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**Factors Affecting the Interstate Migration of Manufacturing Firms:
Much to do about nothing?**

By

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Factors Affecting the Interstate Migration of Manufacturing Firms: Much to do about nothing?

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Abstract Manufacturing recruitment remains an important part of most state and local governments' economic development portfolio. Using a panel (2000 to 2011) of firm interstate migration data for manufacturer across the lower 48 states we model how state and local government fiscal policies influence firm migration patterns. We find that very few manufacturing firms migrate across state lines in any given year. State and local governments are attempting to recruit from a very small number of relocating manufacturers. Indeed, most firms that do relocate across state lines tend to move to neighboring states. Fiscal policies have mixed and somewhat inconsistent influence of manufacturing interstate migration patterns.

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Factors Affecting the Interstate Migration of Manufacturing Firms: Much to do about nothing?

“Recruitment of large industrial and commercial facilities is a key aspect of most local development strategies.” Goss and Phillips (1994 :p78)

“State economic development programs have traditionally tried to create jobs by recruiting large manufacturing businesses from other states or countries.” Smith and Fox (1990: p25)

“[US] [c]ities and states in the south and west competed fiercely for branch plant relocations from the Rustbelt and the investment of foreign manufacturers. An economic development profession skilled in business prospecting, place marketing and the design of tax and subsidy schemes emerged to support that competition.” Feser (2014: p22)

State and local governments have been “at war” with each other economic growth and development for generations. Indeed, in 1791 New Jersey awarded Alexander Hamilton tax incentives to influence the location of his factory. It was the passage of the Mississippi Balance Agriculture with Industry (BAWI) Act of 1933 that laid the foundation for the modern “War Between the States”. Building on export base theory and neoclassical firm location theory, as it was known at the time, Mississippi promoted itself to northern manufacturers as a low cost alternative offering cheaper labor, lower taxes, and limited regulations. More important than a simple marketing campaign the BAWI instituted the notion of targeted tax incentives to lure northern manufacturing firms.

The apparent success of the BAWI coupled with the strong growth in manufacturing after the end of WWII put into place what is now commonly called the First Wave of economic development policies and strategies (Deller and Goetz 2009; Shaffer, Deller and Marcouiller 2006). Industrial recruitment, particularly manufacturing firms, through the use of incentives became synonymous with economic growth and development policy. These incentives can range from reduced tax rates, exempting items from the tax base, tax credits to lower overall tax bills, aid in financing and credit programs, the use of industrial revenue bonds to reduce debt interest costs, targeted public infrastructure investments, and focused educational and labor training programs to name a few (Anderson and Wassmer 2000; Fisher and Peters 1998; Buss 2001). Recent examples include the State of Nevada offering the Tesla Motors’ \$1.25 billion in incentives to locate its car battery manufacturing facility, South Carolina’s \$150 million to attract BWM along with an additional \$100 million for a planned expansion, and \$250 million from Alabama to recruit Mercedes-Benz. The frenzy of “winning the game” led Rubin (1988) to introduce the phrase “shoot anything that flies, claim anything that falls” into the lexicon of economic development discussions.

The theoretical foundation for the use of incentives flows directly from neo-classic firm location theory. Here firms make location decisions in a two-step process: the first step involved selecting a general location to minimize transportation costs to and from both input and output markets, the second

involving the selection of a specific site. The decision criterion in both steps is to minimize costs in order to maximize profits. Incentives are aimed at reducing costs thus making a particular locale more profitable over another. Promoting lower labor costs, lower taxes, and limited regulations in the name of lower operating costs became synonymous with a positive business climate. The recent passage of right-to-work legislation in Indiana and Michigan, and the impending passage in Wisconsin, were justified in part as promoting a more favorable business climate in the name of economic development.

This neo-classical framework, however, presumes that firms are mobile and possess full information about all alternative locations. But as argued by Pellenbarg, van Wissen and van Dijk (2002), Shaffer, Deller and Marcouiller (2004) among others these assumptions seldom hold in the real world. In a study of small (less than 100 employees) rural manufacturing firms in northern New England (Maine, New Hampshire and Vermont) and Wisconsin Halstead and Deller (1997) found that the typical firm had been in its current location for almost 24 years and the majority (75%) are still in the same location as when it was founded. This apparent lack of mobility becomes particularly important when one considers that the primary reason (61%) the firm is in its currently location is because the owner of the firm lives in that area. Halstead and Deller reported that one respondent to the survey stated: “[f]ind an area that you want to live, then start your business.” (p160).

More recently, in an analysis of firm migration patterns in Wisconsin over the period 2000 to 2011 Conroy and Deller (2014) found that 1.1 percent of all establishments move in any given year. Of those Wisconsin businesses that did move 60 percent moved less than or equal to ten miles. Migration of establishments into Wisconsin from other states represented 11.1 percent of all movers and out-migration accounted for only 11.6 percent of movers. In 2011, less than 1,200 firms moved between states and the vast majority of those inter-state migrating firms were to or from Illinois and Minnesota. They found that net change in state-level employment from establishment relocation is less than 0.05 percent of total state employment. Further, the typical firm that did relocate is likely a service industry firm with four or fewer employees and under \$250k in annual sales.

Given the general interest in attracting manufacturing firms consider that in 2011 there were about 290,000 manufacturing firms (with Alaska and Hawaii removed) in the US. Now drawing on the National Establishment Time Series (NETS) data for 2011, there were just over 2,000 firms that moved between states (again, Alaska and Hawaii removed). This suggests that in 2011 only 0.7% of manufacturing firms relocated across state lines. If the Wisconsin patterns identified by Conroy and Deller (2015) are representative, the vast majority of these manufacturing firms moved to an immediate neighboring state.

A simple mapping of the rate of in-migration of manufacturing firms (Figure 1), as a percent of total manufacturing firms in the state, reveals that the state with lowest rate is Arkansas (0.33%) followed by California (0.35%), Alabama (0.37%) and Mississippi (0.39%) and the state with the highest in-migration rate is Nevada (2.91%) followed by Delaware (2.34%) and Wyoming (1.48%). If we look at the absolute number of manufacturing firms moving, there were only nine firms moving into Arkansas, 134 firms into California, 16 into Alabama and nine into Mississippi. For the largest in-migration state Nevada, 49 manufacturing firms relocated into Nevada and 14 into Delaware and only eight into Wyoming.

There are also manufacturing leaving these states (Figure 2) which suggest that there is a natural flow of manufacturing firms relocating. The net change is perhaps the most interesting: which states lost or gained manufacturing firms over this natural flow of firms (Figure 3). Within the guise of the “recruitment game” there appear to be some “winners” as well as “losers”. The biggest “winner” as a percent of firms is Nevada which experienced a net-gain of 1.25 percent, or 21, firms followed by Rhode Island with a net-gain of 0.73 percent or 11 firms. The biggest “loser” on a percent basis was Vermont (-0.41%) which is only four manufacturing firms followed by Alabama with a net loss rate of 0.41% which is 17 firms.

The top three states that had the largest number of manufacturing firm moving in where Florida with 138 firms then Texas and California each with 134 and the three states with the fewest number of manufacturing firms moving in were North Dakota with only three, Vermont with four and West Virginia with six (Table 1). At the same time California lost 205 manufacturing firms, New York lost 144 and Florida lost 129. The states with the biggest net-gain was Texas with 53, North Carolina with 42 and Nevada with 21 and the largest net-lose was California losing 71 manufacturing firms, followed by New York with 47 firms and Alabama and Massachusetts tied with 17 firms.

Based on this simple descriptive analysis three observations can be raised. First and foremost, very few manufacturing firms relocate in any given year, particularly across state lines. This is consistent with the work of Lee (2006, 2008) who finds that three percent of manufacturing plants relocate to other states in a given (Census) year. This raises a simple question: are state economic development organizations that actively try to recruit manufacturing firms drawing upon a remarkably small pool of mobile firms? Second, there appears to be a natural movement of firms, albeit a very small pool of firms, which is consistent with any dynamic economy. Firms elect to relocate for a variety of reasons and while there appears to be some states that are net “winners” and “losers” it is not clear if these winners and losers are purely random. Third, and foremost, it is not clear if state policies have any influence over these patterns.

This study is aimed at contributing the empirical literature which seeks to explore the location decisions of manufacturing firms with a particular focus on interstate migration flows. We use interstate flow data of manufacturing firms for the lower 48 states annually from 2000 to 2011. The source of the flow data is the National Establishment Time Series (NETS) a database of U.S. establishments continually updated by Dun & Bradstreet (D&B) in partnership with Walls & Associates. Drawing on the literature related to business climate (e.g., Stallmann and Deller 2011) and the broader firm location literature (e.g., Deller 2009) we explore how various state characteristics help explain the observed interstate manufacturing patterns. The empirical analysis proceeds in three steps. First we bifurcate states into two groups, those with positive net migration and those with negative net migration. We then use a set of subsample equivalency tests to explore differences in business climate metrics. Second, we use logit regression analysis to model net positive and negative net migration. Finally, we panel estimators to model actual net migration flows.

Discussion of the Relevant Literature

A location decision for a business concerns several factors including those affected by incentive packages, but many factors go beyond the influence of local government and economic development agencies. Each analytic approach to location decisions indicates certain factors that are most relevant to the choice. The “neoclassical approach” emphasizes factors that affect production and costs. The “institutional approach” draws attention to the role of government and fiscal policy as well as the market power of large firms. Indeed, certain neoclassical and institutional factors produce consistent results across several studies of industrial location. The “behavioral approach” also suggests several key factors, though more difficult to quantify, such as quality of life.

The neoclassical approach has established some of the fundamental factors to business location decisions, particularly for large firms that utilize objective decision-making processes such as profit maximization. In general, businesses consider the most profitable locations. Hence, factors that affect costs and revenues are important to location choice. Studies testing the neoclassical approach consistently find that locations with skilled labor are more desirable to firms, but those with high wages are less appealing (Arauzo-Carod et al. 2010). Much of the production process involves moving inputs and outputs, thus transportation infrastructure is an important aspect of the location choice though it varies across industries (Ibid.). Relatedly, businesses also value market access/size in trying to most efficiently reach customers (Ibid.; Deller et al., 2006).

Yet location is often not a decisive factor for profit or loss (Pellengard et al. 2002) and in many cases the decision process is far less objective than the neoclassical model predicts (Berg 2014). There may be many profitable location choices and it seems that businesses only consider a very narrow subset of them (Berg 2014). In many cases businesses choose between just three alternatives and in some cases consider just one location (Ibid.). There is only limited information available about each location and rather than invest potentially limitless time and resources collecting information, many business owners and entrepreneurs simply choose to locate in the same location that other businesses chose (i.e., “follow the leader”) (Ibid.).

In short, information is costly to collect and process. One strategy that communities can pursue is to have detailed information about the local/regional economy available for any business that might be interested in locating within the community. This includes information about potential sites and actions needed to bring those sites into acceptable condition. A strong signal that can be sent to the prospective business about the positive business climate of the community is if site information in neighboring communities is also shared.

Businesses do tend to cluster together because there are many advantages of co-locating. In “agglomerated economies” or “cluster economies” businesses that are physically near each other benefit from shared labor pools and supplier networks, and valuable flows of information that can spur innovation. Economies that feature a productive industrial mix, or urbanization, generally draw more new businesses than do highly specialized economies (Arauzo-Carod et al. 2010). As evidence of this, Lee (2008) finds that manufacturing plants tend to leave places that are concentrated in same-industry activity and relocate to new centers of industry. Headquarters, though, seem to relocate to

metropolitan areas with same industry specialization and an agglomeration or clustering of other headquarters (Strauss-Kahn and Vives, 2009).

Even if state and local governments do manage to attract new business with incentive packages the changes in employment and incomes are likely to be small. Neumark et al. (2006, p. 93) write, "...the negligible role of business relocation suggests that a policy focus on such relocation is badly misdirected, and unlikely—even if successful at attracting new businesses and retaining old ones—to contribute visibly to job growth..." Local start-ups and the expansion of existing business have a much larger effect on employment dynamics, (Ibid., Eisenger, 1995). If employment growth is indeed the goal, it may be strategic to focus on fostering a dynamic economy with high rates of start-up and failure (Bunten et al., 2015).

As a special type of industrial recruitment, Enterprise Zones (EZs) have proved successful in some cases as measured by employment growth and wage increases (Busso et al. 2013, Okeefe 2004). In other studies the impact of Empowerment Zones is insignificant or negative (Parker and Fisher 2002, Neumark and Kolko 2010). The specific features and incentives of these programs vary dramatically across the country, however, making them difficult to assess. Likely the success of EZs is a function of the particular attributes of the incentive program, the surrounding community, and the implementation process. There is also evidence that EZs have a different affect across business dynamics (Bondonio and Greenbaum, 2007). New establishments tend to benefit the most from EZs and by a wide margin in terms of employment, shipments, and capital expenditures (Ibid., Billings, 2009). Existing establishments exhibit small, positive effects, but the gains are offset by losses from business closures and exits. Taken together across each type of dynamic, the net effect of EZs is small (Bondonio and Greenbaum 2007).

Whereas the cost of labor, access to markets, and patterns of industry concentration are largely beyond the influence of policy makers and economic development practitioners, they can alter tax rates and spending on public services. Many do just that but the effect of taxes on location is ambiguous (Arauzo-Carod, 2010). Operating outside the conventional profit-maximization model, there is evidence that entrepreneurs largely ignore tax incentives. Berg (2014, p 1700) writes, "...when asked directly about how tax incentives would (or do) influence location choice, the modal reaction was to ignore government's nudges to invest in regions of the city targeted by policies seeking to stimulate local economic growth in particular locations." Certain industries, such as manufacturing, may be sensitive to changes in particular tax rates but the effect is still small (Billings 2009, Lee 2008). Businesses do however seem to consider taxation and public good provision together, preferring a high tax-high public service location to one featuring low taxes and fewer public services. (Gabe and Bell, 2004).

Empirical Modeling

One of the most popular ways in which policies aimed at business recruitment is inferred is in term of business climate. Returning to the Mississippi Balance Agriculture with Industry (BAWI) Act of 1933 and the neoclassical view of business location decision-making business climate is cast in terms of costs of operation: policies aimed at reducing the cost of business operations is said to promote a positive business climate. Although Plaut and Pluta (1987) correctly argue that the term business climate itself is ambiguous and poorly defined they note that at the top of the many potential factors that could affect a

region's business climate tends to be regional tax burdens and the regulatory environment. Generally, regions with higher taxes and stricter regulations are said to have poorer business climates and "pro-business" policies are aimed at reducing taxes and regulations. At the extreme, artificial tax and expenditure limits, such as Colorado's Taxpayers Bill of Rights (TABOR) or California's Proposition 13, are imposed in the name of improving the business climate of the region (Stallmann and Deller 2011; Deller, Stallmann and Amiel 2012). A fundamental problem with business climate studies is that the measures used generally are not tested for their relation to performance.

As noted by Gabriel and Rosenthal (2004) there is a vast collection of popular press rankings of best places to live as well as best places to conduct business. At the heart of these types of rankings are tax rates, regulatory environments, union membership rates, ease of liability law suits, amongst other factors. These rankings are often promoted by economic development officials whose communities fare well as evidence of the economic vitality of their community and bemoaned by those who rank low as flawed and not reflective of reality. Although numerous studies (e.g., Plaut and Pluta 1987; Lane, Glennon and McCabe 1989) challenge the rigor of such rankings, they remain popular and the driver of many policy debates.

Drawing on this literature we use measures of (1) agglomeration effects within manufacturing, (2) overall economic strength of the state, (3) labor related costs, (4) energy costs, (5) tax burdens, (6) levels of public services, (7) the political environment, and (8) two business climate indices.

Agglomeration Metrics

State Share of US Gross Domestic Product from Manufacturing
Share of State Employment from Manufacturing

Overall Economic Strength

Coincident Index of Economic Activity

Labor Characteristics

Per Job Compensation in Manufacturing (\$000)
Union Membership Rate
Percent of those over Age 25 with at Least a Bachelor's Degree

Energy Costs

Electricity Rate Costs

Taxes

Corporate Income Tax per \$1000 of Personal Income
Individual Income Tax per \$1000 of Personal Income
Property Tax per \$1000 of Personal Income

Public Service Levels

Spending on Higher Education per \$1000 of Personal Income
Spending on K-12 Education per \$1000 of Personal Income
Spending on Welfare per \$1000 of Personal Income
Spending on Highways per \$1000 of Personal Income
Spending on Corrections per \$1000 of Personal Income

Political Environment

Share of State Legislature Held by Democrats
Governor Veto Rate

Business Climate Indices

Beacon Hill Competitive Index
Liability Exposure Ranking

The agglomeration effects within manufacturing measures are included to capture the effects of industry scale with the idea that states that have a larger overall manufacturing industry and/or are more dependent upon manufacturing will be more attractive to other manufactures. In essence, a higher concentration of manufacturing will create a self-reinforcing clustering effect (e.g., Shields, Barkley and Emery 2009; Woodward and Guimarães 2009). The coincidence index of economic activity, developed and maintained by the Federal Reserve Bank of Philadelphia, is a general index of overall economic performance. We would argue that manufacturers will be more inclined to move to states that have a more viable economy following the same logic as attraction to states that have stronger agglomeration effects.

Labor related characteristics, as measured by labor costs (average compensation of a manufacturer worker, union membership rates and general education levels), is a central piece of the “old school” view of business climate. Laws, like the right-to-work recently enacted in Indiana, Michigan and Wisconsin, are promoted as a means to reduce the labor costs associated with manufacturing. In the simplest sense manufacturers will be repealed by states with higher labor costs and union membership rates. Education levels are simple measures of potential labor productivity: a more highly educated workforce, other costs held constant, should be more productive and attractive to manufacturers. At the same time, it is possible that a more highly educated workforce may not be appealing to working in manufacturing, thus acts as a potential labor supply constraint.

Energy costs, particularly the cost of electricity, is often put forward as an important component of the costs of operation and hence business climate. Carlton (1983), for example, found that electricity costs was one of the few costs variables, relative to taxes or incentives, that consistently explained the location decisions of manufacturers. The political environment is aimed at capturing the notion that the Republican Party tends to be more “pro-business” or “business-friendly” and will enhance the business climate of the state. Republicans tend to favor lower taxes, deregulation and pro-business policies. Thus we would expect manufacturers to be drawn to states that tend to be controlled by Republicans. In addition, political conflict can add uncertainty to the business climate and we measure this by the rate

at which governors use their veto authority. We would expect businesses to be less likely to relocate to a state with higher levels of political conflict.

The key variables of interest are taxation and expenditure rates of state and local governments. If the old school view of business climate is true, it is clear that manufacturers will be attracted to states with lower corporate income taxes, lower individual income taxes, and lower property taxes. Yet, as argued by many (e.g., Due 1961; Oakland; 1978; Wasylenko 1980, 1981, 1997; Bartik 1991, 1992; Newman and Sullivan 1998; Ladd 1998; White 1998; and Lynch 2004) there is a balance between the potentially negative effects of taxation and the positive effect of the public goods and services that those taxes pay for. Taxes pay for public education which is vital to the productivity of the workforce and transportation infrastructure which is necessary for manufacturing shipping, among other services. We include expenditures (per \$1,000 of personal income) on K12 education, higher education, highways, corrections and welfare. We include the latter two as proxies for how the state approaches social services: are states more likely to spend on corrections (law enforcement, jails, prisons) or on social support services (welfare broadly defined).

We also include two indices that are aimed at reflecting the business climate of the state. The first is from the Beacon Hill Institute for Public Policy Research at Suffolk University, Massachusetts and is a general index of overall economic competitiveness. We include this index in the spirit of Plaut and Pluta (1987) and Lane, Glennon and McCabe (1989) to test if these popular types of business climate type rankings and indices help us understand the movement of manufacturing firms. The challenge with modeling the influence of these types of indices over any reasonable length of time is the inconsistency in the reporting of these types of rankings. The Beacon Hill index is the one index that we could uncover that was consistently available over the whole study period. The second is an index of liability exposure constructed by the US Chamber Institute for Legal Reform. The argument is that states where liability law suits are easier to file and pursue have a weaker business climate and manufactures are likely to avoid those states in making a location decision. The rankings are such that higher ranked states are more difficult to file suits (e.g., Delaware is ranked one and is the most difficult to sue whereas West Virginia is ranked 50th and is the easiest to file suits).

As outlined above first we bifurcate states into two groups, those with positive net migration and those with negative net migration. We then use a set of subsample equivalency tests to explore differences in business climate metrics. Second, we use logit regression analysis to model net positive and negative net migration. Finally, we panel estimators to model actual net migration flows.

Empirical Results

Consider first the simple sub-sample equivalency testing. While one could view this type of analysis exploratory we would argue that it provides a set of bare minimum level tests. If we find no statistically significant difference, then further analysis is unlikely to uncover any patterns in the underlying data. If we do find differences, then more thoughtful analysis is justified. The sub-sample equivalency tests

include two tests for central tendency and three non-parametric tests of distribution. The central tendency tests are the ANOVA F-test for mean equivalency and the non-parametric median test of central tendency. The van der Waerden, Savage and Kruskal-Wallis or Wilcoxon are non-parametric tests that compare the distribution of the measures of economic performance across the sub-samples. The test of median equivalency tests the null hypothesis that the medians of the populations from which the samples are drawn are identical. The median test categorizes all scores as above or below the median and then tests for differences among the sub-samples. The median test is considered elementary, but because there are so few assumptions a statistically significant result is very convincing. The van der Waerden test is a non-parametric test for the homogeneity of samples based on the rank statistic where the rank scores are the quantiles of a standard normal distribution. The Savage test is similar, but is built on an exponential distribution. Kruskal-Wallis is similar to the Wilcoxon test but for several sub-samples and does not assume a normal distribution.

Generally, the results on our two agglomeration metrics are somewhat mixed (Table 2). We hypothesized that states that has a larger scale of manufacturing, as measured by the state's share of the US gross domestic product from manufacturing, would be more attractive to manufacturers. The data does not generally support this hypothesis. But, the relative dependency of the state on manufacturing for employment as an alternative measure of agglomerations, does appear to be associated with higher levels of net in-migration. We also find that states that have generally stronger economies, as measured by the Federal Reserve Bank of Philadelphia's coincident index, are also associated with higher levels of net in-migration.

In terms of labor related characteristics we find that higher per job compensation in manufacturing, higher rates of union membership and higher education levels are associated with net out-migration of manufacturing firms. Manufacturers appears to be more likely to move to states with lower labor costs and union membership rates. We also find that states with higher electricity costs tend to experience negative net migration, or out-migration of manufacturing firms. On face value, this suggests that some elements of the traditional way of thinking about business climate appear to hold true.

Also consistent with the older view of business climate, states with higher corporate income taxes, higher personal income taxes and higher property taxes (all on a \$1,000 of personal income basis) tend to experience net out-migration of manufacturing firms over the 2000 to 2011 study period. At the same time, spending on higher education, welfare, corrections and highways does not appear to be associated with net-migration patterns. There is weak evidence that higher spending on welfare may be associated with net out-migration. There is evidence that spending on K12 education is also associated with net out-migration. Taken on face value, the older view of business climate appears to help explain the net migration of manufacturing firms across state lines: higher taxes is generally a "bad" and corresponding spending on public services does not compensate for the negative effects of taxation.

States that tend to be controlled by Democrats, as measured by the share of state legislative seats held by Democrats, tend to experience negative net migration, or more manufacturing firms leaving the state than moving into the state. We also find that political conflict, proxied by the governor veto rate, is

weakly linked to negative net migration. This again tends to support the underlying logic of the older view of business climate. Finally, the liability exposure index does not appear to help us understand if a state is a net gainer or loser of manufacturing firms over the study period. The Beacon Hill Competitive Index actually is linked to net out-migration: higher values of the competitive index is associated with out-migration. This could be due to the nature of the competitive index itself which is a broad index and is not specific to manufacturing.

It is clear that there are statistically significant differences along a range of our business climate metrics across states that experienced positive and negative net migration of manufacturing firms over the 2000 to 2011 study period. To gain further insights into these patterns we use a simple logit-probit estimator (Table 3) along with a panel estimator of net flows (Table 4). We employ two specifications of the models: one with taxes included and expenditures excluded and one with taxes excluded and expenditure included. We do this to minimize the problems of collinearity and issues of endogeneity if taxes and expenditures are included at the same time.

The discrete model (logit-probit) is structured such that the dependent variable takes on a value of one if net migration is negative, zero if net migration is positive. The two agglomeration variables provide mixed results, the relative size of state manufacturing compared to the US does not influence migration flows and is generally consistent with the sub-sample equivalency analysis, but the share of state employment in manufacturing has the expected influence in the tax specification model, but not the expenditure specification model. State's whose economies are generally performing well tends to be attractive to manufacturers and again is consistent with the sub-sample analysis.

Labor cost, measured by per job compensation in manufacturing, is surprisingly not statistically significant, but union membership rates have the expected dampening effect on manufacturing firm movement. Taken together, wages may not be an issue as manufacturers may be willing to pay for productive workers, but prefer not to work through unions to achieve that end. Share of the population with a college education appears to dampen in-migration, but not when taxes are considered. Energy costs, specifically electricity costs, have the expected dampening effect, albeit weakly, but not when taxes are considered.

Consistent with the older view of business climate and much of the more current firm location literature, taxes have a consistent dampening effect on manufacturing firm movement. Again consistent with the sub-sample testing, states with higher taxes are likely to experience net out-migration of manufacturing firms. Spending on public services does not appear to compensate for the negative effect of taxes. Only one expenditure category is statistically significant, highway spending, but with the opposite than what is expected: states with higher spending on highways are likely to experience net out-migration. Measuring the flow of services from transportation infrastructure, which is really what manufacturing firms are considering, is difficult to measure. The "fallback position" of using expenditures is problematic: a high quality transportation system requires less maintenance expenditures than a system in poor repair. It is possible that higher expenditures is linked to a poorer highway transportation system.

Neither of the political variables appear to matter once other factors are considered and exposure to liability law suits also does not appear to matter. The Beacon Hill Competitive Index is statistically significant in the two models with taxes included but not when expenditures are considered. The positive coefficient, which is consistent with the sub-sample analysis, suggests that more “competitive” states are likely to experience net out-migration of manufacturing firms. Again, it could be that the Beacon Hill metric is looking at competitiveness more broadly than simply manufacturing.

Next we model net flows of manufacturing firms (3rd column of Table 1) using a simple pooled estimator which ignores the panel nature of the data and a fixed effects estimator that controls for unobserved differences across the states (Table 4). From a purely statistical perspective on the performance of the individual variables, the pooled estimator performs stronger than the fixed effects estimator. Yet, an F-test for fixed effects tells us that we cannot reject the importance of the fixed effects. We can see this in the large increase in the R^2 from the pooled to fixed effects models. Also troublesome is that the direction of the relationships at times flips between the simple pooled and fixed effects. For example, the two simple aggregation metrics provide inconsistent results. For the pooled estimator, as the share of the state’s contribution to total US manufacturing GDP goes up we are likely to see net out-flows but for the fixed effects the result is flipped for the tax augmented model but is insignificant for the expenditure augmented model. Also, the share of state employment in manufacturing has a positive impact on net flows in the pooled model, but a negative impact on the fixed effect model.

Consistent with the other analysis, a state with a stronger overall economy is like to have a positive net migration flow of manufacturing firms and union membership rates are tied to a lower in flows and possibly leads to net out flows. Labor cost related to compensation rates tends to have a positive influence on in flows, but is statistically insignificant in the fixed effects model. Higher education levels does not appear to matter, but may have a weak dampening effect. Electricity rates have the expected negative influence, but is significant only in the fix effects model. A higher share of state legislative seats held by Democrats appears to have a dampening effect, but is only significant in the expenditure arguments pooled estimator. The governor veto rate, our simple measure of political conflict, has the expected negative relationship on manufacturer net migration flows, but is insignificant in the fixed effects model. The Beacon Hill Competitive Index has a negative relationship, but the result is statistically weak. Finally, liability exposure does not appear to matter.

The taxation metrics have the expected relationship, suggesting that taxes are indeed a “bad” in terms of trying to attract manufacturing firms. But if the fixed effects estimator is the “correct” one, only property taxes appear to matter. On the expenditure side, we see that higher spending on highways is consistently associated with lower in-migration flows and may lead to net out flows. In the pooled estimator none of the other expenditure categories matter, but in the fixed effects model higher levels of spending on higher education has a positive impact but higher spending levels on K12 have a negative impact. Given the result on general education levels, albeit weak results, the result on higher education spending is unexpected.

If we take all three sets of results in aggregate, we can find both consistencies and inconsistencies across methods. For consistent results, manufacturing firms are drawn to states that have overall stronger

economies, tend to move away from states with high union membership rates, move toward states that score lower on the Beacon Hill competitive index, and move away from states with higher taxes. We find mixed results on cost of labor as measured by average compensation per manufacturing job as well as our two agglomeration economy measures and higher education levels. We also find that state and local spending on broad categories of services do not influence net migration flows, but there is evidence that spending more on highways has a negative effect. This latter result is likely due to the higher costs of maintaining a lower quality transportation infrastructure. We also find that exposure to liability within the courts does not influence migration patterns.

Conclusions

The recruitment of manufacturing firms remains a high priority for most state and local economic development policies. “Winning the recruitment game” at times seems to overwhelm more effective uses of limited economic development policies. In the name of “winning the recruitment game” many states have pursued the “old school” view of business climate embodied in the Mississippi Balance Agriculture with Industry (BAWI) Act of 1933. The notion is based on a neoclassical understanding of firm, particularly manufacturing, location decisions where a region’s comparative advantage is driven by lower costs. This is in the form of lower labor costs, lower land prices, lower taxes, and limited regulations.

The question is if the movement of manufacturing firms across state lines (i.e., moving to the “winning” state) still adheres to this old school view of business climate. Using the National Establishment Time Series (NETS) database we model the movement of manufacturing firms across state lines using three empirical approaches. While the statistical modeling generally supports the “old school” view of manufacturing movement (e.g., taxes and labor unions are “bad”) the magnitude of those flows brings the whole recruitment strategy into question. As a share of all manufacturing firms within a state, only a very small percentage of firms actually relocate and cross state lines. For 2011, the last year of our study period, the state with the biggest net-gain was Texas with 53, followed by North Carolina with 42 and Nevada with 21 and the largest net-lose was California losing 71 manufacturing firms, followed by New York with 47 firms and Alabama and Massachusetts tied with 17 firms. In relative terms, this movement of firms is exceedingly small. For Texas, the net gain 0.27% of all manufacturing firms in the state. For California the net loss amounts to 0.18% of all manufacturing firms. Even for the smaller states, such as Alabama which lost firms in 2011 the loss amounted to 0.40% of all manufacturing firms.

The question that should be asked is not if pursuing “old school” views of business climate in order to win the recruitment game, but rather why do states pursue recruitment when so few firms actually move in any given year?

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Figure 1: Manufacturing Movement: Percent Entering (2011)

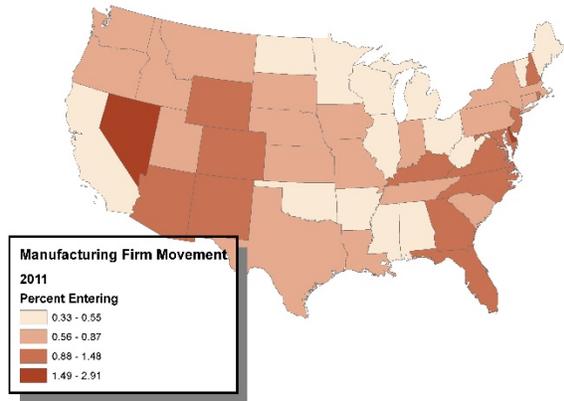


Figure 2: Manufacturing Movement Percent Existing (2011)

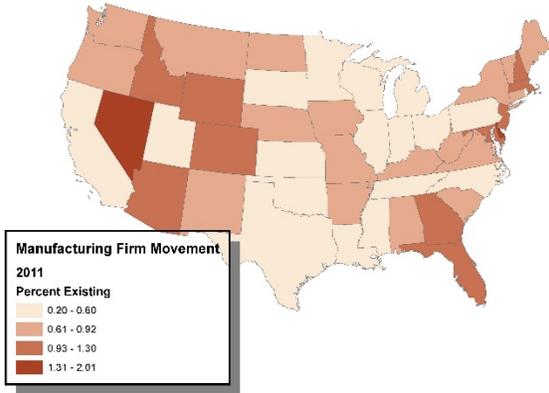


Figure 3: Manufacturing Movement Percent Net (2011)

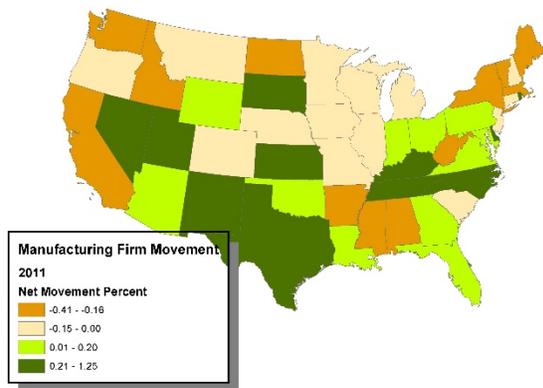


Table 1: Manufacturing Firm Movement Across State Lines (2011)

	Entering	Existing	Net Change		Entering	Existing	Net Change
Alabama	16	33	-17	Nebraska	12	12	0
Arizona	56	48	8	Nevada	49	28	21
Arkansas	9	17	-8	New Hampshire	19	19	0
California	134	205	-71	New Jersey	96	98	-2
Colorado	48	53	-5	New Mexico	15	10	5
Connecticut	34	36	-2	New York	97	144	-47
Delaware	14	12	2	North Carolina	95	53	42
Florida	138	129	9	North Dakota	3	5	-2
Georgia	84	72	12	Ohio	59	57	2
Idaho	13	18	-5	Oklahoma	15	14	1
Illinois	77	84	-7	Oregon	32	36	-4
Indiana	48	41	7	Pennsylvania	86	80	6
Iowa	24	26	-2	Rhode Island	17	6	11
Kansas	25	15	10	South Carolina	33	36	-3
Kentucky	42	30	12	South Dakota	8	2	6
Louisiana	22	18	4	Tennessee	50	32	18
Maine	8	12	-4	Texas	134	81	53
Maryland	41	38	3	Utah	22	15	7
Massachusetts	52	69	-17	Vermont	4	8	-4
Michigan	51	58	-7	Virginia	49	45	4
Minnesota	33	34	-1	Washington	46	60	-14
Mississippi	9	13	-4	West Virginia	6	8	-2
Missouri	43	43	0	Wisconsin	43	43	0
Montana	9	10	-1	Wyoming	8	7	1

Source: National Establishment Time Series (NETS).

Table 2: Simple Sub-Sample Equivalency Testing

	Frequency	Net Positive In-Migration	Net Negative Out-Migration	F Statistic	Kruskal-Wallis	Median	Van der Waerden	Savage
	317	259		(Chi-Square)	(Chi-Square)	(Chi-Square)	(Chi-Square)	(Chi-Square)
Importance of Manufacturing to State Economy								
State Share of US Gross Domestic Product from Manufacturing	1,929	2,264		3.0409 *	0.0175	0.0630	0.0451	2.6520
				(0.0817)	(0.8949)	(0.8018)	(0.8318)	(0.1034)
Share of State Employment from Manufacturing	9,020	8,134		11.3404 **	10.5398 **	5.8899 **	9.4175 **	12.0150 **
				(0.0008)	(0.0012)	(0.0152)	(0.0021)	(0.0005)
Cost of Labor Metrics								
Per Job Compensation in Manufacturing (\$000)	55,814	60,175		23.0884 ***	18.7411 ***	16.8152 ***	19.7813 ***	26.1888 ***
				(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Union Membership Rate	9,294	12,461		60.6651 ***	53.5381 ***	40.7345 ***	56.1498 ***	51.4171 ***
				(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Percent of those over Age 25 with at Least a Bachelor's Degree	25,203	27,973		49.7247 ***	47.0033 ***	41.5231 ***	42.5894 ***	43.9181 ***
				(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Energy Costs								
Electricity Rate Costs	22,619	25,956		26.8099 ***	20.5658 ***	12.9493 **	19.6938 ***	25.0191 ***
				(0.0001)	(0.0001)	(0.0003)	(0.0001)	(0.0001)
Overall Economic Performance								
Coincident Index of Economic Activity	148,119	143,349		12.4921 **	4.8131 **	0.3432	8.0666 **	11.0355 ***
				(0.0004)	(0.0282)	(0.5580)	(0.0045)	(0.0009)

Number in parentheses is marginal significance or p value.

***: Significant at 99.9% level.

**: Significant at 95.0% level.

*: Significant at 90.0% level.

Table 2 (cont): Simple Sub-Sample Equivalency Testing

	Frequency	Net Positive In-Migration	Net Negative Out-Migration	F Statistic	Kruskal- Wallis	Median	Van der Waerden	Savage
		317	259		(Chi-Square)	(Chi-Square)	(Chi-Square)	(Chi-Square)
Tax Costs								
Corporate Income Tax per \$1000 of Personal Income		3.267	4.022	18.5509 *** (0.0001)	14.7078 *** (0.0001)	9.5877 ** (0.0020)	17.5245 *** (0.0001)	16.2876 *** (0.0001)
Individual Income Tax per \$1000 of Personal Income		17.858	22.022	19.3586 *** (0.0001)	15.1815 *** (0.0001)	5.1055 ** (0.0239)	18.6722 *** (0.0001)	16.676 *** (0.0001)
Property Tax per \$1000 of Personal Income		29.399	33.332	24.2725 *** (0.0001)	24.0232 *** (0.0001)	19.6725 *** (0.0001)	23.7086 *** (0.0001)	20.5774 *** (0.0001)
Public Services								
Spending on Higher Education per \$1000 of Personal Income		18.891	18.301	1.2548 (0.2631)	2.2051 (0.1376)	11.7727 ** (0.0006)	0.8115 (0.3677)	0.1265 (0.7221)
Spending on K-12 Education per \$1000 of Personal Income		41.156	42.942	6.3011 ** (0.0123)	4.7811 ** (0.0288)	3.7048 * (0.0543)	6.922 ** (0.0085)	5.5297 ** (0.0187)
Spending on Welfare per \$1000 of Personal Income		31.097	32.604	2.8106 * (0.0942)	0.7896 (0.3742)	0.1751 (0.6756)	2.5864 (0.1078)	2.9976 * (0.0834)
Spending on Highways per \$1000 of Personal Income		14.205	14.166	0.0100 (0.9202)	0.9936 (0.3189)	0.3432 (0.5580)	0.8135 (0.3671)	0.2782 (0.5979)
Spending on Corrections per \$1000 of Personal Income		5.068	5.011	0.1863 (0.6662)	1.2892 (0.2562)	2.024 (0.1548)	0.2637 (0.6076)	0.0061 (0.9376)

Number in parentheses is marginal significance or p value.

***: Significant at 99.9% level.

**: Significant at 95.0% level.

*: Significant at 90.0% level.

Table 2 (cont): Simple Sub-Sample Equivalency Testing

	Frequency	Net Positive In-Migration	Net Negative Out-Migration	F Statistic	Kruskal- Wallis	Median	Van der Waerden	Savage
	317	259			(Chi-Square)	(Chi-Square)	(Chi-Square)	(Chi-Square)
State Political Environment								
Share of State Legislature Held by Democrats	48.497	53.386		15.9938 *** (0.0001)	15.7556 *** (0.0001)	9.5877 ** (0.0020)	15.1721 *** (0.0001)	15.9015 *** (0.0001)
Governor Veto Rate	4.173	5.406		1.9995 (0.1579)	5.1435 ** (0.0233)	1.1836 (0.2766)	5.4608 ** (0.0194)	6.5945 ** (0.0102)
Misc								
Beacon Hill Competitive Index	4.891	5.167		11.2696 ** (0.0008)	9.4103 ** (0.0022)	2.8209 * (0.0930)	10.9307 ** (0.0009)	15.6199 *** (0.0001)
Liability Exposure Ranking	25.322	24.734		0.2372 (0.6264)	0.2746 (0.6002)	0.0301 (0.8622)	0.5437 (0.4609)	0.2016 (0.6534)

Number in parentheses is marginal significance or p value.

***: Significant at 99.9% level.

**: Significant at 95.0% level.

*: Significant at 90.0% level.

Table 3: Modeling Yes/No Net In-Migration (Probability modeled is "no")

	Logit		Probit	
Intercept	-0.0383 (0.9804)	-2.9931 (0.1238)	0.0262 (0.9773)	-1.8665 (0.1088)
State Share of US Gross Domestic Product from Manufacturing	0.0131 (0.8226)	0.0651 (0.2979)	0.0072 (0.8394)	0.0415 (0.2755)
Share of State Employment from Manufacturing	-0.1275 ** (0.0027)	-0.0718 (0.1591)	-0.0761 ** (0.0024)	-0.0416 (0.1707)
Coincident Index of Economic Activity	-0.0346 *** (0.0001)	-0.0260 ** (0.0004)	-0.0213 *** (0.0001)	-0.0158 ** (0.0003)
Per Job Compensation in Manufacturing (\$000)	-0.0067 (0.6107)	-0.0080 (0.5799)	-0.0043 (0.5870)	-0.0052 (0.5435)
Union Membership Rate	0.0768 ** (0.0040)	0.1083 *** (0.0001)	0.0472 ** (0.0033)	0.0653 *** (0.0001)
Percent of those over Age 25 with at Least a Bachelor's Degree	0.0470 (0.1547)	0.1039 ** (0.0050)	0.0292 (0.1457)	0.0650 ** (0.0036)
Electricity Rate Costs	0.0162 (0.3006)	0.0270 (0.1094)	0.0101 (0.2813)	0.0169 * (0.0918)
Corporate Income Tax per \$1000 of Personal Income	0.1397 ** (0.0047)	---	0.0857 ** (0.0042)	---
Individual Income Tax per \$1000 of Personal Income	0.0260 ** (0.0131)	---	0.0160 ** (0.0116)	---
Property Tax per \$1000 of Personal Income	0.0246 ** (0.0344)	---	0.0148 ** (0.0360)	---
Spending on Higher Education per \$1000 of Personal Income	---	-0.0012 (0.9604)	---	-0.0010 (0.9466)
Spending on K-12 Education per \$1000 of Personal Income	---	0.0324 (0.1113)	---	0.0192 (0.1096)
Spending on Welfare per \$1000 of Personal Income	---	-0.0111 (0.4436)	---	-0.0059 (0.4900)
Spending on Highways per \$1000 of Personal Income	---	0.0757 ** (0.0396)	---	0.0471 ** (0.0318)
Spending on Corrections per \$1000 of Personal Income	---	-0.0823 (0.3690)	---	-0.0494 (0.3754)
Share of State Legislature Held by Democrats	-0.0007 (0.9391)	0.0079 (0.3899)	-0.0011 (0.8406)	0.0042 (0.4480)
Governor Veto Rate	-0.0008 (0.9386)	-0.0016 (0.8644)	-0.0006 (0.9231)	-0.0008 (0.8902)
Beacon Hill Competitive Index	0.3463 ** (0.0366)	0.1419 (0.4132)	0.2086 ** (0.0345)	0.0844 (0.4125)
Liability Exposure Ranking	0.0153 (0.1517)	0.0072 (0.4905)	0.0096 (0.1295)	0.0046 (0.4609)

Number in parentheses is marginal significance or p value.

***: Significant at 99.9% level.

**: Significant at 95.0% level.

*: Significant at 90.0% level.

Table 4: Modeling Net Manufacturing Firm Flow

Intercept	-8.4780 (0.4882)	24.1290 (0.1340)	-1.7414 (0.9573)	-9.8059 (0.7654)
State Share of US Gross Domestic Product from Manufacturing	-3.1609 *** (0.0001)	-3.9096 *** (0.0001)	3.6453 * (0.0757)	2.6150 (0.2105)
Share of State Employment from Manufacturing	1.5935 *** (0.0001)	0.8895 ** (0.0362)	-3.5406 ** (0.0051)	-2.9893 ** (0.0188)
Coincident Index of Economic Activity	0.2568 *** (0.0001)	0.2032 ** (0.0006)	0.0912 (0.4635)	0.1575 (0.2059)
Per Job Compensation in Manufacturing (\$000)	0.4279 *** (0.0001)	0.4735 *** (0.0001)	0.3769 (0.3376)	0.4370 (0.2671)
Union Membership Rate	-1.5309 *** (0.0001)	-1.8123 *** (0.0001)	-0.1720 (0.8448)	-0.1804 (0.8359)
Percent of those over Age 25 with at Least a Bachelor's Degree	-0.3195 (0.2526)	-0.9689 ** (0.0027)	0.5713 (0.3480)	0.4278 (0.4842)
Electricity Rate Costs	-0.0207 (0.8731)	-0.0781 (0.5800)	-0.5169 * (0.0688)	-0.5343 * (0.0588)
Corporate Income Tax per \$1000 of Personal Income	-2.0814 *** (0.0001)		-0.4419 (0.4081)	
Individual Income Tax per \$1000 of Personal Income	-0.4189 *** (0.0001)		-0.0099 (0.9475)	
Property Tax per \$1000 of Personal Income	0.0014 (0.9888)		-0.3818 ** (0.0045)	
Spending on Higher Education per \$1000 of Personal Income		0.1170 (0.5788)		1.4190 ** (0.0016)
Spending on K-12 Education per \$1000 of Personal Income		-0.2000 (0.2377)		-0.7216 ** (0.0019)
Spending on Welfare per \$1000 of Personal Income		-0.1230 (0.2999)		0.3062 (0.1514)
Spending on Highways per \$1000 of Personal Income		-0.7777 ** (0.0141)		-0.7735 * (0.0527)
Spending on Corrections per \$1000 of Personal Income		-0.1399 (0.8632)		-0.2589 (0.8426)
Share of State Legislature Held by Democrats	-0.0657 (0.3750)	-0.1857 ** (0.0177)	0.1258 (0.3508)	-0.0091 (0.9458)
Governor Veto Rate	-0.1864 ** (0.0170)	-0.2051 ** (0.0119)	0.0812 (0.2319)	0.0889 (0.1893)
Beacon Hill Competitive Index	-2.6271 ** (0.0395)	-0.4774 (0.7400)	-2.3126 (0.1770)	-2.4586 (0.1516)
Liability Exposure Ranking	-0.0929 (0.2762)	0.0390 (0.6578)	-0.1248 (0.3951)	-0.0570 (0.6971)
R sqr	0.4330	0.3917	0.7212	0.7254
Fixed Effects	no	no	yes	yes

Number in parentheses is marginal significance or p value.

***: Significant at 99.9% level.

**: Significant at 95.0% level.

*: Significant at 90.0% level.