth over the past 5 years against the 28 significant coefficients going forward.

The other index that appeared to perform well is the Corporation for Economic Development Capacity Index which generated 17 significant positive effects on relative growth at the borders against 5 significant negative effects. Like the Grant Thornton index, it appears to be genuinely forward looking as it had only 3 significant positive coefficients in its backcasting regressions.

Some indexes seem to have information for a few outcomes but not others. For example, the Tax Foundation index seems to forecast relative population growth on either side of the border. However, it has strangely negative results in projecting per capita income, average wage and productivity, the series that should be equilibrating on either side of the border. That it failed to register positively or negatively for most series suggests that its success in forecasting relative population growth may be a fluke.

Even more perversely, some indexes consistently predict in the wrong direction. The Small Business Survival Index produces consistently incorrect forecasts of relative growth in nonfarm income, population, employment and the wage bill. The Corporation for Economic Development-Policy and Fiscal Policy Indexes also explain relatively more of the variation in relative economic growth outcomes than the other indexes, but in the wrong direction. Across the two series, we have 33 significant negative coefficients against only 4 positive effects. However, they are clearly not trying to replicate the past in that all 32 significant coefficients on relative business climate in the backcast columns are negative.

The New Economy Index was the only one that seemed to look backward rather than forward. It generated 3 significantly negative and no significantly positive coefficients in its forecasting equations, but 6 significantly positive coefficients in its backcasting equations. The remaining indexes had almost

no predictive power going either forward or backward, suggesting they had no information to offer on why states grow at different rates on either side of their borders.^{16, 17}

5. DO BUSINESS CLIMATE INDEXES EXPLAIN GROWTH IN ANY PERIOD?

Our indexes that were issued on multiple years are highly correlated over time, suggesting that their evaluations of relative business climate are quite stable. It may be that a business climate index will do better in some other five year period, even if it does not distinguish itself in the first five years after its release. On the other hand, we may find that a business climate index that appears to have some forecasting ability over the next five years will have a similar ability to explain relative growth in other five year periods also. We explore these questions in Table 3.

We divided the period between 1975 and 2010 into seven 5 year periods, and then applied equation 1) to each regardless of the publication date of each index. If a state's business climate is determined by relatively stable government policies regarding taxation, spending and regulation, or if it is fixed by local geoclimatic conditions or naturally occurring geographical advantages, we should find that the index performs similarly across the seven 5-year growth periods spanning 35 years. On the other hand, if business climate evolves over time, then the index should perform best in the period immediately after release. As before, an index is less impressive if it performs best looking backward than forward.

We perform this analysis using relative growth in nonfarm income, population, wage bill and employment as our measures of economic outcomes. The first of these, nonfarm income, is reported in Table 3A. As before, the Grant Thornton index distinguishes itself by generating positive predictions in 45 of 49 cases, 32 of these coefficients being statistically significant. This performance is even more impressive because the Grant Thornton indexes continue to be able to predict relative growth at state

borders 20 years after release. It explained at least 3 percent of the variation in relative growth for each 5-year period between 1975-2005 before losing predictive power in the 2005-2010 period.

The CED-Capacity Index also showed some ability to forecast although most of its coefficients were not precise. Its editions from the early 1990s were still able to demonstrate marginally significant positive predictive power 20 years later. The Pacific Research Institute, Small Business Survival, and Tax Foundation indexes were also relatively successful across all periods, although those indexes were released after most of the periods had passed. The rest of the indexes were generally unsuccessful regardless of the 5-year period chosen. Most have their best performance, and that a meager showing, looking backward rather than forward.

In the last column we report the common out-of-sample forecast period, 2005-2010, for all 11 indexes. Only the CED-Capacity Index demonstrates any ability to predict relative economic performance at state borders over that 5-year period, albeit only explaining about 1 percent of the variation in relative growth of nonfarm income.

We repeat the exercise with other growth measures in the next three tables. For population growth, Grant Thornton, PRI, Small Business and Tax Foundation continue to outperform the rest and all manage to generate significant explanatory power in the common out-of-sample period of 2005-2010. Efforts to predict wage bill growth were less successful for all of the better performers although the Small Business Index maintains its ability to predict into the 2005-10 period. As for employment growth, the Grant Thornton, Small Business and Tax Foundation Indexes had explanatory power in the 2005-2010 period.

The results from Table 3 show that the relatively successful indexes have some persistence in explaining relative growth across states. The effects appear relatively small such that a 10 percent difference in business climate index would have less than 1 percent difference in relative growth.

However, these indexes were relatively stable over time and the estimated effects were quite consistent over long stretches of time. That suggests that a poor business climate index as measured by Grant Thornton could be magnified over time, leading to progressively poorer relative economic performance of the state over the following decades.

The best performing indexes including the Grant Thornton, PRI, Small Business and Tax Foundation Indexes, all emphasized relative tax policy in measuring business climate. Of the others, only the CED-Capacity Index managed to have predictive power in the right direction and that only for nonfarm income growth. The Beacon Hill, New Economy, Fraser and CED-Development and Fiscal Indexes had no ability to predict forward.

6. COMPOSITE BUSINESS CLIMATE

Even the best performing indexes in Table 3 could predict at best 3 percent of the variation in economic growth in the 2005-2010 period. That leads to another question: How much of the variance in relative economic performance could we expect a business climate index to explain? To address this question, we stacked all the business climate indexes together into a single regression explaining relative growth of counties at the state borders between 2005-2010. Presuming that these 11 indexes exhaust the available expertise of economic development experts regarding relative growth potential, the combined explanatory power of their forecasts should be an upper-bound measure of the best performance possible by any individual index.

The results are reported in Table 4. Across the four growth measures, the combined forecasts can only explain 3.5-6 percent of the variation in economic growth. That suggests that even the very best business climate index can only explain a small fraction of the relative economic performance of states. The great majority of economic performance is due to factors other than measurable business climate.

One might be tempted to examine the individual coefficients in Table 4 and claim that the results demonstrate relative value of the individual indexes in explaining relative performance. In fact, the 2004 Small Business Index does maintain its ability to predict relative growth at the borders as it did in Table 3, at least at the 10th percentile significance level. However, by itself, the Small Business Index could explain no more than 3 percent of any of the growth measures, and it could not explain any of the variation in nonfarm income growth. In other words, the Small Business Index is the best performer compared to the others, but that is not a very high bar.

7. CONCLUSIONS

The recent paper by Kolko et al. (2013) covered some of the same ground as this study but using states as the unit of observation. As they stress, there are issues of endogenous policy responses to relative growth that could complicate interpretation of their results if states base their policies on business climate indexes. However, our results buttress two findings that they report – that tax based indexes perform better and that most of the sources of growth are outside the influence of economic policy.

This study adds the following stylized facts about business climate indexes:

1) The information content in the better business climate indexes is amazingly persistent. Grant Thornton indexes released in the 1980s remained among the best performing indexes in explaining relative growth across state borders 25 years later.

2) The business climate indexes explain an even smaller fraction of the variation in relative state growth at the border than implied by the Kolko et al. (2013) state-level analysis. However, this is due in part to the limited amount of the variance in relative growth that could be forecasted. We estimate that even the very best business climate index could explain at most 3.5-6 percent of economic growth across state borders, depending on the measure of growth employed.

3) The indexes that purport to measure local economic innovation, infrastructure, labor market skill, or other indicators of the ‘new economy’ have no explanatory power and, in fact, explain the past more than the future.

A general conclusion that would follow from both the Kolko et al. (2013) analysis and ours is that the business climate indexes lack the scientific rigor typically required of social science research. Indexes claim validity based on included inputs rather than testing forecasts against the data. Both studies suggest that there is considerable potential for improved measures if modern econometric forecasting tools are applied to the task.

REFERENCES

- Anderson, John E. 2012. "State Tax Rankings: What do They and Don't They Tell Us?." *National Tax Journal*, 64(4), 985–1010.
- Atkinson, Robert D. and Luke A. Stewart. 2012. *The 2012 State New Economy Index: Benchmarking Economic Transformation in the States*. Washington DC: Information Technology and Innovation Foundation.
- Center for Enterprise Development. 1987. "Making the Grade: The Development Report Card for the States," Washington, DC.
- Courant, Paul N. and George A. Fulton. 1985. "What Do Business Climate Studies Have To Do with Business?" Discussion Paper No. 243, Institute of Public Policy Studies, The University of Michigan.
- Dube, Arindrajit, T. William Lester, and Michael Reich. 2010. "Minimum wage effects across state borders: Estimates using contiguous counties," *The Review of Economics and Statistics*, 92(4), 945–964.
- Duranton, Gilles, Laurent Gobillon, and Henry G. Overman. 2011. "Assessing the Effects of Local Taxation using Microgeographic Data*," *The Economic Journal*, 121(555), 1017–1046.
- Fox, William F. 1986. "Tax Structure and the Location of Economic Activity Along State Borders," *National Tax Journal*, 39 (4), 397–401.
- Holcombe, Randall G. and Donald J. Lacombe. 2004. "The Effect of State Income Taxation on Per Capita Income Growth," *Public Finance Review*, 32 (May), 292–312.
- Holmes, Thomas J. 1998. "The Effect of State Policies on the Location of Manufacturing: Evidence from State Borders," *Journal of Political Economy*, 106, 667–705.
- Khan, Romana, Peter F. Orazem and Daniel M. Otto. 2001. "Deriving Empirical Definitions of Spatial Labor Markets: The Roles of Competing versus Complementary Growth," *Journal of Regional Science*, 41 (November), 735–756.
- Kolko, Jed, David Neumark, and Marisol Cuellar Mejia. 2013. "What do business climate indexes teach us about state policy and economic growth?" *Journal of Regional Science*, 53(2), 220–255.
- Lane, Julia, Dennis Glennon and James McCabe. 1989. "Measures of Local Business Climate: Alternative Approaches," *Regional Science Perspectives*, 19, 89–106.
- Lee, David S. and Thomas Lemieux. 2010. "Regression Discontinuity Designs in Economics," *Journal of Economic Literature*, 48(2), 281–355.
- McKinnish, Terra. 2005. "Importing the Poor Welfare Magnetism and Cross-Border Welfare Migration," *Journal of Human Resources*, 40(1), 57–76.

_____. 2007. "Welfare-induced migration at state borders: New evidence from micro-data," *Journal of public Economics*, 91(3), 437–450.

Plaut, Thomas R. and Joseph E. Pluta. 1983. "Business Climate, Taxes and Expenditures, and State Industrial Growth in the United States," *Southern Economic Journal*, 99–119.

Rork, Jonathan C. 2003. "Coveting Thy Neighbors' Taxation," *National Tax Journal*, LVI(4), 775–787.

TABLE 1: Correlations across Business Climate Indexes, Various Years

	GT81	FT75	SB00	BH01	NE99	FrNG04	FrSG04	PRI99	CEDdp89	CEDc92	CE
GT81	1										
FT75	.71	1									
SB00	.39	.36	1								
BH01	-.12	-.35	-.05	1							
NE99	-.12	-.45	-.12	.63	1						
FrNG04	-.36	-.12	-.45	-.20	-.24	1					
FrSG04	-.46	-.28	-.58	-.12	-.17	.90	1				
PRI99	.69	.71	.47	-.05	-.34	-.35	-.42	1			
CEDdp89	-.60	-.58	-.51	.19	.35	.41	.46	-.67	1		
CEDc92	-.31	-.48	-.19	.62	.81	-.11	-.04	-.39	.51	1	
CEDpi92	-.23	-.27	-.54	.07	.07	.34	.50	-.21	-.46	-.12	1
TF03	.50	.35	.75	.10	.07	-.52	-.61	.44	-.52	-.04	-.04

GT81	Grant Thornton 1981 index
FT75	(-1)* Fantus 1975 index
SB00	(-1)*Small Business Survival Index 2000 index
BH01	Beacon Hill 2001 index
NE99	New Economy Index 1999 index
FrNG04	Fraser Institute/NCPA Economic Freedom Index: All government 2004 index
FrSG04	Fraser Institute/NCPA Economic Freedom Index: State and Local government 2004 index
PRI99	(-1)*Clemson/Pacific Research Institute 1999 index
CEDdp89	(-1) Corporation for Enterprise Development: economic development policy ranking 1989 index
CEDc92	(-1) Corporation for Enterprise Development: capacity ranking 1992 index
CEDpi92	Corporation for Enterprise Development: fiscal policy index 1992 index
TF03	Tax Foundation 2003 index

TABLE 2A: Performance of Business Climate Indexes in Predicting Relative 5-Year Growth at State Borders

Growth in:	Beacon Hill		CED Policy		CED Capacity		CED Fiscal Policy	
	Backcast	Forecast	Backcast	Forecast	Backcast	Forecast	Backcast	Forecast
Aggregate Income								
$\beta_I > 0$	4/4	2/4	0/5	0/5	2/10	5/10	0/9	2/9
$\beta_I \gg 0$	1/4	0/4	0/5	0/5	0/10	4/10	0/9	1/9
$\beta_I \ll 0$	0/4	0/4	3/5	3/5	0/10	1/10	4/9	1/9
$\acute{\epsilon}_I$	0.05	0.00	-0.02	-0.02	-0.01	0.00	-0.07	-0.03
R ²	.005	.001	.01	.026	.007	.017	.018	.010
Nonfarm Income								

$\beta_I > 0$	3/4	1/4	0/5	0/5	5/10	8/10	0/9	1/9
$\beta_I \gg 0$	1/4	0/4	0/5	0/5	1/10	1/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	3/5	4/5	0/10	0/10	5/9	3/9
$\hat{\epsilon}_I$	0.03	0.00	-0.01	-0.01	0.00	0.00	-0.05	-0.02
R ²	.012	.001	.014	.022	.003	.005	.024	.008
Per capita Income								
$\beta_I > 0$	3/4	2/4	1/5	0/5	2/10	6/10	0/9	6/9
$\beta_I \gg 0$	1/4	1/4	0/5	0/5	1/10	3/10	0/9	1/9
$\beta_I \ll 0$	0/4	0/4	3/5	3/5	2/10	2/10	2/9	1/9
$\hat{\epsilon}_I$	0.03	0.01	-0.01	-0.01	0.00	0.00	-0.03	0.00
R ²	.005	.003	.016	.018	.010	.014	.013	.008
Population								
$\beta_I > 0$	4/4	0/4	4/4	0/4	5/10	9/10	0/9	0/9
$\beta_I \gg 0$	0/4	0/4	0/4	0/4	0/10	4/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	0/4	0/4	0/10	0/10	7/9	5/9
$\hat{\epsilon}_I$	0.01	-0.01	0.01	-0.01	0.00	0.00	-0.03	-0.03
R ²	.002	.002	.006	.019	.002	.001	.017	.012
Average Wage								
$\beta_I > 0$	1/4	0/4	1/5	2/5	10/10	6/10	2/9	0/9
$\beta_I \gg 0$	1/4	0/4	0/5	1/5	0/10	0/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	0/5	3/5	0/10	0/10	0/9	2/9
$\hat{\epsilon}_I$	0.02	-0.01	-0.01	0.00	0.00	0.00	-0.01	-0.02
R ²	.005	.001	.002	.008	.002	.001	.001	.007
Productivity								
$\beta_I > 0$	2/4	2/4	1/5	2/5	7/10	4/10	2/9	1/9
$\beta_I \gg 0$	1/4	0/4	0/5	1/5	0/10	0/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	2/5	3/5	0/10	0/10	1/9	2/9
$\hat{\epsilon}_I$	0.01	0.00	0.00	0.00	0.00	0.00	-0.01	-0.02
R ²	.004	.001	.004	.013	.001	.001	.002	.007
Wage Bill								
$\beta_I > 0$	4/4	4/4	1/5	0/5	6/10	8/10	3/9	1/9
$\beta_I \gg 0$	0/4	1/4	0/5	0/5	0/10	2/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	0/5	0/5	0/10	0/10	0/9	1/9
$\hat{\epsilon}_I$	0.03	0.05	-0.01	-0.01	0.00	0.01	-0.01	-0.03
R ²	.001	.004	.001	.003	<.001	.003	.006	.005
Employment								
$\beta_I > 0$	4/4	4/4	2/5	0/5	6/10	10/10	3/9	2/9
$\beta_I \gg 0$	0/4	0/4	0/5	0/5	1/10	3/10	0/9	0/9
$\beta_I \ll 0$	0/4	0/4	0/5	1/5	2/10	2/10	2/9	2/9
$\hat{\epsilon}_I$	0.04	0.03	0.00	-0.01	0.00	0.00	-0.01	-0.02
R ²	.003	.002	.001	.003	.001	.005	.008	.005

TABLE 2B: Performance of Business Climate Indexes in Predicting Relative 5-Year Growth at State Borders

Growth in:	Fantus		Fraser		Grant Thornton		New Economy	
	Backcast	Forecast	Backcast	Forecast	Backcast	Forecast	Backcast	Forecast
Aggregate Income								

$\beta_I > 0$	0/1	1/1	0/2	2/2	6/7	7/7	2/2	1/2
$\beta_I \gg 0$	0/1	0/1	0/2	0/2	3/7	4/7	2/2	0/2
$\beta_I \ll 0$	1/1	0/1	0/2	0/2	0/7	0/7	0/2	1/2
$\hat{\epsilon}_I$	-0.03	0.02	-0.01	0.02	0.03	0.07	0.07	-0.02
R ²	.019	.005	0	.002	.006	.014	.017	.004
Nonfarm Income								
$\beta_I > 0$	0/1	0/1	0/2	2/2	4/7	7/7	2/2	0/2
$\beta_I \gg 0$	0/1	0/1	0/2	0/2	3/7	6/7	1/2	0/2
$\beta_I \ll 0$	1/1	0/1	1/2	0/2	0/7	0/7	0/2	1/2
$\hat{\epsilon}_I$	-0.01	0.00	-0.04	0.01	0.03	0.05	0.05	-0.02
R ²	.01	.001	.01	.002	.009	.03	.004	.005
Per capita Income								
$\beta_I > 0$	0/1	1/1	2/2	2/2	2/7	5/7	2/2	1/2
$\beta_I \gg 0$	0/1	1/1	0/2	2/2	1/7	2/7	1/2	0/2
$\beta_I \ll 0$	1/1	0/1	0/2	0/2	0/7	0/7	0/2	1/2
$\hat{\epsilon}_I$	-0.02	0.02	0.02	0.07	0.00	0.03	0.03	-0.02
R ²	.029	.013	.003	.025	.004	.008	.013	.005
Population								
$\beta_I > 0$	0/1	0/1	0/2	0/2	7/7	7/7	2/2	1/2
$\beta_I \gg 0$	0/1	0/1	0/2	0/2	3/7	7/7	0/2	0/2
$\beta_I \ll 0$	0/1	0/1	2/2	2/2	0/7	0/7	0/2	0/2
$\hat{\epsilon}_I$	0.00	0.00	-0.05	-0.04	0.02	0.03	0.01	0.00
R ²	.001	.002	.021	.023	.008	.025	.002	.002
Average Wage								
$\beta_I > 0$	0/1	0/1	2/2	2/2	2/7	7/7	2/2	1/2
$\beta_I \gg 0$	0/1	0/1	0/2	1/2	0/7	3/7	0/2	0/2
$\beta_I \ll 0$	0/1	0/1	0/2	0/2	1/7	0/7	0/2	0/2
$\hat{\epsilon}_I$	-0.01	0.00	0.02	0.03	-0.01	0.02	0.01	-0.01
R ²	.005	.003	.004	.009	.002	.006	.001	.002
Productivity								
$\beta_I > 0$	0/1	0/1	2/2	2/2	1/7	4/7	1/2	0/2
$\beta_I \gg 0$	0/1	0/1	0/2	2/2	0/7	2/7	0/2	0/2
$\beta_I \ll 0$	0/1	0/1	0/2	0/2	1/7	0/7	0/2	0/2
$\hat{\epsilon}_I$	-0.01	0.00	0.03	0.04	-0.01	0.01	0.00	-0.02
R ²	.006	.003	.006	.008	.002	.006	.002	.003
Wage Bill								
$\beta_I > 0$	0/1	0/1	1/2	0/2	6/7	7/7	2/2	2/2
$\beta_I \gg 0$	0/1	0/1	0/2	0/2	1/7	1/7	1/2	0/2
$\beta_I \ll 0$	0/1	0/1	0/2	1/2	0/7	0/7	0/2	0/2
$\hat{\epsilon}_I$	0.00	0.00	-0.01	-0.05	0.01	0.04	0.05	0.03
R ²	<.001	<.001	<.001	.003	.003	.008	.007	.002
Employment								
$\beta_I > 0$	1/1	1/1	1/2	0/2	5/7	5/7	2/2	2/2
$\beta_I \gg 0$	0/1	0/1	0/2	0/2	1/7	3/7	1/2	0/2

$\beta_I \ll 0$	0/1	0/1	0/2	2/2	0/7	0/7	0/2	0/2
$\hat{\epsilon}_I$	0.00	0.01	0.00	-0.04	0.00	0.02	0.05	0.02
R^2	<.001	.005	<.001	.005	.002	.008	.009	.002

TABLE 2C: Performance of Business Climate Indexes in Predicting Relative 5-Year Growth at State Borders

Growth in:	Pacific Institute		Small Business		Tax Foundation		Forecast	
	Backcast	Forecast	Backcast	Forecast	Backcast	Forecast		
Aggregate Income								
$\beta_I > 0$	1/2	0/2	4/5	2/5	0/2		0/2	
$\beta_I \gg 0$	0/2	0/2	0/5	1/5	0/2		0/2	
$\beta_I \ll 0$	0/2	0/2	0/5	0/5	0/2		0/2	
$\hat{\epsilon}_I$	0.02	-0.04	0.03	0.02	-0.04		-0.05	
R^2	.006	.003	.005	.005	.003		.007	
Nonfarm Income								
$\beta_I > 0$	2/2	1/2	0/5	0/5	2/2		1/2	
$\beta_I \gg 0$	1/2	0/2	0/5	0/5	0/2		0/2	
$\beta_I \ll 0$	0/2	0/2	1/5	4/5	0/2		0/2	
$\hat{\epsilon}_I$	0.06	0.00	-0.02	-0.05	0.04		0.00	
R^2	.012	.003	.005	.027	.011		.004	
Per capita Income								
$\beta_I > 0$	0/2	0/2	5/5	4/5	0/2		0/2	
$\beta_I \gg 0$	0/2	0/2	1/5	2/5	0/2		0/2	
$\beta_I \ll 0$	0/2	1/2	0/5	0/5	0/2		2/2	
$\hat{\epsilon}_I$	-0.01	-0.04	0.02	0.02	-0.02		-0.08	
R^2	.001	.006	.004	.007	.0025		.032	
Population								
$\beta_I > 0$	2/2	2/2	0/5	0/5	2/2		2/2	
$\beta_I \gg 0$	1/2	1/2	0/5	0/5	1/2		2/2	
$\beta_I \ll 0$	0/2	0/2	1/5	5/5	0/2		0/2	
$\hat{\epsilon}_I$	0.05	0.03	-0.02	-0.04	0.03		0.05	
R^2	.017	.005	.005	0	.008		.022	
Average Wage								
$\beta_I > 0$	1/2	0/2	4/5	4/5	0/2		0/2	
$\beta_I \gg 0$	1/2	0/2	2/5	1/5	0/2		0/2	
$\beta_I \ll 0$	0/2	1/2	0/5	0/5	0/2		2/2	
$\hat{\epsilon}_I$	0.03	-0.04	0.02	0.01	-0.02		-0.05	
R^2	.012	.009	.008	.003	.005		.019	
Productivity								
$\beta_I > 0$	1/2	0/2	4/5	2/5	1/2		0/2	
$\beta_I \gg 0$	1/2	0/2	0/5	0/5	0/2		0/2	
$\beta_I \ll 0$	0/2	0/2	0/5	0/5	0/2		2/2	
$\hat{\epsilon}_I$	0.00	-0.02	0.01	0.00	-0.01		-0.05	
R^2	.002	.004	.005	.001	.001		.013	
Wage Bill								
$\beta_I > 0$	1/2	0/2	2/5	0/5	1/2		2/2	

$\beta_I \gg 0$	0/2	0/2	0/5	0/5	0/2	1/2
$\beta_I \ll 0$	0/2	0/2	0/5	3/5	0/2	0/2
$\hat{\epsilon}_I$	0.00	-0.04	-0.01	-0.05	0.00	0.08
R^2	.004	.003	<.001	.008	<.001	.01

Employment						
$\beta_I > 0$	0/2	1/2	1/5	0/5	1/2	2/2
$\beta_I \gg 0$	0/2	0/2	0/5	0/5	1/2	2/2
$\beta_I \ll 0$	1/2	1/2	0/5	3/5	0/2	0/2
$\hat{\epsilon}_I$	-0.04	-0.04	-0.01	-0.03	0.00	0.06
R^2	.006	.004	<.001	.006	<.001	.01

TABLE 3A: 5-year growth regressions: relative nonfarm income growth on relative business climate indexes, 1975-2010

Index	Index Year	Occurrences in the 7 periods ^a		R ² , period and estimated β_I for best 5-year forecast ^b			2005-2010 ^c	
		$\beta_I > 0$	$\beta_I \gg 0$	highest R ²	Best Period	largest β_I	β_I	
Beacon Hill	2001	4/7	1/7	.023	95-00	0.068**	0.01	
	2002	4/7	1/7	.012	95-00	0.049*	0.012	
	2003	4/7	0/7	.014	95-00	0.057	0.021	
	2004	4/7	1/7	.019	95-00	0.064**	0.015	
CED-Development	1989	1/7	0/7	.004	05-10	0.006	0.006	
	1990	1/7	0/7	<.001	05-10	0.002	0.002	
	1991	0/7	0/7	N/A	N/A	N/A	-0.003	
CED-Capacity	1990	4/7	0/7	.005	05-10	0.006**	0.006**	
	1991	5/7	2/7	.008	05-10	0.007**	0.007**	
	1992	4/7	2/7	.011	05-10	0.008**	0.008**	
	1993	4/7	2/7	.009	05-10	0.007**	0.007**	
	1994	4/7	0/7	.005	80-85	0.007	0.004	
	1995	4/7	0/7	.005	80-85	0.007	0.003	
CED-Fiscal	1996	4/7	1/7	.011	95-00	0.009*	0.003	
	1990	1/7	0/7	.001	75-80	0.008	-0.0001	
	1991	1/7	0/7	.001	75-80	0.012	-0.0004	
	1992	2/7	0/7	.005	75-80	0.021	-0.003	
	1993	2/7	0/7	<.001	95-00	0.004	0.006	
	1994	1/7	0/7	<.001	05-10	0.003	0.003	
Fantus	1995	2/7	0/7	<.001	75-80	0.003	0.006	
	1996	2/7	0/7	<.001	75-80	0.002	0.0005	
	1975	5/7	0/7	.007	95-00	0.007*	0.006	
	Fraser	2004	1/7	0/7	.006	05-10	0.031	0.031
		2004	1/7	0/7	.005	05-10	0.030	0.03
	Grant Thornton	1980	6/7	4/7	.039	95-00	0.128**	-0.017
1981		6/7	6/7	.036	95-00	0.042**	-0.013	
1982		6/7	6/7	.033	95-00	0.055**	-0.011	
1983		7/7	5/7	.032	90-95	0.049**	0.006	
1984		7/7	3/7	.035	90-95	0.042**	0.003	
1985		7/7	4/7	.035	90-95	0.041**	0.005	
New Economy	1986	6/7	3/7	.03	85-90	0.051**	-0.007	
	1999	4/7	0/7	.005	95-00	0.021	0.019	
PRI	2002	4/7	0/7	.007	75-80	-0.044	0.015	
	1999	5/7	3/7	.024	90-95	0.109**	-0.04	

	2004	5/7	4/7	.021	90-95	0.070**	-0.055**
Small Business	2000	6/7	2/7	.066	85-90	0.120**	0.011
	2001	7/7	2/7	.067	85-90	0.126**	0.004
	2002	6/7	3/7	.072	85-90	0.107**	0.003
	2003	7/7	3/7	.07	85-90	0.109**	0.004
	2004	5/7	3/7	.072	85-90	0.124**	-0.001
Tax Foundation	2003	6/7	2/7	.057	85-90	0.135**	-0.036
	2004	6/7	3/7	.049	85-90	0.129**	-0.034

^a Number of positive and significant positive coefficients in the 7 5-year periods, 1975-2010. ^b Statistics for the best performing regression which has $\beta_1 > 0$. ^c Estimate for the out of sample period 2005-2010. Standard errors corrected for clustering by border. * significance at the 10th percentile; ** significance at the 5th percentile.

TABLE 3B: 5-year growth regressions: relative populations growth on relative business climate indexes, 1975-2010

Index	Index Year	Occurrences in the 7 periods ^a		R ² , period and estimated β_I for best 5-year forecast ^b			2005-2010 ^c
		$\beta_I > 0$	$\beta_I < 0$	highest R ²	Best Period	largest β_I	β_I
Beacon Hill	2001	4/7	0/7	.001	95-00	0.009	0.002
	2002	2/7	0/7	.001	90-95	0.008	-0.001
	2003	3/7	0/7	.001	95-00	0.009	0.005
	2004	2/7	0/7	<.001	90-95	0.0001	-0.017
CED-Development	1989	1/7	1/7	.023	75-80	0.013	-0.005**
	1990	1/7	1/7	.015	75-80	0.01	-0.005*
	1991	1/7	1/7	.007	75-80	0.007	-0.004*
CED-Capacity	1990	1/7	1/7	.012	75-80	0.01	-0.0002
	1991	4/7	0/7	.001	75-80	0.002	-0.001
	1992	4/7	0/7	.001	75-80	0.002	-0.001
	1993	4/7	0/7	.002	75-80	0.003	-0.002
	1994	5/7	0/7	.002	75-80	0.004	-0.004*
	1995	3/7	1/7	.005	75-80	0.005	-0.001
	1996	3/7	0/7	.003	75-80	0.004	-0.002
CED-Fiscal	1990	0/7	0/7	N/A	N/A	N/A	-0.014**
	1991	0/7	0/7	N/A	N/A	N/A	-0.012
	1992	0/7	0/7	N/A	N/A	N/A	-0.007
	1993	0/7	0/7	N/A	N/A	N/A	-0.020**
	1994	0/7	0/7	N/A	N/A	N/A	-0.020**
	1995	0/7	0/7	N/A	N/A	N/A	-0.019**
	1996	0/7	0/7	N/A	N/A	N/A	-0.020*
Fantus	1975	5/7	1/7	.008	85-90	0.007*	0.003
Fraser	2004	0/7	0/7	N/A	N/A	N/A	-0.027
	2004	0/7	0/7	N/A	N/A	N/A	-0.033
Grant Thornton	1980	7/7	5/7	.045	95-00	0.1**	0.021
	1981	7/7	7/7	.027	85-90	0.032**	0.009*
	1982	7/7	6/7	.032	85-90	0.047**	0.016**
	1983	7/7	7/7	.031	90-95	0.034**	0.012*
	1984	7/7	4/7	.045	85-90	0.039**	0.006
	1985	7/7	5/7	.032	85-90	0.032**	0.007
	1986	7/7	5/7	.033	85-90	0.037**	0.001
New Economy	1999	4/7	0/7	.001	90-95	0.008	-0.007
	2002	4/7	0/7	.001	85-90	0.009	-0.016
PRI	1999	6/7	4/7	.023	95-00	0.076**	0.036**
	2004	6/7	2/7	.016	95-00	0.044**	0.010
Small Business	2000	6/7	4/7	.051	85-90	0.074**	0.039**
	2001	6/7	4/7	.051	85-90	0.077**	0.037**
	2002	6/7	5/7	.057	85-90	0.067**	0.032**
	2003	6/7	5/7	.058	85-90	0.069**	0.033**
	2004	6/7	5/7	.061	85-90	0.08**	0.038**
Tax Foundation	2003	7/7	6/7	.043	85-90	0.082**	0.031**
	2004	7/7	6/7	.04	85-90	0.081**	0.032**

Same notes as Table 3A

TABLE 3C: 5-year growth regressions: relative wage-bill growth on relative business climate indexes, 1975-2010

Index	Index Year	Occurrences in the 7 periods ^a		R ² , period and estimated β_I for best 5-year forecast ^b			2005-2010
		$\beta_I > 0$	$\beta_I > 0$	highest R ²	Best Period	largest β_I	β_I
Beacon Hill	2001	5/7	1/7	.01	80-85	0.110**	0.002
	2002	4/7	1/7	.008	80-85	0.105*	-0.025
	2003	5/7	0/7	.007	80-85	0.104	0.050
	2004	5/7	1/7	.021	80-85	0.170**	-0.011
CED-Development	1989	3/7	0/7	.003	00-05	0.010	-0.003
	1990	1/7	0/7	<.001	75-80	0.002	-0.002
	1991	3/7	0/7	.001	95-00	0.006	-0.012*
CED-Capacity	1990	5/7	1/7	.007	95-00	0.014*	0.001
	1991	4/7	0/7	.004	95-00	0.010	0.002
	1992	4/7	1/7	.005	95-00	0.011*	-0.002
	1993	4/7	0/7	.003	95-00	0.009	-0.002
	1994	4/7	1/7	.006	95-00	0.012**	-0.007
	1995	4/7	1/7	.007	95-00	0.012**	-0.006
	1996	4/7	1/7	.005	95-00	0.011*	-0.005
CED-Fiscal	1990	3/7	0/7	.005	85-90	0.042	-0.040*
	1991	3/7	0/7	.001	85-90	0.022	-0.032
	1992	3/7	0/7	<.001	80-85	0.008	-0.015
	1993	3/7	1/7	.012	85-90	0.100*	-0.100**
	1994	4/7	0/7	.009	85-90	0.083	-0.077**
	1995	3/7	0/7	.008	85-90	0.077	-0.064**
	1996	2/7	1/7	.01	85-90	0.085*	-0.064**
Fantus	1975	4/7	0/7	.001	80-85	0.008	-0.005
Fraser	2004	2/7	0/7	.006	85-90	0.086	-0.044
	2004	4/7	0/7	.001	85-90	0.034	-0.033
Grant Thornton	1980	4/7	0/7	.008	85-90	0.145	0.040
	1981	4/7	0/7	.006	05-10	0.029	0.029
	1982	5/7	1/7	.006	80-85	0.061*	0.030
	1983	6/7	0/7	.006	05-10	0.034	0.033
	1984	4/7	0/7	.012	85-90	0.058*	0.018
	1985	6/7	1/7	.015	85-90	0.063	0.022
	1986	5/7	1/7	.028	85-90	0.097**	0.008
	1986	5/7	1/7	.028	85-90	0.097**	0.008
New Economy	1999	5/7	0/7	.004	00-05	0.039	0.013
	2002	5/7	2/7	.008	95-00	0.068**	-0.002
PRI	1999	5/7	0/7	.003	90-95	0.065	0.046
	2004	5/7	0/7	.003	75-80	0.063	0.014
Small Business	2000	5/7	1/7	.009	90-95	0.069*	0.056
	2001	4/7	2/7	.011	05-10	0.073**	0.073**
	2002	5/7	2/7	.015	05-10	0.068**	0.068**
	2003	5/7	2/7	.018	05-10	0.076**	0.076**
	2004	6/7	2/7	.013	90-95	0.083*	0.074**
Tax Foundation	2003	5/7	0/7	.006	05-10	0.063	0.063
	2004	5/7	0/7	.007	05-10	0.068	0.068

Same notes as Table 3A

TABLE 3D: 5-year growth regressions: relative employment growth on relative business climate indexes, 1975-2010

Index	Index Year	Occurrences in the 7 periods ^a		R ² , period and estimated β_I for best 5-year forecast ^b			2005-2010 ^c
		$\beta_I > 0$	$\beta_I > 0$	highest R ²	Best Period	largest β_I	β_I
Beacon Hill	2001	6/7	1/7	.008	80-85	0.074*	0.006
	2002	3/7	0/7	.004	80-85	0.055	-0.014
	2003	6/7	1/7	.008	80-85	0.082*	0.032
	2004	6/7	1/7	.026	80-85	0.130**	0.007
CED-Development	1989	2/7	0/7	.006	95-00	0.011	-0.004
	1990	2/7	0/7	.001	75-80	0.007	-0.007
	1991	3/7	0/7	.006	95-00	0.010	-0.010**
CED-Capacity	1990	5/7	2/7	.008	95-00	0.011*	0.002
	1991	5/7	0/7	.007	95-00	0.011	0.001
	1992	4/7	1/7	.009	00-05	0.011**	-0.001
	1993	4/7	1/7	.006	00-05	0.010*	-0.001
	1994	4/7	2/7	.01	95-00	0.012**	-0.002
	1995	4/7	2/7	.01	95-00	0.011**	-0.002
	1996	4/7	2/7	.009	00-05	0.012**	-0.002
CED-Fiscal	1990	4/7	0/7	.002	85-90	0.019	-0.028**
	1991	4/7	0/7	.002	80-85	0.019	-0.023*
	1992	3/7	0/7	.001	80-85	0.018	-0.013
	1993	4/7	0/7	.006	85-90	0.053	-0.059**
	1994	4/7	0/7	.004	75-80	0.038	-0.047**
	1995	4/7	0/7	.004	75-80	0.039	-0.041**
	1996	4/7	0/7	.004	75-80	0.037	-0.045**
Fantus	1975	4/7	1/7	.005	75-80	0.010	0.001
Fraser	2004	2/7	0/7	.007	85-90	0.066	-0.031
	2004	4/7	0/7	.005	75-80	0.058	-0.024
Grant Thornton	1980	5/7	0/7	.01	85-90	0.118	0.048
	1981	3/7	1/7	.007	05-10	0.022*	0.021
	1982	4/7	0/7	.005	05-10	0.026	0.026
	1983	6/7	1/7	.01	05-10	0.031**	0.031**
	1984	5/7	2/7	.02	85-90	0.055**	0.025*
	1985	6/7	3/7	.018	85-90	0.0506*	0.028**
	1986	6/7	1/7	.028	85-90	0.072**	0.023
New Economy	1999	5/7	0/7	.003	00-05	0.0266	0.013
	2002	6/7	1/7	.012	95-00	0.069**	0.008
PRI	1999	4/7	1/7	.007	75-80	0.0956	0.022
	2004	4/7	1/7	.014	75-80	0.095	0.002
Small Business	2000	5/7	1/7	.012	90-95	0.063**	0.031
	2001	6/7	2/7	.011	90-95	0.062**	0.046**
	2002	5/7	2/7	.011	90-95	0.0526*	0.041**
	2003	6/7	2/7	.013	05-10	0.046**	0.046**
	2004	6/7	1/7	.012	05-10	0.049**	0.049**
Tax Foundation	2003	4/7	0/7	.007	05-10	0.045	0.045
	2004	4/7	2/7	.007	90-95	0.0584*	0.049*

Same notes as Table 3A

TABLE 4: Regressions of relative growth from 2005-2010 at state borders on all relative state business climate indexes, using the best performing index year.				
Index and Year	Non-Farm Income	Population	Wage Bill	Employment
Beacon Hill 2004	-0.0003	-0.002	-0.018	0.008
	(0.01)	(0.16)	(0.30)	(0.23)
CED-Capacity 1987	0.006	0.009*	-0.011	0.000040
	(0.64)	(1.66)	(0.71)	(<0.01)
CED-development 1987	-0.013*	0.0003	-0.013	-0.018*
	(1.89)	(0.07)	(0.78)	(1.86)
CED-policy 1995	-0.002	0.023	-0.116*	-0.036
	(0.04)	(1.19)	(1.82)	(0.99)
Fantus 1975	0.014**	-0.0001	-0.026**	-0.010
	(2.54)	(0.05)	(2.95)	(1.56)
Fraser SG 2004	0.023	-0.028	0.162**	0.092**
	(0.50)	(1.22)	(2.47)	(2.20)
Grant Thornton 1982	-0.022	0.012	0.039	0.020
	(1.32)	(1.03)	(1.15)	(1.06)
New Economy 2002	0.059	-0.049**	0.114*	0.056
	(1.39)	(2.22)	(1.80)	(1.10)
PRI 1999	-0.069	0.005	0.038	-0.038
	(1.40)	(0.17)	(0.39)	(0.68)
Small Business 2004	0.072**	0.033*	0.088*	0.066*
	(2.30)	(1.90)	(1.67)	(1.65)
Tax Foundation 2004	-0.126**	0.012	-0.030	0.002
	(2.55)	(0.47)	(0.35)	(0.03)
Constant	-0.015**	-0.007**	0.011	0.001
	(2.57)	(2.15)	(0.94)	(0.22)
N	1222	1222	1222	1222
R-sq	0.059	0.047	0.045	0.035

t-statistics in parentheses. * significance at the 10th percentile; ** significance at the 5th percentile. Standard errors corrected for clustering by border.

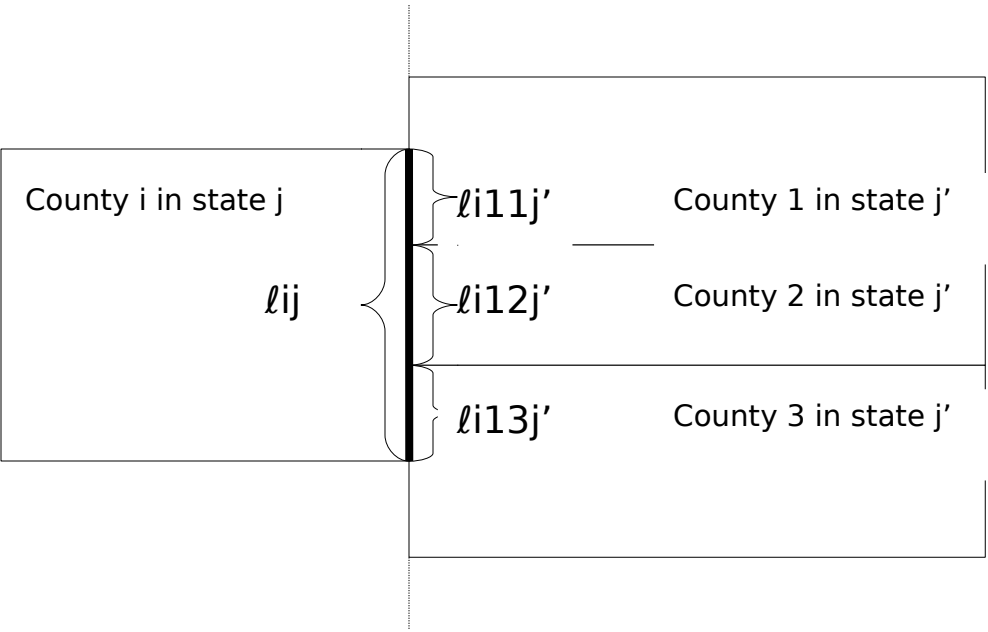


FIGURE 1: Example of the creation of county pairs based on border segment lengths.

Appendix Table A1: Overview of Business Climate Indexes Used in this Study

Index	Comments
Fantus Company (1975) Symbol: FT	<ul style="list-style-type: none"> • Commissioned by the Illinois Manufacturers' Association. • 15 measures that primarily related to the cost of doing business. • Measures appeared to be equally weighted. • To the authors' knowledge, there are no surviving copies of the original report, only cursory discussions in secondary sources.
Grant Thornton (1979-1989) Symbol: GT	<ul style="list-style-type: none"> • 1979 study commissioned by the Council of State Manufacturers' Associations (COSMA). Thereafter, COSMA members participated, but COSMA did not financially sponsor the annual study. • 18-22 measures primarily associated with the cost of doing business, with a few demographic and performance measures. • Measures are weighted based on survey responses regarding measures' importance to COSMA membership. • Only the 48 contiguous states
Small Business Survival Index (2000-2004) Symbol: SB	<ul style="list-style-type: none"> • Product of the Small Business and Entrepreneurship Council (formerly known as the Small Business Survival Council). http://www.sbsc.org/ • 15-21 measures primarily associated with the costs of doing business. Heavily weighted toward tax policy measures. Small index values indicate a "better" business climate. • All measures equally weighted. • The index dates back to the mid-1990s, but earlier versions were unavailable.
Metro Area and State Competitiveness Report (2001-2004) Symbol: BH	<ul style="list-style-type: none"> • Product of the Beacon Hill Institute at Suffolk University. http://www.beaconhill.org/ • Approximately 40 measures categorized into 5 subindexes: Policy, Security, Infrastructure, Human Resources, Technology, and Finance. • Each measure is equally weighted within each subindex. Each subindex is equally weighted in the aggregate index.
The State New Economy Index (1999 & 2002) Symbol: NE	<ul style="list-style-type: none"> • Product of the Progressive Policy Institute. http://www.neweconomyindex.org/states/2002/ • 23 measures categorized into 5 categories: Knowledge Jobs, Globalization, Economic Dynamism, Digital Economy, and Innovation Capacity. Measures focus on technology-related areas. • Weights applied to each measure to mitigate the influence of closely correlated measures.

Index	Comments
<p>Economic Freedom Index 2004</p> <p>Symbol: FrN (All gov't)</p> <p>Symbol: FrS (S&L gov't)</p>	<ul style="list-style-type: none"> • Product of the Fraser Institute and the National Center for Policy Analysis. http://www.fraserinstitute.ca/ http://www.ncpa.org/ • The methodology was applied to both U.S. and Canadian data at both the national and subnational levels of government. The index is reported at both levels of aggregation. • 10 measures related to the size of government and the regulation of markets in three categories: Size of Government, Takings and Discriminatory Taxation, and Labor Market Freedom. • Each measure is equally weighted within each subindex. Each subindex is equally weighted in the aggregate index.
<p>The U.S. Economic Freedom Index (2004)</p> <p>Economic Freedom in America's 50 States (1999)</p> <p>Symbol: PRI</p>	<ul style="list-style-type: none"> • The 2004 index is a product of the Pacific Research Institute (in association with Forbes Magazine). The 1999 index is a product of the work of three Clemson University economics professors. http://www.pacificresearch.org/ http://freedom.clemson.edu/ • The 1999 Clemson index (used in the present analysis) is the intellectual forerunner of the 2004 PRI report. • Dozens of metrics categorized into five categories: Fiscal Sector, Regulatory Sector, Judicial Sector, Size of Government, and Welfare Spending. • Lower index scores means greater economic freedom. • The 1999 Index has a two-part weighting procedure. Individual measures within each category are given decile-based scores, and the decile score of the various measures within each category are averaged to produce a category score. In 1999, the category scores were aggregated into a single index using weights from principle components analysis. In 2004, the aggregation used weights from regression coefficients relating the categories to interstate migration between 1995-2000.
<p>Development Report Card of the States—Policy Index (1987-1992)</p> <p>Symbol: CEDdp</p>	<ul style="list-style-type: none"> • Product of the Corporation for Enterprise Development http://drc.cfed.org/ • Dozens of measures separated in to eight subindexes. • Each measure equally weighted in each subindex. Each subindex equally weighted in the aggregate Policy index. • Measures focus on the existence of government-based economic development programs.

Index	Comments
Development Report Card of the States—Capacity Index (1987-2004) Symbol: CEDc	<ul style="list-style-type: none"> • Product of the Corporation for Enterprise Development http://drc.cfed.org/ • 26-30 measures separated into five subindexes: Human Resources, Technology, Finance, Infrastructure, and Amenities. • Each measure equally weighted in each subindex. Each subindex equally weighted in aggregate Capacity index.
Development Report Card of the States—Fiscal Policy Index (1988-1998) Symbol: CEDpi	<ul style="list-style-type: none"> • Product of the Corporation for Enterprise Development http://drc.cfed.org/ • 16-18 measures separated into three subindexes: Fiscal Stability and Balance, Tax Fairness, and Fiscal Equalization. • Separate reporting of this index began with the 1988 report (but was part of the 1987 Policy Index). • Each measure equally weighted in each subindex. Each subindex equally weighted in aggregate Capacity index.
State Business Tax Climate Index (2003-2004) Symbol: TF	<ul style="list-style-type: none"> • Product of the Tax Foundation http://www.taxfoundation.org/ • The 2003 index was comprised of 5 major indexes: Corporate Income Tax, Individual Income Tax, Sales and Gross Receipts Tax, Fiscal Balance, Tax Base Conformity. The major indexes contain 18 subindexes and 32 measures. • Each major index is weighted equally to form the aggregate index. Each sub-index is weighted equally within the major indexes. In many instances, a measure equals a sub-index (e.g., tax rates) • The 2004 index replaces adds the Conformity index variables into the other major indexes and adds an Unemployment Tax index. It also expands the number of sub-indexes and measures, and alters the weighting scheme to diminish the weights of “yes-or-no” variables.

Appendix Table A2: Intertemporal correlations for repeated business climate indexes, various years

	<i>GT80</i>	<i>SB00</i>	<i>NE99</i>	<i>BH01</i>	<i>PRI99</i>	<i>CEDdp87</i>	<i>CEDc87</i>	<i>CEDpi88</i>	<i>TF0</i> <i>3</i>
<i>X(T+1)</i>	0.81	0.97		0.97		0.84	0.85	0.75	0.99
<i>X(T+2)</i>	0.81	0.96		0.96		0.84	0.83	0.74	
<i>X(T+3)</i>	0.81	0.92	0.96	0.84		0.68	0.79	0.74	
<i>X(T+4)</i>	0.76					0.71	0.72	0.71	
<i>X(T+5)</i>	0.72				0.86		0.73	0.61	
<i>X(T+6)</i>	0.62						0.73	0.61	
<i>X(T+7)</i>							0.74	0.61	
<i>X(T+8)</i>							0.73	0.58	
<i>X(T+9)</i>							0.68		

Correlations represent the earliest available index X at time T with values of the same index taken at time

$T+t, t=1, 2, 9.$

|

1 Kolko et al. (2013) analyze one-year growth rates of employment, total wages and Gross State Product following the release of a business climate index in a panel data framework over the years 1992 to 2008. They also analyzed 2- and 3-year changes and note the results were unchanged but they do not report these in their paper. In contrast, we examine a 5-year window following the release of the business climate index.

2 See Plaut and Pluta (1983) and Lane et al. (1989) for generally favorable studies. An unpublished paper by Courant and Fulton (1985) concluded that the Grant Thornton index had weak predictive power except in recessions.

3 For example, Rork (2003) shows that taxes on mobile resources respond positively to rates in neighboring states; a 10 percent home states' tax rates decline between 1.6 and 6.4 percent for a 10 percent decrease in neighboring states' tax rates, depending on the tax.

4 See Kolko et al. (2013), table 11, for an analysis of some of the individual factors used in formulating three of the business climate indexes. Our aim is to assess the index creators' expertise in collecting and interpreting data rather than investigating individual components, and so we restricted our analysis to the performance of each index as a whole.

5 Our indexes overlap extensively with the indexes studies by Kolko et al. (2013). Our set includes the Grant Thornton and FANTUS indexes that predate the Kolko et al. study and we exclude the Cato Institute Report Card on the Nation's Governors because it emphasized short-term policy responses rather than structural measures which we viewed as more permanent and likely to affect long-term private investments. We also did not evaluate the Milken Institute's Cost of Doing Business Index. The one edition available on line was the 2007 edition which is too late for our tests. We sought the earlier releases from the reported author but did not receive a response.

6 These are reported in Appendix Table 2.

7 Because the various editions of an index are highly inter-correlated, we pick an index at the midpoint of the series of releases as the representative index. To make the correlations easier to interpret, indexes for which smaller numbers imply better climates were multiplied by -1.

8 The Dube et al. (2010) study did not exploit the difference-in-differences methodology but rather attempted to control for confounding effects using other control variables (county population and aggregate employment) and various fixed effects. It seems plausible that their inability to find stronger minimum wage effects is related to their use of these potentially endogenous covariate controls rather than to weaker effects of the minimum wage at the state border.

9 The presumption that state business climate would matter most at state borders is also consistent with evidence of how economic advantages or disadvantages dissipate with distance. Khan, Orazem, and Otto (2001) found that employment growth in one county has positive spillovers on its neighbors that diminish with distance and disappear beyond two counties distance. Holmes (1986) found that the disadvantages and advantages associated with right-to-work declined with distance and disappeared around 25-50 miles of the border. The implication is that interior state counties are not as advantaged or disadvantaged by the state's relative business climate as are the border counties in the state.

10 The R^2 in this context measures the added predictive power of the business climate index. The error term in equation (2) measures the future relative growth

at the border that is uncorrelated with the business climate index, which one could equate with forecast error. The R^2 is $1 - (\text{variance of growth uncorrelated with the business climate index}) / (\text{total variance of growth})$.

11 We exclude the corner counties that border on more than one state, so the cumulative weights sum up to less than one for borders with one or more multistate corners.

12 Data descriptions and county-level data can be downloaded from <http://www.bea.gov/bean/regional/data.htm> and are reported in the U.S. Department of Commerce, Bureau of Economic Analysis (2013).

13 We had thought that natural barriers to travel across the border such as a river might moderate the equilibrating forces across state borders, but we found similar effects when we controlled for rivers and bridges.

14 We replicated this analysis including a 5-year lagged growth of the dependent variable. The key results were not changed.

15 Between 1975-2005, there were only four recessions, the longest lasting 16 months.

16 Kolko et al. (2013), p. 242, report various tests of the attributes of the indexes including whether the indexes were just based on past economic growth or contributed information independent of past growth. We conducted a similar test that examined whether the correlation between past and current business climate indexes was due only to consistent methodology or to correlation with past growth in population, employment, productivity and nonfarm income. In all cases, past indexes were significantly predictive of future indexes. The joint test of significance of the four past growth rates was insignificant except for the CED-Capacity and CED-Development indexes. Consistent with Kolko et al., we did not find much evidence of endogenous business climate indexes.

17 An anonymous reviewer raised a concern about the inclusion of "empty counties," border counties with low levels of economic activity particularly in the western part of the U.S., affecting the interpretation of the results. We ran specifications of our model including region fixed effects and regional interactions allowing the effect of the business climate index to vary across regions. The addition of these controls does not change our conclusions regarding the inability of the business climate indices to predict growth at the borders.