What Really Determines Whether a Manufacturing Firm Locates and Remains in California?

Katherine Chalmers, Ph.D.
Robert W. Wassmer, Ph.D.
WHAT REALLY DETERMINES WHETHER A MANUFACTURING FIRM LOCATES
AND REMAINS IN CALIFORNIA?

With a review of public policies that are likely to encourage greater
manufacturing investment and growth in the State

Katherine Chalmers, Ph.D.
Assistant Professor
Department of Economics
California State University, Sacramento
Sacramento, CA 95819-6082
Office: Tahoe 3012
Phone: 916-278-7080
Fax: 916-278-5768
Email: chalmers@csus.edu

and

Robert W. Wassmer, Ph.D.
Professor
Department of Public Policy and Administration
California State University, Sacramento
Sacramento, CA 95819-6081
Office: Tahoe 3037
Phone: (916) 278-6304
Fax: (916) 278-6544
Email: rwassme@csus.edu

November 25, 2007

This report was produced with the help of a 2006-2007 contract from the California State University Faculty Research Fellows Program for the California Governor’s Office. The opinions expressed here do not necessarily reflect the opinion of the California Governor’s Office. The Coordinator of the Faculty Research Fellows Program is Miguel Ceja, Center for California Studies, California State University, Sacramento. For information on the Faculty Research Fellows Program and a list of all previous reports, visit www.csus.edu/calst/Government_Affairs/faculty_fellows_program.html
Dear Friend:

The Faculty Research Fellows Program was created in 1994 to give California’s policy makers greater access to the applied research resources of the California State University. Since then, the Program has distributed more than $700,000 to over 71 CSU faculty and staff from 13 different CSU campuses who have completed more than 60 research projects.

Administered by the Center for California Studies of California State University, Sacramento, the Faculty Research Fellows Program is driven by the research needs of policy makers in the executive and legislative branches. Requests for data, research, conference support and other activities are submitted to the Center by the Assembly, Senate and Governor’s office. The Center then utilizes a system-wide computer network to notify CSU faculty and staff of these requests and disseminate request for proposals. The Center evaluates the responses and awards the research funding.

The Center for California Studies is a public policy, public service, and curricular support unit of California State University, Sacramento. The Center’s capital location and ability to draw on the resources of the entire State University system provide it a unique capacity for making contributions to the development of public policies and the public life of the State. Center programs cover four broad areas: administration of the nationally known Assembly, Senate and Executive Fellowship Programs; university-state government liaison and applied public-affairs research, including the Faculty Research Fellows Program; civic education and community service through forums and conferences; and curricular support in the interdisciplinary field of California Studies.

Please note that the views and opinions expressed in this report are those of the author(s) and do not necessarily represent the Center for California Studies, California State University, Sacramento, or the California State University.

If you have questions about this report, the Faculty Research Fellows Program or the Center for California Studies, please feel free to contact us.

Sincerely,

Timothy A. Hodson
Executive Director
Center for California Studies

Miguel Ceja
Coordinator
Faculty Research Fellows Program
# TABLE OF CONTENTS

**LIST OF TABLES** ........................................................................................................................................................................ iv

**EXECUTIVE SUMMARY** .................................................................................................................................................................... v

**INTRODUCTION: THE RELEVANCE OF THE POLICY QUESTION** ........................................................ 1

**IS IT IN CALIFORNIA’S BEST INTEREST TO PURSUE MANUFACTURING JOBS?** ...................................................... 6

  Multiplier Effects ................................................................................................................................................................................... 6

  Research and Development Capacity .................................................................................................................................................. 8

  High Productivity .................................................................................................................................................................................. 9

  High Income and Benefits .............................................................................................................................................................. 10

  State and Local Tax Revenue .......................................................................................................................................................... 12

**FACTORS CITED IN POLICY AND BUSINESS DISCUSSIONS AS BEING IMPORTANT TO WHY CALIFORNIA IS LOSING MANUFACTURING** .......................................................... 14

  State Business Tax Climate Index ..................................................................................................................................................... 15

  U.S. Economic Freedom Index ...................................................................................................................................................... 16

  America’s Top States for Business .................................................................................................................................................. 17

**WHAT PREVIOUS EMPIRICAL STUDIES HAVE FOUND AS IMPORTANT DETERMINANTS OF INTRA-STATE MANUFACTURING LOCATION** ............................................. 19

  The Location Decision of a Manufacturing Firm ............................................................................................................................. 19

  Labor Costs ......................................................................................................................................................................................... 21

  Unionization ....................................................................................................................................................................................... 22

  Unemployment ................................................................................................................................................................................ 23

  Transportation Networks ........................................................................................................................................................... 24

  Regional Markets ........................................................................................................................................................................... 26
Sub-National Taxes.......................................................................................................... 27
State and Local Granted Economic Development Incentives................................. 32
Foreign Investment Research...................................................................................... 37

THE EFFECT OF CURRENT CALIFORNIA BUSINESS CLIMATE ON
MANUFACTURING INVESTMENT SUGGESTED POLICIES TO
RETAIN/INCREASE MANUFACTURING INVESTMENT............................................. 39

Labor.............................................................................................................................. 39
Transportation .............................................................................................................. 40
Costs of Doing Business ............................................................................................. 41
Business Regulation and Tax Credits ......................................................................... 42

SUGGESTED POLICIES TO RETAIN/INCREASE
MANUFACTURING INVESTMENT............................................................................. 44

REFERENCES ................................................................................................................. 50

APPENDIX I
Table A1: Annotated List of Studies at the Inter-state Level
Analyzing the Effects of State and Local Taxes on Business Activity....................... 58

APPENDIX II
Shift-Share Analysis ................................................................................................... 64
Industrial Mix Component ............................................................................................ 66
Competitive Component ............................................................................................... 67
Shift-Share Analysis ................................................................................................... 68
Table A2: California Shift-Share Calculated Against U.S. Employment....................... 72
Table A3: California Shift-Share Calculated Against U.S. Mfg. Employment.............. 74
LIST OF TABLES

TABLE 1: RIMS II MULTIPLIERS FOR STATE OF CALIFORNIA........................................ 7

TABLE 2: MEAN ANNUAL 2006 CALIFORNIA WAGE FOR ALL OCCUPATIONS IN LISTED INDUSTRY................................................................. 11

TABLE 3: PERCENTAGE OF WORKERS IN TWO TYPES OF INDUSTRIAL SECTORS RECEIVING A PARTICULAR NON-WAGE BENEFIT IN UNITED STATES ........................................ 12

TABLE 4: VARIABLES AFFECTING FIRM LOCATION DECISIONS (AS PREDICTED BY EMPIRICAL LITERATURE)....................................................... 32

TABLE 5: 2002-2005 CALIFORNIA VS. NATIONAL MANUFACTURING SECTOR EMPLOYMENT ................................................................. 45
EXECUTIVE SUMMARY

Introduction: The Relevance of the Policy Question

Manufacturing provides high paying jobs for nearly 10 percent of working Californians. Compared to the 2004 California median income of slightly more than $37,000, the average annual income earned in manufacturing was $57,000.

California policymakers are concerned over some rather dismal trends related to Manufacturing. The State lost almost 400,000 manufacturing jobs between 1990 and 2003.

Based upon a complex, but well accepted method of “shift-share” analysis for the periods 1999 to 2001 and 2002 to 2005, we find that much of these losses in California’s manufacturing activity are tied to national and international economic trends that are beyond the control of the State’s policymakers.

So there is statistically based evidence that although things still remain “bad” in many manufacturing sectors in California, they are not as “bad” as in these same sectors in the United States as a whole.

Nevertheless, some (especially many in the business community) believe that a significant portion of California’s loss in manufacturing base is attributable to statewide public policies that raise the cost of doing business in the State.

Is It in California’s Best Interest to Pursue Manufacturing Jobs?

Importance of manufacturing to the State goes beyond sheer magnitude and is also driven by the economic benefits that are offered to a larger degree in this sector than in others: multiplier effects, research and development capacity, high productivity, high income and benefits, and state/local tax revenue.

Policymakers should not embrace the expansion of all forms of manufacturing activity without a careful consideration of the economic benefits offered by it weighed against the environmental costs. This being said, yes, it is in California’s interest to retain many of the existing forms of manufacturing.

Factors Cited in Policy and Business Discussions as Being Important to Why California is Losing Manufacturing

A closer examination of two recent “business climate” studies that placed California at 45th and 49th in desirability reveals flaws in regard to a concentration on taxes alone and a biased weighting scheme.
California’s ranking of 28th in a recent CNBC business climate index is a more reasonable and is based upon these factors and weights: Cost of Doing Business (22%), Workforce (17%), Economy (16%), Education (12%), Quality of Life (12%), Technology and Innovation (7%), Transportation (5%), Cost of Living (3%), Business Friendliness (3%), and Access to Capital (3%).

What Previous Empirical Studies Have Found As Important Determinants of Intra-State Manufacturing Location

A business firm is most likely to locate in the jurisdiction that offers it the largest profit.

While lower wages appear attractive to a firm’s bottom line, they are not if less skilled and/or less educated workers are what caused them.

Empirical findings regarding the influence of unionization on industrial activity in a state are mixed, with a slightly greater number of studies finding a negative influence.

Transportation networks are almost uniformly observed in previous empirical studies to exert a positive effect on a state’s economic development.

The level of taxation imposed upon a manufacturing entity within a state may exert a negative influence on the amount of industrial activity observed in a state.

To a state policymaker asking whether an incentive program, in of itself, can stem the flow of existing manufacturing, we would respond in the range of “absolutely not” to “if pursued greatly enough, and in conjunction with other statewide industrial incentives, then perhaps only slightly”. A statewide economic development incentive program that resulted in an overall 10 percent decrease in business taxation is likely to increase manufacturing activity in the state by only 1.5 to 3.5 percent. A response of even this magnitude is predicated on other states not matching this state’s offers.

The Effect of Current California Business Climate on Manufacturing Investment

Doubt over the future of California’s skilled labor force is due largely to the under funding and perceived negligence of California’s career-tech facilities and vocational training programs.

Increased traffic congestion and lengthening transport times are growing worse due to both poorly maintained existing highways and a lack of building the necessary new highways to support the State’s continued growth.
The State’s manufacturing firms in particular are troubled by the higher than average electricity rates that exist in California as compared to other states and ever-rising costs of insuring their workers.

The top self-reported concerns facing California businesses are taxes, workers’ compensation costs and labor and housing costs.

**Suggested Policies to Retain/Increase Manufacturing Investment**

California’s manufacturing industries have weathered recent economic downturns more effectively than other states’ manufacturing across the nation.

This relative success could be short-lived, however, if steps are not taken soon to shore up the manufacturing sector.

Successful policies will work by minimizing the cost of doing business and focusing on variables that will help to increase productivity.

As discussed in this report, policies that address tax credits, transportation infrastructure, and worker training/education would help to address such concerns.
INTRODUCTION: THE RELEVANCE OF THE POLICY QUESTION

The State of California is a manufacturing powerhouse. In early 2007, over 1.6 million Californians were employed in manufacturing at over 27 thousand different firms (Central Valley Business Times, 4/3/07). This raw employment number is far above the next highest state of Texas that employs less than one million of its residents in manufacturing. Interestingly, if the five-county Los Angeles area and San Diego County were a state, its manufacturing employment would be just behind Texas (Business News Press Release, 3/29/07). California’s manufacturing employment makes up nearly nine percent of the entire country’s, and over 60 percent of this form of employment in the American West.

Manufacturing is undoubtedly an important element in California’s economy. It provides high paying jobs for nearly 10 percent of working Californians and generates about $150 billion in value added (final sales less intermediate input purchases). Compared to the 2004 California median income of slightly more than $37,000, the average annual income earned in manufacturing was $57,000 (Keystone Group, 2004, p. 10). Manufacturing employment offers an economic base for California’s economy (or a regional or local economy within the State). This base arises since a large majority of manufacturing output is sold outside the economy where it is produced. An inflow of dollars generated from manufacturing sales supports other manufacturing supply, service, and retail employment in the economy and generates what economists refer to as a “multiplier effect” – a dollar of manufacturing output sold provides more than a dollar of economic benefit. After considering this multiplication, studies estimate that manufacturing in California supports more than four million jobs and close to one third of the State’s total employment (Los Angeles Business Journal, 8/28/06).
Understanding the importance of manufacturing to California’s overall economic well-being, it is reasonable that state policymakers are concerned over some rather dismal trends related to it. California lost almost 400,000 manufacturing jobs between 1990 and 2003. In 1990, nearly 16 percent of employed Californians worked in manufacturing. Thirteen years later, this figure fell below 11 percent. A recent study of manufacturing firm movement between 1999 and 2003 found that California respectively lost 14, 23, 14, and 17 more firms to Oregon, Nevada, Arizona, and Texas than they gained (The Keystone Group, 2004. p. 6). The 2007 Directory of California Manufacturers recorded that the State entered its fourth straight year of overall factory losses and in 2006 alone over 1,500 manufacturing firms went out of business or left California, translating into job losses of over 24,000 (Central Valley Business Times, 4/3/07). As reported by the California Manufacturers and Technology Association (http://www.cmta.net), manufacturing employment between 2001 and 2006 declined by 19.9 percent, while a similar figure calculated for the whole country (absent California) declined by a smaller 17.0 percent.

When interpreting this doom and gloom it is important to recognize that the cause of much of these losses in California’s manufacturing activity are tied to national and international economic trends that are beyond the control of the State’s policymakers. We reach this conclusion based upon a complex, but well accepted method of “shift-share” analysis for the periods 1999 to 2001 and 2002 to 2005 that is fully described in this report’s appendix. Shift-share analysis allows us to separate the overall trend in activity in different California manufacturing sectors between the portion due to a national trend, and the portion due to a state-specific trend. For most of the manufacturing sectors examined in the State, forces unique to California have actually resulted in positive statewide trends as compared to
the negative national trends. A likely reason for this is the comparative advantage the State offers to manufacturing over other national locations. So there is statistically based evidence that although things still remain “bad” in many manufacturing sectors in California, they are not as “bad” as in these same sectors in the United States as a whole.

Nevertheless, some (especially many in the business community) believe that a significant portion of California’s loss in manufacturing base is attributable to statewide public policies that raise the cost of doing business in the State. The California Manufacturers and Technology Association reports that State business costs are 24.2 percent higher than the national average and thus contribute to the greater loss in manufacturing employment experienced in California than the rest of the United States.

Furthermore, a study commissioned by the Bay Area Economic Forum in 2005 notes the competitive challenges imposed by state policy upon California’s manufacturing firms that include: (1) unit labor costs that are 9.1 percent higher than national average – despite direct wages that are below, (2) worker’s compensation premiums that are near the highest in the United States, (3) energy costs that are over 60 percent higher than rest of United States, (4) only Pennsylvania having a higher corporate tax rate than California’s at 8.8%, and (5) California’s regulatory environment being far more stringent than other states (pp. 7 – 8). The Bay Area Economic Forum report estimates that these policies reduce the profit margins of manufacturing firms in California from 0.75 to 3.50 percent.

It also often mentioned in policy and business circles that high tech manufacturing in California has been hindered by the State’s scarcity of skilled workers (USA Today, 12/5/06). In addition, there exists a feeling in the business community that California’s decline in manufacturing employment has resulted in part by an increase in State legislation viewed as
detrimental to industry. In a 2004 study by The Keystone Group (pp. 10 – 11), it is documented that since 1995 there has been a substantial increase in the ratio of bills introduced or signed into law that were not supported by the California Manufacturing and Technology Association as compared to those that were.

The previous information offers the necessary background on why the California Governor’s Office has requested this report on the future of manufacturing activity in the State. In particular, the Governor’s Office is specifically seeking answers to the following questions:

(1) Is it in California’s best economic interest to create new and/or retain existing manufacturing jobs?

(2) Does the current business climate, especially California’s taxation policy on manufacturers, encourage or discourage companies from investing in California?

(3) Are there policies California can adopt to promote greater investment from manufacturing and technology companies?

(4) What kind of impact would such policies, including tax policies, have on the future vitality of California’s economy and society?

We generate answers to these questions through a multi-pronged approached. We look to recent studies that purport to rank the attractiveness of a state’s business climate. From these studies, we report on how California ranks and take a critical look at the factors and methodology used to generate these rankings. We earlier listed six of these factors mentioned in The Keystone Group (2004) study: labor cost, worker’s compensation premiums, energy costs, corporate tax rate, regulatory environment, and skilled labor. In this review, we look at the most often cited “cost of doing business” or “competitiveness” rankings to see if they use other factors not already included among these six. We then investigate the “real-world” importance of this expanded list of business location factors
through a review of recent empirical studies on what is actually important to the
determination of the distribution of manufacturing activity across the United States (and not
perhaps just by a business person in a survey as a lobbying exercise). Results of this review
are summarized in a table that indicates the range of expected effects and a reasonable
midpoint estimated effect (if any) of each of these factors on manufacturing location. These
findings provide the basis for our production of academically grounded answers to questions
(2) through (4) posed by the California’s Governor’s Office.

The next section begins the body of this paper with an answer to Question (1)
regarding whether it is in California’s best interest to try and encourage manufacturing.
Section 3 describes the factors most often cited in policy and business discussions as being
important to why California is losing manufacturing. The “meat” of our analysis is contained
in Section 4 in the form of a table that summarizes the findings of recent empirical studies on
what actually drives differences in state manufacturing activity. Section 5 summarizes the
academic consensus on what the “true” effects of variables most often cited in business
climate studies on manufacturing activity in California. We conclude the paper with our own
suggestions, based on the material presented here, for public policy changes that are likely to
increase (or at least maintain or slow the decrease) of manufacturing activity in the State.

IS IT IN CALIFORNIA’S BEST INTEREST TO PURSUE MANUFACTURING JOBS?

As described in the introduction, manufacturing clearly matters to California just
because of the scale of its activity in the State (1.6 million, or 10 percent of Californians are
employed in manufacturing). However, the importance of this activity to the State goes
beyond sheer magnitude and is also driven by the economic benefits derived from
manufacturing that are offered to a larger degree than offered in other sectors. These are (1) multiplier effects, (2) research and development capacity, (3) high productivity, (4) high income and benefits, and (5) state and local tax revenue. To make the case that it is in California’s best interest to pursue manufacturing jobs (or at least try to not adopt state policies that are expected to drive this employment sector from the State) a discussion of each of these benefits follow.

Multiplier Effects

Differences in multiplier effects arise because economic activity in a specific region (say a state) can be divided into “basic” and “non-basic” sectors. These two sectors are often respectively referred to as “export-based” and “non-export-based” sectors. Basic sectors, of which manufacturing is a part, sell a large percentage of their output outside of the state under consideration. Non-basic sectors, like service or retail industries, sell most of their output within the state under consideration. By selling output produced in a state to consumers outside of the state, new outside dollars are brought into the state’s economy. These outside dollars are paid to factors of production in the export-based industry (i.e., labor, raw materials, rents, and owner profits) and a large percentage of these payments are then further spent in the state, while some of these factor payments leak out of the state if spent on items produced outside the state’s boundaries. Money spent in the state is again spent on in-state and out-of-state items. This process continues and the progressive stream of in-state spending produces what economists have termed the “multiplier effect” whereas a
given change in earnings or employment in a specific industry produces a greater change in the same variable in the state’s economy.

Multipliers are higher for export-based sectors and they are also higher for industries that make greater use of materials from within California. Thus, statewide multipliers calculated for manufacturing activity tend to be higher than for non-manufacturing activity. Manufacturing can truly be considered a basic industry because it offers a foundation upon which an economy can rest upon. There are backward ties in the form of raw material and construction inputs purchased by manufacturing, and forward ties in the form of warehousing, transportation, wholesale, service, and retail activity generated by manufacturing production.

Using a complex process that maps the typical inputs and outputs of an industrial sector in California, the U.S. Department of Commerce has created a Regional Input-Output Modeling System (RIMS II) that illustrates the expected eventual effect of a one unit increase in either earnings or employment on these measures for the entire state (based upon 2002 data). Some of these multipliers are listed below in Table 1 (a full list can be found at http://www.labor.ca.gov/panel/pdf/Multipliers.pdf):

**TABLE 1: RIMS II MULTIPLIERS FOR STATE OF CALIFORNIA**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Earnings Multiplier</th>
<th>Employment Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Manufacturing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm Products and agricultural, forestry, and fishing services</td>
<td>2.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Construction</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Insurance</td>
<td>2.5</td>
<td>2.8</td>
</tr>
<tr>
<td>Hotel, amusement and recreation services, motion pictures</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Health Services</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>Earnings Multiplier</td>
<td>Employment Multiplier</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Non-Manufacturing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and Kindred Products and Tobacco Products</td>
<td>3.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Apparel and Other Textile Products</td>
<td>2.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Chemicals and Allied Products and Petroleum and Coal</td>
<td>2.8</td>
<td>4.4</td>
</tr>
<tr>
<td>Primary Metal Industries</td>
<td>2.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Industrial Machinery and Equipment</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Electronic and Other Electric Equipment</td>
<td>2.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Motor Vehicles and Equipment</td>
<td>2.9</td>
<td>3.5</td>
</tr>
<tr>
<td>Instruments and Related Products</td>
<td>2.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>

The sample above illustrates the fact that multiplier values for manufacturing industries are generally larger than for non-manufacturing industries. For instance, a job added to the retail trade sector in California is only expected to add 1.6 more jobs (including the original one added) to the entire California economy, while an additional job in the manufacturer of food products is expected to generate a total of four new jobs to the State’s economy. But at the same time, policymakers need to be aware that not all manufacturing multipliers are equally potent. An additional manufacturing job in a textile mill, printer, or plastic producer is only expected to generate a total of two jobs in the state; or an increase very similar in magnitude to the multiplier predicted for many non-manufacturing sectors.

Research and Development Capacity

The purpose of spending on research and development (R and D) is the discovery of more efficient production process that benefits a state’s economy in multiple ways. The first is through the use of fewer resources to produce a good or service. This increase in efficiency translates into a combination of a lower price for the product, greater wages paid
to workers producing the product, and/or higher returns for the owner of the production process. Though what should not be ignored are the secondary “spillover” benefits whereby innovation by one firm or industry benefits other firms or industries. Often times these spillover benefits are geographically specific and stay within a state (e.g., Silicon Valley). Tied to the greater incomes produced through these R and D innovations are greater earnings that are dispersed through a state’s economy by the multiplier process just discussed.

The importance of manufacturing industries to generating these research and development benefits in California is immediately seen by the fact that about two-thirds of total domestic private-sector R and D activities in the United States occur in the manufacturing sector (Popkin, 2003). A decline in California manufacturing activity, as compared to a similar decline in a different economic sector within the State, will therefore result in a greater decrease in R and D and the subsequent benefits it offers the State’s economy.

High Productivity

Active R and D spending by manufacturing has paid off in the form of greater productivity increases in this sector than in others. Productivity increases guarantee that more things can be produced with fewer resources. This increases the “value added” of a worker in manufacturing (the differences between the cost of material inputs and what the final output can be sold for) and subsequently what workers are paid. Between 1995 and 2001, labor productivity in U.S. manufacturing grew at annual rate of 4.2 percent, while the same productivity in the private non-farm economy only grew at 2.4 percent annually (Hersh
and Weller, 2003, p. 65). The greater increase in manufacturing productivity is likely due to advances in computer applications over this same period and the greater use of these applications in all forms of manufacturing. Gordon (2000) points out that much of the “New Economy” productivity increases were enjoyed in the manufacture of computers and electronic equipment.

High Income and Benefits

The high value added generated by the typical worker in the manufacturing sector allows the payment of relatively high wages and benefits to them. Table 2 offers information from the U.S Bureau of Labor Statistics (BLS) on the average wage earned by all employed in a selection of non-manufacturing industries and different categories of manufacturing industries (http://www.bls.gov/oes/current/oessrci.htm). Observe from this table that the overall mean annual wage earned in manufacturing of $40,320 is relatively high in comparison to the mean annual wages listed for non-manufacturing industries. Of particular note to the issue of whether California policymakers should continue to try and pursue/retain manufacturing jobs, are the mean annual wages listed for many of the sectors that Californians are likely to find a job in if they lose their manufacturing job: Agriculture, Forestry, Fishing, and Hunting ($22,960), Retail ($27,040), Real Estate and Rental ($36,020); Arts, Entertainment, and Recreation ($29,260). A similar story is told by Mishel et al. (2002) who found that in 2001 the average hourly compensation of workers in the U.S. manufacturing sector was $24.30, as compared to $19.74 in U.S. service industry sectors. Furthermore, the loss of manufacturing jobs in California, without a subsequent exodus of
manufacturing workers from the State, would put downward pressure on these already lower non-manufacturing wages and hurt Californians currently employed in these sectors.

**TABLE 2: MEAN ANNUAL 2006 CALIFORNIA WAGE FOR ALL OCCUPATIONS IN LISTED INDUSTRY**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Mean Annual Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Manufacturing</strong></td>
<td></td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing and Hunting</td>
<td>$22,960</td>
</tr>
<tr>
<td>Mining</td>
<td>$46,310</td>
</tr>
<tr>
<td>Utilities</td>
<td>$55,750</td>
</tr>
<tr>
<td>Construction</td>
<td>$41,950</td>
</tr>
<tr>
<td>Wholesale</td>
<td>$44,930</td>
</tr>
<tr>
<td>Retail</td>
<td>$27,040</td>
</tr>
<tr>
<td>Transportation and Warehousing</td>
<td>$40,340</td>
</tr>
<tr>
<td>Information</td>
<td>$51,860</td>
</tr>
<tr>
<td>Finance and Insurance</td>
<td>$51,150</td>
</tr>
<tr>
<td>Real Estate and Rental</td>
<td>$36,020</td>
</tr>
<tr>
<td>Professional, Scientific, and Technical Services</td>
<td>$60,590</td>
</tr>
<tr>
<td>Educational Services</td>
<td>$43,560</td>
</tr>
<tr>
<td>Health Care and Social Assistance</td>
<td>$41,050</td>
</tr>
<tr>
<td>Art, Entertainment, and Recreation</td>
<td>$29,260</td>
</tr>
<tr>
<td>Accommodation and Food Services</td>
<td>$19,650</td>
</tr>
<tr>
<td>Other Services</td>
<td>$31,680</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>$40,320</td>
</tr>
<tr>
<td>Food</td>
<td>$29,870</td>
</tr>
<tr>
<td>Beverage and Tobacco Products</td>
<td>$38,940</td>
</tr>
<tr>
<td>Textile Mills</td>
<td>$30,310</td>
</tr>
<tr>
<td>Wood Products</td>
<td>$30,660</td>
</tr>
<tr>
<td>Paper</td>
<td>$40,430</td>
</tr>
<tr>
<td>Printing</td>
<td>$37,510</td>
</tr>
<tr>
<td>Petroleum and Coal Products</td>
<td>$53,380</td>
</tr>
<tr>
<td>Chemical Products</td>
<td>$48,650</td>
</tr>
<tr>
<td>Plastic and Rubber Products</td>
<td>$34,390</td>
</tr>
<tr>
<td>Non-Metallic Mineral Products</td>
<td>$35,370</td>
</tr>
<tr>
<td>Primary Metal</td>
<td>$39,390</td>
</tr>
<tr>
<td>Fabricated Metal</td>
<td>$37,370</td>
</tr>
<tr>
<td>Machinery</td>
<td>$42,340</td>
</tr>
<tr>
<td>Computer and Electronic Product</td>
<td>$59,390</td>
</tr>
<tr>
<td>Electrical Equipment, Appliance, and Components</td>
<td>$39,230</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>$47,450</td>
</tr>
<tr>
<td>Furniture</td>
<td>$32,220</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>$38,910</td>
</tr>
</tbody>
</table>

### TABLE 3: PERCENTAGE OF WORKERS IN TWO TYPES OF INDUSTRIAL SECTORS RECEIVING A PARTICULAR NON-WAGE BENEFIT IN UNITED STATES

<table>
<thead>
<tr>
<th>Non-Wage Benefit</th>
<th>Goods Producing Industry</th>
<th>Service Producing Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Insurance</td>
<td>62%</td>
<td>49%</td>
</tr>
<tr>
<td>Short-Term Disability</td>
<td>53%</td>
<td>35%</td>
</tr>
<tr>
<td>Retirement</td>
<td>88%</td>
<td>83%</td>
</tr>
<tr>
<td>Medical Care</td>
<td>81%</td>
<td>72%</td>
</tr>
<tr>
<td>Dental Care</td>
<td>86%</td>
<td>75%</td>
</tr>
<tr>
<td>Vision Care</td>
<td>83%</td>
<td>72%</td>
</tr>
<tr>
<td>Paid Holidays</td>
<td>85%</td>
<td>74%</td>
</tr>
<tr>
<td>Non-Production Related Bonuses</td>
<td>55%</td>
<td>44%</td>
</tr>
</tbody>
</table>

State and Local Tax Revenue

A final reason that the continued presence of manufacturing activity benefits the State of California comes from the relatively high valued added generated in the sector. As already discussed, this translates into higher wages paid and higher corporate profits earned in the manufacturing sector in comparison to others. Popkin (2003, p. 23) reports that in the last decade, manufacturers have paid about one-third of all state and local taxes, social security and payroll taxes, excise taxes, import and tariff duties, environmental taxes, and license
taxes collected in the country. Though no specific estimates exist in regard to the percentage of California’s sub-national tax revenue originating from the manufacturing sector, it is very likely higher than in other states where reliance on the personal income tax and corporate income tax as sources of state general revenue is not as great. According to the California Legislative Analyst’s Office (http://www.lao.ca.gov/2006/cal_facts/2006_calfacts_pdf_toc.htm) these two sources of revenue respectively account for about 53 and 11 percent of the State’s 2005-2006 general revenue.

In this section of the report we have offered a description of why many forms of manufacturing activity offers heightened benefits to California’s economy. We would be remiss if we also did not mention that many forms of manufacturing activity could also impose heightened costs on California’s natural environment. We do not mean to imply that the State’s policymakers should embrace the expansion of all forms of manufacturing activity without a careful consideration of the economic benefits offered by it weighed against the environmental costs. This being said, and the need for it being carefully considered when looking at the desirability to the state of a specific manufacturing plant or industry, our general answer to the question posed for this section is that yes, it is in California’s interest to try and retain many of the existing forms of manufacturing in the State.

FACTORS CITED IN POLICY AND BUSINESS DISCUSSIONS AS BEING IMPORTANT TO WHY CALIFORNIA IS LOSING MANUFACTURING

The genesis of this paper is a desire by California policymakers to understand better the reasons why the State has lost manufacturing activity and what, if anything can be done to retain the remainder and even attract more. Reports generated by business and
manufacturing groups, such as those discussed in the introduction by the Keystone Group (2004) and Bay Area Economic Forum (2005), usually point to the higher cost of doing business in California as the reason that manufacturing has left California. State policymakers have all heard that California’s higher labor costs, worker’s compensation costs, energy costs, corporate tax rate, and a more stringent regulatory environment are the primary drivers of this higher cost and policy solutions involve reducing these business burdens in one way or another. In this section we wish to extend this discussion further by a closer examination of three recent “business climate” studies that all placed California in the bottom half of states in regard to desirability. The purpose of this examination is to uncover the variables and methodology that earned California this designation. In the next section of this report we then look to a literature review of academic studies to determine if these variables have actually been found to influence differences in manufacturing activity across the United States. That is we test if what business groups say as being important to whether a manufacturing firm locates in a state has actually been found to be important in the many data-driven and statistical studies on the subject.

The three business climate studies discussed here are the Tax Foundation’s (2004) State Business Tax Climate Index, Pacific Research Institute’s (2004) U.S. Economic Freedom Index, and CNBC’s (2007) America’s Top States for Business. Below the top state in which these studies found is best to do business in, California is respectively assigned rankings of 45th, 49th, and 28th. A brief description of the business location variables used in these rankings and how they were calculated for each study follows.
State Business Tax Climate Index

Created by the Tax Foundation, it is perhaps not a surprise that this analysis only uses 113 different tax variables to come up with its ranking of the 50 state business climates. These variables measure both the rates and bases of tax collection. All variables are placed into component indexes by scaling them each from zero (worst) to ten (best) based on how they contribute to the “competitiveness” of each state’s tax system in regard to the corporate income tax, individual income tax, sales tax, unemployment insurance tax, and property tax. Across these five component indexes, California did best on the property tax (16th) and worst on the individual income tax (46th). On unemployment insurance it was ranked 18th, while on the corporate income tax and sales tax it was respectively ranked 40th and 39th.

As an example of how this index is calculated, consider that the corporate tax rate index is created by looking at the top marginal rate (lower is better), taxable income level at which the highest rate kicks in (higher is better), number of tax brackets (less is better), and the average width of brackets (narrower is better). In a critical evaluation, Fisher (2005, p. 18) points out that the Tax Foundation’s interpretation of competitiveness is really all about “low taxes, and not neutral taxes”. In addition, he points out that nowhere are the multitude of tax preferences (investment and job tax credits, R and D tax credits, enterprise zones, foreign-source income, etc.) accounted for in this index. Fisher concludes (p. 28): “As a tool for assessing public policy, it is fatally flawed…”
U.S. Economic Freedom Index

The Pacific Research Institute (PRI) states that its Economic Freedom Index is designed to measure how friendly a state government is toward free enterprise and consumer choices. The purpose of trying to measure this friendliness is that people and businesses are expected to flee economically oppressive states. To calculate this overall index, scores are generated for each state through the use of 47 different variables spread over five different sectors (fiscal, regulatory, judicial, government size, and welfare spending) that PRI believe best capture the degree of economic oppression in a state. For each variable, each state is given a rank of one for the “most free” and 50 for the “least free.” The five sector scores for a state are simple averages of the ranks of variables included in the score. As an example, few of the eight variables included in the judicial sector measure are number of attorneys (fewer are better), compensation of judges (higher is better), terms of judges (shorter is better), and medical liability reform (caps on damages good, etc.).

PRI chooses not to report the specific rank of a state in regard to a sector, but instead lists whether a state was in the first group of 10 states from the top, second group, third group, fourth group, or fifth group. In the fiscal, regulatory, and welfare categories, California finished in the fifth or lowest group. In government size it finished in the second group, and in judicial it finished in the first group. In a somewhat biased weighting scheme that has been criticized by Fisher (2005, p. 55), PRI counts a state’s score in the fiscal, regulatory, and welfare spending categories much higher than in the two categories that
California did well on. This resulted in California’s receipt of its 49th ranking in regard to relative economic freedom among the states in 2004.

America’s Top States for Business

Completed in July of 2007, the final state business climate index discussed here is also the most recent. Two members of the CNBC newsgroup designed a study that they believe captures what states are better than others at attracting new business. They began this study by designating 10 broad categories that they felt captured the “competitiveness” of a state for business. These included: Cost of Doing Business (22%), Workforce (17%), Economy (16%), Education (12%), Quality of Life (12%), Technology and Innovation (7%), Transportation (5%), Cost of Living (3%), Business Friendliness (3%), and Access to Capital (3%). They then chose a total of 40 different variables (4 for each of the 10 categories) that they believe offer a measure of how states compared across these categories. Choosing not to weigh each of the 10 categories equally in the final calculation of their state ranking, the CNBC researchers decided to anonymously request a packet of economic development marketing materials from all 50 states and count the number of times each of the 10 categories are cited. This led to the relative weights that are listed in the parentheses next to each of the categories above.

California’s overall ranking of 28th was the result of applying the weights derived from the business marketing tools to the ranks given to California of 48th for business cost, 33rd for workforce, 6th for economy, 31st for education, 9th for quality of life, 1st for technology, 19th for transportation, 49th for cost of living, 48th for business friendly, and 1st
for capital access. All in all, the methods used in the derivation of this middling ranking for California are more balanced than in the other two studies. CNBC has appeared to capture in its choice of 40 variables spread across the 10 all of elements that could attract or repel a business (including a manufacturer) from the State. What is perhaps flawed in the CNBC methodology is the exclusive use of literature used by the states to promote their own economic development in developing the relative importance of the 10 categories. A state will emphasize in such literature what it hears business people saying as important to economic development. Thus, it is no surprise that business cost and regulation categories drive about two-thirds of the determination of where a state ranks. Academics who have worked in the statistical study of trying to determine what drives a business to locate in one place as opposed to another have long been skeptical of only soliciting the personal opinions of business people on this issue (see Anderson and Wassmer (2000, pp. 32-35); Bittlingmayer, Hall, and Orazem (2005), Courant and Fulton (1985), and Fisher (2005) as examples). The reason is that business people may view the opportunity to answer such a question not as an exercise in the truth, but as an opportunity to lobby for a public policy change that increases their bottom line. Thus, the preferred method of determining what really drives a manufacturing firm to locate in one state as opposed to another, and what public policies could be used to alter these decisions, is to look studies of real world data that correlate the observed relationship between explanatory variables thought to cause differences in business location (like those used in the CNBC study) to real world measure of differences in manufacturing activity across the states. We offer an extensive review of such studies next.
WHAT PREVIOUS EMPIRICAL STUDIES HAVE FOUND AS IMPORTANT DETERMINANTS OF INTRA-STATE MANUFACTURING LOCATION

Tiebout (1956) first proposed that if given sufficient diversity and mobility, citizens would willingly sort themselves by “voting with their feet” among communities (or even between states) based upon their preferences for sub-nationally provided goods and taxes. Citizens who preferred high (low) levels of public goods and correspondingly higher (lower) taxes would migrate to the community (or state) whose package of public goods and taxes best expressed the taxpayer’s own preferences. Within economics, Tiebout’s argument is still the most relied upon expression of what drives the location decisions of not only people, but also firms.

Since the purpose of this paper it to inform California’s state policymakers on the degree that variables under their control may have influenced the exodus of manufacturing activity from the State, we begin this section with a brief overview of how economists think about the location decision of a manufacturing firm. Next, we offer a review of the variables that theory indicates can influence a manufacturing firm’s location decision and could conceivably be altered by the actions of state policymakers. Finally, a more in-depth examination of certain studies particularly relevant to California follows.

The Location Decision of a Manufacturing Firm

A business firm is most likely to locate in the jurisdiction that offers it the largest profit. Differences in profit across jurisdictions is determined by differences in the market for the good or services the firm sells, differences in the availability and quality of needed
inputs, and differences in state and local government activities across jurisdictions that influence the firm’s profitability. State policymakers possess little ability to affect the market (either increase the number of demanders or reduce the number of alternate suppliers) for a firm’s product, limited ability to improve the input markets needed by firms, and the greatest ability to alter the sub-national government provision of goods/services that benefit business and the tax/regulatory policies that cost business.

Holding sales constant, profit maximization by a firm is the same as minimizing costs. Thus, businesses prefer lower taxes, lower labor costs, and less regulation that forces them to alter their production methods from the least costly. Everything else equal, firms also prefer high labor productivity and access to government provided infrastructure, goods, and services they use in production. Government provided inputs used in production allow a firm to produce the same amount of goods and services with less purchased inputs, thereby lowering costs and raising profits.

Most data driven studies that assess what variables influence where a manufacturing firm locate, and whether variables influenced by state public policy can exert an influence, rely upon on this model of profit maximization to determine which variables to examine. Next, we discuss several categories of the variables widely cited as likely to influence the location choice of a firm, and that can be either directly or indirectly influenced by the decisions of state policymakers. The specific influence of corporate income and business taxes is outlined in more detail in Table I in the Appendix. Specifically we exclude from this discussion those variables that could influence business location, but are clearly outside of a state policymaker’s control (e.g., climate).
Labor Costs

The relationship between the observed cost of labor in a state and the intra-state location decisions of manufacturing firms is not as clear-cut as one might think. While lower wages appear attractive to a firm’s bottom line, they are not if less skilled and/or less educated workers are what caused them. Using regression analysis, Bartik (1985) tested this question and did find (holding other location factors constant) that higher wages were a negative influence on the probability of locating a new branch plant in a state. Little (1978), deduced through a sound empirical study, that foreign investors were more likely to be influenced by state wage differentials than domestic investors, while Lugar and Shetty (1985) report similar results for foreign manufacturing firms. These findings contrast with Glickman and Woodward (1987) who observed that wage differentials across states did not affect the observed differences in the employment growth of foreign-owned firms across the states. Glickman and Woodward’s results may be explained by differences between domestic and foreign firms of what influences a firm’s profit. Because these studies have unfortunately controlled to varying degrees for the positive (higher skills, higher education, healthier, etc.) and negative (lack of labor supply, unionization, etc.) factors that can drive higher labor costs in a state, little consensus has been reached on the influence of high wages on the degree of manufacturing activity in a state.

---

1 A regression analysis is used to assess the marginal impact of one variable (say average) on a dependent variable (say some measure of economic activity) holding other influences on the dependent variable constant.
Some empirical studies have attempted to try and isolate the independent influence of the degree of statewide unionization on intrastate manufacturing location decisions. This was first attempted by Carlton (1979, 1983) who did not include a separate unionization variable, but did include a measure of whether a state had a “right to work” law restricting union activity. Later researchers narrowed their analysis by isolating the percentage of the private workforce that is unionized as a separate variable in their regressions. Bartik (1985) found that high unionization levels within a state serve as a strong deterrent to the formation of new branch plants. These results mirror those reported by Newman (1983) and Plaut and Pluta (1983) who reported an average union elasticity of about -0.4. Similarly, Woodward (1992) argues that foreign manufacturing firms perceive the presence of unions as an impediment to their own corporate “culture” and as such argues that unions serve to discourage foreign direct investment. Likewise, Glickman and Woodward (1987) discovered that the presence in a state of right-to-work legislation negatively affected the growth of foreign firms in that state.

Though in contrast, Coughlin, et al. (1991) find that higher rates of unionization are positively related to foreign direct investment. They note that this unexpected positive effect may be the result of an interaction between unionization and lower rates of unemployment. Beeson and Husted (1989) also found in an empirical study that higher rates of unionization were correlated with productive efficiency in manufacturing at the state level. This effect

---

2 Elasticity is the percentage effect in state and/or local business activity expected to occur after a one percent increase in state and/or local unionization rates in the labor force.

3 See Nakabayashi (1987) for anecdotal evidence.
can also be seen in Dalenberg and Partridge (1995) who find a very small, but positive and statistically significant effect for unionization on state business activity.

In summary, the empirical findings regarding the influence of unionization in a state on industrial activity in that state are mixed, but with a slightly greater number of studies finding a negative influence.

Unemployment

Given that the desired level of employment in a manufacturing firm fluctuates across the business cycle and employees are likely to be laid off, it is odd that more empirical studies have not assessed the influence of statewide requirements on unemployment insurance benefits in their analyses of firm location determinants. Feldstein (1976) did find that the amount a firm pays in unemployment premiums is related to the frequency with which its employees claim benefits. Feldstein observes that firms with a high turnover rate of employees are subsidized by less volatile firms. Coughlin, Terza, and Arromdee (1991) note that Feldstein’s argument would discourage firms with low turnover rates from locating in states where they would have to subsidize the unemployed former workers of other firms. Tannenwald (1997) found only two previous empirical studies that include workers compensation as an explanatory variable in a model predicting firm location: Bartik (1985) and Schmenner, Huber, and Cook (1987). Bartik found that the probability of a plant being located in a state was positively related to the state’s average workers compensation rate.

---

4 Unemployment insurance is rarely used as an independent variable in empirical studies examining firm location decisions. Coughlin, *et al.* (1991) mentions unemployment insurance to explain why the unemployment rate is not a good measure of labor availability across states and why underlying factors behind a high unemployment rate may actually deter foreign direct investment.
Schmenner, Huber and Cook found that high workers’ compensation rates were a significant deterrent to firm location.

Several studies have also examined unemployment rates to see if manufacturing firms are attracted or repelled by areas with a pool of available labor. Coughlin, et al. (1991) argues that states with high levels of unemployment are likely to see higher levels of foreign direct investment (FDI) to the extent that this unemployment represents a pool of potential workers. However, as pointed out in Ehrenberg and Oaxaca (1976), the unemployment insurance benefits paid to unemployed workers will also tend to increase unemployment rates by increasing the average duration of time spent unemployed and encouraging workers to seek higher paying employment.

Using regression analysis, Coughlin, et al. (1991) finds that foreign direct investors do look to the unemployment rate as a positive signal for available labor. However, Woodward (1992) and Dalenberg and Partridge (1995) find a significant and large negative effect of state unemployment rates on state business activity. Such conflicting results confirm the conflicting theoretical predictions of the effect (positive/negative) of statewide unemployment on statewide business activity and suggest that the nature of firm ownership (domestic/foreign) plays a significant factor in whether a large unemployment rate is perceived as a positive spatial characteristic.

Transportation Networks

By facilitating the movement of inputs from suppliers and goods to consumers, the transportation infrastructure of a state or region can significantly affect a manufacturing
firm’s profit margins and hence its location decision. Woodward (1992) argues that a measure of firms’ accessibility to regional and national markets is the presence of transportation linkages and finds evidence that greater linkages of this form are correlated with greater manufacturing activity. Interstate highways are perceived as especially attractive for firms, given their role in connecting non-urban counties to larger markets. Moriarity (1983) also found a similar role for transportation access in the location decision of foreign firms at the sub-state level. Bartik (1985) included a transportation variable in his study as a proxy for public services and found it exerted a positive influence on a measure of business activity.

Fisher (1997) reviewed the literature on transportation’s effects on economic growth, controlling for other public services such as highways, education, and public safety and found that nearly 70 percent of the studies he examined yielded a statistically significant and positive influence for transportation. Of the 15 studies reviewed by Fisher, eight reported a statistically significant positive relationship between the presence of transportation/highways in a state and the state’s economic development. For example, Luce (1994) concluded that sub-national public spending on transportation had a positive effect on economic development.

In marked contrast, Dalenberg and Partridge (1995) observed that highway and other public spending over a 15-year period had a negative effect on economic growth. Their work is of interest because it contradicts the majority of other empirical research – such as Bartik (1985) and Luce (1994) – which found uniformly positive (although not always statistically significant) relationships between economic growth/development and transportation. Dalenberg and Partridge’s research examines the effects of highway and other public
spending on employment both in the aggregate as well as for specific industries among metropolitan areas over a 15-year period. Their research addresses common problems among this area of research by including measures of all taxing and spending categories, correcting for unobserved area-specific factors, exploring disaggregated effects for particular sectors, and exploring the potential influence of public capital stock separate from marginal changes to that stock. Even with these theoretical and econometric cautions, they still find a significant negative relationship between highway spending and economic development. They attempt to explain their finding in three ways: perhaps the average effect of highways is positive but the marginal effect of highways is negative, or greater highway spending is a response to deteriorating highway stock and thus represent declining transportation services, or finally, highway service may only influence economic development at the state-level, not the metropolitan level.

With the exception of the findings recorded by Dalenberg and Partridge (1995), transportation networks are almost uniformly observed in previous empirical studies to exert a positive effect on a state’s economic development. This is not true of other types of public spending, such as education or public safety, where the empirical results are mixed.

Regional Markets

The effect of regional markets on the location decision of manufacturing firms would be dependent upon the location of consumers and input suppliers for individual manufacturing industries. Given California’s large, relatively concentrated population, its potential as a regional market for manufacturing is strong. The relatively dense population
provides not only a readily accessible market for final goods but also provides a readily accessible pool of labor for firms as well.

Sub-National Taxes

As discussed by the many previous reviewers (Anderson and Wassmer, 2000; Bartik, 1991, 1992; Fisher and Peters, 1997; Papke, 1993; and Wasylenko, 1997) of the extensive economic literature that have tried to assess the impact of sub-national taxes on business, the interpretation of tax findings for policy purposes related to business location must be done carefully. Many of these studies look at the impact of state and local taxes on economic activity or economic growth (as measured by employment or income growth), rather than specifically on business creation or location.

These studies report findings using the concept of elasticity, or the percentage effect in state and/or local business activity expected to occur after a one percent change in state and/or local taxes. Amacher and Ulbrich (1986) and Netzer (1997) note that policy makers and analysts need to understand that elasticities are only meant to be interpreted as the expected effect given only a very small change in the explanatory variable. Similarly, Papke (1997) warns that when looking at the results of empirical studies to only consider as relevant the casual variables that have been found to exert a “statistically significant” influence and even then to play close attention to the magnitude of the influence. Understanding these caveats, we have included a Table A1 in the appendix of this report that summarizes the tax elasticity of manufacturing activity found by previous studies that tried to assess the
influence of tax differentials observed across states on difference in manufacturing levels across states.

As noted by Luger and Shetty (1985) and many others, the importance that taxes exert upon business location decisions depends upon the type of industry being studied. Wasylenko (1997) observes that manufacturing industries are not as tied to locating in one region or state because they typically sell their products in national and international markets. Such firms are naturally more migratory and thus responsive to differences in cost factors influenced by sub-national government choices (such as taxes). This theoretical argument concurs with the findings of other researchers that manufacturing location decisions are more sensitive to taxes than non-manufacturing location decisions (Anderson and Wassmer, 2000; Fisher, 1997; Testa, 1989; Wasylenko and McGuire, 1985).

Research that studies the effect of taxes on economic growth focuses on detecting their influence at either the inter-regional (within a state or metropolitan area) or intra-regional (between states or metropolitan areas). The consensus that has developed among empirical researchers is that differences in the rate of taxation across potential locations within a region or state are much more likely to exert an influence on business location choices than differences between regions or states. As argued by Bartik (1991) and Anderson and Wassmer (2000), the reason being is that other factors that are likely to influence where a firm locates are more likely to be held constant across possible intra-regional or intra-state locations. Differences in taxes paid are more likely to be the swing factor in determining whether a firm chooses a location in one city as opposed to another in the same metropolitan area or same state. In support of this belief, Papke (1995) found that
for six Great Lake Region states, net of tax returns on investment for various types of manufacturing were similar enough that one state could not be preferred over another.

In a summary of this research, Wasylenko (1981) finds that taxes have a significant negative effect on business formation at the inter-state level. Newman (1983) observed state corporate income taxes also had an effect on business location decisions at the inter-state level. Further studies by Newman and Sullivan (1988) tentatively concluded that there also was a negative tax effect, but only under certain model specifications at the inter-state level. Bartik (1985) argued that state taxes on corporate profit had a negative and significant effect on manufacturing branch plant formation at the inter-state level. Helms (1985) argued that a state’s tax pattern would have a significant effect upon its ability to attract and retain businesses, particularly if the tax revenue is used to fund transfer payments. Papke and Papke (1986) find that tax differentials may play an important role in business location decisions with higher taxes consistently deterring business activity. Bartik (1989) examines the effect of taxes on start-up firms and also finds a statistically significant negative effect, particularly for property taxes.

More recently, Wasylenko (1997) identified 74 inter-regional and/or inter-state tax studies with most studies showing a negative tax elasticity of economic activity (i.e., lowering the tax rate would result in an increase in economic activity). Studies that found statistically significant negative elasticities include: Bartik (1989), Brown, Mieszkoki, and Syron (1980), McConnell and Schwab (1990), Munnell (1990), Papke (1991), and Wasylenko and McGuire (1985).

Phillips and Goss (1995) performed the only formal meta-analysis found in the literature on the effects of taxation on business location. This meta-analysis consisted of
gathering the tax elasticities reported as results in a wide variety of empirical studies and using them as dependent variables in a statistical regression analysis that uses important measurable differences in the studies as explanatory variables. Phillips and Goss performed this meta-analysis on the 81 studies that Bartik (1991) reviewed to better understand the relationship between state and local taxes and economic development. These results generally support the earlier discussed conclusions that the influence of taxes on business location is greater at the intra-region than intra-state level, and that taxes are more likely to influence the location of manufacturing firms than commercial firms. A review of the empirical literature reveals that in certain instances, the location decisions of manufacturing firm location can be influenced by the level of sub-national taxation.

When surveyed, it is little surprise that firms reflexively respond that lower taxes are a key variable in their location decision, and often the benefits that also accrue to them from the programs those taxes finance. It is for this reason that Wasylenko (1997) examines over 70 previous studies to ascertain the role taxes play in stimulating economic development by attempting to explain why the estimates of tax effects vary so widely across those studies. After discussing the non-fiscal variables (such as labor costs, energy costs, unions, and agglomeration economies) that previous studies have included in their analysis of what influences a firm’s location decision, Wasylenko then dissects how previous studies have included fiscal policy variables. He notes that how the quality/quantity of public services is measured, as well as the fact that certain industries may value some services and not others, can complicate the interpretation of different analyses. For example, most studies have reported that firms value transportation infrastructure and high-quality primary and secondary education for their ability to move inputs and goods and attract workers,
respectively, while government spending on welfare and prisons is not valued by firms. An additional complication is whether the measurement of fiscal policy variables is as nominal rates or by the ratio of revenue collected to personal income or population. He concludes that “the imprecision with which most explanatory variables are measured” is an on-going problem in this area of research and should be carefully considered when evaluating its published results.

In his review of those results, Wasylenko notes that the range of elasticities reported is fairly wide. There is an important lesson that emerges from the data, however. Intraregional studies consistently report higher elasticity values than inter-regional studies. This means that studies which analyze a smaller geographical area are likely to see less variation in non-fiscal variables since suburbs of a city will have access to the same labor force or transportation infrastructure and must distinguish themselves from potential competitors using fiscal policy measures. Inter-regional studies show lower tax elasticities, suggesting that non-fiscal factors play a more important role in attracting and retaining business on a larger geographical scale.

As seen in the summary Table 4 below, the preceding review of the literature revealed that a high rate of unionization, transportation networks, and regional markets have all been found to very likely act as attracters of manufacturing activity to a state. The problem with putting this information to use in crafting manufacturing friendly policies in a state is the difficulty and/or expense in manipulating these statewide variables in a manner that attracts greater or retains existing manufacturing activity. It has also been revealed that the level of taxation imposed upon a manufacturing entity within a state may exert a negative influence on the amount of industrial activity observed in a state. Though it is difficult and
costly to reduce manufacturing taxes across the board in a state, incentives can be offered to select firms. The next section of this report discussed the previous empirical findings in regard to the efficacy of such efforts at the state and local level.

**TABLE 4: VARIABLES AFFECTING FIRM LOCATION DECISIONS (AS PREDICTED BY EMPIRICAL LITERATURE)**

<table>
<thead>
<tr>
<th>Policy Variable</th>
<th>Predicted Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Costs</td>
<td><strong>Generally negative,</strong> though complicated by positive correlation between high wages and high labor productivity</td>
</tr>
<tr>
<td>Unionization</td>
<td><strong>Mixed results,</strong> though leaning to negative</td>
</tr>
<tr>
<td>Unemployment Rates</td>
<td><strong>Mixed results,</strong> though leaning to negative</td>
</tr>
<tr>
<td>Transportation</td>
<td><strong>Almost uniformly positive</strong></td>
</tr>
<tr>
<td>Regional Markets</td>
<td><strong>Positive</strong></td>
</tr>
<tr>
<td>Sub-National Taxes</td>
<td><strong>Negative but likely small influence</strong></td>
</tr>
</tbody>
</table>

State and Local Granted Economic Development Incentives

An additional factor that can influence the location of business activity, and one that state policymakers can control, is the offering of incentive packages and preferential tax programs to selected firms. Buss (2001) notes that there are political and economic justifications for such incentives. Chief among the political justifications is the pressure put on politicians by both corporate and labor interests to protect a state from losing existing business activity by either shielding current businesses from interstate competition or rescuing failing firms (see Ambrosius, 1989; Burnier, 1992; Noto, 1991; Wolman, 1988), as well as the need to attract new firms and hence jobs and tax revenue to a state (see Clingmayer and Feiock, 1995; Ledebur and Woodward, 1990; Spindler and Forrester, 1993; Wolman, 1988). Furthermore, many citizens, politicians, and economic development decision makers perceive tax incentive
programs as essentially costless since funding comes from tax revenue foregone, and not tax revenue collected and then spent.

Economic justifications for the use of incentives include addressing unemployment and industrial underinvestment. In their study of publicly funded sports stadiums, Noll and Zimbalist (1997) argue that incentives may direct resources to more productive employment in slack markets. Similarly, Bartik (1991) argues that incentives tend to redistribute income by redirecting economic activity to areas with a greater number of low-income individuals and thereby giving them employment experiences they would not have otherwise had and enhancing their lifetime economic prospects. Similarly, Noto (1991) argues that when property values and wages decline during economic downturns, but displaced workers do not out migrate, incentives can stimulate reinvestment.

It should be noted that most states prefer to not evaluate the benefits verses the costs of their tax incentive programs (Barnekov and Hart, 1993; Bartik, 1994; Buss and Yancer, 1999, Hartzheim, 1997). The National Conference of State Legislators (NCSL, 1997) found that “few states know the exact amount they spend on economic development initiatives.” This relative ignorance is widespread as Milward and Newman (1989) discovered in their study of the impact of state tax incentives on determining the ultimate location six new high-profile automotive plants in the 1980s. Likewise, Wiewel, Persky, and Felsenstein (1995) discovered few examples of cities in the Chicago area evaluating the type and amount of incentives offered to firms. In addition, a Council of State Governments study by Chi and Leatherby (1997) concludes that states were copying each other’s state tax incentive programs, without understanding the efficacy or effectiveness of such programs. Woodward (1992) empirically tested whether state efforts had a significant effect in influencing firm
location decisions. In both specifications of his model (excluding and including regional dummy variables), Woodward found that state incentive programs had no significant effect on the location decision of foreign manufacturing firms.

As described earlier, economic theory indicates that the expected effect of economic development incentives on sub-national economic activity depends on the degree of mobility of the business offered the incentive. In the empirical work just reviewed this is reflected in a clear difference in findings depending upon both the unit of analysis and type of business examined. Because of the greater likelihood of inter-regional mobility than intra-regional mobility, a greater response to economic development incentives have been found in data sets drawn from localities within a region than from date sets drawn from jurisdictions across different states/regions. Empirical analysis also shows that manufacturing activity is more responsive to abatement than commercial (and residential) because it is more “footloose” in its ability to chose alternate locations. Therefore, if asked to advise a sub-national policymaker on what to expect in regard to influencing economic activity through the offering of tax incentives in their jurisdiction, we would first need to know whether it was a state policymaker considering the affect of these incentive on the inter-state location of large manufacturing firms, or whether it was a state or local policymaker considering the affect of incentives on the inter-state or inter-metropolitan location of commercial firms (or small manufacturing firms or housing that were very unlikely to leave the state even if an abatement is not offered).

Realize that the advice that follows is not about whether granting abatement to one firm will make the difference in its location decision. Advice along these lines can only be made on a case-by-case basis and is best accomplished in the manner offered in Bartik et al.

---

5 The remainder of this section is drawn extensively from Wassmer (2007).
(1987) that involves modeling the cost factors important to a representative firm like it. The advice we offer to the administrator concerns the expected long-term impact on an aggregate measure of economic impact in their jurisdiction if incentives are pursued to a degree that they can be reasonably interpreted as cutting business taxation in that jurisdiction by a certain percentage below what it used to be before the incentive program began. Though policymakers do not like it, honest advice must also be given within wide margins of possibility due to the range of findings derived from both representative firm and regression analyses.

To a state policymaker asking whether an incentive program, in of itself, can attract new manufacturing to their jurisdiction or stem the flow of existing manufacturing out of their jurisdiction, we would respond that the existing evidence requires our response to be in the range of “absolutely not” to “if pursued greatly enough, and in conjunction with other statewide industrial incentives, then perhaps only slightly”. If pressed on a more exact response to the upper-end possibility, we would add a statewide economic development incentive program that resulted in an overall 10 percent decrease in business taxation is likely to increase manufacturing activity in the state by only 1.5 to 3.5 percent. And very importantly, a response of even this magnitude is predicated on the other states competing for this new manufacturing activity keeping their business taxes and incentives constant and not matching this state’s offers. The expected effect of an incentive program targeted at commercial or residential activity in the state would unequivocally be none.

To any sub-national policymaker asking whether an incentive program can reallocate manufacturing or commercial activity between localities within their state or within a metropolitan area in their state, we would respond that with some caveats the chances of this
happening are far greater than this program attracting new or retaining existing state business activity. Holding other factors constant, the evidence indicates that a ten percent reduction in overall local business taxation accomplished through incentives is likely to result in a long-term 15 to 20 percent increase in the local economic activity generated by firms that are mobile between communities. But in accepting these numbers, the policymaker must also realize that: (1) that the change is very likely “zero-sum” – one locality’s gain comes at the expense of another locality-within-the-state’s loss, (2) that the forecast change will only occur if state policymakers are diligent in restricting abatement and other business incentives to localities at a comparative advantage, and (3) a response of the magnitude predicted is for most manufacturing firms and only some commercial firms (like regional retail malls, auto malls, or large “big-box” stores whose market they serve consists of most of the region).

The benefits from a sub-national jurisdiction offering incentives arise due to an increase in economic activity that in turn could create more jobs for existing residents in the jurisdiction, more tax revenue for the jurisdiction, and greater agglomeration economies for existing firms in the jurisdiction. The potential costs of a jurisdiction offering an incentive that generates greater economic activity is that it can also generate further public service needs that are greater than additional revenue available after abatement to provide for them (fiscal stress) and a reduction in the physical environment of a community. Understanding this, the final bit of advice we would offer a policymaker considering the undertaking of a new incentive program geared to attract and/or retain manufacturing activity (or the expansion of a given one) is to fully and rationally weigh the likely benefits of the offered incentives against the likely costs. Incentives should only be offered if a healthy positive
margin exists between reasonable expectations of benefits compared to costs. Of note for such an assessment, empirical evidence was earlier offered by Mullen (1990) that a percentage increase in partial property tax exemptions (that occur through abatement) is also likely to yield a near equal increase in one measure of local stress.

Foreign Investment Research

Based upon its size, diversification, and geographic location, California’s economy is unique among the states. Given the sheer magnitude of California’s population and the possible market this creates for the goods or services produced by a firm, it is a viable target for foreign direct investment. In its analysis of how California public policy impacts manufacturing activity in the State, policymakers would be remiss to ignore the variables previously found to influence foreign investors.

Woodward (1992) examined the factors that determined the United States’ location decisions made by Japanese firms. He analyzed state and county level data to isolate the variables that Japanese manufacturing firms considered significant in their location decisions. The size of the regional market (represented by gravity-adjusted state personal income), the presence of a state office in Japan to attract foreign direct investment (FDI), and a state’s land area (i.e., a state with more potential sites has a higher probability of being selected) were all found to be positive influences on the probability of a Japanese firm choosing to locate in a state, while the degree of unionization in the state’s labor force and the presence

---

6 Anderson and Wassmer (2000, p. 147) offer an example of how to do this using data generated for a typical community in the Detroit metropolitan area.
of a unitary state tax system were negative influences. Also significant were regional
dummy variables that suggest that a state located in the Pacific Region of the United States
was more likely to receive Japanese FDI due to its close proximity to Japan, while the “auto
alley” of the East North Central and East South Central regions was also likely to see
Japanese FDI due to previous Japanese investment in the area and other agglomeration/input
economies. These results suggest that regional markets play an important role in the United
States location decision-making of Japanese manufacturers. States like California (and its
neighbor, Oregon) with a worldwide unitary tax on corporate income may have seen a loss in
investment during the time period studied; however, Woodward finds in his empirical
analysis that this loss was more than compensated by California’s location along the Pacific
Rim.

A variable’s ultimate effect does not exist within a vacuum. In making its location
decision, a manufacturing firm will consider many variables simultaneously, including a
state’s overall economic prospects. Next, we turn our attention to how California’s economic
and legislative environments are influencing manufacturing activity in the state.

---

7 Under a unitary tax system, an income tax is levied not only on income earned by the local branch of a
comppany but also by its parent and affiliated companies, regardless of whether the parents and affiliates are
located in the state or not. The purpose of such a tax system is to prevent a corporation from avoiding or
passing on the corporate tax. For example, a local plant of a global company can decrease its domestic reported
earnings by paying above-market prices to its parent company for intra-firm transfers of goods and services.
Twelve states imposed unitary tax laws during the 1980s. For more on this issue, please see Glickman and
THE EFFECT OF CURRENT CALIFORNIA BUSINESS CLIMATE ON MANUFACTURING INVESTMENT

The shift-share analysis described in the appendix indicates that in the last seven years California’s manufacturing firms have declined in step with manufacturing throughout the United States. Nevertheless, many of the State’s manufacturing sectors have exhibited a state specific component that indicates that they have done better than the same sectors throughout the country. These regional growth components are attributable to positive statewide factors unique to State. However, it is possible to identify some burgeoning problems that could undermine these positive statewide factors. We discuss these next.

Labor

California firms benefit from several key factors that generally help to reduce the cost of doing business in the state. As noted by Roger DeVol of the Milken Institute during the 2006 State of the State Conference, California’s firms generally enjoy high labor productivity. This productivity is in part the result of the State’s historic commitment to access to post K-12 higher education and training programs for all. However, the California Manufacturers and Technology Association (CMTA) recently expressed doubt over the future of this skilled labor force. This doubt is due largely to the under funding and perceived negligence of California’s career-tech facilities and vocational training programs. The CMTA notes that manufacturing firms are experiencing difficulty in hiring technically-skilled workers and foresees this shortage growing in the future without significant investment in these alternative higher education programs.
The Silicon Valley Leadership Group (SVLG) found that another labor concern is the increasing difficulty that high tech firms are having in hiring highly skilled labor. A 2005 business climate survey administered by the SVLG found that worker recruitment/retention costs was ranked among the top five costs of doing business among respondents; right in step with affordable housing costs for employees and health care costs. The survey results mirror the findings of Lowell (2004) and Dietz and Orr (2006). Lowell notes that there are increased business costs associated with lengthy searches and increased on the job training required to hire certain high skilled occupations. Such problems have been exacerbated since 2001 by increasing national-security restrictions that have limited the ability of firms to hire skilled labor for their U.S. operations; the difficulty to hire appropriately skilled labor has furthered interest in out-sourcing from California and the possibility of overseas production.

Transportation

A concern for high tech and low tech manufacturing firms alike is the relative high cost of living in California, making it difficult for manufacturing firms to attract and retain workers. This lack of affordability is attributable to the high cost of California real estate and the automobile dependence it generates as affordable housing creeps outward from employment centers. As evidence of this growing trend, the Public Policy Institute of California (2006) noted that nearly half of all commutes in California went from central employment places to the suburbs. Furthermore, while commute times for the typical worker dropped from 1990 to 2004, from 2004 to 2006 the average commute time increased by 10 percent.
In addition, California businesses face increasing costs arising from overall infrastructure degradation. Increased traffic congestion and lengthening transport times are growing worse due to both poorly maintained existing highways and a lack of building the necessary new highways to support the State’s continued growth. The American Society for Civil Engineers (ASCE) rated the State’s overall highway system as only a “D” in 2005 and reported that 71% of California’s roadways were in poor to mediocre condition. The Federal Highway Administration rated California’s roads the second worse off in the nation in its annual statistics. In 2003, the California Department of Finance estimated that it would cost $54.2 billion over 5 years to repair state infrastructure alone. For private citizens, the ASCE study also found that driving on poorly maintained roads cost private motorists $12.6 billion a year in extra vehicle repairs and operating costs, averaging $554 per motorist.

Costs of Doing Business

The State’s manufacturing firms in particular are troubled by the higher than average electricity rates that exist in California as compared to other states. As Jack Stewart of the CMTA noted in 2005, “electricity costs for larger manufacturers served by the three major investor-owned utilities remain nearly double the rates in neighboring states” (http://www.cmta.net/multimedia/stewart_testimony_20050209.pdf). Given that electricity is a primary component of many manufacturing processes, this represents a significant cost of doing business in California for manufacturing.

Additionally, manufacturing firms in California face the ever-rising costs of insuring their workers. The SVLG (2005) found that 47% of its survey respondents cited health care
costs as a significant cost of doing business. The California Healthcare Foundation notes that historically California enjoyed lower health insurance premiums than the national average. But California’s premiums have increased by double digits over the last four years and now approach the national average. Shouldering this burden causes the State’s manufacturing firms to decrease their employment or ask workers to bear a larger portion of their own health care costs in an attempt to maintain profitability. These increases in health care costs have eliminated a source of comparative advantage for California.

Business Regulation and Tax Credits

Manufacturing firms also express concern about several regulations in California, namely those governing workers compensation, the treatment of investment, the imposition of use taxes, and the regulation of overtime. While the State Legislature reformed California’s laws concerning workers’ compensation in 2003 and again in 2004, manufacturing firms still express dissatisfaction with these reforms, maintaining that the cost decreases are short run in nature and do not fully reflect the extended nature of such claims. A 2005 California Business Roundtable study, notes that the top self-reported concerns facing California businesses are taxes, workers’ compensation costs and labor and housing costs.

The State of California’s manufacturing investment credit, in place since 1994, expired in 2004. This tax credit exempted certain qualified purchases of manufacturing equipment from the full California state sales tax.8 Between 1995 and 2000; California

8 “Qualified property” is defined as property used directly in a manufacturing or other qualifying activity that is both tangible personal property and appropriate labor and leasing costs. In addition, special-purpose buildings
corporations claimed over $2 billion worth of these manufacturing tax credits. Two-thirds of
the respondents to a CMTA survey claimed that they had invested more in California as a
result of this tax credit. The previous exemption of these purchases from state sales tax was
significant because California is one of only four states that have such a tax. Ray Rossi
(2003) of Intel Corporation estimates that the expiration of this state tax credit has increased
the cost of investment in California by at least 6 percent and discouraged the State’s
manufacturing firms from engaging in needed improvements to machines and equipment and
therefore reduced the productivity of the State’s workforce. Combined with the expiration of
the manufacturing investment credit, manufacturing firms argue, and we believe reasonably
so, that these factors all discourage them from expanding or updating their facilities in
California.

Finally, California’s labor laws that are designed to protect workers, also limit the
flexibility of firms in managing efficiently their overall labor force requirements,
specifically, those governing overtime. Current law requires payment of overtime to a
worker if he or she has worked more than 8 hours in a 24 hour period, regardless of whether
or not the worker’s total weekly hours add up to more than 40 hours or not. Jack Stewart of
the CMTA notes that relaxing this restriction would allow manufacturing firms to engage in
flexible scheduling that would allow them to reduce overall costs as well as better address the
specific scheduling needs of their workers.

and foundations used in certain high-tech, bio-tech and biopharmaceutical activities qualify. Specifically
excluded from the credit is furniture, facilities used for warehousing purposes after completion of the
manufacturing process or to store finished products, and tangible personal property used in administration,
general management or marketing.
This report has shown that manufacturing firms chose a location based largely upon where they expect the highest return (profit) on their investment. This return varies between locations across the states due to factors out of the control of state policymakers and in part due to factors that state policymakers can in fact conceivably control. For example, California voters and policymakers have chosen since 1978 to privilege long-term firms under the statewide property tax system established by Proposition 13. For those manufacturing firms already in California with property land holdings, the overall tax climate is markedly superior to that faced by new entrants. The existing manufacturer need only pay property taxes based upon the acquisition value of their holdings, while the new entrant must pay taxes on their current market value of property.

While California does face relative disadvantages in the form of regulation and taxation, our comparison of the state specific manufacturing job changes between 2002 and 2005 reveals that all but two of the State’s manufacturing sectors gained employment across this period as compared to none of these same manufacturing sectors gaining employment at the national level. Further evidence for the differing nature of California manufacturing is revealed by results of the shift-share analysis shown in Table 5. This analysis reveals that many manufacturing sectors in the State have outpaced the rest of the United States for purely unspecified California-specific reasons.\textsuperscript{9} This is most evident is the Transportation, Apparel, Textile and Computer/Electronics industries that struggled nationally, but posted strong gains in California between 2002 and 2005. Additionally, Transportation and Fabricated Metal products stand out as industries with both strong state factors and increased

\textsuperscript{9} A detailed explanation of this shift-share analysis can be found in the appendix of this report.
national pressure for employment growth. Remember the relative strength of manufacturing in California even allows for states with significantly lower taxes, such as Nevada; or a more favorable regulatory environment, such as Arizona or Idaho.

**TABLE 5: 2002-2005 CALIFORNIA VS. NATIONAL MANUFACTURING SECTOR EMPLOYMENT**

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>National Job Change</th>
<th>National % Change</th>
<th>California Job Change</th>
<th>California % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>-1012000</td>
<td>-7.21%</td>
<td>192500</td>
<td>11.71%</td>
</tr>
<tr>
<td>Food and beverage and tobacco products</td>
<td>-75000</td>
<td>-4.61%</td>
<td>-2300</td>
<td>-1.20%</td>
</tr>
<tr>
<td>Textile Product Mills</td>
<td>-98000</td>
<td>-26.06%</td>
<td>5100</td>
<td>15.84%</td>
</tr>
<tr>
<td>Apparel Mfg.</td>
<td>-107000</td>
<td>-35.55%</td>
<td>30800</td>
<td>30.34%</td>
</tr>
<tr>
<td>Wood Product Mfg.</td>
<td>-2000</td>
<td>-0.35%</td>
<td>3600</td>
<td>8.91%</td>
</tr>
<tr>
<td>Paper Mfg.</td>
<td>-59000</td>
<td>-12.58%</td>
<td>4700</td>
<td>14.92%</td>
</tr>
<tr>
<td>Printing and Related Support Activities</td>
<td>-61000</td>
<td>-9.47%</td>
<td>13500</td>
<td>19.45%</td>
</tr>
<tr>
<td>Petroleum and Coal Products Mfg.</td>
<td>-7000</td>
<td>-6.42%</td>
<td>2000</td>
<td>12.99%</td>
</tr>
<tr>
<td>Chemical Mfg.</td>
<td>-51000</td>
<td>-5.92%</td>
<td>-300</td>
<td>-0.38%</td>
</tr>
<tr>
<td>Plastics and Rubber Products Mfg.</td>
<td>-44000</td>
<td>-5.56%</td>
<td>8500</td>
<td>13.39%</td>
</tr>
<tr>
<td>Nonmetallic Mineral Product Mfg.</td>
<td>-15000</td>
<td>-3.02%</td>
<td>500</td>
<td>1.09%</td>
</tr>
<tr>
<td>Primary Metal Mfg.</td>
<td>-39000</td>
<td>-8.50%</td>
<td>3400</td>
<td>12.64%</td>
</tr>
<tr>
<td>Fabricated Metal Product Mfg</td>
<td>-23000</td>
<td>-1.53%</td>
<td>20800</td>
<td>14.15%</td>
</tr>
<tr>
<td>Machinery Mfg.</td>
<td>-61000</td>
<td>-5.31%</td>
<td>11500</td>
<td>12.41%</td>
</tr>
<tr>
<td>Computer and Electronic Product Mfg.</td>
<td>-183000</td>
<td>-14.12%</td>
<td>53200</td>
<td>14.52%</td>
</tr>
<tr>
<td>Electrical Equipment and Appliance Mfg.</td>
<td>-62000</td>
<td>-14.45%</td>
<td>2300</td>
<td>5.76%</td>
</tr>
<tr>
<td>Transportation Equipment Mfg.</td>
<td>-54000</td>
<td>-3.06%</td>
<td>21600</td>
<td>15.70%</td>
</tr>
<tr>
<td>Furniture and Related Product Mfg.</td>
<td>-37000</td>
<td>-6.65%</td>
<td>6800</td>
<td>9.94%</td>
</tr>
<tr>
<td>Miscellaneous Mfg.</td>
<td>-34000</td>
<td>-5.22%</td>
<td>6800</td>
<td>7.20%</td>
</tr>
<tr>
<td>Durable Goods</td>
<td>-510000</td>
<td>-5.75%</td>
<td>130400</td>
<td>12.31%</td>
</tr>
<tr>
<td>Nondurable Goods</td>
<td>-501000</td>
<td>-9.67%</td>
<td>62100</td>
<td>10.62%</td>
</tr>
</tbody>
</table>

Even after considering California’s relatively educated labor force, its favorable geographic location and weather, its proximity to large input and output markets, and its overall “business climate” (which as shown earlier by reasonable measures is no worse than half the other states), there are still policy reforms that we believe policymakers should consider to encourage the retention of existing firms and attraction of new manufacturing
firms. These reforms require emphasizing the State’s advantages, while strategically targeting certain business policies that are particularly detrimental.

The rate of business taxation is an obvious target for policymakers and firms alike. For firms, higher rates of taxation mean less profit and higher costs of doing business, and taxes can be easily reduced to a single complaint to the State’s Legislators. According to Garrett and Wall (2006), of all the 50 states, California ranks fifth highest in its rate of corporate income taxation (behind Connecticut, Rhode Island, Minnesota, and Massachusetts) with a maximum rate of 9.3 percent. There are five states that have no corporate income tax (including neighboring Nevada). And while this number may seem significant, our review of the empirical literature on the effect of taxes on business location discussed earlier indicates that it does likely exert some influence on inter-state business location decisions, though not as large an influence as representatives in the business community like to claim.\(^\text{10}\)

The state policymaker interested in this issue may turn to industry specific tax incentives such as the recently expired Manufacturers’ Investment Credit. Renewing this tax credit has the advantages Buss (2001) describes in that the government is not collecting money to redistribute, thereby minimizing any administrative costs that would be associated with its collection. Proponents argue that such a tax would lower the cost of doing business for all manufacturing firms, regardless of longevity in California or size. However, the majority of such tax credits accrue to large corporations.

Buss (2001) cites a Washington state Department of Revenue (1996) study that analyzed the predicted and actual effects of a manufacturing sales tax deferral much like the expired California program. The manufacturing industry predicted 23,348 new jobs would

\(^{10}\) For a more detailed list of corporate income tax elasticities, please refer to the table in the Appendix.
be created from $3.2 billion of new investment. Accordingly, Washington deferred approximately $129 million in sales taxes over the course of a decade. But from this tax credit, only 5,997 new jobs were created and economically distressed areas saw negligible job growth.

Other options for policymakers include industrial revenue bonds (IDB) or targeted job tax credits. The empirical research on the impact of these programs is equally negative. The General Accounting Office (GAO) examined 68 projects in three states and found that 60% of the developers would have completed their projects in the absence of an IDB. Fisher and Peters (1997) note “The work on IDBs does not support any firm conclusions about the impact of IDB issuance and growth, although the majority of the evidence suggests little impact.”

While industry argues strongly for industry-specific tax credits and public spending programs, it is our opinion that those state monies may be put to better use in alternate government programs such as vocational education training or transportation. Rather than engaging in a dangerous race to the bottom of corporate taxation, state policy makers should pursue the long-held advice of fiscal policy researchers such as Feldstein and Vaillant (1994) to levy taxes with low marginal tax rates and broad tax bases.

A less obvious but equally important area of policy to consider is the labor needed by manufacturing firms and the issues facing workers such as affordable housing and education/job skills. Manufacturing firms increasingly are finding it difficult to hire the workers they need. For example, Jack Stewart, President of the California Manufacturers and Technology Association (CMTA) argued on Capitol Public Radio’s show *Insight* on July 25, 2007 that California needs workers who possess the skills necessary to enter the labor
force, which may or may not be obtained through traditional four-year institutions of higher education, quoting reports from the Public Policy Institute of California and the California Postsecondary Education Commission.¹¹ These skills could be fostered with state training programs, support of vocational education, and targeted spending on higher education.

Similarly, the issues of affordable housing and traffic congestion are concerns shared by all Californians, including manufacturing firms. As housing prices rise near employment centers, housing that middle and lower income families can afford is pushed to the urban fringe. Unless jobs are re-located from their traditional locations in the city centers to the suburban fringe, the placement of affordable housing creates a need for transportation infrastructure to transport workers between home and work. This issue indirectly affects all employers in California as their ability to hire and retain workers is diminished. If an individual faces a choice between California and another state with lower housing prices and less congestion, California manufacturing firms will lose. In addition, those workers in whom California has invested considerable resources through its public education system may also leave for states that are perceived to be cheaper, both in terms of commuting time and money.

It is within this context that empirical studies on migration literature may shed some light. While California enjoys economic advantages relative to its near neighbors, borne out by the results of our shift-share analysis, empirical research has shown that non-economic factors are also significant in determining overall migration rates. Beyond economic variables such as relative wages, employment strength and overall job opportunities, according to Glaeser and Shapiro (2003) the primary modern amenity attractors of labor are

¹¹ These reports are online at the following respective websites: http://www.ppic.org/main/publication.asp?i=750 and http://www.cpec.ca.gov/completereports/2006reports/06-19.pdf.
relatively lower personal/property crime rates, higher education levels, and strong social networks. These variables can be shaped by policy and serve to attract the skilled, productive labor that firms desire.

California is in a unique position to chart its future. Its manufacturing industry has weathered recent economic downturns more effectively than other states’ manufacturing across the nation. This relative success can be attributed to local competitive factors such as its skilled, highly educated labor force and its favorable geographical location. This relative success could be short-lived, however, if steps are not taken soon to shore up the manufacturing sector. These steps should make it advantageous to do business in California, regardless of a particular firm’s longevity in California. This perspective will make California appear as an attractive destination for firms that want to re-locate, in addition to retaining the manufacturing firms already located in state. Successful policies will work with a firm’s profit motive by minimizing the cost of doing business and focusing on variables that will help to increase productivity. As discussed in this report, policies that address tax credits, transportation infrastructure, and worker training/education would help to address such concerns.
REFERENCES


*USA Today* (12/5/06), U.S. Manufacturers Getting Desperate for Skilled People. B. Hagenbaugh


APPENDIX I

TABLE A1: ANNOTATED LIST OF STUDIES AT THE INTER-STATE LEVEL ANALYZING THE EFFECTS OF STATE AND LOCAL TAXES ON BUSINESS ACTIVITY

(Source: Bartik, 1991; Anderson and Wassmer, 2000; and specific studies completed after 2000.)

<table>
<thead>
<tr>
<th>Study</th>
<th>Business Activity Measure</th>
<th>Tax Measure</th>
<th>Long-Run Tax Elasticity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phillips and Goss (1995)</td>
<td>meta-analysis</td>
<td>meta-analysis</td>
<td>-1.25 controlled for fixed effects, -1.48 controlled for public services</td>
</tr>
<tr>
<td>Coughlin, Terza, Arromdee (1991)</td>
<td># mfg foreign direct investments, by state, 1981-83</td>
<td>state and local taxes per capita</td>
<td>2 specifications with results of -0.27 and -0.16 (average = -0.21)</td>
</tr>
<tr>
<td>Eberts (1991)</td>
<td># new plant openings, by MSA and industry, 1976-78</td>
<td>“taxes”</td>
<td>0.18 for all firms, 0.34 for small firms, -0.20 for large firms</td>
</tr>
<tr>
<td>Mullen and Williams (1991)</td>
<td>average growth rate of GSP, 1969-86</td>
<td>average state and local tax rates as % of GSP, marginal tax rate calculated by examining how taxes vary with GSP</td>
<td>-0.14</td>
</tr>
<tr>
<td>Crihfield (1990)</td>
<td>% change in MSA output, 1963-77 by mfg industry</td>
<td>state and MSA taxes per $ of income, property tax rate</td>
<td>-0.88</td>
</tr>
<tr>
<td>Luce (1990a)</td>
<td>shift effect in employment for individual mfg industries for 38 MSAs, 1972-77, 1977-82</td>
<td>ACIR tax effort index</td>
<td>-0.15</td>
</tr>
<tr>
<td>McConnell and Schwab (1990)</td>
<td>new auto branch plants in county, 1973-82</td>
<td>Wheaton effect business tax rate for state, property tax rate for county</td>
<td>-1.4</td>
</tr>
<tr>
<td>Mehay and Solnick (1990)</td>
<td>state employment, pooled time series cross-section data from 1976 to 1985</td>
<td>state and local taxes and fees per $1000 of personal income</td>
<td>long run elasticity -4.85</td>
</tr>
<tr>
<td>Study</td>
<td>Business Activity Measure</td>
<td>Tax Measure</td>
<td>Long-Run Tax Elasticity*</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Mofidi and Stone (1990)</td>
<td>change in mfg employment and investment, 1967-72, 1972-77, 1977-82, by state, pooled time series cross-section</td>
<td>taxes as % of personal income</td>
<td>-1.32 for mfg employment -2.59 for mfg investment</td>
</tr>
<tr>
<td>Munnell (1990)</td>
<td>state employment growth rate, 1970-88</td>
<td>state and local taxes as % of personal income</td>
<td>-0.66</td>
</tr>
<tr>
<td>Reynolds and Maki (1990)</td>
<td>new autonomous and branch plant establishments per 10,000 residents 1982-84 for 382 labor market areas in US, by various industry classifications</td>
<td>taxes per capita, 1972</td>
<td>positive effect for autonomous births in mfg and local industries negative effect for branch plants across all industries</td>
</tr>
<tr>
<td>Woodward (1990)</td>
<td># new Japanese branch plants by state, 1980-89</td>
<td>effective corporate income tax rate, presence of unitary tax</td>
<td>-0.14</td>
</tr>
<tr>
<td>Bartik (1989a)</td>
<td>state small business start rate by industry, 1976-78, 1980-82, pooled time-series cross-section</td>
<td>effective business rates for many taxes</td>
<td>-0.73</td>
</tr>
<tr>
<td>Bauer and Cromwell (1989)</td>
<td># new firm births divided by existing employment, 259 MSAs, 1980-82</td>
<td>effect state corporate tax rate</td>
<td>-0.61</td>
</tr>
<tr>
<td>Carrol and Wasylenko (1989)</td>
<td>% employment change by industry for each state, 1981-87</td>
<td>state and local taxes as percentage of income</td>
<td>-0.39 for total employment -1.25 for mfg</td>
</tr>
<tr>
<td>Crihfield (1989)</td>
<td>% change in aggregate MSA labor demand, 1963-77, by mfg industries</td>
<td>state and MSA taxes per $ of income, effective county property tax rate</td>
<td>-0.77</td>
</tr>
<tr>
<td>Study</td>
<td>Business Activity Measure</td>
<td>Tax Measure</td>
<td>Long-Run Tax Elasticity*</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Deich (1989)</td>
<td># small business starts and branch plant starts</td>
<td>effect corporate income tax rate and property tax rate</td>
<td>0.13 for small business 0.02 for branch plants (average = 0.07)</td>
</tr>
<tr>
<td>Duffy-Deno and Eberts (1989)</td>
<td>per capita personal income level, 28 MSAs, each year from 1980-84, pooled cross-section time series</td>
<td>state and local tax revenue divided by state and local tax capacity (from ACIR)</td>
<td>-0.27</td>
</tr>
<tr>
<td>Papke (1989a)</td>
<td>state GSP in 4 industries, 1975-82, pooled cross-section time-series</td>
<td>effective tax rate from AFTAX model</td>
<td>-0.74 for apparel -0.19 for furniture and fixtures 0.13 for printing and publishing -0.32 for electric and electronic equipment</td>
</tr>
<tr>
<td>Papke (1989b, 1986)</td>
<td># new plant births, by state, 1975-82, by industry, pooled cross-section time-series</td>
<td>effective tax rate from AFTAX model</td>
<td>-0.49 for communication equipment -0.13 for furniture -0.05 for apparel 0.08 for publishing 0.23 for electronic components</td>
</tr>
<tr>
<td>Testa (1989)</td>
<td>% change in total mfg and nonmfg employment, 1976-85, and mfg output</td>
<td>% change in per capita state and local taxes</td>
<td>-0.35 for total employment -0.93 for mfg -0.02 for nonmfg 0.04 for mfg output</td>
</tr>
<tr>
<td>Wasylenko (1988)</td>
<td>% employment change by industry for each state, 1980-85</td>
<td>state and local taxes as % of income</td>
<td>-0.13 for total employment -0.90 for mfg</td>
</tr>
<tr>
<td>Canto and Webb (1987)</td>
<td>annual % change in state per capita personal income, separate time-series analysis of each state, 1957-77</td>
<td>% change in state and local tax burden per $1000 of personal income</td>
<td>average elasticity -0.35 over all 48 states</td>
</tr>
<tr>
<td>Doeringer, Terkla, and Topakian (1987)</td>
<td>% growth in state employment, 1970-80</td>
<td>nominal corporate tax rate</td>
<td>-0.16</td>
</tr>
<tr>
<td>Gyourko (1987a)</td>
<td>labor intensity of MSA mfg base, 1972 and 1977</td>
<td>property taxes, payroll taxes, corporation income taxes</td>
<td>elasticity not comparable property taxes tend to increase labor intensity of</td>
</tr>
<tr>
<td>Study</td>
<td>Business Activity Measure</td>
<td>Tax Measure</td>
<td>Long-Run Tax Elasticity*</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Luce (1987)</td>
<td>absolute change in # high-tech jobs, by MSA, 1972-77, 1977-82</td>
<td>ACIR tax effort</td>
<td>-0.82 for 1972-77</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.18 for 1977-82</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(average = 0.18)</td>
</tr>
<tr>
<td>McGuire and Wasylenko (1987)</td>
<td>% employment change by industry for each state, 1973-77, 1977-84</td>
<td>personal taxes, sales taxes, corporate tax rate, effective property tax rate</td>
<td>units unclear</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>generally insignificant</td>
</tr>
<tr>
<td>Nakosteen and Zimmer (1987)</td>
<td>probability of mfg firm locating out of state, 1970-80</td>
<td>state corporate income taxes divided by state employment</td>
<td>-0.76 (wrong sign and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>insignificant)</td>
</tr>
<tr>
<td>Papke (1987)</td>
<td>new capital expenditure in state per production worker, by industry, for 1978</td>
<td>effective tax rate for representative firm, using AFTAX model</td>
<td>-0.17</td>
</tr>
<tr>
<td>Quan and Beck (1987)</td>
<td>state mfg employment relative to the national average, annual data from 1974-83, pooled cross-series time series</td>
<td>polynomial distributed lag in state and local taxes as % of personal income relative to national average</td>
<td>-0.95 for Northeast states</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.20 for Sunbelt states</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(average = -0.58)</td>
</tr>
<tr>
<td>Schmenner, Huber, and Cook (1987)</td>
<td>new branch plants and new branch plants that say they want low taxes</td>
<td>nominal corporate rate, property tax as % of personal income</td>
<td>-0.50 for all plants, -3.09 for plants desiring low taxes</td>
</tr>
<tr>
<td>Benson and Johnson (1986)</td>
<td>per capita mfg investment in state as share of US, 1966-78, pooled cross-section time-series</td>
<td>total taxes as % of personal income relative to US</td>
<td>-1.02</td>
</tr>
<tr>
<td>Harris (1986)</td>
<td>formation rate of high tech establishments, low tech establishments, and high tech branches in various MSAs, 1976-80</td>
<td>index of local taxes</td>
<td>0.12 for high tech branch formations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.31 for all high tech establ.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.49 for low tech establ.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(average = -0.40)</td>
</tr>
<tr>
<td>Place (1986)</td>
<td>annual state employment</td>
<td>state revenue per capita</td>
<td>units unclear</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sign varies w/specification</td>
</tr>
<tr>
<td>Study</td>
<td>Business Activity Measure</td>
<td>Tax Measure</td>
<td>Long-Run Tax Elasticity*</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Bartik (1985)</td>
<td>growth, 1972-84, pooled cross-section time series</td>
<td>effective corporate tax rate, property tax rate, UI tax rate, workers’ compensation tax rate</td>
<td>-0.45</td>
</tr>
<tr>
<td>Helms (1985)</td>
<td>state personal income, pooled cross-section time series, 1965-79</td>
<td>property taxes, other taxes as % of personal income</td>
<td>-0.39</td>
</tr>
<tr>
<td>Luger and Shetty (1985)</td>
<td># new foreign plant start-ups in 3 industries, 1979, 1981-83</td>
<td>weighted average of Wheaton business tax measure and personal tax rate</td>
<td>significantly negative for drugs significantly positive for motor vehicles</td>
</tr>
<tr>
<td>Summers and Luce (1985)</td>
<td>metro employment growth rate by industry, pooled over all mfg, 1967-77, 1977-83</td>
<td>MSA tax effort index from ACIR</td>
<td>-0.10 for 1967-77 0.05 for 1977-83 (average = -0.03)</td>
</tr>
<tr>
<td>Wasylenko and McGuire (1985)</td>
<td>% growth in total state employment and by major industry, 1973-80</td>
<td>tax effort, effective corporate and personal income taxes</td>
<td>-0.85 for total employment -1.54 for mfg employment</td>
</tr>
<tr>
<td>Armington, Harris, and Odle (1984)</td>
<td># business formations per 1000 workers and employment growth in MSAs, 1976-80</td>
<td>ACIR tax capacity index</td>
<td>formation rate/employment growth -0.25 for high-tech -0.89 for other mfg (average mfg empl growth = -0.55)</td>
</tr>
<tr>
<td>Gyourko (1984)</td>
<td>new mfg capital investment per $ of value-added, 42 cities, 1969-78, pooled cross-section time series</td>
<td>nominal state corporate tax rate, nominal local corporate tax rate, local income tax rate, effective property tax rate</td>
<td>not calculable</td>
</tr>
<tr>
<td>Yandle (1984)</td>
<td>% change in real value added in mfg by state, 1963-67, 1967-72, 1972-77</td>
<td>total state and local taxes per $1000 of income</td>
<td>-0.03</td>
</tr>
<tr>
<td>Carlton (1983)</td>
<td>probability of new branch location and plant size in various MSAs, for various</td>
<td>effective property tax rate, average of corporate and personal income tax rate</td>
<td>0.17 for plastics 0.00 for other industries</td>
</tr>
<tr>
<td>Study</td>
<td>Business Activity Measure</td>
<td>Tax Measure</td>
<td>Long-Run Tax Elasticity*</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Garofalo and Malhotra (1983)</td>
<td>responsiveness of long-run optimal state mfg capital stock, based on estimated cost functions, pooled cross-section time series</td>
<td>cost of capital term incorporates property tax rates and state corporate tax rates</td>
<td>-0.02</td>
</tr>
<tr>
<td>Newman (1983)</td>
<td>relative % growth in employment by state, for 2-digit mfg industries, 1957-65 and 1965-73, pooled cross-section time series</td>
<td>maximum marginal tax corporate tax rate, lagged 10 years</td>
<td>-0.26 more negative for more capital-intensive industries but not significantly so</td>
</tr>
</tbody>
</table>

* The long-run tax elasticity measures the expected percentage change in the respective business activity measure for a one-percent change in the respective tax measure. Long-run refers to the expected change after all expected adjustments have fully occurred. As an example, in the Bradbury, Downs, and Small (1982) research listed above as the last entry in Table A1, if the total local taxes paid per person in a metropolitan area rises by one percent over a ten-year period, the employment change in the metropolitan area is expected to fall by -0.13 percent over that same period. These results were calculated for data drawn from 1960 to 1970.
APPENDIX II

Shift-Share Analysis

Description of Traditional Shift-Share Components

Shift-share analysis focuses on separating the overall growth or decline in an economic variable for a region into a region-specific (or in this case, state-specific) component and a national component. Shift-share analysis is not a behavioral model; that is, it does not explain why a region grows or declines differently than the nation. It merely develops a framework for identifying these two components of growth or decline. Shift-share analysis uses set of identity equations, each of which depicts some aspect of economic growth.

Shift-share analysis does provide insights in evaluating the performance of a state or local economy. By identifying the industries that exhibit a positive comparative advantage (or whose region-specific growth component is positive), economic development practitioners can target these industries for retention or expansion.

The traditional shift-share model decomposes the growth of economic variables such as income or employment into their national and regional components (Selting and Loveridge 1993). The components of growth in California, within the context of national growth are:

1. the effect of the national overall growth rate component, or “national share” (N);
2. the difference in the industrial structure or composition of California and the nation, or the “industrial mix component” (IM);
3. the amount of growth not due to nationwide growth or industry wide growth or the “competitive effect” C.

The algebraic shift-share equation for these three components of growth occurring in the \( i^{th} \) sector and the \( j^{th} \) state during the period of analysis is:
(2002) \( \text{ChE}_j = \Sigma_n (N_{ij} + IM_{ij} + C_{ij}) \),

where:

- \( \text{ChE}_j \) is the actual growth in the “\( j^{th} \)” region;
- \( N_{ij} \) is the national growth by economic sector “\( i \)” in region “\( j \)”;
- \( IM_{ij} \) is the industrial mix component of economic sector “\( i \)” in region “\( j \)”;
- \( C_{ij} \) is the competitive effect of economic sector “\( i \)” in region “\( j \)” and
- \( n \) is the number of sectors in region “\( j \).”

**National Growth**

The national growth component reflects expected growth in the region, had it grown at the same rate as the nation. The national growth component is calculated by multiplying the base year employment in each economic sector by the growth rate of total national employment between the base year and terminal year. The national growth component is stated mathematically as:

\[
(2) \quad N_{ij} = E_{ij} \times n
\]

where:

- \( N_{ij} \) is the national growth component for the “\( i \)”th economic sector in the “\( j \)”th region,
- \( E_{ij} \) is the base year employment for sector “\( i \)” in region “\( j \),” and
- \( n \) is the growth rate during the period of analysis for all sectors in the nation.

The national growth component for the region is the sum of the economic sector’s national growth component in the region, or stated mathematically as:

\[
(3) \quad N_j \equiv \hat{a}_i^n NE_{ij}
\]

where:

- \( N_j \) is the national growth component for region “\( j \).”

65
Industry Mix Component

Industry mix refers to the initial industrial structure of a given region. The purpose of the industrial mix component is to measure the influence of fast or slow growing industries within a regional economy. If an area is growing faster than the national average, it may be due in part to a concentration of rapid growth industries. For example, the service sector of the national economy has been growing faster than all other national economic sectors. Given that a large proportionate share of California’s economy is in service related industries, it would not be too surprising to see California’s rate of economic growth far exceeding national growth. However, this might not be a sign of a healthy economy, because a reversal in this one economic sector could cause overall regional economic reversal. By isolating the industry mix component, it becomes clearer when positive and diversified growth is occurring.

The industrial mix component is stated mathematically as:

\[
(2002) \ IM_{ij} = \frac{E_{ij} \times (n_i - n)}{n_i}
\]

where:

- \(IM_{ij}\) is the industrial mix component for sector “i” in region “j”, and
- \(n_i\) is the growth rate during the period of study for sector “i” in the nation.

The industrial mix component for the region is the sum of the economic sector’s industrial mix components in the region, or stated mathematically as:

\[
(2002) \ IM_j = \sum_{i} IM_{ij}
\]

where:

- \(IM_{ij}\) is the industrial mix component for region “j”.
Competitive Component

This competitive component at the economic sector level is often considered the most important component in terms of regional development. A positive sectoral component (sometimes called the local or state share) is an indicator of a region’s competitiveness with other regions for a particular economic sector. The competitive component therefore is considered by many economists to be the dynamic element in regional employment increases and the main component to be considered in any economic development plan (Andrikopoulos 1977; Curtis 1972; Kalbacher 1979; Petrulis 1979).

The competitive component is stated mathematically as:

$C_{ij} = E_{ij} \times (r_{ij} - n_i)$

where:

$C_{ij}$ is the competitive component for sector “i” in region “j,” and

$r_{ij}$ is the growth rate during the period of study for sector “i” in region “j.”

The competitive component for the region is the sum of the economic sector’s competitive component in the region or stated mathematically as:

$C_j = \sum_{i=1}^{n} C_{ij}$

Where:

$C_j$ is the regional shift component for region “j.”
Shift-Share Analysis

We employed Shift-share analysis to examine the recent performance of California’s economy. We analyzed two periods, 1998-2001 and 2002-2005. The 2001 break is used to account for the economic difficulties and recessionary pressures the nation and California was experiencing at the time. The end point of 2005 is necessitated by the lack of more current data. Our analysis separates the growth explained by the mix of industries located within the state (i.e., the state’s industrial structure) and the growth attributed to particular regional influences. Shift share accomplishes this by comparing the actual growth rate of the state to the growth rate that would have occurred if every industry in California had grown at the national growth rate for that industry.\textsuperscript{12} The industry mix (IM) effect will be positive for industries that grew above the overall national average during the periods.\textsuperscript{13} The local factors (LF) effect will be positive if the industry in California out-performed the industry at the national level. Overall, when comparing California to the U.S. during the periods California benefited from competitive local factors that fought against dampened employment growth in national manufacturing sectors. This will become clearer as we further examine the tables below.

Table A2 decomposes California’s job growth in comparison to that of the nation’s employment as a whole. If California’s manufacturing sector grew at the same rate as national employment (which was positive in both periods) then jobs would have been created

\textsuperscript{12} Three criticisms are leveled against shift-share analysis: (1) calculation of the structural component takes no account of linkages between the industries of a region and that, for example a fast growing industry may promote growth in other industries which supply it, (2) industrial classifications are to some degree arbitrary, and (3) it offers no explanation of the residual or unexplained growth.

\textsuperscript{13} The national share (NS) concept simply measures the growth of an industry if it grew at the overall national rate. It is not particularly instructive for analyzing a region’s performance, but is necessary for the calculations.
in all manufacturing sub-sectors across both time periods. National Manufacturing growth however was significantly less than overall national employment growth in the rest of the nation’s sectors. This manifests itself in the Industry Mix columns during both periods, which reveal the downward decline of manufacturing industries relative to the economy as a whole in the nation. With rare exceptions, California’s unique competitiveness reverses the downward trend in manufacturing in both periods and one observes overall manufacturing increases for most sub-sectors in California across the two periods. The exceptions to the employment growth pattern in the most recent 2002-2005 period being Food, Beverage and Tobacco products and Chemical Manufacturing. Also of note from our shift-share analysis that:

- Manufacturing grows more slowly at the national level than the U.S. average, and employment concentrations in these industries in California were hurt by U.S. trends. In the case of manufacturing, positive local factors helped these industries grow.

- Durable Goods manufacture experiences the greatest decline nationally, however strong local factors help those sub-sectors outperform Non-Durable Goods manufacture.

- Computer, Transportation, and Apparel have the greatest percentage of employment growth between 2002-2005 in actual workers and in growth attributable to local factors.

Table A3 uses shift-share to examine the effect of the within manufacturing differences in employment attributable to either California or the sector itself. The national trend towards loss in manufacturing employment which manifested itself in the Industrial Mix columns in the previous tables is seen here in the National columns in this table. If employment in the manufacturing sectors in California “grew” at the same rate as the national manufacturing sectors did, then California would have lost jobs in all sub-sectors across both periods. Since California mostly gains manufacturing jobs during these two
periods, additional factors must be in play. The industry mix column provides evidence for the relative strength of weakness of each sub-sector versus manufacturing in general. As can be seen there are a number of sectors (i.e., Textiles; Apparel, Printing and Paper) that lose employment nationally at a faster rate than the manufacturing sector as a whole. There are other sectors such as Food, and Printing and Furniture that do better than the overall manufacturing rate. Thus, the industry mix column reveals California employment changes resulting from changes in the relative importance of each particular sub-sector nationally. The largest and most notable value here is the large employment loss component in 2002-2005 within the Computer and Electronics sector attributable to the increasing off shoring of such manufacturing nationally.

The Local Share column in Table A3 shows unique local factors at work. Here, similar to the first table, it is the state’s comparative advantage, which ultimately yields mostly positive employment growth within these manufacturing sub-sectors in California. This is particularly true in the Computer and Electronics, Transportation, and Printing sectors. Chemical Manufacturing is notable for being one of the few sectors to have negative local factors work against it in the 1998-2001 series and negative national factors in the 2002-2005 series.

- Though the Transportation, Apparel, Textile and Computer/Electronics industries struggled nationally, they posted strong gains in California. Transportation and Fabricated Metal products stand out as industries with both strong local factors and increased national pressure for employment growth.
• The greatest changes in local share factors between the two periods occur in the Food/Beverage sector (negative), Fabricated Metal Sector, Printing sector, Computer/Electronics sector, and the Miscellaneous Manufacturing sector. This indicates a strengthening of these sectors versus the others with the exception of the Food/Beverage sector.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30000000 Manufacturing</td>
<td>69624</td>
<td>-160025</td>
<td>140401</td>
<td>50000</td>
<td>38588</td>
<td>-149124</td>
<td>303036</td>
<td>192500</td>
</tr>
<tr>
<td>311000 Food and beverage and tobacco products</td>
<td>8918</td>
<td>-7562</td>
<td>-1955</td>
<td>-599</td>
<td>4496</td>
<td>-12939</td>
<td>6143</td>
<td>-2300</td>
</tr>
<tr>
<td>313000 Textile Product Mills</td>
<td>1236</td>
<td>-7049</td>
<td>9313</td>
<td>3500</td>
<td>756</td>
<td>-7413</td>
<td>11757</td>
<td>5100</td>
</tr>
<tr>
<td>315000 Apparel Manufacturing</td>
<td>3795</td>
<td>-24672</td>
<td>35277</td>
<td>14400</td>
<td>2382</td>
<td>-29001</td>
<td>57419</td>
<td>30800</td>
</tr>
<tr>
<td>321000 Wood Product Manufacturing</td>
<td>1740</td>
<td>-3063</td>
<td>3123</td>
<td>1800</td>
<td>948</td>
<td>-1091</td>
<td>3743</td>
<td>3600</td>
</tr>
<tr>
<td>322000 Paper Manufacturing</td>
<td>1282</td>
<td>-3620</td>
<td>4338</td>
<td>2000</td>
<td>739</td>
<td>-4259</td>
<td>8220</td>
<td>4700</td>
</tr>
<tr>
<td>323000 Printing and Related Support Activities</td>
<td>2744</td>
<td>-3510</td>
<td>5466</td>
<td>4700</td>
<td>1628</td>
<td>-7633</td>
<td>19505</td>
<td>13500</td>
</tr>
<tr>
<td>324000 Petroleum and Coal Products Mfg.</td>
<td>676</td>
<td>-1921</td>
<td>2145</td>
<td>900</td>
<td>361</td>
<td>-1291</td>
<td>2929</td>
<td>1999</td>
</tr>
<tr>
<td>325000 Chemical Manufacturing</td>
<td>3934</td>
<td>-5693</td>
<td>-4540</td>
<td>-6299</td>
<td>1872</td>
<td>-6330</td>
<td>4158</td>
<td>-300</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>--------------</td>
<td>-----------</td>
<td>-------------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>326000</td>
<td>Plastics and Rubber Products Mfg.</td>
<td>2592</td>
<td>-6054</td>
<td>6963</td>
<td>3501</td>
<td>1490</td>
<td>-4836</td>
<td>11846</td>
</tr>
<tr>
<td>327000</td>
<td>Nonmetallic Mineral Product Mfg.</td>
<td>2194</td>
<td>-1836</td>
<td>-2757</td>
<td>-2399</td>
<td>1079</td>
<td>-2430</td>
<td>1850</td>
</tr>
<tr>
<td>331000</td>
<td>Primary Metal Manufacturing</td>
<td>1171</td>
<td>-3802</td>
<td>2531</td>
<td>-100</td>
<td>631</td>
<td>-2738</td>
<td>5507</td>
</tr>
<tr>
<td>332000</td>
<td>Fabricated Metal Product Mfg.</td>
<td>6581</td>
<td>-13411</td>
<td>3930</td>
<td>-2900</td>
<td>3449</td>
<td>-5663</td>
<td>23014</td>
</tr>
<tr>
<td>333000</td>
<td>Machinery Manufacturing</td>
<td>3735</td>
<td>-10882</td>
<td>13048</td>
<td>5901</td>
<td>2175</td>
<td>-6852</td>
<td>16177</td>
</tr>
<tr>
<td>334000</td>
<td>Computer and Electronic Product Mfg.</td>
<td>14827</td>
<td>-32851</td>
<td>30624</td>
<td>12600</td>
<td>8595</td>
<td>-53918</td>
<td>98523</td>
</tr>
<tr>
<td>335000</td>
<td>Electrical Equipment and Appliance Mfg.</td>
<td>1486</td>
<td>-2451</td>
<td>4466</td>
<td>3501</td>
<td>936</td>
<td>-5975</td>
<td>7338</td>
</tr>
<tr>
<td>336000</td>
<td>Transportation Equipment Mfg.</td>
<td>5919</td>
<td>-15165</td>
<td>10747</td>
<td>1501</td>
<td>3229</td>
<td>-7320</td>
<td>25692</td>
</tr>
<tr>
<td>337000</td>
<td>Furniture and Related Product Mfg.</td>
<td>2656</td>
<td>-3287</td>
<td>6731</td>
<td>6100</td>
<td>1605</td>
<td>-5873</td>
<td>11068</td>
</tr>
<tr>
<td>339000</td>
<td>Miscellaneous Manufacturing</td>
<td>4142</td>
<td>-5870</td>
<td>3628</td>
<td>1900</td>
<td>2215</td>
<td>-6901</td>
<td>11486</td>
</tr>
<tr>
<td>31000000</td>
<td>Durable Goods</td>
<td>44440</td>
<td>-96647</td>
<td>80407</td>
<td>28200</td>
<td>24863</td>
<td>-82512</td>
<td>188048</td>
</tr>
<tr>
<td>32000000</td>
<td>Nondurable Goods</td>
<td>25184</td>
<td>-63091</td>
<td>59707</td>
<td>21800</td>
<td>13725</td>
<td>-65306</td>
<td>113682</td>
</tr>
</tbody>
</table>
TABLE A3: CALIFORNIA SHIFT-SHARE CALCULATED AGAINST U.S. MFG. EMPLOYMENT

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30000000</td>
<td>Manufacturing</td>
<td>-90401</td>
<td>0</td>
<td>140401</td>
<td>50000</td>
<td>-110536</td>
<td>0</td>
<td>303036</td>
</tr>
<tr>
<td>311000</td>
<td>Food and beverage and tobacco products</td>
<td>-11579</td>
<td>12934</td>
<td>-1954</td>
<td>-599</td>
<td>-12879</td>
<td>4436</td>
<td>6143</td>
</tr>
<tr>
<td>313000</td>
<td>Textile Product Mills</td>
<td>-1604</td>
<td>-4209</td>
<td>9313</td>
<td>3500</td>
<td>-2164</td>
<td>-4493</td>
<td>11757</td>
</tr>
<tr>
<td>315000</td>
<td>Apparel Manufacturing</td>
<td>-4927</td>
<td>-15950</td>
<td>35277</td>
<td>14400</td>
<td>-6822</td>
<td>-19796</td>
<td>57418</td>
</tr>
<tr>
<td>321000</td>
<td>Wood Product Manufacturing</td>
<td>-2259</td>
<td>937</td>
<td>3122</td>
<td>1800</td>
<td>-2716</td>
<td>2573</td>
<td>3743</td>
</tr>
<tr>
<td>322000</td>
<td>Paper Manufacturing</td>
<td>-1664</td>
<td>-674</td>
<td>4338</td>
<td>2000</td>
<td>-2117</td>
<td>-1403</td>
<td>8220</td>
</tr>
<tr>
<td>323000</td>
<td>Printing and Related Support Activities</td>
<td>-3563</td>
<td>2797</td>
<td>5466</td>
<td>4700</td>
<td>-4665</td>
<td>-1340</td>
<td>19505</td>
</tr>
<tr>
<td>324000</td>
<td>Petroleum and Coal Products Mfg.</td>
<td>-877</td>
<td>-368</td>
<td>2145</td>
<td>900</td>
<td>-1035</td>
<td>106</td>
<td>2928</td>
</tr>
<tr>
<td>325000</td>
<td>Chemical Manufacturing</td>
<td>-5107</td>
<td>3348</td>
<td>-4540</td>
<td>-6299</td>
<td>-5364</td>
<td>906</td>
<td>4158</td>
</tr>
<tr>
<td>326000</td>
<td>Plastics and Rubber Products Mfg.</td>
<td>-3365</td>
<td>-98</td>
<td>6963</td>
<td>3500</td>
<td>-4268</td>
<td>922</td>
<td>11846</td>
</tr>
<tr>
<td>327000</td>
<td>Nonmetallic Mineral Product Mfg.</td>
<td>-2848</td>
<td>3205</td>
<td>-2756</td>
<td>-2399</td>
<td>-3092</td>
<td>1742</td>
<td>1849</td>
</tr>
<tr>
<td>National Mfg. Employment</td>
<td>National</td>
<td>Industry Mix</td>
<td>Local Share</td>
<td>Total CA</td>
<td>National</td>
<td>Industry Mix</td>
<td>Local Share</td>
<td>Total CA</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------</td>
<td>--------------</td>
<td>-------------</td>
<td>----------</td>
<td>----------</td>
<td>--------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>331000 Primary Metal Manufacturing</td>
<td>-1520</td>
<td>-1111</td>
<td>2531</td>
<td>-100</td>
<td>-1808</td>
<td>-299</td>
<td>5507</td>
<td>3400</td>
</tr>
<tr>
<td>332000 Fabricated Metal Product Mfg</td>
<td>-8544</td>
<td>1714</td>
<td>3930</td>
<td>-2900</td>
<td>-9881</td>
<td>7667</td>
<td>23014</td>
<td>20800</td>
</tr>
<tr>
<td>333000 Machinery Manufacturing</td>
<td>-4849</td>
<td>-2299</td>
<td>13049</td>
<td>5901</td>
<td>-6231</td>
<td>1554</td>
<td>16177</td>
<td>11500</td>
</tr>
<tr>
<td>334000 Computer and Electronic Product Mfg.</td>
<td>-19252</td>
<td>1228</td>
<td>30624</td>
<td>12600</td>
<td>-24621</td>
<td>-20702</td>
<td>98523</td>
<td>53200</td>
</tr>
<tr>
<td>335000 Electrical Equipment and Appliance Mfg.</td>
<td>-1929</td>
<td>963</td>
<td>4467</td>
<td>3501</td>
<td>-2682</td>
<td>-2356</td>
<td>7337</td>
<td>2299</td>
</tr>
<tr>
<td>336000 Transportation Equipment Mfg.</td>
<td>-7685</td>
<td>-1561</td>
<td>10747</td>
<td>1501</td>
<td>-9249</td>
<td>5157</td>
<td>25693</td>
<td>21601</td>
</tr>
<tr>
<td>337000 Furniture and Related Product Mfg.</td>
<td>-3449</td>
<td>2818</td>
<td>6731</td>
<td>6100</td>
<td>-4598</td>
<td>330</td>
<td>11068</td>
<td>6800</td>
</tr>
<tr>
<td>339000 Miscellaneous Manufacturing</td>
<td>-5378</td>
<td>3650</td>
<td>3628</td>
<td>1900</td>
<td>-6345</td>
<td>1660</td>
<td>11485</td>
<td>6800</td>
</tr>
<tr>
<td>3100000 Durable Goods</td>
<td>-57702</td>
<td>5495</td>
<td>80407</td>
<td>28200</td>
<td>-71222</td>
<td>13573</td>
<td>188048</td>
<td>130399</td>
</tr>
<tr>
<td>3200000 Nondurable Goods</td>
<td>-32699</td>
<td>-5207</td>
<td>59706</td>
<td>21800</td>
<td>-39314</td>
<td>-12267</td>
<td>113682</td>
<td>62101</td>
</tr>
</tbody>
</table>