# *THE LOCATION DECISION OF AUTOMOTIVE SUPPLIERS IN TENNESSEE AND THE SOUTHEAST*

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# EXECUTIVE SUMMARY

Understanding the factors that have shaped the automotive industry's growth in Tennessee and the Southeast is important to the design and implementation of policies that can support the long-term sustainability of this very important sector of the economy. This report, funded by the Tennessee Department of Economic and Community Development, continues the Center Business and Economic Research's ongoing investigation into the automotive cluster in Tennessee and surrounding states. The focus of the current study is the set of factors that influence where the automotive industry chooses to locate and expand. These *location determinants* are important as manufacturing firms become more footloose and competition between local governments for capital investment, employment, and tax base intensifies. The current study relies extensively on the work of others, including non-automotive related work, to arrive at general conclusions and principals related to location decisions. The general discussion is complemented with a statistical analysis of the location patterns of automotive suppliers in the region and a survey of automotive suppliers in Tennessee, both of which were conducted by the Center for Business and Economic Research at the University of Tennessee, Knoxville.

Key findings of the study include:

- **Firms approach the site selection process with the goal of matching the company's needs with community characteristics. Firms evaluate a myriad of criteria to determine the optimal location. These criteria can be divided into three main categories: (i) operating costs; (ii) structural conditions; and (iii) quality-of-life attributes.**

Cost factors have traditionally been the cornerstone of location theory. Operating costs that have been shown to influence location decisions include wage levels, utility costs, cost of raw materials, taxes and land costs. Worker productivity and the provision of public services such as infrastructure can also influence site

choice as a result of their effect on a firm's operating cost. Structural conditions encompasses many elements important in location decisions, including access to markets, regulatory environment, provision of public goods, degree of urbanization and demographic makeup of the population. Finally, more and more, developers are hearing that quality-of-life attributes are important in a firm's location choice. Influential attributes include climate, natural environment, crime rate, educational opportunities, amenities and overall appearance of the community.

- **The location decision process can be broken down into three steps: (i) initial screening; (ii) community selection; and (iii) final selection. The location determinants, as well as their relevant importance, are different at each stage of the selection process.**

The initial screening stage in the location decision process consists of identifying the broad region and the individual states comprising the region. Typically the focus is on determinants such as wage differentials, transportation capabilities, and key "fatal flaw" criteria. The next step is community selection which may focus on a geographic area, such as the Southeast, or a handful of disconnected individual states. At this stage, businesses will start making detailed calculations of differences in operating costs and quality-of-life attributes across sites. The final step in the location decision is site selection and generally consists of detailed, line-by-line comparison of the costs, benefits and attributes of three to five sites. All factors are evaluated and compared extensively.

- **A small number of researchers have specifically examined the influence of just-in-time (JIT) manufacturing on location decisions of automotive suppliers. General findings suggest that shortened distance to the closest Japanese assembler and Big Three assembly plants positively influence the location of suppliers.**

Specifically, Japanese transplants are attracted to states with larger numbers of U.S. and Japanese owned establishments in the same industry. However, findings from research specific to automotive suppliers indicate that while JIT manufacturing is significant in drawing supplier firms into a general geographic region, it is not influential in making them locate side-by-side in the same community. This points to the need for cooperation in industrial policies and recruitment across units of government, and perhaps across the state as well. Additionally, research suggests that once a strong supplier base is established, another assembler will not have the same supplier pull as the first or second plant.

**CBER conducted a mail survey of tier 1 and tier 2 automotive suppliers. The key findings of the survey include:**

- On average, automotive suppliers in Tennessee employ 150 employees with an average annual salary of $55,412.

- The majority of the firms surveyed provided health insurance, dental insurance, tuition reimbursement, training programs and 401K plans.

- Even though the firms surveyed were identified as automotive suppliers, on average, only 39.4 percent of their total output is sold to the automotive industry, indicating a substantial degree of diversity.

- Nearly 70 percent of the output produced by the automotive suppliers is exported outside the state and a good share of that which remains in Tennessee is likely to be exported when embodied in the final automobile.

- Tennessee's highest rated location attributes are: (i) quality-of-life; (ii) access to market for firm's product; (iii) quality of *private* schools; (iv) quality of interstate highways; and (v) right-to-work laws.

- Tennessee's lowest rated location attributes are : (i) available supply of workers; (ii) skill level of available work force; (iii) quality of *public* schools; and (iv) quality/adequacy of workforce training.

- The major competitors of automotive suppliers in Tennessee are primarily located within the state, or in Michigan, Ohio, Indiana, Kentucky, or Mexico.

- The top five advantages of other sites relative to current Tennessee sites are: (i) skill level of available workforce; (ii) available supply of workers; (iii) state taxes on businesses; (iv) proximity to market for final product; and (v) quality of public schools.

- The top five disadvantages of other sites relative to current Tennessee sites are: (i) wage rates; (ii) quality of life; (iii) cost of land; (iv) labor/management relations; and (v) right-to-work laws.

- In general, the results suggested that Tennessee rates highest on access to markets and right-to-work laws. However, the results suggest an increasing concern regarding the skill level and availability of workers, with poor public education being an often cited shortcoming of the state.

**CBER conducted a statistical analysis of location decision of automotive suppliers in Tennessee and the Southeast. Key findings of the analysis include:**

- Although some clustering of suppliers did occur at the local level in areas that were first to attract an automotive assembly transplant (e.g., Toyota in Georgetown, Kentucky and Nissan in Smyrna, Tennessee), the more recent transplants have not shown the same degree of influence in attracting suppliers.

- Non-Japanese supplier firms prefer locations with more trained machine operators, lower wages, a large number of individuals who have completed elementary and secondary education and an older population.

- For Japanese firms, the number of machine operators, number of high school graduates, and median age do not significantly influence location decisions. This suggests that these firms prefer to train their own workers as opposed to hiring employees already assimilated into the traditional American system of manufacturing.

- Lower manufacturing wage rates and higher unemployment have a negative influence on the location decisions of Japanese supplier firms. A possible explanation is that Japanese firms perceive lower wages and higher unemployment as an indicator of low labor quality in the county.

- Policymakers seem to have emphatically embraced a new model of economic development based on attracting JIT-based industries like automotive assembly plants as a mechanism to counter dwindling manufacturing bases. However, the results of the analysis did not provide justification for offering large incentive packages to attract these firms on the hopes that it will generate large indirect and spin-off effects via the co-location of supplier facilities unless the state

was among one of the first to attract an assembler. More specifically, incentives made sense early on but once a strong supplier base is established in a region, another assembler will not have supplier attraction power.

# THE LOCATION DECISION OF AUTOMOTIVE SUPPLIERS IN TENNESSEE AND THE SOUTHEAST

## I. INTRODUCTION

When Nissan site search teams reportedly first considered Tennessee as a potential location for its U.S. plant in 1977, there were 49 auto suppliers in the state.[1] Twenty-two years later, some sources indicate there are 500 automotive suppliers in the state employing as many as 100,000 Tennesseans.[2] The state has clearly become a major force in the domestic production of automobiles, ranking fourth in the nation in the number of cars produced in 1998.[3] Understanding the factors that have shaped the industry's growth in Tennessee and the Southeast is important to the design and implementation of policies that can support the long-term sustainability of this very important sector of the economy.

This report, funded by the State Department of Economic and Community Development, continues the Center for Business and Economic Research's (CBER) ongoing series investigating the automotive cluster in Tennessee and the Southeast. The focus of the current study is the set of factors that influence where the automotive industry chooses to locate and expand. This includes policy factors (e.g., taxes, expenditures, and subsidized training programs), input market characteristics (e.g., labor productivity, infrastructure, and energy prices), and features of the final product market (e.g., demand factors). These *location determinants* are important as manufacturing firms become more footloose and competition between local governments for capital investment, employment, and tax revenue intensifies. The bidding wars for BMW and Mercedes set new

standards in the level of incentives, providing telling evidence of this competition. Yet incentives are a small piece of the much larger business location and expansion puzzle.

Traditionally, industry location determinants studies are based on one of three methods: (i) empirical analysis based on historical data of the pattern of actual firm location; (ii) analysis based on data obtained from surveying executives of firms; and (iii) case studies of specific location decisions. The current study relies extensively on the work of others, including non-automotive related work, to arrive at general conclusions and principals related to location decisions. The general discussion is complemented with a statistical analysis of automotive suppliers in the region and a survey of automotive suppliers in Tennessee, both of which were conducted by the Center for Business and Economic Research at the University of Tennessee, Knoxville.

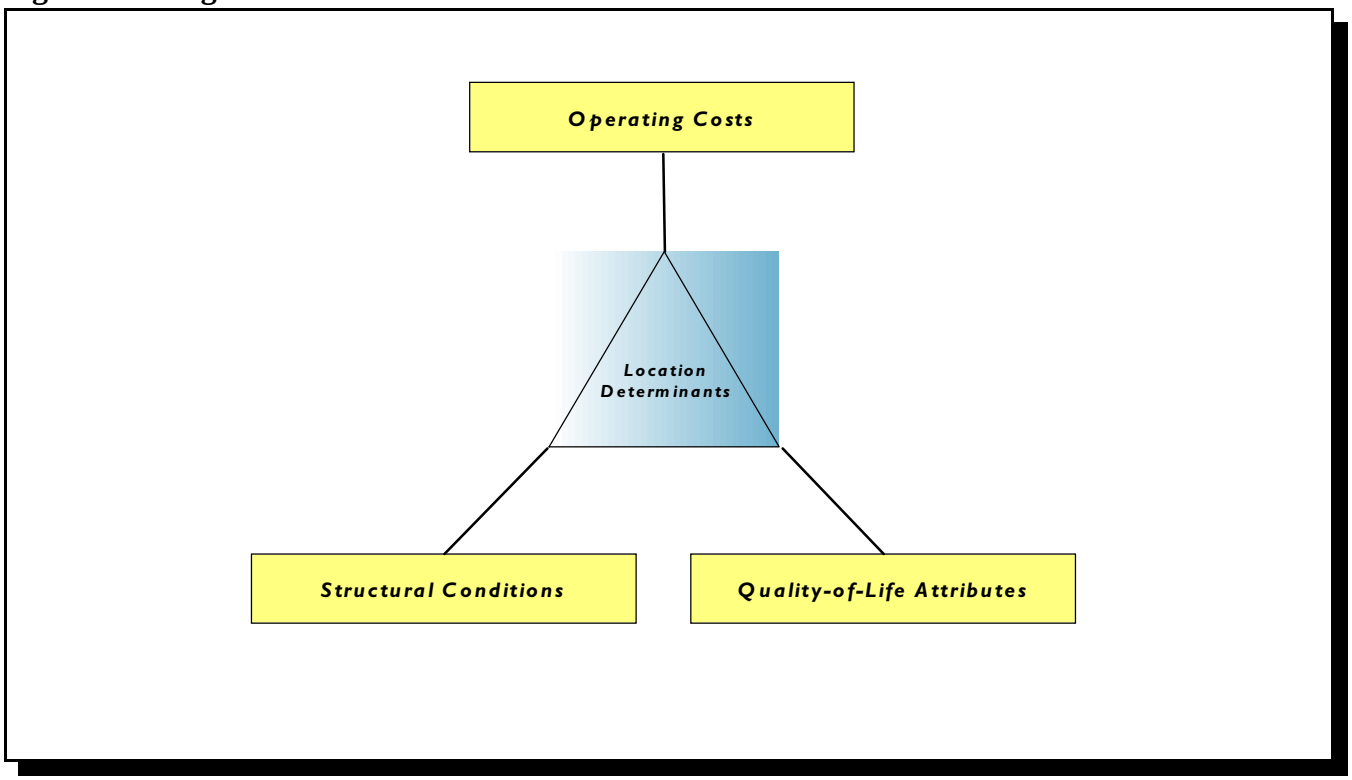
The report proceeds with a general discussion of the factors influencing industrial location decisions in section 2 in order to establish the general framework. Next, section 3 details the results of a survey of automotive suppliers in Tennessee on factors influencing location, retention, and expansion. Section 4 contains a discussion of a statistical analysis of location decisions of automotive suppliers in Tennessee and the Southeast. Conclusions and recommendations are provided in section 5.

## II. WHAT INFLUENCES BUSINESS LOCATION?

Business location is a game of strategy with the two major players being firms and the governments of competing states or local communities. From the firm's perspective, the basic approach to site selection is matching the company's needs with community characteristics. Often, businesses start with a broad array of locations and systematically narrow the choices until the location with the most advantages and fewest disadvantages emerges. Firms use a myriad of criteria to evaluate potential locations. These factors are divided into three main categories: (i) operating costs; (ii) structural conditions; and (iii) quality-of-life characteristics (see Figure 1).[4] Operating costs include such items as labor costs, utility costs, transportation costs, and tax costs. Structural conditions include access to markets (both final product and input markets), labor force quality, and overall business climate. Quality-of-life characteristics may include cultural activities, sporting opportunities, and environmental quality.

State and local governments, in their competition for capital investment and jobs, face the challenge of enhancing the attractiveness of their region to businesses. They actively compete for firms and capital investment by setting tax policy, choosing public service levels, structuring regulation, and promoting an overall pro-business attitude. In addition, they may offer special incentive packages consisting of wage and training subsidies, land grants, special financing arrangements, and tax concessions just to name a

**Figure 1: Categories of Location Determinants**



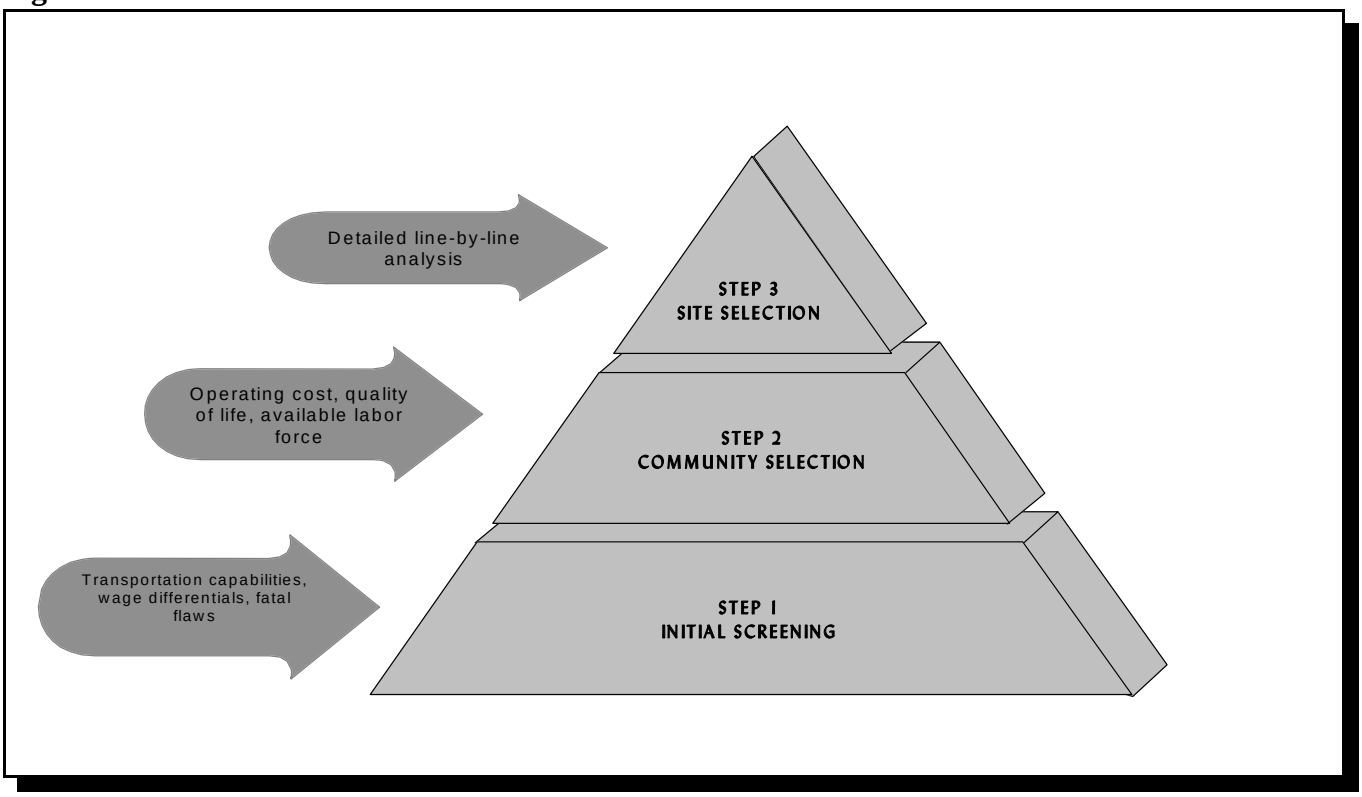

few. The question is: Are these factors effective in encouraging firms to locate in a state?

Location factors are different for different industries and even for different firms within an industry, as well as at different stages in the site selection process. For example, a food processing plant may view proximity to output markets as being a primary factor in their site choice. For a firm using electronic commerce as its primary mode of conducting business, this factor would be expected to be much less important in their search. This complicates the ability of analysts to discern specific causal relationships, such as between tax policy and business location decisions. What might be a direct relationship in one firm's site choice may play no role in another firm's choice.

**The Location Decision Process**

Location decisions are a dynamic process of elimination based on a set of screens that systematically rule out the least favorable locations. The location determinants, as well as their relevant importance, are different at each stage of the screening process. This is important for analysts to realize as they try to evaluate the effects of specific community characteristics or economic development initiatives on location decisions. The selection process can be broken down into three steps: (i) initial screening; (ii) community selection; and (iii) final selection (see Figure 2).[5] State and local officials do not passively wait for the firms to narrow their choices. Instead, they actively recruit businesses

**Figure 2: Site Selection Process**




starting with the initial screening process, hoping to clear all three hurdles.

The initial screening stage in the location decision process can be described as "defining the area of search," or identifying the broad region and the individual states that comprise that region. At this level, the importance of specific location factors will be different for each individual firm. For automotive plants it is likely that proximity to a transportation network, such as the north-south I-75/I-65 automotive corridor, would be crucial in identifying the general search area. Typically, the focus is on wage differentials, transportation capabilities, and key "fatal flaw" criteria such as right-to-work laws, access to an international airport, available buildings, and so on. Fatal flaws will differ by industry as well as by firm. It is important for state and local policymakers to know the characteristics of their region that could be viewed as fatal flaws by different industries. As will be detailed later in the report, a fatal flaw area for Tennessee is the perception of the quality of public education, both primary/secondary and higher education. Public education is important both as a signal of the quality of the local labor force and as a community attribute for managers and executives with school-age children. Generally, no detailed analysis of specific determinants has been done at this stage in the decision process unless it falls into the "fatal flaw" category.

The next step in the location screening process is community selection. The general area of the search has been defined and may consist of a

geographic area, such as the Southeast, or a handful of disconnected individual states. Since areas with fatal flaws or noncompetitive characteristics have already been eliminated, firms will evaluate all potential locations within the search area in more detail. At this stage, businesses will start evaluating differences in operating costs, as well as quality-of-life factors for each location. For example, availability of a quality workforce and favorable business climate are likely to be important factors for automotive assembly plants at this stage in the selection process. Suppliers, on the other hand, are likely to place a high value on inter-industry linkages and proximity to final goods market. At the end of this stage, only a handful of potential locations will remain.

The final step in the location decision generally consists of detailed, line-by-line comparison of three to five sites. At this stage, all operating costs, structural conditions, and quality-of-life factors are evaluated and compared extensively across the competing sites. It is important to note that financial profits are not the only determinant of location. In the end, the location providing the advantages in terms of low cost, business climate, and living conditions most often emerges as the final choice. The challenge for state and local policymakers is ensuring that Tennessee is in a competitive position and able to make the cut at *all three steps*. The key to meeting this challenge is having an understanding of location determinants and their impact on the decision process. In an effort to enhance this understanding, the following section discusses, in more detail, specific factors that have been found to influence location decisions.

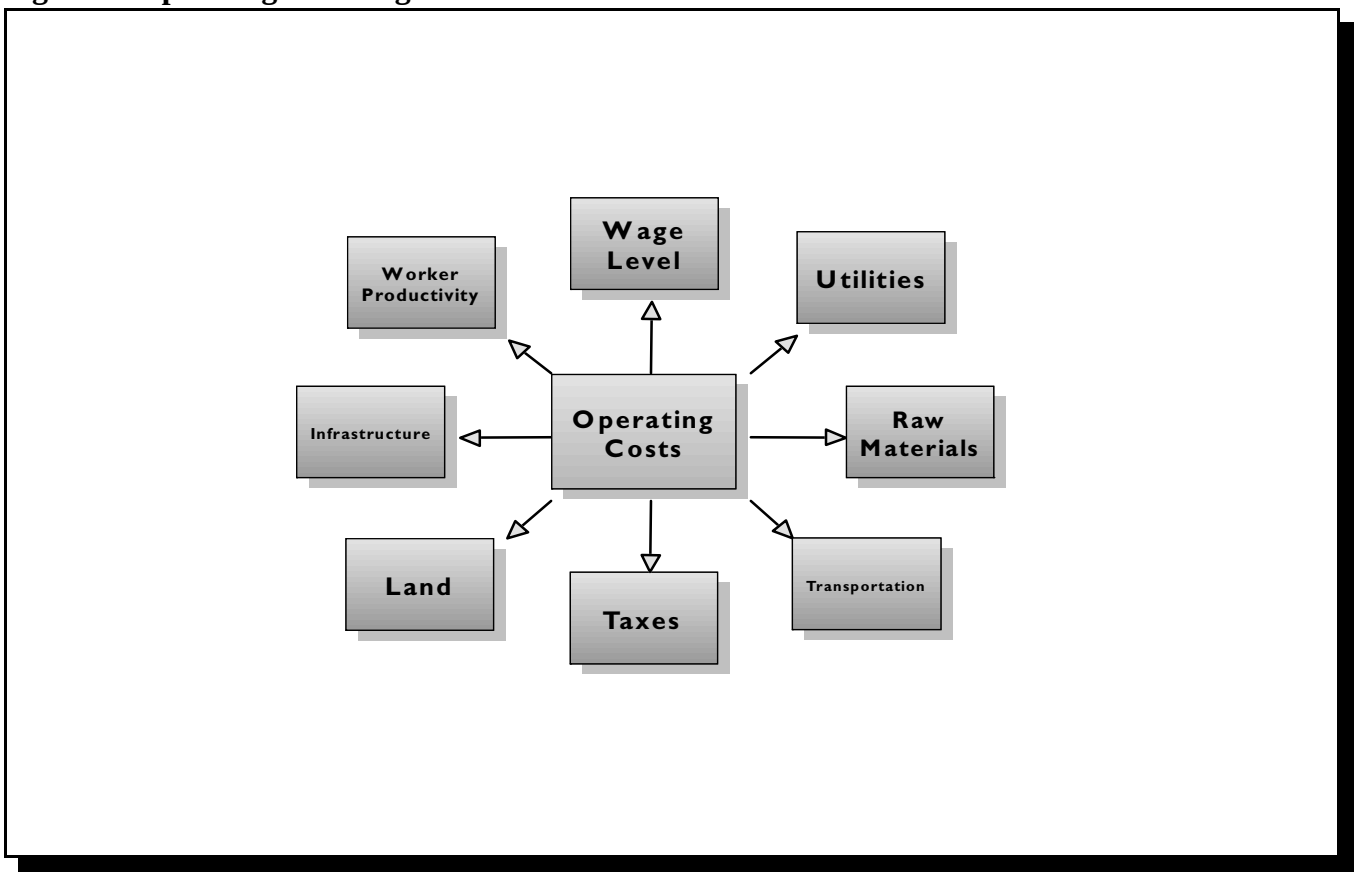
**What Factors Determine Location?**

As mentioned in the previous section, factors influencing location decisions can be divided into three categories -- operating costs, structural conditions, and quality-of-life attributes. These categories are not independent. For example, structural conditions such as quality of the labor force, as well as quality-of-life attributes, can affect operating costs by influencing wage rates via labor productivity. There has also been speculation that political factors play a role in location decisions, especially for the larger transplant assembly facilities. For example, since each state has two U.S. senators in Congress, the location of assemblers *across* states might be perceived as broadening the political base of foreign-owned production facilities. These political factors, which are largely speculative, are not discussed in what follows. Given that the purpose of the current study is to evaluate location decisions of automotive suppliers, a separate section containing a brief discussion of studies dealing specifically with just-in-time (JIT) manufacturing and the automotive supplier network is also included.

*Operating Costs*

Cost factors have traditionally been the cornerstone of location theory (see Figure 3). However, due to sweeping innovations in technology and increased interstate competition, many of the traditional cost differentials have eroded. For example, technological advances in the electric power industry combined with more efficient heating and cooling equipment have decreased the relative importance of energy price

**Figure 3: Operating Costs Significant in Site Selection**




differentials between regions. However, the costs for other inputs, such as labor and land, may still differ significantly across locations and can influence location decisions.

Firms are ultimately concerned with their cost per unit of output produced, so *productivity* of inputs will also be important in evaluating operating costs. Accordingly, wage levels may not be the primary criteria used in a firm's decision process. Instead, factors measuring worker productivity, such as educational attainment and worker training, might play a more significant role. Firms in the automotive industry have historically been willing to pay higher wages for more skilled and productive workers, and invest in these same workers through on-the-job training. The same is also true of other inputs. Being the nominal low-cost leader in land prices and wage rates does not automatically give a region a competitive advantage.

Taxes represent another set of costs that can influence business location, but as with wage rates, firms may be more concerned about the public service benefits received in exchange for payment of taxes. Conventional wisdom is that high taxes can be expected to make a state less attractive. However, research on the role of taxes has not been as clear cut.[6] Generally, it is agreed that taxes influence the site choice, but the effect is small relative to other location determinants.

Notably, taxes play a larger role in *intra-regional*, relative to *interregional*, location decisions due to small or non-existent differentials in other costs within a region. Regardless, states continue to overestimate the extent to which taxes influence industry location, often resulting in ad-hoc tax reforms and specific tax incentives aimed at improving the business climate of the state. However, a state that systematically alters its tax system in efforts to enhance its competitiveness could ultimately discourage business location due to heightened concerns about the state's overall fiscal stability and health. Moreover, some of the policy changes directed at new firms may simply hurt existing industry. In general, firms do not focus on specific taxes when making location decisions but instead prefer a stable business tax system that efficiently funds the services demanded by businesses and residents of the state. It is important to note that businesses also are sensitive to issues of tax fairness in addition to efficiency. A tax structure that is perceived to place a disproportionate burden on businesses may negatively impact location decisions.

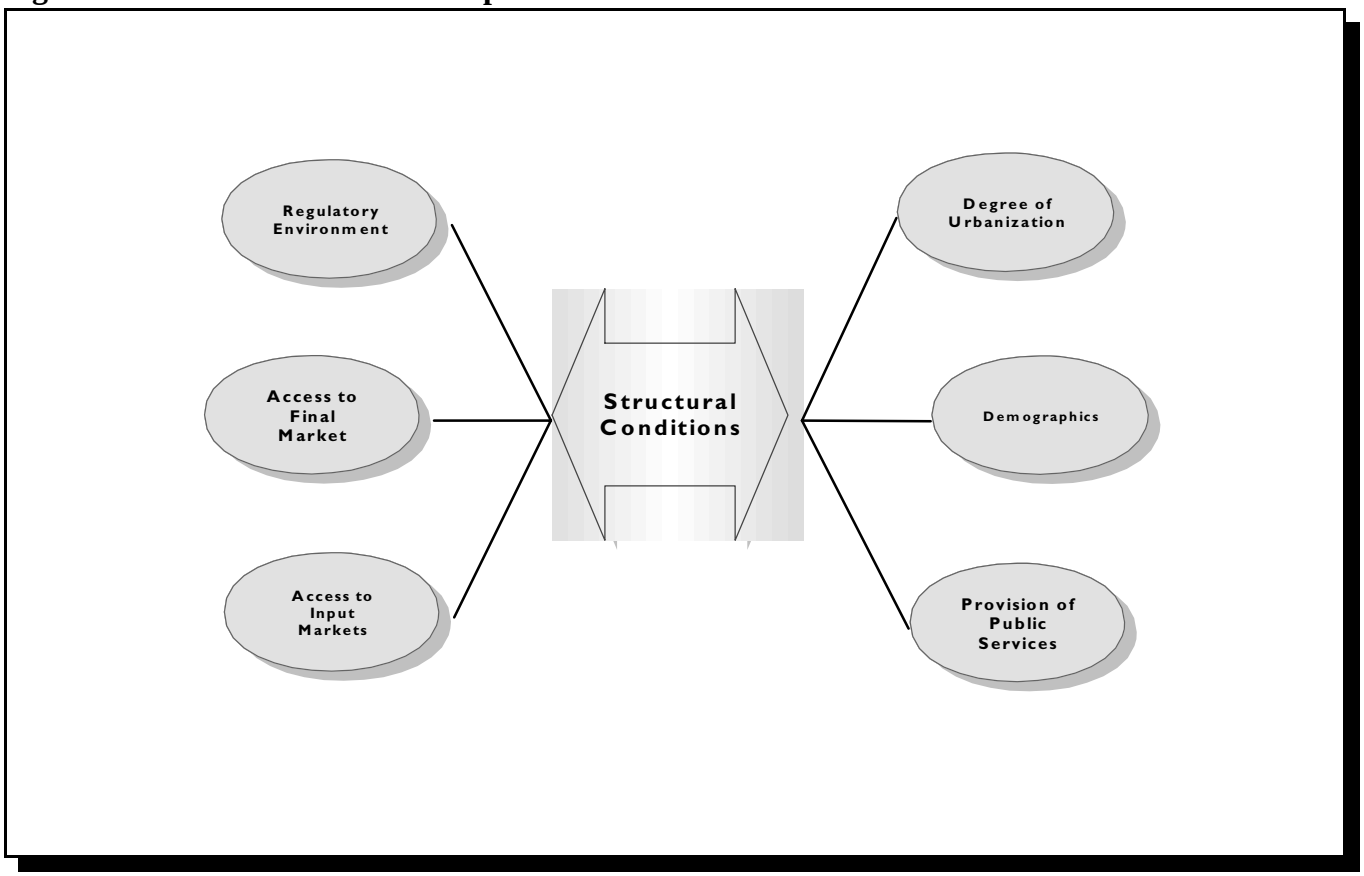
The other side of the fiscal coin is provision of public services, such as education, infrastructure, and public safety which have also been shown to be a significant factor in influencing firm location decisions. Because public services can serve as inputs in a firm's production process, they can lower the cost of producing final goods and services. For example, good higher education services can result in more skilled employees, better highways reduce transportation costs, and higher police expenditures may result in lower crime rates that can reduce the cost of a firm's insurance. The level and quality of these and other services provides a measure of the benefits a company receives in return for its tax payments by determining the magnitude of cost savings to the company. These public expenditures can also influence business locations by improving the overall quality-of-life available in a community. Remember, plant executives and plant mangers, as well as workers themselves, prefer quality, livable communities.

Although current research continues to suggest that operating costs play a significant role in location decisions, the degree to which they matter and the way that these are evaluated have evolved over time. Many of the cost differentials have dissipated over time due to increased capital and labor mobility across the states, resulting in an increased awareness of input quality and productivity, both of which are influenced by the structural condition of a state.

*Structural Conditions*

Structural conditions of the state encompass many elements important in location decisions, including access to markets, regulatory environment, provision of public services, degree of urbanization, and demographic makeup of the population (see Figure 4). Market access (input and final product) continues to be a prominent location determinant. The degree to which a firm values final market access will depend upon its output. For example, the final goods market for automotive assemblers includes national and international markets. Therefore, while still important, access to final markets is most likely not the top factor influencing location. However,

**Figure 4: Structural Conditions Important to Location Decisions**




for automotive *parts* suppliers—as opposed to assemblers—it may well be a top priority due to the importance of JIT inventory practices. For some firms, proximity to input markets will play a more significant role in site selection. For example, a firm requiring a specific natural resource found only in a specific region could be expected to place a higher value on locating close to the source of that input.

A state's regulatory environment is important to businesses. The effect of many state regulations is to raise the costs of production and/or diminish input productivity by internalizing negative spillover effects (e.g., cost of polluting a river), constraining technological choice, and requiring outputs (e.g., periodic reports and consumer information) that producers would not otherwise provide. Regulations receiving the most attention with regards to industrial location are workforce-related regulations and environmental regulations.

The state regulations pertaining to the labor force that have been considered most widely are right-to-work laws and worker compensation rules. Right-to-work laws have consistently been shown to be very important in location decisions. The significance of such laws can be attributed to their effect on minimizing unionization, retarding wage levels, and promoting a pro-business attitude on the behalf of policymakers. Tennessee's status as a right-to-work state has

played to its advantage in recruiting and retaining industry.

Analyzing the significance of environmental regulations is more problematic and has resulted in contrary findings. One reason is cost differences in complying with antipollution regulations varies widely across industries. However, one notable finding is that the location of Japanese plants appears to be more sensitive to pollution abatement than domestic or other foreign owned plants.[7] While increased environmental regulations may deter firm location in some industries by imposing higher costs, lack of such regulations could deter firm location in other industries due to undesirable living conditions.

*Quality-of-Life*

More and more, developers are hearing that quality-of-life attributes are important in a firm's location decision. In a nationwide survey, livability was ranked as the fifth most important factor in influencing a firm's location.[8] The importance of quality-of-life factors is two-fold: (i) managers and executives want to enjoy time spent with their families in a safe, enjoyable community and (ii) increased quality-of-life leads to happier workers and increased labor productivity. As shown in Figure 5, some attributes influencing firm location are beyond the control of state policymakers such as climate (e.g., average rainfall or average temperature) and natural environment. However, attributes significant in the location decision that can be influenced by public policy include a low crime rate, amenities such as sports facilities and cultural attractions, educational opportunities, and overall appealing appearance of the community.

*JIT and the Location of Automotive Suppliers*

A small number of researchers have specifically examined the location decisions of automotive suppliers. Most of these studies have examined the influence of JIT manufacturing on location decisions. General findings suggest that shortened distance to the closest Japanese assembler and Big Three assembly plants positively influence the location of suppliers. Specifically, Japanese transplants are attracted to states with larger numbers of U.S. and Japanese owned establishments in the same industry.[9] Kiretsu[10] membership is also shown to have a significant influence on the locations of incoming Japanese transplants.

Findings based on an empirical test of the impact of JIT and industry characteristics on the degree of integration (measured as the ratio of locally provided to total material inputs) between an incoming manufacturing plant and its host region suggest that despite the theoretical importance of JIT, its positive impact on attracting supplier plants is only present at state level. The presence of automobile plants in a county actually lowers the overall measure of integration between the plant and its host community.[11] Additionally, while attracted by JIT to the same general region (i.e., state), automotive suppliers remain dispersed among proximate local communities in order to avoid competing against one another for workers and other inputs.[12]

The general conclusion from research of the location of automotive suppliers is that while JIT manufacturing is significant in drawing supplier firms into a general geographic region, it is not influential in making them locate side-by-side

**Figure 5: Quality-of-Life Attributes Important in Location Decisions**


within the same local community. This suggests that the challenge is to focus on maintaining and strengthening the traditional factors influencing location throughout the state and to not count on suppliers to simply follow the assemblers. It also points to the need for the cooperation in industrial policies and recruitment across units of local government, and perhaps across the state as well.

## III. THE LOCATION OF AUTOMOTIVE SUPPLIERS: A SURVEY APPROACH

Another commonly used method in location determinant studies involves surveying existing firms. While highly complementary to statistical analysis, surveys reveal what people *say* and statistical analysis reveals what was *done*. Industrial survey studies generally ask those who have been involved in making a location decision to rank the importance of factors influencing their decision. Survey approaches are popular because: (i) data are obtained at the plant level; (ii) the actual decision maker provides the information; (iii) the researcher can learn about the interrelationships among location factors; (iv) a weighting of all factors can be obtained; (v) the context of the location decision can be obtained (i.e., start-up of new enterprise, branch plant, or expansion); and (vi) results are easily interpreted.[13]

Despite the advantages, the survey approach also has some disadvantages. These include: (i) the expense of survey research; (ii) the often low response rate; (iii) the difficulty in contacting the correct person; (iv) difficulty in obtaining an accurate comprehensive listing of all plants in industry; and (v) respondent bias. Regardless, surveying existing firms can provide insights into location decisions that may not be picked up in an empirical study based on historical data.

The Center for Business and Economic Research conducted a survey of tier 1 and tier 2 automotive suppliers in Tennessee and surrounding states. For the purpose of the current study, a total of 2,023 surveys were sent, with 1,543 sent to plants located in Tennessee and the remaining 480 sent to plants in Alabama, Georgia, North Carolina, and South Carolina. The sample was drawn from several sources including Elm International, the *1999 Harris Directory of Tennessee Manufacturers*, the *Japanese Automotive Supplier Investment Directory*, the *Dunn and Bradstreet Registry of U.S. Companies*, and a database provided by Tennessee Department of Economic and Community Development. Copies of the in-state and out-of-state survey instruments are included in Appendix A. A total of 141 usable surveys were returned from the in-state suppliers, resulting in a disappointing response rate of only 9.1 percent. Unfortunately, the response from out-of-state suppliers was insufficient to conduct any useful statistical analysis. The following sections will concentrate on the results from the in-state suppliers.

**Table 1: Summary Data on Capital Investment and Employment**

| | |
|---|---|
| Initial investment | $1,174,357,600 |
| Current investment | $1,759,100,519 |
| Current payroll | $1,175,071,304 |
| Current employment | 21,206 full-time |
| Percentage unionized | 6% |

*General Company Information*

The first part of the survey focused on specific company information such as employment, capital investment, employment benefits, and economic development incentives received by the company. Summary data on capital investment and employment are provided in Table 1. These data reveal that, on average, the responding suppliers employ 150 employees with an average annual salary of $55,412 which is 46 percent higher than the statewide average for all manufacturing jobs.[14] In addition to higher than average salaries, automotive supplier firms tend to offer a spectrum of fringe benefits (see Table 2).

**Table 2: Summary of Company Provided Benefits**

| Benefit | % of Firms |
|---|---|
| Health insurance | 89.4% |
| Dental insurance | 67.4% |
| Tuition reimbursement | 58.2% |
| Training programs | 67.4% |
| 401k plan | 56.0% |
| Pension plan | 36.9% |

The final questions on general company information pertained to types of state and local economic development incentives received by the firms. As can be seen in Table 3, state incentives were dominated by tax incentives whereas local government provided more assistance in terms of site acquisition and development. Training programs were a popular tool used by both state and local governments.

**Table 3: State and Local Economic Development Incentives Received by Automotive Suppliers in Tennessee**

| | Percent of Firms | |
|---|---|---|
| Incentive | State | Local |
| Financial capital | 2.1 | 2.1 |
| Tax incentives | 19.9 | 6.4 |
| Site acquisition and/or development | 9.9 | 11.3 |
| Training programs | 9.9 | 10.6 |
| Other | 3.5 | 2.8 |

*Product/Market Information*

The second part of the survey included questions aimed at assessing the markets for products of supplier firms in Tennessee, an important component of structural conditions influencing site selection. The products and services produced by the firms included in the sample consisted of parts supplied directly to the assemblers and those supplied to tier 1 suppliers. The breakdown of the principal users of the surveyed firms final products is provided in Figure 6. The automotive industry, on average, consumed 39.4 percent of the goods and services produced by the responding firms. Compared to five years ago, 53.9 percent of the firms said their output to the auto industry had increased while 34.0 percent reported no change and the remaining 12.1 percent indicated output to the industry had decreased. It is important to note that, while these firms are automotive suppliers, just over one-third of their total output is sold to the automotive industry, indicating a substantial degree of economic diversity. When asked about future expectations (5 years in the future), 75.2 percent of the suppliers expect that their prospects will get better, 19.1 percent anticipate no change, and the remaining 5.7 percent forecast a decline in their activity. The geographical market for the automotive outputs produced by these firms is depicted in Figure 7. Notable is the fact nearly 70 percent of these outputs are exported outside the state and a good share of that which remains in Tennessee is likely exported when embodied in the final automobile. Again, this suggests that supplier networks are not as concentrated as might be expected under JIT manufacturing.

*Site Attributes*

Section three of the survey asked supplier firms to evaluate their company's current Tennessee site based on a list of attributes commonly found in business location decision literature. These attributes, along with their rating are presented in Table 4. Several interesting implications emerge from these rankings. As can been seen in the table, included in Tennessee's highest rated attributes are some of the most frequently found primary determinants in siting decisions. For example, the top five rated attributes are: (i) quality of life; (ii) access to market for firm's

**Figure 6: Principal Users of the Goods and Services Produced by Surveyed Firms**

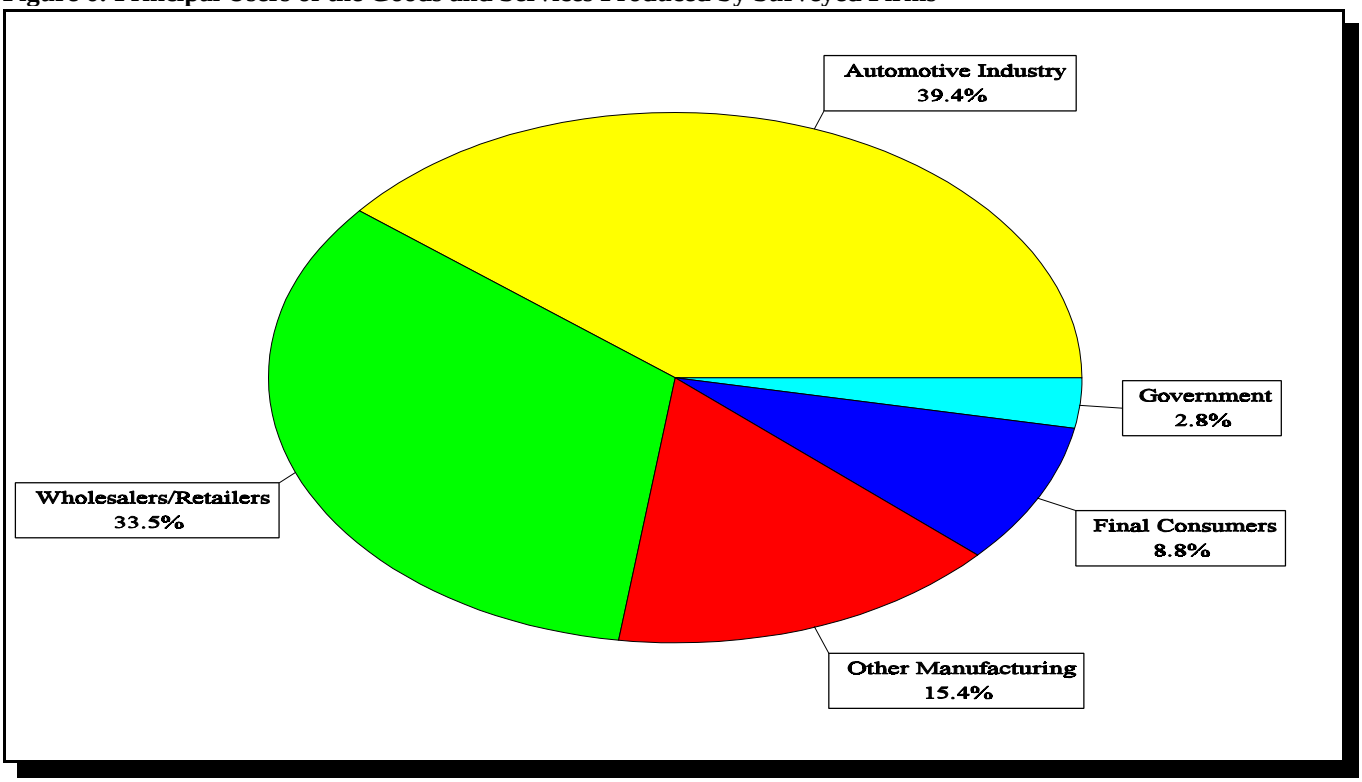
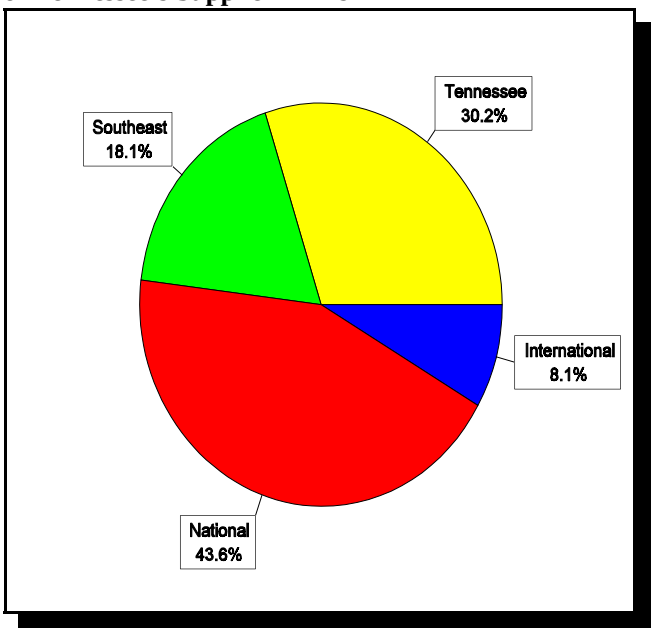



**Figure 7: Final Market for Automotive Output of Tennessee's Supplier Firms**




product; (iii) quality of private schools; (iv) quality of interstate highways; and (v) right-to-work laws. Of those, access to final product market and right-to-work laws are consistently found to be significant location determinants. On the other hand, the lowest rated attributes for Tennessee locations are also among the factors frequently found to be critical to location decisions. These include labor force factors consisting of the available supply of workers, skill level of available workforce, and quality/adequacy of workforce training and development. Another of the lowest rated attributes closely related to these labor variables is quality of public school. Helping to mitigate the implications of these weaknesses are the relatively higher ratings of wage rates at current Tennessee sites compared to

other sites and labor/management relations.

**Table 4: Attribute Ratings of Automobile Supplier Firms Located in Tennessee**

| Site Attribute | Excellent | Adequate | Inadequate |
|---|---|---|---|
| Access to market for your product | 44.9% | 54.4% | 0.7% |
| Proximity to market for final product | 29.7% | 68.8% | 1.4% |
| Access to marketing and advertising services | 14.7% | 79.1% | 6.2% |
| Access to financial, accounting, and legal services | 26.7% | 67.2% | 6.1% |
| Access to engineering and research & development services | 12.7% | 70.6% | 16.7% |
| Access to raw materials | 15.7% | 78.4% | 6.0% |
| Available supply of workers | 13.4% | 30.6% | 56.0% |
| Skill level of available workforce | 8.2% | 37.3% | 54.5% |
| Worker productivity | 15.4% | 66.9% | 17.6% |
| Quality/adequacy of workforce training and development | 9.7% | 58.2% | 32.1% |
| Wage rates compared to other potential sites | 16.5% | 78.9% | 4.5% |
| Other labor costs relative to other potential sites | 10.8% | 82.3% | 6.9% |
| Labor/management relations | 39.4% | 59.1% | 1.5% |
| Cost of land | 24.2% | 69.5% | 6.3% |
| Availability of land | 24.3% | 67.1% | 8.6% |
| Availability of financial capital in Tennessee | 19.8% | 66.1% | 14.0% |
| State taxes on businesses, individuals (franchise/excise, sales) | 8.5% | 65.4% | 26.2% |
| Local taxes on businesses (property, sales) | 9.9% | 71.0% | 19.1% |
| Zoning and building regulations | 15.6% | 79.3% | 5.2% |
| Environmental regulations and requirements | 8.8% | 83.8% | 7.4% |
| Quality of interstate highways | 43.4% | 52.9% | 3.7% |
| Quality of state highways | 32.3% | 59.4% | 8.3% |
| Quality of local highways and roads | 27.2% | 55.1% | 17.6% |
| Availability of quality rail service | 9.8% | 67.9% | 22.3% |
| Availability of air transportation services | 19.8% | 58.8% | 21.4% |
| Quality of electric power service | 2.1% | 60.6% | 7.3% |
| Access to natural gas | 27.8% | 66.9% | 5.3% |
| Price of natural gas | 10.6% | 82.6% | 6.8% |
| Available water supply | 28.3% | 61.2% | 10.5% |
| Adequacy of waste disposal | 11.6% | 78.3% | 10.1% |
| Availability of high speed telecommunications services | 18.0% | 70.7% | 11.3% |
| General business climate in Tennessee | 33.8% | 63.9% | 2.3% |
| Quality of life | 65.7% | 32.8% | 1.5% |
| Availability of affordable housing | 36.0% | 55.1% | 8.8% |
| Low crime rate | 19.3% | 67.4% | 13.3% |
| Quality of public schools | 12.5% | 55.9% | 31.6% |
| Quality of private schools | 44.2% | 45.3% | 10.5% |
| Higher education and research facilities | 25.6% | 60.9% | 13.5% |
| Community recreation resources | 25.0% | 64.7% | 10.3% |
| Right-to-work laws | 41.6% | 56.2% | 2.2% |
| Cooperation of local governments | 28.9% | 60.0% | 11.1% |
| Cooperation of state officials | 20.2% | 69.0% | 10.9% |

While the state received high ratings for quality-of-life attributes, it received mixed reviews with regards to factors relating to operating costs and structural conditions. For example, in terms of operating costs, Tennessee rated favorably in terms of wage levels but unfavorably in worker skill level and productivity. Both positive and negative feedback was also provided concerning structural conditions within the state. Access to final market, inter-state highways, right-to-work laws, and labor/management relations are structural conditions in which Tennessee received high marks. On the other hand, quality of public schools and available supply of skilled workers present unfavorable structural characteristics.

*Site Comparisons*

In an effort to gain a better understanding of how Tennessee compared to other potential sites, the last section of the survey consisted of questions pertaining to the location of the competitors of Tennessee suppliers. First, the firms were asked where their major competitors were located. Tennessee, Michigan, and Ohio were the top three locations specified (see Table 5). Once the firms identified the location of their competitors, they were asked to identify advantages and disadvantages of these location relative to their current Tennessee site. The information reported here corroborated the data from the previous section. For example, according to Tennessee suppliers, the top five *advantages* identified were: (i) skill level of available workforce; (ii) available supply of workers; (iii) state taxes on businesses; (iv) proximity to market for final products; and (v) quality of public schools. Likewise, the resulting top five *disadvantages* were: (i) wage rates; (ii) quality of life; (iii) cost of land; (iv) labor/management relations; and (v) right-to-work laws. Again, these data are closely correlated with the ranking of site attributes discussed in the previous section and can be related back to the three primary categories of location factors discussed in section two—(i) operating costs; (ii) structural conditions; and (iii) quality-of-life attributes.

**Table 5: Location of Major Competitors to Tennessee Automotive Suppliers**

| State/Country | Number of Firms with Competitors |
|---|---|
| Tennessee | 62 |
| Michigan | 32 |
| Ohio | 26 |
| Indiana | 18 |
| Kentucky | 15 |
| Mexico | 13 |
| California | 11 |
| Illinois | 10 |
| North Carolina | 10 |
| Georgia | 8 |
| South Carolina | 7 |
| Europe | 6 |
| Canada | 5 |
| Japan | 5 |
| Mississippi | 5 |
| China | 4 |
| Other | 11 |

Finally, supplier firms were asked what policies and/or characteristics encouraged and discouraged business retention and expansion in Tennessee. Policies most often cited as encouraging business retention and expansion in the state included no state income tax, right-to-work laws, quality of life, labor force work ethic,

and access to final market. In contrast, those policies most often alluded to as discouraging business in Tennessee were high business taxes, poor education, labor skills and availability, and workman compensation laws. Overall, the firms felt that the most important things state government should do in order to retain supplier firms are to reduce business taxes and provide more worker education and training. In terms of local governments, the firms offered many suggestions with one of the most frequently mentioned being cooperation between city and county governments. A detail table of the open-ended responses is provided in Appendix B.

*Summary*

In summary, the results garnered from the survey of automotive suppliers in Tennessee reaffirmed existing research on location determinants. Access to markets, labor availability and quality, and right-to-work laws all play crucial roles in determining business location, expansion, and retention in Tennessee. Currently, firms rank the state highest on access to markets and right-to-work laws. However, the results suggest an increasing concern regarding the skill level and availability of workers. Poor public education was an often cited short-coming of the state, a matter policymakers must continue to address in order to remain competitive in the future. A significant portion of the responding firms also alluded to the need for an increase in quality technical training for the workforce. This could be accomplished through more support for high-school vocational training programs, local community technical schools, and continuing adult education programs.

The survey provided voluminous comments regarding the effects of the state's taxation structure on business location and expansion, due in part to the fact that the survey was conducted in the midst of a heated tax reform debate at the state level. The general consensus was that high business taxes and the prospects of an income tax are both detrimental to attracting and retaining businesses in the state. Low personal taxation was touted as being a primary policy encouraging business in Tennessee, however many firms felt that the resulting higher taxation on businesses had a mitigating effect. Of course this produces an inconsistency, as a better educated workforce will require increased public sector support, presumably funded through taxes.

While the survey did not provide any unexpected results, it did support what researchers have consistently found to be important to business location decisions. The challenge for policymakers in Tennessee is to maintain and promote the positive attributes of the state while striving to become more competitive in the disadvantaged areas such as poor perception of labor quality and education.

## IV. THE LOCATION OF AUTOMOTIVE SUPPLIERS: A STATISTICAL ANALYSIS

Policymakers often justify granting large incentive packages to firms based on the attraction force those large firms will have on suppliers. This is especially true for automotive assembly plants, as evidenced by the ever-growing incentive packages offered by states. In an effort to discern

if the attraction force of assembly plants is sufficient enough to result in establishing a notable supplier network, the Center for Business and Economic Research conducted a statistical analysis of automotive supplier plant locations in the Southeast. The goal of the study was to examine: (i) if proximity to an assembler is sufficient in luring suppliers to locate in a region and (ii) if not, what other county characteristics in addition to proximity to assemblers are important in attracting supplier firms.

The data set used in the analysis consisted of 804 plant locations throughout the counties in Tennessee, Alabama, Georgia, and North Carolina. The data were compiled from two sources: (1) the *Japanese Automotive Supplier Investment Directory, May 1994, Fifth Edition* (JASID); and (2) the *Dunn and Bradstreet Registry of U.S. Companies* (DBR).[15] The sample contains 341 Japanese owned firms and 463 U.S. owned firms. The final data set is a compilation of a count of automotive supplier firms, along with a number of socio-economic variables identified in the previous section as being important to location decisions for each county in the four state region for the years 1980-1992. Given the time period examined, it is important to note that more recent location developments in the automotive industry are not included in our analysis (e.g., the location of suppliers tied to BMW and Mercedes-Benz). The assumption is that trends and patterns influencing location decisions of automotive suppliers during the time period examined continue to be applicable in more recent years. In order to gain a better understanding of how proximity to assemblers, a structural condition of location, may influence location decisions of supplier plants, one group of the variables included in the data set measures the distance from the supplier to the various automotive assemblers. To demonstrate why these distance variables may provide insight into the location decision of automotive suppliers, the following section discusses, in detail, the establishments of supplier plant networks in the Southeast.

**Analysis of Supplier Plant Networks**

The rapid influx of Japanese automotive components facilities began in 1982, the same year Honda of America opened its Marysville, Ohio plant, and grew steadily until the latter part of the decade. According to the JASID, the peak years for Japanese component plant investments occurred in 1987 (50 new facilities), 1988 (62 new facilities) and 1989 (53 new facilities). Once the Japanese assembly firms reached full production, established their supplier networks and achieved their domestic sourcing goals, however, growth in new supplier investments slowed to a trickle. Only two new plants opened in 1992, the last year covered by this release of the JASID survey. Again, because of the maturity of the U.S. vehicle market, the rate of growth in supplier plant investments is not likely to return to the pace experienced in the 1980's. However, additions to their U.S. capacity by Japanese suppliers in the present decade may be forthcoming if the political pressure on transplant assemblers to increase the domestic content of their vehicles persists and if currency fluctuations continue to make the importation of critical large components like engines and transmissions risky in terms of

profitability. During the initial years of assembly operations at the Japanese transplants, lack of confidence in the ability of U.S. firms to meet Japanese assembler quality and delivery standards made importing of key vehicle systems a standard practice (Rubenstein, 1992). Because of continued exchange rate volatility and high transport costs, some expansion of domestic engine production capacity at Japanese assembly plants is likely in the near future. However, domestic supplier firms have now proven able to conform to the quality and deliverability requirements of Japanese automakers and the increased use of U.S. suppliers will dampen any future additions to the Japanese supplier network.

Although nearly all of the Japanese suppliers serve at least one of the eight transplant facilities established by Japanese automakers in the U.S., most also provide components to Big Three firms as well. American-owned supplier firms have also made inroads into the Japanese supplier network. This increased use of U.S. firms is due, in part, to the high degree of component out-sourcing practiced by Japanese assembly plants, a fact that makes the supplier network for any one plant quite extensive. Nissan, for example had about 225 domestic suppliers for its U.S. built vehicles making it impossible for the company to rely exclusively on transplanted Japanese firms for all of its components. Similarly, Toyota's Georgetown, Kentucky facility had more than 200 domestic suppliers (Haywood, 1992). Still, if JIT has in fact lead to a high degree of spatial concentration among newly located automotive suppliers in the United States it should be most evident among Japanese supplier firms because they have had more experience with the intricacies of JIT techniques than American automotive suppliers. In addition, among the transplant facilities, those that are not joint-ventures with established Big Three automakers—Honda, Nissan, Subaru-Isuzu, and Toyota's Georgetown, Kentucky plant—can be expected, all other things equal, to attract a larger number of Japanese supplier firms to the U.S. because these plants are less likely to have forged ties with existing domestic suppliers. In light of this hypothesis, while some data are presented below for all of the transplant facilities, the discussion will be focused on these "pure" transplant establishments.

Based on the supplier-customer information given in the JASID, information on the geographic scope of the Japanese supplier networks for the seven Japanese assemblers is presented in Table 6. The average distance between assembler and supplier facilities given in the first column of the table ranges from 1,750 miles for the New United Motor Manufacturing (NUMMI) facility in Freemont, California (a joint venture between Toyota and General motors to manufacture the Geo Prism/Toyota Corolla), to a minimum of 262 miles for the Honda plants located in central Ohio (Anna, East Liberty, and Marysville). Because of its location outside the main automobile assembly corridor, the NUMMI plant is clearly an outlier. Opened in 1984 in a previously closed GM plant, the NUMMI facility had attracted only three Japanese suppliers to California. Honda, the first Japanese manufacturer to establish U.S. operations with its motorcycle production plant in 1979 and vehicle plant in 1982, has developed the largest and most

**Table 6: Distance Between Assembly and Supply Activities for Japanese Auto Production Networks in the U.S. (in Miles)**

| Assembler | Mean | Median | Std. Dev. | Minimum | Maximum | n |
|---|---|---|---|---|---|---|
| Autoalliance | 366.47 | 245.00 | 453.83 | 5.00 | 2013.00 | 59.00 |
| Diamond-Star | 316.78 | 265.77 | 312.61 | 0.00 | 1726.29 | 50.00 |
| Honda | 262.47 | 152.00 | 379.63 | 0.00 | 2022.00 | 117.00 |
| Nissan | 343.21 | 251.20 | 347.35 | 6.96 | 1801.80 | 64.00 |
| NUMMI | 1749.85 | 1959.24 | 651.28 | 33.05 | 2191.87 | 25.00 |
| Saturn | 310.68 | 294.34 | 243.14 | 27.28 | 922.54 | 17.00 |
| Subaru-Isuzu | 309.94 | 193.37 | 411.14 | 19.60 | 1837.73 | 53.00 |
| Toyota | 335.30 | 174.19 | 481.32 | 0.00 | 1897.00 | 67.00 |

concentrated Japanese supplier network. Half of its 117 Japanese parts producers are located within 152 miles of its main assembly facility in Marysville, Ohio. Forty-three, or 36.75 percent, of these facilities are located within Ohio's borders at an average distance of 50.42 miles from the Marysville plant. Honda also utilized Japanese suppliers in sixteen other states: Alabama (2); California (4); Georgia (1); Iowa (1); Illinois (5); Indiana (10); Kentucky (15); Michigan (16); Missouri (3); North Carolina (2); Nebraska (2); South Carolina (2); Tennessee (7); Texas (2); Virginia (1); and Vermont (1).

Toyota's Georgetown, Kentucky plant had the second largest Japanese supplier network among the transplant facilities and drew on 67 Japanese-owned manufacturers for parts and components. The distance of these suppliers from the Toyota assembly plant ranged from approximately 0 miles to 1,897 miles, with an average distance of 335 miles. Half of these suppliers were located within 175 miles of Georgetown. Of these 67 facilities, fifteen (22 percent) are located in Kentucky while the remainder are dispersed among thirteen states: Alabama (1); California (5); Iowa (1); Illinois (6); Indiana (8); Michigan (6); Missouri (1); North Carolina (3); Ohio (9); South Carolina (3); Tennessee (7); Texas (1); and Vermont (1). Thus, despite the fact that Toyota pioneered the development of Japanese JIT manufacturing techniques in the development of its "Toyota City" complex in Japan, the same degree of agglomeration was not imported into the United States. In addition, the overall indirect impact of the Toyota plant in terms of the number of suppliers attracted to the U.S. is slightly overstated here. Of the nine Toyota supplier plants located in Ohio, eight also provided parts

and components to Honda so, although the majority of these plants located after Toyota, Toyota's plant location was likely not the exclusive, or perhaps even the primary, determinant of their location decision. Honda's Ohio manufacturing complex was still being developed at the time of Toyota's location in Kentucky.[16] Some of the Toyota suppliers choosing locations in Kentucky, however, also became part of the Honda supplier network. The fact that five of Toyota's fifteen Japanese supplier plants located in Kentucky also supplied Honda clearly illustrates the advantage states can derive from their relative positions in the I-65/I-75 auto corridor. Without its attraction of Toyota, these five parts manufacturers would likely have chosen a location in Ohio rather than Kentucky. Alternatively, but for Honda's location in Ohio, Kentucky might have attracted even more auto parts manufacturers, namely, the Toyota suppliers that chose locations in Ohio instead of sites closer to the Georgetown, Kentucky assembly plant.

Nissan's U.S. based Japanese supplier network is somewhat smaller and more dispersed than that of Toyota. Its Smyrna, Tennessee facility relied upon 64 Japanese parts manufacturers in seventeen states including Tennessee. The average supplier-customer distance for these manufacturers was 343 miles, with a range of between 7 and 1,801 miles. Half of these establishments are located within 251 miles of Smyrna. As was the case for Honda and Toyota, the assembly plant's home state gained the largest influx of supplier investments, fifteen of these 64 plants (23 percent) are located in Tennessee. The remainder are spread among the following states: Arkansas (1); California (2); Georgia (1); Illinois (3); Indiana (5); Kentucky (10); Massachusetts (1); Michigan (7); North Carolina (2); Nebraska (1); New York (1); Ohio (11); Pennsylvania (1); South Carolina (1); Texas (1); and Vermont (1). It is interesting to note that, although Ohio has the second largest concentration of Nissan suppliers among these states, only two of these eleven Ohio-based manufacturers actually supplied both Nissan and Honda. That nine of these supplier firms chose to locate in the already established concentration of Japanese automotive parts and components firms in Ohio rather than closer to Nissan's assembly plant clearly demonstrates that agglomeration economies play a large role in the location decisions of automobile industry firms, a fact that makes the timing of a "victory" in the competition to attract automobile assemblers critical in determining the size of the benefits a state can expect to receive. The relative strength of these competing agglomeration and transport cost economies with regard to the plant location decision is an empirical issue explored in the next section.

Prior to the establishment of BMW and Mercedes-Benz, the last of the pure transplant automobile assembly facilities, both in terms of its timing and the size of its Japanese supplier network, is the Subaru-Isuzu joint venture located in Lafayette, Indiana which opened in 1989. This facility purchased components from 53 Japanese supplier firms dispersed at an average distance of 310 miles from its Lafayette factory. Half of these suppliers, however, were located within 193 miles of the assembly plant. By state, these supplier plants were distributed as follows: California (3);

Georgia (1); Illinois (4); Indiana (9); Kentucky (11); Michigan (3); Missouri (1); Ohio (11); South Carolina (1); Tennessee (7); and Texas (2). In this case the assembly plant's home state gained fewer supplier plant locations than states that had previously attracted assembly plants, Ohio and Kentucky, and just two more than Nissan's home state of Tennessee. Thus there is clearly a substantial amount of overlap between Subaru-Isuzu's Japanese supplier network and those of Honda, Toyota, and Nissan, providing additional evidence of an early winner advantage accruing to states and localities from attracting an assembly facility. Of the 53 Subaru-Isuzu suppliers, nearly half (25) also provided components to Honda including all eleven located in Ohio. Furthermore, these eleven Ohio-based facilities were all open prior to the Subaru-Isuzu plant indicating that its location was not a factor in their location choice. A similar result is found from looking at plants supplying both Subaru-Isuzu and Toyota. Here there were nineteen shared suppliers and of the six located in Kentucky, five were opened prior to 1989, indicating that the location of the Subaru-Isuzu plant was not a factor in their location. In the case of Nissan, the Subaru-Isuzu and Nissan assembly plants shared 24 Japanese suppliers and each of the five located in Tennessee started production prior to the opening of the Subaru-Isuzu plant.

Table 7 presents additional data on the degree of spatial concentration of the respective assembler/supplier networks analyzed above, as well as information for three additional assemblers: Autoalliance, Diamond-Star, and Saturn. In this table, the degree of localization is illustrated by separating the supplier facilities into 50 mile distance intervals. For each assembly facility the number of supplier plants in each distance category appears in the first column and the cumulative distribution of supplier facilities is given in the second column. Note that because all of these assembly plants are located either within, or adjacent to the I-65/I-75 corridor, for each, more than 70 percent of their Japanese suppliers are located within a one-day (500 mile) truck haul.[17] Still, to the extent that JIT requires more than daily (often hourly) delivery of components, we should expect a higher but varying degree of localization among these supplier plants depending on the extent to which JIT has been implemented at the assembly plants. Again, the Honda assembly complex shows the highest degree of localization with 24 supplier plants (20.5 percent) located within 49 miles of the assembly facility. Nissan has the second highest concentration of plants among these facilities with 17.2 percent of its Japanese suppliers located within 49 miles of its assembly location. Note that these two assemblers were the first Japanese transplants to establish greenfield automobile production sites in the United States, beginning auto production in 1982, providing further evidence for the notion that the early winners of automobile plants reaped the most in terms of indirect location benefits. Because the number and geographic spread of actual and potential customers was limited during the early 1980's, Japanese supplier firms were more likely to locate within close proximity of one of these two Japanese assembly facilities or one of the existing Big Three plants. Of the twenty-two Japanese

**Table 7: Japanese Supplier Plant Networks: Number of Plants by Distance Category**

| Distance | Autoalliance | | Diamond-Star | | Honda | | Nissan | | Saturn | | Subaru-Isuzu | | Toyota | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % | No. | % |
| 0-49 | 10 | **16.9** | 3 | **6.0** | 24 | **20.5** | 11 | **17.2** | 2 | **11.8** | 4 | **7.5** | 7 | **10.4** |
| 50-99 | 5 | **25.4** | 2 | **10.0** | 19 | **36.8** | 2 | **20.3** | 3 | **29.4** | 5 | **17.0** | 11 | **26.9** |
| 100-149 | 7 | **37.3** | 2 | **14.0** | 13 | **47.9** | 3 | **25.0** | 0 | **29.4** | 4 | **24.5** | 7 | **37.3** |
| 150-199 | 2 | **40.7** | 5 | **24.0** | 15 | **60.7** | 6 | **34.4** | 2 | **41.2** | 21 | **64.2** | 10 | **52.2** |
| 200-249 | 7 | **52.5** | 6 | **36.0** | 7 | **66.7** | 10 | **50.0** | 1 | **47.1** | 5 | **73.6** | 3 | **56.7** |
| 250-299 | 6 | **62.7** | 15 | **66.0** | 10 | **75.2** | 3 | **54.7** | 1 | **52.9** | 3 | **79.2** | 13 | **76.1** |
| 300-349 | 0 | **62.7** | 10 | **86.0** | 5 | **79.5** | 7 | **65.6** | 1 | **58.8** | 3 | **84.9** | 5 | **83.6** |
| 350-399 | 3 | **67.8** | 2 | **90.0** | 6 | **84.6** | 1 | **67.2** | 1 | **64.7** | 1 | **86.8** | 2 | **86.6** |
| 400-449 | 3 | **72.9** | 1 | **92.0** | 3 | **87.2** | 6 | **76.6** | 1 | **70.6** | 0 | **86.8** | 1 | **88.1** |
| 450-499 | 4 | **79.7** | 0 | **92.0** | 2 | **88.9** | 7 | **87.5** | 0 | **70.6** | 2 | **90.6** | 0 | **88.1** |
| 500-549 | 5 | **88.1** | 1 | **94.0** | 1 | **89.7** | 1 | **89.1** | 4 | **94.1** | 0 | **90.6** | 0 | **88.1** |
| 550-599 | 0 | **88.1** | 0 | **94.0** | 2 | **91.5** | 0 | **89.1** | 0 | **94.1** | 0 | **90.6** | 1 | **89.6** |
| > 599 | 7 | **100.0** | 3 | **100.0** | 10 | **100.0** | 7 | **100.0** | 1 | **100.0** | 5 | **100.0** | 7 | **100.0** |
| n | 59 | | 50 | | 117 | | 64 | | 17 | | 53 | | 67 | |

*Source: Authors calculations from JASID*

suppliers to locate in the U.S. between 1980 (the year the Honda and Nissan automobile plant locations were announced) and 1983 (prior to the announced location of the Autoalliance facility), each of whom supply at least one Big Three plant, twelve chose locations in either Ohio (4), or Tennessee (4), or Michigan (4), with the remainder being dispersed among other states. Once the early supplier plant locations are established, then, agglomeration economies,[18] including the availability of a pool of appropriately skilled labor and the ability to draw on a developed community of industry specific expertise, tend to draw more supplier facilities into the close knit supplier network. However, the appearance of a new assembly facility in the network may cause a new growth pole to be established depending upon its relative location within the production system and the strength of its supplier attraction, that is, the degree to which JIT techniques are utilized by the assembler.

**The Determinants Used in the Analysis**

The discussion above has emphasized distance and proximity of suppliers to assemblers. But other factors influencing location decisions of firms, as discussed in sections 1 and 2 are also important. For the purpose of this empirical

inquiry, a set of variables based on this discussion were selected for inclusion in the analysis. Variables representing operating costs were divided into transport costs and labor costs. Structural conditions are represented both by the distance variables and public service variables while quality-of-life attributes are categorized as amenities. Because one goal of the study is to determine the relative attraction force of assemblers, variables measuring the distance from the county to selected assembly plants are included both as the transport cost proxy as well as a measure of the attraction force of assemblers. In addition, the transport cost variables include four qualitative variables to account for the presence of an east-west interstate, a north-south interstate, short or long-haul rail lines, and a navigable waterway. The existence of these modes of transport are all expected to have a positive influence on the location decisions of supplier firms.

The next set of variables consisted of factors aimed at measuring labor costs and quality. The first variable was the number of machine operators, assemblers, and inspectors in a given county and was used to proxy the availability of a qualified skilled workforce. Similarly, the county unemployment rate was included as a measure of the availability of unutilized workers. Additional variables in this set included the average manufacturing wage, the median age of the county's population, and the number of persons twenty-five years old and older who have completed high school.

For public service factors affecting firm location, one variable was included. The variable incorporated in the study is the level of per pupil school expenditures which is used as a measure of school quality across counties in different years. Education spending was chosen as the sole public service variable because the empirical literature to date has consistently identified it as being the public expenditure bearing a significant influence on firm location (Fisher, 1997).

The final category of location determinants, amenities and other factors, includes several measures of county size and degree of urbanization including land area, population, designation as part of a metropolitan area, number of households, percent of population living in an urban area, and population density. It has been shown that a positive relationship exists between size and degree of urbanization and the number of amenities available (i.e., parks, theaters, museums, sport facilities, etc.). The remaining variables in the data set reflect the racial mix of the county's population.

**Empirical Results**

The statistical model used in the analysis was specified as a *count model*. A count model is concerned with the number of times a specified event occurs. In the current study, the event of interest is the location of a supplier firm. Therefore, the dependent variable (i.e., the variable the analysis is attempting to explain) in the current study is the number of automotive supplier firms in a county each year from 1980-1992. The explanatory variables are the location determinants detailed in the previous section. Table 8 provides the results in terms of each variable's influence on location decisions of

## Table 8: Results for Empirical Model of Supplier Plant Location

| Variable Name | Description | | |
|---|---|---|---|
| **Dependent Variables** | | | |
| $FIRMS_{i,t}$ | Count of supplier firms in county i in year t. | | |
| $NJFIRMS_{i,t}$ | Count of non-Japanese owned supplier firms in county i in year t. | | |
| $JAPFIRMS_{i,t}$ | Count of Japanese owned supplier firms in county i in year t. | | |
| **Independent Variable** | **Description** | **Japanese** | **Non-Japanese** |
| **Transport Costs** | | | |
| $EWINT_{i,t}$ | Dummy variable equal to one if county i contains an East-West interstate. | NS | - |
| $NSINT_{i,t}$ | Dummy variable equal to one if county i contains a North-South interstate. | + | + |
| $RAIL_{i,t}$ | Dummy variable equal to zero if no rail line in county i in year t, equal to one if county contains a short line, equal to two if county contains a main line. | NS | + |
| $WTRWAY_{i,t}$ | Dummy variable equal to one if county i had a navigable waterway in year t. | - | - |
| DISTTMMi | Distance in miles from county i to Toyota's Georgetown, Kentucky plant. | - | - |
| DISTSATi | Distance in miles from county i to Saturn's Spring Hill, Tennessee plant. | NS | NS |
| DISTNISSi | Distance in miles from county i to Nissan's Smyrna, Tennessee plant. | - | NS |
| $DISTSIA_i$ | Distance in miles from county i to the Subaru-Isuzu plant in Lafayette, Indiana. | NS | NS |
| $DISTDIA_i$ | Distance in miles from county i to the Diamond-Star plant in Normal, Illinois. | + | + |
| $DISTAALI_i$ | Distance in miles from county i to the Autoalliance plant in Flat Rock, | + | + |
| $DISTHOAM_i$ | Distance in miles from county i to Honda's Marysville, Ohio plant. | NS | NS |
| $DISTFDKY_i$ | Distance in miles from county i to Ford's Louisville, Kentucky plant. | + | - |
| $DISTFDVA_i$ | Distance in miles from county i to Ford's Norfolk, Virginia plant. | - | + |
| $DISTGMKY_i$ | Distance in miles from county i to GM's Bowling Green, Kentucky plant. | - | NS |
| $DISTGMGA_i$ | Distance in miles from county i to GM's Doraville, Georgia plant. | + | + |
| $DISTGMLA_i$ | Distance in miles from county i to GM's Shreveport, Louisiana plant. | + | NS |
| **Labor Costs** | | | |
| $MACHOP_{i,t}$ | Number of machine operators, assemblers, and inspectors in county i in year t. | + | + |
| $UNEMP_{i,t}$ | Unemployment rate in county i in year t. | - | NS |
| $MFGWAGE_{i,t}$ | Average manufacturing wage in county i in year t, calculated as | + | - |
| $SCH12_{i,t}$ | Number of county i residents having completed 12 years of education in year t. | NS | + |
| $MEDAGE_{i,t}$ | Median age of the population in county i in year t. | NS | + |
| **Public Services** | | | |
| $EXPPUP_{i,t}$ | Expenditures per pupil for high expenditure school district in county i in year t. | NS | NS |
| **Amenities & Other Factors** | | **Japanese** | **Non-Japanese** |
| $LAND_{i,t}$ | Land area of county i in year t. | NS | NS |
| $METRO_{i,t}$ | Dummy variable equal to one if county i is part of a metropolitan area in year t. | - | + |
| $HSHLDS_{i,t}$ | Number of households in county i in year t. | NS | - |
| $PCTURB_{i,t}$ | Percent of county i population living in an urban area in year t. | NS | + |
| $POPDENS_{i,t}$ | Population density in county i in year t, calculated as $POP_{i,t}/LAND_{i,t}$ and expressed in thousands/$mi^2$. | - | + |
| $NONWHT_{i,t}$ | Percent of county i population that is non-white in year t. | NS | NS |
| $PCTASIAN_{i,t}$ | Percent of county i population that is Asian in year t. | + | - |

automotive suppliers. Several interesting results follow from this model.

First, of the transport costs, the existence of a north-south interstate variable is shown to have a positive influence on the location decision of automotive suppliers, both Japanese and non-Japanese. The existence of a rail system has a positive impact on the number of non-Japanese supplier firms. This suggests that rail transport is less important in the location choice of Japanese supplier transplants. The availability of water transport as well as the existence of an east-west interstate displayed a negative influence on the number of supplier plants in a county. This is likely due to the fact that the majority of the automobile assembly plants included in the study are located along the north-south oriented I-65/I-75 automobile corridor.

The variables measuring the distance of supplier firms from the various assembly plants provide some insightful results. First, the variable accounting for the distance from a county to the Toyota Motor Manufacturing facility in Georgetown, Kentucky is found to be significant in affecting location decisions of both Japanese and non-Japanese supplier plants. In other words, being located farther from this particular assembly plant would lead to counties gaining fewer supplier plant investments, assuming all other factors were equal. Alternatively, the distance variable for Tennessee's Japanese plant, Nissan, is shown only to have a significant attraction effect on the Japanese supplier firm. The distance variables for the remaining Japanese-owned assembly plants (Subaru-Isuzu of America and Honda) were shown to have no influence in attracting supplier plants to the four state region under consideration. Possible explanations include: (i) the Subaru-Isuzu plant was one of the newer plants in the Southeast and a large portion of the supplier network was already in place and (ii) the suppliers for Honda tend to be concentrated around its Ohio facilities and, because the geographic scope of our analysis is limited to four states in the Southeast, they were not included in our data set.

For the Big Three assembly facilities located in the region, the variable accounting for distance from the Saturn plant in Spring Hill, Tennessee is not significant in attracting either Japanese or non-Japanese supplier firms. This is likely a result of the fact that Saturn draws more heavily from the existing GM supplier network rather than newly locating Japanese or non-Japanese suppliers, as evidenced by the fact that Saturn had a relatively small number (seventeen) of Japanese suppliers. For Ford's car production plant in Bowling Green, Kentucky the distance variable is significant only in the attraction of non-Japanese firms. Alternatively, General Motors' Kentucky plant in Bowling Green has a strong attraction effect among the Japanese supplier firms. While this result may indicate that transplant supplier firms are actually supplying components to the GM plant (a possibility which we cannot confirm directly from our data), we may also be picking up some of the attraction force of the Nissan plant in north central Tennessee. Bowling Green is located along Interstate 65 just 80 miles north of Smyrna, Tennessee. A similar, but less reconcilable, result was obtained for distance to the Ford plant in Norfolk, Virginia. The final two plants included in the model are both GM

facilities located in Georgia and Louisiana. In the case of the Georgia facility, the variable is significant in attracting both Japanese and non-Japanese suppliers while it is found only to have an influence among Japanese suppliers for the Louisiana location. The limited attraction force of these plants is not all that surprising given their locations on the outer edges of the "automotive alley". That is, because of their non-central placements within the automobile corridor, supplier plants tend to locate farther away from these plants in order to have better access to the close grouping of assembly plants within the I-65/I-75 auto producing region.

Turning to the labor cost variables, we find a very interesting result in comparing the different findings for the separate non-Japanese and Japanese supplier firm models. The results for the non-Japanese firms show that these suppliers prefer locations with more trained machine operators, lower wages, a larger number of individuals who have completed elementary and secondary education, and an older population. More generally, these variables taken as a group suggest that non-Japanese supplier firms search for locations with an already trained and experienced labor pool. For the Japanese firms, however, the fact that the number of machine operators, number of high school graduates, and median age are not significant lends support to the notion that these suppliers prefer to train their own workers rather than hire employees who have already been indoctrinated into the traditional American system of manufacturing, a factor that is important because of the uniqueness of the Japanese style of production management. Another interesting finding was that lower manufacturing wage rates and higher unemployment rates appeared to have a negative influence on location decisions of Japanese-owned supplier firms. This could be due to the fact that Japanese firms perceive lower wages and higher unemployment as an indicator of low labor quality in the county.

The last set of variables used in the study related to the role of amenities. Notable results include a suggestion that Japanese supplier firms prefer non-metropolitan locations (thus, contradicting previous studies) and locations with high concentrations of minorities, particularly Asian residents. In addition, county land area, while serving as a proxy for the number and cost of available sites, is not shown to have any influence on location decisions for either Japanese or non-Japanese firms.

**Policy Implications**

The data and analysis presented here attempts to shed some light on the determinants and impacts of supplier plant locations in the Southeastern automobile industry, in particular with regard to the degree of spatial concentration that has arisen between these establishments and their assembly plant customers. Because of the hypothesized importance of distance as it pertains to the realization by firms of transport cost and agglomeration economies within a just-in-time system of production and inventory management, a new model of economic development predicated on attracting JIT-based industries like automobiles has been put forth as a solution to many of the problems faced by regions with dwindling manufacturing bases (Mair, 1993). Moreover, the

large packages of incentives and other inducements that have been offered by state and local governments to attract the location of automobile assembly plants within their jurisdictions indicate that this model has been emphatically embraced by economic development policymakers. However, from a policy perspective, especially with regard to local economic development practices, the efficacy of offering large packages of incentives to attract an assembly operation on the hope that it will generate large indirect and spinoff effects via the co-location of supplier facilities is a question that can only be answered empirically. The analysis presented here shows that, although some clustering of suppliers did occur at the local level in areas that were the first to attract an automobile assembly transplant, later winners in this incentives game were not so fortunate. What the empirical evidence suggests is that from the spatial realignment of the U.S. automobile assembly plant network a number of growth poles with varying attraction forces have emerged. Further, this attraction force tends to be larger for transplant facilities, and smaller for assembly operations that enter the network in later years.

## V. CONCLUSION

The focus of this report was to investigate the factors influencing the location decisions of automotive suppliers. Both a statistical analysis and a survey were utilized in the study in an attempt to identify factors contributing to as well as discouraging business location in Tennessee.

The survey reaffirmed previous research on location determinants with access to markets and labor force characteristics playing the most significant role in site decisions. The survey did reveal areas of concern for Tennessee, including lack of skilled workers and deficient educational opportunities. The state scored high for its right-to-work laws, quality of life, and interstate system, all of which have been recognized in the literature as being significant factors in site selection.

The statistical analysis also addressed the importance of JIT manufacturing in these location decisions as well as how Japanese-owned firms may differ from domestically-owned firms. The analysis led to the conclusion that JIT was not sufficient by itself to attract a vast supplier network. Other, more traditional location determinants continue to be influential. One notable difference between Japanese and non-Japanese firms was the suggestion that Japanese firms tend to prefer to train their employees whereas non-Japanese firms tend to prefer locations with an already trained labor force.

The challenge for policymakers is to enhance the competitiveness of the state given limited resources. This report suggests that in order to achieve this, the state's priorities should include increasing the quality of education, maintaining fair business taxes and a favorable business climate, and attracting qualified labor force participants.

## ENDNOTES

1. Robert Perrucci, *Japanese Transplants in the Heartland: Corporation and Community*, 1994.

2. U.S. Motor Vehicle Employment," *Plant Sites and Parks*. December 1998/January 1999.

3. Automotive News Market Data Book, May, 1999. For an expanded discussion of the automotive sectors development, see "A Profile of the Automotive Sector in the U.S. and Southeastern States," University of Tennessee, Knoxville: Center for Business and Economic Research, 1999.

4. Robert M. Ady, *New England Economic Review*, Federal Reserve Bank of Boston, March/April 1997.

5. Fantus Consulting first developed the three step process of site selection outlined here.

6. For example, Bartik (1991) conducts a review of 123 papers analyzing the effect of taxes on firm location and finds that only 90 of the studies were able to find one or more statistically significant negative tax effect.

7. See Freidman, Gerlowski, and Silberman (1992).

8. See Calzonetti and Walker (1991).

9. See Smith and Florida (1993) and Head, Reis, and Swenson (1995).

10. A Kiretsu is defined generally as a group of vertically or horizontally related firms that have forged close relationships without any formal joint-ownership agreement.

11. See Reid (1995).

12. See Mair, et. al (1988).

13. For a more complete description of these characteristics see Calzonetti and Walker (1991).

14. Data on statewide average manufacturing salary obtained from Tennessee Department of Employment Security.

15. The DBR data were provided by the Tennessee Valley Authority so its geographic coverage is limited to state having territory in the TVA region. Therefore, data for the Southeast region includes Alabama, Georgia, North Carolina, and Tennessee.

16. Honda's Anna, Ohio engine plant and its East Liberty, Ohio assembly plant opened in July 1985 and December 1989, respectively.

17. There is some debate in the JIT literature on the appropriate distance between supplier and assembly facilities for JIT to function properly. Estall (1985) has suggested that suppliers need to locate within about 65 miles of their customers while Mair, et. al (1988) focus on a maximum two-hour truck haul (about 125 miles).

18. Agglomeration economies arise from the ability of firms to produce goods and services more efficiently as a result of the geographic concentration of firms within the same industry. Such firms draw upon common resources, industry workers with specific skills, and unique raw materials even though they may not trade amongst themselves.

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Rubenstein, James M. (1992). *The Changing U.S. Auto Industry: A Geographical Analysis* (New York: Routledge).

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## Appendix A: Survey Instruments

# Tennessee Automotive Industry Survey

**Physical location of company:**

Please make corrections above as necessary.

**Survey completed by:**

_____
**contact person**

_____
**firm**

_____
**address**

_____
**city** **state** **ZIP**

☐ Check here if you would like to receive a copy of the survey results.

## Part I - Company Information

1. What year was this plant established in Tennessee? _____
2. What was the initial investment at start-up? $_____
3. Since start-up, what additional investment has been made? $_____
4. What was the initial employment at this plant? _____
5. What is the current employment at this plant? _____
6. What is the current total payroll at this company? $_____
7. What percentage, if any, of your labor force is unionized? _____
8. What benefits does this company provide to employees? (*Check all that apply*)

   ___Health insurance ___Tuition reimbursement ___401k plan
   ___Dental insurance ___Training programs ___Pension plan

9. Has your company received tax or other incentives from **state** government? ___Yes ___No
   *If yes, please check all that apply*:

   ___Financial capital ___Site acquisition/development ___Training programs
   ___Tax incentives ___Other_____

10. Has your company received tax or other incentives from **local** government? ___Yes ___No
*If yes, please check all that apply*:

___Financial capital ___Site acquisition/development ___Training programs
___Tax incentives ___Other_____

## Part II - Product/Market Information

1. What are the primary products or services produced by this company? (*Include SIC if known*)

_____

_____

_____

2. Please specify the percent of each market for your company's **automotive** outputs:

Tennessee_____% Southeast_____% National_____% International_____%

3. Who are the principal users (customers) of your product(s)?

Automotive industry_____% Other manufacturers_____% Government_____%
Wholesalers/retailers_____% Final consumers_____%

4. What share of the primary raw materials or inputs for this company are purchased in Tennessee? _____%

5. What raw materials or inputs for this company are relatively scarce and/or expensive? (*Please list*)

_____

_____

6. What raw materials or inputs for this company are relatively abundant and/or *in*expensive? (*Please list*)

_____

_____

7. Compared to 5 years ago, this company's output to the **auto industry** has

___increased ___stayed the same ___decreased

8. Over the next 5 years, would you say business prospects for your company will

___get better ___stay the same ___get worse

## Part III - Site Attributes

Following is a list of attributes concerning your company's current Tennessee site. Please evaluate each item by checking the appropriate column.

| # | Site attribute | Excellent | Adequate | Inadequate |
|---|---|---|---|---|
| a. | Access to market for your product(s) | | | |
| b. | Proximity to market for final product(s) | | | |
| c. | Access to marketing and advertising services | | | |
| d. | Access to financial, accounting, and legal services | | | |
| e. | Access to engineering and research & development services | | | |
| f. | Access to raw materials | | | |
| g. | Available supply of workers | | | |
| h. | Skill level of available workforce | | | |
| i. | Worker productivity | | | |
| j. | Quality/adequacy of workforce training and development | | | |
| k. | Wage rates compared to other potential sites | | | |
| l. | Other labor costs relative to other potential sites | | | |
| m. | Labor/management relations | | | |
| n. | Cost of land | | | |
| o. | Availability of land | | | |
| p. | Availability of financial capital in Tennessee | | | |
| q. | State taxes on businesses, individuals (franchise, excise, sales) | | | |
| r. | Local taxes on businesses (property, sales) | | | |
| s. | Zoning and building regulations | | | |
| t. | Environmental regulations and requirements | | | |
| u. | Quality of interstate highways | | | |
| v. | Quality of state highways | | | |
| w. | Quality of local highways and roads | | | |
| x. | Availability of quality rail service | | | |
| y. | Availability of air transportation service | | | |
| z. | Quality of electric power service | | | |
| aa. | Access to natural gas | | | |
| bb. | Price of natural gas | | | |
| cc. | Available water supply | | | |
| dd. | Adequacy of waste disposal | | | |
| ee. | Availability of high speed telecommunications services | | | |
| ff. | General business climate in Tennessee | | | |
| gg. | Quality of life | | | |
| hh. | Availability of affordable housing | | | |
| ii. | Low crime rate | | | |
| jj. | Quality of public schools | | | |
| kk. | Quality of private schools | | | |
| ll. | Higher education and research facilities | | | |
| mm. | Community recreation resources | | | |
| nn. | Right-to-work laws | | | |
| oo. | Cooperation of local governments | | | |
| pp. | Cooperation of state officials | | | |
| qq. | Other (please specify) | | | |

## Part IV - Site Comparison

1. Where are your major competitors located? (*Please list states or countries*)

   _____

   _____

2. Using *item numbers* from the table in Part III, list 5 **advantages** of the **states** where your competitors are located.

   _____

3. Using *item numbers* from the table in Part III, list 5 ***dis*advantages** of the **states** where your competitors are located.

   _____

4. What characteristics and/or policies **encourage** business retention and expansion in **Tennessee**?

   _____

   _____

   _____

5. What characteristics and/or policies **discourage** business retention and expansion in **Tennessee**?

   _____

   _____

   _____

6. What should **Tennessee state government** do to retain a business like yours?

   _____

   _____

   _____

7. What should **Tennessee local governments** do to retain a business like yours?

   _____

   _____

   _____

*We are very interested in your comments. If necessary, please attach additional comments to this survey before returning it to our office at the address below. Thank you for your participation.*

**Center for Business & Economic Research, UTK ● 1000 Volunteer Blvd., Knoxville, TN 37996-4170 ● (423) 974-5441 ● FAX (423) 974-3100**

# Automotive Industry Survey

**Physical location of company:**

Please make corrections above as necessary.

**Survey completed by:**

_____
**contact person**

_____
**firm**

_____
**address**

_____
**city** **state** **ZIP**

☐ Check here if you would like to receive a copy of the survey results.

## Part I - Company Information

1. What year was this plant established? _____
2. What was the initial investment at start-up? $_____
3. Since start-up, what additional investment has been made? $_____
4. What was the initial employment at this plant? _____
5. What is the current employment at this plant? _____
6. What is the current total payroll at this company? $_____
7. What percentage, if any, of your labor force is unionized? _____
8. What benefits does this company provide to employees? (*Check all that apply*)

   ___Health insurance ___Tuition reimbursement ___401k plan
   ___Dental insurance ___Training programs ___Pension plan

9. Has your company received tax or other incentives from **state** government? ___Yes ___No
   *If yes, please check all that apply*:

   ___Financial capital ___Site acquisition/development ___Training programs
   ___Tax incentives ___Other_____

10. Has your company received tax or other incentives from **local** government? ___Yes ___No
*If yes, please check all that apply*:

___Financial capital ___Site acquisition/development ___Training programs
___Tax incentives ___Other_____

## Part II - Product/Market Information

1. What are the primary products or services produced by this company? (*Include SIC if known*)

_____

_____

_____

2. Please specify the percent of each market for your company's **automotive** outputs:

Within your state_____% Southeast_____% National_____% International_____%

3. Who are the principal users (customers) of your product(s)?

Automotive industry_____% Other manufacturers_____% Government_____%
Wholesalers/retailers_____% Final consumers_____%

4. What share of primary raw materials or inputs for this company are purchased within your state? _____%

5. What raw materials or inputs for this company are relatively scarce and/or expensive? (*Please list*)

_____

_____

6. What raw materials or inputs for this company are relatively abundant and/or *in*expensive? (*Please list*)

_____

_____

7. Compared to 5 years ago, this company's output to the **auto industry** has

___increased ___stayed the same ___decreased

8. Over the next 5 years, would you say business prospects for your company will

___get better ___stay the same ___get worse

## Part III - Site Attributes

Please evaluate the following characteristics of your current location *relative* to Tennessee by checking the appropriate column. For example, if labor costs are cheaper in your state compared to costs in Tennessee, you would check *Superior to TN*.

| # | Site attribute | Superior to TN | Same as TN | Inferior to TN |
|---|---|---|---|---|
| a. | Access to market for your product(s) | | | |
| b. | Proximity to market for final product(s) | | | |
| c. | Access to marketing and advertising services | | | |
| d. | Access to financial, accounting, and legal services | | | |
| e. | Access to engineering and research & development services | | | |
| f. | Access to raw materials | | | |
| g. | Available supply of workers | | | |
| h. | Skill level of available workforce | | | |
| i. | Worker productivity | | | |
| j. | Quality/adequacy of workforce training and development | | | |
| k. | Wage rates compared to other potential sites | | | |
| l. | Other labor costs relative to other potential sites | | | |
| m. | Labor/management relations | | | |
| n. | Cost of land | | | |
| o. | Availability of land | | | |
| p. | Availability of financial capital in your state | | | |
| q. | State taxes on businesses, individuals (franchise, excise, sales) | | | |
| r. | Local taxes on businesses (property, sales) | | | |
| s. | Zoning and building regulations | | | |
| t. | Environmental regulations and requirements | | | |
| u. | Quality of interstate highways | | | |
| v. | Quality of state highways | | | |
| w. | Quality of local highways and roads | | | |
| x. | Availability of quality rail service | | | |
| y. | Availability of air transportation service | | | |
| z. | Quality of electric power service | | | |
| aa. | Access to natural gas | | | |
| bb. | Price of natural gas | | | |
| cc. | Available water supply | | | |
| dd. | Adequacy of waste disposal | | | |
| ee. | Availability of high speed telecommunications services | | | |
| ff. | General business climate in your state | | | |
| gg. | Quality of life | | | |
| hh. | Availability of affordable housing | | | |
| ii. | Low crime rate | | | |
| jj. | Quality of public schools | | | |
| kk. | Quality of private schools | | | |
| ll. | Higher education and research facilities | | | |
| mm | Community recreation resources | | | |
| nn. | Right-to-work laws | | | |
| oo. | Cooperation of local governments | | | |
| pp. | Cooperation of state officials | | | |
| qq. | Other (please specify) | | | |

## Part IV - Site Comparison

1. Where are your major competitors located? (*Please list states or countries*)

   _____

   _____

2. Using *item numbers* from the table in Part III, list 5 **advantages** of the **states** where your competitors are located.

   _____

3. Using *item numbers* from the table in Part III, list 5 ***dis*advantages** of the **states** where your competitors are located.

   _____

4. What characteristics and/or policies **encourage** business retention and expansion within **your state**?

   _____

   _____

   _____

5. What characteristics and/or policies **discourage** business retention and expansion within **your state**?

   _____

   _____

   _____

6. What should **state government** do to retain a business like yours?

   _____

   _____

   _____

7. What should **local governments** do to retain a business like yours?

   _____

   _____

   _____

*We are very interested in your comments. If necessary, please attach additional comments to this survey before returning it to our office at the address below. Thank you for your participation.*

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