AN EVALUATION OF THE ECONOMIC IMPACT OF THE SEMATECH RESEARCH CONSORTIUM ON THE ECONOMY OF AUSTIN, TEXAS

BY

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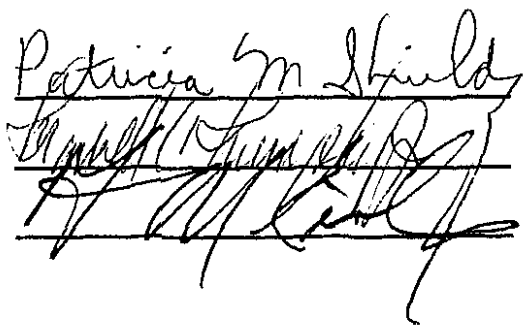

To

Virginia

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CHAPTER I: INTRODUCTION

During the last decade American cities have been increasingly concerned about economic development. Therefore, homegrown policies aimed at boosting a city's financial position are welcome by the community and encouraged by its public officials. In the eighties, high-technology become a popular source of potential new employment in the eyes of many localities. Public officials in Texas viewed high technology as a critical issue. The high technology sector, such as microelectronics and related industries, became the focus of great attention and hope. Many cities, including Austin, banked on a vibrant high technology research and manufacturing sector.

Austin attracted its first high technology consortium in 1983. In that year, the Microelectronics and Computer Technology Corporation (MCC)

announced that Austin would be the site for its world headquarters. The consortium would conduct research on advanced, new computer technologies.[1] Years later, the city would host another high technology research consortium. It would be the Semiconductor Manufacturing Technology Consortium (SEMATECH Inc.).

When the city's leaders expressed a rationale for attracting the SEMATECH research consortium, their arguments focused on economic development. Therefore, an evaluative analysis of the economic impact of the consortium on the city's economy offers an interesting and fruitful line of inquiry. Research consortia are a relatively recent phenomenon; both as a mean to encourage growth in a specific industry, and as a way to achieve economic development. Clearly, economic development was advanced as a preeminent justification for dispensing public funds in the form of economic incentives to attract the consortium to Austin. Attempting to determine whether the economic-development outputs of the consortium were worth the community's investment in attracting it should be an interesting and important question to explore.

The study examines the concept of economic development and various other economic analysis methodologies. It is performed as a one time policy-outcome-evaluation-case-study. To provide depth, it applies several economic analysis methodologies.

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[1] Scheps, Philip B., and Schechter, Lawrence A., "Financial Policy Considerations Under Conditions of Rapid Growth," Governmental Finance 12 (December 1983), p. 39.

Evaluation research is usually an applied endeavor intended to influence policy. Policy makers provide the definitions (including goals and proposed impact), operationalizations, and the research setting of the evaluation. Traditional evaluation methods rely on managers to define goals in quantitative terms, and obtain baseline data. Some authors advocate the use of additional evaluation criteria (evaluation goals from enabling legislation, or stakeholders, and the application of a theory).[2]

Wherever possible, the evaluation employs policy goals derived from local government and business leaders. It also borrows from theory to help define and operationalize vague goals (from public officials) and goals not derived from public statements. Four general policy objectives are evaluated. These are jobs, tax revenues, improved business prospects, and business investment.

The analysis begins in chapter two. This chapter presents a review of the scholarly literature covering the theoretical frameworks used in the study. These theoretical frameworks include general regional science theories as well as those theories in regional science that emphasize economic development and high technology. It also examines economic development theories that borrow from classical economic theory. Furthermore, it explores the economic development literature.

In addition, the literature review covers specific cost-effectiveness theories such as the cost-benefit analysis. It presents traditional economic

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[2] Schneider, "The evaluation of a policy orientation for evaluation research: A guide to practice," Public Administration Review. (1986), p. 356.

analysis theories; such as the economic base study, and the employment shifts and shares analysis. Finally, it examines evaluation theory and the case study methodology. The evaluation framework is used to tie it all together.

A setting chapter follows the literature review. This is chapter three. Chapter three provides historic and setting information about the microelectronics industry, the city of Austin and SEMATECH. It also explores some recent legal and policy issues.

Chapter four outlines the project's methodology. It expands on the methodological issues presented in the literature review. This is done to offer a better understanding of how the study was performed. For example, the main hypothesis of the study can be stated as follows: the SEMATECH research consortium will produce greater economic outputs as defined by the community's economic policy objectives and economic development theories. Chapter four defines how the aforementioned hypothesis is tested. Therefore, a positive evaluation would be found in response to favorable outcomes along several specific sub-hypothesis.

Chapter five presents the results of the sub-hypotheses tested and the overall evaluation. This chapter explores the results of the analysis and discusses its strengths and weaknesses. Results are graphically displayed wherever possible.

Chapter six offers a summary and discussion of the results obtained in the study. It also puts forth some tentative conclusions and avenues for further research. This is the concluding chapter.

CHAPTER II: LITERATURE REVIEW

THEORETICAL FRAMEWORKS

INTRODUCTION

During the last decade American cities have been concerned about economic development. Many cities have relied on their own tax and expenditure policies to alleviate fiscal stress.[3] Therefore, homegrown policies aimed at helping a city's financial position are encouraged by its public officials.

In the eighties, high-technology become a popular source of potential new employment. In Texas, public officials viewed high-technology as a critical issue. For example, the popular mayor of San Antonio was an advocate of high-technology.[4] The high-technology sector became the focus of much attention.

In 1987, Austin successfully attracted SEMATECH to the city. When the city's leaders expressed a rationale for attracting the SEMATECH research consortium, their arguments centered on economic development.

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[3] Carnevale, John T., "Recent Trends in the Finances of the State and Local Sector," Public Budgeting & Finance 8 (Summer 1988), p. 33.

[4] Cisneros, Henry G., "Promoting Prosperity Through Economic Development," Governmental Finance 12 (December 1983), p. 3.

Therefore, an evaluative framework could be applied to study the economic impact of the SEMATECH's research consortium on Austin's economy. To do this, this report begins by exploring the issue of economic development as well as various economic analyses evaluative methodologies. Then, an economic impact study is performed within the framework of a one-time policy outcome evaluation-case-study.

Generally two main, intertwined approaches address the issue of economic development. These, are the regional science perspective and the economic development perspective. Regional science and economic development theories provide the background within which the potential economic impact of the SEMATECH consortium may be assessed. From a methodological point of view, the economic assessment can proceed with such general tools of economic analysis as an economic base study, the employment shifts and shares analysis; as well as a cost-benefit analysis. The theoretical framework behind the use of the aforementioned economic research strategies, and the evaluation approach also provide tools with which to proceed.

GENERAL CONCEPTUAL FRAMEWORKS

REGIONAL SCIENCE THEORIES

The literature of regional science has devoted great attention to the general issue of economic development. Within this framework, one can make a distinction between economic development theories that offer an international economic development perspective (with or without

consideration for high-technology); and theories that focus on high-technology growth in industrialized countries like the United States.

Authors such as Allen and Levine relate that research on advanced-technology development has generally followed two traditions. The first is that of regional economic-development. The second is that about industrial site selection factors and decisions.[5] However, perhaps as a note of caution, Levine mentions that advanced-technology development theories are considered to be incomplete and unable to provide useful public-policy insight.[6]

Innovation and diffusion theories

Advanced technology-firm innovation and diffusion theories focus on innovation and competition as the driving mechanisms behind high-technology firms. These theories have not been fully integrated. They postulate that fast growing firms are early innovators that have flexible, daring managements, and use information sharing networks.[7] With the aid of these advantages, these firms manage to stay ahead of their competitors and stay at the forefront of technology.

There are at least two sub-categories of diffusion theories. The first category includes Regional Model theories that focus on space as a major

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5 Allen and Levine Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy, (New York, New York : Praeger publishers, 1986), p. 64,65.

6 ibid., p. 65.

7 Allen, David N., and Victor, Levine., Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy, (New York, New York : Praeger publishers, 1986), p. 65.

impediment to the flow of information and prefer a fully integrated space; and Contagion or Epidemic Models that suggest that nearby firms will adopt sooner and that the process will decay with distance.[8] The regional model theories focus on the impact of the distance between firms as a factor in innovation. The contagion models focus on the idea that nearby firms would be better able to emulate their neighbors and that in that manner they propagate innovation. Except for their focus both theories are similar.

Growth-Pole Theories

Growth-pole theories usually make distinction between areas of a country that gain high-technology firms and older industrial areas that lose them. This theoretical framework applies spatial environments and technology as its main analytical concepts.[9] The phenomenon described in these theories has occurred in most industrialized countries. The theory postulates that concentrated economic activity and agglomeration economies initiate growth-center conditions that spread to outlying areas.[10]

Life cycle and specialization theories

Product life cycle theories view an industrial sector as evolving through a series of stages. A life cycle begins with innovation; is

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[8] Ibid., p. 65.
[9] Ibid., p. 66.
[10] Ibid., p. 67.

followed by a growth stage, and ends in maturity.[11] Life cycle and specialization theories place more attention on the individual stages of technological development. Work is first performed in costly areas with facilities (research and development capacity), local markets, support networks, and skilled employees in an innovation stage. This is followed by a growth stage where product and process are similar; require less skilled labor; external markets grow, and production begins to move away from the growth stage area. In the third and final standardization stage, production costs bottom out, and low labor costs, and easily transferable technologies encourage movement away from the initial-high cost centers.[12] The innovative stage is the ideal stage for economic development.[13]

Organizational-labor market theory

Organizational-labor market theory adds the dynamic of labor to the product life cycle theory. Scott states that: ". . . the two major sources of agglomeration economies within high-technology growth centers are inter-industrial transactional structures and local labor markets."[14] He looks at inter-industrial transactions as the whole system of high-technology agglomeration economies existing in an area. These agglomeration economies consist of the industrial system of contractors and

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[11] Scott, Allen J., and Storper, Michael., "High Technology Industry and Regional Development: A Theoretical Critique and Reconstruction," International Social Science Journal 39 (May 1987), p. 219.

[12] Allen, David N., and Victor, Levine., Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy, (New York, New York : Praeger publishers, 1986)., pp. 67,68

[13] ibid., p. 68.

[14] Scott, Allen J., and Storper, Michael., "High Technology Industry and Regional Development: A Theoretical Critique and Reconstruction," International Social Science Journal 39 (May 1987), p. 230.

subcontractors vertically integrated and specialized, as well as the area's infrastructure and business climate.[15] However, these industrial transactional structures are complemented by favorable labor market characteristics. These labor market characteristics include a highly trained, technical labor force, low cost unskilled labor, a good business climate (in terms of low organized labor participation), and a climate amenable to the social interaction and reinforcement of the technical endeavors of the high-technology community.[16]

Agglomeration effects

Agglomeration effects are important considerations in any economic development strategy. In several of their theories various authors mention agglomeration effects. One way to look at the agglomeration economies of an area is in terms of the local market and economic base of the region. In this respect, industry location decision makers might be attracted to a region by its market and economic base characteristics and little effort would be needed by the community to attract outside industries there.[17] Most corporations prefer to locate closeby, and in an area with existing manufacturing plants; with the result that most multi-establishment corporations tend to be concentrated in single regions.[18]

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15 Ibid, p. 230, p. 220-230
16 Ibid.
17 Miller, Roger and Cote, Scott., Growing the Next Silicon Valley: A Guide for Successful Regional Planning, (Lexington, Massachusetts : D.C. Heath and Company, 1987), p. 118.
18 Ibid., p. 119.

Finally, self contained branch plants that may be attracted to a community by various "seek and find" efforts are scarce, represent a small proportion the total new jobs created in North America, have limited growth potential and can be expensive to attract in terms of time and effort.[19] This would suggest that the best strategy is to concentrate on improving the prospects for a viable agglomeration economy in the area that may offer large growth potential. This is something that public officials should be aware of.

Seedbed-incubator hypothesis theories

Other theoretical models, like the seedbed/incubator hypothesis, attempt to determine the geographical conditions under which new sectors of production form and are encouraged through an initial growth phase.[20] These theories focus on groups of factors that attract high-technology firms to a particular area. These factors usually include: the presence of universities with major science and engineering programs, access to international airports, nearby military bases, local access to venture capital, large populations of technical and scientific workers, and a superior quality of life.[21] Theories that use lists of factors as their foci of analysis appear to borrow from industrial location theories.

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19 Ibid., pp. 118,119.

20 Scott, Allen J., and Storper, Michael., "High Technology Industry and Regional Development: A Theoretical Critique and Reconstruction," International Social Science Journal 39 (May 1987), p. 218.

21 Scott, Allen J., and Storper, Michael., "High Technology Industry and Regional Development: A Theoretical Critique and Reconstruction," International Social Science Journal 39 (May 1987), p. 220.

ECONOMIC DEVELOPMENT THEORIES

Industrial Location theories

Location theories of economic development draw from the 'classical' approach to industrial location theory which in turn is derived from a micro-economic framework.[22] The firm is considered the unit of analysis in these theories. The focus is on the location's characteristics. There are two types of characteristics; one is the cost of overcoming space and the other refers to the unique characteristics of the area. Location studies are usually undertaken in the form of survey-based studies; including business-climate studies (which have similar methodologies).[23]

Various studies have been performed to determine which factors influence high-technology firm location decisions the most. Waugh and Waugh found that the most relevant factors were skills and availability of labor; with some factors tipping the balance between sites such as the tax climate and regulatory practices.[24] These results confirm the importance that high-technology endeavors place on human capital.

In a related example, the Massachusetts High Technology Council (formed in 1977) asked for a friendlier tax climate in that state.[25] They

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[22] Allen and Levine Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy, (New York, New York : Praeger publishers, 1986), p. 68.

[23] ibid., p. 69.

[24] Waugh, William L. Jr. and Waugh, Deborah M., "Baiting the Hook: Targeting Economic Development Monies More Effectively," Public Administration Quarterly 12 (Summer 1988), p. 232.

[25] Massachusetts High Technology Council., Lampe, David R., editor., The Massachusetts Miracle, (Cambridge, Massachusetts: The MIT Press, 1988), p. 155.

specifically focused on easing the tax burden on individuals; and conceded that the state's high tax climate created a situation where professional managers and engineers (then in a shortage) demanded as much as a twenty to thirty percent salary premium to work in Massachusetts.[26] The group members were high-technology companies around the area that has become known as Route 128 (in Massachusetts); and therefore, their views could be considered to be representative of high-technology companies. The group stated that the area's high cost of living was no longer offset by the proximity of MIT, Boston's venture capital markets or the cultural milieu of the area. They stated that other high-technology areas offered the same advantages with a better 'business climate.' They believed that the high cost of the area negatively affected high-technology industry startups and expansion plans in the state.[27]

Startup firms

There is no doubt that startup firms are important to economic development. Usually these firms are classified as small businesses. Although most new firms fail, a study of new firms in the eighties found that about half of new firms were projected to endure five years, thirty-eight percent ten years and thirty-one percent fifteen years. Nevertheless, they create the most jobs.[28] Not all fail. A few have the potential to become high level employers.

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26 Ibid., p. 160.

27 Ibid., p. 160.

28 Birch, David L., Job Creation in America: How Our Smallest Companies Put the Most People to Work., (New York: Collier Macmillan Publishers Inc., 1987), p. 18.

Economic development theories of urban development

Many of the economic development theories of urban development have an international focus. Hamm argues that theories of urban development and urbanization can be classified into two general approaches; convergence versus divergence theories. As such, these theories are usually applied to an understanding of international economic development. Convergence theories assume that third world urban development will follow the same basic pattern as development in Europe and North America.[29] On the other hand, divergence theorists argue that urban processes are culturally unique and shaped by specific cultural factors.[30]

Cultural factors

Other authors argue in favor of the importance of cultural factors in economic development. They propose that traditional economic development thinking has failed to consider culture either as a goal or as an instrumentality. They feel that it performs a crucial function (it helps maintain order) without which development could not proceed.[31] They point out that culture cannot be denied and that it performs important functions that, if improperly attended or neglected can impede development.[32] These authors emphasize the international aspects of economic development.

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[29] Hamm, Bernd, and Litsch, Martin., "Sunbelt versus frostbelt: a case for convergence theory," International Social Science journal, 112 (May, 1987), p. 200.

[30] ibid Hamm p. 201

[31] Dube, S. C., "Cultural Dimensions of Development," International Social Science Journal 40 (November 1988), p. 505.

[32] ibid., p. 507.

Political economy theories

Political economy theories of economic development have looked at economic development from two points of view; the neo-classical and the neo-marxist.[33] Some authors, with a third world point of view, decry the lack of progress in the field from both the neo-classical and the neo-marxist perspective. They ascribe both viewpoints to European perspectives that had their roots in European-western origins; but which do not apply to; nor have they attempted to, or managed to solve any development problems in the third world.[34] Indeed, the neo-classical approach has been dominant in the past two decades and has failed to show any real success in third world nations.[35] Therefore, these authors call for more and better research into the political economy of economic development.

Feiock's economic development dimensions

At the national level Feiock relates how local policy-makers seldom define exactly what they mean by "economic development." He states that it is often used synonymously with increased business activity, employment growth, new investment, larger incomes, greater revenues and an improved quality of life.[36] This makes it difficult to judge exactly what the intent of

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[33] Ake, Claude., "The Political Economy of Development: Does It Have a Future," International Social Science Journal 118 (November 1988) p. 485.
[34] ibid., pp.485,486.
[35] ibid., p. 491.
[36] Feiock, Richard C., "Local Government Economic Development Incentives and Urban Economic Growth," Public Administration Quarterly 12 (Summer 1988) : p. 141.

a policy of economic development may be. However, public statements may reflect political postures rather than clearly thought out goals.

Feiock has defined two closely related dimensions of economic development for a community. His first dimension is increased economic output. The second dimension is improved economic outcomes. The economic outcomes include higher personal income, an enhanced tax base and higher living standards. The development output is measured by business activity indicators; for example, changes in the population of firms, investment, and employment. These changes may be a result of the public policy incentives intended to stimulate local economic growth. The public policy incentives can be classified as the inputs.[37] Feiock's efforts offer a systems analysis perspective to economic development that can help to study the issue further.

THE HISTORY OF ECONOMIC DEVELOPMENT IN THE UNITED STATES

Economic development aid for cities has evolved during the past sixty years. In the nineteenth century, state governments concentrated their efforts on developing their natural resources and economies. Cities were expected to go at it alone. The states limited their role in city government to occasional political meddling and moral leadership in such matters as the regulation of alcoholic beverages.[38] The first programs to aid cities evolved out of the great depression. These included the WPA, PWA, and CCC

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[37] ibid., p. 142.

[38] Liebschutz, Sarah F., "Neighborhood revitalization in the United States: The decentralization dynamic," Public Administration Quarterly 14 (Spring 1990), p. 88.

public works and housing construction programs. Their main goal was to stimulate economic activity and increase employment.[39]

The beginning of the modern system

Widespread national support for housing and community development activities began with the enactment of the National Housing Act of 1949.[40] The Act spawned urban renewal with its emphasis on slum clearance and urban redevelopment[41]. This legislation started the process that we have come to know as aid to cities and economic development of cities.

The Housing Act of 1954 changed the previous emphasis on urban renewal and provided for neighborhood participation in the planning process.[42] However, the changes reflected a change of method rather than a reversal of previous public policy towards aid for the cities. The old tradition continued under the Housing and Urban Development Act of 1968; which introduced an annual funding system.[43] Overall, urban development policy toward American cities remained largely unchanged throughout most of the sixties.

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[39] U. S. Conference of Mayors, the National Community Development Association and the Urban Land Institute., Local Economic Development Tools and Techniques: A Guidebook for Local Government., (Washington D. C. : U. S. Government Printing Office, 1979), p. 13.

[40] Liebschutz, Sarah F., "Neighborhood revitalization in the United States: The decentralization dynamic," Public Administration Quarterly 14 (Spring 1990), p. 88.

[41] U. S. Conference of Mayors, the National Community Development Association and the Urban Land Institute., Local Economic Development Tools and Techniques: A Guidebook for Local Government., (Washington D. C. : U. S. Government Printing Office, 1979), p. 13.

[42] Liebschutz, Sarah F., "Neighborhood revitalization in the United States: The decentralization dynamic," Public Administration Quarterly 14 (Spring 1990), p. 89.

[43] ibid.

In the sixties, most programs emphasized urban renewal over economic development. The Demonstration Cities and Metropolitan Development Act of 1966 (the "Model Cities" Act) represented a fresh attempt to provide a broad approach; including funding for job training, and many other social services as well as physical improvements[44] The Model Cities program of 1966 was enacted to try to coordinate physical and social development actions and target them for distressed areas.[45] This was a departure from previous policy.

Grants and economic development

The Nixon administration began moving away from specialized categorical aid grants and towards general revenue sharing and special revenue sharing grants (community development block grants, comprehensive employment and training block grants, and Title IX EDA economic adjustment assistance grants).[46] This was the beginning of a major policy shift that would allow more money to be spent on economic development incentives. The Community Development Block Grant Program (CDBG) of 1974 restructured national urban aid programs and gave greater flexibility to local officials in implementing community priorities. The block grant consolidated seven existing programs into one formula-based grant program.[47]

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[44] Ibid.

[45] U. S. Conference of Mayors, the National Community Development Association and the Urban Land Institute., Local Economic Development Tools and Techniques: A Guidebook for Local Government., (Washington D. C. : U. S. Government Printing Office, 1979), p. 13.

[46] Ibid., p. 13.

[47] Liebschutz, Sarah F., "Neighborhood revitalization in the United States: The decentralization dynamic," Public Administration Quarterly 14 (Spring 1990), p. 90.

Economic development aid in the seventies and eighties

Overall, most of the federal aid for local urban economic development and business retention in the seventies came from: HUD's Community Development Block Grants and Urban Development Action Grants, the Economic Development Administration's program of public works and business development grants, loans, and loan guarantees, the Small Business Administration's loans and loan guarantees to business, the manpower training under the Comprehensive Employment and Training Act, and the support of Community Development Corporations by the Community Services Administration.[48] These programs provided the bulk of community development grants during this period and beyond.

In the eighties, the movement away from specific-program federal aid grants to block grants for the states continued. Some of these changes allowed economic development projects to be incorporated into the small cities CDBG (Community Development Block Grants) funding. In 1979, the Carter administration allowed communities to grant funds to public or private nonprofit agencies aimed at reducing physical and economic distress. This was followed by the Reagan administration's (1981 amendment) 'provision of assistance to private, for-profit entities' which encouraged more aggressive development programs.[49] The effect was to

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[48] U. S. Conference of Mayors, the National Community Development Association and the Urban Land Institute., Local Economic Development Tools and Techniques: A Guidebook for Local Government., (Washington D. C. : U. S. Government Printing Office, 1979), p. 14.

[49] Herzik, Eric B., and Pelissero, John P., "Decentralization, Redistribution and Community Development: A Reassessment of the Small Cities CDBG Program," Public Administration Review 46 (January/February 1986) p. 32.

shift more of the responsibility for economic development to the states. After OBRA81 (The Omnibus Budget Reconciliation Act of 1981), the states could take away from HUD all the administrative responsibility for the small cities program.[50]

State aid for economic development

Between 1948 and 1974, seventy percent (almost 12 billion) of all national aid to cities was provided by the 1948, 1954 and 1968 Acts.[51] Despite greater discretion, national involvement has declined. National aid to state and local government (including aid for economic development) declined in the 1980s. In 1978, aid to state and local governments amounted to seventeen percent of the national government's budget; it declined to ten percent in 1987.[52] As a result, some states have increased the size and scope of their involvement. The states provide aid for local economic development in the form of aid in advertising, information and technical assistance to new businesses, below-market rate loans and loan guarantees, tax incentives, grants to local government for development-related public works, job training program financing, roads or interchange construction, and other similar efforts.[53]

Enterprise zones in economic development

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50 ibid., p. 32.

51 Liebschutz, Sarah F., "Neighborhood revitalization in the United States: The decentralization dynamic," Public Administration Quarterly 14 (Spring 1990), p. 89.

52 ibid., p 105.

53 U. S. Conference of Mayors, the National Community Development Association and the Urban Land Institute., Local Economic Development Tools and Techniques: A Guidebook for Local Government., (Washington D. C. : U. S. Government Printing Office, 1979), p. 36.

A type of economic development program that has been widely associated with economic development goals has been enterprise zones. First promoted by U.S. Representative Jack F. Kemp (R -NY) and Robert Garcia (D-NY) in 1980, enterprise zones refer to small geographical areas of concentrated economic activity where small businesses are encouraged (with lessened financial and regulatory burdens); and in exchange, they are usually required to hire disadvantaged persons.[54] Enterprise zones have been prevalent in many cities in the past ten years. Florida was the first to enact an enterprise zone in 1980 as a response to civil disturbances in Miami.[55]

Economic development agencies and programs

As a practical matter, economic development programs and their agencies operate in a difficult political environment. To be successful, an economic development agency should foster good communications between city agencies involved in economic development, its clients and funding sources; cultivate broad-based support; be innovative; try to manage and reduce conflicts; and not be afraid to seek help from older better established economic development agencies.[56]

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[54] Revzan, Lawrence, "Enterprise Zones: Present Status and Potential Impact," Governmental Finance 12 (December 1983) p. 31.

[55] ibid. Revzan p 31.

[56] Cowles, Patrick J., and Sink, David W., "Implementation Problems in Urban Economic Development," Public Administration Quarterly 8 (Spring 84) pp. 88,89.

Regardless of economic incentives some authors contend that firms will not risk their investment resources in a physical location that does not receive adequate public services and facilities.[57] Adding physical resources to the community may or may not be possible. Nevertheless, the local infrastructure is still important.

WHAT IS A HIGH TECHNOLOGY FIRM?

High-technology has attracted great attention from governments in most industrialized countries. In 1983 the office of technology assessment singled out high-technology electronics as crucial to the economic growth and national security of the nation.[58] Many European governments also consider high-technology to be important. These governments have commissioned various studies to study and advise on the impact of high technologies on their economy and employment prospects.[59]

Most writers look at high-technology development; and technology in a positive light. However, some writers, worry about its possible consequences. These writers often call for a look at how high-technology affects management, public administration and politics.[60]

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[57] Mumphrey, Anthony J., and Moomau, Pamela H., "New Orleans: An Island in the Sunbelt," Public Administration Quarterly 8 (Spring 84), p. 108.

[58] Howel, Thomas R., Noellert, William A., MacLaughlin, Janet H., and Wolff, Alan Wm., The Microelectronics Race: The Impact of Government Policy on International Competition. (Boulder, Colorado : Westview Press,1988), p. 2.

[59] Hazewindus, Nico and Tooker, John., The U.S. Microelectronics Industry: Technical Change, Industry Growth and Social Impact, (New York, New York : Pergamon Press Inc., 1982), p. 165.

[60] Kroll, Norton., "Technological Change and Research in Public Administration," Public Administration Quarterly, 8 (Fall 1984), pp. 302-304.

The concept of a universal definition for high-technology and high-technology firms has been difficult to define. High-technology has been said to improve efficiency in producing existing goods and services and in producing new goods and services.[61] To this end a menu of characteristics has been offered to classify a high-technology firm. These characteristics include: a high percentage of technical and professional staff, intensive research and development, high value-added products, high growth rates, product competition in national and international markets, technology intensity, high levels of innovation and science based products and processes that are based on state-of-the art knowledge.[62]

COST EFFECTIVENESS

COST-BENEFIT ANALYSIS

Cost-Benefit analysis falls under the rubric of the neoclassical paradigm of economics. It is considered to be a part of cost effectiveness analysis. It has also been described as a sub-discipline (and technique) of operations research. Operations research may be the main discipline in management science; which involves an analytical approach to management, and development of a scientific rationale.[63] The analysis uses a 'Pareto-

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61 Allen, David N., and Victor, Levine., Nurturing Advanced Technology Enterprises: Emerging Issues in State and Local Economic Development Policy. (New York, New York : Praeger publishers, 1986), p. 28.
62 Ibid., p. 29.
63 Newton, Trevor., Cost-Benefit Analysis in Administration. (Oxford, England : George Allen & Unwin LTD, 1972), p. 15.

Better' criterion in which a project may proceed if the gainers (buyers) can compensate the losers (owners of the inputs used to produce the goods).[64]

Cost-Benefit analysis in the public sector entertains the same general notions as economic analysis in the private sector. Indeed, the private sector routinely makes use of cost-benefit analysis in its financial planning decisions. The objective of the analysis is to make optimal use of scarce resources. In the public sector, cost-benefit analysis attempts to find the most 'socially profitable' option.[65] That is the option that generates the most benefits over costs for the community. Having said this, it should be pointed out that many authors recommend that the results of the analysis should be used to help guide decisions and not as the only decision criteria.[66]

A historical perspective of cost-benefit analysis

Over recent years, Cost-Benefit Analysis has become an important element of the national decision making process. It has been important since President Johnson made it an integral part of his new budgetary techniques in 1965.[67] It dates back to the River and Harbor Act of 1902 that required the Army Cops of Engineers to evaluate federal navigation

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64 Schmid, Allan A., Benefit-Cost Analysis: A Political Economy Approach, (Boulder, Colorado : Westview Press, 1989), p. 2.

65 Galambos and Schreiber, Economic Analysis for Local Government, p. 62.

66 Strageldin, D. Salkever and Osborn R. editors, Evaluating Population Programs: International Experience with cost-effectiveness analysis and cost-benefit analysis, (New York, New York: St. Martin's Press, 1983), p. 7.

67 Campen, James T., Benefit, Cost, And Beyond: The Political Economy of Benefit-Cost Analysis, (Cambridge, Massachusetts : Ballinger Publishing Company, 1986), p. 1.

expenditures so as to identify commercial benefits and costs. Later, it gained widespread use with the Flood Control Act of 1936 where flood control projects were approved if their benefits exceeded their estimated costs.[68] Then, an interagency group was formed in 1946 to develop a consistent set of principles. The result was the Proposed Practices for Economic Analysis of River Basin Projects produced by the U.S. Federal Inter-Agency River Basin Committee's Subcommittee on Benefits and Costs in 1950 (revised 1958).[69] This unofficial manual was very influential. It was called the "Green Book," and its principles were later incorporated in the U.S. Bureau of the Budget's Budget Circular A-47 (1952).[70] The interagency-U. S. President's-Water Resources Council's Policies, Standards, and Procedures in the Formation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources (1962) replaced the Budget Circular A-47 as the authority on cost-benefit analysis throughout the sixties.[71]

The growth and acceptance of cost-benefit analysis continued throughout the seventies when it began to be applied to regulatory policies. In March of 1978, President Jimmy Carter signed Executive Order 12044; which required that major proposed regulations be "subjected to regulatory analyses that would identify the economic consequences of alternative responses, and that the least burdensome of the alternative alternatives be

68 ibid., p. 16.
69 ibid., p. 17.
70 ibid.
71 ibid., pp. 17, 18.

chosen."[72] Later, President Reagan's 1981 executive order (12291) specifically called for cost-benefit analysis as: "it specified the single evaluative standard of 'maximizing the aggregate net benefits to society,' implicitly rejecting a multiple-objective framework that might include environmental or distributional objectives as well as total net social benefits."[73]

Cost-benefit analysis theory

A basic premise of cost-benefit analysis is that there are always tradeoffs; even when one choice is to maintain the status-quo.[74] The process has been described as consumer information for public entities.[75] The analysis has three basic principles. The first is that all reasonable alternatives be investigated. The second is that each alternative be considered in terms of its full life cycle. The third is that money has value over time, and the analysis should express benefits and costs in terms of their present value.[76]

The cost-benefit procedure involves several specific steps. The first step is to define the objective. This is followed by generating alternatives, formulating assumptions, determining costs and benefits, comparing costs

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[72] Campen, James T., Benefit, Cost, And Beyond: The Political Economy of Benefit-Cost Analysis, (Cambridge, Massachusetts : Ballinger Publishing Company, 1986), p. 20.
[73] ibid. , p. 20.
[74] Research and Education Association, Handbook of Economic Analysis., (New York, New York: Research and Education Association, 1982), p. 2.
[75] Schmid, Allan A., Benefit-Cost Analysis: A Political Economy Approach, (Boulder, Colorado : Westview Press, 1989), p. 1
[76] Research and Education Association, Handbook of Economic Analysis., (New York, New York: Research and Education Association, 1982), p. 3.

and benefits and ranking alternatives; and finally, performing a sensitivity analysis to provide feedback and find where refinements might be needed.[77] Out of this a decision follows.

Cost Benefit Analysis adheres to the allocative economics concept that the value of an object is determined by what a person is willing to pay. Therefore, the concept of consumer surplus is very important.[78] Population and aggregate economic growth affect calculations of possible consumer surplus and should be carefully looked at (particularly with infrastructure projects).[79] In addition, there are various other important economic concepts to consider. These concepts include a resource owner's rent, opportunity costs, the distinction between benefits and transfer costs, possible double counting of benefits or costs, shadow prices and externalities among the most important ones.[80]

GENERAL ECONOMIC ANALYSIS

ECONOMIC ANALYSIS AND THE ECONOMIC BASE STUDY

Economic analysis is an essential component in the evaluation of an economic policy. Primarily, it can help to describe the economic framework within which the evaluation will begin and from which it will continue and end. An effective local development strategy requires a basic understanding

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77 ibid., pp. 4, 7.
78 Mishan, Edward J., Cost-Benefit Analysis, (New York, New York : Praeger Publishers, 1976), p. 24.
79 ibid., p. 46.
80 ibid., pp. 55-109.

of the local economy.[81] An economic analysis should provide the initial basic understanding. In addition, specific economic analysis can help determine which is most efficient or best expenditure for limited tax dollars.[82] The specific cost-benefit will help make this determination.

Jobs and employment are a vital resource for a community. Local employment is also a major concern of local policy makers. Galambos & Schreiber state that the basic issue for a local economy is jobs; including the maintenance of present employment, and attracting more jobs. This is because local government services depend on tax flows which are made possible by income from individual taxpayers.[83] Most of this income stems from the tax payer's job. A good starting point for developing an effective local economic development strategy is an economic base study.[84]

Regularly provided and accurate economic information about the local economy and its economic base should help local public officials and business leaders to make better decisions.[85] This is a major reason to conduct an annual economic base study. The United States Department of Commerce, Bureau of the Census publishes County Business Patters annually. This publication offers all the necessary data to conduct an economic base study as well as an economic shifts and shares analysis.

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81 Galambos, Eva., and Schreiber, Arthur F., Making Sense Out of Dollars: Economic Analysis for Local Government., (Washington, D.C. : National League of Cities, 1978.), p. 3.

82 ibid.

83 Galambos, Eva., and Schreiber, Arthur F., Making Sense Out of Dollars: Economic Analysis for Local Government., (Washington, D.C. : National League of Cities, 1978.) p. 5

84 ibid., p. 6.

85 Tiebout, Charles M., The Community Economic Base Study, (New York, New York : The Committee for Economic Development, 1962), p. 13.

The annual publication covers number of establishments, total employment, and payroll data on establishments whose main activity at each location had been previously classified.[86] In this manner, a breakdown by industry and industry sub-categories is possible. The data has been published since 1946 (although at irregular intervals before 1964); and the report series was revised and expanded in 1974.[87]

The economic base study identifies the key economic activities of the community and subdivides them into basic and non-basic sectors. The basic sector of the economy produces goods for sale outside the local area.[88] The basic industry export jobs are considered to be the primary driving mechanism behind job creation within the local economy.[89] With this information a local community can get an idea of where to focus its economic development efforts. Economic base studies can also provide the background for more specialized studies and help a community evaluate its progress towards various public goals.[90]

EMPLOYMENT SHIFTS AND SHARES

Employment shifts and shares analysis is used to determine if a local industry is losing or raising its share of employment relative to the

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86 U.S. Department of Commerce: Bureau of the Census, County Business Patters, 1987, Texas, (Washington D.C. : Bureau of the Census, 1990) p. v.
87 ibid.
88 Tiebout, Charles M., The Community Economic Base Study, (New York, New York : The Committee for Economic Development, 1962), p. 13.
89 ibid.
90 ibid. p.15.

national industry.[91] As might be expected a negative performance forecasts losses in employment and a positive performance would be ideal. Through its assessment of strengths and weaknesses in a community, economic shifts-and-shares analysis can help guide the creation of an effective local economic development strategy.[92]

EVALUATION RESEARCH

Evaluation research could be seen as an extension of what we do in everyday situations. Often, when confronted with a new, or somehow salient activity, object or situation, we attempt to evaluate it. As a research tool, evaluation research assesses program effectiveness to determine the extent to which program goals were accomplished.[93] As such, evaluation could take various forms. Some of the approaches that have been attempted in evaluation research include systems analysis, economic approaches and cost-benefit analyses, decision theory, as well as policy analysis and implementation studies.[94]

Nevertheless, evaluation research is still bounded by traditional rules or methods. These include the fact that evaluation research is usually an applied endeavor intended to influence policy; that the policy makers provide the definitions (including goals and proposed impact) and

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91 Galambos, Eva., and Schreiber, Arthur F., Making Sense Out of Dollars: Economic Analysis for Local Government., (Washington, D. C. : National League of Cities, 1978.), p. 6.

92 Ibid.

93 Adams, Gerald R., and Schvaneveldt, Jay D., Understanding Research Methods, (White Plains, New York: Longman Inc., 1985.), p. 317.

94 Schneider, Anne Larason, "The evaluation of a policy orientation for evaluation research: A guide to practice," Public Administration Review. 46 (July/August1986) , p. 357.

operationalizations of the program; and that the evaluation is limited to the research setting of the intervention program.[95] Overall evaluation research is a form of applied research.[96]

Types of evaluation research can be separated into three categories. The categories are process evaluation (also called formative evaluation), outcome evaluation (also called impact evaluation or summative evaluation), and monitoring[97]. The study will borrow from the outcome evaluation paradigm to assess the economic impact of the project.

The traditional evaluation approach relies on managers to provide goals in quantitative terms, and obtaining baseline data that later is used as a standard against which to judge the outcome of the evaluation[98]. This approach is probably the one that the layman and working bureaucrat is most familiar with. Schneider advocates the use of some additional evaluation criteria such as determining goals to evaluate from enabling legislation, constituencies, stakeholders and the application of a theory[99].

Three specific evaluation criteria have been identified from official statements. These criteria are jobs, an improved employment base, and added tax revenues. At SEMATECH's grand opening Mayor Lee Cooke stated

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95 Adams, Gerald R., and Schvaneveldt, Jay D., Understanding Research Methods, (White Plains, New York: Longman Inc., 1985.), p. 317.
96 Babbie, Earl., The Practice of Social Research., (Belmont, California: Wadsworth Publishing Co., 1986) p. 298.
97 Schneider, "The evaluation of a policy orientation for evaluation research: A guide to practice," Public Administration Review. (1986), p. 356.
98 ibid., p. 356.
99 ibid.

that the consortium had improved the city's employment base and would: "... boost people who might have gone out of business.[100]" His reference to helping businesses that might have otherwise failed clearly shows that one of the objectives of city officials was an improved economic base.

TABLE 2.1 EVALUATION CRITERIA FOR SEMATECH AS OF THE END OF 1990.

Measures of Economic Activity	Objective if specific	Aspect of Theory or public statements	Expectation
ECONOMIC BASE STUDY		Economic Base Theory	↑ export jobs
EMPLOYMENT SHIFTS AND SHARES STUDY		Employment Shifts and Shares Theory	↑ share
JOBS		Feiock***	Higher
	960 jobs*	public statements	960 jobs
FIRMS		Feiock***	Higher
TAXES		Feiock***,	Higher
	42.8 million**	public statements	$42.8 million
BUILDING PERMITS		Feiock***	Higher
COST/BENEFIT		Cost-Benefit Theory	Benefits > Costs

Note:
* This figure is obtained by multiplying 2,400 jobs by two fifths.
** This figure is obtained by multiplying the 150 million by two sevenths.
***This refers to Feiock's theory described earlier.

In the same ceremony then chief economist for the Austin Chamber of Commerce, Angelos Angelou, stated that he expected about 2,400 spin-off jobs within five years and additional state and local revenues of 150 million dollars by the middle nineties[101]. These expectations about the economic impact of the consortium on the local economy may be used as evaluation goals (see Table 2.1).

[100] Pope, Kyle., "SEMATECH Opens with High Hopes" Austin American Statesman, 11/16/90, p. A11.
[101] Pope, Kyle., "SEMATECH Opens with High Hopes" Austin American Statesman, 11/16/90, p. A11.

Additional evaluation criteria can be borrowed from the theoretical literature. The short matrix in Table 2.1 outlines how such an evaluation analysis could proceed. Using a straightforward division of the publicly stated expectations; evaluation criteria for the end of 1990 (two years after its dedication) were determined.

A second evaluation goal (as of the end of 1993) was also determined for the cost-benefit analysis. It would use the evaluation criteria outlined in Table 2.2. A second evaluation time frame is needed for the cost-benefit analysis because a cost-benefit analysis is usually done over the life of the project. The SEMATECH research consortium is expected to function for five years. The figures used would be for the entire five year period. An evaluation outcome for the cost-benefit analysis as of that future date would be speculative.

TABLE 2.2 COST/BENEFIT EVALUATION CRITERIA FOR SEMATECH AS OF THE END OF 1993.

Measures of Economic Activity	Objective if specific	Aspect of Theory or public statements	Expectation
COST/BENEFIT		Cost-Benefit Theory	Benefits > Costs

CONCLUSION

The literature of economic development of high-technology firms can be approached from two perspectives. These perspectives are regional economic development and a combination of other neo-classical economic

perspectives; such as firm location studies. The high-technology firm economic development literature is not yet fully developed and is in a process of evolution. The literature on cost-benefit analysis, economic base studies, employment shifts and shares and evaluation is more mature.

CHAPTER III: RESEARCH SETTING

BACKGROUND INFORMATION:

THE RISE OF THE SEMICONDUCTOR INDUSTRY

The microelectronics industry grew out of advances made in semiconductor technology. These technical achievements allowed the creation of microscopic circuits etched on the surface of silicon chips hardly larger than a finger nail. In a sense semiconductors and microelectronics created a new manufacturing revolution. Today's consumer electronics, computer and aerospace industries, among others, are dependent on, and driven by advances in the microelectronics industry. At the same time, the manufacturing output of these industries creates important sources of wealth for the companies and nations that master these technologies.

Early electronics technology was based on the use of electron tubes. The familiar vacuum tubes most people have seen in old radio and television sets are a type of electron tube. For example, in the 1930's, the solid state diode rectifier was the only other electronic device available. This device

only allowed a one-way-only flow of electricity through a solid known as a semiconductor. This was the first widely used semiconductor device.[102]

The solid-state electronics revolution that eventually gave birth to semiconductor chips took place between 1940 and 1980 when solid-state devices nearly replaced the use of vacuum electron tubes worldwide.[103] Today semiconductor devices can be coaxed to manipulate electric currents in many ways; replacing vast numbers of old vacuum electron tubes and whole arrays of electronic circuits. Only three applications for electron tubes remain. A widely used application involves monitors such as television tubes, (CRT's) computer displays, and in some photoelectric devices. They are also used to generate large amounts of power at very high frequencies. Their third use is as new-generation X-ray tubes.[104]

INTERNATIONAL SETTING AND THE SEMICONDUCTOR INDUSTRY

The American semiconductor industry has experienced a painful reversal of leadership since the late 1970s. The United States is acknowledged to to have lost its leadership over the microchip business in the 1980s. Some expect that U.S. companies will continue to lose market share through the early 1990s; but will regain their loses later in the decade. Japanese companies dominate the memory chip market largely

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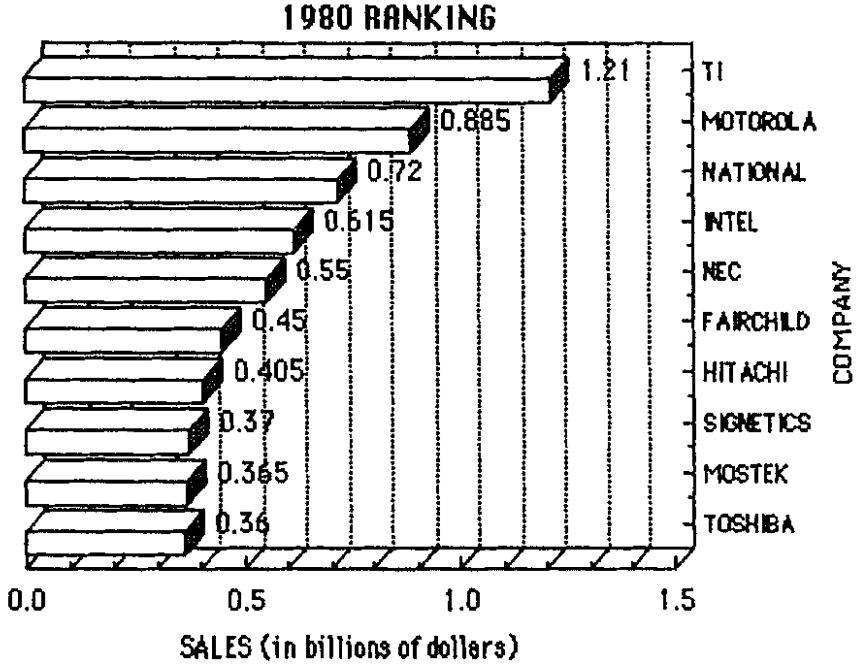
102 Ryder, John D., and Fink, Donald G., Engineers & Electrons: A Century of Electrical Progress, (New York, New York : IEEE Press,1984) p. 118.
103 Ibid., p. 118.
104 Ibid.

because of their advantage in economies of scale. American companies retain an advantage in customized chips (ASICs) and microprocessors.[105]

FIGURE 3.1 SEMICONDUCTOR FIRMS WORLDWIDE MARKET SHARE RANKINGS FOR 1980



Source: Adapted from data presented in the Austin American Statesman.[106]

According to Integrated Circuits Engineering data, American companies' sales have slipped since 1980. In 1980, four American companies had the largest worldwide semiconductor sales (TI, Motorola, National, and Intel). Seven American companies were represented among the top ten market share holders (see Figure 3.1).

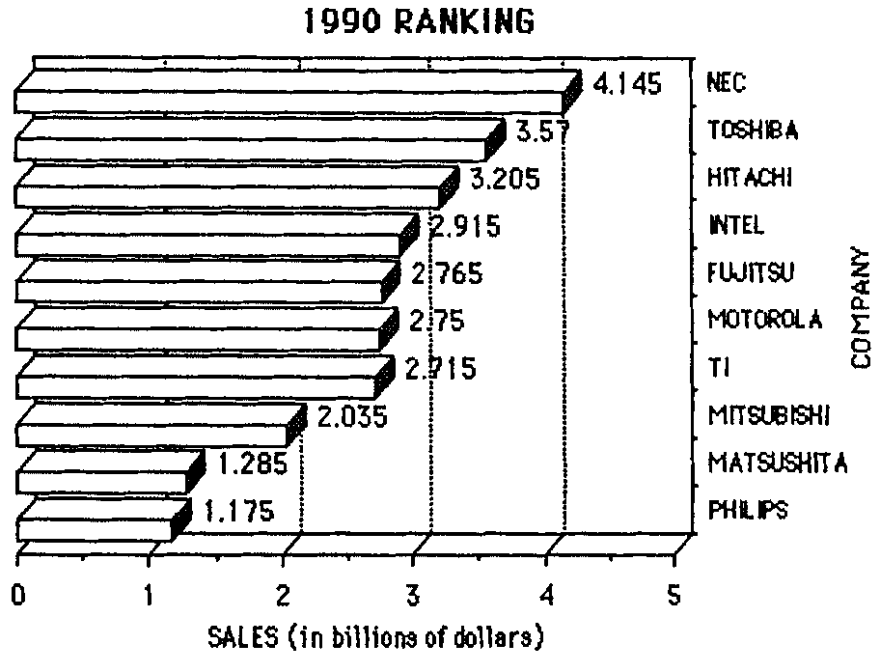
By 1990 only three American companies were left in the top ten (Motorola, Intel and TI). The top three market share holders were Japanese

105 Ladendorf, Kirk., "Chipping Away: U.S. semiconductor industry's world market share still slipping," Austin American Statesman, 28, January 1991, Business Section, p. 1.

106 ibid.

(see Figure 3.2).[107] It is partly in response to such statistics that SEMATECH was formed.

FIGURE 3.2 SEMICONDUCTOR FIRMS WORLDWIDE MARKET SHARE RANKINGS FOR 1990



Source: Adapted from data presented in the Austin American Statesman.[108]

The microelectronics business is very complex. It includes firms which manufacture silicon chips, raw materials, and machinery to manufacture semiconductors. Also included are design firms that design microcircuits, and software houses that program computers. All types of computer manufacturers, consumer electronics, medical instruments and defense and aerospace related firms are also involved.

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107. Ladendorf, Kirk., "Chipping Away: U.S. semiconductor industry's world market share still slipping," Austin American Statesman, 28, January 1991, Business Section, p. 1.
108 ibid.

NATIONAL SETTING

The high-technology sector incorporates many industries. Electronics and specifically microelectronics and semiconductors represent only a fraction of the high-technology industry.

TABLE 3.1 HIGH-TECHNOLOGY CLUSTERS: 1984

Cluster	Establishments	Employment
1. Los Angeles	7,919	519,305
2. Metropolitan New York, New Jersey	7,415	360,917
3. Silicon Valley	4,133	309,416
4. Route 128	2,602	254,557
5. Chicago	3,303	208,891
6. Delaware Valley	1,716	151,607
7. Dallas/Forth Worth	2,113	132,752
8. Baltimore/Washington	2,561	118,226
9. Austin	**2,082**	**114,820**
10. Buffalo/Rochester	679	114,003
11. New Haven/Stamford	1,242	97,405
12. San Diego	1,511	77,114
13. Seattle	1,281	73,597
14. Houston	2,413	71,840
15. Minneapolis/St.Paul	1,176	70,223
16. Denver/Boulder	1,140	64,411
17. Phoenix	1,086	63,888
18. St. Louis	600	57,081
19. Raleigh/Durham	565	53,718
20. Detroit	1,513	48,077
21. Salt Lake City	570	45,239
22. Pittsburgh	693	42,940
23. Milwaukee	555	42,451
24. Portland, Oregon	673	38,309
25. Atlanta	918	32,314
26. Tampa	797	27,374
27. Kansas City	265	26,069
28. Santa Fe	351	18,749
29. Columbus	497	17,011
30. Lexington	153	11,807

Adapted from: Miller and Cote, Growing the Next Silicon Valley, p.16.

Many regions around the country enjoy vibrant high-technology clusters. Table 3.1 represents a listing of some of these clusters offered by Miller

and Cote.[109] Austin was the eighth largest high-technology cluster in 1984. The SEMATECH consortium might help the city to keep or improve its top ten ranking.

Unfortunately, various members of the electronics industry sometimes work at cross-purposes. So that while U.S. chipmakers ask for tough government action to open Japan's chip market, U.S. computer makers make use of foreign chips and express concerns that trade sanctions might endanger their supplies.[110] At the same time, joint ventures between American and foreign firms continue.

PHYSICAL SETTING

AUSTIN, TEXAS' HISTORY OF ATTRACTING SEMATECH

Austin, Texas is the capital of the state of Texas. The city was incorporated in 1839 and became the state's capital that same year. Austin is a home rule city chartered in 1891.[111] It is currently operating under a recent charter adopted in 1953.[112] The city has a council-manager form of city government.[113]

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109 Miller, Roger and Cote, Scott., Growing the Next Silicon Valley : A Guide for Successful Regional Planning, (Lexington, Massachusetts : D.C. Heath and Company, 1987). p. 16.

110 DeWitt, Phillip Elmer. "High Tech's Fickle Helping Hand," Time Magazine 4, December 1989, p.

111 The City of Austin, Texas., Approved City of Austin Financial Plan 1989-90 Volume 1. (Austin, Texas : City of Austin Texas, 1989) p. 24.

112 The League of Women Voters of Austin, Texas., Citizen's Guide to Austin & Travis County, 2nd edition (Austin, Texas : The League of Women Voters of Austin, Texas, 1978). p. 6.

113 The City of Austin, Texas., Approved City of Austin Financial Plan 1989-90 Volume 1. (Austin, Texas : City of Austin Texas, 1989) p. 24.

Austin's first major success in attracting a high-technology consortium was with MCC. On May 16, 1983, the Microelectronics and Computer Technology Corporation (MCC) announced that Austin would be the site for its world headquarters.[114] MCC was the first American consortium to bring together companies in the competitive microchip and computer industries. It was formed in 1982 by ten companies as a response to Japan's Fifth Generation Computer Project.[115] Fifth Generation computers are expected to be able to "think" in a primitive form and mimic human thought processes. Their achievement involves the development and use of artificial intelligence hardware and software.[116]

Government is Austin's largest employer. This is apparent from the fact that Austin is a state capital and the home of its flagship university (The University of Texas). However, the electronics industry also figures prominently in Austin's economy. Motorola and IBM have been consistent top ten raters among Austin's top ten employers for the past five years.[117]

After the success with MCC, Austin was interested in attracting its second research consortium. The city officially launched its effort to attract SEMATECH on June 30, 1987. On that day Peter Mills, vice president

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114 Scheps, Philip B., and Schechter, Lawrence A., "Financial Policy Considerations Under Conditions of Rapid Growth," Governmental Finance 12 (December 1983), p. 39.

115 Ladendorf, Kirk., "Rebooting Consortium ponders high-tech mission, future," Austin American Statesman, 16, September 1990, Sec.A, p. A1.

116 Dizard, Wilson P. Jr., The Coming Information Age: An Overview of Technology, Economics and Politics, second edition (New York, N.Y. : Longman Inc. 1985) p. 68.

117 The City of Austin, Texas., Approved City of Austin Financial Plan 1984 to 1985; to 1989-90 Volume 1. (Austin, Texas : City of Austin Texas, 1989) pp, t-52, 14, 247, 27,24.

of economic development for the Austin Chamber of Commerce, traveled to New York to hand deliver to Semiconductor Industry Association (SIA) officials Austin's proposal to attract SEMATECH to the city.[118]

To lure SEMATECH the state of Texas offered through the University of Texas at Austin a 46-acre site. This site included a five-story office building and a warehouse. The package also included renovation and furnishings for the office building, partial renovation for the warehouse into a semiconductor fabrication facility; and, paid issuance costs and first-year low cost interest on construction bonds. The city of Austin provided electrical power facilities, utility connections and building and development fee abatements.[119]

Austin Economic Development officials promised SEMATECH a permanent tax exemption as an incentive to move to Austin.[120] The city's incentive plan also included choice tickets to sports and cultural events and club memberships for SEMATECH employees. About 100 small businesses near the site offered discounts, discounted mortgage loans and airline discounts for SEMATECH employees. The city also arranged with various private groups to help SEMATECH employees move in.[121]

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118 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Statesman, 16, November 1988.

119 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 11.

120 Pope, Kyle., "Tax ruling goes against SEMATECH" Austin American Statesman, 23, August, 1989, Sec.A p. A1.

121 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Statesman, 24, July 1988, Sec.H, p. H1.

Other states apparently offered larger sums of money. Massachusetts offered 440 million in grants and loans. California offered 125 million and Florida 72 million the first year and 180 million over 10 years. Seven cities offered more than the 68 million offered by Austin.[122] Austin boosters pointed out that the city offered a 15 million dollar bank account up front (another contribution by the University of Texas); whereas other offers included money that had yet to be approved by state legislatures.[123] In addition, the University of Texas guaranteed 35 million in bonds used to buy the vacant Data General building and land for SEMATECH, and to build a permanent adjacent facility at the site. The balance of the 68 million came from several public and private sources.[124]

An example of a creative public inducement involved the city's promise to give SEMATECH a reimbursement from the city's resource management program fund if the consortium installed energy efficient air conditioning. This became an issue in August of 1989 when the city council debated an energy incentive payment of $218,604 dollars. Council members Sally Shipman, Smoot Carl-Mitchell and Charles Urdy told opposing council member Robert Barnstone that the reimbursement was part of the original SEMATECH incentive package.[125]

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122 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Statesman, 24, July 1988, Sec.H, p.H1.

123 ibid.

124 ibid.

125 Banta, Bob., "Council to pay for Sematech's air conditioning" Austin American Statesman, 4, August 1989.

On September 12, 1987, SEMATECH sent a five-member technical advisory team to tour Austin's potential project site; the former Data General building on Montopolis Boulevard in southeast Austin. They also flew over the University of Texas Balcones Research Center. At the time, the five member team was touring potential sites across the country. In late October, the advisory team returned to look at the former Data General building again. They were also treated to a lunch meeting with Governor Bill Clements at the Governor's Mansion.[126]

By November 19, 1987, Austin was declared to be among eleven finalists. Austin's 68 million incentive package was accepted and the city was officially announced as the winning site on January 6, 1988. SEMATECH and local officials later met to decide on an architectural firm to remodel the Data General Building on Montopolis Drive.[127]

Austin also met various other criteria. The city offered a suitable site, access to a first class university, a pool of skilled workers, a good quality of life, a low cost of living, a central location and state and local incentives. This placed Austin near the top in every category although it never was the winner in any single category according to SEMATECH spokesman Daniel Rime.[128] In addition, the city was eager to please and had the best organized and orchestrated offer. Finally, some analysts attribute Austin's success to political clout in Washington from such politicians as

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126 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Statesman, 16, November 1988.

127 Ibid.

128 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Statesman, 24, July 1988, Sec.H, p. H1.

House Speaker Jim Wright and especially U.S. Representative Jake Pickle who could help assure a continuous influx of federal money.[129]

Austin launched a very well prepared effort. For example, Austin was the only bidder to personally hand-deliver its proposal. Austin demonstrated a mockup clean room for visiting SEMATECH scouts. Austin's bid included a prepared building permit and waived development fees worth $400,000 dollars. The Austin team attended to every detail and coached everyone who might come in direct contact with the selection team. This coaching included such detail as to what to and not to say, eye contact, and voice inflection. All activities were planned orchestrated and rehearsed.[130]

There is no doubt that Austin set up a good recruiting campaign. In this respect, the fact that the city was the host to an established research consortium (MCC) might have helped. Pike Power, an attorney who helped orchestrate the recruiting campaign noted that his work to get MCC to Austin in 1983 offered valuable experience and an example of a successful effort. In addition, MCC and SEMATECH had overlapping memberships. Half of the companies in SEMATECH were members of MCC. Three of the original thirteen members of SEMATECH already had plants in Austin. Finally, the University of Texas was an active participant in the negotiations to attract SEMATECH; just as it had been in the past with MCC.

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129 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Statesman, 24, July 1988, Sec.H, p.H1..
130 ibid.

SEMATECH officials threw a coming out party to officially dedicate their Austin facility on November 15, 1988. The invitation-only dedication ceremony was attended by over 1,300 people. Representative Jake Pickle of Austin might have summed up the feelings of those involved when he commented: "We wooed her, we chased her, we caught her, we fell in love with her and we married her. It's been a happy marriage."[131] SEMATECH is located at 2706 Montopolis Drive in Southeast Austin.

A HISTORY OF SEMATECH

SEMATECH evolved out of the semiconductor industry's perception that the United States would lose its leadership and markets to Japanese competition. Sometime in February 1986 IBM's General Technology Division vice president, Sanford L. Kane presented the results of his study of the semiconductor industry to the company's six man management committee headed by John Akers (IBM's president and chief operating officer). The statistics warned about the ability of the American semiconductor industry to maintain its technological leadership.[132] Sanford Kane's presentation has been said to have been the catalyst for SEMATECH. That month he began traveling the country warning government and industry leaders such as Bob Noyce (Intel), Bill Sick (TI), Jim Norling (Motorola), Charlie Sporck and others about the dire shape of the American Semiconductor Industry.[133]

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131 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished" Austin American Statesman, 16, November 1988.

132 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) pp. 1-4.

133 ibid., p. 366.

The industry feared that without an American semiconductor industry "merchant" producers such as IBM would be forced to buy semiconductors from Japanese vendors who could be direct competitors. In addition, the ability to closely monitor and participate in the design of specific semiconductor chips offers a competitive advantage.[134] This advantage would be lost if the semiconductor chips have to be bought from actual or potential competitors halfway across the world.

In the following SIA (Semiconductor Industry Association) meeting in Santa Clara California on June 1986, the statistics in Sanford Kane's presentations, and their potential meaning, became a main topic of conversation. A task force was formed in October 1986 to try to find solutions for the potential problem. From this task force, the idea for SEMATECH was developed. One of those involved, Charlie Sporck, stated that this would not be a mere research project; he said, "The American Industry has fallen behind Japan not so much in research but in the manufacturing of products at low cost with high quality. SEMATECH will be aimed at improving manufacturing ability."[135]

In early 1987, semiconductor production and test equipment manufacturing firms were unconvinced that any consortium would help them. Without assurances that sufficient resources would be allocated for development of future testers and machinery, they were reluctant to back financially the consortium plans. Many of them felt that they were

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134 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y.: Macmillan Publishing Company, 1989) p. 4.
135 Ibid., p. 367.

shortchanged by the Defense Department's previous VHSIC (Very High Speed Integrated Circuit) program. They wanted to make sure that enough money would be devoted to costly new machinery and tester development.

The VHSIC effort started as an equipment development initiative. However, most of the work was done on device and system areas and little was done for equipment development. Equipment manufacturers were also wary of government strings attached and worried that the government subsidy might be inappropriate.[136] These fears seemed to be confirmed by the fact that the initial trust of the SEMATECH effort was pushed by integrated circuit firms and initially the role of equipment companies was ill defined.[137]

On May 12, 1987, SIA officials met in Dallas to approve a 1.5 billion, five year funding plan for a national research consortium.[138] In August SEMATECH Inc. was formed.[139] Then in September, SEMATECH named its board of directors and the thirteen founding members. This group included Advanced Micro Devices Inc., American Telephone and Telegraph, Digital Equipment Corporation, Harris Corp., Hewlett-Packard Co., Intel Corp., International Business Machines Corp., LSI Logic Corp., Micron Technology Inc., Motorola Inc., National Semiconductor Corp., Rockwell International

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136 Levine, Bernard., "Gear Firms Skeptical About Consortia: Disappointed by VHSIC, Most Demand Details on SEMATECH, Other Proposals" Electronic News, 9, March 1987.

137 Ibid.

138 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Stateman, 16, November 1988.

139 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 2.

Corp., and Texas Instrument Inc.[140] Congress appropriated 100 million in fiscal years 1988 and 1989 in December; and authorized the Department of Defense (DOD) to participate.[141] In January 1988 SEMATECH announced that Austin would be its permanent site.

On January 27, 1988, IBM and AT&T engaged in SEMATECH's first cooperative move when they agreed to share proprietary information by turning over to SEMATECH processes for making two computer chips.[142] IBM and AT&T surprised everyone by offering their most advanced technologies. They agreed to contribute the designs, masks, test data bases, and all the equipment required to manufacture their most advanced chips (IBM's 4-megabit DRAM, and AT&T's 64-kilobit static RAM). At the time, these were considered next generation technologies. These offers speeded up the process and demonstrated the companies' commitment in that they were willing to give up some of their competitive technological advantages for the sake of the consortium.[143]

On February 17, 1988, NCR Corporation became the 14th member of SEMATECH. NCR was the first new member since the consortium was founded. The company would be represented by its Microelectronics Division, which manufactures microprocessors, memories, peripherals, and

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140 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Stateman, 16, November 1988.

141 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 2.

142 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Stateman, 16, November 1988.

143 Warshofsky, Fred., The Chip War : The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 367.

digital signal processing devices.[144] February also saw SEMATECH's first potential setback when on February 19, 1988 President Reagan proposed reducing the federal contribution for SEMATECH from 100 million to 45 million as part of Reagan's 1.09 trillion 1989 fiscal budget.[145] SEMATECH's federal contribution was saved when on May 18, 1988, the House Appropriations Subcommittee rejected Reagan's proposed 45 million appropriation for SEMATECH and approved the original 100 million request.[146]

In April SEMATECH occupied its southeast Austin site. The consortium also signed a 20-year lease with the University of Texas in May. The lease would become effective in January 1989.[147] Meanwhile, work crews worked on the former Data General plant site at times for as much as 20 hours a day.[148]

The summer of 1988 witnessed the selection of SEMATECH's two top officials. After an initial fruitless search, SEMATECH announced the selection of Robert Noyce as SEMATECH's chief executive officer on Wednesday, July 28, 1988. Robert Noyce left his job as vice-chairman of Intel. He had originally declined to be considered claiming he was too old. However, since the search failed to find anyone willing or able to take the

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144 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Statesman, 16, November 1988.

145 ibid.

146 ibid.

147 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 11.

148 Tyson, Kim., "Work crews hurry to complete manufacturing plant by August," Austin American Statesman, 10, April 1988, Sec.H, p. H1.

job, Noyce accepted the position.[149] The sixty year old was a co-inventor of the integrated circuit with Jack Kilby. He co-founded Fairchild Semiconductor and Intel. Noyce had a towering reputation in the semiconductor industry.[150] The same day Paul Castrucci was named chief operating officer.[151] At fifty-four years, Paul Castrucci was a former IBM executive whose task would be to manage SEMATECH's day-to-day technical affairs and oversee relations with equipment and materials suppliers.[152]

The Japanese held a surprise for SEMATECH officials in August. On August 14, 1988, Tomihiro Matsumura (director of NEC's semiconductor division) stated that his company wished to join SEMATECH.[153] Industry executives warned that SEMATECH officials would have to weigh the costs of giving up any possible technological contributions from NEC Corporation against the benefits of supporting only American companies through SEMATECH. On the other hand, many experts questioned the ability of the United States to keep any technological advances gained from SEMATECH in the country for long; particularly given the increasingly large number of alliances between American and Japanese manufacturers.[154] For their part, SEMATECH officials denied the request. Bob Noyce stated: "SEMATECH is for

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149 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 25

150 Ladendorf, Kirk., "Change of heart brings Noyce aboard," Austin American Stateman, 28, July 1988, Sec.E, p. E1.

151 Ladendorf, Kirk., "Electronics pioneer to lead SEMATECH," Austin American Stateman, 28, July 1988, Sec.A, p.A1.

152 Ladendorf, Kirk., "'Mr. Inside' draws praise from industry," Austin American Stateman, 31, July, 1988, Sec.H, p. H2.

153 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 327.

154 Sanger, David E., "Japanese firm wants to Join SEMATECH," Austin American Stateman, 16, August 1988, Sec.D, p. D7.

the benefit of American industry and American taxpayers." Matsumura did not specify what technologies NEC would offer SEMATECH. Some American executives questioned NEC's motives; others were willing to consider the offer.[155]

On September 9, 1988, SEMATECH's vice-president of administration was selected. The choice was Austin Chamber of Commerce's Peter Mills, who performed a key role in the eight-month drive to bring SEMATECH to Austin. Mills would manage SEMATECH's legal, personnel, finance and communications divisions.[156] This rounded off SEMATECH's three top management positions.

Later on September 29, 1988, a congressional conference committee approved SEMATECH's entire 100 million funding request.[157] However, the committee requested that 75 million be withheld until the Department of Defense and the consortium agreed on an operating plan for 1989[158] This plan was reflected in the National Defense Authorization Acts for Fiscal Years 1988 and 1989. These acts authorized DOD (the Department of Defense) to grant SEMATECH its funds upon the successful completion of annual operating plans developed in consultation with DOD and a newly created Advisory Council on Federal Participation in SEMATECH.[159] The

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155 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 328.

156 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Stateman, 16, November 1988.

157 ibid.

158 ibid..

159 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 16.

intent was to establish a framework that would allow government supervision without needless constraints on SEMATECH's operations or management. DOD's management oversight of SEMATECH's activities is established through the Defense Advanced Research Projects Agency (DARPA).[160] The Secretary of Defense delegated its oversight responsibility for SEMATECH to DARPA in April 1988.

In September 1988, Charlie Sporck (former president and CEO of National Semiconductor) became chairman of SEMATECH.[161] The first manufacturing equipment was installed in October.[162] On November 15, 1988, SEMATECH officially dedicated its southeast Austin facility; which featured a 60,000-square-foot state-of-the-art computer clean room.[163] Overall it took SEMATECH over eight months to fight various delays and find a president before it dedicated its facility in November.[164]

The SEMATECH, Inc. consortium includes 14 U.S. semiconductor manufacturers and the Department of Defense (DOD) as members. Its objective is to supply the U.S. semiconductor industry the domestic capability to be the world leader in semiconductor manufacturing

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160 Ols, John M., Statement of John M. Ols Jr., Director Housing and Community Development Issues before the Subcommittee on Transportation, Aviation and Materials; and the Subcommittee on Science, Research and Technology; Committee on Science, Space, and Technology; House of Representatives. "The SEMATECH Consortium's Startup Activities" (Washington D.C. : GAO/T-RCED-90-11, 11/8/89.)

161 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 365.

162 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 11.

163 Pope, Kyle., "SEMATECH expects to finalize plans: Operational scheme almost finished: A SEMATECH Chronology" Austin American Statesman, 16, November 1988.

164 Warshofsky, Fred., The Chip War: The Battle for the World of Tomorrow., (New, York, N.Y. : Macmillan Publishing Company, 1989) p. 12.

technology.[165] Through its five year plan the consortium hopes to reach technological parity with foreign semiconductor manufacturing competitors by 1992 and regain technological leadership in 1993.[166]

According to a General Accounting Office's 1989 report, SEMATECH has been proposed as a model for other government-industry consortia. The Congressional Budget Office noted in its report that federal funding for a particular firm or industry could be justified if it provided public benefits beyond those given to the particular affected firms.[167]

PRESENT STATUS AND FUTURE EXPECTATIONS

The consortium has gone through several reorganizations. In March of 1989, Paul Castrucci resigned as chief operating officer after frequent disagreements with Robert Noyce over strategic decisions and management style.[168] He was replaced by Turner Hasty who took office in July.[169] A year later, on Sunday, June 3, 1990, SEMATECH's chief operating officer, Robert Noyce died.[170] William Spencer was chosen as Robert Noyce's successor. SEMATECH also received a new chairman of the board in January 1991, Robert Gavin (former Motorola Chief Executive) was named chairman

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165 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 8.

166 ibid.

167 ibid., p. 4.

168 Ladendorf, Kirk., "SEMATECH begins difficult search for Noyce successor," Austin American Statesman, June 10, 1990, Sec H, p. H1.

169 Pope, Kyle. "SEMATECH Gets Down To Business: Chip Consortium Settles Into Job of Step-by-Step Research," Austin American Statesman, 20, November, 1989, Business Supplement, p.13.

170 Ladendorf, Kirk, "Electronics legend Robert Noyce dies," Austin American Statesman, June 4, 1990, Sec A, p. A1.

on January 17 to replace Charles Sporck who had requested that someone else be named chairman of the board. Sporck planned to remain as a member of the board.[171]

Overall, SEMATECH expects to be on track. Its primary goal is to provide the American semiconductor industry with the capability to regain world manufacturing leadership. To do this the consortium formulated three main objectives. One was to develop materials and equipment capable of reducing the linewidth of semiconductors' integrated circuits from the current 0.8 microns to 0.35 microns. This would allow manufacturers to pack more components onto the same chip; increasing data storage capacity and decreasing processing time. The second goal is to increase the size of the silicon wafers that can be processed. The third is to maintain or, if possible, increase the manufacturing yield.[172]

SEMATECH revised its strategic approach and organizational structure in 1989. The consortium opted to demonstrate the capability to fabricate 0.8 micron linewidth semiconductors instead of fully replicating the process. In its 1990 operating plan, SEMATECH revised the target date for achieving an integrated circuit linewidth of 0.5 microns from the end of 1990 to the end of 1991. The consortium also moved its phase-three milestone (0.35 micron integrated circuit linewidth) from the end of 1992

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171 Ladendorf, Kirk. "Motorola veteran is named chairman of SEMATECH board," Austin American Statesman, 18, January 1991, Section C, p. C8.

172 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 24.

to the middle of 1993.[173] The consortium continues to maintain it ties with industry, universities and national laboratories.

LEGAL SETTING AND ISSUES

SEMATECH's legal problems have revolved around three main topics. The first issue involves policy more than straightforward legal matters. It pertains to whether or not SEMATECH as a research consortium should receive government help or rely solely on private funds. This matter continues to be debated in the political arena. Closely tied to this policy matter is the question of whether foreign companies should be allowed to acquire SEMATECH member firms. This issue came to the fore when a Japanese firm attempted to buy Semi-Gas Systems and SEMATECH opposed the sale on national security and anti-trust grounds. The third major legal problem that SEMATECH has had to deal with involved a legal challenge of its tax exempt status by the Travis Central Appraisal District Review Board.

POLICY DEBATES

Debate over the appropriateness of spending government money to aid the semiconductor industry through SEMATECH raged in Washington long after SEMATECH's inauguration. Reports circulating in Washington in December 1989 warned about the Bush administration's intention to cut ten million in funding for research on high definition TV and all federal funding

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[173] General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 24.

for SEMATECH (100 million in 1991).[174] However, two blue-ribbon studies contradicted the administration's intentions. The reports by the National Advisory Committee on Semiconductors (NACS) and the Economic Policy Institute (EPI) concluded that the American high-technology industry needed more government help.[175]

Perhaps as a result of these studies, and industry and congressional complaints, the administration reversed itself the following day. This incident has been interpreted as an example of the differences of opinion between the Commerce and Defense departments and White House conservatives led by Budget Director Richard Darman over what role the government should play in the new global economy. Many staff members at the Commerce and Defense Departments argue in favor of a strong American electronics industry as a vital national security asset. They favor government help for the industry such as SEMATECH. White House conservatives argue against any form of preferential government intervention.[176]

In April 1990, the Defense Department removed the director of the Defense Advanced Research Projects Agency (DARPA), Craig Fields, and transferred him to the position of deputy director of defense research. Department officials admitted that the move was a result of a "bitter dispute" over the proper role of the agency in financing research projects

174 Elmer DeWitt, Phillip. "High Tech's Fickle Helping Hand," 4, December 1989.
175 ibid.
176 ibid.

aimed at making U.S. industries more competitive.[177] Some officials at DARPA claimed that he lost his post because of his support for high-technology initiatives opposed by some high ranking Bush administration officials.[178]

As a SEMATECH ally, Fields helped fight the Bush administration's effort to cut support for SEMATECH earlier that year. Within the administration Richard Darman (White House budget director) and Michael Boskin (chairman of the President's Council of Economic Advisors) are reported to oppose aid for high-technology research consortia. The dismissal of Fields was widely decried in the industry and in Congress.[179] The dismissal also appeared to define what the administration felt about the issue.

NATIONAL SECURITY AND ANTITRUST CONTROVERSY

On July 27, 1990, President Bush approved the planned acquisition of Semi-Gas Systems Inc. by Nippon Sanso K.K. for 23 million dollars. Semi-Gas Systems had been offered for sale by its parent company Gas Hercules Inc. of Wilmington Delaware. Hercules had announced its intentions to sell Semi-Gas to Nippon Sanso in April.[180] The sale was recommended by the federal government's Committee on Foreign Investment in the United States

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177 Staff and Wire Reports., "In Policy dispute, Defense ousts head of high-tech agency: SEMATECH loses ally in Fields," Austin American Statesman, 21, April 1990, Sec.C, p. C1.
178 ibid.
179 ibid.
180 Rothschild, Scott., "SEMATECH blasts Bush for letting Japan buy chip-related company," Austin American Statesman, 28, July 1990, Sec.D, p. D10.

(CFIUS) headed by Treasury Secretary Nicholas Brady over the strong objections of SEMATECH officials. SEMATECH maintained that the sale would breach national security and break antitrust laws.[181]

SEMATECH argued that the semiconductor chip technology developed at SEMATECH should be given a national security designation which would bar its transfer to foreign purchasers such as Nippon Sanso.[182] Testifying before Congress, Peter Mills (Chief Administrative Officer of SEMATECH) said that Semi-Gas' technology was at least two year ahead of Nippon Sanso.[183] The administration refused to acknowledge that there was a problem and SEMATECH continued to lobby against the sale. Presidential science adviser D. Allan Bromley was also reported to have lobbied against the sale.[184]

SEMATECH argued that the Semi-Gas sale should be stopped on antitrust grounds. Semi-Gas supplies over forty percent of the ultrapure gases used by the semiconductor industry.[185] Semi-Gas is a small company based in San Jose California with 122 employees and 21 million in annual sales in a 19 billion U.S. semiconductor industry.[186] SEMATECH had worked

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181 Rothschild, Scott., "SEMATECH blasts Bush for letting Japan buy chip-related company," Austin American Stateman, 28, July 1990, Sec.D, p. D10.

182 Kay, Michele., "SEMATECH wants data kept from competition," Austin American Stateman, 19, September 1990, Sec.C, p. C1.

183 Kantor, Seth., "Uproar over proposed Semi-Gas sale: Bush is blasted for approving purchase by Japanese company," Austin American Stateman, 2, August 1990, Sec.F, p. F1.

184 Ladendorf, Kirk., "U.S. joins SEMATECH in opposing firm's sale," Austin American Stateman, 29, December 1990, Sec.A, p. A1.

185 Kay, Michele., "SEMATECH wants data kept from competition," Austin American Stateman, 19, September 1990, Sec.C, p. C1.

186 Ladendorf, Kirk., "U.S. joins SEMATECH in opposing firm's sale," Austin American Stateman, 29, December 1990, Sec.A, p. A1

with the company to help it refine its technology and manufacturing process and was afraid of seeing its worked turned over to Japanese competitors. After the president's July decision it was up to the Justice Department to decide whether the Japanese acquisition violated anti-trust laws. SEMATECH maintained that the sale would give Nippon Sanso control over 43 percent of the American market, 51 percent of the Japanese market and almost 52 percent of the world market.[187]

In the end, the administration opposed the sale. On Friday December 29, 1990, the U.S. Justice Department agreed to block the sale of Semi-Gas Systems to Japan.[188] The decision was based on antitrust grounds. SEMATECH officials were happy to hear the news. Earlier they had threatened to replace it with another equipment supply firm if necessary, in spite of the cost. James Rill (assistant attorney general in charge of antitrust matters) stated that the sale would have decreased competition and injured consumers.[189] Semi-Gas Systems stated that it would fight the lawsuit. It should be noted that in considering its decision American antitrust law was applied to a foreign company operating in a world market in addition to separate national markets.

The SEMATECH consortium exists because of legislation that specifically allows its existence. However, it would have been difficult for SEMATECH member firms to have formed the consortium without breaking

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187 Kay, Michele., "SEMATECH wants data kept from competition," Austin American Statesman, 19, September 1990, Sec.C, p. C1.
188 Ladendorf, Kirk., "U.S. joins SEMATECH in opposing firm's sale," Austin American Statesman, 29, December 1990, Sec.A, p. A1
189 ibid.

antitrust laws. This has prompted calls among many inside and outside the industry calling for firms to be allowed to participate in joint production ventures. Robert Noyce testified before a Congressional Committee in March 1990 in favor of reforming the nation's antitrust laws to facilitate this process. Noyce pointed out that Japanese antitrust laws are virtually unenforced.[190] Congressman Jake Pickle has been reported to favor relaxation of American antitrust laws that prevent cooperation among microelectronic industry leaders.[191] This is a sensitive area where Japanese practices appear to call for some type of American response.

LOCAL LEGAL CONTROVERSY

In an eight to four decision, on Tuesday, August 22, 1989, the Travis Central Appraisal District review board voted to ask SEMATECH to pay property taxes. The District claimed that the consortium was in business to make money for its members and could not qualify as a public agency.[192] Perhaps, the board felt that SEMATECH could fall under the same tax guidelines as its predecessor MCC (The Microelectronics and Computer Technology Corporation) had fallen before. MCC is considered a for-profit venture and pays property taxes on its land.[193]

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190 Kantor, Seth., "SEMATECH innovator seeks antitrust law reform," Austin American Statesman, 31, March 1990, Sec.B p. B2.

191 Pope, Kyle., "Pickle proposes high-tech policy," Austin American Statesman, 16, February 1990, Sec.D, p. D10.

192 Pope, Kyle., "Tax ruling goes against SEMATECH" Austin American Statesman, 23, August 1989, Sec.A, p. A1.

193 ibid.

For its part SEMATECH argues that it operates in the public interest. The consortium stated that its non-profit status has been upheld by dozens of government rulings which include opinions by the Congress, the U.S. Department of Defense, the Texas State Comptroller's Office and the Texas State Attorney General's Office. SEMATECH filed a lawsuit against the Travis Central Appraisal District contesting the property taxes on Monday, November 13, 1989. At that time, SEMATECH's tax bill was estimated at over one million dollars.[194] This was based on a property appraisal of almost 61 million as the 1989 market value of the property owned by SEMATECH as of January first.[195] The taxable property included 4.2 million in personal property owned by SEMATECH, 16.1 million in equipment leased from the Travis County Research and Development Authority and approximately 40.7 million in property owned by the University of Texas. The board also estimated that SEMATECH held about 124 million in taxable property as of September 1989.[196]

Bill Elkins who chaired the Appraisal board stated that SEMATECH had mentioned the commercialization of its research in its lease. Before the August board decision Art Cory the district's chief appraiser had ruled in July that SEMATECH should be exempt because its leased land and equipment is owned by tax-exempt public entities.[197] SEMATECH would pay taxes only on the property it owned (about 8 million in property). In addition, in a

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194 Pople, Kyle., "SEMATECH files suit to contest property tax" Austin American Stateman, 14, November 1989, Sec.E, p. E1.
195 McCann, Bill., "SEMATECH tax bill may hit $1 million" Austin American Stateman, 23, August 1989, Sec.D, p. D8.
196 ibid.
197 Pope, Kyle., "Tax ruling goes against SEMATECH" Austin American Stateman, 23, August 1989, Sec.A, p. A1.

letter written in 1987, appraisal district attorney Rick Fine promised SEMATECH a permanent tax-exempt status. This was the letter which Austin city economic development officials used as part of the SEMATECH incentive package.[198] This matter has not yet been resolved. The appraisal district board has not filled a permanent file record or filed a specific tax appraisal for SEMATECH yet. The computer file listing for the consortium's property does not show any specific tax information.

SEMATECH is a complex organization dedicated to the improvement of a leading edge technology in competitive world market. In some respects the consortium is unique. It is unique because special legislation was needed for its creation and its goals are specific. However, its creation was prompted by a sense of urgency that has spawned other similar organizations in the past. MCC (its Austin's predecessor) began life as an emergency effort to address the Japanese fifth generation computer challenge. More recently an effort was launched to create another semiconductor consortium (U.S. Memories). This effort failed for lack of funds, but not before the city of Austin launched a well fought effort to attract the consortium.[199] Nevertheless, research consortia have emerged as a possible answer to research and development problems, as well as local economic development problems from many localities' point of view.

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198 Pope, Kyle., "Tax ruling goes against SEMATECH" Austin American Statesman, 23, August 1989, Sec.A, p. A1.

199 Pope, Kyle., "U.S. Memories pronounced dead by lack of money," Austin American Statesman, 16, January 1990, Sec.C, p. 7.

CHAPTER IV: METHODOLOGY

BACKGROUND INFORMATION

This report evaluates the economic impact of the SEMATECH research consortium on the economy of Austin, Texas. The tentative hypothesis can be expressed as follows: SEMATECH will bring to the community jobs and economic development as operationalized by the policy objectives of its community leaders and economic development theory. The independent variable in this hypothesis is the SEMATECH research consortium viewed as an economic development policy intervention. The dependent variables are the policy goals gleaned from community expectations and economic development theory.

In the economic development literature, economic development goals are usually operationalized in terms of jobs, or economic growth factors (business firms, incomes). As a point of departure, the present study employs some of the publicly stated policy objectives of city and Chamber of Commerce officials as the evaluation criteria. Statements expressed by these public officials at SEMATECH's inauguration are used to determine some of the evaluation criteria. Economic development theories are used to complete the set of evaluation criteria. The economic impact of the consortium is examined from the point of view of the local economy.

The primary method used is a one time policy-outcome-evaluation-case-study. Four general policy objectives are evaluated. These objectives are jobs, tax revenues, business prospects, and investment. They are later used to arrive at seven evaluation sub-hypotheses. Table 4.1 illustrates the seven evaluation sub-hypotheses.

TABLE 4.1 EVALUATION SUB-HYPOTHESES FOR SEMATECH

Sub-hypothesis	Description
(S1)	SEMATECH will produce an improved economic base (from theory).
(S2)	SEMATECH will produce an improved employment shifts and shares outcome in the microelectronics industry sector of the Austin economy (from theory).
(S3)	SEMATECH will yield a specific number of spin-off jobs by a certain date (from official statements).
(S4)	SEMATECH will attract a greater number of firms to Austin (from theory).
(S5)	SEMATECH will yield a specific amount of tax revenues by a certain date (from official statements).
(S6)	SEMATECH will encourage greater investment by present and new microelectronics firms (from theory).
(S7)	SEMATECH will yield more benefits than costs (from theory).

A positive evaluation outcome is defined as resulting from a majority of positive outcomes among the seven evaluation sub-hypotheses. A conclusive positive evaluation outcome would be determined if all the sub-hypotheses' outcomes produce positive results. The seven individual sub-hypotheses are later operationalized and individually tested. The outcomes of these sub-hypothesis are expected to help clarify the overall policy success or failure of SEMATECH as an economic development intervention.

Public officials have stated various specific job and tax revenue expectations for SEMATECH. The meaning of improved business prospects and investment goals was less well defined. These goals were mentioned in a general way. For example, an improved business climate was generally referred to as attracting and keeping more businesses and business investment.

The evaluation study makes use of Feiock's theoretical framework to determine what economic development aspects to focus on. Feiock differentiates between economic outputs and economic outcomes. He shows that economic outcomes are obtained through economic outputs.[200] In other words, economic outputs come first. Economic outputs are the most easily measured and direct results of an intervention.

The evaluation study examines several economic development outputs. These outputs include the number of firms attracted by the consortium, and business investment. Business investment is operationalized with city of Austin commercial building permit records (changes in number of permits).

Employment is treated as an economic development output. Employment statistics provide the basis with which the economic base and employment shifts and shares study are performed. The economic base study and the employment shifts and shares analysis are completed to

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200 Feiock, Richard C., "Local Government Economic Development Incentives and Urban Economic Growth," Public Administration Quarterly 12 (Summer 1988) : p. 142.

determine to what extent SEMATECH might have improved the economic base and job prospects of the city.

The evaluation also considers cost-effectiveness issues. This is done with the cost-benefit analysis. The cost-benefit analysis uses the findings from previous analyses. For example, it uses economic base study data. It also offers a forum in which to consider and discuss some of the externalities involved.

Because the estimated life of the SEMATECH project exceeded the time frame within which the study was conducted two evaluation time frames are used with the cost-benefit analysis. The first time frame examines the present impact as of the time of the study. This time frame is operationalized at two years after the official dedication of the consortium on November 15, 1988. For convenience of computation, this evaluation date is operationalized as of December (or the end of the year) of 1990.

The purpose of the second time frame is to determine the potential impact of SEMATECH five years down the road (December of 1993). SEMATECH is expected to operate for five years. The second time frame is intended to provide an evaluation over the life of the project. Results from the second time frame calculations would be speculative to the extent that only trends obtained from previous data can be used.

The methodologies used were chosen because they seemed appropriate for the study. For example, an economic base study examines employment data. Feiock's economic development framework emphasizes the most

proximate outputs of an economic development intervention. A cost-benefit analysis is an accepted technique to explore the overall worthiness of a project. Finally, the evaluation-case-study framework provides a good way to tie it all together.

CLASSIC ECONOMIC ANALYSIS

THE ECONOMIC BASE STUDY

An economic base study is performed on Travis, Hays and Williamson counties and on the Austin Metropolitan Statistical Area. These counties comprise what is known as the Austin Metropolitan Statistical Area. Employment statistics are obtained from County Business Patterns publications for Texas and the United States and the Texas Employment Commission's Covered Employment and Wages: By Industry and County quarterly publications. The Texas Employment Commission's statistics covered the period from 1976 to 1990. The economic base analysis includes the years from 1977 to 1988. County Business Patterns statistics for 1989 and 1990 have not been published yet. Statistics from tables in the Statistical Abstract of the United States are also used.

Individual county data is combined to obtain an economic base analysis of the Austin Metropolitan Statistical Area. The Austin Metropolitan Statistical Areas was chosen to provide a complete assessment of the impact of the consortium on the local economy. Data is also presented for individual counties. This approach provides a

comprehensive set of information and allows one to isolate statistics for one specific county; such as Travis county.

Travis county includes the geographical area that more closely approximates the boundaries of the city of Austin. The results of the economic base analysis, and the statistics provided by County Business Patterns are used extensively in other parts of this evaluation, including the cost-benefit study and the employment shifts and shares section.

Thus, the economic base study facilitates an examination of the history of employment patterns in Austin. It can also help to determine what the present and future economic impact of SEMATECH on the community might be. Past, present and future trends in employment by industrial sector are determined and compared where possible. This facilitates an analysis of what effect SEMATECH might have on employment.

Levels of analysis

The economic base study is performed at three different levels of detail. For 1977 to 1988 industry wide data is examined. An analysis is performed for each county and the metropolitan statistical area, and for every year from 1977 to 1988. An employment multiplier is calculated for each year. Simple average employment multipliers are also derived for each county and for the metropolitan statistical area from the eleven year statistics. The industry level statistics are presented in Appendix A1.

The economic base study is also performed at the two-digit industry category level. It compares two sets of years. The years compared are 1977 with 1986 and 1986 with 1988. This is done to get a more detailed look at two different periods of time, before and after SEMATECH. Economic base study data for 1977, 1986 and 1988 is presented in Appendix A2.

To examine the impact of SEMATECH on the microelectronics industry in detail, data for specific standard industrial categories is examined at the two-digit, three-digit and four-digit Standard Industrial Classification Category level. Specifically, data is examined for Standard Industrial Classification 36 (Electronic and other electronic equipment), 367 (Electronic components and accessories) and 3674 (Semiconductors and related devices) categories. These categories pertain to firms in the semiconductor and general microelectronics industry.

The economic base analysis is also performed on a 'control' group of high-technology industry categories (see Table 4.5). This is done to obtain employment statistics that will later be applied to the employment section of the analysis. The full set of data is presented in Appendix A4.

Theoretical Issues.

The theory of the economic base states that exports determine the aggregate level of economic activity in a community. This is because the local economy is more specialized and less self-sufficient than the national economy; and therefore, sales to buyers outside the local economy generate

local labor and business income. This income is spent locally generating a multiplier effect that leads to more employment.[201]

The local economy is compared to the national economy. Therefore, a first step in determining the impact of SEMATECH as an economic development intervention is to calculate the number of export jobs it created if any. The economic base study essentially compares estimates of local employment statistics with estimates of national employment statistics. Out of this analysis, export employment is determined.

The Source Statistics

The economic base study makes extensive use of private industry County Business Patterns statistics published by the Commerce Department and the Census Bureau. The employment statistics are currently available up to 1988. The economic base study was not performed beyond 1988 because of the lack of County Business Patterns statistics.

United States statistical abstracts and Employment Commission statistics are used to estimate government employment. Employment Commission statistics are used to determine local employment by county. The quarterly Employment Commission statistics are translated into annual average form and applied to the analysis. Because County Business Patterns annual statistics are published for the first quarter (up to mid March) of a given year (and for the preceding three quarters of the previous year), the

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201 Galambos, Eva., and Schreiber, Arthur F., Making Sense Out of Dollars: Economic Analysis for Local Government., (Washington, D.C.: National League of Cities, 1978.), p. 13.

Employment Commission government statistics were also tabulated in a similar manner. This was done to try to make both sets of data as comparable as possible.

The Texas Employment Commission collects data from quarterly contribution and wage reports submitted by Texas employers under the Texas Unemployment Compensation Act for the pay period that includes the 12th of the month.[202] Quarterly statistics are tabulated according to the most recent Standard Industrial Classification Manual for the state and by individual Texas Counties. Railroad Retirement Act employees, the self-employed and unpaid family members are not included in the Texas Commission's employment statistics.[203]

The Employment Commission calculates government statistics from government agency reports. Federal government statistics refer to civilian employees only. Since 1972 the commission has collected statistics for state employees. It has gathered local government employment statistics only since the first quarter of 1978. In that year, coverage was expanded to local governments, agricultural workers and domestics.[204] The evaluation used an estimate for the 1977 local government county statistics which were unavailable.

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202 Texas Employment Commission, Economic Research and Analysis Department, Covered Employment and Wages: By Industry and County first quarter 1988, (Austin, Texas : Texas Employment Commission Economic Research and Analysis Department, 1988). p.2.

203 ibid.

204 ibid., p. 3.

National government employment estimates were obtained for local, state and federal employment. Statistical Abstract tables from the Statistical Abstract of the United States for 1978[205] (No. 457 and No. 506), 1980[206] (No. 526), 1982-83[207] (No. 502), 1984[208] (No. 494), 1985[209] (No. 479), 1986[210] (No. 485), 1988[211] (No. 466) and 1990[212] (No. 493 and No. 521) were used. National full-time employment estimates were used. No estimates were available for state and local employment for 1988. Therefore, the estimates for 1987 were used as an approximation.

The federal employment statistics contain civilian employment only. They include employees working in United States territories and foreign countries. They exclude employees for the Central Intelligence Agency, the National Security Agency, (as of 1984) the Defense Intelligence Agency and some temporary Postal Service Employees (1977). The annual estimates are derived from average monthly figures.[213]

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205 U. S. Bureau of the Census, Statistical Abstract of the United States: 1978, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1977), pp.279, 317.

206 U. S. Bureau of the Census, Statistical Abstract of the United States: 1980, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1979), p.323.

207 U. S. Bureau of the Census, Statistical Abstract of the United States: 1982-83, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1982), p.304.

208 U. S. Bureau of the Census, Statistical Abstract of the United States: 1984, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1983), p.308.

209 U. S. Bureau of the Census, Statistical Abstract of the United States: 1985, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1984), p.297.

210 U. S. Bureau of the Census, Statistical Abstract of the United States: 1986, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1985), p.297.

211 U. S. Bureau of the Census, Statistical Abstract of the United States: 1988, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1987), p.285.

212 U. S. Bureau of the Census, Statistical Abstract of the United States: 1990, (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1989), pp. 303, 324.

213 Ibid., p. 324.

County Business Patterns and Texas Employment Commission statistics employ the classification scheme of the Standard Industrial Classification (SIC) Manual. This manual divides industries into groups assigned specific Standard Industrial Classification codes. The codes offer four levels of detail. The first digit represents a broad industry group, which is subdivided several times to achieve further levels of detail.[214]

TABLE 4.2. MAJOR INDUSTRIAL CATEGORIES

1.	Agricultural services, forestry and fishing
2.	Mining
3.	Construction
4.	Manufacturing
5.	Transportation and Public Utilities
6.	Wholesale Trade
7.	Retail Trade
8.	Finance, Insurance and Real Estate
9.	Services
-.	Unclassified Establishments

Source: County Business Patterns for 1988.

The Standard Industrial Classification manual includes ten broad industry groups. The evaluation focuses on the fourth broad industry group. This is Manufacturing. The tenth broad industry group is not an industrial category as such. This tenth category (Unclassified Establishments) is used to tabulate statistics for those establishments that have not yet been assigned to a specific industry grouping. Since 1970 the classification scheme was re-adjusted in 1972 and 1988. Industry groups are divided into two-digit industry categories that are subdivided into three-digit sub-categories; which in turn are subdivided into four-digit sub-sub-categories.[215] These broad industry groups are illustrated in Table 4.2.

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[214] Galambos, Eva., and Schreiber, Arthur F., Making Sense Out of Dollars: Economic Analysis for Local Government., (Washington, D. C. : National League of Cities, 1978.), p. 14.

[215] Ibid.

County Business Patterns is banned from publishing statistics that may reveal the identity of particular business establishments. Therefore, estimate ranges are published in place of specific figures; where the publication of exact employment statistics might reveal individual employers.[216] The estimates indicate specific ranges where actual employment might fall.

To achieve consistency, specific quantities were applied to individual estimate categories in the economic base study. The specific estimate numbers were calculated by adding half of the estimate range (actually one plus the estimate range) to the base of the range. For example, for category B the base is twenty and the range is seventy-nine (eighty is used as the range). Therefore, forty plus twenty yields sixty as the estimate number used. These estimate numbers are shown in Table 4.3.

TABLE 4.3 ESTIMATE QUANTITIES USED IN THE ECONOMIC BASE STUDY

CATEGORY	ESTIMATE RANGE	ESTIMATE USED
A	0 to 19	10
B	20 to 99	60
C	100 to 249	175
E	250 to 499	375
F	500 to 999	750
G	1,000 to 2,499	1,750
H	2,500 to 4,999	3,750
I	5,000 to 9,999	7,500
J	10,000 to 24,999	17,500
K	25,000 to 49,999	37,500
L	50,000 to 99,999	75,000
M	100,000 or more	100,000

Source: County Business Patterns

[216] U. S. Department of Commerce: Bureau of the Census, County Business Patters, 1988, Texas. (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1991).

In 1988, the Standard Industrial Classification code scheme was modified. As a result, various changes at the three and four-digit industry code level occurred. Some categories were combined, sub-divided, moved around or had their names changed. Appendix B of the United States County Business Patterns booklet for 1988 presents any significant changes in SIC codes in detail.[217] Changes relevant to the statistics examined in this study are reflected in the 1988 statistics, which may differ in some specific three and four-digit level classification codes from statistics for 1987 and since 1972. In 1972 the Standard Industrial Classification code system was also modified.

For example, a change was made within the Electronic Components and Accessories (SIC 367) category that affected some of its sub-categories; but which should not have affected the aggregate employment statistics at the three-digit code level (SIC 367). The Semiconductors and Related Devices (SIC 3674) sub-category that measures semiconductor firms was not affected. However, its sibling four-digit level sub-categories 3671 (Electron Tubes, receiving type), 3672 (Cathode Ray Television Picture Tubes), 3673 (Electron Tubes Transmitting) and 3679 (Electronic Components, n.e.c.) were affected.[218]

Firms in the old category 3679 (Electronic Components, n.e.c.) classification were distributed among three new SIC classification categories for 1988. These new 1988 SIC classification categories were

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217 U. S. Department of Commerce : Bureau of the Census, County Business Patters, 1988, United States. (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1991) Appendix B

218 U. S. Department of Commerce : Bureau of the Census, County Business Patters, 1988, United States. (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1991) Appendix B

3672 (Printed Circuit Boards), the new 3679 (Electronic Components, n.e.c) and 3671 (Electron Tubes). The new SIC category 3671 (Electron Tubes) also incorporated establishments classified prior to 1988 as 3671 (Electron Tubes, receiving type), 3672 (Cathode Ray Television Picture Tubes) and 3673 (Electron Tubes Transmitting).[219]

Statistics for other high-technology categories are examined as a control device to observe changes in other high-technology industrial sectors that did not receive a boost from the research consortium. The assumption used is that high-technology sectors are similar, and that Austin's high-technology, microelectronics industry received a specific impetus from SEMATECH. These industrial categories are discussed in detail in the employment section of this chapter.

Limitations of the Economic Base Study Evaluation

The main weakness in this section of the analysis is related to the fact that the economic base study could not be performed beyond 1988 with presently available County Business Patterns statistics. In addition, these statistics are published as of March of the year of publication. They do not cover the full year. Therefore, less than a year since SEMATECH was being courted and was present in the city is examined. This is a very short evaluation period for the overall evaluation and the cost-benefit analysis in particular. It is shorter than the two year evaluation goal. Because of the lack of data this defect was inevitable. Supplemental employment

219 Ibid.

statistics (provided for the time period after 1988) are used to help alleviate this situation. As a result any direct conclusions are correspondingly weakened.

EMPLOYMENT SHIFTS AND SHARES ANALYSIS

The employment shifts and shares analysis can give an idea of the direction of the Austin economy in relation to the economy of the nation. The analysis might show if SEMATECH helped the city and its MSA (Metropolitan Statistical Area) to attract more microelectronics employment. In essence, the employment shifts and shares analysis examines the local and national economies at two separate times and compares them. It can help show whether the local economy is improving in relation to growth in specific national industries. It can illustrate which industries are declining or growing nationally and locally. This may help local officials decide which industries they might want to support and attract.

Levels of analysis

As with the economic base study, the employment shifts and shares study examines individual county statistics as well as Austin Metropolitan Statistical Area (Travis, Hays and Williamson counties) statistics. The data obtained in the economic base analysis section is used to develop the employment shifts and shares analysis. The analysis is performed at the two-digit Standard Industry Classification code level for two sets of years. These two sets of years are 1977 and 1986 and 1986 and 1988.

Specific micro-electronics industry categories are also examined. Statistics are computed for Standard Industrial Classification code categories 36 (Electronic and other electronic equipment), 367 (Electronic components and accessories) and 3674 (Semiconductors and related devices). An analysis was performed at this level of detail for the two sets examined at the two-digit classification level. (1977 and 1986 and 1986 and 1988).

The employment shifts-and-shares study suffered from many of the same weaknesses as the economic base study. This is because both studies depended on the same set of statistical data. Therefore, they were both limited by its availability and accuracy. The statistics obtained are discussed in the Results chapter. Detailed statistics are presented in Appendixes B1 and B2.

ECONOMIC ACTIVITY ANALYSIS

EMPLOYMENT EVALUATION

SEMATECH's probable employment contribution is estimated through the economic base study. The evaluation relies on the 'export' sector statistics to estimate the consortium's impact on the local economy. This is done in part to evaluate what spin-off job effect the consortium might have had on local employment. Spin-off jobs would result from any 'export' sector multiplier-derived employment that might be calculated to have resulted from SEMATECH's presence in the city. The employment figures

used in this part of the evaluation are derived from the employment statistics obtained in the economic base study. Other employment statistics are used to supplement the economic base study derived employment statistics.

The economy of Austin, Texas is examined at the county level (Travis, Hays and Williamson counties) and at the Austin Metropolitan Statistical Area level. Austin's Metropolitan Statistical area includes Travis, Hays and Williamson counties. The city of Austin is within Travis county.

Estimates made for information beyond 1988 are derived from an assessment of trends in the employment statistics and supplemental employment statistics. Specific trends are searched for in the County Business Patterns data. These trends are compared to those obtained from supplemental information. The supplemental information includes statistics from the Texas Employment Commission for 1986 to 1990. It also includes statistics on high-technology employment from the Austin Chamber of Commerce for 1980 to 1989. The secondary information sources are given to offer a more comprehensive view of the employment data and close the gap in County Business Patterns statistics for 1989 and 1990.

Development of evaluation criteria

A single public source is used to obtain the public official policy expectations for SEMATECH. Public statements given at the inauguration of the consortium (on November 15, 1988) are used to estimate specific employment and tax revenue targets. For example, Austin Chamber of

Commerce chief economist, Angelos Angelou, stated that: "The project is expected to create as many as 2,400 spin-off jobs within the next five years and raise $150 million in additional state and local tax revenues by the mid 1990s."[220]

From this public statement, an employment figure is obtained by relating the five year period mentioned by Angelou to the five year life of SEMATECH. Therefore, each year SEMATECH is in operation; it could be expected to create an average of 480 jobs. By 1989, it should have created 480 jobs; and by 1990, 960 jobs. The total number of jobs counted includes export and spin-off jobs. For the purposes of the study, the total number of jobs would include any export and non-export jobs that might be attributed to SEMATECH.

A positive outcome for the employment aspect of the evaluation requires that over 960 jobs be created by the end of 1990. The total number of jobs can be compared to official expectations. If the number of new jobs is greater than that predicted, then, a positive evaluation outcome may be assessed. If no new jobs are created, the outcome would be negative. These new jobs will include any export sector and 'export' sector derived spin-off jobs that may be estimated.

220 Pope, Kyle., "SEMATECH Opens with High Hopes" Austin American Statesman, 11/16/90, p. A11.

The job estimating process

The key to determine what the impact of SEMATECH on the economy of Austin, Texas is in relation to jobs is to determine whether any export jobs are created. The economic base study is used to determine the number of 'export' jobs created. In this instance, export jobs are defined as, and derived from, economic base analysis theory. Thus, the economic base study is performed first. Afterwards, the total number of export sector jobs is multiplied by the employment multiplier obtained to arrive at a specific number of spin-off jobs.

The SEMATECH consortium was formed to advance the state of the art in semiconductor chip manufacturing technology. Within the Standard Industrial Classification scheme, the consortium could be said to belong to the Semiconductors and Related Devices (SIC 3674) sub-category. This category is part of the Electronic Components and Accessories (SIC 367) sub-category; which in turn is part of the Manufacturing, Electronic and Other Electronic Equipment (SIC 36) category. Employment statistics for all the aforementioned categories are examined.

As an economic development strategy the hope was that the consortium would encourage firms that make use of semiconductor technology to move to Austin. In this regard, many of the consortium's member firms manufacture semiconductor dependent electronic devices, and not merely semiconductors. Therefore, the Electronic Components and Accessories (SIC 367) industrial category, which includes the Semiconductors and Related Devices (SIC 3674) category, is used to

determine the consortium's impact on employment. This is an important assumption. The Electronic Components and Accessories category is used to avoid an excessively narrow or broad definition. The hope is that this category closely approximates the true impact of the consortium on local employment.

However, it is still possible that this approach may underestimate the true impact of the consortium on employment. This would be true to the extent that other (yet unexamined) industrial categories also reflect employment gains or losses derived from the presence of SEMATECH. For example, supplier firms for the consortium may fall under a different industrial classification; such as Electric Industrial Apparatus (SIC 362). This problem is not directly explored by the present analysis and may lead to a conservative estimate of the consortium's impact on employment.

Development of experimental-like control estimates

It would be difficult to assign causality to any pattern that may appear. There is no definite way to say that SEMATECH was the cause of whatever employment outcome is found. To obtain a greater degree of confidence in the employment evaluation results, a way to control for other possible factors is attempted. Several approaches are taken to act as controls.

The first approach is simply to examine general trends found for SEMATECH after 1987 and to compare them with what might have been expected from trends figured before 1988. The years after 1988 are

selected because in early 1988 SEMATECH officially announced that it was coming to Austin and began operations. Its impact was probably felt since 1987. The selection process had been in progress since 1987 and Austin was seen as a favorite all along.

A second control involves looking at other high-technology industrial sectors in the city and examining what happened to them. Miller and Cote show that some industries have been classified as high-technology industries. These industries are shown in Table 4.4.[221]

TABLE 4.4 HIGH-TECHNOLOGY SECTOR INDUSTRIES

SIC Code	Industry
281	Industrial inorganic chemicals
282	Plastic materials and synthetics
283	Drugs
348	Ordinance and accessories
351	Engines and turbines
357	Office computing machinery
361	Electric distributing equipment
362	Electric industrial apparatus
366	Communications equipment
367	**Electronic components and accessories**
372	Aircraft and parts
376	Guided missiles, space vehicles, and parts
381	Engineering and scientific instruments
382	Measuring and controlling devices
383	Optical instruments and lenses
384	Medical instruments and supplies
386	Photographic equipment and supplies
737	Computer and data processing services
7391	Research and development labs
822	Universities
891	Engineering and architectural services
892	Non-commercial research organizations

Adapted from Miller and Cote., Growing the Next Silicon Valley, p. 13

221 Miller, Roger and Cote, Scott., Growing the Next Silicon Valley: A Guide for Successful Regional Planning, (Lexington, Massachusetts : D.C. Heath and Company, 1987). p. 13

Some of the high-technology industries classified by Miller and Cote are examined for the Austin economy as controls. These high-technology industries are examined between 1984 and 1988. The assumption in looking at these other industries is that most high-technology sector industries respond in a similar way to most circumstances. The exception would be the Electronic Components and Accessories (SIC 367) industrial sector category that theoretically would have received a boost from the SEMATECH consortium in 1988.

The Austin Metropolitan Statistical Area did not possess several of the high-technology categories consistently for the five year evaluation period of 1984 to 1988 that was used as control. Table 4.5 presents the high-technology industrial sector categories that were examined for the Austin Metropolitan Statistical Area.

TABLE 4.5 HIGH-TECHNOLOGY SECTOR INDUSTRIES EXAMINED IN THE AUSTIN MSA

SIC Code	Industry
283	Drugs
357	Office computing machinery
361	Electric distributing equipment
362	Electric industrial apparatus
366	Communications equipment
367	**Electronic components and accessories**
382	Measuring and controlling devices
384	Medical instruments and supplies
737	Computer and data processing services
7391	Research and development labs
822	Universities
891	Engineering and architectural services
892	Non-commercial research organizations

Adapted from Miller and Cote., Growing the Next Silicon Valley.

It was not possible to examine SIC category 383 (Optical Instruments and Lenses) because this category underwent major changes in the Standard

Industrial Classification code revisions of 1988. Category 383 (Optical Instruments and Lenses) establishments were combined with category 381 (Engineering and Scientific Instruments) establishments to form a new category 3826 (Analytical Instruments). Category 381 (Engineering and Scientific Instruments) also underwent changes in its name and composition.[222] Because of the difficulties in interpreting which firms belonged to which categories; data for these categories was excluded. Data was also excluded for categories that failed to show employment in Austin's MSA in 1984.

There were changes in category 891 (Engineering and Architectural Services) which was reclassified and subdivided into SIC code categories; 8711 (Engineering Services), 8712 (Architechtural Services) and 8713 (Surveying Services). The three old individual category totals were added to obtain a figure equivalent to the new category. Also Category 892 (Non-commercial Research Organizations) was changed to category 8733 and kept the same title.[223] Because the changes in these categories were minor, these categories are included in the analysis. No changes were made to the other high-technology categories examined.

The third approach involves comparing the performance of the Electronic Components and Accessories (SIC 367) industrial sector with some measure of the overall performance of the economy. Because the electronics industry is sensitive to national and international economic

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222 U. S. Department of Commerce: Bureau of the Census, County Business Patters, 1988, United States. (Washington D.C. : Bureau of the Census, U. S. Government Printing Office, 1991) Appendix B

223 ibid.

conditions both trends may be expected to follow each other closely. National and state unemployment rate statistics are examined for this purpose. This examination may reveal if Austin's microelectronics industry was pulled in a direction different from national trends by SEMATECH.

Estimates used in the analysis

Employment information beyond 1988 is estimated. These estimates are based on those employment patterns found in more recent information sources. Two specific extra information sources are examined for this purpose. The first is the Texas Employment Commissions' quarterly statistics on employment. The second is the Austin Chamber of Commerce annual statistics on High-Technology Employment in Austin Texas.

EVALUATION OF BUSINESS FIRMS

An analysis of business establishment (firms) information is performed. Statistics for this evaluation are also obtained from County Business Patterns. In particular, the study focuses on the 'number of establishments' section of the County Business Patterns statistics from 1977 to 1988. Number of firms was estimated for Standard Industrial Classification codes 36 (Electronic and Other Electronic Equipment), 367 (Electronic Components and Accessories) and 3674 (Semiconductors and Related Devices) categories.

Other sources are used to get an estimate of the number of Austin firms beyond 1988. Southwestern Bell's greater Austin area phone book

yellow pages data is examined. Five yellow pages subtitles are reviewed for data from 1980 to 1990. These five subtitles are: Electronics Equipment and Supplies Manufacturers, Electronic Equipment & Supplies Service and Repair, Electronic Instruments, Electronic Testing Equipment, and Electronics Research and Development.

Trend information on the number of firms obtained from County Business Patterns is analyzed. Then, it is compared with trend data obtained from the phone book source. A positive outcome would be obtained if positive trends are found, particularly if these trends are higher than expected. No specific control data is used in this area of the analysis

TAX REVENUES EVALUATION

A simple way to evaluate the tax effect of SEMATECH is to look for positive trends in the amount of taxes collected by the most proximate taxing authority. This taxing authority is the city of Austin, Texas. The taxes collected by the city since the 1984 fiscal year are examined.

The tax analysis section focuses on tax statistics collected by the city as part of its annual budget reports. In particular, statistics dating from the 1983-84 to 1989-90 fiscal years are examined. Unfortunately, the highly aggregate nature of these statistics masks any effects that might be attributed to SEMATECH. This makes it difficult to estimate any specific contribution for SEMATECH.

In addition, the evaluation calls for the estimation of a specific tax dollar figure. This figure could be estimated from employment statistics. Employment estimates (derived from the economic base study) are used to arrive at a tax revenue estimate that could be attributed to the consortium. A calculation assigns a 'tax value' to the export employment numbers obtained from the economic base study. Other local employment statistics are used to supplement the economic-base study estimates.

Derivation of tax estimates

Specifically, the economic base study and its export sector multiplier are used to estimate the number of job holders in Travis County. Travis county statistics are used for consistency since the study employs the three main taxes collected by Travis county in its estimation of the effect of SEMATECH on tax revenue. The estimate of the number of jobholders is divided by two to arrive at an estimated number of households. The number of households estimate is multiplied by the percentage of households in Austin that own a home (homeowner-households). The estimate of homeowner-households is multiplied by the most recent average appraised homestead value (for 1988) in Austin. The resulting dollar figure is multiplied by the applicable Austin Independent School District, City of Austin, and Travis County property tax rates to determine an estimated total property tax revenue figure. The three Travis county collected property taxes employed in the study include the Austin Independent School District property tax, the city of Austin property tax and the Travis County property tax.

To obtain a sales tax estimate, the property tax quantity obtained for the city of Austin is multiplied by the average percentage of the 'property tax' collected as 'sales tax' by the city of Austin. This procedure yields a complementary sales tax revenue estimate. In this manner, an estimate of the amount of taxes gained by any employment created by SEMATECH is obtained.

Source of evaluation criteria

The exact tax revenue criteria figures used in the evaluation are derived from public statements given at the inauguration of the consortium. In his public speech, Austin Chamber of Commerce chief economist, Angelos Angelou, stated: "the project is expected to create as many as 2,400 spin-off jobs within the next five years and raise $150 million in additional state and local tax revenues by the mid 1990s."[224]

Unfortunately, the statement is open to a range of interpretations. For the purpose of the study, mid 1990s is defined as the end of 1995. Local tax revenues are interpreted as local property taxes (collected by Travis county). State revenues are defined as sales tax revenues collected in the local area and returned to the city.

These estimates might produce a conservative estimate of the impact of the consortium. They do not consider the wider metropolitan statistical

224 Pope, Kyle., "SEMATECH Opens with High Hopes" Austin American Statesman, 11/16/90, p. A11

area. This approach is taken to simplify the calculations and provide a conservative estimate.

Since the tax estimate statements (given at SEMATECH's inauguration) were given approximately at the end of 1988, the time referred to must have been the seven year period from 1988 to 1995. Therefore, by dividing the estimate given for the expected tax revenues from SEMATECH at its inauguration by seven years, an average annual tax contribution is obtained. This annual contribution is estimated at 21.4 million dollars per year. Thus, SEMATECH could be expected to add 42.8 million dollars in tax revenues to the Austin economy by the end of 1990.

Limitations of the evaluation

The tax revenue evaluation approach has its weaknesses. The main one is the lack of an adequate control. In addition, looking at aggregate tax statistics makes it difficult to assign any patterns to SEMATECH. The best that could be said is that any pattern found may be due to SEMATECH.

On the other hand using the export sector employment figures obtained as a way to approximate the tax revenue impact on the city offers a more concrete way to gauge impact. However, this analysis is dependent on the accuracy and validity of the economic base study, and is based on a very complex series of estimates. The presence of a large number of estimates makes it more likely that errors might have been introduced. The use of estimates also lacks the concreteness of primary statistical data obtained from records of actual events.

BUSINESS INVESTMENT EVALUATION

A measure of investment is also examined. It is operationalized by using building permit records. Monthly building permit statistics obtained from the city of Austin's Department of Planning and Development are used. Statistics for 1970 to 1990 are compared and analyzed. The focus is on the early eighties to 1990. Trends are compared. The discovery of strong positive trends after 1987 might suggest a positive assessment. A base of analysis dating back to 1970 is used to provide as much breadth as possible.

However, aggregate statistics are used. Therefore, it is not possible to distinguish between different industrial sectors from the aggregate statistics. This weakens any possible conclusions. The data only distinguishes between residential, commercial and public building permit data. The commercial building permit statistics are compared to residential and public sector building permit statistics. Given the aggregate nature of the data, any conclusions obtained would be highly tentative. It would not be possible to conclude with certainty that any changes observed are due to SEMATECH; only that they might be.

COST-BENEFIT ANALYSIS

The cost-benefit analysis is focused on the local community. The benefits are compared to the costs. Implicitly, the cost-benefit analysis examines the choice between having the SEMATECH consortium and the status-quo. In this instance, the status-quo represents the absence of the

consortium in Austin. Data from various other parts of the overall evaluation is used in the cost-benefit analysis.

The cost-benefit analysis examines two time frames. The first time point is as of the end of 1990. The second is as of the end 1993. The reason for including a second evaluation point is two-fold. First, the expected life of the SEMATECH project is five years. Second, the first evaluation point occurs too soon after the inception of the project. In addition, the cost-benefit literature recommends that a cost-benefit analysis be carried out over the life of the project.

The cost-benefit analysis also provides a framework to examine the intangible costs and benefits from SEMATECH. It is important to note the effect of intangibles and externalities in order to provide a more comprehensive cost-benefit evaluation. The discussion of intangibles can also illustrate potential problems and benefits. Many of the costs and benefits are not quantifiable.

Theoretical Issues

In their application of cost-benefit analysis principles, Whinston and Davis suggest that it is possible for a cost-benefit analysis to consider only the revenues and costs (expenditures) of a project as the pertinent costs and benefits.[225] They specifically applied cost-benefit principles to local government redevelopment projects. This cost-benefit framework ('profit

[225] Newton, Trevor., Cost-Benefit Analysis in Administration. (Oxford, England : George Allen & Unwin LTD, 1972), p. 158.

and loss criterion') involves a simple 'profit and loss account' that counts only the financial costs and benefits accruing to the locality.[226] In the evaluation, this locality is the city of Austin, Texas and its economy as defined by the Austin Metropolitan Statistical Area, Travis county or the city of Austin. The cost-benefit analysis attempts to approximate the costs and benefits at the county (Travis) and city (Austin) level.

TABLE 4.6 COSTS AND BENEFITS FOR THE AUSTIN ECONOMY

Benefits	Costs
1. Net additions to the local economy's tax revenues	1. Cost of incentive package to the city 2. Opportunity cost of lost tax revenues

The profit and loss criterion is used in the cost-benefit analysis for two main reasons. First, it lends itself directly to the purpose of the overall evaluation. The intent is to evaluate the impact on and focus on the Austin economy. Second, the SEMATECH consortium is a very complex undertaking. It involves actors and funding (costs) derived from federal, state, local and private sources. Attempting to provide a full analysis of the costs and benefits from a societal perspective might be beyond the scope of the study. Table 4.6 presents the costs and benefits examined in the study. The cost and benefits are represented in dollar terms adjusted by an appropriate discount rate. The dollar values are given in 1988 dollars.

The use of a profit and loss criterion for the cost-benefit analysis has several weaknesses. It focuses on the community without taking account of the wider social costs and benefits that may result including an

[226] Newton, Trevor., Cost-Benefit Analysis in Administration. (Oxford, England : George Allen & Unwin LTD, 1972), p. 158.

explicit integration of externalities by assigning values to them.[227] Thus, the impact of the consortium on the state, nation or internationally is not considered in the explicit analysis. Aspects of the national impact are included in the externalities. The analysis focuses on the local government without attempting to identify the costs and benefits to specific segments of the community.[228] Finally, the study does not measure the classic notion of social benefit and cost that is usually associated with a cost-benefit analysis. This is because to take this wider approach would shift the study beyond the narrow focus on the local economy.

Besides the 'profit loss criterion' the cost-benefit analysis uses another important analogy. This might be described as an 'agricultural' analogy. The local economy can be viewed as an agricultural field, employment as a crop, and the consortium as a specific intervention intended to improve the 'employment yield.' This analogy brings out the importance of the economic base study to the execution of the cost-benefit analysis.

Within the framework used in the evaluation, an attempt to measure the employment at SEMATECH directly would be complicated by the fact that many employees are loaned to the consortium and would have been otherwise employed elsewhere locally or in some distant city. Using the economic base study results as a measure of the effect of SEMATECH allows one to measure the economic impact of the consortium's employment

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227 Newton, Trevor., Cost-Benefit Analysis in Administration, (Oxford, England : George Allen & Unwin LTD, 1972), p. 159.
228 ibid.

through the economic base study. In this manner, the aforementioned detailed employment issues are already taken into account.

The funds given to SEMATECH by the federal government are not be directly counted as benefits. At some level, the effects of federal and private funds on the Austin economy are measured through the effect of the consortium on the community's employment. Employment derived values are used to measure benefits.

The cost of the consortium to the Austin Economy is measured by the total estimated cost of the subsidies given to SEMATECH by the city of Austin. This includes local costs in the incentive package and the opportunity cost of tax revenues foregone to the locality from the consortium's present tax-exempt property site.

The community will feel the impact of federal and state contributions through their effect on the local economy. The effect of SEMATECH on the local economy is measured through the Economic Base Study.

In a sense, an attempt to measure the value of the federal and state contribution to SEMATECH is a separate matter that involves comparing the total benefits to society from the research and development performed by SEMATECH against the costs incurred in supporting the consortium. Some of the benefits of the research and development advanced by SEMATECH might involve economic benefits to the Austin economy. The total benefits would have to be measured at least nation wide.

By focusing on the local economy, the problem of measuring the value of Research and Development is avoided and the study is allowed to focus on the economic impact to the local economy. Because of the fact that private firms also contributed to the consortium, measuring the benefit of SEMATECH's research and development efforts involves, at some level, the general question of measuring the value of federal and state research-and-development assistance to private firms. Solving the general question of research-and-development aid for private firms is beyond the focus of the study as an assessment of SEMATECH's impact on the local economy with the consortium viewed as an economic development incentive.

Assessment of costs and benefits

The use of the 'profit loss criterion' in the cost-benefit analysis allows one to focus on the costs and benefits as they are measured through the operations of local government authorities. In this study, the costs to the community are approximated as the costs to the city of Austin, Texas, the Austin Independent School District and Travis County. The costs to the city of Austin, Texas specifically includes part of the cost of the incentive package as well as lost-tax-revenue opportunity costs. The costs to the Austin Independent School District and Travis County only include lost tax revenue costs. Following the principle of measuring costs and benefits through local government fiscal operations, the benefits to the community are measured through the local government's gains in tax revenues that may have resulted from SEMATECH.

Using this approach limits the analysis of the impact of SEMATECH to the three local governments described above. The intent is to provide a simple, conservative definition of the local economy. The main disadvantage is that this approach may fail to measure the full impact of SEMATECH since it does not take into account every government that operates throughout the Austin Metropolitan Statistical Area. However, for the most part the bulk of the impact of SEMATECH may still be obtained since the most proximate area is measured.

In that regard, the costs of the incentive package may be broken down into costs to the locality and costs to the state of Texas. Costs to the state of Texas are treated like federal costs and excluded from the immediate focus of the cost-benefit analysis. Again, their effect is measured through the impact of the consortium on the local economy.

Costs incurred by the University of Texas represent costs to the state. The University contributed the cost of SEMATECH's present site; renovation and new construction costs at the site, and issuance and first-year interest costs on construction bonds.[229] The cost of the property owned by the University of Texas and leased to SEMATECH is a good approximation of the cost of the state contribution. This is approximately 40.7 million dollars.[230] In addition, the University of Texas also set up a bank account with 15 million dollars for SEMATECH bringing the total state

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229 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 11.

230 Pope, Kyle., "Tax ruling goes against SEMATECH" Austin American Statesman, 23, August 1989, Sec.A, p. A1.

contribution to 55.7 million dollars.[231] Therefore, subtracting 55.7 million dollars from the 68 million dollar incentive package leaves only 12.3 million dollars to consider as the potential local contribution.

The city of Austin provided electrical power facilities, utility connections, and building and development fee abatements among other assorted public and private incentives.[232] The cost of the building and development fee abatements has been placed at $400,000 dollars.[233] The city also provided other incentives, such as the energy incentive payment of $218,604 dollars given to SEMATECH in 1989.[234]

The aforementioned cost figures provide a range of values that can later be placed in a sensitivity analysis. The sensitivity analysis is included as part of the cost-benefit analysis. It is designed to give an idea of the impact of various cost and benefit assumptions on the study. Usually the most important assumptions are examined.

The low end cost of the incentive package to SEMATECH may be set at least at the cost of the building and development fee abatements plus ($400,000) the cost of the energy incentive payment (218,604) to SEMATECH. This yields a total minimum cost of $618,604 dollars. The

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231 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Stateman, 24, July 1988, Sec.H, p.H1.

232 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 11.

233 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Stateman, 24, July 1988, Sec.H, p.H1.

234 Banta, Bob., "Council to pay for SEMATECH's air conditioning" Austin American Stateman, 4, August 1989.

maximum cost that might be attributed to the city of Austin might be the full $12.3 million dollars, not part of the cost to the state, which was part of the value of the total 68 million dollar incentive package.

Since many of the costs in the incentive package were private costs intermingled with public costs, which might or might not have been expended regardless of the presence of SEMATECH, a way to approximate the true cost to the city might be to take a cost value between the high and low cost estimates as a 'probable' cost to the city. This procedure offers a simple way to look at a range of values for a sensitivity analysis of the cost of the SEMATECH incentive package without having to resort to a long, complex analysis. This median cost figure happens to be $5,840,698 dollars for the incentive package cost to the city.

Clearly, most of the costs to the locality are in the form of opportunity costs from lost tax revenues. This is because the bulk of the incentive package was absorbed by the state of Texas in its operations through the University of Texas. In addition, some of the cost of the incentive package was also absorbed by private sources.

The employment figures used in this section of the analysis refer to statistics for Travis county obtained from the economic base study. Other aggregate statisticas used in the determination of the tax revenues are obtained from the Austin Chamber of Commerce's, Austin MSA Demographics and Selected Market Segments publication, and Austin budget reports.

Austin MSA Demographics and Selected Market Segments city aggregate statistics nearly match complementary statistical values for Travis county given in the same publication. For example, the median household income given for Travis county by the Austin Chamber of Commerce was $29,900 and that for the city of Austin was $29,500.[235] The city figures are lower. This may be because Travis county includes more land area than the city boundaries as well as more suburban communities that enjoy higher incomes.

Cost-benefit analysis assumptions

The cost-benefit analysis includes the following assumptions. The benefits to the community can be measured through the employment figures obtained from the economic base study. The economic base study measures reliable and valid employment effects. An accurate estimate of the number of households resulting from the employment statistics in the economic base study is possible. The benefit of SEMATECH to the community can be approximated through the measure of tax revenues. Any research and development benefits as well as outside government contributions provided by SEMATECH to the local community can be measured through their effect on local employment. Tax contributions can successfully measure the benefits of SEMATECH within the context of the study. Any employment measured by the economic base study that may have resulted from SEMATECH would otherwise represent idle employment.

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235 Greater Austin Chamber of Commerce, Austin MSA Demographics and Selected Market Segments, (Austin, Texas : Greater Austin Chamber of Commerce, 1990), p. 8.

THE EVALUATION APPROACH: TYING IT ALL TOGETHER

The evaluation approach aggregates all the separate evaluation studies. Positive responses among four (or more) of seven categories will yield a positive evaluation. Positive responses along all dimensions will yield a conclusive positive outcome. If only three or fewer sub-hypotheses show a positive outcome, a negative conclusion will be reached. No positive responses will clearly show a negative evaluation. Neutral outcomes will be regarded as negative.

TABLE 4.7 EVALUATION CRITERIA AS OF THE END OF 1990.

Variables	Operationalization	Data Source	Decision Rule
ECONOMIC BASE STUDY	result from theory	CBP* , SA**** TEC**	↑ export jobs
EMPLOYMENT SHIFTS AND SHARES	result from theory	CBP*	↑ share
JOBS (EMPLOYMENT)	employment statistics	CBP*, TEC** ACofC***	higher < 960 jobs
BUSINESS FIRMS	firm statistics	CBP* phone book	Higher
TAXES	tax statistics	city of Austin statements	Higher <$42.8 million
BUILDING PERMITS (INVESTMENT)	permit statistics	city of Austin	Higher
COST/ BENEFIT	result from theory	various	Benefits > Costs

Note: * CBP refers to County Business Patterns statistics
** TEC refers to Employment Commission data
*** ACofC refers to Austin Chamber of Commerce data
**** SA refers to the United States Statistical Abstracts

Table 4.7 outlines each evaluation sub-category, its variables, and their operationalization, as well as the source of the data and the decision

rule relevant to each variable used in the evaluation. These criteria are used to evaluate each of the sub-hypothesis enumerated in Table 4.1.

Table 4.7 provides specific evaluation criteria figures for only two categories. These are the categories where specific figures are obtained from public records. These two evaluation criteria have specific quantities of jobs, taxes, or dollars that they need to satisfy a specific decision rule. The other five evaluation criteria demand a 'larger quantity' or a 'better position' (Firms, Investment, Economic Base Study, Employment Shifts and Shares). The information for the cost-benefit analysis' second evaluation time point is provided in Table 4.8.

TABLE 4.8 EVALUATION CRITERIA FOR THE COST-BENEFIT ANALYSIS AS OF THE END OF 1993

Variables	Operationalization	Data Sources	Decision Rule
COST/ BENEFIT	result from theory	CBP,TEC,ACofC, City of Austin, Travis County,SA	Benefits > Costs

Note: CBP refers to County Business Patterns statistics
TEC refers to Employment Commission data
ACofC refers to Austin Chamber of Commerce data
SA refers to the United States Statistical Abstracts

CHAPTER V: ANALYSIS AND RESULTS

This chapter examines the results of the evaluation methodologies used to evaluate the main hypothesis and its sub-hypotheses. Results are given for the seven sub-hypotheses and their corresponding methodologies. The results are analyzed and graphically displayed in tables and graphs. The chapter begins with the results from the economic base study.

ECONOMIC BASE STUDY

The economic base study examines private industry and government employment statistics to arrive at estimates of 'export' job growth. State and federal employment are analyzed to determine what export component they might represent. Local employment is not examined because it is by definition non-export employment.

Industry wide results

Travis county shows consistent dependence on government employment. The county gained export employment from state government and except for two years (1983 and 1984), also from federal employment. Finance insurance and real estate is another steady supplier of export employment for Travis county. Retail trade offered export jobs various years. Until 1986, contract construction showed a steady supply of export

sector employment. The manufacturing sector did not provide any aggregate export employment for any of the eleven years studied.

The economy of Hays county depends heavily on retail trade and state employment. The biggest source of export employment is state government; followed by retail trade. The presence of Southwest Texas State University may explain this phenomenon. The University employs a large number of workers and brings many student residents to the San Marcos area. Contract construction, services, agriculture and mining also contributed export employment in various years.

Williamson county had the most diversified economy of all three counties. Its primary export employment sectors are non-classifiable establishments, construction and retail trade. The county also showed export employment in mining and agriculture in several years. However, Williamson county failed to provide any government export employment in any given year.

The Austin Metropolitan Statistical Area is primarily a government and service economy. Retail trade, finance insurance and real estate, and non-classifiable establishments show the most consistent export employment results since 1977. State employment is also a strong and consistent source of export employment for the area. The federal government produced export employment in the last two years examined and in the late seventies and early eighties. Contract construction also produced export employment in the late seventies and early eighties but failed to do so recently. However, the bulk of the export employment for the

Austin Metropolitan Statistical Area is derived from state employment. The employment patterns for Travis county are almost identical to those for the statistical area.

The Austin Metropolitan Statistical Area does not have a viable manufacturing sector. Most of the area's manufacturing industries do not produce any export employment. Only the Electric and Electronic Equipment Manufacturing (SIC 36) sector category has demonstrated positive export sector employment growth since 1977. In 1977, the only other industry to show export employment in Travis county and in the Austin Metropolitan Statistical Area was the Furniture and Fixtures (SIC 25) category industry. By 1986, it no longer showed any export sector employment; it showed none in 1988. The area also had a large number of export employment in the Machinery-except electrical (SIC 35) manufacturing industry category in 1986. However, by 1988, the export component in that category was gone.

Hays and Williamson counties produce manufacturing export employment in a few manufacturing sub-categories. However, the impact does not carry over to the Austin Metropolitan Statistical Area. This may be due to their small size in relation to Travis County. Nevertheless, both counties fail to show a positive export sector component in their overall Manufacturing Industry sector.

Employment Multipliers

Simple average employment multipliers were calculated for each county (and the Austin Metropolitan Statistical Area) from the aggregate

annual export sector multipliers obtained from 1977 to 1988. Travis county had an average employment multiplier of 5.88. Hays county had the lowest multiplier with 4.28. Williamson county enjoyed the highest multiplier with 9.96. The Austin Metropolitan Statistical Area had a simple average employment multiplier of 6.26.

Conclusion

The results reveal that the Austin Metropolitan Statistical Area and the economy of Austin,Texas are highly dependent on the service sector of the economy. Most of this dependence is on the state government and the service sector. Over the eleven year period examined, the economy of Austin became less diversified. This happened as a result of having to rely on fewer industries for export employment.

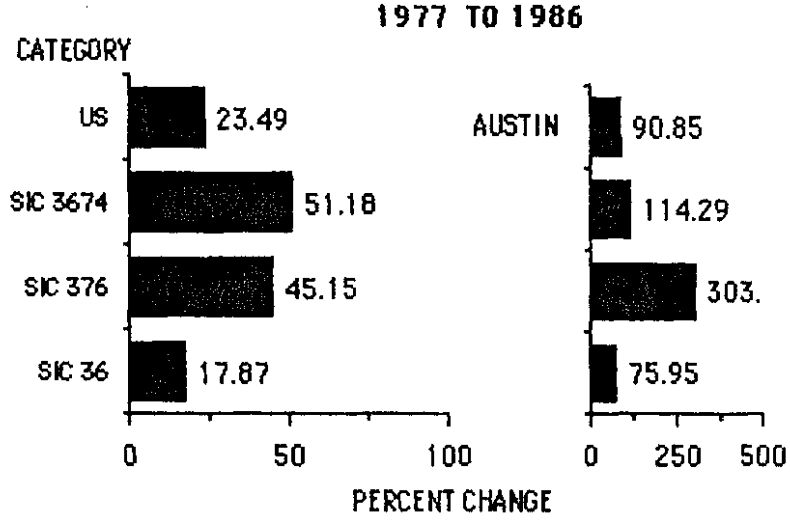
Detailed economic base employment results are offered in Appendixes A1, A2, A3 and A4. The important industry categories to observe are the Electric and Electronic Equipment Manufacturing (SIC 36) manufacturing sector category and its sub-categories. They have generally trended upward and surged in 1988. Therefore, a guarded positive evaluation outcome will be offered.

EMPLOYMENT SHIFTS AND SHARES

An employment shifts and shares analysis is performed on the private industry sector of the Austin economy. This analysis is performed at the overall two-digit industry category level and for the specific previously

examined microelectronics industry sub-categories. The analysis compares two sets of years. The comparisons made are between 1977 and 1986 and between 1986 and 1988.

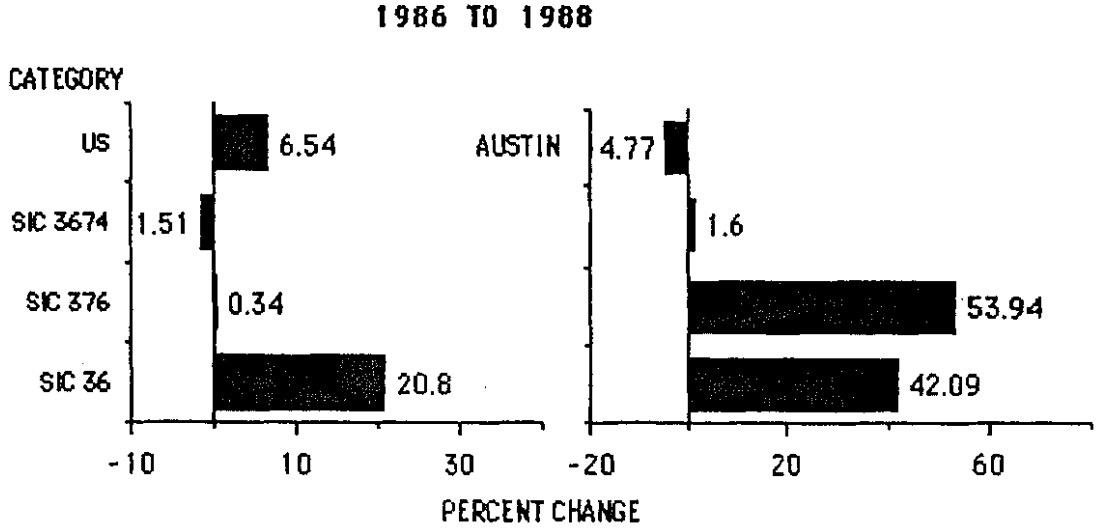
FIGURE 5.1 COMPARISON OF MICROELECTRONICS CATEGORY FIRMS PERCENT CHANGES IN TOTAL EMPLOYMENT BETWEEN 1977 AND 1986 FOR THE UNITED STATES AND THE AUSTIN METROPOLITAN STATISTICAL AREA



Note: The categories given are classified as follows:
SIC 36. Electric and Electronic Equipment
SIC 376. Electronic Components and Accessories
SIC 3674. Semiconductors and Related Devices
Source: Appendix B3.

The results show that national employment grew 23.49 percent between 1977 and 1986. The Austin Metropolitan Statistical Area experienced a job growth of 90.85 percent during this time. On the other hand, between 1986 and 1988, the national economy grew by 6.54 percent; and the Austin Metropolitan Statistical Area's economy contracted by -4.77 percent. Figure 5.1 illustrates the rate of growth for the nation, the metropolitan statistical area and for the microelectronics industry component of the Austin Metropolitan Statistical Area between 1977 and 1986.

FIGURE 5.2 COMPARISON OF MICROELECTRONICS CATEGORY FIRMS PERCENT CHANGES IN TOTAL EMPLOYMENT BETWEEN 1986 AND 1988 FOR THE UNITED STATES AND THE AUSTIN METROPOLITAN STATISTICAL AREA

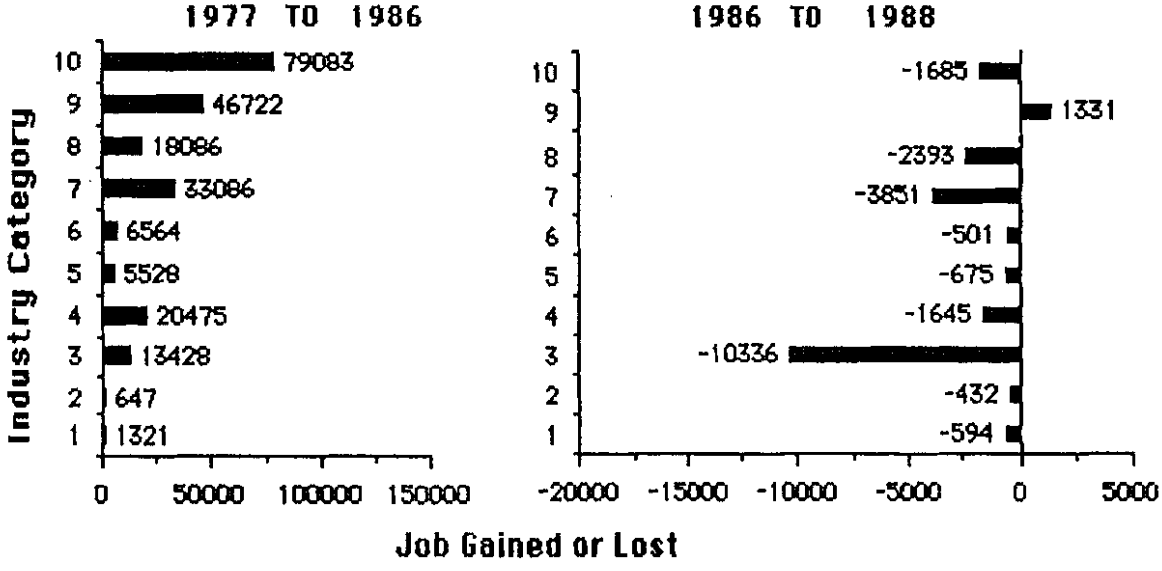


Note: The categories given are classified as follows:
SIC 36. Electric and Electronic Equipment
SIC 376. Electronic Components and Accessories
SIC 3674. Semiconductors and Related Devices
Source: Appendix B3.

The total employment comparison statistics for the microelectronics industry between 1977 and 1986 show that the Austin Metropolitan Statistical Area gained microelectronics industry employment at a rate above that of the city's aggregate employment growth, and above the national rate of growth. This means that Austin attracted a large number of electronics high-technology firms and employment during this time. Therefore, this was a period of time when such employment expanded. The employment expansion probably created the high number of export sector jobs seen in the economic base study for the microelectronics industry high-technology categories Figure 5.2 shows the percentage changes in total employment for the nation and the Austin Metropolitan Statistical Area that occurred between 1986 and 1988.

Between 1986 and 1988 the Austin economy experienced a net loss of jobs. This loss was not reflected in the Austin Metropolitan Statistical Area's microelectronics category industries. Instead the rate of job growth in this industry in Austin surpassed the average national figures. In the Semiconductors and Related Devices (SIC 3674) category, average national employment fell nationwide and increased in the Austin area.

FIGURE 5.3 AUSTIN METROPOLITAN STATISTICAL AREA INDUSTRY WIDE EMPLOYMENT SHIFTS AND SHARES GAINS OR LOSES IN EMPLOYMENT FOR TWO SEPARATE SETS OF COMPARISON YEARS.



Note: Categories 1 to 10 are classified as follows:

1. Agricultural Services
2. Mining
3. Contract Construction
4. Manufacturing
5. Transportation and Other Public Utilities.
6. Wholesale Trade
7. Retail Trade
8. Finance Insurance and Real Estate
9. Services
10. Non-classifiable Establishments

Source: Appendixes B1 and B2.

Overall the Austin economy lost many manufacturing jobs. However, Austin managed to keep its advantage in microelectronics industry employment by gaining electric and electronic manufacturing jobs faster than the nation lost them. Figure 5.3 shows the industry wide employment shifts and shares results for the Austin Metropolitan Statistical Area

between for the two sets of years examined. Section B of the Appendixes offers detailed information for Travis, Hays and Williamson Counties as well as the Austin Metropolitan Statistical Area.

The results illustrated in Figure 5.3 show the heavy employment losses suffered by the Austin Metropolitan Statistical Area between 1986 and 1988. Only the Services Industry managed to keep a positive shift in employment from 1986 to 1988. Figure 5.4 examined the employment shifts and shares results for the microelectronics sector of the Austin Metropolitan Statistical Area for both sets of years.

FIGURE 5.4 MANUFACTURING AND MICROELECTRONICS INDUSTRY CATEGORIES EMPLOYMENT SHIFTS AND SHARES GAINS OR LOSES IN EMPLOYMENT FOR TWO SEPARATE SETS OF COMPARISON YEARS.

Note: The categories given are classified as follows:
SIC 36. Electric and Electronic Equipment
SIC 376. Electronic Components and Accessories
SIC 3674. Semiconductors and Related Devices
Source: Appendix B3.

The results from the employment shifts and shares analysis performed on the microelectronics industry categories are positive on both sets of comparison years. In spite of the overall decline in employment

experience by the manufacturing sector, the microelectronics industry gained employment. This demonstrates that the Austin economy has gained a good share of the nation's microelectronics (high-technology) manufacturing sector in spite of the overall decline in manufacturing experienced by the city.

Conclusion

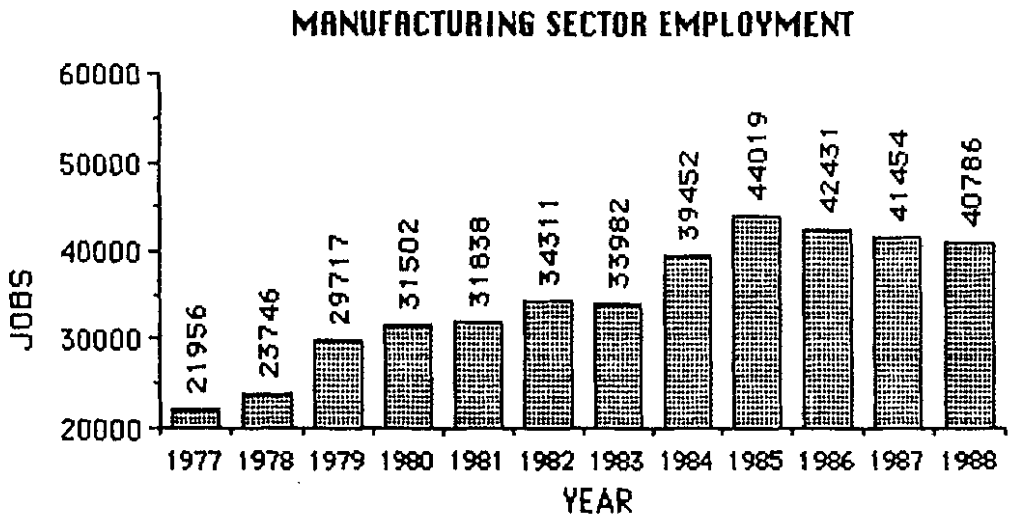
In regard to gaining employment shifts and shares, the Austin economy did well in the microelectronics industry. Judging from the positive employment trends previously mentioned, there is little reason to doubt that this changed drastically between 1988 and 1990. Therefore, a guarded positive evaluation is given for this section of the evaluation.

EMPLOYMENT EVALUATION

The employment evaluation begins with an examination of County Business Patterns statistics. The County Business Patterns information presented here includes employment statistics at the industry and two-digit level Standard Industrial Classification (SIC) designation for all industries from 1977 to 1988. The same data set used in the economic base study is applied to the employment shifts and shares study. Like in previous evaluations, it was not possible to conduct the analysis beyond 1988 with County Business Patterns statistics. Other employment statistics are used to supplement the information missing from County Business Patterns.

Figure 5.5 illustrates employment for the Manufacturing sector of the Austin Metropolitan Statistical Area from 1977 to 1986. This is total employment for the entire manufacturing sector. Employment in this category of the Austin economy peaked in 1985 and declined somewhat since then.

FIGURE 5.5 MANUFACTURING SECTOR EMPLOYMENT FOR THE AUSTIN METROPOLITAN STATISTICAL AREA FROM 1977 TO 1988



Source: Appendix A1, the data was derived from County Business Patterns statistics.

No obvious upward trend is apparent after 1987. These 'regular' employment statistics should not be confused with 'export' employment statistics. Indeed, the manufacturing industry sector of the Austin economy failed to show any export employment at all.

Microelectronics industry export employment analysis

Even though the manufacturing sector did not exhibit any positive export sector employment since 1977, the Electric and Electronic Equipment (SIC Code 36) sub-category produced export employment. The rate of export

sector job growth was high after 1987 (in 1988) with a rate of growth of 172 percent. Table 5.1 presents the number of 'export' sector jobs derived from the economic base study for the Austin Metropolitan Statistical Area from 1977 to 1988 in the Electric and Electronic Equipment (SIC Code 36) industry category. Detailed statistics for this part of the study are offered in Section A2 of the Appendixes.

TABLE 5.1 'EXPORT' SECTOR JOBS IN THE ELECTRIC AND ELECTRONIC EQUIPMENT (SIC 36) INDUSTRY CATEGORY FOR THE AUSTIN METROPOLITAN STATISTICAL AREA.

YEAR	JOBS	PERCENT CHANGE
1977	1,741	
1978	1,931	10.95
1979	765	-60.40
1980	2,396	213.21
1981	2,716	13.37
1982	1,944	-28.42
1983	2,887	48.51
1984	3,009	4.23
1985	4,503	49.63
1986	2,800	-37.82
1987	3,486	24.5
1988	9,479	171.91

Source: Appendix A3, derived from County Business Patterns Statistics.

The export sector figures for the Electronic Components and Accessories category (SIC 367, a subcategory of SIC 36) are equally encouraging. This category is closely related to the activities of SEMATECH's member firms. Table 5.2 presents the export sector job employment results obtained for this category for the Austin Metropolitan Statistical Area. A large percentage increase in employment is observed between 1987 and 1988. One may speculate that part this export employment growth may be due to SEMATECH.

TABLE 5.2 'EXPORT' SECTOR JOBS IN THE ELECTRONIC COMPONENTS AND ACCESSORIES (SIC 367) INDUSTRY CATEGORY FOR THE AUSTIN METROPOLITAN STATISTICAL AREA.

YEAR	JOBS	PERCENT CHANGE
1977	971	
1978	885	-8.83
1979	2,679	202.63
1980	2,518	-6.03
1981	2,651	-5.32
1982	2,473	-6.71
1983	2,441	-1.33
1984	2,181	-10.64
1985	5,684	160.59
1986	5,634	-0.88
1987	5,874	4.26
1988	10,061	71.28

Source: Appendix A3, derived from County Business Patterns Statistics.

Export sector employment results for the Semiconductors and Related Devices (SIC 3674) sub-category are different. A large percentage increase in employment for 1988 is missing. Table 5.3 presents these results.

TABLE 5.3 'EXPORT' SECTOR JOBS IN THE SEMICONDUCTORS AND RELATED DEVICES (SIC 3674) INDUSTRY CATEGORY FOR THE AUSTIN METROPOLITAN STATISTICAL AREA.

YEAR	JOBS	PERCENT CHANGE
1977	1,451	
1978	1,440	-0.72
1979	3,388	135.22
1980	3,311	-2.26
1981	3,266	-1.36
1982	3,192	-2.28
1983	3,212	0.63
1984	3,001	-6.56
1985	2,996	-0.17
1986	3,051	1.81
1987	3,169	3.88
1988	3,194	0.80

Source: Appendix A3, derived from County Business Patterns Statistics.

The percentage changes from year to year show a declining pattern in the early eighties with an increase in export sector employment in 1986. Perhaps SEMATECH will help stop any negative trend in future years; or

perhaps, it might prevent a worst decline. The export employment sector data from this category do not show any apparent effect from the consortium.

Employment estimates after 1988

It is still necessary to try to estimate employment patterns beyond 1988 (in 1989 and 1990). The Austin Chamber of Commerce provided valuable assistance in this regard through its annual listing of high-technology annual job statistics for the Austin Metropolitan Statistical Area. Table 5.4 presents their results.[236] These are overall employment statistics, unlike the 'export' sector statistics described above. A substantial percentage increase in employment (in relation to most previous years) can be detected in 1988. This increase is sustained in 1989. The data offers the hint of a sustained upward trend.

TABLE 5.4 SELECTED HIGH-TECHNOLOGY SECTOR EMPLOYMENT GROWTH FOR THE AUSTIN METROPOLITAN STATISTICAL AREA FOR 1980 TO 1989.

YEAR	JOBS	PERCENT CHANGE
1980	18,500	
1981	20,050	8.4
1982	19,200	-4.2
1983	20,200	5.2
1984	23,800	17.8
1985	24,100	1.3
1986	22,900	-5.0
1987	23,400	2.2
1988	25,300	8.1
1989	27,400	8.3

Source: Adapted from the Greater Austin Chamber of Commerce, Employment and Economic Forecast 1990-1991.

236 Greater Austin Chamber of Commerce, Employment and Economic Forecast 1990-1991, (Austin, Texas : Greater Austin Chamber of Commerce, 1990) p.22.

Another look at the Austin Metropolitan Statistical Area's employment history is presented in the Texas Employment Commission's employment statistics. Unfortunately, these statistics are only available at the broad manufacturing industry level. From 1987 to 1988, the quarterly Texas Employment Commission Statistics show a pattern of stable growth in employment for the Austin Metropolitan Statistical Area.

TABLE 5.5 TEXAS EMPLOYMENT COMMISSION QUARTERLY EMPLOYMENT STATISTICS FOR THE MANUFACTURING SECTOR IN THE AUSTIN METROPOLITAN STATISTICAL AREA (MSA)

Year	Quarter	Travis	Hays	Williamson	Austin MSA	Percent Change
1987	1	32,805	1,774	3,896	38,475	
	2	32,856	1,738	4,093	38,687	0.55
	3	33,367	1,761	4,306	39,434	1.93
	4	33,623	1,837	4,370	39,830	1.00
1988	1	33,950	1,887	4,597	40,434	1.52
	2	34,285	1,814	4,615	40,714	0.69
	3	35,146	1,839	4,787	41,772	2.60
	4	35,192	1,871	4,879	41,942	0.41
1989	1	36,024	1,810	4,914	42,748	1.92
	2	37,002	1,853	5,106	43,961	2.84
	3	38,580	1,873	5,152	45,605	3.74
	4	39,470	1,946	5,227	46,643	2.28
1990	1	39,521	2,020	5,074	46,615	-0.06
	2	40,314	2,046	5,281	47,641	2.20

Source: Texas Employment Commission reports.

This appears to contradict the annual statistics from County Business Patterns that show a slight decrease in employment for the Austin Metropolitan Statistical Area. This may be due to changes in tabulating the statistics from quarterly data to annual data, and to the fact that the County Business Patterns statistics only cover up to the first quarter of 1988 and count the last three quarters of 1987. The manufacturing industry statistics given above were not adjusted to match those of County Business Patterns. These supplementary employment data results of the evaluation

lend support to the notion that an overall increase in microelectronics employment may have been stable for most of 1989 and 1990.

Controlling for other factors

Some type of control is necessary to get a better feel about whether any changes in employment measured in the analysis are due to SEMATECH. One way to control for other factors involves performing an analysis of the impact of other high-technology industry sectors on the Austin economy. The assumption is that these other high-technology industry sectors tend to respond to 'normal' conditions in the same manner because of their similarities as high-technology sectors.

County Business Patterns high-technology (three-digit industry category) employment statistics are compared. The results are shown in Table 5.6, Table 5.7, Table 5.8, and Table 5.9. These four tables show percentage change 'export' employment changes for the five year period beginning in 1984 and ending in 1988. The results show that four categories exhibit negative growth from 1987 to 1988. These are the Office Computing Machinery (SIC 357) category , the Communications Equipment (SIC 366) category, the Universities (SIC 822) category, and the Engineering and Architectural Services (SIC 891) category. The other eight categories demonstrate employment gains from 1987 to 1988.

TABLE 5.6 SELECTED HIGH-TECHNOLOGY SECTOR 'EXPORT' EMPLOYMENT ECONOMIC BASE ANALYSIS DERIVED STATISTICS FOR THE AUSTIN METROPOLITAN STATISTICAL AREA

Year	Category 283*	Change	Category 357**	Change	Category 361***	Change
1984	253		5,939		-335	
1985	300	18.57	16.063	170.46	-240	28.25
1986	1,268	322.15	16,189	0.79	-310	-28.92
1987	1,305	2.89	16,347	0.97	-319	-3.08
1988	1,329	1.84	2,390	-85.38	-268	16.26

Source: Appendix A4, Derived from County Business Patterns Statistics.
* Drugs
** Office Computing Machinery
*** Electric Distributing Equipment
Note: Only positive employment figures represent 'export' employment.

TABLE 5.7 SELECTED HIGH-TECHNOLOGY SECTOR 'EXPORT' EMPLOYMENT ECONOMIC BASE ANALYSIS DERIVED STATISTICS FOR THE AUSTIN METROPOLITAN STATISTICAL AREA

Year	Category 362*	Change	Category 366**	Change	Category 382***	Change
1984	-22		1,588		82	
1985	421	1975.04	1,706	7.46	305	269.53
1986	-216	-151.32	1,552	-9.03	294	-3.67
1987	-41	81.12	804	-48.18	274	-6.68
1988	-34	17.56	238	-70.40	517	88.82

Source: Appendix A4, Derived from County Business Patterns Statistics.
* Electric Industrial Apparatus
** Communications Equipment
*** Measuring and Controlling Devices
Note: Only positive employment figures represent 'export' employment.

TABLE 5.8 SELECTED HIGH-TECHNOLOGY SECTOR 'EXPORT' EMPLOYMENT ECONOMIC BASE ANALYSIS DERIVED STATISTICS FOR THE AUSTIN METROPOLITAN STATISTICAL AREA

Year	Category 384*	Change	Category 737**	Change	Category 8731***	Change
1984	-221		-126		303	
1985	196	188.91	-515	-307.84	482	59.24
1986	-472	-340.22	-434	15.63	650	34.90
1987	-389	17.55	564	229.93	855	31.52
1988	20	105.02	567	0.57	897	4.98

Source: Appendix A4, Derived from County Business Patterns Statistics.
* Medical Instruments and Supplies
** Computer and Data Processing Services
*** Research and Development Labs (SIC 7391 before 1988)
Note: Only positive employment figures represent 'export' employment.

TABLE 5.9 SELECTED HIGH-TECHNOLOGY SECTOR 'EXPORT' EMPLOYMENT ECONOMIC BASE ANALYSIS DERIVED STATISTICS FOR THE AUSTIN METROPOLITAN STATISTICAL AREA

Year	Category 822*	Change	Category 891**	Change	Category 8733***	Change
1984	-2,456		3,117		-95	
1985	-2,380	3.09	4,275	37.14	-51	46.52
1986	-2,170	8.81	4,410	3.16	-97	-91.12
1987	-1,494	31.15	3,854	-12.60	20	120.35
1988	-1,650	-10.42	3,659	-5.06	38	92.71

Source: Appendix A4, Derived from County Business Patterns Statistics.
* Universities
** Engineering and Architectural Services
*** Non-commercial Research Organizations (SIC 892 before 1988)
Note: Only positive employment figures represent 'export' employment.

The results show a mixed outcome for the two electronics related categories (SIC categories 362 and 366 in Table 5.7) with one gaining and the other losing ground in 1988. The two instrument related categories gained export jobs during the same period (SIC categories 382 and 384 in Tables 5.8 and 5.9). The university and engineering related categories did not improve. The other categories improved to varying degrees.

The analysis of these other high-technology industries offers a mixed bag of results. No clear pattern is apparent. Some high-technology sectors gained ground while others lost it. Therefore, no definite conclusions can be derived from this analysis.

Unemployment as an economic indicator

Unemployment statistics for the United States and Texas are examined as an economic indicator of the state of the economy. Unemployment statistics were obtained from 1982 to 1988. Table 5.10 shows these unemployment statistics.

ABLE 5.10 UNEMPLOMENT RATE FOR THE UNITED STATES AND TEXAS FOR 1982 TO 1988.

YEAR	UNITED STATES	TEXAS
1982	9.7	6.9
1983	9.6	8.0
1984	7.5	5.9
1985	7.2	7.0
1986	7.0	8.9
1987	6.2	8.4
1988	5.5	7.3

Source: Statistical Abstract of the United States for 1990 and 1987.

The period from 1982 to 1988 exhibits a declining national unemployment rate. The rate is particularly low in 1988. The declining national unemployment rate demonstrates that the national economy improved between 1984 and 1988. However, the national improvement was not reflected in Texas unemployment statistics. Texas suffered from high unemployment in the middle of the national recovery. The national upswing may be partially responsible for the improvement seen in the microelectronics industry in Austin in recent years.

Conclusion

The alternate industry control data set and the unemployment rate economic indicator were inconclusive. No clear cut positive or negative evidence is apparent. Since, a considerable sudden increase in employment was observed in the microelectronics industry from 1987 to 1988; at least some of this job growth might tentatively be attributed to SEMATECH.

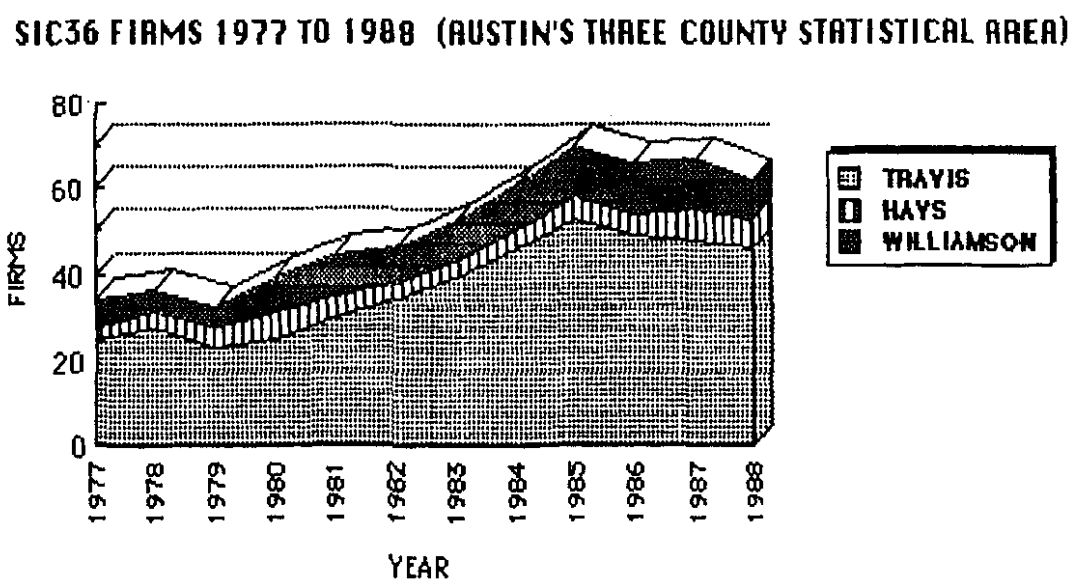
The total number of jobs that might be attributed to SEMATECH as a result of greater job growth in 1988 may be as high as four thousand (this

refers to export jobs only) with the seventy percent increase noted for 1988 in Table 5.2. This is higher than the 960 job expectation for 1990. Therefore, the evaluation outcome for this section of the analysis is positive.

BUSINESS ESTABLISHMENTS EVALUATION

The number of firms in the Electric and Electronic Equipment (SIC Code 36) category declined since 1985; the year they also peaked. Figure 5.6 shows the trend for the number of establishments reported by County Business Patterns from 1977 to 1988 for the Electric and Electronic Equipment (SIC Code 36) category. The results for this category show that the number of firms within the SIC 36 category have declined since 1975.

FIGURE 5.6 ESTABLISHMENTS IN THE ELECTRIC AND ELECTRONIC EQUIPMENT (SIC 36) CATEGORY FOR THE AUSTIN METROPOLITAN STATISTICAL AREA.



Source: Appendix A3, Derived from County Business Patterns Statistics.

The statistics for the Electronic Components and Accessories (SIC 367) category for the Austin Metropolitan Statistical Area show an increase in the number of firms that peaked in 1985 and was followed by a decline. However, no change in the number of firms occurred between 1987 and 1988. This implies that SEMATECH might have had no effect on this industrial category in 1988.

Table 5.11 shows a breakdown by county and the Austin Metropolitan Statistical Area of the number of establishments for the Electronic Components and Accessories (SIC 367) category. The statistics show that most of the firms were located in Travis and Williamson counties and no firms resided in Hays county.

TABLE 5.11 ESTABLISHMENT STATISTICS BY COUNTY AND BY AUSTIN METROPOLITAN STATISTICAL AREA (MSA) FOR THE ELECTRONIC COMPONENTS AND ACCESSORIES (SIC 367) CATEGORY.

Year	Travis	Hays	Williamson	Austin MSA	Percent Change
1977	7	0	4	11	
1978	8	0	3	11	0.0
1979	9	0	3	12	9.1
1980	9	0	5	14	16.7
1981	13	0	6	19	35.7
1982	15	0	5	20	5.3
1983	15	0	6	21	5.0
1984	20	0	8	28	33.3
1985	23	0	8	31	10.7
1986	21	0	9	30	-3.2
1987	17	0	7	24	-20.0
1988	19	0	5	24	0.0

Source: Appendix A3, Derived from County Business Patterns Statistics.

The results for Semiconductors and Related Devices (SIC 3674) category show an increase in the past few years. Table 5.12 displays the same statistics for this category. This data is derived from statistics

presented in Appendix A3. In this instance, except for two firms in Williamson county, all the firms in this category resided in Travis county.

TABLE 5.12 ESTABLISHMENT STATISTICS BY COUNTY AND BY AUSTIN METROPOLITAN STATISTICAL AREA (MSA) FOR THE SEMICONDUCTORS AND RELATED DEVICES (SIC 3674) CATEGORY.

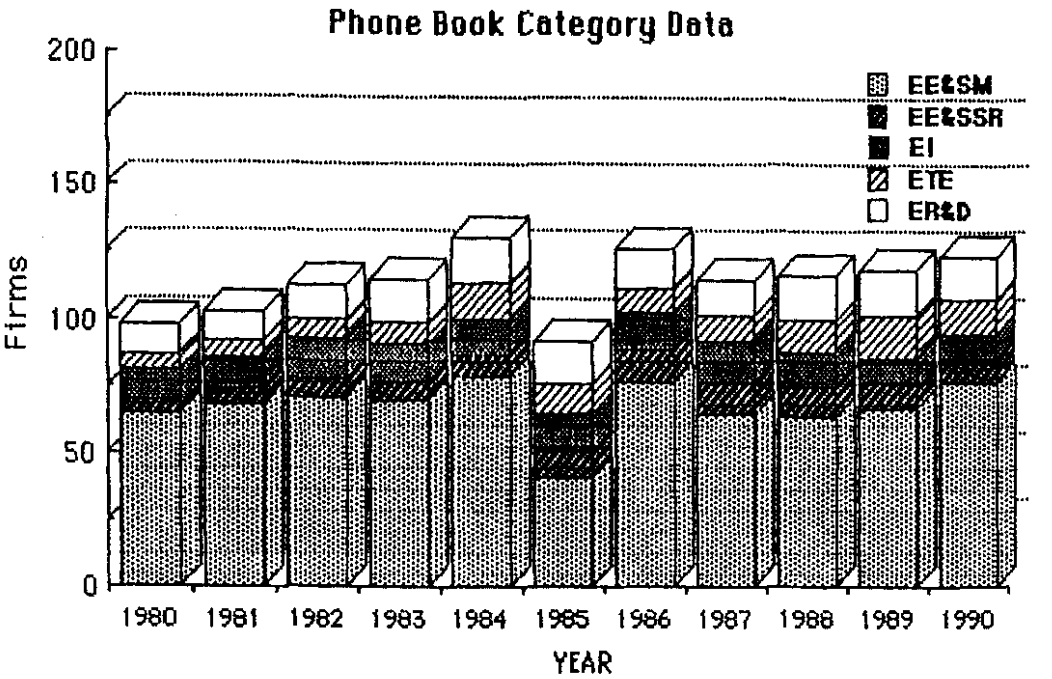
Year	Travis	Hays	Williamson	Austin MSA	Percent Change
1977	2	0	0	2	
1978	2	0	0	2	0.0
1979	4	0	0	4	100.0
1980	2	0	0	2	-50.0
1981	3	0	0	3	50.0
1982	4	0	0	4	33.3
1983	3	0	0	3	-25.0
1984	3	0	0	3	0.0
1985	3	0	0	3	0.0
1986	2	0	0	2	-33.3
1987	2	0	1	3	50.0
1988	5	0	1	6	100.0

Source: Appendix A3, Derived from County Business Patterns Statistics.

Phone Book statistics

Suthwestern Bell's Greater Austin area phone book yellow pages data results are illustrated in Figure 5.7. Five yellow pages subtitles are examined for data from 1980 to 1990. These five specific subtitles are Electronics Equipment and Supplies Manufacturers, Electronic Equipment & Supplies Service and Repair, Electronic Instruments, Electronic Testing Equipment and Electronics Research and Development. The results show a slight increase in the overall number of firms listed in these five categories after 1987.

FIGURE 5.7 SELECTED ELECTRONIC INDUSTRY TELEPHONE-BOOK-CATEGORY STATISTICS FOR 1980 TO 1990.



LEGEND ABBREVIATION DEFINITIONS:

EE&SM	Electronic Equipment & Supplies Manufacturers
EE&SSR	Electronic Equipment & Supplies Services and Repair
EI	Electronic Instruments
ETE	Electronic Testing Equipment
ER&D	Electronic Research and Development

Source: Greater Austin Phone Books (1980-81 to 1990-91 editions).

The results from this part of the evaluation (including data from all five phone book categories) lead one to give this aspect of the evaluation a tentative positive result. This is a tentative evaluation decision because the results were mixed for specific categories. However, there are some indications that the number microelectronics firms rose somewhat.

Conclusion

Firms in the Semiconductors and Related Devices (SIC 3674) increased in number in 1988. The telephone book analysis also showed a slight increase. However, the Electronic Components and Accessories (SIC 367) category remained the same from 1987 to 1988. Because of this a tentative positive evaluation result is given on the business firms aspect of the evaluation.

TAX REVENUES EVALUATION

Austin tax collections statistics show a positive trend. However, it is not possible to say with certainty that any changes were caused by the introduction of SEMATECH. Table 5.13 presents the amounts of property and sales taxes collected by the city since fiscal year 1983-84. The tax information for the last two fiscal years includes an estimate by the city. The information before that time shows actual tax collections.

TABLE 5.13: PROPERTY AND SALES TAXES PAID TO THE CITY OF AUSTIN FOR SELECTED FISCAL YEARS.

FISCAL YEAR	PROPERTY	SALES
83 to 84	42,419,195	36,873,298
84 to 85	41,761,754	44,634,353
85 to 86	49,295,602	43,948,837
86 to 87	51,888,822	39,888,228
87 to 88	63,540,778	42,924,913
88 to 89	47,957,931	44,500,000
89 to 90	53,723,727	49,315,000

Source: City of Austin Budget documents.

Property tax revenue estimates

To get an estimate of the amount of taxes produced by the export sector employment several calculations are performed. Many of the results of this section are later used in the cost-benefit analysis. The Travis county export sector job figures and export sector multiplier are used to arrive at an estimate of the number of jobs created by SEMATECH. This number is divided by two to arrive at an estimate of a number of households. The number of households is multiplied by the percentage of households that own a home. The estimate of homeowner-households is multiplied by the most recent average appraised value of a home (in 1988) in the city of Austin. This dollar figure is multiplied by the applicable Austin Independent School District, City of Austin and Travis County Tax rates to arrive at a final property tax revenue estimate. The property tax estimates obtained are used to calculate a sales tax estimate.

The calculations used to estimate the number of jobs created in Travis county are taken from the economic base study. The economic base study examined export employment for the Electric and Electronic Equipment (SIC 36) category, the Electric Components and Accessories (SIC 367) sub-category and the Semiconductors and Related Devices (SIC 3674) sub-sub-category. Job estimate figures for SEMATECH were estimated from the results obtained from the Electronic Components and Accessories (SIC 367) category. Table 5.14 presents these results for Travis county.

TABLE 5.14 EXPORT SECTOR JOB ESTIMATES FOR TRAVIS COUNTY IN THE ELECTRONIC COMPONENTS AND ACCESSORIES (SIC 367) CATEGORY

Year	Export Sector Jobs	Percent Change
1977	903	
1978	837	-7.33
1979	2,648	216.46
1980	2,503	-5.47
1981	2,454	-1.95
1982	2,295	-6.48
1983	2,265	-1.42
1984	1,707	-24.57
1985	5,539	224.59
1986	5,617	1.41
1987	5,736	2.12
1988	9,833	71.41

Source: Appendix A3, derived from County Business Patterns Statistics.

According to the economic base study methodology, the number of export sector jobs obtained is derived from the excess employment produced by the local economy (Travis county) beyond that which would be expected if the local economy produced the same percentage of jobs in relation to total local employment as the national economy does in relation to national employment. As can be seen in Table 5.14, Travis county produced export sector employment in this category since 1977. A respectable change occurred in 1988 that may be attributable to SEMATECH.

Some of the economic base study statistics employed in estimating export sector employment at some three and four-digit level standard industrial categories (SIC) have to rely on estimates since specific employment figures could not be provided by County Business Patterns. The estimate numbers outlined in chapter four (Table 4.3) are used in these cases. For example, applying the proper estimate number for the Electronic Components and Accessories category (SIC 367) for 1988 would have yielded a nonsense result (a number higher than its parent category, SIC 36).

This number could be no higher than 13,644 (the SIC 36 employment figure for 1988). Therefore an estimate halfway between 10,000 (the lower estimate range number for the estimate range applicable in this instance) and 13,000 is used. The estimate for the Electronic Components and Accessories employment category used for 1988 is 11,500. From this employment estimate, the export sector employment figure shown in Table 5.7 is obtained. Thus, only 1,409 export sector jobs were expected for 1988 in this category. The balance are export sector jobs. Detailed analysis numbers can be examined in the Appendixes.

To determine the total number of jobs produced by SEMATECH; it is first necessary to arrive at an 'export' sector employment estimate for Travis county. Later, the corresponding export sector multiplier can be applied to this figure. In 1988, 'export' employment grew by 71.4 percent. The rate of job growth for the two years before 1988 was below 2.2 percent. Therefore, SEMATECH might have contributed to the high rate of export job growth seen in 1988 (72 percent). If an assumption is made that without SEMATECH the 'export' sector job growth in this sector might have been no higher than 2.2 percent, then about 70 percent of the growth between 1987 and 1988 may be due to SEMATECH. This 'export' employment estimate can then be used to estimate a tax impact.

The next step in the tax impact estimation is to estimate the total number of jobs created from the 'export' employment. If an employment multiplier of 5.88 (the average for Travis county) is applied, then an estimate of total employment derived from SEMATECH is obtained. The rest of the previously mentioned tax estimating procedure is performed on this

employment estimate to obtain the final tax dollar estimate figure for that year.

To estimate the impact of SEMATECH on future years the 'export' employment figure for 1988 is used as a base (9,833 jobs). From this base a percentage of added employment for future years is calculated. A base percentage figure is used to estimate increments in employment in future years. The base percentage used is 70 percent (the percentage increase figure for 1988 less the average percentage change figures derived for the two previous years). Working on the assumption that SEMATECH would only produce half of the previous year's employment increase in a given future year (down to zero), export employment estimates are obtained for the period from 1988 to 1993. Table 5.15 presents the results of these calculations.

TABLE 5.15 EMPLOYMENT CALCULATION TABLE

[1] Year
[2] The base number of jobs used to estimate future employment calculations. It is the number of 'export' sector jobs in 1988.
[3] The percentage factor applied to the base number of jobs to obtain estimates for a given year.
[4] The estimate of the number of 'export' sector jobs for a given year.
[5] The total employment estimate obtained from Travis county's average employment multiplier of 5.88 is applied (by multiplying column three by column four).

[1] YEAR	[2] BASE	[3] FACTOR	[4] 'EXPORT JOBS'	[5] TOTAL EMPLOYMENT
1988*	-	-	4,015	23,609
1989	9,833	0.33	3,442	20,235
1990	9,833	0.165	1,721	10,118
1991	9,833	0.0825	860	5,059
1992	9,833	0.04125	430	2,530
1993	9,833	0.020625	215	1,265

*The estimate for 1988 was performed using a different employment figure as the base.
Source: Appendix A3, derived from County Business Patterns Statistics.

Once employment estimates are obtained, it is possible to estimate the number of households represented by these employment estimates. From the number of households, an estimate of the number of home owners and the value of that property is estimated. Table 5.16 illustrates how those estimates are performed.

TABLE 5.16 ESTIMATES OF TAXABLE PROPERTY VALUES

[1] Year
[2] Total number of jobs used in the estimate, derived from Table 5.14.
[3] The estimated number of households, jobs divided by two.
[4] The estimate of the number of homeowners; household multiplied by 0.526 which is the percent of the population who own a home in Austin. It is 59.8 percent for the Austin Metropolitan Statistical Area.[237]
[5] The number of homeowners multiplied by the average appraised homestead property value in 1988 in the city of Austin ($63,766 minus a $5,000 dollar homestead exemption).[238]

[1] YEAR	[2] JOBS	[3] HOUSEHOLDS	[4] HOMEOWNERS	[5] PROPERTY VALUE
1988	23,609	11,805	7,059	$414,841,148
1989	20,236	10,118	6,051	$355,572,961
1990	10,118	5,059	3.025	$177,786,480
1991	5,059	2,530	1,513	$88,893,240
1992	2,530	1,265	756	$44,446,620
1993	1,265	632	378	$22,223,310

Source: Appendix A3, Austin Chamber of Commerce statistics, City of Austin budget documents, Travis county tax tables.

Note: The $5,000 dollar homestead exemption is mandatory only for AISD across the board. The table uses it to calculate tax figures for the city of Austin and Travis county too. This may help approximate the effects of homestead exemptions for those over 65 and the disabled ranging from $10,000 to $50,000 in Travis county, the city of Austin and the Austin Independent School District.

When an estimate of the potential value of the assessed property has been obtained, specific property tax rates are applied to obtain an estimate of the provable tax revenues generated by SEMATECH. Property tax

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237 Greater Austin Chamber of Commerce, Austin MSA Demographics and Selected Market Segments, (Austin, Texas : Greater Austin Chamber of Commerce, 1990) p.9.

238 The City of Austin Texas, City Manager's Approved Budget 1989-1990: Volume 1 : General Fund, (Austin, Texas : The City of Austin Texas, 1989). p. 24.

collections are estimated for the Austin Independent School District, The City of Austin, and Travis County. Using city of Austin tax statistics, an estimate of the possible sales tax collected by the city from SEMATECH derived economic activity is performed. Table 5.17 presents the property tax rates applicable in 1989 and 1990.

TABLE 5.17 APPLICABLE TAX RATES IN SELECTED LOCAL GOVERNMENTS FOR 1989 AND 1990.

Year	Austin Independent School District	City of Austin	Travis County
1989	1.1935	0.5750	0.3862
1990	1.26660	0.5695	0.4090

Source: Travis county tax rates table.

Using the tax rates enumerated in Table 5.17 and the taxable property estimates given in Table 5.16, an estimate of the total taxes collected in Travis county from SEMATECH's probable economic impact is obtained. The tax rates were held constant after 1990. The results of the overall evaluation yield an estimate of the tax revenues generated by SEMATECH.

Table 5.18 shows the next step in the calculation. City of Austin property tax collections in 1989 are estimated to be over fifty-two million dollars.[239] The estimates of the property tax impact of SEMATECH are two million dollars, which is about four percent of the city's total tax revenue collections. In some respects this figure may appear to be too high. However, it should be remembered that it incorporates the effects of a large number of export sector employment multiplier generated jobs.

239 The City of Austin Texas, City Manager's Approved Budget 1989-1990: Volume 1: General Fund, (Austin, Texas : The City of Austin Texas, 1989). p. 36.

TABLE 5.18 ESTIMATE OF PROPERTY TAX REVENUES FOR 1989 TO 1993.

[1] Year
[2] Value of taxable property, derived from Table 5.15.
[3] Austin Independent School District (AISD) property taxes for 1989 to 1993.
[4] City of Austin, Texas property taxes for 1989 to 1993.
[5] Travis County property taxes for 1989 to 1993.
[6] Totals

[1] YEAR	[2] PROPERTY	[3] AISD	[4] AUSTIN	[5] TRAVIS	[6] TOTAL
1989	355,572,961	4,243,763	2,044,545	1,373,223	7,661,531
1990	177,786,481	2,250,777	1,012,494	727,147	3,990,418
1991	88,893,240	1,125,388	506,247	363,573	1,995,209
1992	44,446,620	562,694	253,124	181,787	997,604
1993	22,223,310	281,347	126,562	90,893	498,802
TOTALS		8,463,970	3,942,971	2,736,623	15,143,564

Note: The tax rates given in Table 5.16 were applied for 1989 and 1990. The tax rates for 1990 were applied in subsequent years.
Source: Appendix A3, Travis county tax tables.

Sales tax estimate

To estimate the amount of sales tax revenues generated by SEMATECH; city of Austin budget documents are examined. The mean percentage of sales to property tax revenues collected for the past seven fiscal years is estimated and applied to future tax estimates used in the study. Figure 5.19 shows the total amount of sales taxes derived from the property tax estimates.

TABLE 5.19 SALES TAX ESTIMATES DERIVED FROM COLLECTED PROPERTY TAXES.

YEAR	PROPERTY TAXES	SALES TAXES
1989	7,661,531	6,665,532
1990	3,990,418	3,471,663
1991	1,995,209	1,735,832
1992	997,604	867,916
1993	498,802	433,958

NOTE: Sales taxes were estimated to be 87 percent of property taxes.
Source: City of Austin budget documents.

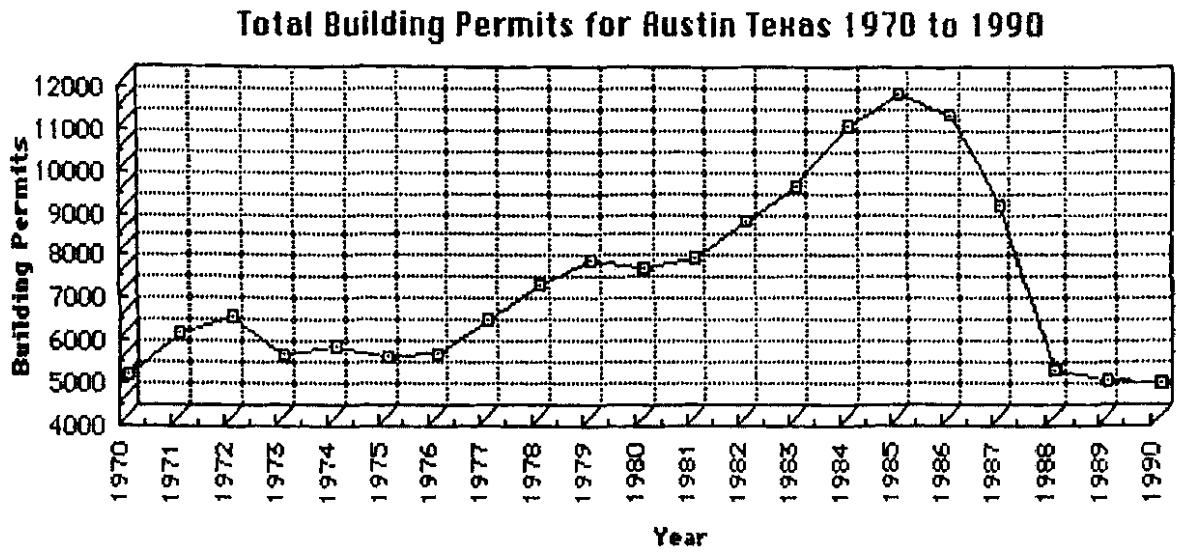
Conclusion

The results show that as of 1990 less than forty-two million dollars in tax revenues had been derived from SEMATECH. Therefore, the analysis fails to show an estimate above that which was expected for tax revenues for 1990. However, over the life of the project, tax collections rose. Nevertheless, a tentatively negative assessment is applicable. The evaluation outcome for taxes is negative in relation to the specific evaluation target for 1990. The calculations are performed up to 1993 because the results will be later used in the cost-benefit analysis section of the study.

INVESTMENT EVALUATION (BUILDING PERMITS)

The building permit information used in this section of the study is obtained from Austin's Department of Planning and Development. The data used in the evaluation was compiled as monthly aggregate building permit statistics for the period of years beginning in 1970 and ending in 1990 by the city of Austin. The building permit records were divided into four categories. The first three categories were: residential, commercial, and non-taxable public. The fourth category showed monthly totals. The raw data is presented in Appendix C.

FIGURE 5.8 ANNUAL BUILDING PERMIT TOTALS FOR AUSTIN TEXAS: 1970 TO 1990.

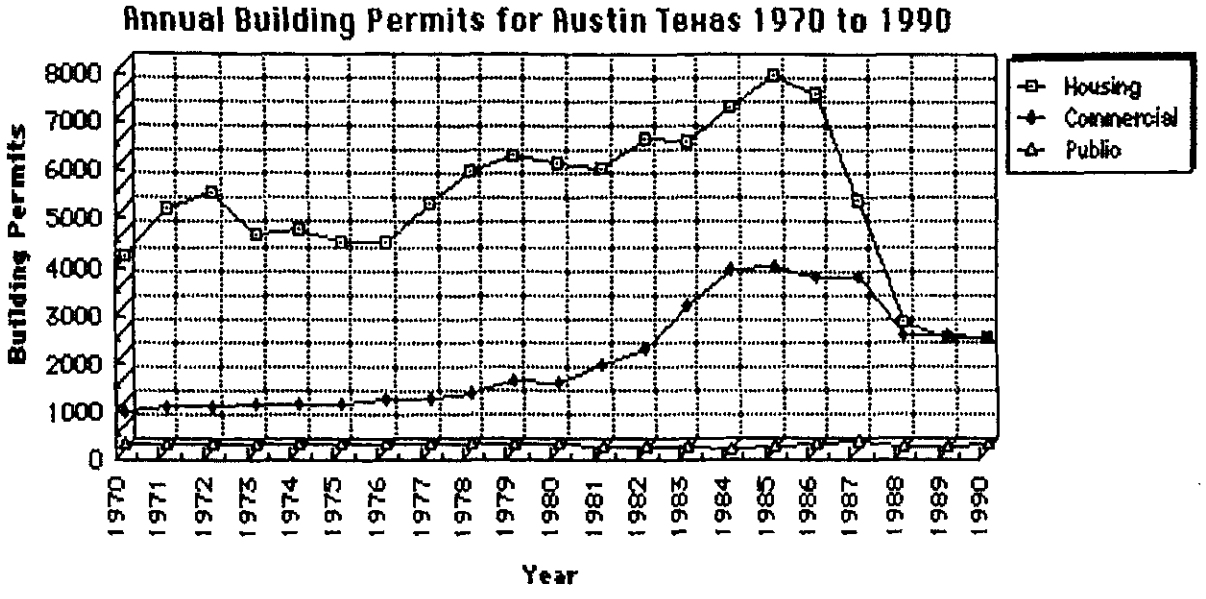


Source: Appendix C.

Unfortunately no information was obtained to provide a control data set to compare the Austin building permit results with. Therefore, it may not be possible to conclude that any patterns found were related to SEMATECH with certainty. Figure 5.8 shows the trend in overall annual building permits from 1970 to 1990.

The building permit statistics presented in Figure 5.4 show the total number of annual building permits granted in Austin in the period beginning in 1970 and ending in 1990. Looking at the aggregate statistics, it is difficult to discern any patterns for SEMATECH. This may be as expected. Aggregate statistics at this level may more closely correspond to overall economic trends than to any specific economic intervention such as SEMATECH. The chart clearly shows Austin's booming economy in the early to mid-eighties. It also illustrates the extent of the decline experienced in the construction sector after the mid-eighties' boom years.

FIGURE 5.9 ANNUAL BUILDING PERMIT DATA BY EMPLOYMENT CATEGORY: 1970 TO 1990



Source: Appendix C

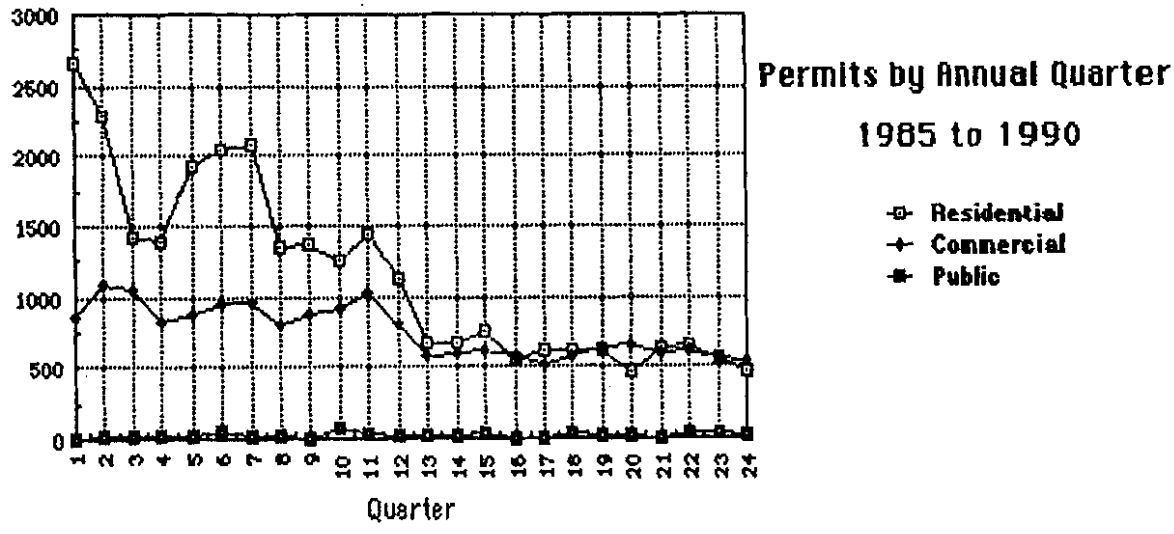
Figure 5.9 subdivides the annual building permit totals (presented in figure 5.8) into its constituent housing, commercial and public sector building permit activity components. Presenting the data in this manner allows one to determine to what extent various building permit sub-categories contributed to total building permit activity. The graph illustrates the importance of the residential (housing) category before 1988. Since 1970, residential housing permits have represented the bulk of building permit activity.

The data shows that most of the recent decline in total building permits activity was due to a decline in residential building permits. Commercial building permit activity declined somewhat before it began to

pick up after 1988. Public building permit activity was flat. However, this may be due to the relatively small levels of activity typical of public building permits in relation to other categories.

It should be noted that at the level of detail presented in figure 5.9 the statistics fail to show any appreciable patterns for SEMATECH. Again, the graph clearly shows Austin's booming economy in the early to mid-eighties. There is one apparent peculiarity though, for the first time, the number of housing and commercial building permits appear to meet in 1988. After 1988, commercial building permit activity sometimes exceeds residential building permit activity. This phenomenon had not appeared in the statistics before 1988.

FIGURE 5.10 QUARTERLY BUILDING PERMIT STATISTICS FOR 1985 TO 1990.



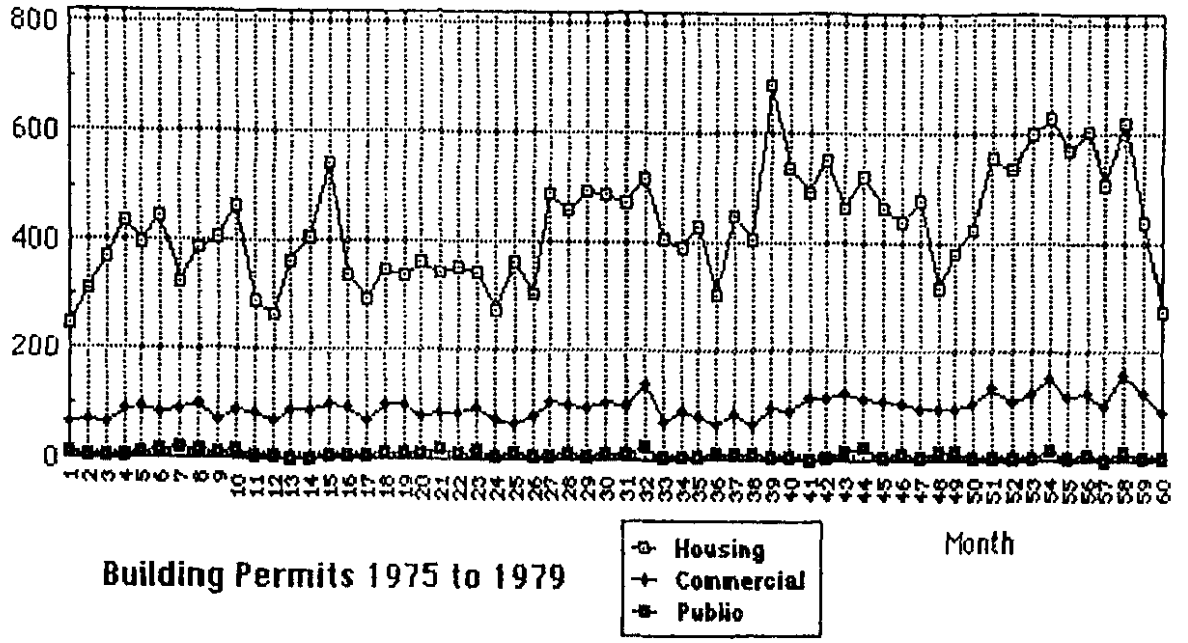
Source: Appendix C
Note: The quarters are represented in the graph in numerical order from first to last for the given time period and not for specific years.

To narrow the focus of the statistics, the building permit data was compiled into quarterly statistics and analyzed. The patterns found in the data for the period of time from 1970 to 1984 looked very similar to those in the annual statistics. Figure 5.10 illustrates the quarterly building permit statistics for 1985 to 1990. This is the time during which the city of Austin competed with other cities to attract SEMATECH. It is also the time during which SEMATECH moved to Austin.

Looking at the quarterly statistics it is easy to see the decline in residential building permits that occurred after the mid-eighties. At around the fourth quarter of 1988 (the 16th quarter in the graph), the number of commercial and residential building permits appeared to equalize. In addition, the graph shows how in the third quarter of 1989 (quarter number 20) the number of commercial building permits exceeded the number of residential building permits for the first time. By the first quarter of 1988, the decline in commercial building permits stabilized.

To further narrow the focus of the statistics, a monthly analysis of the data is carried out. The monthly building permit data is presented in three graphs. Three graphs are used because of the large number of months that must be examined. The first and second graphs cover a five year period. The third graph covers the six year period from 1985 to 1990. Figure 5.11 illustrates the monthly building permit statistics for 1975 to 1979.

FIGURE 5.11 MONTHLY BUILDING PERMIT STATISTICS FOR 1975 TO 1979.

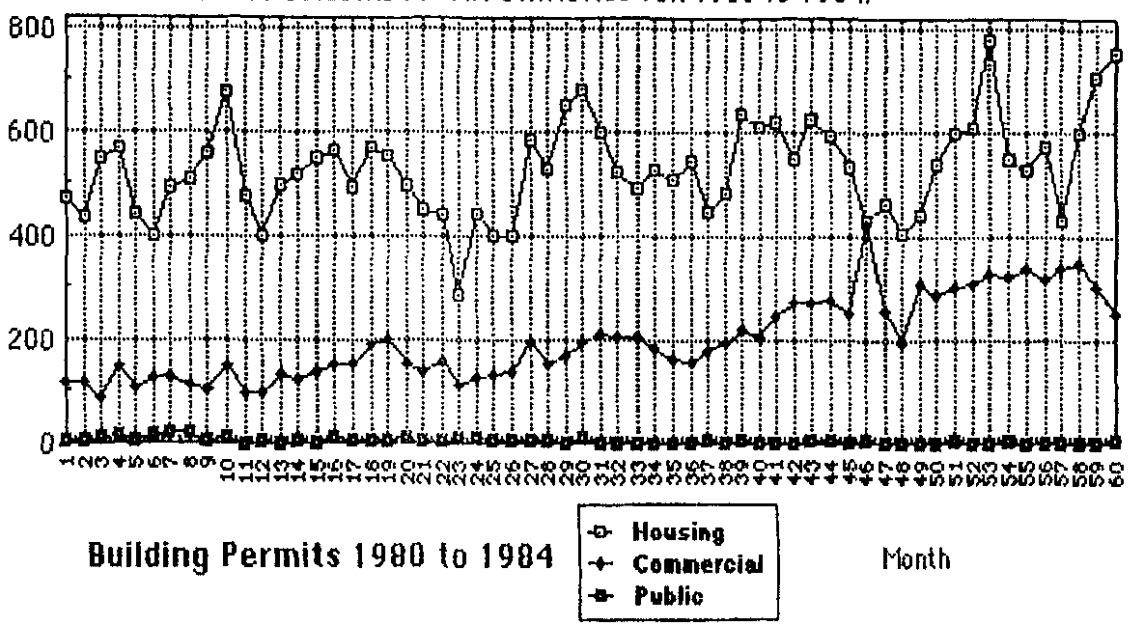


Building Permits 1975 to 1979

Source: Appendix C

Note: Individual months are represented in the graph in numerical order from first to last for the given *period and not by specific years.*

FIGURE 5.12 MONTHLY BUILDING PERMIT STATISTICS FOR 1980 TO 1984.



Building Permits 1980 to 1984

Source: Appendix C

Note: Individual months are represented in the graph in numerical order from first to last for the given period and not by specific years.

The statistics shown in Figure 5.11 look stable. No unusual patterns are apparent. Throughout the five year period, the number of residential building permits remained above that of commercial building permits. The number of commercial building permits in turn remained above that of public building permits. The following five year period is shown in Figure 5.12.

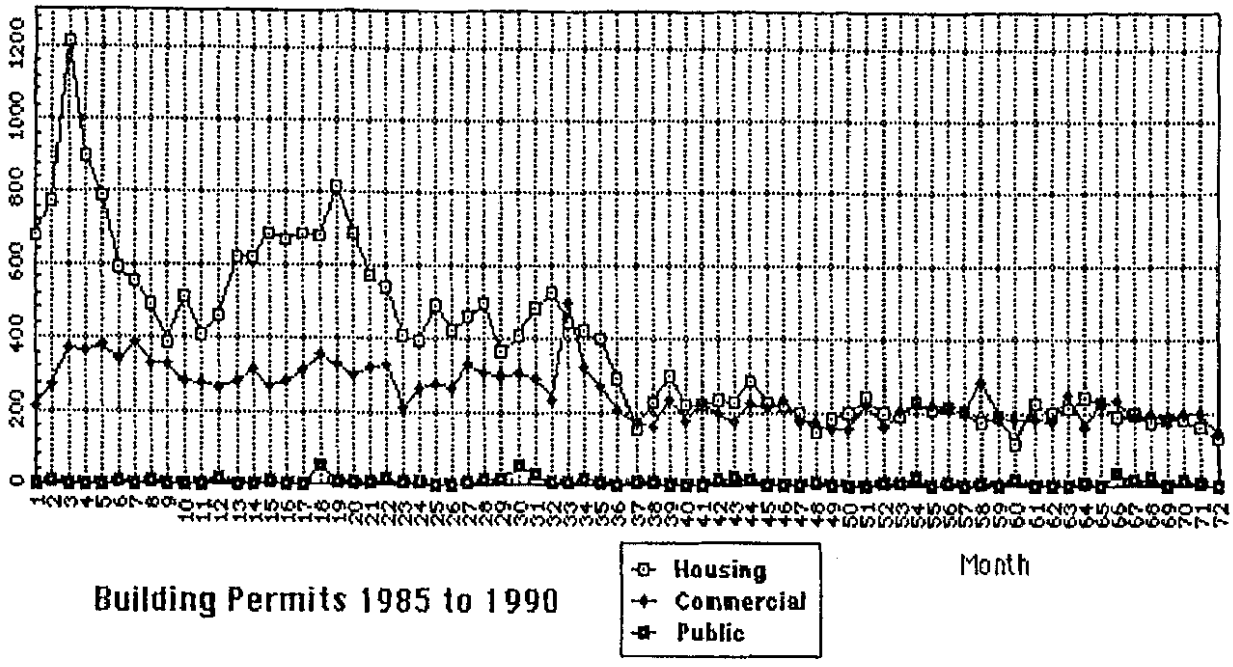
The monthly statistics for the early eighties an increase in residential building permit activity at the end of the five year period. Activity in the public sector is stable and mostly flat. Commercial building permit activity shows a steady increase. These patterns appear to be consistent with Austin's booming economy at that time.

The previous two five year periods offer a point of reference from which to look at the most recent statistics. Figure 5.13 shows the statistics for the six year period from 1985 to 1990. These statistics fall within the time during which SEMATECH moved to Austin.

The continuing decline in building permits can be seen to proceed early in this period and stabilize by 1987. Commercial building permit activity also presents a similar pattern. The public sector building permit statistics appear to have remained at the same level throughout. A prominent peak in commercial building permit activity is apparent in September of 1987 (month 33). By coincidence, in September of 1987 the SEMATECH selection team was visiting Austin. This was actually the first time that the number of commercial building permits first exceeded the

number of residential building permits. This fact was probably masked by the aggregate nature of the quarterly and annual statistics.

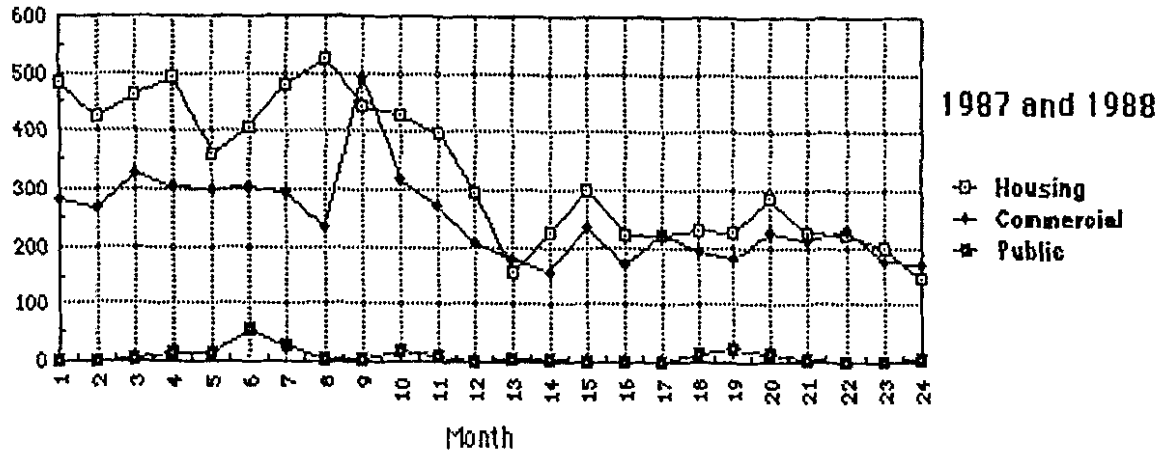
FIGURE 5.13 MONTHLY BUILDING PERMIT STATISTICS FOR 1985 TO 1990.



Source: Appendix C
Note: Individual months are represented in the graph in numerical order from first to last for the given time and not by specific years.

Figure 5.14 further isolates the monthly building permit data for 1987 and 1988. This is the time during which the competition for SEMATECH was taking place. The increase in commercial building permit activity seen in figure 5.13 is apparent, as well as a second similar increase by the end of 1988. Then, the number of commercial building permits exceeded the number of housing permits for the second time.

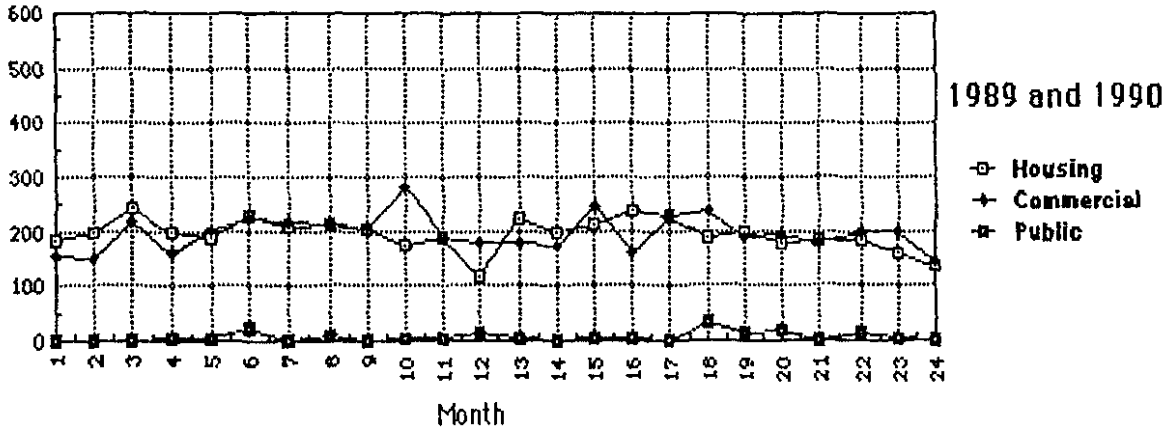
FIGURE 5.14 MONTHLY BUILDING PERMIT STATISTICS FOR 1987 AND 1988



Source: Appendix C
Note: Individual months are represented in the graph in numerical order from first to last for the given time and not by specific years.

Figure 5.15 shows the same building permit data in detail for the period beginning in 1989 and ending in 1990. During this time, the number of commercial building permits surpassed the number of housing building permits various times. Overall the statistics were stable.

FIGURE 5.15 MONTHLY BUILDING PERMIT STATISTICS FOR 1989 AND 1990



Source: Appendix C
Note: Individual months are represented in the graph in numerical order from first to last for the given time and not by specific years.

Conclusion

Because the data offers no way to separate the aggregate number of commercial building permits from those specifically attributable to the microelectronics industry, any conclusions derived from the data are correspondingly tentative. Clearly, the number of commercial building permits has leveled off since 1987. It is tempting to speculate about the sudden peak of activity observed the same month that the SEMATECH selection team visited Austin. Other peaks of commercial building permit activity are also apparent later.

Considering the fact that commercial building permit remained mostly at the same level after 1987, a tentative neutral conclusion for this aspect of the evaluation will be given. This is because although it appears that SEMATECH might have helped, no clear upward pattern could be discerned. Still, commercial building permit activity failed to show the very large decline seen in the residential market and it surged somewhat various times. The results appear to be somewhat positive but uncertain overall.

COST-BENEFIT ANALYSIS

A cost-benefit analysis is performed using data obtained from the previous evaluations and a document analysis. The value of the SEMATECH incentive package is placed at $68 million dollars. The amount that the University of Texas paid for the SEMATECH site is estimated at 40.7 million

dollars. These numbers are taken as the base figures for the cost calculations. A discount rate of eight percent is used. This particular rate is used because it is the rate most local governments usually pay their government bond investors.

TABLE 5.20 ESTIMATED COSTS OF THE SEMATECH RESEARCH CONSORTIUM TO THE COMMUNITY OF AUSTIN, TEXAS.

[1] Year
[2] Value of the incentive package as derived in chapter four.
[3] Austin Independent School District (AISD) lost property taxes for 1989 to 1993.
[4] City of Austin, Texas lost property taxes for 1989 to 1993.
[5] Travis County lost property taxes for 1989 to 1993.
[6] Totals
[7] Adjusted totals applying an eight percent discount rate in 1988 tax dollars.

[1] YEAR	[2] INCENTIVE PACKAGE			[6] TOTAL	[7] ADJUSTED
1988	5,840,698			5,840,698	5,840,698
	[3] AISD	[4] AUSTIN	[5] TRAVIS		
1989	485,754	234,025	157,183	876,962	812,067
1990	512,262	231,786	166,463	910,511	780,308
1991	515,262	231,786	166,463	913,511	725,328
1992	515,262	231,786	166,463	913,511	671,431
1993	515,262	231,786	166,463	913,511	622,101

Note: The calculations of the opportunity cost of lost tax revenues were based on the loss of $40.7 million dollars in taxable property. This is the estimated value of the SEMATECH property bought and renovated by the State through the University of Texas as discussed in chapter four. The property tax calculations also incorporated the applicable property tax rates discussed in the tax estimate section in this chapter.

Source: Austin American Statesman, Travis county tax tables.

The tax benefits used in the analysis are obtained from the tax impact calculations given in the tax analysis section of this chapter. The costs are estimated as the probable cost of the incentive package to the city in addition to the opportunity cost of the tax revenues lost to the community as a result of SEMATECH's tax exempt status. A detailed discussion of the estimated cost of the incentive package to the city and the estimated value

of any lost tax revenues is included in the cost-benefit analysis section in chapter four. Tables 5.20 and 5.21 present the calculation of the costs and benefits.

TABLE 5.21 BENEFITS DERIVED FROM SEMATECH'S ESTIMATED IMPACT ON AUSTIN EMPLOYMENT

[1] Year.
[2] Austin Independent School District property taxes for 1989 to 1993.
[3] City of Austin property taxes for 1989 to 1993.
[4] Travis County property taxes for 1989 to 1993.
[5] Estimated sales tax revenues.
[6] Totals
[7] Adjusted totals applying an eight percent discount rate to adjust to 1988 tax dollars.

[1] YEAR	[2] AISD	[3] AUSTIN	[4] TRAVIS	[5] SALES TAX	[6] TOTAL	[7] ADJUSTED
1989	4,243,763	2,044,545	1,373,223	6,665,532	14,327,062	13,266,860
1990	2,250,777	1,012,494	727,147	3,471,663	7,462,081	6,395,003
1991	1,125,388	506,247	363,573	1,735,832	3,731,040	2,962,446
1992	562,694	253,124	181,787	867,916	1,865,520	1,371,157
1993	281,347	126,562	90,893	433,958	932,760	635,210

Source: Table 5.18 and 5.19.

The benefit section in Table 5.21 also includes an estimate of the sales taxes collected by the city of Austin. This was obtained by estimating the average ratio of property to sales taxes collected and holding that average constant in future years. The benefit calculations assume that the 1988 export sector job growth attributed to SEMATECH remained high and was only diminished by half every year afterwards over the next five years. The annual decline was introduced as a conservative assumption.

The assumption of some level of further job growth is based in part on a positive job growth interpretation derived from the fact that the high-technology employment statistics presented in Table 5.4 show a continued

increase in job growth in 1989; and the Texas Employment Commission's statistics in Table 5.5 demonstrate a slight, steady upward trend in employment from 1987 to 1990. Although it is difficult to generalize, this information gives a hint of a stable growth pattern applicable for the period of time after 1988. This might mean that there is a good probability that the increase in employment seen in 1988 held its ground in subsequent years. Table 5.22 compares the costs and benefits estimated for the cost-benefit analysis.

TABLE 5.22 COMPARISON OF COSTS AND BENEFITS FOR THE SEMATECH RESEARCH CONSORTIUM

[1] Year.
[2] Costs from Table 5.20
[3] Benefits from Table 5.21
[4] Benefits minus costs; column three minus column two.

[1] YEAR	[2] COSTS	[3] BENEFITS	[4] BENEFITS MINUS COSTS
1988	5,840,698		
1989	812,067	13,266,860	
1990	780,308	6,395,003	
TOTALS FOR 1990	**7,433,073**	**19,661,863**	**12,228,790**
1991	725,328	2,962,446	
1992	671,431	1,371,157	
1993	622,101	635,210	
TOTALS FOR 1993	**9,451,933**	**24,630,676**	**15,178,743**

Source: Table 5.20 and Table 5.21

The results show that given the assumptions and estimates previously outlined, the SEMATECH research consortium produced an excess of benefits over costs. This is true even for the first time frame evaluation. These results give the cost-benefit analysis a positive evaluation outcome for both time points

Sensitivity Analysis

A sensitivity analysis is performed on the cost-benefit analysis to gauge the impact of important assumptions on the evaluation's outcome. Three major assumptions include the value of the tax estimates derived from the employment statistics; the estimated value of the SEMATECH tax-exempt property, and the cost of the incentive package to the city.

TABLE 5.23 ESTIMATED COSTS OF THE SEMATECH RESEARCH CONSORTIUM TO THE COMMUNITY OF AUSTIN TEXAS: LIBERAL SENSITIVITY ANALYSIS

[1] Year
[2] Value of the incentive package, liberal estimate.
[3] Austin Independent School District (AISD) lost property taxes for 1989 to 1993.
[4] City of Austin, Texas lost property taxes for 1989 to 1993.
[5] Travis County lost property taxes for 1989 to 1993.
[6] Totals
[7] Adjusted totals applying an eight percent discount rate in 1988 tax dollars.

[1]	[2]			[6]	[7]
YEAR	INCENTIVE PACKAGE			TOTAL	ADJUSTED
1988	618,604			618,604	618,604
	[3]	[4]	[5]		
	AISD	AUSTIN	TRAVIS		
1989	441,595	212,750	142,894	797,239	738,243
1990	468,420	210,715	151,330	830,465	711,709
1991	468,420	210,715	151,330	830,465	661,005
1992	468,420	210,715	151,330	830,465	611,887
1993	468,420	210,715	151,330	830,465	566,932

Note: The calculations of the opportunity cost of lost tax revenues were based on the loss of $35 million dollars in taxable property. This is the estimated value of the SEMATECH property bought by the State through the University of Texas for the building and land (less renovation costs). The property tax calculations also incorporated the applicable property tax rates discussed in the tax estimate section in this chapter.
The lowest estimated incentive package cost figured in chapter four is also applied.

Source: Austin American Statesman, Travis county tax tables.

Table 5.23 presents an overview of what a liberal set of assumptions might look like. A sensitivity analysis considering various assumptions is

performed to help measure the impact of these assumptions on the analysis. For example, the total amount of tax revenue benefits may be halved to approximate a lower employment impact. The value of the SEMATECH tax-exempt property (used to estimate the opportunity cost in lost tax revenues) may be lowered to the 35 million that the University paid for the building and land (minus any renovations).[240] The full 12.3 million dollar estimated high-end cost of the incentive package to the city of Austin may be used in the analysis.

Table 5.24 shows an estimate of the tax revenues collected if half of the employment benefits previously attributed to SEMATECH are used. This calculation is part of a conservative estimate calculation. The results from Table 5.24 are used to evaluate a conservative evaluation outcome.

TABLE 5.24 BENEFITS DERIVED FROM SEMATECH'S ESTIMATED IMPACT ON AUSTIN EMPLOYMENT FOR THE CONSERVATIVE SENSITIVITY ANALYSIS CALCULATION

[1] Year.
[2] Half of the tax estimates from Table 5.21
[3] Adjusted totals applying an eight percent discount rate to adjust to 1988 tax dollars.

[1]	[2]	[3]
YEAR	NEW ESTIMATE	ADJUSTED ESTIMATE
1989	7,163,531	6,633,430
1990	3,731,040	3,197,502
1991	1,865,520	1,481,223
1992	932,760	685,579
1993	466,380	317,605

Source: Table 5.21.

Table 5.25 calculates a sensitivity analysis for the most conservative set of assumptions. It assumes that the full 12.3 million incentive package

240 Whitney, Elizabeth., "How Austin snared SEMATECH: the view from the other side," Austin American Statesman, 24, July 1988, Sec.H, p. H1.

cost was absorbed by the city. It keeps the tax revenue opportunity cost at the full 40.7 million estimated cost of the SEMATECH property to the University of Texas. It reduces in half the employment benefits.

TABLE 5.25 COMPARISON OF COSTS AND BENEFITS FOR THE SEMATECH RESEARCH CONSORTIUM FOR THE CONSERVATIVE SENSITIVITY ANALYSIS.

[1] Year.
[2] Conservative estimates.
[3] Benefits from Table 5.24; conservative estimates.
[4] Benefits minus costs, column three minus column two.

[1] YEAR	[2] COSTS	[3] BENEFITS	[4] BENEFITS MINUS COSTS
1988	12,300,000		
1989	812,069	6,633,430	
1990	711,709	3,197,502	
TOTALS FOR 1990	**13,892,375**	**9,830,932**	**-4,061,443**
1991	725,328	1,481,223	
1992	671,431	685,579	
1993	622,101	317,605	
TOTALS FOR 1993	**15,911,235**	**12,315,339**	**-3,595,896**

Source: Table 5.23 and Table 5.24

The results of the conservative sensitivity analysis generate a negative cost-benefit outcome in both time points. In this example, all the previously identified sensitive assumptions are conservatively defined. This demonstrates the importance of the assumptions used to the eventual outcome of the evaluation.

Finally, to get an outcome that might be closer to a break even point, a mixed sensitivity analysis evaluation is performed. This calculation leaves the employment calculations intact. It changes the opportunity cost and incentive package estimates. The incentive package cost is examined at its full 12.3 million dollar level; and the opportunity cost is calculated for

the liberal assumption of a lesser lost opportunity cost. Table 4.26 shows the results of this calculation.

TABLE 5.26 COMPARISON OF COSTS AND BENEFITS FOR THE SEMATECH RESEARCH CONSORTIUM FOR THE MIXED SENSITIVITY ANALYSIS.

[1] Year.
[2] Conservative incentive package estimate at full value. Liberal opportunity cost from Table 5.23.
[3] Benefits from Table 5.21, regular estimates
[4] Benefits minus costs, column three minus column two.

[1] YEAR	[2] COSTS	[3] BENEFITS	[4] BENEFITS MINUS COSTS
1988	12,300,000		
1989	738,243	13,266,860	
1990	711,709	6,395,003	
TOTALS FOR 1990	**13,749,952**	**19,661,863**	**5,911,911**
1991	661,005	2,962,446	
1992	611,887	1,371,157	
1993	566,932	635,210	
TOTALS FOR 1993	**15,589,776**	**24,630,676**	**9,040,900**

Source: Table 5.23 and Table 5.21

The results clearly demonstrate the importance of the job estimate to the analysis. Given mixed cost estimates (liberal opportunity cost and conservative incentive package costs) and regular benefit estimates, the outcome in both time periods remains positive. This can be interpreted as showing that the cost-benefit analysis is highly sensitive to the benefit (employment) estimates used.

INTANGIBLE COSTS AND BENEFITS OF SEMATECH

Like most other industries, the microelectronics industry is not immune from health risks to its workers. Risks are present even though it

is generally considered one of the least hazardous industries to work for. In May 1989, the Semiconductor Industry Association began a $3.5 million nationwide study of health risks faced by chip production workers. A previous study had found an increased rate (twice normal) of miscarriages among Massachusetts female microchip production workers and a higher rate of 'general malaise' (headaches, nausea and dizziness) among both male and female workers.[241] The 1989 study was supervised by researchers from the University of California at Davis.

Health risks may be associated with the handling of toxic gases and chemicals used to etch the microscopic circuits onto their silicon wafers, the strong solvents used as cleaners, the caustic acids used to form intricate layers on the wafers, or the poisonous gases used to alter the chip's conducting properties. As in many other industrial processes, various health risks remain undetermined. The Massachusetts study was performed at a Digital Equipment plant and reported in 1986.[242]

The effect of the chemicals the industry must use on the environment has also presented itself as a concern. In June 1990, Austin's SEMATECH facility was toured by environmental and labor activists concerned about the health, safety and environmental risks posed by the chemicals used in the production process. SEMATECH's president Robert Noyce reiterated that the industry has had a good record on environmental and health issues.[243]

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241 Benson, Mitchel., "Chip group to initiate safety study," Austin American Stateman, 7, January 1989, Sec.C p. C6.

242 ibid.

243 Ladendorf, Kirk., "SEMATECH pressed on environmental safety," Austin American Stateman, 2, June 1990.

Nevertheless, there are environmental risks that the industry and local communities must keep in mind. In 1984, CTS Printex of Mountain View California announced that it was moving and closing its local printed circuit board production plant because it could not meet local ordinances regulating the storage and disposal of hazardous materials.[244]

The production process uses many toxic chemicals. Various widely used chemicals such as hydrocarbon solvents are known to cause illnesses ranging from headaches to birth defects and cancer.[245] The composite of health and environmental risks represent two of the most obvious categories of possible negative externalities in the industry.

However, SEMATECH may also offer some positive externalities. These may include advances in national defense brought about from a stable semiconductor production capability and technological leadership. Other benefits may involve spillovers within the semiconductor industry resulting from SEMATECH's long term research and development focus. In addition, spillovers to the national economy from advances in semiconductor technology leading to lower computer costs and greater capabilities (which might benefit all industries) are also possible.[246] The success of SEMATECH may also bring benefits in the form of greater competitiveness and future growth potential.

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244 Siegel, Lenny and Markoff, John., The High Cost of High Tech, (New York, N.Y. : Harper & Row Publishers, 1985) p. 161.

245 ibid., p. 164.

246 General Accounting Office, Federal Research: The SEMATECH Consortium's Start-up Activities, (Washington, D.C. : GAO RCED-90-37, November 1989), p. 4.

Finally, SEMATECH may help bring jobs to the city. The presence of the consortium in the city could help tip the balance in favor of Austin when a decision to locate a manufacturing plant or research center is made in the industry. The competition for and arrival of SEMATECH in Austin created a large amount of publicity for the city. The consortium may help increase any high-technology agglomeration effects that Austin economy may already possess.

Conclusion

The outcome of the cost-benefit evaluation is positive for both time frames. Given the regular set of assumptions SEMATECH could be said to have brought more benefits to the community than costs. The fact that the city government contributed a relatively small part of the full cost of the 68 million dollar incentive package undoubtedly helped to keep the benefits to the city's economy high in proportion to the costs. Another factor of importance to the outcome was related to the fact that all the employment gains attributed to SEMATECH occurred in export sector employment. After the application of the multiplier, total employment estimates helped boost the employment figures attributed to SEMATECH, which in turn helped boost the tax revenue estimate calculations. The importance of the employment estimates to the outcome of the evaluation was clearly demonstrated by the sensitivity analysis.

EVALUATION RESULTS

TABLE 5.27 EVALUATION CRITERIA RESULTS FOR SEMATECH AS OF THE END OF 1990.

Measures of Economic Activity	Expectation	Aspect of Theory	Result
Economic Base Study (EBS)	↑ export jobs	EBS theory	↑ export jobs
Employment Shifts and Shares (ESS)	↑ share	ESS theory	↑ share
JOBS (EMPLOYMENT)	Higher 960 spin off jobs*	Feiock*** statements	Higher positive
BUSINESS FIRMS	Higher	Feiock***	tentative positive
TAXES	Higher $42.8 million**	Feiock*** statements	Uncertain negative
BUILDING PERMITS (INVESTMENT)	Higher	Feiock***	Uncertain
Cost-Benefit Theory	Benefits > Costs	Cost-Benefit Theory	Benefits>Costs

Note:
* This figure is obtained by multiplying 2400 by two fifths.
The 1993 evaluation would call for 2,400 new jobs.
** This figure is obtained by multiplying 150 million by two sevenths.
*** This refers to Feiock's theory described earlier.

Most of the individual sub-hypotheses evaluation results were positive. Table 5.27 offers a summary of the evaluation results. The overall evaluation yielded positive outcomes in five of the seven individual evaluations. Positive evaluations were obtained for the economic base study, the employment shifts and shares analysis, the employment (Jobs) and business firms evaluations, and the cost-benefit study (as of the end of 1990). The results for the building permit (Investment) evaluation analysis were inconclusive. Therefore, they were considered to be negative. The tax revenue evaluation provided a negative outcome.

The cost-benefit analysis was performed using two separate evaluation time points. The results for the second evaluation time point are provided in Table 5.28. They were positive with the benefits exceeding the costs. Thus, the full cost-benefit analysis offered a positive outcome.

TABLE 5.28 COST-BENEFIT ANALYSIS EVALUATION CRITERIA RESULTS FOR SEMATECH AS OF THE END OF 1993.

Measures of Economic Activity	Expectation	Aspect of Theory	Result
Cost-Benefit Theory	Benefits > Costs	Cost-Benefit Theory	Benefits>Costs

The evaluation of the economic impact of the SEMATECH research consortium on the economy of Austin, Texas yielded a positive outcome. Most of the seven individual sub-hypotheses gave positive results. Although the tax revenues projected from public statements were found to be excessive, the cost-benefit analysis demonstrated that the consortium was

profitable. From the point of view of the city, SEMATECH brought more economic benefits to the community than what it cost the city to recruit the consortium. SEMATECH may have also improved the competitive position of the city as a high-technology area. The gains made by Austin as a 'high-technology' cluster may lead to further economic gains in the future.

CHAPTER VI: CONCLUSION

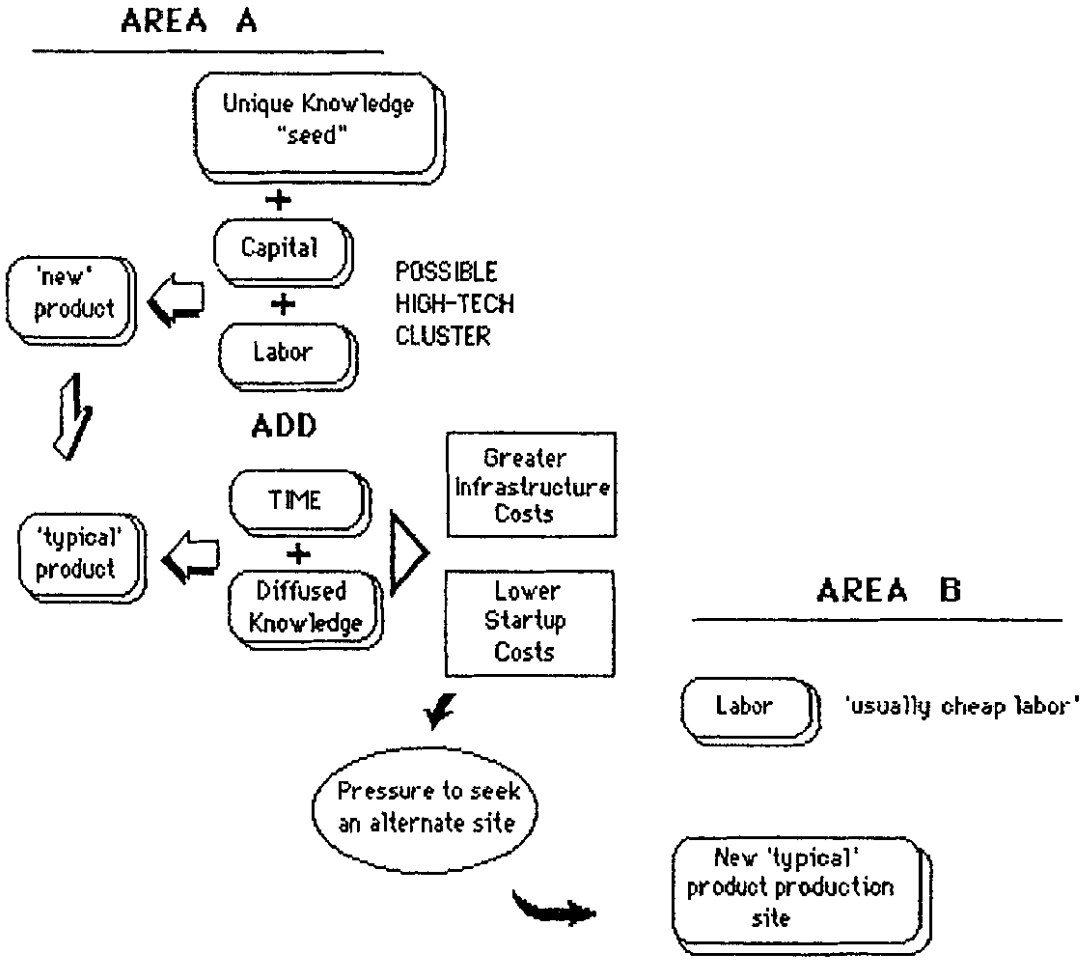
The evaluation results shows that the SEMATECH research consortium improved the economy of Austin, Texas. Most of the benefits of the consortium are concentrated in the area's electronics and microelectronics industry. This is the only manufacturing industry that showed any export employment for the Austin Metropolitan Statistical Area in 1988.

The evaluation study relied heavily on an analysis of the consortium's impact on the economic base of the city. The consortium produced many export jobs. This was due in part to the fact that the Electronic Components and Accessories (SIC 367) industrial sector of the Austin economy already produced export employment. Therefore, whatever effect SEMATECH might have had added to the already present export employment. In turn, the new export jobs created more jobs through the employment multiplier effect.

The job growth measured in the study was found primarily in the Electronic Components and Accessories (SIC 367) category. However, it may be too early to discount an increase in job growth in the Semiconductor and Related Devices sub-category (SIC 3674). The employment shifts and shares analysis demonstrated that the semiconductor industry sector gained local employment in spite of a national decline in employment. The lack of more recent County Business Patterns employment statistics makes it difficult to ascertain any possible employment growth after 1988. County

Business Patterns statistics provide the most detailed and comprehensive employment data available. Their unavailability after 1988 limited the evaluation.

FIGURE 6.1 CONCEPTUAL ECONOMIC DEVELOPMENT MODEL OF A THEORETICAL HIGH-TECHNOLOGY CLUSTER



Source: The model is adapted from several economic development theories.

Nevertheless, Austin may already possess many positive high-technology sector prerequisites. SEMATECH may help the city to become a more viable high-technology cluster. Figure 6.1 provides a model of how a

high-technology cluster might function. The model is based on the various theories described earlier in the literature review.

For example, Area A enjoys the benefits of a well-trained workforce and the infrastructure necessary to create the 'unique knowledge seeds' which may lead to 'unique' products. The unique knowledge seed refers to those elements that contribute to the creation of new and unique products. In the high-technology sector innovations qualify as unique products. The SEMATECH consortium's mission is to help create unique technological innovations that would be directly applied to the manufacture of new and innovative products. Unique products are important because they sustain a highly technical and well paid workforce, and are able to command high prices in the marketplace.

Once a unique product becomes typical (through the passage of time and diffusion of knowledge) its ability to sustain high wages and a high price is diminished. At that point competitive pressures take hold. An item that was once unique, new and innovative becomes 'typical' with the passage of time and the diffusion of the skill necessary to create it At that point, Area A becomes an expensive area to manufacture typical products (partly because of the high cost of the infrastructure present in the area). Therefore, typical product manufacturers tend to migrate to areas that offer cheap labor and low infrastructure costs.

As a result, the unique infrastructure characteristics of a successful high-technology producing area (which favor the continued creation of unique products for sale) are an important factor in sustaining the area's

continued economic expansion. Once such a high-technology area is forced to rely solely on "typical" products, it begins to lose some of its economic advantage. High-technology products can easily classify as 'unique' products. The infrastructure characteristics of an area such as Area A could be said to comprise agglomeration or high-technology cluster characteristics.

This brings us back to the theoretical discussion of consortia as drivers of economic activity. Consortia may aid the community's competitive economic position particularly in specific high-technology sectors such as the semiconductor and microelectronics industries. They also operate within the context of the community's total economy. This total economic context includes such local characteristics as the prevailing tax rates, education levels, workforce characteristics and others. SEMATECH may contribute to any high-technology-cluster-agglomeration effects which could improve the competitive position of Austin in the microelectronics industry.

The economic base study became a central aspect of the overall evaluation. It provided the key economic output variable measure on which the bulk of the evaluation was based. This key economic output was employment. The level of detail found in the County Business Patterns employment statistics was very helpful in this regard. It is unfortunate that more recent statistics were not available.

The economic base study offered an instrument with which the economic impact of SEMATECH on the Austin economy could be measured.

The popular spin-off jobs term could be operationalized as export employment with the use of the economic base study. The theoretical framework of the economic base study also fit nicely with the 'agricultural' analogy and 'profit-loss' criterion employed in the cost-benefit analysis. This is because the definition of the local economy as a closed self-sufficient entity in the economic base study could be also apply to the definition of the local community in the cost-benefit analysis.

The economic base study offered a common variable through which the impact of SEMATECH on the local economy could be measured. The number of jobs estimated from the economic base study could be used to arrive at an estimate of tax revenues. This required a complicated set of assumptions; but, such assumptions can be described, quantified and analyzed. This was a fortunate coincidence because the cost-benefit analysis asked for a way to estimate the economic impact in concrete dollar terms. The economic base study offered a readily available framework with which to approach the problem.

The use of the economic base study led to several other logical consequences. For example, 'export' employment was found to be more valuable than non-export employment. Therefore, dollar for dollar and job for job, SEMATECH would be more profitable as an economic development intervention to the extent that it helped an already established 'export' job producing sector instead of a 'non-export' job producing sector. The total value of an 'export' sector job could be multiplied by the employment multiplier. The value of a 'non-export' sector job would be limited to the single 'non-export' job.

The fact that a job is an 'export' or 'non-export' job also leads to an interesting set of implications. These implications relate to the determination of the monetary value that may be assigned to a job. Jobs derived from 'export' employment figures plus their corresponding multiplier are clearly a form of typical-aggregate-type of local job. Therefore, one may feel confident in assigning the value of the average wage or salary in the community to this job. However, the 'non-export' job is a job that represents employment in a specific industry, unlike the 'export' sector derived job that incorporates community wide employment multiplier effects. Therefore, the value of this typical 'non-export' job might be better approximated by giving it the value of the average wage in the industry from which this 'non-export' job was derived.

The use of the 'profit-loss criterion' in the analysis of the costs and benefits also involves some interesting implications. Many of the costs and benefits are measured by way of the consortium's impact on local tax revenues. This kind of measurement makes the total quantity of local costs and benefits susceptible to local level of taxation. This is interesting because it might be said that within the framework of the economic base study (as a measure of aggregate economic conditions) local tax rates are a factor that may influence employment. Therefore, the community could derive a larger income from an increased tax rate; but this increased tax rate may have a negative impact on employment. This effect is considered to be separate from the determination of the consortium's effect on the local economy. However, it is noteworthy that the effect is there; and that perhaps at some level the impact of SEMATECH as an economic development

intervention would be different under a different set of prevailing local tax rates.

The focus of this study was narrowly confined to the local community. In addition, the study suffered from a lack of recent statistical information. The fact that the study was performed shortly after the consortium began operations aggravated this problem. A future study could make use of actual historical statistical information. Such a study would more adequately estimate the impact of SEMATECH on the Austin economy.

Specific methodologies, such as the cost-benefit analysis could also offer some avenues for future research. The cost-benefit analysis evaluation performed had a narrow focus. Future cost-benefit analyses could examine the costs and benefits of the consortia from a wider social cost and benefit perspective. The other methodologies used in the evaluation might also be expanded upon.

Overall, the evaluation results gave a tentative positive assessment about SEMATECH's impact on the Austin economy. The consortium appears to have the potential of producing long term benefits; and it seems to have created many jobs. In addition, there is a strong possibility that it positively contributed to the local economy's characteristics as a high-technology cluster in the semiconductors and microelectronics industry. Although, the future is uncertain and the results obtained are tentative, the economic impact evaluation results were positive.

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APPENDIXES

ECONOMIC BASE ANALYSIS FOR
TRAVIS COUNTY
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1977	172,091		78,358,580			
AGRICULTURAL SERVICES		428	0.2487%	242,997	0.3101%	534	-106
MINING		150	0.0872%	830,178	1.0595%	1,823	-1,673
CONTRACT CONSTRUCTION		8,650	5.0264%	3,571,973	4.5585%	7,845	805
MANUFACTURING		18,874	10.97%	19,638,852	25.0628%	43,131	-24,257
TRANSPORTATION AND OTHER PUBLIC UTILIT		5,311	3.09%	4,030,479	5.1436%	8,852	-3,541
WHOLESALE TRADE		6,172	3.59%	4,562,083	5.8221%	10,019	-3,847
RETAIL TRADE		30,672	17.82%	13,384,271	17.0808%	29,395	1,277
FINANCE INSURANCE AND REAL ESTATE		10,553	6.13%	4,568,788	5.8306%	10,034	519
SERVICES		28,225	16.40%	14,059,994	17.9431%	30,879	-2,654
Nonclassifiable Establishments		258	0.15%	85,965	0.1097%	189	69
STATE EMPLOYMENT		41,439	24.0797%	2,902,000	3.7035%	6,373	35,066
FEDERAL EMPLOYMENT		7596	4.4139%	2,885,000	3.6818%	6,336	1,260
		109,293	0.635088	64,975,580	0.8292082	142,699	38,997
NATIONAL GOVERNMENT EMPLOYMENT				13,383,000			

LOCAL	13,763
STATE	41,439
FEDERAL	7,596
TOTAL	62,798
Multiplier	TRAVIS
TOTAL EMPLOYMENT	172,091
divided EXPORT EMPLOYMENT	38,997
	4.4130

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1978	185,304		83,888,236			
AGRICULTURAL SERVICES		477	0.2574%	265,068	0.3160%	586	-109
MINING		161	0.0869%	826,326	0.9850%	1,825	-1,664
CONTRACT CONSTRUCTION		11,045	5.9605%	4,129,819	4.9230%	9,123	1,922
MANUFACTURING		20,089	10.84%	20,612,389	24.5713%	45,532	-25,443
TRANSPORTATION AND OTHER PUBLIC UTILIT		5,852	3.16%	4,344,603	5.1790%	9,597	-3,745
WHOLESALE TRADE		6,800	3.67%	4,837,359	5.7664%	10,685	-3,885
RETAIL TRADE		33,678	18.17%	14,480,933	17.2622%	31,987	1,691
FINANCE INSURANCE AND REAL ESTATE		12,070	6.51%	4,871,825	5.8075%	10,762	1,308

SERVICES	32,022	17.28%	15,567,801	18.5578%	34,388	-2,366
Nonclassifiable Establishments	976	0.53%	353,113	0.4209%	780	196
STATE EMPLOYMENT	40,520	21.8668%	2,996,000	3.5714%	6,618	33,902
FEDERAL EMPLOYMENT	7845	4.2336%	2,875,000	3.4272%	6,351	1,494
	123,170	0.664692	70,289,236	0.8378915	155,265	40,514
NATIONAL GOVERNMENT EMPLOYMENT			13,599,000			

LOCAL	13,769
STATE	40,520
FEDERAL	7,845
TOTAL	62,134
Multiplier TRAVIS	
TOTAL EMPLOYMENT	185,304
divided EXPORT EMPLOYMENT	40,514
	4.5739

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1979	208,714		88,521,388			
AGRICULTURAL SERVICES		547	0.2621%	282,689	0.3193%	667	-120
MINING		126	0.0604%	948,644	1.0717%	2,237	-2,111
CONTRACT CONSTRUCTION		12,160	5.8262%	4,609,029	5.2067%	10,867	1,293
MANUFACTURING		25,703	12.3149%	21,483,353	24.2691%	50,653	-24,950
TRANSPORTATION AND OTHER PUBLIC UTILIT		6,503	3.1157%	4,603,524	5.2005%	10,854	-4,351
WHOLESALE TRADE		7,167	3.4339%	5,185,772	5.8582%	12,227	-5,060
RETAIL TRADE		36,947	17.7022%	15,148,435	17.1127%	35,717	1,230
FINANCE INSURANCE AND REAL ESTATE		12,789	6.1275%	5,159,917	5.8290%	12,166	623
SERVICES		35,921	17.2106%	16,774,161	18.9493%	39,550	-3,629
Nonclassifiable Establishments		1,412	0.6765%	485,864	0.5489%	1,146	266
STATE EMPLOYMENT		43,927	21.0465%	3,072,000	3.4703%	7,243	36,684
FEDERAL EMPLOYMENT		8060	3.8617%	2,987,000	3.3743%	7,043	1,017
		137,863	0.660535	74,195,524	0.8381649	174,937	41,114
NATIONAL GOVERNMENT EMPLOYMENT				13,840,000			

LOCAL	17,452
STATE	43,927
FEDERAL	8,060
TOTAL	69,439
Multiplier TRAVIS	
TOTAL EMPLOYMENT	208,714
divided EXPORT EMPLOYMENT	41,114
	5.0765

[1] [2] [3] [4] [5] [6]

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

Employment Category		TRAVIS	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1980	217,023		88,878,180			
AGRICULTURAL SERVICES		602	0.2774%	290,351	0.3267%	709	-107
MINING		142	0.0654%	994,464	1.1189%	2,428	-2,286
CONTRACT CONSTRUCTION		13,167	6.0671%	4,473,010	5.0327%	10,922	2,245
MANUFACTURING		26,960	12.4226%	21,164,697	23.8132%	51,680	-24,720
TRANSPORTATION AND OTHER PUBLIC UTILIT		6,532	3.0098%	4,623,352	5.2019%	11,289	-4,757
WHOLESALE TRADE		7,490	3.4512%	5,211,549	5.8637%	12,726	-5,236
RETAIL TRADE		38,285	17.6410%	15,047,300	16.9303%	36,743	1,542
FINANCE INSURANCE AND REAL ESTATE		13,576	6.2556%	5,294,675	5.9572%	12,929	647
SERVICES		38,232	17.6166%	17,186,190	19.3368%	41,965	-3,733
Nonclassifiable Establishments		1,633	0.7525%	558,592	0.6285%	1,364	269
STATE EMPLOYMENT		44,299	20.4121%	3,106,000	3.4947%	7,584	36,715
FEDERAL EMPLOYMENT		8177	3.7678%	2,987,000	3.3608%	7,294	883
		146,619	0.675592	74,844,180	0.8420985	182,755	42,302
NATIONAL GOVERNMENT EMPLOYMENT				14,034,000			
LOCAL	17,928						
STATE	44,299						
FEDERAL	8,177						
TOTAL	70,404						
Multiplier	TRAVIS						
TOTAL EMPLOYMENT	217,023						
divided EXPORT EMPLOYMENT	42,302						
	5.1303						

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1981	228,923		88,676,402			
AGRICULTURAL SERVICES		616	0.2691%	302,694	0.3413%	781	-165
MINING		327	0.1428%	1,107,726	1.2492%	2,860	-2,533
CONTRACT CONSTRUCTION		13,819	6.0365%	4,286,069	4.8334%	11,065	2,754
MANUFACTURING		26,934	11.7655%	20,428,330	23.0369%	52,737	-25,803
TRANSPORTATION AND OTHER PUBLIC UTILIT		6,660	2.9093%	4,613,030	5.2021%	11,909	-5,249
WHOLESALE TRADE		8,167	3.5676%	5,260,928	5.9327%	13,581	-5,414
RETAIL TRADE		39,740	17.3595%	15,039,998	16.9605%	38,827	913
FINANCE INSURANCE AND REAL ESTATE		14,809	6.4690%	5,409,780	6.1006%	13,966	843
SERVICES		44,340	19.3690%	17,814,081	20.0889%	45,988	-1,648
Nonclassifiable Establishments		1,898	0.8291%	587,766	0.6628%	1,517	381
STATE EMPLOYMENT		44,291	19.3476%	3,087,000	3.4812%	7,969	36,322
FEDERAL EMPLOYMENT		8384	3.6624%	2,909,000	3.2805%	7,510	874
		157,310	0.687174	74,850,402	0.8440848	193,230	42,088
NATIONAL GOVERNMENT EMPLOYMENT				13,826,000			
LOCAL	18,938						
STATE	44,291						
FEDERAL	8,384						

TOTAL	71,613
Multiplier	TRAVIS
TOTAL EMPLOYMENT	228,923
divided EXPORT EMPLOYMENT	42,088
	5.4392

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export
TOTALS	1982	243,138		87,997,252			employment
AGRICULTURAL SERVICES		747	0.3072%	320,411	0.3641%	885	-138
MINING		540	0.2221%	1,187,807	1.3498%	3,282	-2,742
CONTRACT CONSTRUCTION		12,788	5.2596%	3,940,770	4.4783%	10,888	1,900
MANUFACTURING		29,316	12.0574%	19,572,113	22.2417%	54,078	-24,762
TRANSPORTATION AND OTHER PUBLIC UTILIT		7,192	2.9580%	4,626,875	5.2580%	12,784	-5,592
WHOLESALE TRADE		8,847	3.6387%	5,234,731	5.9487%	14,464	-5,617
RETAIL TRADE		44,509	18.3061%	15,280,312	17.3645%	42,220	2,289
FINANCE INSURANCE AND REAL ESTATE		15,616	6.4227%	5,447,030	6.1900%	15,050	566
SERVICES		50,277	20.6784%	18,581,939	21.1165%	51,342	-1,065
Nonclassifiable Establishments		377	0.1551%	105,264	0.1196%	291	86
STATE EMPLOYMENT		44,716	18.3912%	3,083,000	3.5035%	8,518	36,198
FEDERAL EMPLOYMENT		8537	3.5112%	2,871,000	3.2626%	7,933	604
		223,462	0.919075	80,251,252	0.9119745	221,736	41,643
NATIONAL GOVERNMENT EMPLOYMENT				13,700,000			

LOCAL	19,676
STATE	44,716
FEDERAL	8,537
TOTAL	72,929
Multiplier	TRAVIS
TOTAL EMPLOYMENT	243,138
divided EXPORT EMPLOYMENT	41,643
	5.8387

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export
TOTALS	1983	256,373		86,734,318			employment
AGRICULTURAL SERVICES		924	0.3604%	325,352	0.3751%	962	-38
MINING		407	0.1588%	971,512	1.1201%	2,872	-2,465
CONTRACT CONSTRUCTION		15,127	5.9004%	3,765,265	4.3411%	11,130	3,997
MANUFACTURING		29,238	11.4045%	18,231,529	21.0200%	53,890	-24,652
TRANSPORTATION AND OTHER PUBLIC UTILIT		6,708	2.6165%	4,550,547	5.2465%	13,451	-6,743
WHOLESALE TRADE		9,674	3.7734%	5,121,939	5.9053%	15,140	-5,466
RETAIL TRADE		45,824	17.8740%	15,231,531	17.5611%	45,022	802
FINANCE INSURANCE AND REAL ESTATE		16,985	6.6251%	5,544,757	6.3928%	16,389	596
SERVICES		55,623	21.6961%	18,831,814	21.7121%	55,664	-41

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

Nonclassifiable Establishments	1,941	0.7571%	397,072	0.4578%	1,174	767
STATE EMPLOYMENT	45,175	17.6208%	3,116,000	3.5926%	9,210	35,965
FEDERAL EMPLOYMENT	8577	3.3455%	2,878,000	3.3182%	8,507	70
	182,451	0.711662	72,971,318	0.84132	215,692	42,197
NATIONAL GOVERNMENT EMPLOYMENT			13,763,000			

LOCAL	20,170
STATE	45,175
FEDERAL	8,577
TOTAL	73,922
Multiplier TRAVIS	
TOTAL EMPLOYMENT	256,373
divided EXPORT EMPLOYMENT	42,197
	6.0756

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1984	287,982		82,564,354			
AGRICULTURAL SERVICES		1,047	0.3636%	356,881	0.4322%	1,245	-198
MINING		704	0.2445%	974,285	1.1800%	3,398	-2,694
CONTRACT CONSTRUCTION		19,226	6.6761%	4,171,763	5.0527%	14,551	4,675
MANUFACTURING		33,797	11.7358%	19,325,352	23.4064%	67,406	-33,609
TRANSPORTATION AND OTHER PUBLIC UTILIT		8,092	2.8099%	4,675,385	5.6627%	16,308	-8,216
WHOLESALE TRADE		10,928	3.7947%	5,387,724	6.5255%	18,792	-7,864
RETAIL TRADE		51,595	17.9161%	16,090,830	19.4767%	56,089	-4,494
FINANCE INSURANCE AND REAL ESTATE		20,678	7.1803%	5,783,225	7.0045%	20,172	506
SERVICES		61,920	21.5013%	20,349,322	24.6466%	70,978	-9,058
Nonclassifiable Establishments		3,985	1.3838%	890,799	1.0789%	3,107	878
STATE EMPLOYMENT		46,210	16.0461%	3,117,000	3.7752%	10,872	35,338
FEDERAL EMPLOYMENT		8679	3.0137%	2,935,000	3.5548%	10,237	-1,558
		211,972	0.73606	77,995,566	0.9446639	272,046	41,397
NATIONAL GOVERNMENT EMPLOYMENT				14,078,000			

LOCAL	21,121
STATE	46,210
FEDERAL	8,679
TOTAL	76,010
Multiplier TRAVIS	
TOTAL EMPLOYMENT	287,982
divided EXPORT EMPLOYMENT	41,397
	6.9566

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1985	313,323		97,789,257			
AGRICULTURAL SERVICES		1,141	0.3642%	381,632	0.3903%	1,223	-82

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

MINING	637	0.2033%	943,372	0.9647%	3,023	-2,386
CONTRACT CONSTRUCTION	22,699	7.2446%	4,479,533	4.5808%	14,353	8,346
MANUFACTURING	37,617	12.0058%	19,433,606	19.8729%	62,267	-24,650
TRANSPORTATION AND OTHER PUBLIC UTILIT	9,754	3.1131%	4,815,535	4.9244%	15,429	-5,675
WHOLESALE TRADE	10,846	3.4616%	5,625,007	5.7522%	18,023	-7,177
RETAIL TRADE	56,985	18.1873%	16,851,827	17.2328%	53,994	2,991
FINANCE INSURANCE AND REAL ESTATE	24,178	7.7166%	6,004,136	6.1399%	19,238	4,940
SERVICES	66,871	21.3425%	21,543,425	22.0305%	69,027	-2,156
Nonclassifiable Establishments	4,105	1.3101%	1,041,184	1.0647%	3,336	769
STATE EMPLOYMENT	46,250	14.7611%	3,984,000	4.0741%	12,765	33,485
FEDERAL EMPLOYMENT	9879	3.1530%	3,001,000	3.0688%	9,615	264
	234,833	0.749492	81,119,257	0.8295314	259,911	50,795
NATIONAL GOVERNMENT EMPLOYMENT			16,670,000			

LOCAL	22,361
STATE	46,250
FEDERAL	9,879
TOTAL	78,490
Multiplier	TRAVIS
TOTAL EMPLOYMENT	313,323
divided EXPORT EMPLOYMENT	50,795
	6.1684

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1986	325,384		96,763,465			
AGRICULTURAL SERVICES		1,368	0.4204%	412,010	0.4258%	1,385	-17
MINING		451	0.1386%	847,143	0.8755%	2,849	-2,398
CONTRACT CONSTRUCTION		19,081	5.8641%	4,658,669	4.8145%	15,666	3,415
MANUFACTURING		36,853	11.3260%	19,141,756	19.7820%	64,367	-27,514
TRANSPORTATION AND OTHER PUBLIC UTILIT		10,384	3.1913%	4,884,297	5.0477%	16,424	-6,040
WHOLESALE TRADE		12,084	3.7138%	5,724,864	5.9163%	19,251	-7,167
RETAIL TRADE		58,373	17.9397%	17,549,841	18.1368%	59,014	-641
FINANCE INSURANCE AND REAL ESTATE		27,531	8.4611%	6,370,787	6.5839%	21,423	6,108
SERVICES		71,106	21.8529%	22,878,357	23.6436%	76,932	-5,826
Nonclassifiable Establishments		3,694	1.1353%	912,741	0.9433%	3,069	625
STATE EMPLOYMENT		46,777	14.3759%	3,437,000	3.5520%	11,558	35,219
FEDERAL EMPLOYMENT		11051	3.3963%	3,047,000	3.1489%	10,246	805
		240,925	0.740433	83,380,465	0.8616937	280,381	46,173
NATIONAL GOVERNMENT EMPLOYMENT				14,899,000			

LOCAL	26,631
STATE	46,777
FEDERAL	11,051
TOTAL	84,459
Multiplier	TRAVIS
TOTAL EMPLOYMENT	325,384

divided EXPORT EMPLOYMENT 46,173
7.0471

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1987	312,988		100,644,804			
AGRICULTURAL SERVICES		1,197	0.3824%	437,869	0.4351%	1,362	-165
MINING		264	0.0843%	724,967	0.7203%	2,255	-1,991
CONTRACT CONSTRUCTION		12,693	4.0554%	4,884,281	4.8530%	15,189	-2,496
MANUFACTURING		35,008	11.1851%	19,002,692	18.8809%	59,095	-24,087
TRANSPORTATION AND OTHER PUBLIC UTILIT		9,639	3.0797%	5,107,254	5.0745%	15,883	-6,244
WHOLESALE TRADE		11,581	3.7001%	5,820,453	5.7832%	18,101	-6,520
RETAIL TRADE		57,469	18.3614%	18,416,653	18.2987%	57,273	196
FINANCE, INSURANCE, AND REAL ESTATE		26,943	8.6083%	6,727,313	6.6842%	20,921	6,022
SERVICES		74,109	23.6779%	24,140,054	23.9854%	75,071	-962
Nonclassifiable Establishments		606	0.1936%	221,842	0.2204%	690	-84
STATE EMPLOYMENT		46,731	14.9306%	3,491,000	3.4686%	10,856	35,875
FEDERAL EMPLOYMENT		11205	3.5800%	3,075,000	3.0553%	9,563	1,642
		229,509	0.733284	85,483,378	0.8493571	265,839	43,735

NATIONAL GOVERNMENT EMPLOYMENT 15,161,000

LOCAL	25,543
STATE	46,731
FEDERAL	11,205
TOTAL	83,479
Multiplier	TRAVIS
TOTAL EMPLOYMENT	312,988
divided EXPORT EMPLOYMENT	43,735
	7.1564

Employment Category		[1] TRAVIS	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5] expected	[6] export employment
TOTALS	1988	308,081		103,094,632			
AGRICULTURAL SERVICES		988	0.3207%	461,768	0.4479%	1,380	-392
MINING		216	0.0701%	734,953	0.7129%	2,196	-1,980
CONTRACT CONSTRUCTION		10,580	3.4342%	4,938,977	4.7907%	14,759	-4,179
MANUFACTURING		34,624	11.2386%	19,261,691	18.6835%	57,560	-22,936
TRANSPORTATION AND OTHER PUBLIC UTILIT		9,843	3.1949%	5,270,318	5.1121%	15,749	-5,906
WHOLESALE TRADE		11,788	3.8263%	5,981,378	5.8018%	17,874	-6,086
RETAIL TRADE		54,212	17.5967%	18,801,521	18.2371%	56,185	-1,973
FINANCE INSURANCE AND REAL ESTATE		25,237	8.1917%	6,659,618	6.4597%	19,901	5,336
SERVICES		72,222	23.4425%	25,142,715	24.3880%	75,135	-2,913
Nonclassifiable Establishments		2,260	0.7336%	628,693	0.6098%	1,879	381
STATE EMPLOYMENT		48,197	15.6443%	3,500,000	3.3949%	10,459	37,738
FEDERAL EMPLOYMENT		11559	3.7519%	3,113,000	3.0196%	9,303	2,256

	221,970	0.720492	87,881,632	0.8524365	262,620	45,711
NATIONAL GOVERNMENT EMPLOYMENT			15,213,000			
LOCAL	26,355					
STATE	48,197					
FEDERAL	11,559					
TOTAL	86,111					
Multiplier	TRAVIS					
TOTAL EMPLOYMENT	308,081					
divided EXPORT EMPLOYMENT	45,711					
	6.7397					

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

ECONOMIC BASE ANALYSIS FOR
HAYS COUNTY
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1977	10,404		78,358,580			
AGRICULTURAL SERVICES	A (estimate)	10	0.0961%	242,997	0.3101%	32	-22
MINING	A(estimate)	10	0.0961%	830,178	1.0595%	110	-100
CONTRACT CONSTRUCTION		573	5.5075%	3,571,973	4.5585%	474	99
MANUFACTURING		934	8.98%	19,638,852	25.0628%	2,608	-1,674
TRANSPORTATION AND OTHER PUBLIC UTI		254	2.44%	4,030,479	5.1436%	535	-281
WHOLESALE TRADE		286	2.75%	4,562,083	5.8221%	606	-320
RETAIL TRADE		2,178	20.93%	13,384,271	17.0808%	1,777	401
FINANCE INSURANCE AND REAL ESTATE		394	3.79%	4,568,788	5.8306%	607	-213
SERVICES		2,394	23.01%	14,059,994	17.9431%	1,867	527
Nonclassifiable Establishments		56	0.54%	85,965	0.1097%	11	45
STATE EMPLOYMENT		2,116	20.3383%	2,902,000	3.7035%	385	1,731
FEDERAL EMPLOYMENT		72	0.6920%	2,885,000	3.6818%	383	-311
		7,089	0.6813725	64,975,580	0.8292082	8,627	2,802

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,125
STATE		2,116
FEDERAL		72
TOTAL		3,313
Multiplier	HAYS	
TOTAL EMPLOYMENT		10,404
divided EXPORT EMPLOYMEN		2,802
		3.7129

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1978	11,875		83,888,236			
AGRICULTURAL SERVICES	A (estimate)	10	0.0842%	265,068	0.3160%	38	-28
MINING	A(estimate)	10	0.0842%	826,326	0.9850%	117	-107
CONTRACT CONSTRUCTION		734	6.1811%	4,129,819	4.9230%	585	149
MANUFACTURING		1,073	9.04%	20,612,389	24.5713%	2,918	-1,845
TRANSPORTATION AND OTHER PUBLIC UTI		320	2.69%	4,344,603	5.1790%	615	-295
WHOLESALE TRADE		382	3.22%	4,837,359	5.7664%	685	-303
RETAIL TRADE		2,513	21.16%	14,480,933	17.2622%	2,050	463
FINANCE INSURANCE AND REAL ESTATE		508	4.28%	4,871,825	5.8075%	690	-182

SERVICES		2,612	22.00%	15,567,801	18.5578%	2,204	408
Nonclassifiable Establishments		65	0.55%	353,113	0.4209%	50	15
STATE EMPLOYMENT		2,336	19.6716%	2,996,000	3.5714%	424	1,912
FEDERAL EMPLOYMENT		79	0.6653%	2,875,000	3.4272%	407	-328
		8,227	0.6928	70,289,236	0.8378915	9,950	2,948
NATIONAL GOVE EMPLOYMENT							
LOCAL	1,235						
STATE	2,336						
FEDERAL	79						
TOTAL	3,650						
Multiplier	HAYS						
TOTAL EMPLOYMENT	11,875						
divided EXPORT EMPLOYMEN	2,948						
	4.0286						

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1979	12,684		88,521,388			
AGRICULTURAL SERVICES	A (estimate)	10	0.0788%	282,689	0.3193%	41	-31
MINING	A(estimate)	10	0.0788%	948,644	1.0717%	136	-126
CONTRACT CONSTRUCTION		650	5.1246%	4,609,029	5.2067%	660	-10
MANUFACTURING		1,234	9.73%	21,483,353	24.2691%	3,078	-1,844
TRANSPORTATION AND OTHER PUBLIC UTI		382	3.01%	4,603,524	5.2005%	660	-278
WHOLESALE TRADE		427	3.37%	5,185,772	5.8582%	743	-316
RETAIL TRADE		2,683	21.15%	15,148,435	17.1127%	2,171	512
FINANCE INSURANCE AND REAL ESTATE		568	4.48%	5,159,917	5.8290%	739	-171
SERVICES		2,808	22.14%	16,774,161	18.9493%	2,404	404
Nonclassifiable Establishments		50	0.39%	485,864	0.5489%	70	-20
STATE EMPLOYMENT		2,473	19.4970%	3,072,000	3.4703%	440	2,033
FEDERAL EMPLOYMENT		78	0.6149%	2,987,000	3.3743%	428	-350
		8,772	0.6915799	74,195,524	0.8381649	10,631	2,950
NATIONAL GOVE EMPLOYMENT							
LOCAL	1,313						
STATE	2,473						
FEDERAL	78						
TOTAL	3,864						
Multiplier	HAYS						
TOTAL EMPLOYMENT	12,684						
divided EXPORT EMPLOYMEN	2,950						
	4.3001						

[1] [2] [3] [4] [5] [6]

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

Employment Category		Hays	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1980	13,813		88,878,180			
AGRICULTURAL SERVICES	A (estimate)	10	0.0724%	290,351	0.3267%	45	-35
MINING	A(estimate)	10	0.0724%	994,464	1.1189%	155	-145
CONTRACT CONSTRUCTION		1,361	9.8530%	4,473,010	5.0327%	695	666
MANUFACTURING		1,541	11.16%	21,164,697	23.8132%	3,289	-1,748
TRANSPORTATION AND OTHER PUBLIC UTI		483	3.50%	4,623,352	5.2019%	719	-236
WHOLESALE TRADE		430	3.11%	5,211,549	5.8637%	810	-380
RETAIL TRADE		2,654	19.21%	15,047,300	16.9303%	2,339	315
FINANCE INSURANCE AND REAL ESTATE		367	2.66%	5,294,675	5.9572%	823	-456
SERVICES		2,849	20.63%	17,186,190	19.3368%	2,671	178
Nonclassifiable Establishments		91	0.66%	558,592	0.6285%	87	4
STATE EMPLOYMENT		2,518	18.2292%	3,106,000	3.4947%	483	2,035
FEDERAL EMPLOYMENT		97	0.7022%	2,987,000	3.3608%	464	-367
		9,796	0.709187	74,844,180	0.8420985	11,632	3,199

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,401
STATE		2,518
FEDERAL		97
TOTAL		4,016
Multiplier	HAYS	
TOTAL EMPLOYMENT		13,813
divided EXPORT EMPLOYMEN		3,199
		4.3183

		[1]	[2]	[3]	[4]	[5]	[6]
Employment Category		Hays	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1981	14,090		88,676,402			
AGRICULTURAL SERVICES	B (estimate)	60	0.4258%	302,694	0.3413%	48	12
MINING	A(estimate)	10	0.0710%	1,107,726	1.2492%	176	-166
CONTRACT CONSTRUCTION		1,151	8.1689%	4,286,069	4.8334%	681	470
MANUFACTURING		1,640	11.64%	20,428,330	23.0369%	3,246	-1,606
TRANSPORTATION AND OTHER PUBLIC UTI		472	3.35%	4,613,030	5.2021%	733	-261
WHOLESALE TRADE		414	2.94%	5,260,928	5.9327%	836	-422
RETAIL TRADE		2,669	18.94%	15,039,998	16.9605%	2,390	279
FINANCE INSURANCE AND REAL ESTATE		367	2.60%	5,409,780	6.1006%	860	-493
SERVICES		2,977	21.13%	17,814,081	20.0889%	2,831	146
Nonclassifiable Establishments		176	1.25%	587,766	0.6628%	93	83
STATE EMPLOYMENT		2,605	18.4883%	3,087,000	3.4812%	491	2,114
FEDERAL EMPLOYMENT		115	0.8162%	2,909,000	3.2805%	462	-347
		9,936	0.705181	74,850,402	0.8440848	11,893	3,105

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,462
STATE		2,605
FEDERAL		115

TOTAL		4,182
Multiplier	HAYS	
TOTAL EMPLOYMENT		14,090
divided EXPORT EMPLOYMEN		3,105
		4.5382

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1982	13,610		87,997,252			
AGRICULTURAL SERVICES	B (estimate)	60	0.4409%	320,411	0.3641%	50	10
MINING	B(estimate)	60	0.4409%	1,187,807	1.3498%	184	-124
CONTRACT CONSTRUCTION		916	6.7303%	3,940,770	4.4783%	609	307
MANUFACTURING		1,414	10.39%	19,572,113	22.2417%	3,027	-1,613
TRANSPORTATION AND OTHER PUBLIC UTI		435	3.20%	4,626,875	5.2580%	716	-281
WHOLESALE TRADE		363	2.67%	5,234,731	5.9487%	810	-447
RETAIL TRADE		3,041	22.34%	15,280,312	17.3645%	2,363	678
FINANCE INSURANCE AND REAL ESTATE		489	3.59%	5,447,030	6.1900%	842	-353
SERVICES		2,620	19.25%	18,581,939	21.1165%	2,874	-254
Nonclassifiable Establishments		60	0.44%	105,264	0.1196%	16	44
STATE EMPLOYMENT		2,566	18.8538%	3,083,000	3.5035%	477	2,089
FEDERAL EMPLOYMENT		105	0.7715%	2,871,000	3.2626%	444	-339
		12,129	0.891183	80,251,252	0.9119745	12,412	3,128

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,480
STATE		2,566
FEDERAL		105
TOTAL		4,151
Multiplier	HAYS	
TOTAL EMPLOYMENT		13,610
divided EXPORT EMPLOYMEN		3,128
		4.3517

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1983	13,923		86,734,318			
AGRICULTURAL SERVICES	B (estimate)	60	0.4309%	325,352	0.3751%	52	8
MINING	B(estimate)	60	0.4309%	971,512	1.1201%	156	-96
CONTRACT CONSTRUCTION		1,041	7.4768%	3,765,265	4.3411%	604	437
MANUFACTURING		1,426	10.24%	18,231,529	21.0200%	2,927	-1,501
TRANSPORTATION AND OTHER PUBLIC UTI		353	2.54%	4,550,547	5.2465%	730	-377
WHOLESALE TRADE		388	2.79%	5,121,939	5.9053%	822	-434
RETAIL TRADE		3,223	23.15%	15,231,531	17.5611%	2,445	778
FINANCE INSURANCE AND REAL ESTATE		482	3.46%	5,544,757	6.3928%	890	-408
SERVICES		2,518	18.09%	18,831,814	21.7121%	3,023	-505

Nonclassifiable Establishments		120	0.86%	397,072	0.4578%	64	56
STATE EMPLOYMENT		2,689	19.3134%	3,116,000	3.5926%	500	2,189
FEDERAL EMPLOYMENT		94	0.6751%	2,878,000	3.3182%	462	-368
		9,671	0.694606	72,971,318	0.84132	11,714	3,467
NATIONAL GOVE EMPLOYMENT							
LOCAL	1,489						
STATE	2,689						
FEDERAL	94						
TOTAL	4,272						
Multiplier	HAYS						
TOTAL EMPLOYMENT	13,923						
divided EXPORT EMPLOYMEN	3,467						
	4.0154						

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	**1984**	14,703		82,564,354			
AGRICULTURAL SERVICES	B (estimate)	60	0.4081%	356,881	0.4322%	64	-4
MINING	B(estimate)	60	0.4081%	974,285	1.1800%	173	-113
CONTRACT CONSTRUCTION		946	6.4341%	4,171,763	5.0527%	743	203
MANUFACTURING		1,225	8.33%	19,325,352	23.4064%	3,441	-2,216
TRANSPORTATION AND OTHER PUBLIC UTI		298	2.03%	4,675,385	5.6627%	833	-535
WHOLESALE TRADE		496	3.37%	5,387,724	6.5255%	959	-463
RETAIL TRADE		3,343	22.74%	16,090,830	19.4767%	2,864	479
FINANCE INSURANCE AND REAL ESTATE		701	4.77%	5,783,225	7.0045%	1,030	-329
SERVICES		2,828	19.23%	20,349,322	24.6466%	3,624	-796
Nonclassifiable Establishments		287	1.95%	890,799	1.0789%	159	128
STATE EMPLOYMENT		2,831	19.2546%	3,117,000	3.7752%	555	2,276
FEDERAL EMPLOYMENT		97	0.6597%	2,935,000	3.5548%	523	-426
		10,244	0.6967286	77,995,566	0.9446639	13,889	3,087
NATIONAL GOVE EMPLOYMENT							
LOCAL	1,531						
STATE	2,831						
FEDERAL	97						
TOTAL	4,459						
Multiplier	HAYS						
TOTAL EMPLOYMENT	14,703						
divided EXPORT EMPLOYMEN	3,087						
	4.7633						

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	**1985**	16,484		97,799,257			
AGRICULTURAL SERVICES	B (estimate)	60	0.3640%	381,632	0.3903%	64	-4

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

MINING	B(estimate)	60	0.3640%	943,372	0.9647%	159	-99
CONTRACT CONSTRUCTION		1,229	7.4557%	4,479,533	4.5808%	755	474
MANUFACTURING		1,393	8.45%	19,433,606	19.8729%	3,276	-1,883
TRANSPORTATION AND OTHER PUBLIC UTI		316	1.92%	4,815,535	4.9244%	812	-496
WHOLESALE TRADE		543	3.29%	5,625,007	5.7522%	948	-405
RETAIL TRADE		3,648	22.13%	16,851,827	17.2328%	2,841	807
FINANCE INSURANCE AND REAL ESTATE		770	4.67%	6,004,136	6.1399%	1,012	-242
SERVICES		3,073	18.64%	21,543,425	22.0305%	3,632	-559
Nonclassifiable Establishments		382	2.32%	1,041,184	1.0647%	176	206
STATE EMPLOYMENT		3,223	19.5523%	3,984,000	4.0741%	672	2,551
FEDERAL EMPLOYMENT		100	0.6066%	3,001,000	3.0688%	506	-406
		11,474	0.6960689	81,119,257	0.8295314	13,674	4,039

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,679
STATE		3,223
FEDERAL		100
TOTAL		5,002
Multiplier	HAYS	
TOTAL EMPLOYMENT		16,484
divided EXPORT EMPLOYMEN		4,039
		4.0810

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	17,515		96,763,465			
AGRICULTURAL SERVICES		69	0.3939%	412,010	0.4258%	75	-6
MINING		156	0.8907%	847,143	0.8755%	153	3
CONTRACT CONSTRUCTION		1,403	8.0103%	4,658,669	4.8145%	843	560
MANUFACTURING		1,456	8.31%	19,141,756	19.7820%	3,465	-2,009
TRANSPORTATION AND OTHER PUBLIC UTI		345	1.97%	4,884,297	5.0477%	884	-539
WHOLESALE TRADE		480	2.74%	5,724,864	5.9163%	1,036	-556
RETAIL TRADE		4,022	22.96%	17,549,841	18.1368%	3,177	845
FINANCE INSURANCE AND REAL ESTATE		868	4.96%	6,370,787	6.5839%	1,153	-285
SERVICES		3,276	18.70%	22,878,357	23.6436%	4,141	-865
Nonclassifiable Establishments		305	1.74%	912,741	0.9433%	165	140
STATE EMPLOYMENT		3,116	17.7905%	3,437,000	3.5520%	622	2,494
FEDERAL EMPLOYMENT		113	0.6452%	3,047,000	3.1489%	552	-439
		12,380	0.7068227	83,380,465	0.8616937	15,093	4,041

NATIONAL GOVE EMPLOYMENT		
LOCAL		1,906
STATE		3,116
FEDERAL		113
TOTAL		5,135
Multiplier	HAYS	
TOTAL EMPLOYMENT		17,515

divided EXPORT EMPLOYMEN 4,041
4.3339

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1987	16,554		100,644,804			
AGRICULTURAL SERVICES		67	0.4047%	437,869	0.4351%	72	-5
MINING	B(estimate)	60	0.3625%	724,967	0.7203%	119	-59
CONTRACT CONSTRUCTION		1,079	6.5181%	4,884,281	4.8530%	803	276
MANUFACTURING		1,381	8.34%	19,002,692	18.8809%	3,126	-1,745
TRANSPORTATION AND OTHER PUBLIC UTI		423	2.56%	5,107,254	5.0745%	840	-417
WHOLESALE TRADE		352	2.13%	5,820,453	5.7832%	957	-605
RETAIL TRADE		3,902	23.57%	18,416,653	18.2987%	3,029	873
FINANCE INSURANCE AND REAL ESTATE		828	5.00%	6,727,313	6.6842%	1,107	-279
SERVICES		3,086	18.64%	24,140,054	23.9854%	3,971	-885
Nonclassifiable Establishmer	B(estimate)	60	0.36%	221,842	0.2204%	36	24
STATE EMPLOYMENT		3,121	18.8534%	3,491,000	3.4686%	574	2,547
FEDERAL EMPLOYMENT		122	0.7370%	3,075,000	3.0553%	506	-384
		11,238	0.6788692	85,483,378	0.8493571	14,060	3,719

NATIONAL GOVE EMPLOYMENT
LOCAL 2,082
STATE 3,121
FEDERAL 122
TOTAL 5,325
Multiplier HAYS
TOTAL EMPLOYMENT 16,554
divided EXPORT EMPLOYMEN 3,719
4.4514

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1988	16,806		103,094,632			
AGRICULTURAL SERVICES		63	0.3749%	461,768	0.4479%	75	-12
MINING	B(estimate)	60	0.3570%	734,953	0.7129%	120	-60
CONTRACT CONSTRUCTION		717	4.2663%	4,938,977	4.7907%	805	-88
MANUFACTURING		1,352	8.04%	19,261,691	18.6835%	3,140	-1,788
TRANSPORTATION AND OTHER PUBLIC UTI		427	2.54%	5,270,318	5.1121%	859	-432
WHOLESALE TRADE		332	1.98%	5,981,378	5.8018%	975	-643
RETAIL TRADE		3,977	23.66%	18,801,521	18.2371%	3,065	912
FINANCE INSURANCE AND REAL ESTATE		851	5.06%	6,659,618	6.4597%	1,086	-235
SERVICES		3,150	18.74%	25,142,715	24.3880%	4,099	-949
Nonclassifiable Establishmer	C(estimate)	175	1.04%	628,693	0.6098%	102	73
STATE EMPLOYMENT		3,369	20.0464%	3,500,000	3.3949%	571	2,798
FEDERAL EMPLOYMENT		115	0.6843%	3,113,000	3.0196%	507	-392

11,104	0.6607164	87,881,632	0.8524365	14,326	3,783	

NATIONAL GOVE EMPLOYMENT		
LOCAL		2,267
STATE		3,369
FEDERAL		115
TOTAL		5,751
Multiplier	HAYS	
TOTAL EMPLOYMENT		16,806
divided EXPORT EMPLOYMEN		3,783
		4.4425

ECONOMIC BASE ANALYSIS FOR
WILLIAMSON COUNTY
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1977	11,303		78,358,580			
AGRICULTURAL SERVICES		53	0.4689%	242,997	0.3101%	35	18
MINING	C(estimate)	175	1.5483%	830,178	1.0595%	120	55
CONTRACT CONSTRUCTION		1,162	10.2805%	3,571,973	4.5585%	515	647
MANUFACTURING		2,148	19.00%	19,638,852	25.0628%	2,833	-685
TRANSPORTATION AND OTHER PUBLIC UTI		408	3.61%	4,030,479	5.1436%	581	-173
WHOLESALE TRADE		390	3.45%	4,562,083	5.8221%	658	-268
RETAIL TRADE		2,136	18.90%	13,384,271	17.0808%	1,931	205
FINANCE INSURANCE AND REAL ESTATE		571	5.05%	4,568,788	5.8306%	659	-88
SERVICES		2,079	18.39%	14,059,994	17.9431%	2,028	51
Nonclassifiable Establishmer	B(estimate)	60	0.53%	85,965	0.1097%	12	48
STATE EMPLOYMENT		144	1.2740%	2,902,000	3.7035%	419	-275
FEDERAL EMPLOYMENT		74	0.6547%	2,885,000	3.6818%	416	-342
		9,182	0.8123507	64,975,580	0.829208	9,372.5	1,024

NATIONAL GOVE EMPLOYMENT	
LOCAL	1,875
STATE	144
FEDERAL	74
TOTAL	2,093
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	11,303
divided EXPORT EMPLOYMEN	1,024
	11.0403

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1978	13,772		83,888,236			
AGRICULTURAL SERVICES		24	0.1743%	265,068	0.3160%	44	-20
MINING	C(estimate)	175	1.2707%	826,326	0.9850%	136	39
CONTRACT CONSTRUCTION		1,496	10.8626%	4,129,819	4.9230%	678	818
MANUFACTURING		2,584	18.76%	20,612,389	24.5713%	3,384	-800
TRANSPORTATION AND OTHER PUBLIC UTI		486	3.53%	4,344,603	5.1790%	713	-227
WHOLESALE TRADE		448	3.25%	4,837,359	5.7664%	794	-346
RETAIL TRADE		2,569	18.65%	14,480,933	17.2622%	2,377	192
FINANCE INSURANCE AND REAL ESTATE		669	4.86%	4,871,825	5.8075%	800	-131

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

SERVICES	2,779	20.18%	15,567,801	18.5578%	2,556	223
Nonclassifiable Establishmer B(estimate)	60	0.44%	353,113	0.4209%	58	2
STATE EMPLOYMENT	138	1.0020%	2,996,000	3.5714%	492	-354
FEDERAL EMPLOYMENT	84	0.6099%	2,875,000	3.4272%	472	-388
	11,290	0.81977926	70,289,236	0.837891	11,539	1,274

NATIONAL GOVE EMPLOYMENT	
LOCAL	2,198
STATE	138
FEDERAL	84
TOTAL	2,420
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	13,772
divided EXPORT EMPLOYMEN	1,274
	10.8079

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1979	14,528		88,521,388			
AGRICULTURAL SERVICES		33	0.2271%	282,689	0.3193%	46	-13
MINING	C(estimate)	175	1.2046%	948,644	1.0717%	156	19
CONTRACT CONSTRUCTION		1,509	10.3868%	4,609,029	5.2067%	756	753
MANUFACTURING		2,780	19.14%	21,483,353	24.2691%	3,526	-746
TRANSPORTATION AND OTHER PUBLIC UTI		553	3.81%	4,603,524	5.2005%	756	-203
WHOLESALE TRADE		578	3.98%	5,185,772	5.8582%	851	-273
RETAIL TRADE		2,683	18.47%	15,148,435	17.1127%	2,486	197
FINANCE INSURANCE AND REAL ESTATE		672	4.63%	5,159,917	5.8290%	847	-175
SERVICES		2,966	20.42%	16,774,161	18.9493%	2,753	213
Nonclassifiable Establishmer C(estimate)		175	1.20%	485,864	0.5489%	80	95
STATE EMPLOYMENT		139	0.9568%	3,072,000	3.4703%	504	-365
FEDERAL EMPLOYMENT		92	0.6333%	2,987,000	3.3743%	490	-398
		11,949	0.82248073	74,195,524	0.838165	12,177	1,277

NATIONAL GOVE EMPLOYMENT	
LOCAL	2,135
STATE	139
FEDERAL	92
TOTAL	2,366
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	14,528
divided EXPORT EMPLOYMEN	1,277
	11.3762

[1] [2] [3] [4] [5] [6]

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

Employment Category		Williamson	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1980	15,832		88,878,180			
AGRICULTURAL SERVICES		60	0.3790%	290,351	0.3267%	52	8
MINING	E(estimate)	375	2.3686%	994,464	1.1189%	177	198
CONTRACT CONSTRUCTION		1,581	9.9861%	4,473,010	5.0327%	797	784
MANUFACTURING		3,001	18.96%	21,164,697	23.8132%	3,770	-769
TRANSPORTATION AND OTHER PUBLIC UTI		567	3.58%	4,623,352	5.2019%	824	-257
WHOLESALE TRADE		551	3.48%	5,211,549	5.8637%	928	-377
RETAIL TRADE		3,234	20.43%	15,047,300	16.9303%	2,680	554
FINANCE INSURANCE AND REAL ESTATE		763	4.82%	5,294,675	5.9572%	943	-180
SERVICES		2,693	17.01%	17,186,190	19.3368%	3,061	-368
Nonclassifiable Establishmer	C(estimate)	175	1.11%	558,592	0.6285%	100	75
STATE EMPLOYMENT		132	0.8338%	3,106,000	3.4947%	553	-421
FEDERAL EMPLOYMENT		129	0.8148%	2,987,000	3.3608%	532	-403
		13,000	0.82112178	74,844,180	0.842098	13,332	1,619

NATIONAL GOVE EMPLOYMENT		
LOCAL	2,632	
STATE	132	
FEDERAL	129	
TOTAL	2,893	
Multiplier	WILLIAMSON	
TOTAL EMPLOYMENT	15,832	
divided EXPORT EMPLOYMEN	1,619	
	9.7762	

		[1]	[2]	[3]	[4]	[5]	[6]
Employment Category		Williamson	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1981	17,276		88,676,402			
AGRICULTURAL SERVICES	B(estimate)	60	0.3473%	302,694	0.3413%	59	1
MINING	E(estimate)	375	2.1706%	1,107,726	1.2492%	216	159
CONTRACT CONSTRUCTION		1,642	9.5045%	4,286,069	4.8334%	835	807
MANUFACTURING		3,264	18.89%	20,428,330	23.0369%	3,980	-716
TRANSPORTATION AND OTHER PUBLIC UTI		785	4.54%	4,613,030	5.2021%	899	-114
WHOLESALE TRADE		562	3.25%	5,260,928	5.9327%	1,025	-463
RETAIL TRADE		3,344	19.36%	15,039,998	16.9605%	2,930	414
FINANCE INSURANCE AND REAL ESTATE		774	4.48%	5,409,780	6.1006%	1,054	-280
SERVICES		3,049	17.65%	17,814,081	20.0889%	3,471	-422
Nonclassifiable Establishmer		304	1.76%	587,766	0.6628%	115	189
STATE EMPLOYMENT		122	0.7062%	3,087,000	3.4812%	601	-479
FEDERAL EMPLOYMENT		176	1.0188%	2,909,000	3.2805%	567	-391
		14,159	0.81957629	74,850,402	0.844085	14,582	1,571

NATIONAL GOVE EMPLOYMENT		
LOCAL	2,912	
STATE	122	
FEDERAL	176	

TOTAL	3,210
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	17,276
divided EXPORT EMPLOYMEN	1,571
	10.9997

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1982	19,198		87,997,252			
AGRICULTURAL SERVICES		92	0.4792%	320,411	0.3641%	70	22
MINING		319	1.6616%	1,187,807	1.3498%	259	60
CONTRACT CONSTRUCTION		2,381	12.4023%	3,940,770	4.4783%	860	1,521
MANUFACTURING		3,581	18.65%	19,572,113	22.2417%	4,270	-689
TRANSPORTATION AND OTHER PUBLIC UTI		567	2.95%	4,626,875	5.2580%	1,009	-442
WHOLESALE TRADE		800	4.17%	5,234,731	5.9487%	1,142	-342
RETAIL TRADE		3,923	20.43%	15,280,312	17.3645%	3,334	589
FINANCE INSURANCE AND REAL ESTATE		874	4.55%	5,447,030	6.1900%	1,188	-314
SERVICES		3,167	16.50%	18,581,939	21.1165%	4,054	-887
Nonclassifiable Establishmer		44	0.23%	105,264	0.1196%	23	21
STATE EMPLOYMENT		116	0.6042%	3,083,000	3.5035%	673	-557
FEDERAL EMPLOYMENT		177	0.9220%	2,871,000	3.2626%	626	-449
		16,041	0.83555579	80,251,252	0.911975	17,508	2,214

NATIONAL GOVE EMPLOYMENT	
LOCAL	3,157
STATE	116
FEDERAL	177
TOTAL	3,450
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	19,198
divided EXPORT EMPLOYMEN	2,214
	8.6727

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1983	19,957		86,734,318			
AGRICULTURAL SERVICES		117	0.5863%	325,352	0.3751%	75	42
MINING		259	1.2978%	971,512	1.1201%	224	35
CONTRACT CONSTRUCTION		2,453	12.2914%	3,765,265	4.3411%	866	1,587
MANUFACTURING		3,318	16.63%	18,231,529	21.0200%	4,195	-877
TRANSPORTATION AND OTHER PUBLIC UTI		648	3.25%	4,550,547	5.2465%	1,047	-399
WHOLESALE TRADE		863	4.32%	5,121,939	5.9053%	1,179	-316
RETAIL TRADE		4,321	21.65%	15,231,531	17.5611%	3,505	816
FINANCE INSURANCE AND REAL ESTATE		964	4.83%	5,544,757	6.3928%	1,276	-312
SERVICES		3,140	15.73%	18,831,814	21.7121%	4,333	-1,193

Nonclassifiable Establishmer		227	1.14%	397,072	0.4578%	91	136
STATE EMPLOYMENT		117	0.5863%	3,116,000	3.5926%	717	-600
FEDERAL EMPLOYMENT		181	0.9069%	2,878,000	3.3182%	662	-481
		16,310	0.8172571	72,971,318	0.84132	16,790	2,616
NATIONAL GOVE EMPLOYMENT							
LOCAL	3,349						
STATE	117						
FEDERAL	181						
TOTAL	3,647						
Multiplier	WILLIAMSON						
TOTAL EMPLOYMENT	19,957						
divided EXPORT EMPLOYMEN	2,616						
	7.6282						

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1984	24,115		82,564,354			
AGRICULTURAL SERVICES		178	0.7381%	356,881	0.4322%	104	74
MINING		229	0.9496%	974,285	1.1800%	285	-56
CONTRACT CONSTRUCTION		3,207	13.2988%	4,171,763	5.0527%	1,218	1,989
MANUFACTURING		4,430	18.37%	19,325,352	23.4064%	5,644	-1,214
TRANSPORTATION AND OTHER PUBLIC UTI		691	2.87%	4,675,385	5.6627%	1,366	-675
WHOLESALE TRADE		770	3.19%	5,387,724	6.5255%	1,574	-804
RETAIL TRADE		4,971	20.61%	16,080,830	19.4767%	4,697	274
FINANCE INSURANCE AND REAL ESTATE		1,203	4.99%	5,783,225	7.0045%	1,689	-486
SERVICES		3,846	15.95%	20,349,322	24.6466%	5,944	-2,098
Nonclassifiable Establishmer		552	2.29%	890,799	1.0789%	260	292
STATE EMPLOYMENT		177	0.7340%	3,117,000	3.7752%	910	-733
FEDERAL EMPLOYMENT		189	0.7837%	2,935,000	3.5548%	857	-668
		20,077	0.83255235	77,995,566	0.944664	22,781	2,628
NATIONAL GOVE EMPLOYMENT							
LOCAL	3,672						
STATE	177						
FEDERAL	189						
TOTAL	4,038						
Multiplier	WILLIAMSON						
TOTAL EMPLOYMENT	24,115						
divided EXPORT EMPLOYMEN	2,628						
	9.1751						

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1985	27,212		97,789,257			
AGRICULTURAL SERVICES	C(estimate)	175	0.6431%	381,632	0.3903%	106	69

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

MINING	E(estimate)	375	1.3781%	943,372	0.9647%	263	112
CONTRACT CONSTRUCTION		3,627	13.3287%	4,479,533	4.5808%	1,247	2,380
MANUFACTURING		5,009	18.41%	19,433,606	19.8729%	5,408	-399
TRANSPORTATION AND OTHER PUBLIC UTI		582	2.14%	4,815,535	4.9244%	1,340	-758
WHOLESALE TRADE		879	3.23%	5,625,007	5.7522%	1,565	-686
RETAIL TRADE		5,410	19.88%	16,851,827	17.2328%	4,689	721
FINANCE INSURANCE AND REAL ESTATE		1,242	4.56%	6,004,136	6.1399%	1,671	-429
SERVICES		4,699	17.27%	21,543,425	22.0305%	5,995	-1,296
Nonclassifiable Establishmer		892	3.28%	1,041,184	1.0647%	290	602
STATE EMPLOYMENT		225	0.8268%	3,984,000	4.0741%	1,109	-884
FEDERAL EMPLOYMENT		195	0.7166%	3,001,000	3.0688%	835	-640
		22,890	0.84117301	81,119,257	0.829531	22,573	3,885

NATIONAL GOVE EMPLOYMENT	
LOCAL	3,972
STATE	225
FEDERAL	195
TOTAL	4,392
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	27,212
divided EXPORT EMPLOYMEN	3,885
	7.0050

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	**1986**	26,971		96,763,465			
AGRICULTURAL SERVICES	E(estimate)	375	1.3904%	412,010	0.4258%	115	260
MINING	E(estimate)	375	1.3904%	847,143	0.8755%	236	139
CONTRACT CONSTRUCTION		3,329	12.3429%	4,658,669	4.8145%	1,299	2,030
MANUFACTURING		4,122	15.28%	19,141,756	19.7820%	5,335	-1,213
TRANSPORTATION AND OTHER PUBLIC UTI		772	2.86%	4,884,297	5.0477%	1,361	-589
WHOLESALE TRADE		848	3.14%	5,724,864	5.9163%	1,596	-748
RETAIL TRADE		5,677	21.05%	17,549,841	18.1368%	4,892	785
FINANCE INSURANCE AND REAL ESTATE		1,205	4.47%	6,370,787	6.5839%	1,776	-571
SERVICES		5,038	18.68%	22,878,357	23.6436%	6,377	-1,339
Nonclassifiable Establishmer		398	1.48%	912,741	0.9433%	254	144
STATE EMPLOYMENT		236	0.8750%	3,437,000	3.5520%	959	-722
FEDERAL EMPLOYMENT		226	0.8379%	3,047,000	3.1489%	849	-623
		22,139	0.82084461	83,380,465	0.861694	23,241	3,358

NATIONAL GOVE EMPLOYMENT	
LOCAL	4,570
STATE	236
FEDERAL	226
TOTAL	5,032
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	26,971

divided EXPORT EMPLOYMEN	3,358
	8.0309

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1987	27,528		100,644,804			
AGRICULTURAL SERVICES		171	0.6212%	437,869	0.4351%	120	51
MINING		324	1.1770%	724,967	0.7203%	198	126
CONTRACT CONSTRUCTION		2,553	9.2742%	4,884,281	4.8530%	1,336	1,217
MANUFACTURING		5,065	18.40%	19,002,692	18.8809%	5,198	-133
TRANSPORTATION AND OTHER PUBLIC UTI		616	2.24%	5,107,254	5.0745%	1,397	-781
WHOLESALE TRADE		745	2.71%	5,820,453	5.7832%	1,592	-847
RETAIL TRADE		5,855	21.27%	18,416,653	18.2987%	5,037	818
FINANCE INSURANCE AND REAL ESTATE		1,216	4.42%	6,727,313	6.6842%	1,840	-624
SERVICES		5,418	19.68%	24,140,054	23.9854%	6,603	-1,185
Nonclassifiable Establishmer		84	0.31%	221,842	0.2204%	61	23
STATE EMPLOYMENT		233	0.8464%	3,491,000	3.4686%	955	-722
FEDERAL EMPLOYMENT		248	0.9009%	3,075,000	3.0553%	841	-593
		22,047	0.80089364	85,483,378	0.849357	23,381	2,235

NATIONAL GOVE EMPLOYMENT	
LOCAL	5,000
STATE	233
FEDERAL	248
TOTAL	5,481
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	27,528
divided EXPORT EMPLOYMEN	2,235
	12.3163

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1988	27,356		103,094,632			
AGRICULTURAL SERVICES		167	0.6105%	461,768	0.4479%	123	44
MINING		274	1.0016%	734,953	0.7129%	195	79
CONTRACT CONSTRUCTION		2,180	7.9690%	4,938,977	4.7907%	1,311	869
MANUFACTURING		4,810	17.58%	19,261,691	18.6835%	5,111	-301
TRANSPORTATION AND OTHER PUBLIC UTI		556	2.03%	5,270,318	5.1121%	1,398	-842
WHOLESALE TRADE		791	2.89%	5,981,378	5.8018%	1,587	-796
RETAIL TRADE		6,032	22.05%	18,801,521	18.2371%	4,989	1,043
FINANCE INSURANCE AND REAL ESTATE		1,123	4.11%	6,659,618	6.4597%	1,767	-644
SERVICES		5,379	19.66%	25,142,715	24.3880%	6,672	-1,293
Nonclassifiable Establishmer		277	1.01%	628,693	0.6098%	167	110
STATE EMPLOYMENT		311	1.1369%	3,500,000	3.3949%	929	-618
FEDERAL EMPLOYMENT		249	0.9102%	3,113,000	3.0196%	826	-577

		21,589	0.78918702	87,881,632	0.852437	23,319	2,146

NATIONAL GOVE EMPLOYMENT	
LOCAL	5,207
STATE	311
FEDERAL	249
TOTAL	5,767
Multiplier	WILLIAMSON
TOTAL EMPLOYMENT	27,356
divided EXPORT EMPLOYMEN	2,146
	12.7467

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

ECONOMIC BASE ANALYSIS FOR
AUSTIN'S METROPOLITAN STATISTICAL AREA
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1977	193,798		78,358,580			
AGRICULTURAL SERVICES		491	0.2534%	242,997	0.3101%	601	-110
MINING		335	0.1729%	830,178	1.0595%	2,053	-1,718
CONTRACT CONSTRUCTION		10,385	5.3587%	3,571,973	4.5585%	8,834	1,551
MANUFACTURING		21,956	11.33%	19,638,852	25.0628%	48,571	-26,615
TRANSPORTATION AND OTHER PUBLIC UTI		5,973	3.08%	4,030,479	5.1436%	9,968	-3,995
WHOLESALE TRADE		6,848	3.53%	4,562,083	5.8221%	11,283	-4,435
RETAIL TRADE		34,986	18.05%	13,384,271	17.0808%	33,102	1,884
FINANCE INSURANCE AND REAL ESTATE		11,518	5.94%	4,568,788	5.8306%	11,300	218
SERVICES		32,698	16.87%	14,059,994	17.9431%	34,773	-2,075
Nonclassifiable Establishments		374	0.19%	85,965	0.1097%	213	161
STATE EMPLOYMENT		43,699	22.5487%	2,902,000	3.7035%	7,177	36,522
FEDERAL EMPLOYMENT		7,742	3.9949%	2,885,000	3.6818%	7,135	607
		125,564	0.6479117	64,975,580	0.829208	160,699	40,943

NATIONAL GOVE EMPLOYMENT	
LOCAL	16,763
STATE	43,699
FEDERAL	7,742
TOTAL	68,204
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	193,798
divided EXPORT EMPLOYMEN	40,943
	4.7334

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1978	210,951		83,888,236			
AGRICULTURAL SERVICES		511	0.2422%	265,068	0.3160%	667	-156
MINING		346	0.1640%	826,326	0.9850%	2,078	-1,732
CONTRACT CONSTRUCTION		13,275	6.2929%	4,129,819	4.9230%	10,385	2,890
MANUFACTURING		23,746	11.26%	20,612,389	24.5713%	51,833	-28,087
TRANSPORTATION AND OTHER PUBLIC UTI		6,658	3.16%	4,344,603	5.1790%	10,925	-4,267
WHOLESALE TRADE		7,630	3.62%	4,837,359	5.7664%	12,164	-4,534
RETAIL TRADE		38,760	18.37%	14,480,933	17.2622%	36,415	2,345
FINANCE INSURANCE AND REAL ESTATE		13,247	6.28%	4,871,825	5.8075%	12,251	996

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1986)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

SERVICES	37,413	17.74%	15,567,801	18.5578%	39,148	-1,735
Nonclassifiable Establishments	1,101	0.52%	353,113	0.4209%	888	213
STATE EMPLOYMENT	42,994	20.3810%	2,996,000	3.5714%	7,534	35,460
FEDERAL EMPLOYMENT	8,008	3.7961%	2,875,000	3.4272%	7,230	778
	142,687	0.6763988	70,289,236	0.837891	176,754	42,683

NATIONAL GOVE EMPLOYMENT	
LOCAL	17,202
STATE	42,994
FEDERAL	8,008
TOTAL	68,204
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	210,951
divided EXPORT EMPLOYMEN	42,683
	4.9423

Employment Category		[1] Austin MSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1979	235,926		88,521,388			
AGRICULTURAL SERVICES		590	0.2501%	282,689	0.3193%	753	-163
MINING		311	0.1318%	948,644	1.0717%	2,528	-2,217
CONTRACT CONSTRUCTION		14,319	6.0693%	4,609,029	5.2067%	12,284	2,035
MANUFACTURING		29,717	12.60%	21,483,353	24.2691%	57,257	-27,540
TRANSPORTATION AND OTHER PUBLIC UTI		7,438	3.15%	4,603,524	5.2005%	12,269	-4,831
WHOLESALE TRADE		8,172	3.46%	5,185,772	5.8582%	13,821	-5,649
RETAIL TRADE		42,313	17.93%	15,148,435	17.1127%	40,373	1,940
FINANCE INSURANCE AND REAL ESTATE		14,029	5.95%	5,159,917	5.8290%	13,752	277
SERVICES		41,695	17.67%	16,774,161	18.9493%	44,706	-3,011
Nonclassifiable Establishments		1,637	0.69%	485,864	0.5489%	1,295	342
STATE EMPLOYMENT		46,539	19.7261%	3,072,000	3.4703%	8,187	38,352
FEDERAL EMPLOYMENT		8,230	3.4884%	2,987,000	3.3743%	7,961	269
		158,584	0.6721769	74,195,524	0.838165	197,745	43,214

NATIONAL GOVE EMPLOYMENT	
LOCAL	20,900
STATE	46,539
FEDERAL	8,230
TOTAL	75,669
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	235,926
divided EXPORT EMPLOYMEN	43,214
	5.4594

[1] [2] [3] [4] [5] [6]

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

Employment Category		Austin MSA	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1980	246,668		88,878,180			
AGRICULTURAL SERVICES		672	0.2724%	290,351	0.3267%	806	-134
MINING		527	0.2136%	994,464	1.1189%	2,760	-2,233
CONTRACT CONSTRUCTION		16,109	6.5306%	4,473,010	5.0327%	12,414	3,695
MANUFACTURING		31,502	12.77%	21,164,697	23.8132%	58,739	-27,237
TRANSPORTATION AND OTHER PUBLIC UTI		7,582	3.07%	4,623,352	5.2019%	12,831	-5,249
WHOLESALE TRADE		8,471	3.43%	5,211,549	5.8637%	14,464	-5,993
RETAIL TRADE		44,173	17.91%	15,047,300	16.9303%	41,762	2,411
FINANCE INSURANCE AND REAL ESTATE		14,706	5.96%	5,294,675	5.9572%	14,695	11
SERVICES		43,774	17.75%	17,186,190	19.3368%	47,698	-3,924
Nonclassifiable Establishments		1,899	0.77%	558,592	0.6285%	1,550	349
STATE EMPLOYMENT		46,949	19.0333%	3,106,000	3.4947%	8,620	38,329
FEDERAL EMPLOYMENT		8,403	3.4066%	2,987,000	3.3608%	8,290	113
		169,415	0.6868139	74,844,180	0.842098	207,719	44,908

NATIONAL GOVE EMPLOYMENT	
LOCAL	21,961
STATE	46,949
FEDERAL	8,403
TOTAL	77,313
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	246,668
divided EXPORT EMPLOYMEN	44,908
	5.4927

		[1]	[2]	[3]	[4]	[5]	[6]
Employment Category		Austin MSA	% OF TOTAL	NATIONAL	%OF TOTAL		
TOTALS	1981	260,289		88,676,402			
AGRICULTURAL SERVICES		736	0.2828%	302,694	0.3413%	888	-152
MINING		712	0.2735%	1,107,726	1.2492%	3,251	-2,539
CONTRACT CONSTRUCTION		16,612	6.3821%	4,286,069	4.8334%	12,581	4,031
MANUFACTURING		31,838	12.23%	20,428,330	23.0369%	59,963	-28,125
TRANSPORTATION AND OTHER PUBLIC UTI		7,917	3.04%	4,613,030	5.2021%	13,540	-5,623
WHOLESALE TRADE		9,143	3.51%	5,260,928	5.9327%	15,442	-6,299
RETAIL TRADE		45,753	17.58%	15,039,998	16.9605%	44,146	1,607
FINANCE INSURANCE AND REAL ESTATE		15,950	6.13%	5,409,780	6.1006%	15,879	71
SERVICES		50,366	19.35%	17,814,081	20.0889%	52,289	-1,923
Nonclassifiable Establishments		2,378	0.91%	587,766	0.6628%	1,725	653
STATE EMPLOYMENT		47,018	18.0638%	3,087,000	3.4812%	9,061	37,957
FEDERAL EMPLOYMENT		8,675	3.3329%	2,909,000	3.2805%	8,539	136
		181,405	0.6969369	74,850,402	0.844085	219,706	44,455

NATIONAL GOVE EMPLOYMENT	
LOCAL	23,312
STATE	47,018
FEDERAL	8,675

TOTAL	79,005
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	260,289
divided EXPORT EMPLOYMEN	44,455
	5.8552

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1982	275,946		87,997,252			
AGRICULTURAL SERVICES		899	0.3258%	320,411	0.3641%	1,005	-106
MINING		919	0.3330%	1,187,807	1.3498%	3,725	-2,806
CONTRACT CONSTRUCTION		16,085	5.8290%	3,940,770	4.4783%	12,358	3,727
MANUFACTURING		34,311	12.43%	19,572,113	22.2417%	61,375	-27,064
TRANSPORTATION AND OTHER PUBLIC UTI		8,194	2.97%	4,626,875	5.2580%	14,509	-6,315
WHOLESALE TRADE		10,010	3.63%	5,234,731	5.9487%	16,415	-6,405
RETAIL TRADE		51,473	18.65%	15,280,312	17.3645%	47,917	3,556
FINANCE INSURANCE AND REAL ESTATE		16,979	6.15%	5,447,030	6.1900%	17,081	-102
SERVICES		56,064	20.32%	18,581,939	21.1165%	58,270	-2,206
Nonclassifiable Establishments		481	0.17%	105,264	0.1196%	330	151
STATE EMPLOYMENT		47,398	17.1765%	3,083,000	3.5035%	9,668	37,730
FEDERAL EMPLOYMENT		8,819	3.1959%	2,871,000	3.2626%	9,003	-184
		251,632	0.9118886	80,251,252	0.911975	251,656	45,165

NATIONAL GOVE EMPLOYMENT	
LOCAL	24,313
STATE	47,398
FEDERAL	8,819
TOTAL	80,530
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	275,946
divided EXPORT EMPLOYMEN	45,165
	6.1098

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1983	290,253		86,734,318			
AGRICULTURAL SERVICES		1,101	0.3793%	325,352	0.3751%	1,089	12
MINING		726	0.2501%	971,512	1.1201%	3,251	-2,525
CONTRACT CONSTRUCTION		18,621	6.4154%	3,765,265	4.3411%	12,600	6,021
MANUFACTURING		33,982	11.71%	18,231,529	21.0200%	61,011	-27,029
TRANSPORTATION AND OTHER PUBLIC UTI		7,709	2.66%	4,550,547	5.2465%	15,228	-7,519
WHOLESALE TRADE		10,925	3.76%	5,121,939	5.9053%	17,140	-6,215
RETAIL TRADE		53,368	18.39%	15,231,531	17.5611%	50,972	2,396
FINANCE INSURANCE AND REAL ESTATE		18,431	6.35%	5,544,757	6.3928%	18,555	-124
SERVICES		61,281	21.11%	18,831,814	21.7121%	63,020	-1,739

Nonclassifiable Establishments	2,288	0.79%	397,072	0.4578%	1,329	959
STATE EMPLOYMENT	47,981	16.5308%	3,116,000	3.5926%	10,428	37,553
FEDERAL EMPLOYMENT	8,852	3.0498%	2,878,000	3.3182%	9,631	-779
	208,432	0.7181046	72,971,318	0.84132	244,196	46,942

NATIONAL GOVE EMPLOYMENT	
LOCAL	25,008
STATE	47,981
FEDERAL	8,852
TOTAL	81,841
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	290,253
divided EXPORT EMPLOYMEN	46,942
	6.1832

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1984	326,800		82,564,354			
AGRICULTURAL SERVICES		1,285	0.3932%	356,881	0.4322%	1,413	-128
MINING		993	0.3039%	974,285	1.1800%	3,856	-2,863
CONTRACT CONSTRUCTION		23,379	7.1539%	4,171,763	5.0527%	16,512	6,867
MANUFACTURING		39,452	12.07%	19,325,352	23.4064%	76,492	-37,040
TRANSPORTATION AND OTHER PUBLIC UTI		9,081	2.78%	4,675,385	5.6627%	18,506	-9,425
WHOLESALE TRADE		12,194	3.73%	5,387,724	6.5255%	21,325	-9,131
RETAIL TRADE		59,909	18.33%	16,080,830	19.4767%	63,650	-3,741
FINANCE INSURANCE AND REAL ESTATE		22,582	6.91%	5,783,225	7.0045%	22,891	-309
SERVICES		68,594	20.99%	20,349,322	24.6466%	80,545	-11,951
Nonclassifiable Establishments		4,824	1.48%	890,799	1.0789%	3,526	1,298
STATE EMPLOYMENT		49,218	15.0606%	3,117,000	3.7752%	12,337	36,881
FEDERAL EMPLOYMENT		8,965	2.7433%	2,935,000	3.5548%	11,617	-2,652
		242,293	0.7414106	77,995,566	0.944664	308,716	45,045

NATIONAL GOVE EMPLOYMENT	
LOCAL	26,324
STATE	49,218
FEDERAL	8,965
TOTAL	84,507
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	326,800
divided EXPORT EMPLOYMEN	45,045
	7.2549

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1985	357,019		97,789,257			
AGRICULTURAL SERVICES		1,376	0.3854%	381,632	0.3903%	1,393	-17

APPENDIX A1

Economic Base Study at Industry Level (1977 to 1988)

Includes Travis, Hays and Williamson Counties; and Austin's Metropolitan Statistical Area,

MINING	1,072	0.3003%	943,372	0.9647%	3,444	-2,372
CONTRACT CONSTRUCTION	27,555	7.7181%	4,479,533	4.5808%	16,354	11,201
MANUFACTURING	44,019	12.33%	19,433,606	19.8729%	70,950	-26,931
TRANSPORTATION AND OTHER PUBLIC UTI	10,652	2.98%	4,815,535	4.9244%	17,581	-6,929
WHOLESALE TRADE	12,268	3.44%	5,625,007	5.7522%	20,536	-8,268
RETAIL TRADE	66,043	18.50%	16,851,827	17.2328%	61,524	4,519
FINANCE INSURANCE AND REAL ESTATE	26,190	7.34%	6,004,136	6.1399%	21,921	4,269
SERVICES	74,643	20.91%	21,543,425	22.0305%	78,653	-4,010
Nonclassifiable Establishments	5,379	1.51%	1,041,184	1.0647%	3,801	1,578
STATE EMPLOYMENT	49,698	13.9203%	3,984,000	4.0741%	14,545	35,153
FEDERAL EMPLOYMENT	10,174	2.8497%	3,001,000	3.0688%	10,956	-782
	269,197	0.7540131	81,119,257	0.829531	296,158	56,719

NATIONAL GOVE EMPLOYMENT	
LOCAL	28,012
STATE	49,698
FEDERAL	10,174
TOTAL	87,884
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	357,019
divided EXPORT EMPLOYMEN	56,719
	6.2945

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	369,870		96,763,465			
AGRICULTURAL SERVICES		1,812	0.4899%	412,010	0.4258%	1,575	237
MINING		982	0.2655%	847,143	0.8755%	3,238	-2,256
CONTRACT CONSTRUCTION		23,813	6.4382%	4,658,669	4.8145%	17,807	6,006
MANUFACTURING		42,431	11.47%	19,141,756	19.7820%	73,168	-30,737
TRANSPORTATION AND OTHER PUBLIC UTI		11,501	3.11%	4,884,297	5.0477%	18,670	-7,169
WHOLESALE TRADE		13,412	3.63%	5,724,864	5.9163%	21,883	-8,471
RETAIL TRADE		68,072	18.40%	17,549,841	18.1368%	67,083	989
FINANCE INSURANCE AND REAL ESTATE		29,604	8.00%	6,370,787	6.5839%	24,352	5,252
SERVICES		79,420	21.47%	22,878,357	23.6436%	87,451	-8,031
Nonclassifiable Establishments		4,397	1.19%	912,741	0.9433%	3,489	908
STATE EMPLOYMENT		50,129	13.5531%	3,437,000	3.5520%	13,138	36,991
FEDERAL EMPLOYMENT		11,390	3.0795%	3,047,000	3.1489%	11,647	-257
		275,444	0.7447049	83,380,465	0.861694	318,715	50,384

NATIONAL GOVE EMPLOYMENT	
LOCAL	33,107
STATE	50,129
FEDERAL	11,390
TOTAL	94,626
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	369,870

divided EXPORT EMPLOYMEN	50,384
	7.3411

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1987	357,070		100,644,804			
AGRICULTURAL SERVICES		1,435	0.4019%	437,869	0.4351%	1,553	-118
MINING		648	0.1815%	724,967	0.7203%	2,572	-1,924
CONTRACT CONSTRUCTION		16,325	4.5719%	4,884,281	4.8530%	17,329	-1,004
MANUFACTURING		41,454	11.61%	19,002,692	18.8809%	67,418	-25,964
TRANSPORTATION AND OTHER PUBLIC UTI		10,678	2.99%	5,107,254	5.0745%	18,120	-7,442
WHOLESALE TRADE		12,678	3.55%	5,820,453	5.7832%	20,650	-7,972
RETAIL TRADE		67,226	18.83%	18,416,653	18.2987%	65,339	1,887
FINANCE INSURANCE AND REAL ESTATE		28,987	8.12%	6,727,313	6.6842%	23,867	5,120
SERVICES		82,613	23.14%	24,140,054	23.9854%	85,645	-3,032
Nonclassifiable Establishments		750	0.21%	221,842	0.2204%	787	-37
STATE EMPLOYMENT		50,085	14.0267%	3,491,000	3.4686%	12,385	37,700
FEDERAL EMPLOYMENT		11,575	3.2417%	3,075,000	3.0553%	10,910	665
		262,794	0.7359733	85,483,378	0.849357	303,280	45,372

NATIONAL GOVE EMPLOYMENT	
LOCAL	32,625
STATE	50,085
FEDERAL	11,575
TOTAL	94,285
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	357,070
divided EXPORT EMPLOYMEN	45,372
	7.8699

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1988	352,243		103,094,632			
AGRICULTURAL SERVICES		1,218	0.3458%	461,768	0.4479%	1,578	-360
MINING		550	0.1561%	734,953	0.7129%	2,511	-1,961
CONTRACT CONSTRUCTION		13,477	3.8261%	4,938,977	4.7907%	16,875	-3,398
MANUFACTURING		40,786	11.58%	19,261,691	18.6835%	65,811	-25,025
TRANSPORTATION AND OTHER PUBLIC UTI		10,826	3.07%	5,270,318	5.1121%	18,007	-7,181
WHOLESALE TRADE		12,911	3.67%	5,981,378	5.8018%	20,437	-7,526
RETAIL TRADE		64,221	18.23%	18,801,521	18.2371%	64,239	-18
FINANCE INSURANCE AND REAL ESTATE		27,211	7.73%	6,659,618	6.4597%	22,754	4,457
SERVICES		80,751	22.92%	25,142,715	24.3880%	85,905	-5,154
Nonclassifiable Establishments		2,712	0.77%	628,693	0.6098%	2,148	564
STATE EMPLOYMENT		51,877	14.7276%	3,500,000	3.3949%	11,958	39,919
FEDERAL EMPLOYMENT		11,923	3.3849%	3,113,000	3.0196%	10,636	1,287

		254,663	0.7229753	87,881,632	0.852437	300,265	46,226

NATIONAL GOVE EMPLOYMENT	
LOCAL	33,829
STATE	51,877
FEDERAL	11,923
TOTAL	97,629
Multiplier	AUSTIN MSA
TOTAL EMPLOYMENT	352,243
divided EXPORT EMPLOYMEN	46,226
	7.6199

ECONOMIC BASE ANALYSIS FOR TRAVIS COUNTY (1977)

[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category	[1] Travis	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1977	172,091		78,358,580			
AGRICULTURAL SERVICES	**428**	**0.2487%**	**242,997**	**0.3101%**	**534**	**-106**
7 Agricultural SE(estimate)	375	0.2179%	217,131	0.2771%	477	-102
8 Forestry	0	0.0000%	14,506	0.0185%	32	-32
9 Fishing, hunting and trapping	0	0.0000%	9,999	0.0128%	22	-22
Administrative and Auxiliary	0	0.0000%	0	0.0000%	0	0
SUBTOTALS	375	0.2179%	241,636	0.3084%	531	-156
MINING	**150**	**0.0872%**	**830,178**	**1.0595%**	**1,823**	**-1,673**
10 Metal Mining	0	0.0000%	94,280	0.1203%	207	-207
11 Anthracite mining	0	0.0000%	3,764	0.0048%	8	-8
12 Bituminous coal and lignite n	0	0.0000%	224,131	0.2860%	492	-492
13 Oil and gas extraction	94	0.0546%	322,951	0.4121%	709	-615
14 Nonmetallic minerals except	0	0.0000%	105,171	0.1342%	231	-231
Administrative and Auxiliary	0	0.0000%	79,881	0.1019%	175	-175
SUBTOTALS	94	0.0546%	830,178	1.0595%	1,823	-1,729
CONTRACT CONSTRUCTION	**8,650**	**5.0264%**	**3,571,973**	**4.5585%**	**7,845**	**805**
15 General contractors and ope	2,361	1.3719%	971,508	1.2398%	2,134	227
16 Heavy construction except h	960	0.5578%	716,063	0.9138%	1,573	-613
17 Special trade contractors	5,329	3.0966%	1,866,504	2.3820%	4,099	1,230
Administrative and Auxiliary	0	0.0000%	15,896	0.0203%	35	-35
SUBTOTALS	8,650	5.0264%	3,569,971	4.5559%	7,840	810
MANUFACTURING	**18,874**	**10.9675%**	**19,638,852**	**25.0628%**	**43,131**	**-24,257**
20 Food and kindred products	1,499	0.8711%	1,498,119	1.9119%	3,290	-1,791
21 Tabacco manufacturers	0	0.0000%	61,422	0.0784%	135	-135
22 Textille mill products	0	0.0000%	883,161	1.1271%	1,940	-1,940
23 Apparel and o'C(estimate)	175	0.1017%	1,296,208	1.6542%	2,847	-2,672
24 Lumber and wood products	422	0.2452%	678,236	0.8656%	1,490	-1,068
25 Furniture and G(estimate)	1,750	1.0169%	446,577	0.5699%	981	769
26 Paper and allied products	0	0.0000%	633,561	0.8085%	1,391	-1,391
27 printing and publishing	2,158	1.2540%	1,127,876	1.4394%	2,477	-319
28 chemicals and allied product	196	0.1139%	888,148	1.1334%	1,951	-1,755
29 Petroleum and coal products	0	0.0000%	139,036	0.1774%	305	-305
30 Rubber and misc. plastic pro	192	0.1116%	703,662	0.8980%	1,545	-1,353
31 Leather and leather products	0	0.0000%	242,525	0.3095%	533	-533
32 Stone, clay, and glass produ	498	0.2894%	601,918	0.7682%	1,322	-824
33 Primary Metal Industries	56	0.0325%	1,137,890	1.4522%	2,499	-2,443

34 Fabricated metal products	560	0.3254%	1,516,661	1.9355%	3,331	-2,771
35 Machinery exH(estimate)	3,750	2.1791%	2,080,422	2.6550%	4,569	-819
36 Electric and Electronic Equip	5,222	3.0344%	1,710,806	2.1833%	3,757	1,465
37 Transportatio G(estimate)	1,750	1.0169%	1,793,451	2.2888%	3,939	-2,189
38 Instruments and related pro	593	0.3446%	561,668	0.7168%	1,234	-641
39 Miscellaneous manufacturi	469	0.2725%	440,519	0.5622%	967	-498
Administrative anF(estimate)	750	0.4358%	1,196,966	1.5275%	2,629	-1,879
SUBTOTALS	20,040	11.6450%	19,638,832	25.0628%	43,131	-23,091
TRANSPORTATION AND OTI	**5,311**	**3.0862%**	**4,030,479**	**5.1436%**	**8,852**	**-3,541**
41 Local and interurban passen	308	0.1790%	260,277	0.3322%	572	-264
42 Trucking and warehousing	899	0.5224%	1,146,153	1.4627%	2,517	-1,618
44 Water transportation	0	0.0000%	185,839	0.2372%	408	-408
45 Transportation by air	199	0.1156%	350,577	0.4474%	770	-571
46 Pipelines except natural gas	0	0.0000%	15,276	0.0195%	34	-34
47 Transportation services	162	0.0941%	155,655	0.1986%	342	-180
48 Communication	3,160	1.8362%	1,146,019	1.4625%	2,517	643
49 Electric, gas, and sanitary s	456	0.2650%	659,328	0.8414%	1,448	-992
Administrative anB(estimate)	60	0.0349%	111,355	0.1421%	245	-185
SUBTOTALS	5,244	3.0472%	4,030,479	5.1436%	8,852	-3,608
WHOLESALE TRADE	**6,172**	**3.5865%**	**4,562,083**	**5.8221%**	**10,019**	**-3,847**
50 Wholesale trade - durable go	4,309	2.5039%	2,497,049	3.1867%	5,484	-1,175
51 Wholesale TraG(estimate)	1,750	1.0169%	1,816,041	2.3176%	3,988	-2,238
Administrative and Auxiliary	0	0.0000%	248,993	0.3178%	547	-547
SUBTOTALS	6,059	3.5208%	4,562,083	5.8221%	10,019	-3,960
RETAIL TRADE	**30,672**	**17.8231%**	**13,384,271**	**17.0808%**	**29,395**	**1,277**
52 Building materials and garde	882	0.5125%	458,320	0.5849%	1,007	-125
53 General merchandise stores	3,890	2.2604%	1,879,056	2.3980%	4,127	-237
54 Food stores	4,346	2.5254%	1,988,605	2.5378%	4,367	-21
55 Automotive dealers and ser	3,483	2.0239%	1,765,521	2.2531%	3,877	-394
56 Apparel and accessory store	2,311	1.3429%	847,990	1.0822%	1,862	449
57 Furniture and home furnishi	1,379	0.8013%	504,007	0.6432%	1,107	272
58 Eating and drinking places	9,956	5.7853%	3,699,628	4.7214%	8,125	1,831
59 Miscellaneous retail	3,454	2.0071%	1,666,602	2.1269%	3,660	-206
Administrative and Auxiliary	971	0.5642%	574,542	0.7332%	1,262	-291
SUBTOTALS	30,672	17.8231%	13,384,271	17.0808%	29,395	1,277
FINANCE INSURANCE AND R	**10,553**	**6.1322%**	**4,568,788**	**5.8306%**	**10,034**	**519**
60 Banking	1,881	1.0930%	1,288,258	1.6441%	2,829	-948
61 Credit agencies and other ba	1,468	0.8530%	488,159	0.6230%	1,072	396
62 Security, commodity broker	203	0.1180%	188,250	0.2402%	413	-210
63 Insurance carriers	3,493	2.0297%	1,114,650	1.4225%	2,448	1,045
64 Insurance agents, brokers a	1,201	0.6979%	383,789	0.4898%	843	358
65 Real estate	1,828	1.0622%	861,904	1.0999%	1,893	-65
66 Combined realB(estimate)	60	0.0349%	29,335	0.0374%	64	-4
67 Holding and other investmen	412	0.2394%	131,608	0.1680%	289	123
Administrative and Auxiliary	0	0.0000%	82,835	0.1057%	182	-182
SUBTOTALS	10,546	6.1282%	4,568,788	5.8306%	10,034	512

SERVICES	**28,225**	**16.4012%**	**14,059,994**	**17.9431%**	**30,879**	**-2,654**
70 Hotels and other lodging plac	2,204	1.2807%	915,178	1.1679%	2,010	194
72 Personal services	2,284	1.3272%	901,047	1.1499%	1,979	305
73 Business services	4,849	2.8177%	2,307,384	2.9446%	5,067	-218
75 Auto repair, services, and g	1,086	0.6311%	477,370	0.6092%	1,048	38
76 Miscellaneous repair servic	536	0.3115%	254,140	0.3243%	558	-22
78 Motion pictur(E(estimate)	375	0.2179%	180,933	0.2309%	397	-22
79 Amusement and recreation s	835	0.4852%	585,304	0.7470%	1,285	-450
80 Health services	6,205	3.6057%	4,339,178	5.5376%	9,530	-3,325
81 Legal services	1,122	0.6520%	392,481	0.5009%	862	260
82 Educational services	1,105	0.6421%	992,019	1.2660%	2,179	-1,074
83 Social services	2,331	1.3545%	764,310	0.9754%	1,679	652
84 Museums, botanical, zoologi	0	0.0000%	22,588	0.0288%	50	-50
86 Membership organizations	2,770	1.6096%	1,100,716	1.4047%	2,417	353
89 Miscellaneous services	2,368	1.3760%	670,425	0.8556%	1,472	896
Administrative and Auxiliary	186	0.1081%	156,921	0.2003%	345	-159
SUBTOTALS	28,256	16.4192%	14,059,994	17.9431%	30,879	-2,623
Nonclassifiable Establishm	**258**	**0.1499%**	**85,965**	**0.1097%**	**189**	**69**
STATE EMPLOYMENT	41,439	24.0797%	2,902,000	3.7035%	6,373	35,066
FEDERAL EMPLOYMENT	7,596	4.4139%	2,885,000	3.6818%	6,336	1,260
TOTALS	329,165	191.2738%	194,748,044	248.5344%	427,705	38,997

Multiplier	TRAVIS
TOTAL EMPLOYME	172,091
divided EXPORT EI	38,997
	4.4130

ECONOMIC BASE ANALYSIS FOR HAYS COUNTY (1977)

[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 ; only positive numbers are significant)

Employment Category	[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1977	10,404		78,358,580			
AGRICULTURAL A (estimate	**10**	**0.0961%**	**242,997**	**0.3101%**	32	-22
7 Agricultural S *(this is a gux	11	0.1057%	217,131	0.2771%	29	-18
8 Forestry	0	0.0000%	14,506	0.0185%	2	-2
9 Fishing, hunting and trapping	0	0.0000%	9,999	0.0128%	1	-1
Administrative and Auxiliary	0	0.0000%	0	0.0000%	0	0
SUBTOTALS	11	0.1057%	241,636	0.3084%	32	-21
MINING A(estimate)	**10**	**0.0961%**	**830,178**	**1.0595%**	**110**	**-100**
10 Metal Mining	0	0.0000%	94,280	0.1203%	13	-13
11 Anthracite mining	0	0.0000%	3,764	0.0048%	0	-0
12 Bituminous coal and lignite n	0	0.0000%	224,131	0.2860%	30	-30
13 Oil and gas extraction	0	0.0000%	322,951	0.4121%	43	-43
14 Nonmetallic minerals except	0	0.0000%	105,171	0.1342%	14	-14
Administrative and Auxiliary	0	0.0000%	79,881	0.1019%	11	-11
SUBTOTALS	0	0.0000%	830,178	1.0595%	110	-110
CONTRACT CONSTRUCTION	**573**	**5.5075%**	**3,571,973**	**4.5585%**	**474**	**99**
15 General contractors and ope	226	2.1722%	971,508	1.2398%	129	97
16 Heavy construction except h	123	1.1822%	716,063	0.9138%	95	28
17 Special trade contractors	224	2.1530%	1,866,504	2.3820%	248	-24
Administrative and Auxiliary	0	0.0000%	15,896	0.0203%	2	-2
SUBTOTALS	573	5.5075%	3,569,971	4.5559%	474	99
MANUFACTURING	**934**	**8.9773%**	**19,638,852**	**25.0628%**	**2608**	**-1,674**
20 Food and kindrB(estimate)	60	0.5767%	1,498,119	1.9119%	199	-139
21 Tabacco manufacturers	0	0.0000%	61,422	0.0784%	8	-8
22 Textille mill products	0	0.0000%	883,161	1.1271%	117	-117
23 Apparel and other textile pr	0	0.0000%	1,296,208	1.6542%	172	-172
24 Lumber and wood products	0	0.0000%	678,236	0.8656%	90	-90
25 Furniture and C(estimate)	175	1.6820%	446,577	0.5699%	59	116
26 Paper and allied products	0	0.0000%	633,561	0.8085%	84	-84
27 printing and piB(estimate)	60	0.5767%	1,127,876	1.4394%	150	-90
28 chemicals and allied product	0	0.0000%	888,148	1.1334%	118	-118
29 Petroleum and coal products	0	0.0000%	139,036	0.1774%	18	-18
30 Rubber and misc. plastic pro	0	0.0000%	703,662	0.8980%	93	-93
31 Leather and leather products	0	0.0000%	242,525	0.3095%	32	-32
32 Stone, clay, and glass produ	0	0.0000%	601,918	0.7682%	80	-80
33 Primary Metal Industries	0	0.0000%	1,137,890	1.4522%	151	-151

34 Fabricated metal products	0	0.0000%	1,516,661	1.9355%	201	-201
35 Machinery except electrical	0	0.0000%	2,080,422	2.6550%	276	-276
36 Electric and E'E(estimate)	375	3.6044%	1,710,806	2.1833%	227	148
37 Transportation equipment	0	0.0000%	1,793,451	2.2888%	238	-238
38 Instruments and related pro	0	0.0000%	561,668	0.7168%	75	-75
39 Miscellaneous manufacturi	0	0.0000%	440,519	0.5622%	58	-58
Administrative and Auxiliary	0	0.0000%	1,196,966	1.5275%	159	-159
SUBTOTALS	670	6.4398%	19,638,832	25.0628%	2,608	-1,938
TRANSPORTATION AND OTH	**254**	**2.4414%**	**4,030,479**	**5.1436%**	**535**	**-281**
41 Local and interurban passen	0	0.0000%	260,277	0.3322%	35	-35
42 Trucking and warehousing	0	0.0000%	1,146,153	1.4627%	152	-152
44 Water transportation	0	0.0000%	185,839	0.2372%	25	-25
45 Transportation by air	0	0.0000%	350,577	0.4474%	47	-47
46 Pipelines except natural gas	0	0.0000%	15,276	0.0195%	2	-2
47 Transportation services	0	0.0000%	155,655	0.1986%	21	-21
48 Communicatio C(estimate)	175	1.6820%	1,146,019	1.4625%	152	23
49 Electric, gas, and sanitary s	0	0.0000%	659,328	0.8414%	88	-88
Administrative and Auxiliary	0	0.0000%	111,355	0.1421%	15	-15
SUBTOTALS	175	1.6820%	4,030,479	5.1436%	535	-360
WHOLESALE TRADE	**286**	**2.7489%**	**4,562,083**	**5.8221%**	**606**	**-320**
50 Wholesale trade - durable go	84	0.8074%	2,497,049	3.1867%	332	-248
51 Wholesale Trade - nondurabl	202	1.9416%	1,816,041	2.3176%	241	-39
Administrative and Auxiliary	0	0.0000%	248,993	0.3178%	33	-33
SUBTOTALS	286	2.7489%	4,562,083	5.8221%	606	-320
RETAIL TRADE	**2,178**	**20.9343%**	**13,384,271**	**17.0808%**	**1777**	**401**
52 Building materials and garde	80	0.7689%	458,320	0.5849%	61	19
53 General merchandise stores	137	1.3168%	1,879,056	2.3980%	249	-112
54 Food stores	304	2.9220%	1,988,605	2.5378%	264	40
55 Automotive dealers and ser	286	2.7489%	1,765,521	2.2531%	234	52
56 Apparel and accessory store	104	0.9996%	847,990	1.0822%	113	-9
57 Furniture and home furnishi	0	0.0000%	504,007	0.6432%	67	-67
58 Eating and drinking places	1,021	9.8135%	3,699,628	4.7214%	491	530
59 Miscellaneous retail	204	1.9608%	1,666,602	2.1269%	221	-17
Administrative and Auxiliary	0	0.0000%	574,542	0.7332%	76	-76
SUBTOTALS	2,136	20.5306%	13,384,271	17.0808%	1,777	359
FINANCE INSURANCE AND RI	**394**	**3.7870%**	**4,568,788**	**5.8306%**	**607**	**-213**
60 Banking	148	1.4225%	1,288,258	1.6441%	171	-23
61 Credit agencies and other ba	0	0.0000%	488,159	0.6230%	65	-65
62 Security, commodity broker	0	0.0000%	188,250	0.2402%	25	-25
63 Insurance carriers	0	0.0000%	1,114,650	1.4225%	148	-148
64 Insurance agents, brokers a	0	0.0000%	383,789	0.4898%	51	-51
65 Real estate	149	1.4321%	861,904	1.0999%	114	35
66 Combined real estate, insur	0	0.0000%	29,335	0.0374%	4	-4
67 Holding and other investmen	0	0.0000%	131,608	0.1680%	17	-17
Administrative and Auxiliary	0	0.0000%	82,835	0.1057%	11	-11
SUBTOTALS	297	2.8547%	4,568,788	5.8306%	607	-310

SERVICES	**2,394**	**23.0104%**	**14,059,994**	**17.9431%**	**1867**	**527**
70 Hotels and oth8(estimate)	60	0.5767%	915,178	1.1679%	122	-62
72 Personal services	125	1.2015%	901,047	1.1499%	120	5
73 Business services	61	0.5863%	2,307,384	2.9446%	306	-245
75 Auto repair, services, and (	0	0.0000%	477,370	0.6092%	63	-63
76 Miscellaneous repair servic	0	0.0000%	254,140	0.3243%	34	-34
78 Motion pictures	0	0.0000%	180,933	0.2309%	24	-24
79 Amusement and recreation s	251	2.4125%	585,304	0.7470%	78	173
80 Health services	376	3.6140%	4,339,178	5.5376%	576	-200
81 Legal services	0	0.0000%	392,481	0.5009%	52	-52
82 Educational seC(estimate)	175	1.6820%	992,019	1.2660%	132	43
83 Social servicsG(estimate)	1,750	16.8205%	764,310	0.9754%	101	1,649
84 Museums, botanical, zoologi	0	0.0000%	22,588	0.0288%	3	-3
86 Membership organizations	0	0.0000%	1,100,716	1.4047%	146	-146
89 Miscellaneous services	0	0.0000%	670,425	0.8556%	89	-89
Administrative and Auxiliary	0	0.0000%	156,921	0.2003%	21	-21
SUBTOTALS	2,798	26.8935%	14,059,994	17.9431%	1,867	931
Nonclassifiable Establishme	**56**	**0.5383%**	**85,965**	**0.1097%**	**11**	**45**
STATE EMPLOYMENT	2,116	20.3383%	2,902,000	3.7035%	385	1,731
FEDERAL EMPLOYMENT	72	0.6920%	2,885,000	3.6818%	383	-311
TOTALS	20,981	201.6628%	194,748,044	248.5344%	25,858	2,802

Multiplier	HAYS
TOTAL EMPLOYME!	10,404
divided EXPORT EM	2,802
	3.7129

ECONOMIC BASE ANALYSIS FOR WILLIAMSON COUNTY (1977)

[1] County Employees

[2] Percent of Total

[3] National Employees

[4] Percent of Total

[5] County Employment Local Requirements (Col 4 * County Population)

[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category	[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1977	11,303		78,358,580			
AGRICULTURAL SERVICES	**53**	**0.4689%**	**242,997**	**0.3101%**	**35**	**18**
7 Agricultural Services	53	0.4689%	217,131	0.2771%	31	22
8 Forestry	0	0.0000%	14,506	0.0185%	2	-2
9 Fishing, hunting and trapping	0	0.0000%	9,999	0.0128%	1	-1
Administrative and Auxiliary	0	0.0000%	0	0.0000%	0	0
SUBTOTALS	53	0.4689%	241,636	0.3084%	35	18
MINING C(estimate)	**175**	**1.5483%**	**830,178**	**1.0595%**	**120**	**55**
10 Metal Mining	0	0.0000%	94,280	0.1203%	14	-14
11 Anthracite mining	0	0.0000%	3,764	0.0048%	1	-1
12 Bituminous coal and lignite n	0	0.0000%	224,131	0.2860%	32	-32
13 Oil and gas extraction	0	0.0000%	322,951	0.4121%	47	-47
14 Nonmetallic mC(estimate)	175	1.5483%	105,171	0.1342%	15	160
Administrative and Auxiliary	0	0.0000%	79,881	0.1019%	12	-12
SUBTOTALS	175	1.5483%	830,178	1.0595%	120	55
CONTRACT CONSTRUCTION	**1,162**	**10.2805%**	**3,571,973**	**4.5585%**	**515**	**647**
15 General contractors and ope	267	2.3622%	971,508	1.2398%	140	127
16 Heavy construction except h	236	2.0879%	716,063	0.9138%	103	133
17 Special trade contractors	659	5.8303%	1,866,504	2.3820%	269	390
Administrative and Auxiliary	0	0.0000%	15,896	0.0203%	2	-2
SUBTOTALS	1,162	10.2805%	3,569,971	4.5559%	515	647
MANUFACTURING	**2,148**	**19.0038%**	**19,638,852**	**25.0628%**	**2833**	**-685**
20 Food and kindrB(estimate)	60	0.5308%	1,498,119	1.9119%	216	-156
21 Tobacco manufacturers	0	0.0000%	61,422	0.0784%	9	-9
22 Textille mill pC(estimate)	175	1.5483%	883,161	1.1271%	127	48
23 Apparel and other textile pr	403	3.5654%	1,296,208	1.6542%	187	216
24 Lumber and wood products	0	0.0000%	678,236	0.8656%	98	-98
25 Furniture and fixtures	408	3.6097%	446,577	0.5699%	64	344
26 Paper and allied products	0	0.0000%	633,561	0.8085%	91	-91
27 printing and publishing	222	1.9641%	1,127,876	1.4394%	163	59
28 chemicals and allied product	0	0.0000%	888,148	1.1334%	128	-128
29 Petroleum and coal products	0	0.0000%	139,036	0.1774%	20	-20
30 Rubber and misc. plastic pro	116	1.0263%	703,662	0.8980%	102	14
31 Leather and leather products	0	0.0000%	242,525	0.3095%	35	-35
32 Stone, clay, and glass produ	85	0.7520%	601,918	0.7682%	87	-2
33 Primary Metal Industries	0	0.0000%	1,137,890	1.4522%	164	-164

34 Fabricated metal products	85	0.7520%	1,516,661	1.9355%	219	-134
35 Machinery except electrical	119	1.0528%	2,080,422	2.6550%	300	-181
36 Electric and E'E(estimate)	375	3.3177%	1,710,806	2.1833%	247	128
37 Transportation equipment	0	0.0000%	1,793,451	2.2888%	259	-259
38 Instruments and related pro	0	0.0000%	561,668	0.7168%	81	-81
39 Miscellaneous manufacturir	0	0.0000%	440,519	0.5622%	64	-64
Administrative and Auxiliary	0	0.0000%	1,196,966	1.5275%	173	-173
SUBTOTALS	2,048	18.1191%	19,638,832	25.0628%	2,833	-785
TRANSPORTATION AND OTH	**408**	**3.6097%**	**4,030,479**	**5.1436%**	**581**	**-173**
41 Local and interurban passen	0	0.0000%	260,277	0.3322%	38	-38
42 Trucking and warehousing	222	1.9641%	1,146,153	1.4627%	165	57
44 Water transportation	0	0.0000%	185,839	0.2372%	27	-27
45 Transportation by air	0	0.0000%	350,577	0.4474%	51	-51
46 Pipelines except natural gas	0	0.0000%	15,276	0.0195%	2	-2
47 Transportation services	0	0.0000%	155,655	0.1986%	22	-22
48 Communicatio B(estimate)	60	0.5308%	1,146,019	1.4625%	165	-105
49 Electric, gas, C(estimate)	175	1.5483%	659,328	0.8414%	95	80
Administrative and Auxiliary	0	0.0000%	111,355	0.1421%	16	-16
SUBTOTALS	457	4.0432%	4,030,479	5.1436%	581	-124
WHOLESALE TRADE	**390**	**3.4504%**	**4,562,083**	**5.8221%**	**658**	**-268**
50 Wholesale trade - durable gc	151	1.3359%	2,497,049	3.1867%	360	-209
51 Wholesale TraC(estimate)	175	1.5483%	1,816,041	2.3176%	262	-87
Administrative and Auxiliary	0	0.0000%	248,993	0.3178%	36	-36
SUBTOTALS	326	2.8842%	4,562,083	5.8221%	658	-332
RETAIL TRADE	**2,136**	**18.8976%**	**13,384,271**	**17.0808%**	**1931**	**205**
52 Building materials and garde	117	1.0351%	458,320	0.5849%	66	51
53 General merchandise stores	168	1.4863%	1,879,056	2.3980%	271	-103
54 Food stores	513	4.5386%	1,988,605	2.5378%	287	226
55 Automotive dealers and ser	410	3.6274%	1,765,521	2.2531%	255	155
56 Apparel and accessory stor	83	0.7343%	847,990	1.0822%	122	-39
57 Furniture and home furnishi	55	0.4866%	504,007	0.6432%	73	-18
58 Eating and drinking places	568	5.0252%	3,699,628	4.7214%	534	34
59 Miscellaneous retail	222	1.9641%	1,666,602	2.1269%	240	-18
Administrative and Auxiliary	0	0.0000%	574,542	0.7332%	83	-83
SUBTOTALS	2,136	18.8976%	13,384,271	17.0808%	1,931	205
FINANCE INSURANCE AND RI	**571**	**5.0518%**	**4,568,788**	**5.8306%**	**659**	**-88**
60 Banking	232	2.0526%	1,288,258	1.6441%	186	46
61 Credit agencies and other ba	53	0.4689%	488,159	0.6230%	70	-17
62 Security, commodity broker	0	0.0000%	188,250	0.2402%	27	-27
63 Insurance carriers	0	0.0000%	1,114,650	1.4225%	161	-161
64 Insurance agents, brokers a	0	0.0000%	383,789	0.4898%	55	-55
65 Real estate	219	1.9375%	861,904	1.0999%	124	95
66 Combined real estate, insur	0	0.0000%	29,335	0.0374%	4	-4
67 Holding and other investmen	0	0.0000%	131,608	0.1680%	19	-19
Administrative and Auxiliary	0	0.0000%	82,835	0.1057%	12	-12
SUBTOTALS	504	4.4590%	4,568,788	5.8306%	659	-155

SERVICES	**2,079**	**18.3933%**	**14,059,994**	**17.9431%**	**2028**	**51**
70 Hotels and other lodging plac	75	0.6635%	915,178	1.1679%	132	-57
72 Personal services	140	1.2386%	901,047	1.1499%	130	10
73 Business services	0	0.0000%	2,307,384	2.9446%	333	-333
75 Auto repair, services, and ç	70	0.6193%	477,370	0.6092%	69	1
76 Miscellaneous repair servic	0	0.0000%	254,140	0.3243%	37	-37
78 Motion pictures	0	0.0000%	180,933	0.2309%	26	-26
79 Amusement and recreation s	0	0.0000%	585,304	0.7470%	84	-84
80 Health services	673	5.9542%	4,339,178	5.5376%	626	47
81 Legal services	55	0.4866%	392,481	0.5009%	57	-2
82 Educational seC(estimate)	175	1.5483%	992,019	1.2660%	143	32
83 Social services	503	4.4501%	764,310	0.9754%	110	393
84 Museums, botanical, zoologi	0	0.0000%	22,588	0.0288%	3	-3
86 Membership organizations	147	1.3005%	1,100,716	1.4047%	159	-12
89 Miscellaneous services	57	0.5043%	670,425	0.8556%	97	-40
Administrative and Auxiliary	0	0.0000%	156,921	0.2003%	23	-23
SUBTOTALS	1,895	16.7655%	14,059,994	17.9431%	2,028	-133
Nonclassifiable B(estimate)	**60**	**0.5308%**	**85,965**	**0.1097%**	**12**	**48**
STATE EMPLOYMENT	144	1.2740%	2,902,000	3.7035%	419	-275
FEDERAL EMPLOYMENT	74	0.6547%	2,885,000	3.6818%	416	-342
TOTALS	26,694	236.1674%	194,748,044	248.5344%	28,092	1,024

Multiplier	WILLIAMSON
TOTAL EMPLOYMEI	11,303
divided EXPORT EM	1,024
	11.0403

ECONOMIC BASE ANALYSIS FOR
AUSTIN'S METROPOLITAN STATISTICAL AREA (1977)
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category	[1] Austin MSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1977	193,798		78,358,580			
AGRICULTURAL SERVICES	**491**	**0.2534%**	**242,997**	**0.3101%**	**601**	**-110**
7 Agricultural Services	439	0.2265%	217,131	0.2771%	537	-98
8 Forestry	0	0.0000%	14,506	0.0185%	36	-36
9 Fishing, hunting and trapping	0	0.0000%	9,999	0.0128%	25	-25
Administrative and Auxiliary	0	0.0000%	0	0.0000%	0	0
SUBTOTALS	439	0.2265%	241,636	0.3084%	598	-159
MINING	**335**	**0.1729%**	**830,178**	**1.0595%**	**2,053**	**-1,718**
10 Metal Mining	0	0.0000%	94,280	0.1203%	233	-233
11 Anthracite mining	0	0.0000%	3,764	0.0048%	9	-9
12 Bituminous coal and lignite n	0	0.0000%	224,131	0.2860%	554	-554
13 Oil and gas extraction	94	0.0485%	322,951	0.4121%	799	-705
14 Nonmetallic minerals except	175	0.0903%	105,171	0.1342%	260	-85
Administrative and Auxiliary	0	0.0000%	79,881	0.1019%	198	-198
SUBTOTALS	269	0.1388%	830,178	1.0595%	2,053	-1,784
CONTRACT CONSTRUCTION	**10,385**	**5.3587%**	**3,571,973**	**4.5585%**	**8,934**	**1,551**
15 General contractors and ope	2,854	1.4727%	971,508	1.2398%	2,403	451
16 Heavy construction except h	1,319	0.6806%	716,063	0.9138%	1,771	-452
17 Special trade contractors	6,212	3.2054%	1,866,504	2.3820%	4,616	1,596
Administrative and Auxiliary	0	0.0000%	15,896	0.0203%	39	-39
SUBTOTALS	10,385	5.3587%	3,569,971	4.5559%	8,829	1,556
MANUFACTURING	**21,956**	**11.3293%**	**19,638,852**	**25.0628%**	**48,571**	**-26,615**
20 Food and kindred products	1,619	0.8354%	1,498,119	1.9119%	3,705	-2,086
21 Tobacco manufacturers	0	0.0000%	61,422	0.0784%	152	-152
22 Textille mill products	175	0.0903%	883,161	1.1271%	2,184	-2,009
23 Apparel and other textile pr	578	0.2982%	1,296,208	1.6542%	3,206	-2,628
24 Lumber and wood products	422	0.2178%	678,236	0.8656%	1,677	-1,255
25 Furniture and fixtures	2,333	1.2038%	446,577	0.5699%	1,104	1,229
26 Paper and allied products	0	0.0000%	633,561	0.8085%	1,567	-1,567
27 printing and publishing	2,440	1.2590%	1,127,876	1.4394%	2,789	-349
28 chemicals and allied product	196	0.1011%	888,148	1.1334%	2,197	-2,001
29 Petroleum and coal products	0	0.0000%	139,036	0.1774%	344	-344
30 Rubber and misc. plastic pro	308	0.1589%	703,662	0.8980%	1,740	-1,432
31 Leather and leather products	0	0.0000%	242,525	0.3095%	600	-600
32 Stone, clay, and glass produ	583	0.3008%	601,918	0.7682%	1,489	-906
33 Primary Metal Industries	56	0.0289%	1,137,890	1.4522%	2,814	-2,758

34 Fabricated metal products	645	0.3328%	1,516,661	1.9355%	3,751	-3,106
35 Machinery except electrical	3,869	1.9964%	2,080,422	2.6550%	5,145	-1,276
36 Electric and Electronic Equip	5,972	3.0816%	1,710,806	2.1833%	4,231	1,741
37 Transportation equipment	1,750	0.9030%	1,793,451	2.2888%	4,436	-2,686
38 Instruments and related pro	593	0.3060%	561,668	0.7168%	1,389	-796
39 Miscellaneous manufacturi	469	0.2420%	440,519	0.5622%	1,090	-621
Administrative and Auxiliary	750	0.3870%	1,196,966	1.5275%	2,960	-2,210
SUBTOTALS	22,758	11.7432%	19,638,832	25.0628%	48,571	-25,813
TRANSPORTATION AND OTH	**5,973**	**3.0821%**	**4,030,479**	**5.1436%**	**9,968**	**-3,995**
41 Local and interurban passen	308	0.1589%	260,277	0.3322%	644	-336
42 Trucking and warehousing	1,121	0.5784%	1,146,153	1.4627%	2,835	-1,714
44 Water transportation	0	0.0000%	185,839	0.2372%	460	-460
45 Transportation by air	199	0.1027%	350,577	0.4474%	867	-668
46 Pipelines except natural gas	0	0.0000%	15,276	0.0195%	38	-38
47 Transportation services	162	0.0836%	155,655	0.1986%	385	-223
48 Communication	3,395	1.7518%	1,146,019	1.4625%	2,834	561
49 Electric, gas, and sanitary s	631	0.3256%	659,328	0.8414%	1,631	-1,000
Administrative and Auxiliary	60	0.0310%	111,355	0.1421%	275	-215
SUBTOTALS	5,876	3.0320%	4,030,479	5.1436%	9,968	-4,092
WHOLESALE TRADE	**6,848**	**3.5336%**	**4,562,083**	**5.8221%**	**11,283**	**-4,435**
50 Wholesale trade - durable go	4,544	2.3447%	2,497,049	3.1867%	6,176	-1,632
51 Wholesale Trade - nondurabl	2,127	1.0975%	1,816,041	2.3176%	4,491	-2,364
Administrative and Auxiliary	0	0.0000%	248,993	0.3178%	616	-616
SUBTOTALS	6,671	3.4422%	4,562,083	5.8221%	11,283	-4,612
RETAIL TRADE	**34,986**	**18.0528%**	**13,384,271**	**17.0808%**	**33,102**	**1,884**
52 Building materials and garde	1,079	0.5568%	458,320	0.5849%	1,134	-55
53 General merchandise stores	4,195	2.1646%	1,879,056	2.3980%	4,647	-452
54 Food stores	5,163	2.6641%	1,988,605	2.5378%	4,918	245
55 Automotive dealers and ser	4,179	2.1564%	1,765,521	2.2531%	4,367	-188
56 Apparel and accessory store	2,498	1.2890%	847,990	1.0822%	2,097	401
57 Furniture and home furnishi	1,434	0.7399%	504,007	0.6432%	1,247	187
58 Eating and drinking places	11,545	5.9572%	3,699,628	4.7214%	9,150	2,395
59 Miscellaneous retail	3,880	2.0021%	1,666,602	2.1269%	4,122	-242
Administrative and Auxiliary	971	0.5010%	574,542	0.7332%	1,421	-450
SUBTOTALS	34,944	18.0311%	13,384,271	17.0808%	33,102	1,842
FINANCE INSURANCE AND RI	**11,518**	**5.9433%**	**4,568,788**	**5.8306%**	**11,300**	**218**
60 Banking	2,261	1.1667%	1,288,258	1.6441%	3,186	-925
61 Credit agencies and other ba	1,521	0.7848%	488,159	0.6230%	1,207	314
62 Security, commodity broker	203	0.1047%	188,250	0.2402%	466	-263
63 Insurance carriers	3,493	1.8024%	1,114,650	1.4225%	2,757	736
64 Insurance agents, brokers a	1,201	0.6197%	383,769	0.4898%	949	252
65 Real estate	2,196	1.1331%	861,904	1.0999%	2,132	64
66 Combined real estate, insur	60	0.0310%	29,335	0.0374%	73	-13
67 Holding and other investmen	412	0.2126%	131,608	0.1680%	325	87
Administrative and Auxiliary	0	0.0000%	82,835	0.1057%	205	-205
SUBTOTALS	11,347	5.8551%	4,568,788	5.8306%	11,300	47

SERVICES	**32,698**	**16.8722%**	**14,059,994**	**17.9431%**	**34,773**	**-2,075**
70 Hotels and other lodging plac	2,339	1.2069%	915,178	1.1679%	2,263	76
72 Personal services	2,549	1.3153%	901,047	1.1499%	2,228	321
73 Business services	4,910	2.5336%	2,307,384	2.9446%	5,707	-797
75 Auto repair, services, and g	1,156	0.5965%	477,370	0.6092%	1,181	-25
76 Miscellaneous repair servic	536	0.2766%	254,140	0.3243%	629	-93
78 Motion pictures	375	0.1935%	180,933	0.2309%	447	-72
79 Amusement and recreation s	1,086	0.5604%	585,304	0.7470%	1,448	-362
80 Health services	7,254	3.7431%	4,339,178	5.5376%	10,732	-3,478
81 Legal services	1,177	0.6073%	392,481	0.5009%	971	206
82 Educational services	1,455	0.7508%	992,019	1.2660%	2,453	-998
83 Social services	4,584	2.3653%	764,310	0.9754%	1,890	2,694
84 Museums, botanical, zoologi	0	0.0000%	22,588	0.0288%	56	-56
86 Membership organizations	2,917	1.5052%	1,100,716	1.4047%	2,722	195
89 Miscellaneous services	2,425	1.2513%	670,425	0.8556%	1,658	767
Administrative and Auxiliary	186	0.0960%	156,921	0.2003%	388	-202
SUBTOTALS	32,949	17.0017%	14,059,994	17.9431%	34,773	-1,824
Nonclassifiable Establishme	**374**	**0.1930%**	**85,965**	**0.1097%**	**213**	**161**
STATE EMPLOYMENT	43,699	22.5487%	2,902,000	3.7035%	7,177	36,522
FEDERAL EMPLOYMENT	7,742	3.9949%	2,885,000	3.6818%	7,135	607
TOTALS	376,840	194.4499%	194,748,044	248.5344%	481,655	40,943

Multiplier	AUSTIN MSA
TOTAL EMPLOYME!	193,798
divided EXPORT EM	40,942.73
	4.7334

ECONOMIC BASE ANALYSIS FOR TRAVIS
COUNTY (1986)
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Travis	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	325,384		96,763,465			
AGRICULTURAL SERVICES		**1,368**	**0.4204%**	**412,010**	**0.4258%**	**1,385**	**-17**
7 Agricultural Services	G(estimate)	1,750	0.5378%	384,284	0.3971%	1,292	458
8 Forestry		0	0.0000%	17,174	0.0177%	58	-58
9 Fishing, hunting and trapping		0	0.0000%	8,340	0.0086%	28	-28
Administrative and Auxiliary		0	0.0000%	2,203	0.0023%	7	-7
SUBTOTALS		1,750	0.5378%	409,798	0.4235%	1,378	372
MINING		**451**	**0.1386%**	**847,143**	**0.8755%**	**2,849**	**-2,398**
10 Metal Mining		0	0.0000%	37,830	0.0391%	127	-127
11 Anthracite mining		0	0.0000%	2,363	0.0024%	8	-8
12 Bituminous coal and lignite mining		0	0.0000%	173,483	0.1793%	583	-583
13 Oil and gas extraction		305	0.0937%	407,314	0.4209%	1,370	-1,065
14 Nonmetallic minerals exce	C(estimate)	175	0.0538%	101,075	0.1045%	340	-165
Administrative and Auxiliary		0	0.0000%	125,065	0.1292%	421	-421
SUBTOTALS		480	0.1475%	847,130	0.8755%	2,849	-2,369
CONTRACT CONSTRUCTION		**19,081**	**5.8641%**	**4,658,669**	**4.8145%**	**15,666**	**3,415**
15 General contractors and operative buil		5,071	1.5585%	1,224,577	1.2655%	4,118	953
16 Heavy construction except	H(estimate)	3,750	1.1525%	693,078	0.7163%	2,331	1,419
17 Special trade contractors		10,683	3.2832%	2,721,543	2.8126%	9,152	1,531
Administrative and Auxiliary	C(estimate)	175	0.0538%	19,471	0.0201%	65	110
SUBTOTALS		19,679	6.0479%	4,658,669	4.8145%	15,666	4,013
MANUFACTURING		**36,853**	**11.3260%**	**19,141,756**	**19.7820%**	**64,367**	**-27,514**
20 Food and kindred products		1,945	0.5978%	1,405,771	1.4528%	4,727	-2,782
21 Tobacco manufacturers		0	0.0000%	48,080	0.0497%	162	-162
22 Textille mill products		0	0.0000%	667,969	0.6903%	2,246	-2,246
23 Apparel and other textile	C(estimate)	175	0.0538%	1,082,437	1.1186%	3,640	-3,465
24 Lumber and wood products		514	0.1580%	657,853	0.6799%	2,212	-1,698
25 Furniture and fixtures		834	0.2563%	492,802	0.5093%	1,657	-823
26 Paper and allied products		64	0.0197%	620,234	0.6410%	2,086	-2,022
27 printing and publishing		4,080	1.2539%	1,451,383	1.4999%	4,881	-801
28 chemicals and allied produ	G(estimate)	1,750	0.5378%	832,862	0.8607%	2,801	-1,051
29 Petroleum and coal products		0	0.0000%	126,243	0.1305%	425	-425
30 Rubber and misc. plastic products		278	0.0854%	769,544	0.7953%	2,588	-2,310
31 Leather and leather products		0	0.0000%	139,246	0.1439%	468	-468
32 Stone, clay, and glass products		1,408	0.4327%	545,952	0.5642%	1,836	-428
33 Primary Metal Industries		400	0.1229%	736,357	0.7610%	2,476	-2,076

34 Fabricated metal products	1,929	0.5928%	1,476,672	1.5261%	4,966	-3,037
35 Machinery except electric J(estimate)	17,500	5.3783%	1,980,031	2.0463%	6,658	10,842
36 Electric and Electronic Equipment	8,957	2.7527%	2,016,533	2.0840%	6,781	2,176
37 Transportation equipment C(estimate)	175	0.0538%	1,805,051	1.8654%	6,070	-5,895
38 Instruments and related products	1,237	0.3802%	615,705	0.6363%	2,070	-833
39 Miscellaneous manufacturing industrie	1,195	0.3673%	375,153	0.3877%	1,262	-67
Administrative and Auxiliary	468	0.1438%	1,295,872	1.3392%	4,358	-3,890
SUBTOTALS	42,909	13.1872%	19,141,750	19.7820%	64,367	-21,458
TRANSPORTATION AND OTHER PUBL	**10,384**	**3.1913%**	**4,884,297**	**5.0477%**	**16,424**	**-6,040**
41 Local and interurban passenger transit	881	0.2708%	272,495	0.2816%	916	-35
42 Trucking and warehousing	1,866	0.5735%	1,308,879	1.3527%	4,401	-2,535
44 Water transportation	0	0.0000%	170,127	0.1758%	572	-572
45 Transportation by air	909	0.2794%	511,759	0.5289%	1,721	-812
46 Pipelines except natural gas	0	0.0000%	17,695	0.0183%	60	-60
47 Transportation services	609	0.1872%	302,980	0.3131%	1,019	-410
48 Communication	5,104	1.5686%	1,265,531	1.3079%	4,256	848
49 Electric, gas, and sanitary services	834	0.2563%	837,949	0.8660%	2,818	-1,984
Administrative and Auxiliary C(estimate)	175	0.0538%	196,882	0.2035%	662	-487
SUBTOTALS	10,378	3.1895%	4,884,297	5.0477%	16,424	-6,046
WHOLESALE TRADE	**12,084**	**3.7138%**	**5,724,864**	**5.9163%**	**19,251**	**-7,167**
50 Wholesale trade - durable goods	7,842	2.4101%	3,217,781	3.3254%	10,820	-2,978
51 Wholesale Trade - nondurabl(estimate)	3,750	1.1525%	2,216,759	2.2909%	7,454	-3,704
Administrative and Auxiliary F(estimate)	750	0.2305%	290,324	0.3000%	976	-226
SUBTOTALS	12,342	3.7931%	5,724,864	5.9163%	19,251	-6,909
RETAIL TRADE	**58,373**	**17.9397%**	**17,549,841**	**18.1368%**	**59,014**	**-641**
52 Building materials and garden supplies	1,988	0.6110%	626,477	0.6474%	2,107	-119
53 General merchandise stores	5,278	1.6221%	1,954,204	2.0196%	6,571	-1,293
54 Food stores	10,100	3.1040%	2,722,802	2.8139%	9,156	944
55 Automotive dealers and service statio	5,102	1.5680%	1,930,359	1.9949%	6,491	-1,389
56 Apparel and accessory stores	3,630	1.1156%	1,091,362	1.1175%	3,636	-6
57 Furniture and home furnishings stores	2,771	0.8516%	668,194	0.6905%	2,247	524
58 Eating and drinking places	21,524	6.6150%	5,577,135	5.7637%	18,754	2,770
59 Miscellaneous retail	7,091	2.1793%	2,204,710	2.2785%	7,414	-323
Administrative and Auxiliary	889	0.2732%	784,598	0.8108%	2,638	-1,749
SUBTOTALS	58,373	17.9397%	17,549,841	18.1368%	59,014	-641
FINANCE INSURANCE AND REAL EST.	**27,531**	**8.4611%**	**6,370,787**	**6.5839%**	**21,423**	**6,108**
60 Banking	4,139	1.2720%	1,639,912	1.6948%	5,514	-1,375
61 Credit agencies and other banks	4,099	1.2597%	813,318	0.8405%	2,735	1,364
62 Security, commodity brokers and serv	701	0.2154%	377,278	0.3899%	1,269	-568
63 Insurance carriers	7,317	2.2487%	1,313,076	1.3570%	4,415	2,902
64 Insurance agents, brokers and service	2,421	0.7440%	597,436	0.6174%	2,009	412
65 Real estate	7,221	2.2192%	1,220,293	1.2611%	4,103	3,118
66 Combined real estate, insu(estimate)	60	0.0184%	24,690	0.0255%	83	-23
67 Holding and other investment offices	1,552	0.4770%	209,952	0.2170%	706	846
Administrative and Auxiliary	0	0.0000%	174,832	0.1807%	588	-588
SUBTOTALS	27,510	8.4546%	6,370,787	6.5839%	21,423	6,087

SERVICES	**71,106**	**21.8529%**	**22,878,357**	**23.6436%**	**76,932**	**-5,826**
70 Hotels and other lodging places	3,626	1.1144%	1,331,620	1.3762%	4,478	-852
72 Personal services	4,524	1.3904%	1,117,133	1.1545%	3,757	767
73 Business services	16,818	5.1687%	4,612,797	4.7671%	15,511	1,307
75 Auto repair, services, and garages	2,359	0.7250%	726,858	0.7512%	2,444	-85
76 Miscellaneous repair services	1,092	0.3356%	338,723	0.3501%	1,139	-47
78 Motion pictures	717	0.2204%	252,221	0.2607%	848	-131
79 Amusement and recreation services	1,490	0.4579%	796,839	0.8235%	2,680	-1,190
80 Health services	14,221	4.3705%	6,614,276	6.8355%	22,242	-8,021
81 Legal services	3,973	1.2210%	745,566	0.7705%	2,507	1,466
82 Educational services	1,806	0.5550%	1,561,782	1.6140%	5,252	-3,446
83 Social services	4,191	1.2880%	1,367,622	1.4134%	4,599	-408
84 Museums, botanical, zoolo B(estimate)	50	0.0154%	37,060	0.0383%	125	-75
86 Membership organizations	6,654	2.0450%	1,696,145	1.7529%	5,704	950
87 Engineering and Management Services	0	0.0000%	0	0.0000%	0	0
89 Miscellaneous services	9,086	2.7924%	1,409,941	1.4571%	4,741	4,345
Administrative and Auxiliary E(estimate)	375	0.1152%	269,774	0.2788%	907	-532
SUBTOTALS	70,982	21.8148%	22,878,357	23.6436%	76,932	-5,950
Nonclassifiable Establishments	**3,694**	**1.1353%**	**912,741**	**0.9433%**	**3,069**	**625**
STATE EMPLOYMENT	46,777	14.3759%	3,437,000	3.5520%	11,558	35,219
FEDERAL EMPLOYMENT	11,051	3.3963%	3,047,000	3.1489%	10,246	805
TOTALS	729,731	224.2676%	248,313,654	256.6192%	834,998	46,173

Multiplier	TRAVIS
TOTAL EMPLOYMENT	325,384
divided EXPORT EMPLOYMENT	46,173
	7.0471

ECONOMIC BASE ANALYSIS FOR HAYS COUNTY (1986)

[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	17,515		96,763,465			
AGRICULTURAL SERVICES		**69**	**0.3939%**	**412,010**	**0.4258%**	**75**	**-6**
7 Agricultural Services		69	0.3939%	384,284	0.3971%	70	-1
8 Forestry		0	0.0000%	17,174	0.0177%	3	-3
9 Fishing, hunting and trapping		0	0.0000%	8,340	0.0086%	2	-2
Administrative and Auxiliary		0	0.0000%	2,203	0.0023%	0	-0
SUBTOTALS		69	0.3939%	409,798	0.4235%	74	-5
MINING		**156**	**0.8907%**	**847,143**	**0.8755%**	**153**	**3**
10 Metal Mining	B(estimate)	60	0.3426%	37,830	0.0391%	7	53
11 Anthracite mining		0	0.0000%	2,363	0.0024%	0	-0
12 Bituminous coal and lignite mining		0	0.0000%	173,483	0.1793%	31	-31
13 Oil and gas extraction		0	0.0000%	407,314	0.4209%	74	-74
14 Nonmetallic minerals except f	B(estimate)	60	0.3426%	101,075	0.1045%	18	42
Administrative and Auxiliary		0	0.0000%	125,065	0.1292%	23	-23
SUBTOTALS		120	0.6851%	847,130	0.8755%	153	-33
CONTRACT CONSTRUCTION		**1,403**	**8.0103%**	**4,658,669**	**4.8145%**	**843**	**560**
15 General contractors and operative builders		282	1.6100%	1,224,577	1.2655%	222	60
16 Heavy construction except highway		556	3.1744%	693,078	0.7163%	125	431
17 Special trade contractors		565	3.2258%	2,721,543	2.8126%	493	72
Administrative and Auxiliary		0	0.0000%	19,471	0.0201%	4	-4
SUBTOTALS		1,403	8.0103%	4,658,669	4.8145%	843	560
MANUFACTURING		**1,456**	**8.3129%**	**19,141,756**	**19.7820%**	**3465**	**-2,009**
20 Food and kindred products		0	0.0000%	1,405,771	1.4528%	254	-254
21 Tobacco manufacturers		0	0.0000%	48,080	0.0497%	9	-9
22 Textille mill products		0	0.0000%	667,969	0.6903%	121	-121
23 Apparel and other textile products		0	0.0000%	1,082,437	1.1186%	196	-196
24 Lumber and wood products	C(estimate)	175	0.9991%	657,853	0.6799%	119	56
25 Furniture and fixtures		0	0.0000%	492,802	0.5093%	89	-89
26 Paper and allied products		0	0.0000%	620,234	0.6410%	112	-112
27 printing and publishing		248	1.4159%	1,451,383	1.4999%	263	-15
28 chemicals and allied products		0	0.0000%	832,862	0.8607%	151	-151
29 Petroleum and coal products		0	0.0000%	126,243	0.1305%	23	-23
30 Rubber and misc. plastic products		0	0.0000%	769,544	0.7953%	139	-139
31 Leather and leather products		0	0.0000%	139,246	0.1439%	25	-25
32 Stone, clay, and glass products		58	0.3311%	545,952	0.5642%	99	-41
33 Primary Metal Industries		0	0.0000%	736,357	0.7610%	133	-133

34 Fabricated metal products	357	2.0383%	1,476,672	1.5261%	267	90
35 Machinery except electrical	0	0.0000%	1,980,031	2.0463%	358	-358
36 Electric and Electronic EquipmE(estimate)	375	2.1410%	2,016,533	2.0840%	365	10
37 Transportation equipment	0	0.0000%	1,805,051	1.8654%	327	-327
38 Instruments and related prodsB(estimate)	60	0.3426%	615,705	0.6363%	111	-51
39 Miscellaneous manufacturing industries	0	0.0000%	375,153	0.3877%	68	-68
Administrative and Auxiliary	0	0.0000%	1,295,872	1.3392%	235	-235
SUBTOTALS	1,273	7.2681%	19,141,750	19.7820%	3,465	-2,192
TRANSPORTATION AND OTHER PUBLIC UT	**345**	**1.9697%**	**4,884,297**	**5.0477%**	**884**	**-539**
41 Local and interurban passenger transit	0	0.0000%	272,495	0.2816%	49	-49
42 Trucking and warehousing	79	0.4510%	1,308,879	1.3527%	237	-158
44 Water transportation	0	0.0000%	170,127	0.1758%	31	-31
45 Transportation by air	0	0.0000%	511,759	0.5289%	93	-93
46 Pipelines except natural gas	0	0.0000%	17,695	0.0183%	3	-3
47 Transportation services	0	0.0000%	302,980	0.3131%	55	-55
48 Communication C(estimate)	175	0.9991%	1,265,531	1.3079%	229	-54
49 Electric, gas, and sanitary services	0	0.0000%	837,949	0.8660%	152	-152
Administrative and Auxiliary	0	0.0000%	196,882	0.2035%	36	-36
SUBTOTALS	254	1.4502%	4,884,297	5.0477%	884	-630
WHOLESALE TRADE	**480**	**2.7405%**	**5,724,864**	**5.9163%**	**1036**	**-556**
50 Wholesale trade - durable goods	210	1.1990%	3,217,781	3.3254%	582	-372
51 Wholesale Trade - nondurable goods	270	1.5415%	2,216,759	2.2909%	401	-131
Administrative and Auxiliary	0	0.0000%	290,324	0.3000%	53	-53
SUBTOTALS	480	2.7405%	5,724,864	5.9163%	1,036	-556
RETAIL TRADE	**4,022**	**22.9632%**	**17,549,841**	**18.1368%**	**3177**	**845**
52 Building materials and garden supplies	202	1.1533%	626,477	0.6474%	113	89
53 General merchandise stores	208	1.1876%	1,954,204	2.0196%	354	-146
54 Food stores	659	3.7625%	2,722,802	2.8139%	493	166
55 Automotive dealers and service stations	416	2.3751%	1,930,359	1.9949%	349	67
56 Apparel and accessory stores	154	0.8792%	1,081,362	1.1175%	196	-42
57 Furniture and home furnishings stores	78	0.4453%	668,194	0.6905%	121	-43
58 Eating and drinking places	1,781	10.1684%	5,577,135	5.7637%	1010	771
59 Miscellaneous retail	303	1.7299%	2,204,710	2.2785%	399	-96
Administrative and Auxiliary	221	1.2618%	784,598	0.8108%	142	79
SUBTOTALS	4,022	22.9632%	17,549,841	18.1368%	3,177	845
FINANCE INSURANCE AND REAL ESTATE	**868**	**4.9558%**	**6,370,787**	**6.5839%**	**1153**	**-285**
60 Banking	202	1.1533%	1,639,912	1.6948%	297	-95
61 Credit agencies and other banks	97	0.5538%	813,318	0.8405%	147	-50
62 Security, commodity brokersE(estimate)	375	2.1410%	377,278	0.3899%	68	307
63 Insurance carriers	53	0.3026%	1,313,076	1.3570%	238	-185
64 Insurance agents, brokers anB(estimate)	60	0.3426%	597,436	0.6174%	108	-48
65 Real estate	166	0.9478%	1,220,293	1.2611%	221	-55
66 Combined real estate, insurance, etc.	0	0.0000%	24,690	0.0255%	4	-4
67 Holding and other investment offices	0	0.0000%	209,952	0.2170%	38	-38
Administrative and Auxiliary	0	0.0000%	174,832	0.1807%	32	-32
SUBTOTALS	953	5.4411%	6,370,787	6.5839%	1,153	-200

SERVICES	**3,276**	**18.7040%**	**22,878,357**	**23.6436%**	**4141**	**-865**
70 Hotels and other lodging places	173	0.9877%	1,331,620	1.3762%	241	-68
72 Personal services	240	1.3703%	1,117,133	1.1545%	202	38
73 Business services	273	1.5587%	4,612,797	4.7671%	835	-562
75 Auto repair, services, and garages	80	0.4568%	726,858	0.7512%	132	-52
76 Miscellaneous repair services	52	0.2969%	338,723	0.3501%	61	-9
78 Motion pictures	0	0.0000%	252,221	0.2607%	46	-46
79 Amusement and recreation services	442	2.5236%	796,839	0.8235%	144	298
80 Health services	1,128	6.4402%	6,614,276	6.8355%	1197	-69
81 Legal services	57	0.3254%	745,566	0.7705%	135	-78
82 Educational services C(estimate)	175	0.9991%	1,561,782	1.6140%	283	-108
83 Social services	247	1.4102%	1,367,622	1.4134%	248	-1
84 Museums, botanical, zoological gardens	0	0.0000%	37,060	0.0383%	7	-7
86 Membership organizations	169	0.9649%	1,696,145	1.7529%	307	-138
87 Engineering and Management Services	0	0.0000%	0	0.0000%	0	0
89 Miscellaneous services	202	1.1533%	1,409,941	1.4571%	255	-53
Administrative and Auxiliary	0	0.0000%	269,774	0.2788%	49	-49
SUBTOTALS	3,238	18.4870%	22,878,357	23.6436%	4,141	-903
Nonclassifiable Establishments	**305**	**1.7414%**	**912,741**	**0.9433%**	**165**	**140**
STATE EMPLOYMENT	3,116	17.7905%	3,437,000	3.5520%	622	2,494
FEDERAL EMPLOYMENT	113	0.6452%	3,047,000	3.1489%	552	-439
TOTALS	36,004	205.5609%	248,313,654	256.6192%	44,947	4,041

Mul	HAYS	
TOTAL EMPLOYMENT		17,515
divided EXPORT EMPLOYMENT		4,041
		4.3339

ECONOMIC BASE ANALYSIS FOR WILLIAMSON COUNTY (1986)

[1] County Employees

[2] Percent of Total

[3] National Employees

[4] Percent of Total

[5] County Employment Local Requirements (Col 4 * County Population)

[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	26,971		96,763,465			
AGRICULTURAL SERVICES	**E(estimate)**	**375**	**1.3904%**	**412,010**	**0.4258%**	**115**	**260**
7 Agricultural Services	E(estimate)	375	1.3904%	384,284	0.3971%	107	268
8 Forestry		0	0.0000%	17,174	0.0177%	5	-5
9 Fishing, hunting and trapping		0	0.0000%	8,340	0.0086%	2	-2
Administrative and Auxiliary		0	0.0000%	2,203	0.0023%	1	-1
SUBTOTALS		375	1.3904%	409,798	0.4235%	114	261
MINING	**E(estimate)**	**375**	**1.3904%**	**847,143**	**0.8755%**	**236**	**139**
10 Metal Mining		0	0.0000%	37,830	0.0391%	11	-11
11 Anthracite mining		0	0.0000%	2,363	0.0024%	1	-1
12 Bituminous coal and lignite mining		0	0.0000%	173,483	0.1793%	48	-48
13 Oil and gas extraction		0	0.0000%	407,314	0.4209%	114	-114
14 Nonmetallic minerals exce	C(estimate)	175	0.6488%	101,075	0.1045%	28	147
Administrative and Auxiliary		0	0.0000%	125,065	0.1292%	35	-35
SUBTOTALS		175	0.6488%	847,130	0.8755%	236	-61
CONTRACT CONSTRUCTION		**3,329**	**12.3429%**	**4,658,669**	**4.8145%**	**1299**	**2,030**
15 General contractors and operative builde		766	2.8401%	1,224,577	1.2655%	341	425
16 Heavy construction except highway		363	1.3459%	693,078	0.7163%	193	170
17 Special trade contractors		2,200	8.1569%	2,721,543	2.8126%	759	1,441
Administrative and Auxiliary		0	0.0000%	19,471	0.0201%	5	-5
SUBTOTALS		3,329	12.3429%	4,658,669	4.8145%	1,299	2,030
MANUFACTURING		**4,122**	**15.2831%**	**19,141,756**	**19.7820%**	**5335**	**-1,213**
20 Food and kindred products	B(estimate)	60	0.2225%	1,405,771	1.4528%	392	-332
21 Tabacco manufacturers		0	0.0000%	48,080	0.0497%	13	-13
22 Textille mill products		0	0.0000%	667,969	0.6903%	186	-186
23 Apparel and other textile p	B(estimate)	60	0.2225%	1,082,437	1.1186%	302	-242
24 Lumber and wood products		382	1.4163%	657,853	0.6799%	183	199
25 Furniture and fixtures		433	1.6054%	492,802	0.5093%	137	296
26 Paper and allied products		0	0.0000%	620,234	0.6410%	173	-173
27 printing and publishing		347	1.2866%	1,451,383	1.4999%	405	-58
28 chemicals and allied products		228	0.8454%	832,862	0.8607%	232	-4
29 Petroleum and coal products		0	0.0000%	126,243	0.1305%	35	-35
30 Rubber and misc. plastic products		219	0.8120%	769,544	0.7953%	214	5
31 Leather and leather products		0	0.0000%	139,246	0.1439%	39	-39
32 Stone, clay, and glass products		260	0.9640%	545,952	0.5642%	152	108
33 Primary Metal Industries		0	0.0000%	736,357	0.7610%	205	-205

34 Fabricated metal products	148	0.5487%	1,476,672	1.5261%	412	-264
35 Machinery except electrical	518	1.9206%	1,980,031	2.0463%	552	-34
36 Electric and Electronic Equipment	1,176	4.3602%	2,016,533	2.0840%	562	614
37 Transportation equipment	0	0.0000%	1,805,051	1.8654%	503	-503
38 Instruments and related pr C(estimate)	175	0.6488%	615,705	0.6363%	172	3
39 Miscellaneous manufacturing industries	0	0.0000%	375,153	0.3877%	105	-105
Administrative and Auxiliary B(estimate)	60	0.2225%	1,295,872	1.3392%	361	-301
SUBTOTALS	4,066	15.0755%	19,141,750	19.7820%	5,335	-1,269
TRANSPORTATION AND OTHER PUBLIC	**772**	**2.8623%**	**4,884,297**	**5.0477%**	**1361**	**-589**
41 Local and interurban passenger transit	0	0.0000%	272,495	0.2816%	76	-76
42 Trucking and warehousing C(estimate)	175	0.6488%	1,308,879	1.3527%	365	-190
44 Water transportation	0	0.0000%	170,127	0.1758%	47	-47
45 Transportation by air	0	0.0000%	511,759	0.5289%	143	-143
46 Pipelines except natural gas	0	0.0000%	17,695	0.0183%	5	-5
47 Transportation services	0	0.0000%	302,980	0.3131%	84	-84
48 Communication	212	0.7860%	1,265,531	1.3079%	353	-141
49 Electric, gas, and sanitary E(estimate)	375	1.3904%	837,949	0.8660%	234	141
Administrative and Auxiliary	0	0.0000%	196,882	0.2035%	55	-55
SUBTOTALS	762	2.8253%	4,884,297	5.0477%	1,361	-599
WHOLESALE TRADE	**848**	**3.1441%**	**5,724,864**	**5.9163%**	**1596**	**-748**
50 Wholesale trade - durable goods	494	1.8316%	3,217,781	3.3254%	897	-403
51 Wholesale Trade - nondurabC(estimate)	175	0.6488%	2,216,759	2.2909%	618	-443
Administrative and Auxiliary	0	0.0000%	290,324	0.3000%	81	-81
SUBTOTALS	669	2.4804%	5,724,864	5.9163%	1,596	-927
RETAIL TRADE	**5,677**	**21.0485%**	**17,549,841**	**18.1368%**	**4892**	**785**
52 Building materials and garden supplies	172	0.6377%	626,477	0.6474%	175	-3
53 General merchandise stores	511	1.8946%	1,954,204	2.0196%	545	-34
54 Food stores	1,584	5.8730%	2,722,802	2.8139%	759	825
55 Automotive dealers and service stations	667	2.4730%	1,930,359	1.9949%	538	129
56 Apparel and accessory stores	367	1.3607%	1,081,362	1.1175%	301	66
57 Furniture and home furnishings stores	151	0.5599%	668,194	0.6905%	186	-35
58 Eating and drinking places	1,709	6.3364%	5,577,135	5.7637%	1555	154
59 Miscellaneous retail	516	1.9132%	2,204,710	2.2785%	615	-99
Administrative and Auxiliary	0	0.0000%	784,598	0.8108%	219	-219
SUBTOTALS	5,677	21.0485%	17,549,841	18.1368%	4,892	785
FINANCE INSURANCE AND REAL ESTAT	**1,205**	**4.4678%**	**6,370,787**	**6.5839%**	**1776**	**-571**
60 Banking	521	1.9317%	1,639,912	1.6948%	457	64
61 Credit agencies and other banks	175	0.6488%	813,318	0.8405%	227	-52
62 Security, commodity brokers and servic	0	0.0000%	377,278	0.3899%	105	-105
63 Insurance carriers	64	0.2373%	1,313,076	1.3570%	366	-302
64 Insurance agents, brokers and service	77	0.2855%	597,436	0.6174%	167	-90
65 Real estate	340	1.2606%	1,220,293	1.2611%	340	-0
66 Combined real estate, insurance, etc.	0	0.0000%	24,690	0.0255%	7	-7
67 Holding and other investment offices	0	0.0000%	209,952	0.2170%	59	-59
Administrative and Auxiliary	0	0.0000%	174,832	0.1807%	49	-49
SUBTOTALS	1,177	4.3639%	6,370,787	6.5839%	1,776	-599

SERVICES	**5,038**	**18.6793%**	**22,878,357**	**23.6436%**	**6377**	**-1,339**
70 Hotels and other lodging places	61	0.2262%	1,331,620	1.3762%	371	-310
72 Personal services	326	1.2087%	1,117,133	1.1545%	311	15
73 Business services	377	1.3978%	4,612,797	4.7671%	1286	-909
75 Auto repair, services, and garages	204	0.7564%	726,858	0.7512%	203	1
76 Miscellaneous repair services	134	0.4968%	338,723	0.3501%	94	40
78 Motion pictures	0	0.0000%	252,221	0.2607%	70	-70
79 Amusement and recreation C(estimate)	175	0.6488%	796,839	0.8235%	222	-47
80 Health services	1,413	5.2390%	6,614,276	6.8355%	1844	-431
81 Legal services	123	0.4560%	745,566	0.7705%	208	-85
82 Educational services F(estimate)	750	2.7808%	1,561,782	1.6140%	435	315
83 Social services	564	2.0911%	1,367,622	1.4134%	381	183
84 Museums, botanical, zoological gardens	0	0.0000%	37,060	0.0383%	10	-10
86 Membership organizations	679	2.5175%	1,696,145	1.7529%	473	206
87 Engineering and Management Services	0	0.0000%	0	0.0000%	0	0
89 Miscellaneous services	431	1.5980%	1,409,941	1.4571%	393	38
Administrative and Auxiliary	0	0.0000%	269,774	0.2788%	75	-75
SUBTOTALS	5,237	19.4172%	22,878,357	23.6436%	6,377	-1,140
Nonclassifiable Establishments	**398**	**1.4757%**	**912,741**	**0.9433%**	**254**	**144**
STATE EMPLOYMENT	236	0.8750%	3,437,000	3.5520%	958	-722
FEDERAL EMPLOYMENT	226	0.8379%	3,047,000	3.1489%	849	-623
TOTALS	65,073	241.2703%	248,313,654	256.6192%	69,213	3,358

Mul	WILLIAMSON
TOTAL EMPLOYMENT	26,971
divided EXPORT EMPLOYMENT	3,358
	8.0309

ECONOMIC BASE ANALYSIS FOR
AUSTIN'S METROPOLITAN STATISTICAL AREA (1986)
[1] County Employees
[2] Percent of Total
[3] National Employees
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] AustinMSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1986	369,870		96,763,465			
AGRICULTURAL SERVICES		**1,812**	**0.4899%**	**412,010**	**0.4258%**	**1,575**	**237**
7 Agricultural Services		2,194	0.5932%	384,284	0.3971%	1,469	725
8 Forestry		0	0.0000%	17,174	0.0177%	66	-66
9 Fishing, hunting and trapping		0	0.0000%	8,340	0.0086%	32	-32
Administrative and Auxiliary		0	0.0000%	2,203	0.0023%	8	-8
SUBTOTALS		2,194	0.5932%	409,798	0.4235%	1,566	628
MINING		**982**	**0.2655%**	**847,143**	**0.8755%**	**3,238**	**-2,256**
10 Metal Mining		60	0.0162%	37,830	0.0391%	145	-85
11 Anthracite mining		0	0.0000%	2,363	0.0024%	9	-9
12 Bituminous coal and lignite mining		0	0.0000%	173,483	0.1793%	663	-663
13 Oil and gas extraction		305	0.0825%	407,314	0.4209%	1,557	-1,252
14 Nonmetallic minerals except fuels		410	0.1108%	101,075	0.1045%	386	24
Administrative and Auxiliary		0	0.0000%	125,065	0.1292%	478	-478
SUBTOTALS		775	0.2095%	847,130	0.8755%	3,238	-2,463
CONTRACT CONSTRUCTION		**23,813**	**6.4382%**	**4,658,669**	**4.8145%**	**17,807**	**6,006**
15 General contractors and operative l		6,119	1.6544%	1,224,577	1.2655%	4,681	1,438
16 Heavy construction except highway		4,669	1.2623%	693,078	0.7163%	2,649	2,020
17 Special trade contractors		13,448	3.6359%	2,721,543	2.8126%	10,403	3,045
Administrative and Auxiliary		175	0.0473%	19,471	0.0201%	74	101
SUBTOTALS		24,411	6.5999%	4,658,669	4.8145%	17,807	6,604
MANUFACTURING		**42,431**	**11.4719%**	**19,141,756**	**19.7820%**	**73,168**	**-30,737**
20 Food and kindred products		2,005	0.5421%	1,405,771	1.4528%	5,373	-3,368
21 Tabacco manufacturers		0	0.0000%	48,080	0.0497%	184	-184
22 Textille mill products		0	0.0000%	667,969	0.6903%	2,553	-2,553
23 Apparel and other textile products		235	0.0635%	1,082,437	1.1186%	4,138	-3,903
24 Lumber and wood products		1,071	0.2896%	657,853	0.6799%	2,515	-1,444
25 Furniture and fixtures		1,267	0.3426%	492,802	0.5093%	1,884	-617
26 Paper and allied products		64	0.0173%	620,234	0.6410%	2,371	-2,307
27 printing and publishing		4,675	1.2640%	1,451,383	1.4999%	5,548	-873
28 chemicals and allied products		1,978	0.5348%	832,862	0.8607%	3,184	-1,206
29 Petroleum and coal products		0	0.0000%	126,243	0.1305%	483	-483
30 Rubber and misc. plastic products		497	0.1344%	769,544	0.7953%	2,942	-2,445
31 Leather and leather products		0	0.0000%	139,246	0.1439%	532	-532
32 Stone, clay, and glass products		1,726	0.4667%	545,952	0.5642%	2,087	-361
33 Primary Metal Industries		400	0.1081%	736,357	0.7610%	2,815	-2,415

34 Fabricated metal products	2,434	0.6581%	1,476,672	1.5261%	5,644	-3,210
35 Machinery except electrical	18,018	4.8714%	1,980,031	2.0463%	7,568	10,450
36 Electric and Electronic Equipment	10,508	2.8410%	2,016,533	2.0840%	7,708	2,800
37 Transportation equipment	175	0.0473%	1,805,051	1.8654%	6,900	-6,725
38 Instruments and related products	1,472	0.3980%	615,705	0.6363%	2,353	-881
39 Miscellaneous manufacturing indus	1,195	0.3231%	375,153	0.3877%	1,434	-239
Administrative and Auxiliary	528	0.1428%	1,295,872	1.3392%	4,953	-4,425
SUBTOTALS	48,248	13.0446%	19,141,750	19.7820%	73,168	-24,920
TRANSPORTATION AND OTHER PU	**11,501**	**3.1095%**	**4,884,297**	**5.0477%**	**18,670**	**-7,169**
41 Local and interurban passenger trar	881	0.2382%	272,495	0.2816%	1,042	-161
42 Trucking and warehousing	2,120	0.5732%	1,308,879	1.3527%	5,003	-2,883
44 Water transportation	0	0.0000%	170,127	0.1758%	650	-650
45 Transportation by air	909	0.2458%	511,759	0.5289%	1,956	-1,047
46 Pipelines except natural gas	0	0.0000%	17,695	0.0183%	68	-68
47 Transportation services	609	0.1647%	302,980	0.3131%	1,158	-549
48 Communication	5,491	1.4846%	1,265,531	1.3079%	4,837	654
49 Electric, gas, and sanitary service:	1,209	0.3269%	837,949	0.8660%	3,203	-1,994
Administrative and Auxiliary	175	0.0473%	196,882	0.2035%	753	-578
SUBTOTALS	11,394	3.0805%	4,884,297	5.0477%	18,670	-7,276
WHOLESALE TRADE	**13,412**	**3.6261%**	**5,724,864**	**5.9163%**	**21,883**	**-8,471**
50 Wholesale trade - durable goods	8,546	2.3105%	3,217,781	3.3254%	12,300	-3,754
51 Wholesale Trade - nondurable goods	4,195	1.1342%	2,216,759	2.2909%	8,473	-4,278
Administrative and Auxiliary	750	0.2028%	290,324	0.3000%	1,110	-360
SUBTOTALS	13,491	3.6475%	5,724,864	5.9163%	21,883	-8,392
RETAIL TRADE	**68,072**	**18.4043%**	**17,549,841**	**18.1368%**	**67,083**	**989**
52 Building materials and garden suppl	2,362	0.6386%	626,477	0.6474%	2,395	-33
53 General merchandise stores	5,997	1.6214%	1,954,204	2.0196%	7,470	-1,473
54 Food stores	12,343	3.3371%	2,722,802	2.8139%	10,408	1,935
55 Automotive dealers and service sta	6,185	1.6722%	1,930,359	1.9949%	7,379	-1,194
56 Apparel and accessory stores	4,151	1.1223%	1,081,362	1.1175%	4,133	18
57 Furniture and home furnishings stor	3,000	0.8111%	668,194	0.6905%	2,554	446
58 Eating and drinking places	25,014	6.7629%	5,577,135	5.7637%	21,318	3,696
59 Miscellaneous retail	7,910	2.1386%	2,204,710	2.2785%	8,427	-517
Administrative and Auxiliary	1,110	0.3001%	784,598	0.8108%	2,999	-1,889
SUBTOTALS	68,072	18.4043%	17,549,841	18.1368%	67,083	989
FINANCE INSURANCE AND REAL E	**29,604**	**8.0039%**	**6,370,787**	**6.5839%**	**24,352**	**5,252**
60 Banking	4,862	1.3145%	1,639,912	1.6948%	6,268	-1,406
61 Credit agencies and other banks	4,371	1.1818%	813,318	0.8405%	3,109	1,262
62 Security, commodity brokers and s	1,076	0.2909%	377,278	0.3899%	1,442	-366
63 Insurance carriers	7,434	2.0099%	1,313,076	1.3570%	5,019	2,415
64 Insurance agents, brokers and serv	2,358	0.6916%	597,436	0.6174%	2,284	274
65 Real estate	7,727	2.0891%	1,220,293	1.2611%	4,664	3,063
66 Combined real estate, insurance, et	60	0.0162%	24,690	0.0255%	94	-34
67 Holding and other investment office	1,552	0.4196%	209,952	0.2170%	803	749
Administrative and Auxiliary	0	0.0000%	174,832	0.1807%	668	-668
SUBTOTALS	29,640	8.0136%	6,370,787	6.5839%	24,352	5,288

SERVICES	**79,420**	**21.4724%**	**22,878,357**	**23.6436%**	**87,451**	**-8,031**
70 Hotels and other lodging places	3,860	1.0436%	1,331,620	1.3762%	5,090	-1,230
72 Personal services	5,090	1.3762%	1,117,133	1.1545%	4,270	820
73 Business services	17,468	4.7227%	4,612,797	4.7671%	17,632	-164
75 Auto repair, services, and garages	2,643	0.7146%	726,858	0.7512%	2,778	-135
76 Miscellaneous repair services	1,278	0.3455%	338,723	0.3501%	1,295	-17
78 Motion pictures	717	0.1939%	252,221	0.2607%	964	-247
79 Amusement and recreation service:	2,107	0.5697%	796,839	0.8235%	3,046	-939
80 Health services	16,762	4.5319%	6,614,276	6.8355%	25,282	-8,520
81 Legal services	4,153	1.1228%	745,566	0.7705%	2,850	1,303
82 Educational services	2,731	0.7384%	1,561,782	1.6140%	5,970	-3,239
83 Social services	5,002	1.3524%	1,367,622	1.4134%	5,228	-226
84 Museums, botanical, zoological gar	50	0.0135%	37,060	0.0383%	142	-92
86 Membership organizations	7,502	2.0283%	1,696,145	1.7529%	6,483	1,019
87 Engineering and Management Servic	0	0.0000%	0	0.0000%	0	0
89 Miscellaneous services	9,719	2.6277%	1,409,941	1.4571%	5,389	4,330
Administrative and Auxiliary	375	0.1014%	269,774	0.2788%	1,031	-656
SUBTOTALS	79,457	21.4824%	22,878,357	23.6436%	87,451	-7,994
Nonclassifiable Establishments	**4,397**	**1.1888%**	**912,741**	**0.9433%**	**3,489**	**908**
STATE EMPLOYMENT	50,129	13.5531%	3,437,000	3.5520%	13,138	36,991
FEDERAL EMPLOYMENT	11,390	3.0795%	3,047,000	3.1489%	11,647	-257
TOTALS	830,808	224.6216%	248,313,654	256.6192%	949,158	50,384

Mult	AUSTIN MSA
TOTAL EMPLOYMENT	369,870
divided EXPORT EMPLOYMEN	50,384
	7.3411

ECONOMIC BASE ANALYSIS FOR TRAVIS
COUNTY (1988)
[1] County Employees
[2] Percent of Total
[3] National Employee
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category	[1] Travis	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1988	308,081		103,094,632			
AGRICULTURAL SERVICES	**988**	**0.3207%**	**461,768**	**0.4479%**	**1,380**	**-392**
7 Agricultural Services F(estimate)	750	0.2434%	432,453	0.4195%	1,292	-542
8 Forestry	0	0.0000%	17,875	0.0173%	53	-53
9 Fishing, hunting and trapping	0	0.0000%	9,067	0.0088%	27	-27
Administrative and Auxiliary	0	0.0000%	2,373	0.0023%	7	-7
SUBTOTALS	750	0.2434%	459,395	0.4456%	1,373	-623
MINING	**216**	**0.0701%**	**734,953**	**0.7129%**	**2,196**	**-1,980**
10 Metal Mining	0	0.0000%	45,033	0.0437%	135	-135
11 Anthracite mining	0	0.0000%	0	0.0000%	0	0
12 Bituminous coal and lignite mining	0	0.0000%	152,001	0.1474%	454	-454
13 Oil and gas extraction	157	0.0510%	301,579	0.2925%	901	-744
14 Nonmetallic minerals except fuels	0	0.0000%	103,333	0.1002%	309	-309
Administrative and Auxiliary	0	0.0000%	133,007	0.1290%	397	-397
SUBTOTALS	157	0.0510%	734,953	0.7129%	2,196	-2,039
CONTRACT CONSTRUCTION	**10,580**	**3.4342%**	**4,938,977**	**4.7907%**	**14,759**	**-4,179**
15 General contractors and B(estimate)	1,750	0.5680%	1,279,815	1.2414%	3,825	-2,075
16 Heavy construction except highway	2,538	0.8238%	704,748	0.6836%	2,106	432
17 Special trade contractors	6,090	1.9768%	2,932,592	2.8446%	8,764	-2,674
Administrative and Auxiliary	0	0.0000%	21,822	0.0212%	65	-65
SUBTOTALS	10,378	3.3686%	4,938,977	4.7907%	14,759	-4,381
MANUFACTURING	**34,624**	**11.2386%**	**19,261,691**	**18.6835%**	**57,560**	**-22,936**
20 Food and kindred products	1,458	0.4733%	1,438,668	1.3955%	4,299	-2,841
21 Tabacco manufacturers	0	0.0000%	46,619	0.0452%	139	-139
22 Textille mill products C(estimate)	175	0.0568%	682,674	0.6622%	2,040	-1,865
23 Apparel and other textile products	107	0.0347%	1,070,973	1.0388%	3,200	-3,093
24 Lumber and wood products	287	0.0932%	712,498	0.6911%	2,129	-1,842
25 Furniture and fixtures	483	0.1568%	519,911	0.5043%	1,554	-1,071
26 Paper and allied productsB(estimate)	60	0.0195%	625,238	0.6065%	1,868	-1,808
27 printing and publishing	4,021	1.3052%	1,524,887	1.4791%	4,557	-536
28 chemicals and allied prodG(estimate)	1,750	0.5680%	831,621	0.8067%	2,485	-735
29 Petroleum and coal products	0	0.0000%	118,263	0.1147%	353	-353
30 Rubber and misc. plastic products	336	0.1091%	869,856	0.8437%	2,599	-2,263
31 Leather and leather products	0	0.0000%	129,561	0.1257%	387	-387
32 Stone, clay, and glass products	993	0.3223%	518,820	0.5032%	1,550	-557
33 Primary Metal Industries	299	0.0971%	725,201	0.7034%	2,167	-1,868

34 Fabricated metal products	642	0.2084%	1,491,640	1.4469%	4,458	-3,816
35 Machinery except electrical	4,050	1.3146%	1,924,409	1.8666%	5,751	-1,701
36 Electric and Electronic Equipment	13,654	4.4320%	1,595,832	1.5479%	4,769	8,885
37 Transportation equipmenG(estimate)	1,750	0.5680%	1,847,865	1.7924%	5,522	-3,772
38 Instruments and related products	2,111	0.6852%	1,002,522	0.9724%	2,996	-885
39 Miscellaneous manufactF(estimate)	750	0.2434%	386,761	0.3752%	1,156	-406
Administrative and Auxiliary	1,093	0.3548%	1,197,872	1.1619%	3,580	-2,487
SUBTOTALS	34,019	11.0422%	19,261,691	18.6835%	57,560	-23,541
TRANSPORTATION AND OTHER PUBLI	**9,843**	**3.1949%**	**5,270,318**	**5.1121%**	**15,749**	**-5,906**
41 Local and interurban passenger transit	1,087	0.3528%	303,501	0.2944%	907	180
42 Trucking and warehousing	1,524	0.4947%	1,482,680	1.4382%	4,431	-2,907
44 Water transportation	0	0.0000%	155,579	0.1509%	465	-465
45 Transportation by air	976	0.3168%	622,522	0.6038%	1,860	-884
46 Pipelines except natural gas	0	0.0000%	16,857	0.0164%	50	-50
47 Transportation services	568	0.1844%	321,424	0.3118%	961	-393
48 Communication	4,480	1.4542%	1,210,665	1.1743%	3,618	862
49 Electric, gas, and sanitary services	845	0.2743%	853,591	0.8280%	2,551	-1,706
Administrative and Auxiliary	334	0.1084%	303,499	0.2944%	907	-573
SUBTOTALS	9,814	3.1855%	5,270,318	5.1121%	15,749	-5,935
WHOLESALE TRADE	**11,788**	**3.8263%**	**5,981,378**	**5.8018%**	**17,874**	**-6,086**
50 Wholesale trade - durable goods	8,129	2.6386%	3,390,497	3.2887%	10,132	-2,003
51 Wholesale Trade - nondurH(estimate)	3,750	1.2172%	2,283,536	2.2150%	6,824	-3,074
Administrative and Auxiliary	0	0.0000%	307,345	0.2981%	918	-918
SUBTOTALS	11,879	3.8558%	5,981,378	5.8018%	17,874	-5,995
RETAIL TRADE	**54,212**	**17.5967%**	**18,801,521**	**18.2371%**	**56,185**	**-1,973**
52 Building materials and garden supplies	1,461	0.4742%	679,445	0.6590%	2,030	-569
53 General merchandise stores	5,326	1.7288%	2,066,306	2.0043%	6,175	-849
54 Food stores	9,592	3.1135%	2,886,034	2.7994%	8,624	968
55 Automotive dealers and service statior	5,140	1.6684%	2,075,912	2.0136%	6,204	-1,064
56 Apparel and accessory stores	3,538	1.1484%	1,156,594	1.1219%	3,456	82
57 Furniture and home furnishings stores	2,101	0.6820%	711,571	0.6902%	2,126	-25
58 Eating and drinking places	19,872	6.4503%	6,097,450	5.9144%	18,221	1,651
59 Miscellaneous retail	6,094	1.9781%	2,317,288	2.2477%	6,925	-831
Administrative and Auxiliary	1,088	0.3532%	810,921	0.7866%	2,423	-1,335
SUBTOTALS	54,212	17.5967%	18,801,521	18.2371%	56,185	-1,973
FINANCE INSURANCE AND REAL ESTA	**25,237**	**8.1917%**	**6,659,618**	**6.4597%**	**19,901**	**5,336**
60 Depository institutions	5,143	1.6694%	1,959,784	1.9010%	5,856	-713
61 NonDepository institutions	3,018	0.9796%	542,186	0.5259%	1,620	1,398
62 Security, commodity brokers and serv	753	0.2444%	426,626	0.4138%	1,275	-522
63 Insurance carriers	7,007	2.2744%	1,326,450	1.2866%	3,964	3,043
64 Insurance agents, brokers and service	2,584	0.8387%	685,969	0.6654%	2,050	534
65 Real estate	5,521	1.7921%	1,286,615	1.2480%	3,845	1,676
66 Combined real estate, insurance, etc.	0	0.0000%	0	0.0000%	0	0
67 Holding and other investG(estimate)	1,750	0.5680%	239,589	0.2324%	716	1,034
Administrative and AuxiliaryC(estimate)	175	0.0568%	192,399	0.1866%	575	-400
SUBTOTALS	25,951	8.4234%	6,659,618	6.4597%	19,901	6,050

SERVICES	**72,222**	**23.4425%**	**25,142,715**	**24.3880%**	**75,135**	**-2,913**
70 Hotels and other lodging places	3,344	1.0854%	1,384,565	1.3430%	4,138	-794
72 Personal services	3,435	1.1150%	1,101,272	1.0682%	3,291	144
73 Business services	13,453	4.3667%	4,385,365	4.2537%	13,105	348
75 Auto repair, services, and garages	2,623	0.8514%	812,538	0.7881%	2,428	195
76 Miscellaneous repair services	1,029	0.3340%	356,096	0.3454%	1,064	-35
78 Motion pictures	757	0.2457%	369,632	0.3585%	1,105	-348
79 Amusement and recreation services	2,050	0.6654%	909,289	0.8820%	2,717	-667
80 Health services	15,657	5.0821%	7,221,951	7.0052%	21,582	-5,925
81 Legal services	4,671	1.5162%	848,507	0.8230%	2,536	2,135
82 Educational services	2,201	0.7144%	1,630,888	1.5819%	4,874	-2,673
83 Social services	4,038	1.3107%	1,532,276	1.4863%	4,579	-541
84 Museums, botanical, zoological gardens	73	0.0237%	56,503	0.0548%	169	-96
86 Membership organizations	6,404	2.0787%	1,778,170	1.7248%	5,314	1,090
87 Engineering and Management Services	11,562	3.7529%	2,301,991	2.2329%	6,879	4,683
89 Miscellaneous services	407	0.1321%	122,267	0.1186%	365	42
Admintstrative and Auxiliary	518	0.1681%	331,405	0.3215%	990	-472
SUBTOTALS	72,222	23.4425%	25,142,715	24.3880%	75,135	-2,913
Nonclassifiable Establishments	**2,260**	**0.7336%**	**628,693**	**0.6098%**	**1,879**	381
STATE EMPLOYMENT	48,197	15.6443%	3,500,000	3.3949%	10,459	37,738
FEDERAL EMPLOYMENT	11,359	3.7519%	3,113,000	3.0196%	9,303	2,256
TOTALS	220,245	71.4892%	87,461,712.3	84.8363%	261,365	45,711

Multiplier	TRAVIS	
TOTAL EMPLOYMENT	308,081	
divided EXPORT EMPLOYMENT	45,711	
	6.7397	

ECONOMIC BASE ANALYSIS HAYS
COUNTY (1988)
[1] County Employees
[2] Percent of Total
[3] National Employee
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category	[1] Hays	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS 1988	16,806		103,094,632			
AGRICULTURAL SERVICES	**63**	**0.3749%**	**461,768**	**0.4479%**	**75**	**-12**
7 Agricultural Services B(estimate)	60	0.3570%	432,453	0.4195%	70	-10
8 Forestry	0	0.0000%	17,875	0.0173%	3	-3
9 Fishing, hunting and trapping	0	0.0000%	9,067	0.0088%	1	-1
Administrative and Auxiliary	0	0.0000%	2,373	0.0023%	0	-0
SUBTOTALS	60	0.3570%	459,395	0.4456%	75	-15
MINING B(estimate)	**60**	**0.3570%**	**734,953**	**0.7129%**	**120**	**-60**
10 Metal Mining	0	0.0000%	45,033	0.0437%	7	-7
11 Anthracite mining	0	0.0000%	0	0.0000%	0	0
12 Bituminous coal and lignite mining	0	0.0000%	152,001	0.1474%	25	-25
13 Oil and gas extraction	0	0.0000%	301,579	0.2925%	49	-49
14 Nonmetallic minerals exc B(estimate)	60	0.3570%	103,333	0.1002%	17	43
Administrative and Auxiliary	0	0.0000%	133,007	0.1290%	22	-22
SUBTOTALS	60	0.3570%	734,953	0.7129%	120	-60
CONTRACT CONSTRUCTION	**717**	**4.2663%**	**4,938,977**	**4.7907%**	**805**	**-88**
15 General contractors and operative buil	112	0.6664%	1,279,815	1.2414%	209	-97
16 Heavy construction except highway	260	1.5471%	704,748	0.6836%	115	145
17 Special trade contractors	345	2.0528%	2,932,592	2.8446%	478	-133
Administrative and Auxiliary	0	0.0000%	21,822	0.0212%	4	-4
SUBTOTALS	717	4.2663%	4,938,977	4.7907%	805	-88
MANUFACTURING	**1,352**	**8.0447%**	**1.9262E+7**	**18.6835%**	**3140**	**-1,788**
20 Food and kindred products	0	0.0000%	1,438,668	1.3955%	235	-235
21 Tobacco manufacturers	0	0.0000%	46,619	0.0452%	8	-8
22 Textille mill products	0	0.0000%	682,674	0.6622%	111	-111
23 Apparel and other textile products	0	0.0000%	1,070,973	1.0388%	175	-175
24 Lumber and wood produc C(estimate)	175	1.0413%	712,498	0.6911%	116	59
25 Furniture and fixtures	0	0.0000%	519,911	0.5043%	85	-85
26 Paper and allied products	0	0.0000%	625,238	0.6065%	102	-102
27 printing and publishing	179	1.0651%	1,524,887	1.4791%	249	-70
28 chemicals and allied products	0	0.0000%	831,621	0.8067%	136	-136
29 Petroleum and coal products	0	0.0000%	118,263	0.1147%	19	-19
30 Rubber and misc. plastic products	0	0.0000%	869,856	0.8437%	142	-142
31 Leather and leather products	0	0.0000%	129,561	0.1257%	21	-21
32 Stone, clay, and glass products	60	0.3570%	518,820	0.5032%	85	-25
33 Primary Metal Industries	0	0.0000%	725,201	0.7034%	118	-118

34 Fabricated metal products	345	2.0528%	1,491,640	1.4469%	243	102
35 Machinery except electrical	0	0.0000%	1,924,409	1.8666%	314	-314
36 Electric and Electronic E:E(estimate)	375	2.2313%	1,595,832	1.5479%	260	115
37 Transportation equipment	0	0.0000%	1,847,865	1.7924%	301	-301
38 Instruments and related B(estimate)	60	0.3570%	1,002,522	0.9724%	163	-103
39 Miscellaneous manufacturing industrie	0	0.0000%	386,761	0.3752%	63	-63
Administrative and Auxiliary	0	0.0000%	1,197,872	1.1619%	195	-195
SUBTOTALS	1,194	7.1046%	19,261,691	18.6835%	3,140	-1,946
TRANSPORTATION AND OTHER PUBLI	**427**	**2.5408%**	**5,270,318**	**5.1121%**	**859**	**-432**
41 Local and interurban passenger transit	0	0.0000%	303,501	0.2944%	49	-49
42 Trucking and warehousing	119	0.7081%	1,482,680	1.4382%	242	-123
44 Water transportation	0	0.0000%	155,579	0.1509%	25	-25
45 Transportation by air	0	0.0000%	622,522	0.6038%	101	-101
46 Pipelines except natural gas	0	0.0000%	16,857	0.0164%	3	-3
47 Transportation services	0	0.0000%	321,424	0.3118%	52	-52
48 Communication C(estimate)	175	1.0413%	1,210,665	1.1743%	197	-22
49 Electric, gas, and sanitary services	0	0.0000%	853,591	0.8280%	139	-139
Administrative and Auxiliary	0	0.0000%	303,499	0.2944%	49	-49
SUBTOTALS	294	1.7494%	5,270,318	5.1121%	859	-565
WHOLESALE TRADE	**332**	**1.9755%**	**5,981,378**	**5.8018%**	**975**	**-643**
50 Wholesale trade - durable goods	238	1.4162%	3,390,497	3.2887%	553	-315
51 Wholesale Trade - nondurable goods	94	0.5593%	2,283,536	2.2150%	372	-278
Administrative and Auxiliary	0	0.0000%	307,345	0.2981%	50	-50
SUBTOTALS	332	1.9755%	5,981,378	5.8018%	975	-643
RETAIL TRADE	**3,977**	**23.6642%**	**1.8802E+7**	**18.2371%**	**3065**	**912**
52 Building materials and garden supplies	134	0.7973%	679,445	0.6590%	111	23
53 General merchandise sto C(estimate)	175	1.0413%	2,066,306	2.0043%	337	-162
54 Food stores	553	3.2905%	2,886,034	2.7994%	470	83
55 Automotive dealers and service statior	445	2.6479%	2,075,912	2.0136%	338	107
56 Apparel and accessory stores	174	1.0353%	1,156,594	1.1219%	189	-15
57 Furniture and home furnishings stores	96	0.5712%	711,571	0.6902%	116	-20
58 Eating and drinking places	1,719	10.2285%	6,097,450	5.9144%	994	725
59 Miscellaneous retail	337	2.0052%	2,317,288	2.2477%	378	-41
Administrative and AuxiliaryE(estimate)	375	2.2313%	810,921	0.7866%	132	243
SUBTOTALS	4,008	23.8486%	18,801,521	18.2371%	3,065	943
FINANCE INSURANCE AND REAL EST/	**851**	**5.0637%**	**6,659,618**	**6.4597%**	**1086**	**-235**
60 Banking	230	1.3686%	1,959,784	1.9010%	319	-89
61 Credit agencies and other banks	79	0.4701%	542,186	0.5259%	88	-9
62 Security, commodity brc E(estimate)	375	2.2313%	426,626	0.4138%	70	305
63 Insurance carriers	55	0.3273%	1,326,450	1.2866%	216	-161
64 Insurance agents, brokers and service	65	0.3868%	685,969	0.6654%	112	-47
65 Real estate	98	0.5831%	1,286,615	1.2480%	210	-112
66 Combined real estate, insurance, etc.	0	0.0000%	0	0.0000%	0	0
67 Holding and other investment offices	0	0.0000%	239,589	0.2324%	39	-39
Administrative and Auxiliary	0	0.0000%	192,399	0.1866%	31	-31
SUBTOTALS	902	5.3671%	6,659,618	6.4597%	1,086	-184

SERVICES	**3,150**	**18.7433%**	**2.5143E+7**	**24.3880%**	**4099**	**-949**
70 Hotels and other lodging places	160	0.9520%	1,384,565	1.3430%	226	-66
72 Personal services	199	1.1841%	1,101,272	1.0682%	180	19
73 Business services	281	1.6720%	4,385,365	4.2537%	715	-434
75 Auto repair, services, and garages	66	0.3927%	812,538	0.7881%	132	-66
76 Miscellaneous repair services	51	0.3035%	356,096	0.3454%	58	-7
78 Motion pictures	51	0.3035%	369,632	0.3585%	60	-9
79 Amusement and recreation services	128	0.7616%	909,289	0.8820%	148	-20
80 Health services	1,431	8.5148%	7,221,951	7.0052%	1177	254
81 Legal services	51	0.3035%	848,507	0.8230%	138	-87
82 Educational services C(estimate)	175	1.0413%	1,630,888	1.5819%	266	-91
83 Social services	261	1.5530%	1,532,276	1.4863%	250	11
84 Museums, botanical, zoological gardens	0	0.0000%	56,503	0.0548%	9	-9
86 Membership organizations	195	1.1603%	1,778,170	1.7248%	290	-95
87 Engineering and Management Services	125	0.7438%	2,301,991	2.2329%	375	-250
89 Miscellaneous services	0	0.0000%	122,267	0.1186%	20	-20
Administrative and Auxiliary	0	0.0000%	331,405	0.3215%	54	-54
SUBTOTALS	3,174	18.8861%	25,142,715	24.3880%	4,099	-925
Nonclassifiable Establis C(estimate)	**175**	**1.0413%**	**628,693**	**0.6098%**	**102**	**73**
STATE EMPLOYMENT	3,369	20.0464%	3,500,000	3.3949%	571	2,798
FEDERAL EMPLOYMENT	115	0.6843%	3,113,000	3.0196%	507	-392
TOTALS	10,862	64.6317%	87,461,712	84.8363%	14,258	3,783

Multi	HAYS	
TOTAL EMPLOYMENT	16,806	
divided EXPORT EMPLOYMENT	3,783	
	4.4425	

ECONOMIC BASE ANALYSIS WILLIAMSON COUNTY (1988)

[1] County Employees
[2] Percent of Total
[3] National Employee
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Williamson	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1988	27,356		103,094,632			
AGRICULTURAL SERVICES		**167**	**0.6105%**	**461,768**	**0.4479%**	**123**	**44**
7 Agricultural Services		167	0.6105%	432,453	0.4195%	115	52
8 Forestry		0	0.0000%	17,875	0.0173%	5	-5
9 Fishing, hunting and trapping		0	0.0000%	9,067	0.0088%	2	-2
Administrative and Auxiliary		0	0.0000%	2,373	0.0023%	1	-1
SUBTOTALS		167	0.6105%	459,395	0.4456%	122	45
MINING		**274**	**1.0016%**	**734,953**	**0.7129%**	**195**	**79**
10 Metal Mining		0	0.0000%	45,033	0.0437%	12	-12
11 Anthracite mining		0	0.0000%	0	0.0000%	0	0
12 Bituminous coal and lignite mining		0	0.0000%	152,001	0.1474%	40	-40
13 Oil and gas extraction		0	0.0000%	301,579	0.2925%	80	-80
14 Nonmetallic minerals exc	C(estimate)	175	0.6397%	103,333	0.1002%	27	148
Administrative and Auxiliary		0	0.0000%	133,007	0.1290%	35	-35
SUBTOTALS		175	0.6397%	734,953	0.7129%	195	-20
CONTRACT CONSTRUCTION		**2,180**	**7.9690%**	**4,938,977**	**4.7907%**	**1311**	**869**
15 General contractors and operative buil		632	2.3103%	1,279,815	1.2414%	340	292
16 Heavy construction except highway		333	1.2173%	704,748	0.6836%	187	146
17 Special trade contractors		1,215	4.4414%	2,932,592	2.8446%	778	437
Administrative and Auxiliary		0	0.0000%	21,822	0.0212%	6	-6
SUBTOTALS		2,180	7.9690%	4,938,977	4.7907%	1,311	869
MANUFACTURING		**4,810**	**17.5830%**	**19,261,691**	**18.6835%**	**5111**	**-301**
20 Food and kindred product	B(estimate)	20	0.0731%	1,438,668	1.3955%	382	-362
21 Tobacco manufacturers		0	0.0000%	46,619	0.0452%	12	-12
22 Textile mill products		0	0.0000%	682,674	0.6622%	181	-181
23 Apparel and other textile	E(estimate)	375	1.3708%	1,070,973	1.0388%	284	91
24 Lumber and wood produc	G(estimate)	1,750	6.3971%	712,498	0.6911%	189	1,561
25 Furniture and fixtures	B(estimate)	60	0.2193%	519,911	0.5043%	138	-78
26 Paper and allied products		0	0.0000%	625,238	0.6065%	166	-166
27 printing and publishing		342	1.2502%	1,524,887	1.4791%	405	-63
28 chemicals and allied proc	C(estimate)	175	0.6397%	831,621	0.8067%	221	-46
29 Petroleum and coal products		0	0.0000%	118,263	0.1147%	31	-31
30 Rubber and misc. plastic products		339	1.2392%	869,856	0.8437%	231	108
31 Leather and leather products		0	0.0000%	129,561	0.1257%	34	-34
32 Stone, clay, and glass products		269	0.9833%	518,820	0.5032%	138	131
33 Primary Metal Industries		0	0.0000%	725,201	0.7034%	192	-192

34 Fabricated metal products	200	0.7311%	1,491,640	1.4469%	396	-196
35 Machinery except electrical	585	2.1385%	1,924,409	1.8666%	511	74
36 Electric and Electronic Equipment	902	3.2973%	1,595,832	1.5479%	423	479
37 Transportation equipmenB(estimate)	60	0.2193%	1,847,865	1.7924%	490	-430
38 Instruments and related E(estimate)	375	1.3708%	1,002,522	0.9724%	266	109
39 Miscellaneous manufacturing industrie	0	0.0000%	386,761	0.3752%	103	-103
Administrative and Auxiliary	0	0.0000%	1,197,872	1.1619%	318	-318
SUBTOTALS	5,452	19.9298%	19,261,691	18.6835%	5,111	341
TRANSPORTATION AND OTHER PUBL	**556**	**2.0325%**	**5,270,318**	**5.1121%**	**1398**	**-842**
41 Local and interurban passenger transit	0	0.0000%	303,501	0.2944%	81	-81
42 Trucking and warehousing	79	0.2888%	1,482,680	1.4382%	393	-314
44 Water transportation	0	0.0000%	155,579	0.1509%	41	-41
45 Transportation by air	0	0.0000%	622,522	0.6038%	165	-165
46 Pipelines except natural gas	0	0.0000%	16,857	0.0164%	4	-4
47 Transportation services	0	0.0000%	321,424	0.3118%	85	-85
48 Communication	235	0.8590%	1,210,665	1.1743%	321	-86
49 Electric, gas, and sanitary services	183	0.6690%	853,591	0.8280%	226	-43
Administrative and Auxiliary	0	0.0000%	303,499	0.2944%	81	-81
SUBTOTALS	497	1.8168%	5,270,318	5.1121%	1,398	-901
WHOLESALE TRADE	**791**	**2.8915%**	**5,981,378**	**5.8018%**	**1587**	**-796**
50 Wholesale trade - durable goods	472	1.7254%	3,390,497	3.2887%	900	-428
51 Wholesale Trade - nondurable goods	319	1.1661%	2,283,536	2.2150%	606	-287
Administrative and Auxiliary	0	0.0000%	307,345	0.2981%	82	-82
SUBTOTALS	791	2.8915%	5,981,378	5.8018%	1,587	-796
RETAIL TRADE	**6,032**	**22.0500%**	**18,801,521**	**18.2371%**	**4989**	**1,043**
52 Building materials and garden supplies	158	0.5776%	679,445	0.6590%	180	-22
53 General merchandise stores	462	1.6888%	2,066,306	2.0043%	548	-86
54 Food stores	1,457	5.3261%	2,886,034	2.7994%	766	691
55 Automotive dealers and service station	774	2.8294%	2,075,912	2.0136%	551	223
56 Apparel and accessory stores	367	1.3416%	1,156,594	1.1219%	307	60
57 Furniture and home furnishings stores	99	0.3619%	711,571	0.6902%	189	-90
58 Eating and drinking places	1,976	7.2233%	6,097,450	5.9144%	1618	358
59 Miscellaneous retail	667	2.4382%	2,317,288	2.2477%	615	52
Administrative and Auxiliary	72	0.2632%	810,921	0.7866%	215	-143
SUBTOTALS	6,032	22.0500%	18,801,521	18.2371%	4,989	1,043
FINANCE INSURANCE AND REAL EST.	**1,123**	**4.1051%**	**6,659,618**	**6.4597%**	**1767**	**-644**
60 Banking	509	1.8607%	1,959,784	1.9010%	520	-11
61 Credit agencies and other banks	144	0.5264%	542,186	0.5259%	144	0
62 Security, commodity brokers and serv	0	0.0000%	426,626	0.4138%	113	-113
63 Insurance carriers	74	0.2705%	1,326,450	1.2866%	352	-278
64 Insurance agents, brokers and service	199	0.7274%	685,969	0.6654%	182	17
65 Real estate	165	0.6032%	1,286,615	1.2480%	341	-176
66 Combined real estate, insurance, etc.	0	0.0000%	0	0.0000%	0	0
67 Holding and other investment offices	0	0.0000%	239,589	0.2324%	64	-64
Administrative and Auxiliary	0	0.0000%	192,399	0.1866%	51	-51
SUBTOTALS	1,091	3.9882%	6,659,618	6.4597%	1,767	-676

SERVICES	**5,379**	**19.6630%**	**25,142,715**	**24.3880%**	**6672**	**-1,293**
70 Hotels and other lodging places	63	0.2303%	1,384,565	1.3430%	367	-304
72 Personal services	333	1.2173%	1,101,272	1.0682%	292	41
73 Business services	367	1.3416%	4,385,365	4.2537%	1164	-797
75 Auto repair, services, and garages	187	0.6836%	812,538	0.7881%	216	-29
76 Miscellaneous repair services	77	0.2815%	356,096	0.3454%	94	-17
78 Motion pictures B(estimate)	60	0.2193%	369,632	0.3585%	98	-38
79 Amusement and recreation services	139	0.5081%	909,289	0.8820%	241	-102
80 Health services	1,721	6.2911%	7,221,951	7.0052%	1916	-195
81 Legal services	113	0.4131%	848,507	0.8230%	225	-112
82 Educational services F(estimate)	750	2.7416%	1,630,888	1.5819%	433	317
83 Social services	624	2.2810%	1,532,276	1.4863%	407	217
84 Museums, botanical, zoological gardens	0	0.0000%	56,503	0.0548%	15	-15
86 Membership organizations	719	2.6283%	1,778,170	1.7248%	472	247
87 Engineering and Management Services	358	1.3087%	2,301,991	2.2329%	611	-253
89 Miscellaneous services	0	0.0000%	122,267	0.1186%	32	-32
Administrative and Auxiliary	0	0.0000%	331,405	0.3215%	88	-88
SUBTOTALS	5,511	20.1455%	25,142,715	24.3880%	6,672	-1,161
Nonclassifiable Establis B(estimate)	**277**	**1.0126%**	**628,693**	**0.6098%**	**167**	**110**
STATE EMPLOYMENT	311	1.1369%	3,500,000	3.3949%	929	-618
FEDERAL EMPLOYMENT	249	0.9102%	3,113,000	3.0196%	826	-577
TOTALS	21,793.67	79.6669%	87,461,712	84.8363%	23,208	2,146

Mul	WILLIAMSON
TOTAL EMPLOYMENT	27,356
divided EXPORT EMPLOYMEN	2,146
	12.7467

ECONOMIC BASE ANALYSIS FOR
AUSTIN'S METROPOLITAN STATISTICAL AREA (1988)
[1] County Employees
[2] Percent of Total
[3] National Employee
[4] Percent of Total
[5] County Employment Local Requirements (Col 4 * County Population)
[6] Excess employment equal export or deficit (col 1 minus col 5 : only positive numbers are significant)

Employment Category		[1] Austin MSA	[2] % OF TOTAL	[3] NATIONAL	[4] %OF TOTAL	[5]	[6]
TOTALS	1988	352,243		103,094,632			
AGRICULTURAL SERVICES		**1,218**	**0.3458%**	**461,768**	**0.4479%**	**1,578**	**-360**
7 Agricultural Services		977	0.2774%	432,453	0.4195%	1,478	-501
8 Forestry		0	0.0000%	17,875	0.0173%	61	-61
9 Fishing, hunting and trapping		0	0.0000%	9,067	0.0088%	31	-31
Administrative and Auxiliary		0	0.0000%	2,373	0.0023%	8	-8
SUBTOTALS		977	0.2774%	459,395	0.4456%	1,570	-593
MINING		**550**	**0.1561%**	**734,953**	**0.7129%**	**2,511**	**-1,961**
10 Metal Mining		0	0.0000%	45,033	0.0437%	154	-154
11 Anthracite mining		0	0.0000%	0	0.0000%	0	0
12 Bituminous coal and lignite mining		0	0.0000%	152,001	0.1474%	519	-519
13 Oil and gas extraction		157	0.0446%	301,579	0.2925%	1,030	-873
14 Nonmetallic minerals except fuels		235	0.0667%	103,333	0.1002%	353	-118
Administrative and Auxiliary		0	0.0000%	133,007	0.1290%	454	-454
SUBTOTALS		392	0.1113%	734,953	0.7129%	2,511	-2,119
CONTRACT CONSTRUCTION		**13,477**	**3.8261%**	**4,938,977**	**4.7907%**	**16,875**	**-3,398**
15 General contractors and operative builder		2,494	0.7080%	1,279,815	1.2414%	4,373	-1,879
16 Heavy construction except highway		3,131	0.8889%	704,748	0.6836%	2,408	723
17 Special trade contractors		7,650	2.1718%	2,932,592	2.8446%	10,020	-2,370
Administrative and Auxiliary		0	0.0000%	21,822	0.0212%	75	-75
SUBTOTALS		13,275	3.7687%	4,938,977	4.7907%	16,875	-3,600
MANUFACTURING		**40,786**	**11.5789%**	**1.9262E+7**	**18.6835%**	**65,811**	**-25,025**
20 Food and kindred products		1,478	0.4196%	1,438,668	1.3955%	4,915	-3,437
21 Tabacco manufacturers		0	0.0000%	46,619	0.0452%	159	-159
22 Textille mill products		175	0.0497%	682,674	0.6622%	2,332	-2,157
23 Apparel and other textile products		482	0.1368%	1,070,973	1.0388%	3,659	-3,177
24 Lumber and wood products		2,212	0.6280%	712,498	0.6911%	2,434	-222
25 Furniture and fixtures		543	0.1542%	519,911	0.5043%	1,776	-1,233
26 Paper and allied products		60	0.0170%	625,238	0.6065%	2,136	-2,076
27 printing and publishing		4,542	1.2895%	1,524,887	1.4791%	5,210	-668
28 chemicals and allied products		1,925	0.5465%	831,621	0.8067%	2,841	-916
29 Petroleum and coal products		0	0.0000%	118,263	0.1147%	404	-404
30 Rubber and misc. plastic products		675	0.1916%	869,856	0.8437%	2,972	-2,297
31 Leather and leather products		0	0.0000%	129,561	0.1257%	443	-443
32 Stone, clay, and glass products		1,322	0.3753%	518,820	0.5032%	1,773	-451
33 Primary Metal Industries		299	0.0849%	725,201	0.7034%	2,478	-2,179

34 Fabricated metal products	1,187	0.3370%	1,491,640	1.4469%	5,096	-3,909
35 Machinery except electrical	4,635	1.3159%	1,924,409	1.8666%	6,575	-1,940
36 Electric and Electronic Equipment	14,931	4.2388%	1,595,832	1.5479%	5,452	9,479
37 Transportation equipment	1,810	0.5138%	1,847,865	1.7924%	6,314	-4,504
38 Instruments and related products	2,546	0.7228%	1,002,522	0.9724%	3,425	-879
39 Miscellaneous manufacturing industries	750	0.2129%	386,761	0.3752%	1,321	-571
Administrative and Auxiliary	1,093	0.3103%	1,197,872	1.1619%	4,093	-3,000
SUBTOTALS	40,665	11.5446%	19,261,691	18.6835%	65,811	-25,146
TRANSPORTATION AND OTHER PUBLIC	**10,826**	**3.0734%**	**5,270,318**	**5.1121%**	**18,007**	**-7,181**
41 Local and interurban passenger transit	1,087	0.3086%	303,501	0.2944%	1,037	50
42 Trucking and warehousing	1,722	0.4889%	1,482,680	1.4382%	5,066	-3,344
44 Water transportation	0	0.0000%	155,579	0.1509%	532	-532
45 Transportation by air	976	0.2771%	622,522	0.6038%	2,127	-1,151
46 Pipelines except natural gas	0	0.0000%	16,857	0.0164%	58	-58
47 Transportation services	568	0.1613%	321,424	0.3118%	1,098	-530
48 Communication	4,890	1.3882%	1,210,665	1.1743%	4,136	754
49 Electric, gas, and sanitary services	1,028	0.2918%	853,591	0.8280%	2,916	-1,888
Administrative and Auxiliary	334	0.0948%	303,499	0.2944%	1,037	-703
SUBTOTALS	10,605	3.0107%	5,270,318	5.1121%	18,007	-7,402
WHOLESALE TRADE	**12,911**	**3.6654%**	**5,981,378**	**5.8018%**	**20,437**	**-7,526**
50 Wholesale trade - durable goods	8,839	2.5093%	3,390,497	3.2887%	11,584	-2,745
51 Wholesale Trade - nondurable goods	4,163	1.1819%	2,283,536	2.2150%	7,802	-3,639
Administrative and Auxiliary	0	0.0000%	307,345	0.2981%	1,050	-1,050
SUBTOTALS	13,002	3.6912%	5,981,378	5.8018%	20,437	-7,435
RETAIL TRADE	**64,221**	**18.2320%**	**1.8802E+7**	**18.2371%**	**64,239**	**-18**
52 Building materials and garden supplies	1,753	0.4977%	679,445	0.6590%	2,321	-568
53 General merchandise stores	5,963	1.6929%	2,066,306	2.0043%	7,060	-1,097
54 Food stores	11,602	3.2937%	2,886,034	2.7994%	9,861	1,741
55 Automotive dealers and service stations	6,359	1.8053%	2,075,912	2.0136%	7,093	-734
56 Apparel and accessory stores	4,079	1.1580%	1,156,594	1.1219%	3,952	127
57 Furniture and home furnishings stores	2,296	0.6518%	711,571	0.6902%	2,431	-135
58 Eating and drinking places	23,567	6.6906%	6,097,450	5.9144%	20,833	2,734
59 Miscellaneous retail	7,098	2.0151%	2,317,288	2.2477%	7,917	-819
Administrative and Auxiliary	1,535	0.4358%	810,921	0.7866%	2,771	-1,236
SUBTOTALS	64,252	18.2408%	18,801,521	18.2371%	64,239	13
FINANCE INSURANCE AND REAL ESTAT	**27,211**	**7.7251%**	**6,659,618**	**6.4597%**	**22,754**	**4,457**
60 Banking	5,882	1.6699%	1,959,784	1.9010%	6,696	-814
61 Credit agencies and other banks	3,241	0.9201%	542,186	0.5259%	1,852	1,389
62 Security, commodity brokers and servic	1,128	0.3202%	426,626	0.4138%	1,458	-330
63 Insurance carriers	7,136	2.0259%	1,326,450	1.2866%	4,532	2,604
64 Insurance agents, brokers and service	2,848	0.8085%	685,969	0.6654%	2,344	504
65 Real estate	5,784	1.6420%	1,286,615	1.2480%	4,396	1,388
66 Combined real estate, insurance, etc.	0	0.0000%	0	0.0000%	0	0
67 Holding and other investment offices	1,750	0.4968%	239,589	0.2324%	819	931
Administrative and Auxiliary	175	0.0497%	192,399	0.1866%	657	-482
SUBTOTALS	27,944	7.9332%	6,659,618	6.4597%	22,754	5,190

SERVICES		**80,751**	**22.9248%**	**2.5143E+7**	**24.3880%**	**85,905**	**-5,154**
70 Hotels and other lodging places		3,567	1.0127%	1,384,565	1.3430%	4,731	-1,164
72 Personal services		3,967	1.1262%	1,101,272	1.0682%	3,763	204
73 Business services		14,101	4.0032%	4,385,365	4.2537%	14,983	-882
75 Auto repair, services, and garages		2,876	0.8165%	812,538	0.7881%	2,776	100
76 Miscellaneous repair services		1,157	0.3285%	356,096	0.3454%	1,217	-60
78 Motion pictures		868	0.2464%	369,632	0.3585%	1,263	-395
79 Amusement and recreation services		2,317	0.6578%	909,289	0.8820%	3,107	-790
80 Health services		18,809	5.3398%	7,221,951	7.0052%	24,675	-5,866
81 Legal services		4,835	1.3726%	848,507	0.8230%	2,899	1,936
82 Educational services		3,126	0.8875%	1,630,888	1.5819%	5,572	-2,446
83 Social services		4,923	1.3976%	1,532,276	1.4863%	5,235	-312
84 Museums, botanical, zoological gardens		73	0.0207%	56,503	0.0548%	193	-120
86 Membership organizations		7,318	2.0775%	1,778,170	1.7248%	6,075	1,243
87 Engineering and Management Services		0	0.0000%	2,301,991	2.2329%	7,865	-7,865
89 Miscellaneous services		407	0.1155%	122,267	0.1186%	418	-11
Administrative and Auxiliary		518	0.1471%	331,405	0.3215%	1,132	-614
SUBTOTALS		68,862	19.5496%	25,142,715	24.3880%	85,905	-17,043
Nonclassifiable Establishments		**2,712**	**0.7699%**	**628,693**	**0.6098%**	**2,148**	**564**
STATE EMPLOYMENT		51,877	14.7276%	3,500,000	3.3949%	11,958	39,919
FEDERAL EMPLOYMENT		11,923	3.3849%	3,113,000	3.0196%	10,636	1,287
TOTALS		244,870.3	69.5174%	87,461,712	84.8363%	298,830	46,226
MuH	AUSTIN MSA						
TOTAL EMPLOYMENT	352,243						
divided EXPORT EMPLOYMENT	46,226						
	7.6199						

TRAVIS COUNTY

1977 SIC 36 code data	TRAVIS Employment	Percent	USA Employment	Percent	expected	export
	172,091		78,358,580			
36 Electric and Electronic Equip	5,222	3.0344%	1,710,806	2.1833%	3,757	1,465
367 Electronic Corp(estimate)	1,750	1.0169%	385,712	0.4922%	847	903
3674 Semiconductors(estimate)	1,750	1.0169%	121,046	0.1545%	266	1,484

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,565	3,551	505
county	25	7	2

1978 SIC 36 code data	TRAVIS		USA		expected	export
	185,304		83,888,236			
36 Electric and Electronic Equip	5,028	2.7134%	1,827,937	2.1790%	4,038	990
367 Electronic Corp(estimate)	1,750	0.9444%	413,469	0.4929%	913	837
3674 Semiconductors(estimate)	1,750	0.9444%	123,215	0.1469%	272	1,478

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,554	3,634	510
county	27	8	2

1979 SIC 36 code data	TRAVIS		USA		expected	export
	208,714		88,521,388			
36 Electric and Electronic Equip	4,490	2.1513%	1,960,514	2.2147%	4,622	-132
367 Electronic Corp(estimate)	3,750	1.7967%	467,490	0.5281%	1,102	2,648
3674 Semiconductors(estimate)	3,750	1.7967%	135,956	0.1536%	321	3,429

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,538	4,052	620
county	23	9	4

1980 SIC 36 code data	TRAVIS		USA		expected	export
	217,023		88,878,180			
36 Electric and Electronic Equip	6,317	2.9108%	2,026,537	2.2801%	4,948	1,369
367 Electronic Corp(estimate)	3,750	1.7279%	510,706	0.5746%	1,247	2,503
3674 Semiconductors(estimate)	3,750	1.7279%	158,104	0.1779%	386	3,364

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,756	4,283	640
county	25	9	2

1981 SIC 36 code data	TRAVIS		USA		expected	export
	228,923		88,676,402			
36 Electric and Electronic Equip	6,311	2.7568%	1,960,337	2.2107%	5,061	1,250
367 Electronic Corp(estimate)	3,750	1.6381%	502,005	0.5661%	1,296	2,454

3674 SemiconductorH(estimate)	3,750	1.6381%	164,793	0.1858%	425	3,325

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	14,142	4,509	701
county	30	13	3

1982 SIC 36 code data	TRAVIS		USA		expected	export
	243,138		87,997,252			
36 Electric and Electronic Equip	6,034	2.4817%	1,971,348	2.2402%	5,447	587
367 Electronic CorH(estimate)	3,750	1.5423%	526,626	0.5985%	1,455	2,295
3674 SemiconductorH(estimate)	3,750	1.5423%	177,963	0.2022%	492	3,258

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	15,116	5,026	776
county	34	15	4

1983 SIC 36 code data	TRAVIS		USA		expected	export
	256,373		86,734,318			
36 Electric and Electronic Equip	7,196	2.8068%	1,862,201	2.1470%	5,504	1,692
367 Electronic CorH(estimate)	3,750	1.4627%	503,300	0.5803%	1,488	2,262
3674 SemiconductorH(estimate)	3,750	1.4627%	160,741	0.1853%	475	3,275

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,088	5,348	769
county	39	15	3

1984 SIC 36 code data	TRAVIS		USA		expected	export
	287,982		82,564,354			
36 Electric and Electronic Equip	9,252	3.2127%	2,049,334	2.4821%	7,148	2,104
367 Electronic CorH(estimate)	3,750	1.3022%	585,659	0.7096%	2,043	1,707
3674 SemiconductorH(estimate)	3,750	1.3022%	189,166	0.2291%	660	3,090

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,445	5,714	815
county	46	20	3

1985 SIC 36 code data	TRAVIS		USA		expected	export
	313,323		97,789,257			
36 Electric and Electronic Equip	10,146	3.2382%	2,082,766	2.1299%	6,673	3,473
367 Electronic CorH(estimate)	7,500	2.3937%	611,966	0.6258%	1,961	5,539
3674 SemiconductorH(estimate)	3,750	1.1968%	206,470	0.2111%	662	3,088

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,392	6,225	791
county	53	23	3

APPENDIX A3

Standard Industrial Code Data

For SIC codes 36, 367 and 3674

1986 SIC 36 code data	TRAVIS		USA		expected export	
	325,384		96,763,465			
36 Electric and Electronic Equip	8,957	2.7527%	2,016,533	2.0840%	6,781	2,176
367 Electronic Cor K(estimate)	7,500	2.3050%	559,846	0.5786%	1,883	5,617
3674 SemiconductorH(estimate)	3,750	1.1525%	182,995	0.1891%	615	3,135

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,374	6,245	804
county	49	21	2

1987 SIC 36 code data	TRAVIS		USA		expected export	
	312,988		100,644,804			
36 Electric and Electronic Equip	8,839	2.8241%	1,977,294	1.9646%	6,149	2,690
367 Electronic Cor K(estimate)	7,500	2.3963%	567,143	0.5635%	1,764	5,736
3674 SemiconductorH(estimate)	3,750	1.1981%	180,737	0.1796%	562	3,188

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,570	6,187	860
county	48	17	2

1988 SIC 36 code data	TRAVIS		USA		expected export	
	308,081		103,094,632			
36 Electric and Electronic Equip	13,654	4.4320%	1,595,832	1.5479%	4,769	8,885
367 Electronic Cor J(estimate)	11,500	3.7328%	557,933	0.5412%	1,667	9,833
3674 SemiconductorH(estimate)	3,750	1.2172%	180,236	0.1748%	539	3,211

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,110	5,939	831
county	46	19	5

HAYS COUNTY

1977 SIC 36 code data	HAYS		USA		expected	export
	10,404		78,358,580			
36 Electric and E'E(estimate)	375	3.60%	1,710,806	2.1833%	227	148
367 Electronic Components and /	0	0.00%	385,712	0.4922%	51	-51
3674 Semiconductors and related	0	0.00%	121,046	0.1545%	16	-16

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,565	3,551	505
county	3	0	0

1978 SIC 36 code data	HAYS		USA		expected	export
	11,875		83,888,236			
36 Electric and E'F(estimate)	750	6.32%	1,827,937	2.1790%	259	491
367 Electronic Components and /	0	0.00%	413,469	0.4929%	59	-59
3674 Semiconductors and related	0	0.00%	123,215	0.1469%	17	-17

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,554	3,634	510
county	4	0	0

1979 SIC 36 code data	HAYS		USA		expected	export
	12,684		88,521,388			
36 Electric and E'F(estimate)	750	5.91%	1,960,514	2.2147%	281	469
367 Electronic Components and /	0	0.00%	467,490	0.5281%	67	-67
3674 Semiconductors and related	0	0.00%	135,956	0.1536%	19	-19

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,538	4,052	620
county	5	0	0

1980 SIC 36 code data	HAYS		USA		expected	export
	13,813		88,878,180			
36 Electric and Electronic Equip	953	6.90%	2,026,537	2.2801%	315	638
367 Electronic Components and /	0	0.00%	510,706	0.5746%	79	-79
3674 Semiconductors and related	0	0.00%	158,104	0.1779%	25	-25

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,756	4,283	640
county	6	0	0

1981 SIC 36 code data	HAYS		USA		expected	export
	14,090		88,676,402			
36 Electric and Electronic Equip	1,006	7.14%	1,960,337	2.2107%	311	695
367 Electronic Components and /	0	0.00%	502,005	0.5661%	80	-80

3674 Semiconductors and related	0	0.00%	164,793	0.1858%	26	-26

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	14,142	4,509	701
county	5	0	0

1982 SIC 36 code data	HAYS		USA		expected	export
	13,610		87,997,252			
36 Electric and Electronic Equip	911	6.69%	1,971,348	2.2402%	305	606
367 Electronic Components and /	0	0.00%	526,626	0.5985%	81	-81
3674 Semiconductors and related	0	0.00%	177,963	0.2022%	28	-28

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	15,116	5,026	776
county	4	0	0

1983 SIC 36 code data	HAYS		USA		expected	export
	13,923		86,734,318			
36 Electric and Electronic Equip	827	5.94%	1,862,201	2.1470%	299	528
367 Electronic Components and /	0	0.00%	503,300	0.5803%	81	-81
3674 Semiconductors and related	0	0.00%	160,741	0.1853%	26	-26

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,088	5,348	769
county	4	0	0

1984 SIC 36 code data	HAYS		USA		expected	export
	14,703		82,564,354			
36 Electric and Electronic Equip	560	3.81%	2,049,334	2.4821%	365	195
367 Electronic Components and /	0	0.00%	585,859	0.7096%	104	-104
3674 Semiconductors and related	0	0.00%	189,166	0.2291%	34	-34

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,445	5,714	815
county	4	0	0

1985 SIC 36 code data	HAYS		USA		expected	export
	16,484		97,789,257			
36 Electric and Electronic Equip	554	3.36%	2,082,766	2.1299%	351	203
367 Electronic Components and /	0	0.00%	611,966	0.6258%	103	-103
3674 Semiconductors and related	0	0.00%	206,470	0.2111%	35	-35

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,392	6,225	791
county	5	0	0

WILLIAMSON COUNTY

1977 SIC 36 code data	WILLIAMSON		USA		expected	export
	11,303		78,358,580			
36 Electric and E'E(estimate)	375	3.32%	1,710,806	2.1833%	247	128
367 Electronic Cor C(estimate)	175	1.55%	385,712	0.4922%	56	119
3674 Semiconductors and related	0	0.00%	121,046	0.1545%	17	-17

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,565	3,551	505
county	6	4	0

1978 SIC 36 code data	WILLIAMSON		USA		expected	export
	13,772		83,888,236			
36 Electric and E'F(estimate)	750	5.45%	1,827,937	2.1790%	300	450
367 Electronic Cor C(estimate)	175	1.27%	413,469	0.4929%	68	107
3674 Semiconductors and related	0	0.00%	123,215	0.1469%	20	-20

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,554	3,634	510
county	5	3	0

1979 SIC 36 code data	WILLIAMSON		USA		expected	export
	14,528		88,521,388			
36 Electric and E'F(estimate)	750	5.16%	1,960,514	2.2147%	322	428
367 Electronic Cor C(estimate)	175	1.20%	467,490	0.5281%	77	98
3674 Semiconductors and related	0	0.00%	135,956	0.1536%	22	-22

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,538	4,052	620
county	4	3	0

1980 SIC 36 code data	WILLIAMSON		USA		expected	export
	15,832		88,878,180			
36 Electric and E'F(estimate)	750	4.74%	2,026,537	2.2801%	361	389
367 Electronic Components and /	185	1.17%	510,706	0.5746%	91	94
3674 Semiconductors and related	0	0.00%	158,104	0.1779%	28	-28

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,756	4,283	640
county	8	5	0

1981 SIC 36 code data	WILLIAMSON		USA		expected	export
	17,276		88,676,402			
36 Electric and Electronic Equip	1,153	6.67%	1,960,337	2.2107%	382	771
367 Electronic Cor E(estimate)	375	2.17%	502,005	0.5661%	98	277

3674 Semiconductors and related	0	0.00%	164,793	0.1858%	32	-32

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	14,142	4,509	701
county	9	6	0

1982 SIC 36 code data	WILLIAMSON		USA		expected	export
	19,198		87,997,252			
36 Electric and Electronic Equip	1,181	6.15%	1,971,348	2.2402%	430	751
367 Electronic Cor E(estimate)	375	1.95%	526,626	0.5985%	115	260
3674 Semiconductors and related	0	0.00%	177,963	0.2022%	39	-39

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	15,116	5,026	776
county	8	5	0

1983 SIC 36 code data	WILLIAMSON		USA		expected	export
	19,957		86,734,318			
36 Electric and Electronic Equip	1,096	5.49%	1,862,201	2.1470%	428	668
367 Electronic Cor E(estimate)	375	1.88%	503,300	0.5803%	116	259
3674 Semiconductors and related	0	0.00%	160,741	0.1853%	37	-37

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,088	5,348	769
county	9	6	0

1984 SIC 36 code data	WILLIAMSON		USA		expected	export
	24,115		82,564,354			
36 Electric and Electronic Equip	1,309	5.43%	2,049,334	2.4821%	599	710
367 Electronic Cor F(estimate)	750	3.11%	585,859	0.7096%	171	579
3674 Semiconductors and related	0	0.00%	189,166	0.2291%	55	-55

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,445	5,714	815
county	11	8	0

1985 SIC 36 code data	WILLIAMSON		USA		expected	export
	27,212		97,789,257			
36 Electric and Electronic Equip	1,407	5.17%	2,082,766	2.1299%	580	827
367 Electronic Components and /	418	1.54%	611,966	0.6258%	170	248
3674 Semiconductors and related	0	0.00%	206,470	0.2111%	57	-57

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,392	6,225	791
county	12	8	0

1986 SIC 36 code data	WILLIAMSON		USA		expected	export
	26,971		96,763,465			
36 Electric and Electronic Equip	1,176	4.36%	2,016,533	2.0840%	562	614
367 Electronic Components and A	274	1.02%	559,846	0.5786%	156	118
3674 Semiconductors and related	0	0.00%	182,995	0.1891%	51	-51

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,374	6,245	804
county	12	9	0

1987 SIC 36 code data	WILLIAMSON		USA		expected	export
	27,528		100,644,804			
36 Electric and Electronic Equip	1,287	4.68%	1,977,294	1.9646%	541	746
367 Electronic Components and A	386	1.40%	567,143	0.5635%	155	231
3674 Semiconductors(estimate)	60	0.22%	180,737	0.1796%	49	11

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,570	6,187	860
county	12	7	1

1988 SIC 36 code data	WILLIAMSON		USA		expected	export
	27,356		103,094,632			
36 Electric and Electronic Equip	902	3.30%	1,595,832	1.5479%	423	479
367 Electronic Components and A	467	1.71%	557,933	0.5412%	148	319
3674 Semiconductors(estimate)	60	0.22%	180,236	0.1748%	48	12

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,110	5,939	831
county	9	5	1

AUSTIN METROPOLITAN STATISTICAL AREA

1977 SIC 36 code data	AUSTIN MSA		USA		expected	export
	193,798		78,358,580			
36 Electric and Electronic Equipment	5,972	3.08%	1,710,806	2.1833%	4,231	1,741
367 Electronic Components and Access	1,925	0.99%	385,712	0.4922%	954	971
3674 Semiconductors and related devic	1,750	0.90%	121,046	0.1545%	299	1,451

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,565	3,551	505
county	34	11	2

1978 SIC 36 code data	AUSTIN MSA		USA		expected	export
	210,951		83,888,236			
36 Electric and Electronic Equipment	6,528	3.09%	1,827,937	2.1790%	4,597	1,931
367 Electronic Components and Access	1,925	0.91%	413,469	0.4929%	1,040	885
3674 Semiconductors and related devic	1,750	0.83%	123,215	0.1469%	310	1,440

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,554	3,634	510
county	36	11	2

1979 SIC 36 code data	AUSTIN MSA		USA		expected	export
	235,926		88,521,388			
36 Electric and Electronic Equipment	5,990	2.54%	1,960,514	2.2147%	5,225	765
367 Electronic Components and Access	3,925	1.66%	467,490	0.5281%	1,246	2,679
3674 Semiconductors and related devic	3,750	1.59%	135,956	0.1536%	362	3,388

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,538	4,052	620
county	32	12	4

1980 SIC 36 code data	AUSTIN MSA		USA		expected	export
	246,668		88,878,180			
36 Electric and Electronic Equipment	8,020	3.25%	2,026,537	2.2801%	5,624	2,396
367 Electronic Components and Access	3,935	1.60%	510,706	0.5746%	1,417	2,518
3674 Semiconductors and related devic	3,750	1.52%	158,104	0.1779%	439	3,311

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	13,756	4,283	640
county	39	14	2

1981 SIC 36 code data	AUSTIN MSA		USA		expected	export
	260,289		88,676,402			
36 Electric and Electronic Equipment	8,470	3.25%	1,960,337	2.2107%	5,754	2,716
367 Electronic Components and Access	4,125	1.58%	502,005	0.5661%	1,474	2,651

3674 Semiconductors and related devic	3,750	1.44%	164,793	0.1858%	484	3,266

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	14,142	4,509	701
county	44	19	3

1982 SIC 36 code data	AUSTIN MSA		USA		expected	export
	275,946		87,997,252			
36 Electric and Electronic Equipment	8,126	2.94%	1,971,348	2.2402%	6,182	1,944
367 Electronic Components and Access	4,125	1.49%	526,626	0.5985%	1,651	2,474
3674 Semiconductors and related devic	3,750	1.36%	177,963	0.2022%	558	3,192

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	15,116	5,026	776
county	46	20	4

1983 SIC 36 code data	AUSTIN MSA		USA		expected	export
	290,253		86,734,318			
36 Electric and Electronic Equipment	9,119	3.14%	1,862,201	2.1470%	6,232	2,887
367 Electronic Components and Access	4,125	1.42%	503,300	0.5803%	1,684	2,441
3674 Semiconductors and related devic	3,750	1.29%	160,741	0.1853%	538	3,212

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,088	5,348	769
county	52	21	3

1984 SIC 36 code data	AUSTIN MSA		USA		expected	export
	326,800		82,564,354			
36 Electric and Electronic Equipment	11,121	3.40%	2,049,334	2.4821%	8,112	3,009
367 Electronic Components and Access	4,500	1.38%	585,859	0.7096%	2,319	2,181
3674 Semiconductors and related devic	3,750	1.15%	189,166	0.2291%	749	3,001

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,445	5,714	815
county	61	28	3

1985 SIC 36 code data	AUSTIN MSA		USA		expected	export
	357,019		97,789,257			
36 Electric and Electronic Equipment	12,107	3.39%	2,082,766	2.1299%	7,604	4,503
367 Electronic Components and Access	7,918	2.22%	611,966	0.6258%	2,234	5,684
3674 Semiconductors and related devic	3,750	1.05%	206,470	0.2111%	754	2,996

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,392	6,225	791
county	70	31	3

APPENDIX A3

Standard Industrial Code Data

For SIC codes 36, 367 and 3674

1986 SIC 36 code data	AUSTIN MSA		USA		expected	export
	369,870		96,763,465			
36 Electric and Electronic Equipment	10,508	2.84%	2,016,533	2.0840%	7,708	2,800
367 Electronic Components and Access	7,774	2.10%	559,846	0.5786%	2,140	5,634
3674 Semiconductors and related devic	3,750	1.01%	182,995	0.1891%	699	3,051

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,374	6,245	804
county	66	30	2

1987 SIC 36 code data	AUSTIN MSA		USA		expected	export
	357,070		100,644,804			
36 Electric and Electronic Equipment	10,501	2.94%	1,977,294	1.9646%	7,015	3,486
367 Electronic Components and Access	7,886	2.21%	567,143	0.5635%	2,012	5,874
3674 Semiconductors and related devic	3,810	1.07%	180,737	0.1796%	641	3,169

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	17,570	6,187	860
county	67	24	3

1988 SIC 36 code data	AUSTIN MSA		USA		expected	export
	352,243		103,094,632			
36 Electric and Electronic Equipment	14,931	4.24%	1,595,832	1.5479%	5,452	9,479
367 Electronic Components and Access	11,967	3.40%	557,933	0.5412%	1,906	10,061
3674 Semiconductors and related devic	3,810	1.08%	180,236	0.1748%	616	3,194

Establishments in this category

SIC code	SIC 36	SIC 367	SIC 3674
national	16,110	5,939	831
county	62	24	6

APPENDIX A4

HIGH-TECHNOLOGY INDUSTRIES EXPORT EMPLOYMENT ANALYSIS FOR SELECTED YEARS (Travis, Hays, and Williamson counties and the Austin Metropolitan Statistical Area)

TRAVIS COUNTY

1984 SIC 36 code data	TRAVIS		USA		expected	export
	287,982		82,564,354			
36 Electric and Electronic Equ	9,252	3.2127%	2,049,334	2.4821%	7,148	2,104
367 Electronic C(H(estimate)	3,750	1.3022%	585,859	0.7096%	2,043	1,707
283 Drugs F(estimate)	750	0.2604%	169,679	0.2055%	592	158
357 Office and c(K(estimate)	7,500	2.6043%	438,542	0.5312%	1,530	5,970
361 Electric distB(estimate)	60	0.0208%	99,807	0.1209%	348	-288
362 Electrical InC(estimate)	175	0.0608%	188,844	0.2287%	659	-484
366 CommunicatiH(estimate)	3,750	1.3022%	640,993	0.7764%	2,236	1,514
382 Measuring and Controlling I	731	0.2538%	223,212	0.2703%	779	-48
384 Medical InstrE(estimate)	375	0.1302%	150,562	0.1824%	525	-150
737 Computer and Data Proces:	1,703	0.5914%	462,144	0.5597%	1,612	91
7391 Research and Development	801	0.2781%	125,930	0.1525%	439	362
822 Colleges and Universities	999	0.3469%	967,509	1.1718%	3,375	-2,376
891 Engineering and Architectu	5,257	1.8255%	603,050	0.7304%	2,103	3,154
892 Noncommercial Research O	172	0.0597%	67,501	0.0818%	235	-63
3674 Semiconduct H(estimate)	1,058	0.3674%	189,166	0.2291%	660	398

1985 SIC 36 code data	TRAVIS		USA		expected	export
	313,323		97,789,257			
36 Electric and Electronic Equ	10,146	3.2382%	2,082,766	2.1299%	6,673	3,473
367 Electronic C(K(estimate)	7,500	2.3937%	611,966	0.6256%	1,961	5,539
283 Drugs F(estimate)	750	0.2394%	171,067	0.1749%	548	202
357 Office and c(J(estimate)	17,500	5.5853%	441,471	0.4515%	1,415	16,085
361 Electric distB(estimate)	60	0.0191%	98,713	0.1009%	316	-256
362 Electrical InC(estimate)	175	0.0559%	185,903	0.1901%	596	-421
366 CommunicatiH(estimate)	3,750	1.1968%	662,477	0.6775%	2,123	1,627
382 Measuring and Controlling I	880	0.2809%	221,902	0.2269%	711	169
384 Medical InstrF(estimate)	750	0.2394%	151,624	0.1551%	486	264
737 Computer and Data Proces:	1,364	0.4353%	514,610	0.5262%	1,649	-285
7391 Research and Development	998	0.3185%	141,390	0.1446%	453	545
822 Colleges and Universities	840	0.2681%	984,602	1.0069%	3,155	-2,315
891 Engineering and Architectu	6,373	2.0340%	667,336	0.6824%	2,138	4,235
892 Noncommercial Research O	202	0.0645%	69,270	0.0708%	222	-20
3674 Semiconduct H(estimate)	3,750	1.1968%	206,470	0.2111%	662	3,088

1986 SIC 36 code data	TRAVIS		USA		expected	export
	325,384		96,763,465			
36 Electric and Electronic Equ	8,957	2.7527%	2,016,533	2.0840%	6,781	2,176
367 Electronic C(K(estimate)	7,500	2.3050%	559,846	0.5786%	1,883	5,617
283 Drugs G(estimate)	1,750	0.5378%	171,789	0.1775%	578	1,172
357 Office and c(J(estimate)	17,500	5.3783%	388,635	0.4016%	1,307	16,193
361 Electric distB(estimate)	60	0.0184%	96,777	0.1000%	325	-265
362 Electrical Industries appar.	71	0.0218%	173,244	0.1790%	583	-512

APPENDIX A4

HIGH-TECHNOLOGY INDUSTRIES EXPORT EMPLOYMENT ANALYSIS

FOR SELECTED YEARS (Travis, Hays, and Williamson counties and the Austin Metropolitan Statistical Area)

366	CommunicatiH(estimate)	3,750	1.1525%	673,067	0.6956%	2,263	1,487
382	Measuring and Controlling I	859	0.2640%	209,380	0.2164%	704	155
384	Medical Instruments and Su	120	0.0369%	154,845	0.1600%	521	-401
737	Computer and Data Process	1,682	0.5169%	553,659	0.5722%	1,862	-180
7391	Research and Development	1,215	0.3734%	147,821	0.1528%	497	718
822	Colleges and Universities	892	0.2741%	997,293	1.0307%	3,354	-2,462
891	Engineering and Architectu	6,782	2.0843%	706,171	0.7298%	2,375	4,407
892	Noncommercial Research O	176	0.0541%	71,493	0.0739%	240	-64
3674	SemiconductH(estimate)	3,750	1.1525%	182,995	0.1891%	615	3,135

1987 SIC 36 code data		TRAVIS		USA		expected	export
		312,988		100,644,804			
36	Electric and Electronic Equ	8,839	2.8241%	1,977,294	1.9646%	6,149	2,690
367	Electronic CoH(estimate)	7,500	2.3963%	567,143	0.5635%	1,764	5,736
283	Drugs G(estimate)	1,750	0.5591%	174,747	0.1736%	543	1,207
357	Office and coH(estimate)	17,500	5.5913%	374,386	0.3720%	1,164	16,336
361	Electric distributing equipn	0	0.0000%	90,043	0.0895%	280	-280
362	Electrical Industries appar.	183	0.0585%	168,784	0.1677%	525	-342
366	Communications Equipment	2,708	0.8652%	642,257	0.6381%	1,997	711
382	Measuring and Controlling I	780	0.2492%	208,849	0.2075%	649	131
384	Medical Instruments and Su	176	0.0562%	159,267	0.1582%	495	-319
737	Computer and Data Process	2,702	0.8633%	618,607	0.6146%	1,924	778
7391	Research and Development	1,379	0.4406%	147,745	0.1468%	459	920
822	Colleges and Universities	1,326	0.4237%	1,006,263	0.9998%	3,129	-1,803
891	Engineering and Architectu	6,133	1.9595%	736,487	0.7318%	2,290	3,843
892	Noncommercial Research O	261	0.0834%	67,986	0.0676%	211	50
3674	SemiconductH(estimate)	3,750	1.1981%	180,737	0.1796%	562	3,188

1988 SIC 36 code data		TRAVIS		USA		expected	export
		308,081		103,094,632			
36	Electric and Electronic Equ	13,654	4.4320%	1,595,832	1.5479%	4,769	8,885
367	Electronic CoH(estimate)	11,500	3.7328%	557,933	0.5412%	1,667	9,833
283	Drugs G(estimate)	1,750	0.5680%	174,440	0.1692%	521	1,229
357	Office and computing machi	3,371	1.0942%	338,369	0.3282%	1,011	2,360
361	Electric distributing equipn	0	0.0000%	78,293	0.0759%	234	-234
362	Electrical InE(estimate)	375	0.1217%	170,822	0.1657%	510	-135
366	Communications Equipment	748	0.2428%	258,986	0.2512%	774	-26
382	Measuring and Controlling I	1,309	0.4249%	300,456	0.2914%	898	411
384	Medical Instruments and Su	581	0.1886%	215,552	0.2091%	644	-63
737	Computer and Data Process	2,887	0.9371%	678,877	0.6585%	2,029	858
8731	Research and Development	1,439	0.4671%	158,513	0.1538%	474	965
822	Colleges and Universities	1,061	0.3444%	1,012,868	0.9825%	3,027	-1,966
891	*Engineering and Architect	6,114	1.9845%	784,946	0.7614%	2,346	3,768
8733	*Noncommercial Research	239	0.0776%	58,784	0.0570%	176	63
3674	SemiconductH(estimate)	3,750	1.2172%	180,236	0.1748%	539	3,211

COMPARISON TABLES TRAVIS COUNTY

Year	Category 283 Drugs	% change	357 office anc	% change	361 Electric distr	& change
1984	158		5,970		-288	
1985	202	27.65%	16,085	169.42%	-256	11.05%
1986	1,172	480.68%	16,193	0.67%	-265	-3.57%
1987	1,207	2.92%	16,336	0.88%	-280	-5.50%
1988	1,229	1.84%	2,360	-85.55%	-234	16.45%

Year	Category 362 Electrica	% change	366 Communi	% change	382 Measuring an	& change
1984	-484		1,514		-48	
1985	-421	13.03%	1,627	7.47%	169	455.39%
1986	-512	-21.61%	1,487	-8.64%	155	-8.34%
1987	-342	33.17%	711	-52.20%	131	-15.75%
1988	-135	60.38%	-26	-103.65%	411	215.01%

Year	Category 384 Medical li	% change	737 Computer	% change	8731 Research an	& change
1984	-150		91		362	
1985	264	275.94%	-285	-412.82%	545	50.65%
1986	-401	-251.67%	-180	36.89%	718	31.74%
1987	-319	20.31%	778	-532.90%	920	28.08%
1988	-63	80.22%	858	10.29%	965	4.98%

Year	Category 822 Colleges .	% change	891 *Engineer	% change	8733 *Noncomme	& change
1984	-2,376		3,154		-63	
1985	-2,315	-2.56%	4,235	34.29%	-20	68.56%
1986	-2,462	6.34%	4,407	4.07%	-64	222.92%
1987	-1,803	-26.74%	3,843	-12.81%	50	176.97%
1988	-1,966	9.01%	3,768	-1.93%	63	27.75%

APPENDIX A4

HIGH-TECHNOLOGY INDUSTRIES EXPORT EMPLOYMENT ANALYSIS FOR SELECTED YEARS

(Travis, Hays, and Williamson counties and the Austin Metropolitan Statistical Area)

HAYS COUNTY

1984 SIC 36 code data	HAYS		USA		expected	export
	14,703		82,564,354			
36 Electric and Electronic Equip	560	3.81%	2,049,334	2.4821%	365	195
367 Electronic Components and /	0	0.00%	585,859	0.7096%	104	-104
283 Drugs	0	0.00%	169,679	0.2055%	30	-30
357 Office and computing machin	0	0.00%	438,542	0.5312%	78	-78
361 Electric distributing equipm	0	0.0000%	99,807	0.1209%	18	-18
362 Electrical Ind.C(estimate)	175	1.1902%	188,844	0.2287%	34	141
366 Communications Equipment	0	0.0000%	640,993	0.7764%	114	-114
382 Measuring anc B(estimate)	60	0.4081%	223,212	0.2703%	40	20
384 Medical Instruments and Sup	0	0.0000%	150,562	0.1824%	27	-27
737 Computer and Data Processi	0	0.0000%	462,144	0.5597%	82	-82
7391 Research and Development L	0	0.0000%	125,930	0.1525%	22	-22
822 Colleges and Universities	0	0.0000%	967,509	1.1718%	172	-172
891 Engineering and Architectur	105	0.7141%	603,050	0.7304%	107	-2
892 Noncommercial Research Or	0	0.0000%	67,501	0.0818%	12	-12
3674 Semiconductors and related	0	0.00%	189,166	0.2291%	34	-34

1985 SIC 36 code data	HAYS		USA		expected	export
	16,484		97,789,257			
36 Electric and Electronic Equip	554	3.36%	2,082,766	2.1299%	351	203
367 Electronic Components and /	0	0.00%	611,966	0.6258%	103	-103
283 Drugs	0	0.0000%	171,067	0.1749%	29	-29
357 Office and computing machin	0	0.0000%	441,471	0.4515%	74	-74
361 Electric distriB(estimate)	60	0.3640%	98,713	0.1009%	17	43
362 Electrical Ind.C(estimate)	175	1.0616%	185,903	0.1901%	31	144
366 Communications Equipment	0	0.0000%	662,477	0.6775%	112	-112
382 Measuring anc B(estimate)	60	0.3640%	221,902	0.2269%	37	23
384 Medical Instruments and Sup	0	0.0000%	151,624	0.1551%	26	-26
737 Computer and Data Processi	0	0.0000%	514,610	0.5262%	87	-87
7391 Research and Development L	0	0.0000%	141,390	0.1446%	24	-24
822 Colleges and Universities	0	0.0000%	984,602	1.0069%	166	-166
891 Engineering and Architectur	131	0.7947%	667,336	0.6824%	112	19
892 Noncommercial Research Or	0	0.0000%	69,270	0.0708%	12	-12
3674 Semiconductors and related	0	0.0000%	206,470	0.2111%	35	-35

1986 SIC 36 code data	HAYS		USA		expected	export
	17,515		96,763,465			
36 Electric and E'E(estimate)	375	2.14%	2,016,533	2.0840%	365	10
367 Electronic Components and /	0	0.00%	559,846	0.5786%	101	-101
283 Drugs	0	0.0000%	171,789	0.1775%	31	-31
357 Office and computing machin	0	0.0000%	388,635	0.4016%	70	-70
361 Electric distributing equipm	0	0.0000%	96,777	0.1000%	18	-18
362 Electrical industries apparat	0	0.0000%	173,244	0.1790%	31	-31

366 Communications Equipment	0	0.0000%	673,067	0.6956%	122	-122
382 Measuring and B(estimate)	60	0.3426%	209,380	0.2164%	38	22
384 Medical Instruments and Sup	0	0.0000%	154,845	0.1600%	28	-28
737 Computer and Data Processi	0	0.0000%	553,659	0.5722%	100	-100
7391 Research and Development L	0	0.0000%	147,821	0.1528%	27	-27
822 Colleges and Universities	0	0.0000%	997,293	1.0307%	181	-181
891 Engineering and Architectur.	111	0.6337%	706,171	0.7298%	128	-17
892 Noncommercial Research Or	0	0.0000%	71,493	0.0739%	13	-13
3674 Semiconductors and related	0	0.00%	182,995	0.1891%	33	-33

1987 SIC 36 code data	HAYS		USA		expected	export
	16,554		100,644,804			
36 Electric and E'E(estimate)	375	2.27%	1,977,294	1.9646%	325	50
367 Electronic Components and /	0	0.00%	567,143	0.5635%	93	-93
283 Drugs	0	0.0000%	174,747	0.1736%	29	-29
357 Office and computing machin	0	0.0000%	374,386	0.3720%	62	-62
361 Electric distributing equipm	0	0.0000%	90,043	0.0895%	15	-15
362 Electrical Industries apparat	0	0.0000%	168,784	0.1677%	28	-28
366 Communications Equipment	0	0.0000%	642,257	0.6381%	106	-106
382 Measuring and B(estimate)	60	0.3625%	208,849	0.2075%	34	26
384 Medical Instruments and Sup	0	0.0000%	159,267	0.1582%	26	-26
737 Computer and Data Processi	0	0.0000%	618,607	0.6146%	102	-102
7391 Research and Development L	0	0.0000%	147,745	0.1468%	24	-24
822 Colleges and Universities	0	0.0000%	1,006,263	0.9998%	166	-166
891 Engineering and Architectur.	102	0.6162%	736,487	0.7318%	121	-19
892 Noncommercial Research Or	0	0.0000%	67,986	0.0676%	11	-11
3674 Semiconductors and related	0	0.00%	180,737	0.1796%	30	-30

1988 SIC 36 code data	HAYS		USA		expected	export
	16,806		103,094,632			
36 Electric and E'E(estimate)	375	2.23%	1,595,832	1.5479%	260	115
367 Electronic Components and /	0	0.00%	557,933	0.5412%	91	-91
283 Drugs	0	0.0000%	174,440	0.1692%	28	-28
357 Office and computing machin	0	0.0000%	338,369	0.3282%	55	-55
361 Electric distributing equipm	0	0.0000%	78,293	0.0759%	13	-13
362 Electrical Industries apparat	0	0.0000%	170,822	0.1657%	28	-28
366 Communications Equipment	0	0.0000%	258,986	0.2512%	42	-42
382 Measuring and B(estimate)	60	0.3570%	300,456	0.2914%	49	11
384 Medical Instruments and Sup	0	0.0000%	215,552	0.2091%	35	-35
737 Computer and Data Processi	0	0.0000%	678,877	0.6585%	111	-111
8731 Research and Development L	0	0.0000%	158,513	0.1538%	26	-26
822 Colleges and Universities	0	0.0000%	1,012,868	0.9825%	165	-165
891 *Engineering and Architectu	50	0.2975%	784,946	0.7614%	128	-78
8733 *Noncommercial Research C	0	0.0000%	58,784	0.0570%	10	-10
3674 Semiconductors and related	0	0.00%	180,236	0.1748%	29	-29

COMPARISON TABLES HAYS COUNTY

Year	Category 283 Drugs	% change	357 office anc	% change	361 Electric	& change
1984	-30		-78		-18	
1985	-29	4.57%	-74	4.71%	43	343.96%
1986	-31	-7.83%	-70	5.47%	-18	-140.40%
1987	-29	7.57%	-62	12.46%	-15	15.45%
1988	-28	1.06%	-55	10.42%	-13	13.82%

relies too much on
estimates

Year	Category 362 Electrica	% change	366 Communi	% change	382 Measuri	& change
1984	141		-114		20	
1985	144	1.62%	-112	2.17%	23	11.58%
1986	-31	-121.83%	-122	-9.10%	22	-2.19%
1987	-28	11.47%	-106	13.29%	26	16.05%
1988	-28	0.00%	-42	60.03%	11	-57.03%

Year	Category 384 Medical li	% change	737 Computer	% change	8731 Resear	& change
1984	-27		-82		-22	
1985	-26	4.67%	-87	-5.40%	-24	-6.28%
1986	-28	-9.66%	-100	-15.53%	-27	-12.27%
1987	-26	6.54%	-102	-1.53%	-24	9.18%
1988	-35	-34.14%	-111	-8.77%	-26	-6.33%

Year	Category 822 Colleges	% change	891 *Engineer	% change	8733 *Nonc	& change
1984	-172		-2		-12	
1985	-166	3.67%	19	874.23%	-12	0.00%
1986	-181	-8.77%	-17	-190.89%	-13	-10.83%
1987	-166	8.31%	-19	-13.76%	-11	13.59%
1988	-165	0.24%	-78	-307.37%	-10	14.30%

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HIGH-TECHNOLOGY INDUSTRIES EXPORT EMPLOYMENT ANALYSIS
FOR SELECTED YEARS (Travis, Hays, and Williamson counties and the Austin Metropolitan Statistical Area)

WILLIAMSON COUNTY

1984 SIC 36 code data	WILLIAMSON		USA		expected	export
	24,115		82,564,354			
36 Electric and Electronic Equip	1,309	5.43%	2,049,334	2.4821%	599	710
367 Electronic Cor F(estimate)	750	3.11%	585,859	0.7096%	171	579
283 Drugs C(estimate)	175	0.73%	169,679	0.2055%	50	125
357 Office and con C(estimate)	175	0.73%	438,542	0.5312%	128	47
361 Electric distributing equipm	0	0.0000%	99,807	0.1209%	29	-29
362 Electrical Ind. E(estimate)	375	1.5550%	188,844	0.2287%	55	320
366 Communicatio E(estimate)	375	1.3550%	640,993	0.7764%	187	188
382 Measuring anc C(estimate)	175	0.7257%	223,212	0.2703%	65	110
384 Medical Instruments and Sup	0	0.0000%	150,562	0.1824%	44	-44
737 Computer and Data Processi	0	0.0000%	462,144	0.5597%	135	-135
7391 Research and Development L	0	0.0000%	125,930	0.1525%	37	-37
822 Colleges and U E(estimate)	375	1.5550%	967,509	1.1718%	283	92
891 Engineering and Architectur	142	0.5888%	603,050	0.7304%	176	-34
892 Noncommercial Research Or	0	0.0000%	67,501	0.0818%	20	-20
3674 Semiconductors and related	0	0.00%	189,166	0.2291%	55	-55

1985 SIC 36 code data	WILLIAMSON		USA		expected	export
	27,212		97,789,257			
36 Electric and Electronic Equip	1,407	5.17%	2,082,766	2.1299%	580	827
367 Electronic Components and A	418	1.54%	611,966	0.6258%	170	248
283 Drugs C(estimate)	175	0.6431%	171,067	0.1749%	48	127
357 Office and con C(estimate)	175	0.6431%	441,471	0.4515%	123	52
361 Electric distributing equipm	0	0.0000%	98,713	0.1009%	27	-27
362 Electrical Ind. F(estimate)	750	2.7561%	185,903	0.1901%	52	698
366 Communicatio E(estimate)	375	1.3781%	662,477	0.6775%	184	191
382 Measuring anc C(estimate)	175	0.6431%	221,902	0.2269%	62	113
384 Medical Instruments and Sup	0	0.0000%	151,624	0.1551%	42	-42
737 Computer and Data Processi	0	0.0000%	514,610	0.5262%	143	-143
7391 Research and Development L	0	0.0000%	141,390	0.1446%	39	-39
822 Colleges and U E(estimate)	375	1.3781%	984,602	1.0069%	274	101
891 Engineering and Architectur	207	0.7607%	667,336	0.6824%	186	21
892 Noncommercial Research Or	0	0.0000%	69,270	0.0708%	19	-19
3674 Semiconductors and related	0	0.0000%	206,470	0.2111%	57	-57

1986 SIC 36 code data	WILLIAMSON		USA		expected	export
	26,971		96,763,465			
36 Electric and Electronic Equip	1,176	4.36%	2,016,533	2.0840%	562	614
367 Electronic Components and A	274	1.02%	559,846	0.5786%	156	118
283 Drugs C(estimate)	175	0.6488%	171,789	0.1775%	48	127
357 Office and con C(estimate)	175	0.6488%	388,635	0.4016%	108	67
361 Electric distributing equipm	0	0.0000%	96,777	0.1000%	27	-27
362 Electrical Ind. E(estimate)	375	1.3904%	173,244	0.1790%	48	327

APPENDIX A4

HIGH-TECHNOLOGY INDUSTRIES EXPORT EMPLOYMENT ANALYSIS

FOR SELECTED YEARS (Travis, Hays, and Williamson counties and the Austin Metropolitan Statistical Area)

366	Communicatio	E(estimate)	375	1.3904%	673,067	0.6956%	188	187
382	Measuring anc	C(estimate)	175	0.6488%	209,380	0.2164%	58	117
384	Medical Instruments and Sup		0	0.0000%	154,845	0.1600%	43	-43
737	Computer and Data Processi		0	0.0000%	553,659	0.5722%	154	-154
7391	Research and Development L		0	0.0000%	147,821	0.1528%	41	-41
822	Colleges and U	F(estimate)	750	2.7808%	997,293	1.0307%	278	472
891	Engineering and Architectur.		216	0.8009%	706,171	0.7298%	197	19
892	Noncommercial Research Or		0	0.0000%	71,493	0.0739%	20	-20
3674	Semiconductors and related		0	0.00%	182,995	0.1891%	51	-51

1987 SIC 36 code data		WILLIAMSON		USA		expected	export
		27,528		100,644,804			
36	Electric and Electronic Equip	1,287	4.68%	1,977,294	1.9646%	541	746
367	Electronic Components and A	386	1.40%	567,143	0.5635%	155	231
283	Drugs	C(estimate)	175	0.6357%	174,747	0.1736%	48	127
357	Office and con	C(estimate)	175	0.6357%	374,386	0.3720%	102	73
361	Electric distributing equipme		0	0.0000%	90,043	0.0895%	25	-25
362	Electrical Ind	E(estimate)	375	1.3622%	168,784	0.1677%	46	329
366	Communicatio	E(estimate)	375	1.3622%	642,257	0.6381%	176	199
382	Measuring anc	C(estimate)	175	0.6357%	208,849	0.2075%	57	118
384	Medical Instruments and Sup		0	0.0000%	159,267	0.1582%	44	-44
737	Computer and Data Processi		57	0.2071%	618,607	0.6146%	169	-112
7391	Research and Development L		0	0.0000%	147,745	0.1468%	40	-40
822	Colleges and U	F(estimate)	750	2.7245%	1,006,263	0.9998%	275	475
891	Engineering and Architectur.		232	0.8428%	736,487	0.7318%	201	31
892	Noncommercial Research Or		0	0.0000%	67,986	0.0676%	19	-19
3674	Semiconducto	B(estimate)	60	0.22%	180,737	0.1796%	49	11

1988 SIC 36 code data		WILLIAMSON		USA		expected	export
		27,356		103,094,632			
36	Electric and Electronic Equip	902	3.30%	1,595,832	1.5479%	423	479
367	Electronic Components and A	467	1.71%	557,933	0.5412%	148	319
283	Drugs	C(estimate)	175	0.6397%	174,440	0.1692%	46	129
357	Office and con	C(estimate)	175	0.6397%	338,369	0.3282%	90	85
361	Electric distributing equipme		0	0.0000%	78,293	0.0759%	21	-21
362	Electrical Ind	C(estimate)	175	0.6397%	170,822	0.1657%	45	130
366	Communicatio	E(estimate)	375	1.3708%	258,986	0.2512%	69	306
382	Measuring anc	C(estimate)	175	0.6397%	300,456	0.2914%	80	95
384	Medical Instr	C(estimate)	175	0.6397%	215,552	0.2091%	57	118
737	Computer and Data Processi		0	0.0000%	678,877	0.6585%	180	-180
3731	Research and Development L		0	0.0000%	158,513	0.1538%	42	-42
822	Colleges and U	F(estimate)	750	2.7416%	1,012,868	0.9825%	269	481
891	*Engineering and Architectu		177	0.6470%	784,946	0.7614%	208	-31
3733	*Noncommercial Research C		0	0.0000%	58,784	0.0570%	16	-16
3674	Semiconducto	B(estimate)	60	0.22%	180,236	0.1748%	48	12

COMPARISON TABLES WILLIAMSON COUNTY

Year	Category 283 Drugs	% change	357 office and	% change	361 Electric c	& change
1984	125		47		-29	
1985	127	1.56%	52	11.17%	-27	5.77%
1986	127	-0.22%	67	27.85%	-27	0.00%
1987	127	0.07%	73	8.88%	-25	8.70%
1988	129	1.19%	85	17.38%	-21	15.65%

relies too much on estimates

Year	Category 362 Electrica	% change	366 Communic	% change	382 Measurin	& change
1984	320		188		110	
1985	698	118.32%	191	1.53%	113	3.14%
1986	327	-53.21%	187	-1.71%	117	2.99%
1987	329	0.65%	199	6.37%	118	1.06%
1988	130	-60.57%	306	53.65%	95	-19.17%

Year	Category 384 Medical li	% change	737 Computer	% change	8731 Researc	& change
1984	-44		-135		-37	
1985	-42	4.05%	-143	-6.09%	-39	-6.97%
1986	-43	-2.29%	-154	-7.77%	-41	-4.72%
1987	-44	-0.93%	-112	27.30%	-40	1.92%
1988	118	370.43%	-180	-60.55%	-42	-4.08%

Year	Category 822 Colleges	% change	891 *Engineer	% change	8733 *Noncor	& change
1984	92		-34		-20	
1985	101	9.30%	21	162.40%	-19	2.23%
1986	472	367.29%	19	-10.01%	-20	-3.38%
1987	475	0.58%	31	59.43%	-19	6.68%
1988	481	1.36%	-31	-202.37%	-16	16.12%

	AUSTIN METROPOLITAN STATISTICAL AREA					
1984 SIC 36 code data	AUSTIN MSA		USA		expected	export
	326,800		82,564,354			
36 Electric and Electronic Equipmen	11,121	3.40%	2,049,334	2.4821%	8,112	3,009
367 Electronic Components and Acce	4,500	1.38%	585,859	0.7096%	2,319	2,181
283 Drugs	925	0.28%	169,679	0.2055%	672	253
357 Office and computing machines	7,675	2.35%	438,542	0.5312%	1,736	5,939
361 Electric distributing equipment	60	0.0184%	99,807	0.1209%	395	-335
362 Electrical industries apparatus	725	0.2218%	188,844	0.2287%	747	-22
366 Communications Equipment	4,125	1.2622%	640,993	0.7764%	2,537	1,588
382 Measuring and Controlling Devic	966	0.2956%	223,212	0.2703%	884	82
384 Medical Instruments and Supplie	375	0.1147%	150,562	0.1824%	596	-221
737 Computer and Data Processing D	1,703	0.5211%	462,144	0.5597%	1,829	-126
7391 Research and Development Labor	801	0.2451%	125,930	0.1525%	498	303
822 Colleges and Universities	1,374	0.4204%	967,509	1.1718%	3,830	-2,456
891 Engineering and Architectural Se	5,504	1.6842%	603,050	0.7304%	2,387	3,117
892 Noncommercial Research Organi	172	0.0526%	67,501	0.0818%	267	-95
3674 Semiconductors and related dev	1,058	0.32%	189,166	0.2291%	749	309

1985 SIC 36 code data	AUSTIN MSA		USA		expected	export
	357,019		97,789,257			
36 Electric and Electronic Equipmen	12,107	3.39%	2,082,766	2.1299%	7,604	4,503
367 Electronic Components and Acce	7,918	2.22%	611,966	0.6258%	2,234	5,684
283 Drugs	925	0.2591%	171,067	0.1749%	625	300
357 Office and computing machines	17,675	4.9507%	441,471	0.4515%	1,612	16,063
361 Electric distributing equipment	120	0.0336%	98,713	0.1009%	360	-240
362 Electrical industries apparatus	1,100	0.3081%	185,903	0.1901%	679	421
366 Communications Equipment	4,125	1.1554%	662,477	0.6775%	2,419	1,706
382 Measuring and Controlling Devic	1,115	0.3123%	221,902	0.2269%	810	305
384 Medical Instruments and Supplie	750	0.2101%	151,624	0.1551%	554	196
737 Computer and Data Processing D	1,364	0.3821%	514,610	0.5262%	1,879	-515
7391 Research and Development Labor	998	0.2795%	141,390	0.1446%	516	482
822 Colleges and Universities	1,215	0.3403%	984,602	1.0069%	3,595	-2,380
891 Engineering and Architectural Se	6,711	1.8797%	667,336	0.6824%	2,436	4,275
892 Noncommercial Research Organi	202	0.0566%	69,270	0.0708%	253	-51
3674 Semiconductors and related dev	3,750	1.0504%	206,470	0.2111%	754	2,996

1986 SIC 36 code data	AUSTIN MSA		USA		expected	export
	369,870		96,763,465			
36 Electric and Electronic Equipmen	10,508	2.84%	2,016,533	2.0840%	7,708	2,800
367 Electronic Components and Acce	7,774	2.10%	559,846	0.5786%	2,140	5,634
283 Drugs F(estimate)	1,925	0.5205%	171,789	0.1775%	657	1,268
357 Office and con K(estimate)	17,675	4.7787%	388,635	0.4016%	1,486	16,189
361 Electric distriB(estimate)	60	0.0162%	96,777	0.1000%	370	-310
362 Electrical Ind C(estimate)	446	0.1206%	173,244	0.1790%	662	-216

366	Communicatio H(estimate)	4,125	1.1153%	673,067	0.6956%	2,573	1,552
382	Measuring anc K(estimate)	1,094	0.2958%	209,380	0.2164%	800	294
384	Medical Instr. E(estimate)	120	0.0324%	154,845	0.1600%	592	-472
737	Computer and Data Processing D	1,682	0.4548%	553,659	0.5722%	2,116	-434
7391	Research and Development Labor	1,215	0.3285%	147,821	0.1528%	565	650
822	Colleges and Universities	1,642	0.4439%	997,293	1.0307%	3,812	-2,170
891	Engineering and Architectural Sc	7,109	1.9220%	706,171	0.7298%	2,699	4,410
892	Noncommercial Research Organi	176	0.0476%	71,493	0.0739%	273	-97
3674	Semiconductors and related dev	3,750	1.01%	182,995	0.1891%	699	3,051

	1987 SIC 36 code data	AUSTIN MSA		USA		expected	export
		357,070		100,644,804			
36	Electric and Electronic Equipmen	10,501	2.94%	1,977,294	1.9646%	7,015	3,486
367	Electronic Components and Acce	7,886	2.21%	567,143	0.5635%	2,012	5,874
283	Drugs F(estimate)	1,925	0.5391%	174,747	0.1736%	620	1,305
357	Office and con K(estimate)	17,675	4.9500%	374,386	0.3720%	1,328	16,347
361	Electric distriB(estimate)	0	0.0000%	90,043	0.0895%	319	-319
362	Electrical Indu C(estimate)	558	0.1563%	168,784	0.1677%	599	-41
366	Communicatio H(estimate)	3,083	0.8634%	642,257	0.6381%	2,279	804
382	Measuring anc K(estimate)	1,015	0.2843%	208,849	0.2075%	741	274
384	Medical Instr. E(estimate)	176	0.0493%	159,267	0.1582%	565	-389
737	Computer and Data Processing D	2,759	0.7727%	618,607	0.6146%	2,195	564
7391	Research and Development Labor	1,379	0.3862%	147,745	0.1468%	524	855
822	Colleges and Universities	2,076	0.5814%	1,006,263	0.9998%	3,570	-1,494
891	Engineering and Architectural Sc	6,467	1.8111%	736,487	0.7318%	2,613	3,854
892	Noncommercial Research Organi	261	0.0731%	67,986	0.0676%	241	20
3674	Semiconductors and related dev	3,810	1.07%	180,737	0.1796%	641	3,169

	1988 SIC 36 code data	AUSTIN MSA		USA		expected	export
		352,243		103,094,632			
36	Electric and Electronic Equipmen	14,931	4.24%	1,595,832	1.5479%	5,452	9,479
367	Electronic Components and Acce	11,967	3.40%	557,933	0.5412%	1,906	10,061
283	Drugs	1,925	0.5465%	174,440	0.1692%	596	1,329
357	Office and computing machines	3,546	1.0067%	338,369	0.3282%	1,156	2,390
361	Electric distributing equipment	0	0.0000%	78,293	0.0759%	268	-268
362	Electrical Industries apparatus	550	0.1561%	170,822	0.1657%	584	-34
366	Communications Equipment	1,123	0.3188%	258,986	0.2512%	885	238
382	Measuring and Controlling Devic	1,544	0.4383%	300,456	0.2914%	1,027	517
384	Medical Instruments and Supplie	756	0.2146%	215,552	0.2091%	736	20
737	Computer and Data Processing D	2,887	0.8196%	678,877	0.6585%	2,320	567
8731	Research and Development Labor	1,439	0.4085%	158,513	0.1538%	542	897
822	Colleges and Universities	1,811	0.5141%	1,012,868	0.9825%	3,461	-1,650
891	*Engineering and Architectural :	6,341	1.8002%	784,946	0.7614%	2,682	3,659
8733	*Noncommercial Research Orgai	239	0.0679%	58,784	0.0570%	201	38
3674	Semiconductors and related dev	3,810	1.08%	180,236	0.1748%	616	3,194

COMPARISON TABLES AUSTIN MSA

Year	Category 283 Drugs	% change	357 office	% change	361 Electri	& change
1984	253		5,939		-335	
1985	300	18.57%	16,063	170.46%	-240	28.25%
1986	1,268	322.15%	16,189	0.79%	-310	-28.92%
1987	1,305	2.89%	16,347	0.97%	-319	-3.08%
1988	1,329	1.84%	2,390	-85.38%	-268	16.26%

relies too much on estimates

Year	Category 362 Electrical Ind	% change	366 Comm	% change	382 Measu	& change
1984	-22		1,588		82	
1985	421	1975.04%	1,706	7.46%	305	269.53%
1986	-216	-151.32%	1,552	-9.03%	294	-3.67%
1987	-41	81.12%	804	-48.18%	274	-6.68%
1988	-34	17.56%	238	-70.40%	517	88.82%

Year	Category 384 Medical Instr	% change	737 Compu	% change	8731 Rese	& change
1984	-221		-126		303	
1985	196	188.91%	-515	-307.84%	482	59.24%
1986	-472	-340.22%	-434	15.63%	650	34.90%
1987	-389	17.55%	564	229.93%	855	31.52%
1988	20	105.02%	567	0.57%	897	4.98%

Year	Category 822 Colleges and	% change	891 *Engi	% change	8733 *Non	& change
1984	-2,456		3,117		-95	
1985	-2,380	-3.09%	4,275	37.14%	-51	-46.52%
1986	-2,170	-8.81%	4,410	3.16%	-97	91.12%
1987	-1,494	-31.15%	3,854	-12.60%	20	120.35%
1988	-1,650	10.42%	3,659	-5.06%	38	92.71%

APPENDIX B1

EMPLOYMENT SHIFTS AND SHARES COMPARISON BETWEEN 1977 AND 1986

Employment Category	U.S. Employment 1977	1986	[1] % change U.S employment 77 to 86	[2] Austin MSA Employment 1977	1986	[3] [4] % in MSA employment 77 to 86
TOTALS	78,358,580	96,763,465	23.49%	193,798	369,870	90.85%
AGRICULTURAL SERVICES	**242,997**	**412,010**	**69.55%**	**491**	**1,812**	**269.04%**
7 Agricultural Services	217,131	384,284	76.98%	439	2,194	399.77%
8 Forestry	14,506	17,174	18.39%	0	0	0.00
9 Fishing, hunting and trapp	9,999	8,340	-16.59%	0	0	0.00
Administrative and Auxiliary	0	2,203	0.00%	0	0	0.00
SUBTOTALS	241,636	409,798	69.59%	439	2,194	399.77%
MINING	**830,178**	**847,143**	**2.04%**	**335**	**982**	**193.13%**
10 Metal Mining	94,280	37,830	-59.87%	0	60	0.00
11 Anthracite mining	3,764	2,363	-37.22%	0	0	0.00
12 Bituminous coal and lignit	224,131	173,483	-22.60%	0	0	0.00
13 Oil and gas extraction	322,951	407,314	26.12%	94	305	224.47%
14 Nonmetallic minerals exc	105,171	101,075	-3.89%	175	410	134.29%
Administrative and Auxiliary	79,881	125,065	56.56%	0	0	0.00
SUBTOTALS	830,178	847,130	2.04%	269	775	188.10%
CONTRACT CONSTRUCTION	**3,571,973**	**4,658,669**	**30.42%**	**10,385**	**23,813**	**129.30%**
15 General contractors and c	971,508	1,224,577	26.05%	2,854	6,119	114.40%
16 Heavy construction excep	716,063	693,078	-3.21%	1,319	4,669	253.98%
17 Special trade contractors	1,866,504	2,721,543	45.81%	6,212	13,448	116.48%
Administrative and Auxiliary	15,896	19,471	22.49%	0	175	0.00%
SUBTOTALS	3,569,971	4,658,669	30.50%	10,385	24,411	135.06%
MANUFACTURING	**19,638,852**	**19,141,756**	**-2.53%**	**21,956**	**42,431**	**93.25%**
20 Food and kindred products	1,498,119	1,405,771	-6.16%	1,619	2,005	23.84%
21 Tabacco manufacturers	61,422	48,080	-21.72%	0	0	0.00
22 Textille mill products	883,161	667,969	-24.37%	175	0	-100.00%
23 Apparel and other textile	1,296,208	1,082,437	-16.49%	578	235	-59.34%
24 Lumber and wood product	678,236	657,853	-3.01%	422	1,071	153.79%
25 Furniture and fixtures	446,577	492,802	10.35%	2,333	1,267	-45.69%
26 Paper and allied products	633,561	620,234	-2.10%	0	64	0.00%
27 printing and publishing	1,127,876	1,451,383	28.68%	2,440	4,675	91.60%
28 chemicals and allied prod	888,148	832,862	-6.22%	196	1,978	909.18%
29 Petroleum and coal produ	139,036	126,243	-9.20%	0	0	0.00
30 Rubber and misc. plastic	703,662	769,544	9.36%	308	497	61.36%
31 Leather and leather produ	242,525	139,246	-42.58%	0	0	0.00
32 Stone, clay, and glass pr	601,918	545,952	-9.30%	583	1,726	196.05%
33 Primary Metal Industries	1,137,890	736,357	-35.29%	56	400	614.29%
34 Fabricated metal products	1,516,661	1,476,672	-2.64%	645	2,434	277.36%
35 Machinery except electri	2,080,422	1,980,031	-4.83%	3,869	18,018	365.70%
36 Electric and Electronic Eq	1,710,806	2,016,533	17.87%	5,972	10,508	75.95%
37 Transportation equipment	1,793,451	1,805,051	0.65%	1,750	175	-90.00%
38 Instruments and related p	561,668	615,705	9.62%	593	1,472	148.23%
39 Miscellaneous manufactu	440,519	375,153	-14.84%	469	1,195	154.80%

Administrative and Auxiliary	1,196,966	1,295,872	8.26%	750	528	-29.60%
SUBTOTALS	19,638,832	19,141,750	-2.53%	22,758	48,248	112.00%
TRANSPORTATION AND OTH	**4,030,479**	**4,884,297**	**21.18%**	**5,973**	**11,501**	**92.55%**
41 Local and interurban pass	260,277	272,495	4.69%	308	881	186.04%
42 Trucking and warehousing	1,146,153	1,308,879	14.20%	1,121	2,120	89.12%
44 Water transportation	185,839	170,127	-8.45%	0	0	0.00
45 Transportation by air	350,577	511,759	45.98%	199	909	356.78%
46 Pipelines except natural g	15,276	17,695	15.84%	0	0	0.00
47 Transportation services	155,655	302,980	94.65%	162	609	275.93%
48 Communication	1,146,019	1,265,531	10.43%	3,395	5,491	61.74%
49 Electric, gas, and sanitar	659,328	837,949	27.09%	631	1,209	91.60%
Administrative and Auxiliary	111,355	196,882	76.81%	60	175	191.67%
SUBTOTALS	4,030,479	4,884,297	21.18%	5,876	11,394	93.91%
WHOLESALE TRADE	**4,562,083**	**5,724,864**	**25.49%**	**6,848**	**13,412**	**95.85%**
50 Wholesale trade - durable	2,497,049	3,217,781	28.86%	4,544	8,546	88.07%
51 Wholesale Trade - nondur	1,816,041	2,216,759	22.07%	2,127	4,195	97.23%
Administrative and Auxiliary	248,993	290,324	16.60%	0	750	0.00%
SUBTOTALS	4,562,083	5,724,864	25.49%	6,671	13,491	102.23%
RETAIL TRADE	**13,384,271**	**17,549,841**	**31.12%**	**34,986**	**68,072**	**94.57%**
52 Building materials and gar	458,320	626,477	36.69%	1,079	2,362	118.91%
53 General merchandise stor	1,879,056	1,954,204	4.00%	4,195	5,997	42.96%
54 Food stores	1,988,605	2,722,802	36.92%	5,163	12,343	139.07%
55 Automotive dealers and s	1,765,521	1,930,359	9.34%	4,179	6,185	48.00%
56 Apparel and accessory st	847,990	1,081,362	27.52%	2,498	4,151	66.17%
57 Furniture and home furnis	504,007	668,194	32.58%	1,434	3,000	109.21%
58 Eating and drinking places	3,699,628	5,577,135	50.75%	11,545	25,014	116.67%
59 Miscellaneous retail	1,666,602	2,204,710	32.29%	3,880	7,910	103.87%
Administrative and Auxiliary	574,542	784,598	36.56%	971	1,110	14.32%
SUBTOTALS	13,384,271	17,549,841	31.12%	34,944	68,072	94.80%
FINANCE INSURANCE AND R	**4,568,788**	**6,370,787**	**39.44%**	**11,518**	**29,604**	**157.02%**
60 Banking	1,288,258	1,639,912	27.30%	2,261	4,862	115.04%
61 Credit agencies and other	488,159	813,318	66.61%	1,521	4,371	187.38%
62 Security, commodity brol	188,250	377,278	100.41%	203	1,076	430.05%
63 Insurance carriers	1,114,650	1,313,076	17.80%	3,493	7,434	112.83%
64 Insurance agents, brokers	383,789	597,436	55.67%	1,201	2,558	112.99%
65 Real estate	861,904	1,220,293	41.56%	2,196	7,727	251.87%
66 Combined real estate, ins	29,335	24,690	-15.83%	60	60	0.00%
67 Holding and other investm	131,608	209,952	59.53%	412	1,552	276.70%
Administrative and Auxiliary	82,835	174,832	111.06%	0	0	0.00
SUBTOTALS	4,568,788	6,370,787	39.44%	11,347	29,640	161.21%
SERVICES	**14,059,994**	**22,878,357**	**62.72%**	**32,698**	**79,420**	**142.89%**
70 Hotels and other lodging p	915,178	1,331,620	45.50%	2,339	3,860	65.03%
72 Personal services	901,047	1,117,133	23.98%	2,549	5,090	99.69%
73 Business services	2,307,384	4,612,797	99.91%	4,910	17,468	255.76%
75 Auto repair, services, an	477,370	726,858	52.26%	1,156	2,643	128.63%
76 Miscellaneous repair serv	254,140	338,723	33.28%	536	1,278	138.43%

78 Motion pictures	180,933	252,221	39.40%	375	717	91.20%
79 Amusement and recreatio	585,304	796,839	36.14%	1,086	2,107	94.01%
80 Health services	4,339,178	6,614,276	52.43%	7,254	16,762	131.07%
81 Legal services	392,481	745,566	89.96%	1,177	4,153	252.85%
82 Educational services	992,019	1,561,782	57.43%	1,455	2,731	87.70%
83 Social services	764,310	1,367,622	78.94%	4,584	5,002	9.12%
84 Museums, botanical, zool	22,588	37,060	64.07%	0	50	0.00%
86 Membership organizations	1,100,716	1,696,145	54.09%	2,917	7,502	157.18%
89 Miscellaneous services	670,425	1,409,941	110.31%	2,425	0	-100.00%
Administrative and Auxiliary	156,921	269,774	71.92%	186	9,719	5,125.27%
SUBTOTALS	14,059,994	22,878,357	62.72%	32,949	375	-98.86%
Nonclassifiable Establishm	**85,965**	**912,741**	**961.76%**	**374**	**79,457**	**21,145.19%**

[5]	[6]	[7]	[8]	
Employment Change Related to				
National Growth	Industrial Mix	Competitive Share	TOTAL CHANGE	
45,519	-0	130,553	176,072	
115	226	979	**1,321**	**AGRICULTURAL SERVICES**
103	235	1,417	1,755	7 Agricultural Services
0	0	0	0	8 Forestry
0	0	0	0	9 Fishing, hunting and trapping
0	0	0	0	Administrative and Auxiliary
103	202	1,449	1,755	SUBTOTALS
79	-72	640	**647**	**MINING**
0	0	0	0	10 Metal Mining
0	0	0	0	11 Anthracite mining
0	0	0	0	12 Bituminous coal and lignite mining
22	2	186	211	13 Oil and gas extraction
41	-48	242	235	14 Nonmetallic minerals except fuels
0	0	0	0	Administrative and Auxiliary
63	-58	501	506	SUBTOTALS
2,439	720	10,269	**13,428**	**CONTRACT CONSTRUCTION**
670	73	2,522	3,265	15 General contractors and operative builders
310	-352	3,392	3,350	16 Heavy construction except highway
1,459	1,387	4,390	7,236	17 Special trade contractors
0	0	0	0	Administrative and Auxiliary
2,439	728	10,859	14,026	SUBTOTALS
5,157	-5,713	21,031	**20,475**	**MANUFACTURING**
380	-480	486	386	20 Food and kindred products
0	0	0	0	21 Tobacco manufacturers
41	-84	-132	-175	22 Textille mill products
136	-231	-248	-343	23 Apparel and other textile products
99	-112	662	649	24 Lumber and wood products
548	-306	-1,307	-1,066	25 Furniture and fixtures
0	0	0	0	26 Paper and allied products
573	127	1,535	2,235	27 printing and publishing
46	-58	1,794	1,782	28 chemicals and allied products
0	0	0	0	29 Petroleum and coal products
72	-44	160	189	30 Rubber and misc. plastic products
0	0	0	0	31 Leather and leather products
137	-191	1,197	1,143	32 Stone, clay, and glass products
13	-33	364	344	33 Primary Metal Industries
151	-169	1,806	1,789	34 Fabricated metal products
909	-1,095	14,336	14,149	35 Machinery except electrical
1,403	-335	3,469	4,536	36 Electric and Electronic Equipment
411	-400	-1,586	-1,575	37 Transportation equipment
139	-82	822	879	38 Instruments and related products
110	-180	796	726	39 Miscellaneous manufacturing industries

176	-114	-284	-222	Administrative and Auxiliary
5,345	-5,921	26,066	25,490	SUBTOTALS
1,403	-138	4,263	**5,528**	**TRANSPORTATION AND OTHER PUBLIC UTILIT**
72	-58	559	573	41 Local and interurban passenger transit
263	-104	840	999	42 Trucking and warehousing
0	0	0	0	44 Water transportation
47	45	619	710	45 Transportation by air
0	0	0	0	46 Pipelines except natural gas
38	115	294	447	47 Transportation services
797	-443	1,742	2,096	48 Communication
148	23	407	578	49 Electric, gas, and sanitary services
14	32	69	115	Administrative and Auxiliary
1,380	-135	4,273	5,518	SUBTOTALS
1,608	137	4,819	**6,564**	**WHOLESALE TRADE**
1,067	244	2,690	4,002	50 Wholesale trade - durable goods
500	-30	1,599	2,068	51 Wholesale Trade - nondurable goods
0	0	0	0	Administrative and Auxiliary
1,567	133	5,120	6,820	SUBTOTALS
8,218	2,671	22,197	**33,086**	**RETAIL TRADE**
253	142	887	1,283	52 Building materials and garden supplies
985	-818	1,634	1,802	53 General merchandise stores
1,213	694	5,274	7,180	54 Food stores
982	-591	1,616	2,006	55 Automotive dealers and service stations
587	101	966	1,653	56 Apparel and accessory stores
337	130	1,099	1,566	57 Furniture and home furnishings stores
2,712	3,147	7,610	13,469	58 Eating and drinking places
911	341	2,777	4,030	59 Miscellaneous retail
228	127	-216	139	Administrative and Auxiliary
8,208	2,668	22,252	33,128	SUBTOTALS
2,705	1,838	13,543	**18,086**	**FINANCE INSURANCE AND REAL ESTATE**
531	86	1,984	2,601	60 Banking
357	656	1,837	2,850	61 Credit agencies and other banks
48	156	669	873	62 Security, commodity brokers and services
820	-199	3,319	3,941	63 Insurance carriers
282	386	688	1,357	64 Insurance agents, brokers and service
516	397	4,618	5,531	65 Real estate
14	-24	10	0	66 Combined real estate, insurance, etc.
97	148	895	1,140	67 Holding and other investment offices
0	0	0	0	Administrative and Auxiliary
2,665	1,810	13,818	18,293	SUBTOTALS
7,680	12,828	26,214	**46,722**	**SERVICES**
549	515	457	1,521	70 Hotels and other lodging places
599	13	1,930	2,541	72 Personal services
1,153	3,753	7,652	12,558	73 Business services
272	333	883	1,487	75 Auto repair, services, and garages
126	52	564	742	76 Miscellaneous repair services

88	60	194	342	78 Motion pictures
255	137	629	1,021	79 Amusement and recreation services
1,704	2,100	5,705	9,508	80 Health services
276	782	1,917	2,976	81 Legal services
342	494	440	1,276	82 Educational services
1,077	2,542	-3,200	418	83 Social services
0	0	0	0	84 Museums, botanical, zoological gardens
685	893	3,007	4,585	86 Membership organizations
570	2,105	-5,100	-2,425	89 Miscellaneous services
44	90	9,399	9,533	Administrative and Auxiliary
7,739	12,926	-53,239	-32,574	SUBTOTALS
88	3,509	75,486	**79,083**	**Nonclassifiable Establishments**

APPENDIX B2

EMPLOYMENT SHIFTS AND SHARES COMPARISON BETWEEN 1986 AND 1988

Employment Category	U.S. Employment 1986	1988	[1] % change U.S employment 86 to 88	[2] Austin MSA Employment 1986	1988	[4] % in MSA employment 86 to 88
TOTALS	96,763,465	103,094,632	6.54%	369,870	352,243	-4.77%
AGRICULTURAL SERVICES	**412,010**	**461,768**	**12.08%**	**1,812**	**1,218**	**-32.78%**
7 Agricultural Services	384,284	432,453	12.53%	2,194	977	-55.47%
8 Forestry	17,174	17,875	4.08%	0	0	0.00
9 Fishing, hunting and trappin	8,340	9,067	8.72%	0	0	0.00
Administrative and Auxiliary	2,203	2,373	0.00%	0	0	0.00
SUBTOTALS	409,798	459,395	12.10%	2,194	977	-55.47%
MINING	**847,143**	**734,953**	**-13.24%**	**982**	**550**	**-43.99%**
10 Metal Mining	37,830	45,033	19.04%	60	0	0.00
11 Anthracite mining	2,363	0	-100.00%	0	0	0.00
12 Bituminous coal and lignite	173,483	152,001	-12.38%	0	0	0.00
13 Oil and gas extraction	407,314	301,579	-25.96%	305	157	-48.52%
14 Nonmetallic minerals excep	101,075	103,333	2.23%	410	235	-42.68%
Administrative and Auxiliary	125,065	133,007	6.35%	0	0	0.00
SUBTOTALS	847,130	734,953	-13.24%	775	392	-49.42%
CONTRACT CONSTRUCTION	**4,658,669**	**4,938,977**	**6.02%**	**23,813**	**13,477**	**-43.40%**
15 General contractors and op	1,224,577	1,279,815	4.51%	6,119	2,494	-59.24%
16 Heavy construction except	693,078	704,748	1.68%	4,669	3,131	-32.94%
17 Special trade contractors	2,721,543	2,932,592	7.75%	13,448	7,650	-43.11%
Administrative and Auxiliary	19,471	21,822	12.07%	175	0	0.00%
SUBTOTALS	4,658,669	4,938,977	6.02%	24,411	13,275	-45.62%
MANUFACTURING	**19,141,756**	**19,261,691**	**0.63%**	**42,431**	**40,786**	**-3.88%**
20 Food and kindred products	1,405,771	1,438,668	2.34%	2,005	1,478	-26.28%
21 Tabacco manufacturers	48,080	46,619	-3.04%	0	0	0.00
22 Textille mill products	667,969	682,674	2.20%	0	175	0.00%
23 Apparel and other textile pi	1,082,437	1,070,973	-1.06%	235	482	105.11%
24 Lumber and wood products	657,853	712,498	8.31%	1,071	2,212	106.54%
25 Furniture and fixtures	492,802	519,911	5.50%	1,267	543	-57.14%
26 Paper and allied products	620,234	625,238	0.81%	64	60	0.00%
27 printing and publishing	1,451,383	1,524,887	5.06%	4,675	4,542	-2.84%
28 chemicals and allied produc	832,862	831,621	-0.15%	1,978	1,925	-2.68%
29 Petroleum and coal product	126,243	118,263	-6.32%	0	0	0.00
30 Rubber and misc. plastic pr	769,544	869,856	13.04%	497	675	35.81%
31 Leather and leather product	139,246	129,561	-6.96%	0	0	0.00
32 Stone, clay, and glass prod	545,952	518,820	-4.97%	1,726	1,322	-23.41%
33 Primary Metal Industries	736,357	725,201	-1.52%	400	299	-25.25%
34 Fabricated metal products	1,476,672	1,491,640	1.01%	2,434	1,187	-51.23%
35 Machinery except electrica	1,980,031	1,924,409	-2.81%	18,018	4,635	-74.28%
36 Electric and Electronic Equi	2,016,533	1,595,832	-20.86%	10,508	14,931	42.09%
37 Transportation equipment	1,805,051	1,847,865	2.37%	175	1,810	934.29%
38 Instruments and related pr	615,705	1,002,522	62.83%	1,472	2,546	72.96%
39 Miscellaneous manufactur	375,153	386,761	3.09%	1,195	750	-37.24%

Administrative and Auxiliary	1,295,872	1,197,872	-7.56%	528	1,093	107.01%
SUBTOTALS	19,141,750	19,261,691	0.63%	48,248	40,665	-15.72%
TRANSPORTATION AND OT	**4,884,297**	**5,270,318**	**7.90%**	**11,501**	**10,826**	**-5.87%**
41 Local and interurban passer	272,495	303,501	11.38%	881	1,087	23.38%
42 Trucking and warehousing	1,308,879	1,482,680	13.28%	2,120	1,722	-18.77%
44 Water transportation	170,127	155,579	-8.55%	0	0	0.00
45 Transportation by air	511,759	622,522	21.64%	909	976	7.37%
46 Pipelines except natural ga:	17,695	16,857	-4.74%	0	0	0.00
47 Transportation services	302,980	321,424	6.09%	609	568	-6.73%
48 Communication	1,265,531	1,210,665	-4.34%	5,491	4,890	-10.95%
49 Electric, gas, and sanitary	837,949	853,591	1.87%	1,209	1,028	-14.97%
Administrative and Auxiliary	196,882	303,499	54.15%	175	334	90.86%
SUBTOTALS	4,884,297	5,270,318	7.90%	11,394	10,605	-6.92%
WHOLESALE TRADE	**5,724,864**	**5,981,378**	**4.48%**	**13,412**	**12,911**	**-3.74%**
50 Wholesale trade - durable g	3,217,781	3,390,497	5.37%	8,546	8,839	3.43%
51 Wholesale Trade - nondurat	2,216,759	2,283,536	3.01%	4,195	4,163	-0.76%
Administrative and Auxiliary	290,324	307,345	5.86%	750	0	0.00%
SUBTOTALS	5,724,864	5,981,378	4.48%	13,491	13,002	-3.62%
RETAIL TRADE	**17,549,841**	**18,801,521**	**7.13%**	**68,072**	**64,221**	**-5.66%**
52 Building materials and gard	626,477	679,445	8.45%	2,362	1,753	-25.78%
53 General merchandise stores	1,954,204	2,066,306	5.74%	5,997	5,963	-0.57%
54 Food stores	2,722,802	2,886,034	6.00%	12,343	11,602	-6.00%
55 Automotive dealers and ser	1,930,359	2,075,912	7.54%	6,185	6,359	2.81%
56 Apparel and accessory stor	1,081,362	1,156,594	6.96%	4,151	4,079	-1.73%
57 Furniture and home furnish	668,194	711,571	6.49%	3,000	2,296	-23.47%
58 Eating and drinking places	5,577,135	6,097,450	9.33%	25,014	23,567	-5.78%
59 Miscellaneous retail	2,204,710	2,317,288	5.11%	7,910	7,098	-10.27%
Administrative and Auxiliary	784,598	810,921	3.35%	1,110	1,535	38.29%
SUBTOTALS	17,549,841	18,801,521	7.13%	68,072	64,252	-5.61%
FINANCE INSURANCE AND I	**6,370,787**	**6,659,618**	**4.53%**	**29,604**	**27,211**	**-8.08%**
60 Banking	1,639,912	1,959,784	19.51%	4,862	5,882	20.98%
61 Credit agencies and other b	813,318	542,186	-33.34%	4,371	3,241	-25.85%
62 Security, commodity broke	377,278	426,626	13.08%	1,076	1,128	4.83%
63 Insurance carriers	1,313,076	1,326,450	1.02%	7,434	7,136	-4.01%
64 Insurance agents, brokers :	597,436	685,969	14.82%	2,558	2,848	11.34%
65 Real estate	1,220,293	1,286,615	5.43%	7,727	5,784	-25.15%
66 Combined real estate, insur	24,690	0	-100.00%	60	0	-100.00%
67 Holding and other investmer	209,952	239,589	14.12%	1,552	1,750	12.76%
Administrative and Auxiliary	174,832	192,399	10.05%	0	175	0.00
SUBTOTALS	6,370,787	6,659,618	4.53%	29,640	27,944	-5.72%
SERVICES	**22,878,357**	**25,142,715**	**9.90%**	**79,420**	**80,751**	**1.68%**
70 Hotels and other lodging pla	1,331,620	1,384,565	3.98%	3,860	3,567	-7.59%
72 Personal services	1,117,133	1,101,272	-1.42%	5,090	3,967	-22.06%
73 Business services	4,612,797	4,385,365	-4.93%	17,468	14,101	-19.28%
75 Auto repair, services, and	726,858	812,538	11.79%	2,643	2,876	8.82%
76 Miscellaneous repair servic	338,723	356,096	5.13%	1,278	1,157	-9.47%

78 Motion pictures	252,221	369,632	46.55%	717	868	21.06%
79 Amusement and recreation	796,839	909,289	14.11%	2,107	2,317	9.97%
80 Health services	6,614,276	7,221,951	9.19%	16,762	18,809	12.21%
81 Legal services	745,566	848,507	13.81%	4,153	4,835	16.42%
82 Educational services	1,561,782	1,630,888	4.42%	2,731	3,126	14.46%
83 Social services	1,367,622	1,532,276	12.04%	5,002	4,923	-1.58%
84 Museums, botanical, zoolog	37,060	56,503	52.46%	50	73	0.00%
86 Membership organizations	1,696,145	1,778,170	4.84%	7,502	7,318	-2.45%
new category	0	2,301,991	0.00%	0	0	0.00%
89 Miscellaneous services	1,409,941	122,267	-91.33%	9,719	407	-95.81%
Administrative and Auxiliary	269,774	331,405	22.85%	375	518	38.13%
SUBTOTALS	22,878,357	25,142,715	9.90%	79,457	68,862	-13.33%
Nonclassifiable Establishm	**912,741**	**628,693**	**-31.12%**	**4,397**	2,712	-38.32%

APPENDIX B2

EMPLOYMENT SHIFTS AND SHARES COMPARISON BETWEEN 1986 AND 1988

[5] National Growth	[6] Industrial Mix	[7] Competitive Share	[8] TOTAL CHANGE	
Employment Change Related to				
24,200	-0	-41,827	-17,627	
119	100	**-813**	**-594**	**AGRICULTURAL SERVICES**
144	131	-1,492	-1,217	7 Agricultural Services
0	0	0	0	8 Forestry
0	0	0	0	9 Fishing, hunting and trapping
0	0	0	0	Administrative and Auxiliary
144	122	-1,483	-1,217	SUBTOTALS
64	-194	**-302**	**-432**	**MINING**
4	7	-11	0	10 Metal Mining
0	0	0	0	11 Anthracite mining
0	0	0	0	12 Bituminous coal and lignite mining
20	-99	-69	-148	13 Oil and gas extraction
27	-18	-184	-175	14 Nonmetallic minerals except fuels
0	0	0	0	Administrative and Auxiliary
51	-153	-280	-383	SUBTOTALS
1,558	-125	**-11,769**	**-10,336**	**CONTRACT CONSTRUCTION**
400	-124	-3,901	-3,625	15 General contractors and operative builders
305	-227	-1,617	-1,538	16 Heavy construction except highway
880	163	-6,841	-5,798	17 Special trade contractors
11	10	-21	0	Administrative and Auxiliary
1,597	-128	-12,605	-11,136	SUBTOTALS
2,776	-2,510	**-1,911**	**-1,645**	**MANUFACTURING**
131	-84	-574	-527	20 Food and kindred products
0	0	0	0	21 Tabacco manufacturers
0	0	0	0	22 Textille mill products
15	-18	249	247	23 Apparel and other textile products
70	19	1,052	1,141	24 Lumber and wood products
83	-13	-794	-724	25 Furniture and fixtures
4	-4	-1	0	26 Paper and allied products
306	-69	-370	-133	27 printing and publishing
129	-132	-50	-53	28 chemicals and allied products
0	0	0	0	29 Petroleum and coal products
33	32	113	178	30 Rubber and misc. plastic products
0	0	0	0	31 Leather and leather products
113	-199	-318	-404	32 Stone, clay, and glass products
26	-32	-95	-101	33 Primary Metal Industries
159	-135	-1,272	-1,247	34 Fabricated metal products
1,179	-1,685	-12,877	-13,383	35 Machinery except electrical
688	-2,880	6,615	4,423	36 Electric and Electronic Equipment
11	-7	1,631	1,635	37 Transportation equipment
96	828	149	1,074	38 Instruments and related products
78	-41	-482	-445	39 Miscellaneaous manufacturing industries

35	-74	605	565	Administrative and Auxiliary
3,157	-2,855	-7,885	-7,583	SUBTOTALS
753	156	-1,584	**-675**	**TRANSPORTATION AND OTHER PUBLIC U**
58	43	106	206	41 Local and interurban passenger transit
139	143	-680	-398	42 Trucking and warehousing
0	0	0	0	44 Water transportation
59	137	-130	67	45 Transportation by air
0	0	0	0	46 Pipelines except natural gas
40	-3	-78	-41	47 Transportation services
359	-597	-363	-601	48 Communication
79	-57	-204	-181	49 Electric, gas, and sanitary services
11	83	64	159	Administrative and Auxiliary
746	155	-1,690	-789	SUBTOTALS
878	-277	**-1,102**	**-501**	**WHOLESALE TRADE**
559	-100	-166	293	50 Wholesale trade - durable goods
274	-148	-158	-32	51 Wholesale Trade - nondurable goods
49	-5	-44	0	Administrative and Auxiliary
883	-278	-1,093	-489	SUBTOTALS
4,454	401	**-8,706**	**-3,851**	**RETAIL TRADE**
155	45	-809	-609	52 Building materials and garden supplies
392	-48	-378	-34	53 General merchandise stores
808	-68	-1,481	-741	54 Food stores
405	62	-292	174	55 Automotive dealers and service stations
272	17	-361	-72	56 Apparel and accessory stores
196	-2	-899	-704	57 Furniture and home furnishings stores
1,637	697	-3,781	-1,447	58 Eating and drinking places
518	-114	-1,216	-812	59 Miscellaneous retail
73	-35	388	425	Administrative and Auxiliary
4,454	401	-8,675	-3,820	SUBTOTALS
1,937	-595	**-3,735**	**-2,393**	**FINANCE INSURANCE AND REAL ESTATE**
318	630	72	1,020	60 Banking
286	-1,743	327	-1,130	61 Credit agencies and other banks
70	70	-89	52	62 Security, commodity brokers and services
486	-411	-374	-298	63 Insurance carriers
167	212	-89	290	64 Insurance agents, brokers and service
506	-86	-2,363	-1,943	65 Real estate
4	-64	0	-60	66 Combined real estate, insurance, etc.
102	118	-21	198	67 Holding and other investment offices
0	0	0	0	Administrative and Auxiliary
1,939	-596	-3,040	-1,696	SUBTOTALS
5,196	2,664	**-6,529**	**1,331**	**SERVICES**
253	-99	-446	-293	70 Hotels and other lodging places
333	-405	-1,051	-1,123	72 Personal services
1,143	-2,004	-2,506	-3,367	73 Business services
173	139	-79	233	75 Auto repair, services, and garages
84	-18	-187	-121	76 Miscellaneous repair services

47	287	-183	151	78 Motion pictures
138	159	-87	210	79 Amusement and recreation services
1,097	443	507	2,047	80 Health services
272	302	109	682	81 Legal services
179	-58	274	395	82 Educational services
327	275	-681	-79	83 Social services
3	23	-26	0	84 Museums, botanical, zoological gardens
491	-128	-547	-184	86 Membership organizations
0	0	0	0	
636	-9,512	-436	-9,312	89 Miscellaneous services
25	61	57	143	Administrative and Auxiliary
5,199	2,665	-18,459	-10,595	SUBTOTALS
288	-1,656	-317	**-1,685**	**Nonclassifiable Establishments**

APPENDIX B3

EMPLOYMENT SHIFTS AND SHARES COMPARISON BETWEEN 1977 and 1986 : 1986 and 1988 (For SIC codes 36, 367 and 3674)

SIC code	U.S. Employment 1977	U.S. Employment 1986	[1] % change U.S employment 77 to 86	[2] Austin MSA Employme 1977	[3] Employme 1986	[4] % in MSA employmer 77 to 86	[5] Employment National Growth	[6] Change Related to Industria Mix	[7] Competitiv Share	[8] TOTAL CHANGE
	7.8359E+7	96,763,465	23.49%	193,798	369,870	90.85%	45,519	-0	130,553	176,072
36	1,710,806	2,016,533	17.87%	5,972	10,508	75.95%	1,403	-335	3,469	4,536
367	385,712	559,846	45.15%	1,925	7,774	303.84%	452	417	4,980	5,849
3674	121,046	182,995	51.18%	1,750	3,750	114.29%	411	485	1,104	2,000

SIC code	U.S. Employment 1986	U.S. Employment 1988	[1] % change U.S employment 86 to 88	[2] Austin MSA Employme 1986	[3] Employme 1988	[4] % in MSA employmer 86 to 88	[5] Employment National Growth	[6] Change Related to Industria Mix	[7] Competitiv Share	[8] TOTAL CHANGE
	9.6763E+7	1.03095E+8	6.54%	369,870	352,243	-4.77%	24,200	-0	-41,827	-17,627
36	2,016,533	1,595,832	-20.86%	10,508	14,931	42.09%	688	-2,880	6,615	4,423
367	559,846	557,933	-0.34%	7,774	11,967	53.94%	509	-535	4,220	4,193
3674	182,995	180,236	-1.51%	3,750	3,810	1.60%	245	-302	117	60

APPENDIX C1

Monthly Building Permit Statistics for Austin, Texas for 1970 to 1990

Building Permit Year	Month	Residential Permits	Residential Value	Commercial Permits	Commercial Value	Public Permits	Public Value	Totals Permits	Totals Value
1970	1	231	$5,466,200	62	$2,176,100	5	$699,750	298	$8,342,050
	2	224	$2,165,800	57	$1,787,700	6	$1,003,983	287	$4,957,483
	3	320	$5,179,400	75	$4,738,200	9	$445,614	404	$10,363,214
	4	313	$5,034,300	93	$3,970,000	10	$353,505	416	$9,357,805
	5	361	$10,905,500	60	$5,270,500	8	$579,496	429	$16,755,496
	6	337	$4,920,800	71	$1,263,500	4	$30,300	412	$6,214,600
	7	422	$10,324,800	63	$4,351,400	26	$1,937,820	511	$16,614,020
	8	354	$4,524,900	63	$5,040,500	25	$4,816,148	442	$14,381,548
	9	413	$6,603,500	51	$1,412,700	2	$12,200	466	$8,028,400
	10	347	$5,235,800	66	$7,094,300	3	$84,500	416	$12,414,600
	11	347	$6,477,900	40	$1,214,800	8	$440,325	395	$8,133,025
	12	372	$5,031,000	60	$6,163,100	6	$7,473,497	438	$18,667,597
1970 Total		4041	$71,869,900	761	$44,482,800	112	$17,877,138	4914	$134,229,838
1971	1	312	$4,591,100	64	$2,253,200	4	$7,969,311	380	$14,813,611
	2	415	$9,797,100	54	$1,685,900	5	$486,020	474	$11,969,020
	3	501	$9,735,000	75	$2,623,300	7	$166,012	583	$12,524,312
	4	504	$7,840,900	107	$4,323,000	2	$1,265,252	613	$13,429,152
	5	424	$7,074,100	85	$1,716,100	6	$762,136	515	$9,552,336
	6	485	$10,479,600	100	$2,237,400	6	$2,409,579	591	$15,126,579
	7	413	$7,788,400	78	$3,340,200	13	$2,988,081	504	$14,116,681
	8	352	$5,811,500	78	$2,074,600	13	$1,861,428	443	$9,747,528
	9	466	$12,328,200	60	$7,048,194	37	$16,146,089	563	$35,522,483
	10	376	$13,547,600	56	$4,513,700	4	$1,375,936	436	$19,437,236
	11	399	$10,080,100	57	$9,246,900	10	$1,590,921	466	$20,917,921
	12	361	$8,353,000	47	$10,567,495	7	$6,385,924	415	$25,306,419
1971 Total		5008	$107,426,600	861	$51,629,989	114	$43,406,689	5983	$202,463,278
1972	1	453	$10,463,100	63	$4,183,000	7	$2,231,698	523	$16,877,798
	2	454	$19,910,830	57	$1,683,400	4	$336,104	515	$21,930,334
	3	496	$14,242,100	81	$3,509,700	12	$6,508,664	589	$24,260,464
	4	491	$12,153,200	72	$4,673,200	9	$1,988,274	572	$18,814,674
	5	462	$11,840,700	86	$3,857,700	16	$2,237,637	564	$17,936,037
	6	454	$15,139,000	80	$11,615,600	12	$4,776,615	546	$31,531,215
	7	472	$11,110,100	98	$1,927,700	20	$4,480,148	590	$17,517,948
	8	495	$12,895,900	73	$5,663,700	17	$930,296	585	$19,489,896
	9	435	$8,156,300	80	$10,035,400	20	$6,573,006	535	$24,764,706
	10	460	$13,448,900	73	$1,496,600	2	$4,449	535	$14,949,949
	11	384	$9,492,000	58	$1,343,400	7	$24,879	449	$10,860,279
	12	271	$12,790,000	47	$2,751,700	6	$5,756,295	324	$21,297,995
1972 Total		5327	$151,642,130	868	$52,741,100	132	$35,848,065	6327	$240,231,295
1973	1	340	$10,165,200	70	$4,436,900	7	$801,415	417	$15,403,515
	2	421	$14,300,200	66	$1,483,200	7	$1,328,548	494	$17,111,948
	3	507	$17,927,800	80	$8,787,300	10	$7,839,670	597	$34,554,770
	4	417	$13,702,200	91	$3,588,000	8	$6,676,200	516	$23,966,400
	5	425	$11,857,600	87	$5,951,200	5	$174,300	517	$17,983,100
	6	416	$8,575,400	82	$2,827,200	9	$4,111,808	507	$15,514,408

	7	359	$7,045,100	85	$14,845,200	9	$5,331,567	453	$27,221,867
	8	380	$16,186,500	116	$9,331,800	13	$1,980,555	509	$27,498,855
	9	303	$3,972,500	55	$1,325,600	7	$271,196	365	$5,569,296
	10	299	$5,983,300	68	$2,476,500	13	$8,322,571	380	$16,782,371
	11	334	$10,458,000	60	$4,878,700	10	$7,207,210	404	$22,543,910
	12	254	$4,417,000	51	$10,896,400	1	$200,000	306	$15,513,400
1973 Total		4455	$124,590,800	911	$70,828,000	99	$44,245,040	5465	$239,663,840
1974	1	275	$12,956,600	75	$4,690,700	6	$1,005,299	356	$18,652,599
	2	282	$4,520,500	87	$8,185,300	6	$972,837	375	$13,678,637
	3	416	$7,598,400	80	$5,479,000	13	$17,738,366	509	$30,815,766
	4	435	$9,141,000	99	$5,499,400	7	$4,080,359	541	$18,720,759
	5	445	$8,122,200	85	$5,267,700	11	$635,266	541	$14,025,166
	6	362	$5,784,700	78	$3,468,900	18	$38,410,240	458	$47,663,840
	7	462	$11,727,400	75	$1,632,500	16	$411,414	553	$13,771,314
	8	408	$5,662,100	93	$2,826,800	10	$1,474,075	511	$9,962,975
	9	330	$4,661,200	81	$3,091,600	13	$30,726,300	424	$38,479,100
	10	426	$9,172,400	88	$1,566,900	3	$24,200	517	$10,763,500
	11	294	$2,837,500	74	$2,641,300	7	$8,534,653	375	$14,013,453
	12	421	$8,132,100	50	$1,125,900	8	$23,085,552	479	$32,343,552
1974 Total		4556	$90,316,100	965	$45,476,000	118	!	5639	$262,890,661
1975	1	245	$2,705,900	62	$575,500	10	$1,407,780	317	$4,689,180
	2	306	$4,443,100	68	$1,001,400	6	$11,328,393	380	$16,772,893
	3	365	$4,505,700	63	$1,464,400	7	$1,015,048	435	$6,985,148
	4	434	$6,883,100	87	$2,237,700	6	$4,193,202	527	$13,314,002
	5	397	$6,752,200	93	$4,650,200	10	$136,232	500	$11,538,632
	6	446	$7,622,700	81	$2,750,400	15	$5,120,792	542	$15,493,892
	7	320	$4,746,700	86	$1,514,500	19	$11,301,953	425	$17,563,153
	8	386	$5,642,900	100	$2,428,900	14	$18,444,994	500	$26,516,794
	9	403	$5,170,900	69	$2,697,000	11	$1,162,900	483	$9,030,800
	10	466	$7,120,200	90	$1,531,400	13	$398,938	569	$9,050,538
	11	289	$4,929,300	83	$5,955,200	3	$4,000	375	$10,888,500
	12	262	$4,434,900	69	$1,554,500	5	$141,540	336	$6,130,940
1975 Total		4319	$64,957,600	951	$28,361,100	119	$54,655,772	5389	$147,974,472
1976	1	360	$6,381,800	90	$4,530,800	1	$300,128	451	$11,212,728
	2	406	$8,476,100	90	$3,335,800	2	$66,000	498	$11,877,900
	3	543	$14,619,300	98	$5,961,600	7	$1,263,815	648	$21,844,715
	4	335	$7,997,000	91	$3,094,800	7	$5,401,942	433	$16,493,742
	5	291	$5,221,100	69	$1,601,800	4	$110,434	364	$6,933,334
	6	347	$13,940,800	99	$3,552,100	12	$2,675,401	458	$20,168,301
	7	337	$7,486,500	99	$8,687,400	8	$3,385,340	444	$19,559,240
	8	359	$7,524,400	80	$4,483,700	9	$3,839,700	448	$15,847,800
	9	344	$9,222,900	82	$2,348,500	18	$259,273	444	$11,830,673
	10	353	$8,424,500	85	$1,896,300	9	$1,475,427	447	$11,796,227
	11	342	$7,381,200	92	$2,211,900	13	$2,010,424	447	$11,603,524
	12	273	$8,180,400	74	$3,512,800	6	$32,056,823	353	$43,750,023
1976 Total		4290	$104,856,000	1049	$45,217,500	96	$52,844,707	5435	$202,918,207
1977	1	363	$9,758,800	62	$1,887,300	12	$9,373,000	437	$21,019,100

	2	303	$6,873,700	78	$2,637,400	3	$194,550	384	$9,705,650
	3	490	$15,154,900	102	$4,429,000	5	$89,600	597	$19,673,500
	4	458	$10,030,900	100	$2,489,900	12	$3,864,656	570	$16,385,456
	5	492	$12,549,000	93	$6,329,300	6	$284,400	591	$19,162,700
	6	486	$13,393,400	103	$7,326,400	8	$397,629	597	$21,117,429
	7	472	$13,459,600	96	$3,542,800	9	$1,382,529	577	$18,384,929
	8	517	$19,920,600	138	$8,464,400	23	$1,397,588	678	$29,782,588
	9	407	$14,035,300	69	$2,312,000	7	$388,194	483	$16,735,494
	10	391	$13,875,300	90	$5,274,600	7	$5,446,785	488	$24,596,685
	11	430	$12,387,300	76	$5,413,100	4	$150,300	510	$17,950,700
	12	304	$8,552,000	63	$4,058,400	9	$969,800	376	$13,580,200
1977 Total		5113	$149,990,800	1070	$54,164,600	105	$23,939,031	6288	$228,094,431
1978	1	451	$17,395,300	81	$12,971,800	10	$2,168,890	542	$32,535,990
	2	406	$18,303,900	62	$6,554,500	8	$788,744	476	$25,647,144
	3	687	$24,204,100	94	$3,137,000	4	$560,300	785	$27,901,400
	4	537	$22,473,600	86	$3,073,100	4	$479,293	627	$26,025,993
	5	494	$28,702,600	111	$5,019,100	2	$133,000	607	$33,854,700
	6	552	$25,076,500	112	$10,432,100	7	$729,500	671	$36,238,100
	7	466	$16,425,500	122	$10,074,900	15	$1,482,903	603	$27,983,303
	8	523	$24,654,200	110	$5,367,900	26	$2,144,940	659	$32,167,040
	9	462	$18,573,500	107	$13,152,600	7	$185,000	576	$31,911,100
	10	438	$15,257,300	103	$6,789,400	9	$2,092,377	550	$24,139,077
	11	478	$18,856,300	95	$10,096,900	5	$181,200	578	$29,134,400
	12	316	$13,010,200	95	$7,731,400	15	$910,665	426	$21,652,265
1978 Total		5810	$242,933,000	1178	$94,400,700	112	$11,856,812	7100	$349,190,512
1979	1	380	$14,354,300	93	$17,874,500	13	$3,592,846	486	$35,821,646
	2	423	$15,748,200	103	$32,419,900	5	$2,764,435	531	$50,932,535
	3	555	$21,781,300	131	$10,395,200	7	$6,433,000	693	$38,609,500
	4	537	$28,195,000	107	$5,594,900	6	$177,296	650	$33,967,196
	5	600	$27,731,900	121	$6,652,600	6	$610,933	727	$34,995,433
	6	628	$20,955,900	150	$9,005,700	20	$431,221	798	$30,392,821
	7	573	$23,459,900	117	$6,142,100	4	$375,000	694	$29,977,000
	8	607	$22,271,300	124	$17,044,800	8	$77,600	739	$39,393,700
	9	507	$21,885,000	98	$10,368,400	2	$640,000	607	$32,893,400
	10	618	$27,432,400	155	$26,906,200	15	$7,879,600	788	$62,218,200
	11	439	$21,290,100	120	$7,097,100	3	$819,000	562	$29,206,200
	12	275	$9,863,100	89	$18,498,000	7	$686,863	371	$29,047,963
1979 Total		6142	$254,968,400	1408	$167,999,400	96	$24,487,794	7646	$447,455,594
1980	1	469	$20,616,400	119	$7,366,900	7	$1,826,100	595	$29,809,400
	2	437	$17,039,300	118	$10,239,500	5	$10,651,450	560	$37,930,250
	3	548	$23,634,000	89	$23,268,600	8	$540,400	645	$47,443,000
	4	569	$31,415,000	147	$30,159,700	15	$10,196,715	731	$71,771,415
	5	443	$13,981,800	109	$10,658,200	4	$17,700	556	$24,657,700
	6	402	$14,286,600	128	$29,944,000	13	$2,633,850	543	$46,864,450
	7	491	$20,438,800	129	$10,924,000	22	$2,269,700	642	$33,632,500
	8	505	$19,038,400	112	$11,539,600	18	$8,196,600	635	$38,774,600
	9	560	$22,391,000	104	$7,969,700	3	$16,100	667	$30,376,800

	10	676	$27,082,400	149	$24,815,877	10	$390,465	835	$52,288,742
	11	477	$22,161,300	98	$18,400,700	1	$825,600	576	$41,387,600
	12	401	$24,391,600	97	$5,759,800	3	$36,200	501	$30,187,600
1980 Total		5978	$256,476,600	1399	$191,046,577	109	$37,600,880	7486	$485,124,057
1981	1	498	$32,312,600	132	$10,537,800	2	$97,000	632	$42,947,400
	2	520	$27,048,000	125	$25,239,400	3	$2,058,000	648	$54,345,400
	3	548	$22,586,400	139	$7,322,700	2	$47,000	689	$29,956,100
	4	566	$24,731,100	155	$21,311,300	8	$5,461,800	729	$51,504,200
	5	493	$33,898,600	154	$11,909,800	5	$4,199,500	652	$50,007,900
	6	568	$34,215,300	191	$11,826,000	6	$3,367,000	765	$49,408,300
	7	554	$25,395,400	200	$38,947,200	5	$346,000	759	$64,688,600
	8	495	$21,070,000	153	$13,976,700	9	$10,737,473	657	$45,784,173
	9	452	$31,809,300	136	$11,270,200	6	$2,749,600	594	$45,829,100
	10	441	$27,710,600	160	$38,364,000	4	$724,667	605	$66,799,267
	11	286	$10,110,700	113	$8,560,600	8	$1,208,000	407	$19,879,300
	12	441	$33,630,200	128	$11,600,400	8	$51,200	577	$45,281,800
1981 Total		5862	$324,518,200	1786	$210,866,100	66	$31,047,240	7714	$566,431,540
1982	1	400	$24,626,100	135	$23,069,700	4	$321,200	539	$48,017,000
	2	400	$19,308,100	140	$16,764,100	4	$772,900	544	$36,845,100
	3	585	$31,713,600	193	$28,576,850	5	$3,311,000	783	$63,601,450
	4	527	$32,227,500	155	$9,001,100	4	$1,012,900	686	$42,241,500
	5	651	$44,031,985	169	$26,590,191	0	$0	820	$70,622,176
	6	684	$36,520,996	196	$70,984,993	11	$175,000	891	$107,680,989
	7	600	$30,116,462	209	$16,935,092	1	$577,777	810	$47,629,331
	8	524	$26,297,953	203	$14,482,228	1	$35,000	728	$40,815,181
	9	492	$37,934,373	203	$18,209,941	0	$0	695	$56,144,314
	10	526	$33,335,343	187	$9,130,720	1	$20,000	714	$42,486,063
	11	507	$35,116,622	165	$10,659,437	1	$20,000	673	$45,796,059
	12	545	$46,214,534	161	$24,627,238	1	$628,000	707	$71,469,772
1982 Total		6441	$397,443,568	2116	$269,031,590	33	$6,873,777	8590	$673,348,935
1983	1	445	$37,501,349	181	$16,507,761	4	$33,000	630	$54,042,110
	2	483	$37,877,636	196	$10,674,855	0	$0	679	$48,552,491
	3	635	$72,542,509	219	$23,353,331	4	$211,500	858	$96,107,340
	4	611	$63,675,514	206	$36,832,484	1	$15,000	818	$100,522,998
	5	620	$45,684,709	247	$22,012,583	1	$330,000	868	$68,027,292
	6	550	$36,122,802	272	$33,998,728	2	$325,000	824	$70,446,530
	7	625	$50,998,245	274	$30,668,536	5	$1,425,000	904	$83,091,781
	8	593	$34,873,258	277	$26,450,031	5	$2,862,588	875	$64,185,877
	9	533	$36,915,518	249	$21,190,347	2	$17,500	784	$58,123,365
	10	428	$62,262,651	421	$6,950,065	4	$140,000	853	$69,352,716
	11	462	$49,630,599	258	$17,435,926	1	$28,000	721	$67,094,525
	12	405	$37,293,005	196	$21,951,659	0	$0	601	$59,244,664
1983 Total		6390	$565,377,795	2996	$268,026,306	29	$5,387,588	9415	$838,791,689
1984	1	442	$54,968,565	309	$34,299,628	1	$1,100	752	$89,269,293
	2	536	$36,541,284	289	$39,956,260	2	$2,240,500	827	$78,738,044
	3	601	$40,712,038	303	$22,023,745	3	$314,898	907	$63,050,681
	4	610	$70,622,838	310	$39,923,634	1	$116,800	921	$110,663,272

	5	779	$53,536,560	328	$31,888,707	0	$0	1107	$85,425,267
	6	549	$34,026,693	323	$99,123,616	5	$1,288,000	877	$134,438,309
	7	530	$39,872,763	339	$87,220,170	2	$859,400	871	$127,952,333
	8	575	$31,792,157	320	$79,083,969	0	$0	895	$110,876,126
	9	433	$17,699,087	337	$65,886,757	1	$10,000	771	$83,595,844
	10	602	$33,837,689	347	$45,987,641	1	$0	950	$79,825,330
	11	709	$21,400,283	301	$60,935,445	1	$35,000	1011	$82,370,728
	12	753	$34,290,598	251	$72,790,399	3	$2,780,000	1007	$109,860,997
1984 Total		7119	$469,300,555	3757	$679,119,971	20	$7,645,698	10896	$1,156,066,224
1985	1	679	$20,708,870	209	$70,609,231	1	$544,462	889	$91,862,563
	2	775	$26,976,583	273	$49,336,128	4	$12,838,000	1052	$89,150,711
	3	1214	$22,057,413	374	$111,164,558	1	$22,000	1589	$133,243,971
	4	901	$46,453,077	365	$33,285,354	0	$0	1266	$79,738,431
	5	790	$28,856,071	379	$99,988,789	1	$210,000	1170	$129,054,860
	6	591	$29,233,087	346	$75,515,298	9	$423,448	946	$105,171,833
	7	555	$36,235,384	386	$84,011,431	2	$590,000	943	$120,836,815
	8	489	$39,774,923	329	$86,014,031	8	$22,764,100	826	$148,553,054
	9	384	$13,203,960	332	$50,076,771	0	$0	716	$63,280,731
	10	508	$18,547,417	288	$46,244,210	2	$69,985	798	$64,861,612
	11	411	$9,487,284	280	$30,871,733	2	$116,000	693	$40,475,017
	12	462	$21,064,834	264	$68,247,355	12	$845,000	738	$90,157,189
1985 Total		7759	$312,598,903	3825	$805,364,889	42	$38,422,995	11626	$1,156,386,787
1986	1	624	$37,068,713	287	$40,425,743	3	$3,181,000	914	$80,675,456
	2	620	$47,093,517	316	$124,078,068	3	$125,300	939	$171,296,885
	3	683	$32,368,780	272	$15,518,359	5	$2,129,000	960	$50,016,139
	4	673	$26,998,019	285	$36,929,472	3	$788,050	961	$64,715,541
	5	686	$23,960,043	317	$37,774,682	3	$995,000	1006	$62,729,725
	6	679	$12,826,870	359	$39,893,100	53	$6,175,592	1091	$58,895,562
	7	821	$18,675,199	332	$28,608,384	5	$3,430,800	1158	$50,714,383
	8	689	$11,226,213	299	$18,634,532	5	$83,000	993	$29,943,745
	9	568	$8,543,446	320	$84,077,355	7	$9,142,027	895	$101,762,828
	10	544	$8,706,453	326	$17,431,488	15	$2,422,590	885	$28,560,531
	11	409	$9,414,746	210	$11,488,987	7	$25,782,000	626	$46,685,733
	12	398	$7,429,826	262	$12,780,260	4	$4,936,000	664	$25,146,086
1986 Total		7394	$244,311,825	3585	$467,640,430	113	$59,190,359	11092	$771,142,614
1987	1	486	$7,291,705	280	$13,980,570	1	$15,000	767	$21,287,275
	2	423	$6,492,835	266	$19,174,499	2	$1,700,000	691	$27,367,334
	3	462	$8,388,074	327	$30,328,096	5	$5,214,560	794	$43,930,730
	4	496	$12,503,601	306	$98,463,932	14	$5,754,496	816	$116,722,029
	5	362	$6,650,818	302	$16,305,163	12	$1,871,000	676	$24,826,981
	6	406	$7,112,002	304	$16,076,989	54	$3,091,800	764	$26,280,791
	7	480	$8,140,606	294	$13,633,698	26	$8,411,000	800	$30,185,304
	8	525	$8,608,242	237	$7,583,764	4	$5,056,190	766	$21,248,196
	9	445	$8,804,065	493	$10,716,042	5	$200,000	943	$19,720,107
	10	427	$12,332,041	319	$83,854,218	17	$1,713,500	763	$97,899,759
	11	399	$5,778,320	272	$14,073,074	8	$216,300	679	$20,067,694
	12	295	$6,258,592	208	$11,713,494	0	$0	503	$17,972,086

1987 Total		5206	$98,360,901	3608	$335,903,539	148	$33,243,846	8962	$467,508,286
1988	1	156	$5,601,063	178	$21,680,857	4	$641,087	338	$27,923,007
	2	226	$8,468,288	159	$39,997,021	4	$16,009,691	389	$64,475,000
	3	299	$13,622,623	236	$9,621,068	2	$102,000	537	$23,345,691
	4	220	$11,023,501	173	$8,936,170	2	$80,000	395	$20,039,671
	5	221	$10,283,253	227	$41,370,893	0	$0	448	$51,654,146
	6	233	$11,940,792	195	$16,100,084	14	$4,731,400	442	$32,772,276
	7	227	$12,885,546	178	$13,477,701	22	$942,000	427	$27,305,247
	8	288	$14,954,107	227	$19,908,425	13	$91,000	528	$34,953,532
	9	226	$17,212,699	212	$10,243,874	3	$357,000	441	$27,813,573
	10	221	$10,108,989	231	$10,204,490	0	$0	452	$20,313,479
	11	199	$8,786,711	174	$8,751,645	2	$1,294,000	375	$18,832,356
	12	149	$7,013,555	172	$20,617,715	4	$1,926,500	325	$29,557,770
1988 Total		2665	$131,901,127	2362	$220,909,943	70	$26,174,678	5097	$378,985,748
1989	1	183	$8,649,297	153	$16,915,876	1	$40,000	337	$25,605,173
	2	196	$9,077,684	151	$7,159,260	0	$0	347	$16,236,944
	3	242	$9,603,039	216	$22,025,646	0	$0	458	$31,628,685
	4	200	$10,440,264	160	$5,298,890	4	$160,000	364	$15,899,154
	5	188	$8,483,621	202	$8,292,411	7	$2,303,000	397	$19,079,032
	6	229	$11,247,174	222	$20,350,064	22	$2,168,000	473	$33,765,238
	7	206	$8,662,828	219	$15,052,710	1	$400,000	426	$24,115,538
	8	211	$12,090,582	212	$23,270,378	9	$96,000	432	$35,456,960
	9	202	$10,705,589	207	$9,814,647	2	$677,800	411	$21,198,036
	10	172	$7,662,591	282	$107,481,790	6	$240,000	460	$115,384,381
	11	190	$9,522,841	190	$6,655,378	3	$446,155	383	$16,624,374
	12	114	$5,237,291	179	$7,740,876	15	$5,985,366	308	$18,963,533
1989 Total		2333	$111,382,801	2393	$250,057,926	70	$12,516,321	4796	$373,957,048
1990	1	223	$11,478,932	181	$8,034,024	3	$1,178,164	407	$20,691,120
	2	197	$11,150,637	175	$8,207,064	2	$80,000	374	$19,437,701
	3	212	$11,441,908	249	$8,153,947	3	$2,563,000	464	$22,158,855
	4	239	$10,079,336	158	$55,193,463	5	$86,000	402	$65,358,799
	5	228	$12,477,597	229	$32,315,383	1	$31,200	458	$44,824,180
	6	187	$7,262,213	236	$16,467,658	34	$448,000	457	$24,177,871
	7	200	$12,553,180	187	$9,782,500	16	$40,745,419	403	$63,081,099
	8	177	$7,439,599	195	$7,838,779	20	$882,460	392	$16,160,838
	9	183	$9,044,455	181	$8,035,031	2	$69,000	366	$17,148,486
	10	182	$8,724,637	200	$13,969,471	13	$1,033,500	395	$23,727,608
	11	160	$9,073,073	199	$15,015,315	4	$1,124,750	363	$25,213,138
	12	135	$6,549,978	143	$9,111,619	1	$71,000	279	$15,732,597
1990 Total		2323	$117,275,545	2333	$192,124,254	104	$48,312,493	4760	$357,712,292

1985	1	679	$20,708,870	209	$70,609,231	1	$544,462	889	$91,862,563
	2	775	$26,976,583	273	$49,336,128	4	$12,838,000	1052	$89,150,711
	3	1214	$22,057,413	374	$111,164,558	1	$22,000	1589	$133,243,971
1stquarter		2668	69742866	856	231109917	6	13404462	3530	314257245
	4	901	$46,453,077	365	$33,285,354	0	$0	1266	$79,738,431
	5	790	$28,856,071	379	$99,988,789	1	$210,000	1170	$129,054,860
	6	591	$29,233,087	346	$75,515,298	9	$423,448	946	$105,171,833
2nd quarter		2282	104542235	1090	208789441	10	633448	3382	313965124
	7	555	$36,235,384	386	$84,011,431	2	$590,000	943	$120,836,815
	8	489	$39,774,923	329	$86,014,031	8	$22,764,100	826	$148,553,054
	9	384	$13,203,960	332	$50,076,771	0	$0	716	$63,280,731
3rd quarter		1428	89214267	1047	220102233	10	23354100	2485	332670600
	10	508	$18,547,417	288	$46,244,210	2	$69,985	798	$64,861,612
	11	411	$9,487,284	280	$30,871,733	2	$116,000	693	$40,475,017
	12	462	$21,064,834	264	$68,247,355	12	$845,000	738	$90,157,189
4th quarter		1381	49099535	832	145363298	16	1030985	2229	195493818
1985 Total		14137	$576,098,271	6818	!	68	$75,815,005	21023	$2,117,279,756
1986	1	624	$37,068,713	287	$40,425,743	3	$3,181,000	914	$80,675,456
	2	620	$47,093,517	316	$124,078,068	3	$125,300	939	$171,296,885
	3	683	$32,368,780	272	$15,518,359	5	$2,129,000	960	$50,016,139
1st quarter		1927	116531010	875	180022170	11	5435300	2813	301988480
	4	673	$26,998,019	285	$36,929,472	3	$788,050	961	$64,715,541
	5	686	$23,960,043	317	$37,774,682	3	$995,000	1006	$62,729,725
	6	679	$12,826,870	359	$39,893,100	53	$6,175,592	1091	$58,895,562
2nd quarter		2038	63784932	961	114597254	59	7958642	3058	186340828
	7	821	$18,675,199	332	$28,608,384	5	$3,430,800	1158	$50,714,383
	8	689	$11,226,213	299	$18,634,532	5	$83,000	993	$29,943,745
	9	568	$8,543,446	320	$84,077,355	7	$9,142,027	895	$101,762,828
3rd quarter		2078	38444858	951	131320271	17	12655827	3046	182420956
	10	544	$8,706,453	326	$17,431,488	15	$2,422,590	885	$28,560,531
	11	409	$9,414,746	210	$11,488,987	7	$25,782,000	626	$46,685,733
	12	398	$7,429,826	262	$12,780,260	4	$4,936,000	664	$25,146,086
4th quarter		1351	25551025	798	41700735	26	33140590	2175	100392350
1986 Total		13437	$463,072,625	6372	$893,580,125	200	$85,240,128	20009	$1,441,892,878
1987	1	486	$7,291,705	280	$13,980,570	1	$15,000	767	$21,287,275
	2	423	$6,492,835	266	$19,174,499	2	$1,700,000	691	$27,367,334
	3	462	$8,388,074	327	$30,328,096	5	$5,214,560	794	$43,930,730
1st quarter		1371	22172614	873	63483165	8	6929560	2252	92585339
	4	496	$12,503,601	306	$98,463,932	14	$5,754,496	816	$116,722,029
	5	362	$6,650,818	302	$16,305,163	12	$1,871,000	676	$24,826,981
	6	406	$7,112,002	304	$16,076,989	54	$3,091,800	764	$26,280,791
2nd quarter		1264	26266421	912	130846084	80	10717296	2256	167829801
	7	480	$8,140,606	294	$13,633,698	26	$8,411,000	800	$30,185,304
	8	525	$8,608,242	237	$7,583,764	4	$5,056,190	766	$21,248,196
	9	445	$8,804,065	493	$10,716,042	5	$200,000	943	$19,720,107
3rd quarter		1450	25552913	1024	31933504	35	13667190	2509	71153607
	10	427	$12,332,041	319	$83,854,218	17	$1,713,500	763	$97,899,759

	11	399	$5,778,320	272	$14,073,074	8	$216,300	679	$20,067,694
	12	295	$6,258,592	208	$11,713,494	0	$0	503	$17,972,086
4th quarter		1121	24368953	799	109640786	25	1929800	1945	135939539
1987 Total		9291	$172,352,849	6417	$562,166,292	271	$64,557,892	15979	$799,077,033
1988	1	156	$5,601,063	178	$21,680,857	4	$641,087	338	$27,923,007
	2	226	$8,468,288	159	$39,997,021	4	$16,009,691	389	$64,475,000
	3	299	$13,622,623	236	$9,621,068	2	$102,000	537	$23,345,691
1st quarter		681	27691974	573	71298946	10	16752778	1264	115743698
	4	220	$11,023,501	173	$8,936,170	2	$80,000	395	$20,039,671
	5	221	$10,283,253	227	$41,370,893	0	$0	448	$51,654,146
	6	233	$11,940,792	195	$16,100,084	14	$4,731,400	442	$32,772,276
2nd quarter		674	33247546	595	66407147	16	4811400	1285	104466093
	7	227	$12,885,546	178	$13,477,701	22	$942,000	427	$27,305,247
	8	288	$14,954,107	227	$19,908,425	13	$91,000	528	$34,953,532
	9	226	$17,212,699	212	$10,243,874	3	$357,000	441	$27,813,573
3rd quarter		741	45052352	617	43630000	38	1390000	1396	90072352
	10	221	$10,108,989	231	$10,204,490	0	$0	452	$20,313,479
	11	199	$8,786,711	174	$8,751,645	2	$1,294,000	375	$18,832,356
	12	149	$7,013,555	172	$20,617,715	4	$1,926,500	325	$29,557,770
4th quarter		569	25909255	577	39573850	6	3220500	1152	68703605
1988 Total		4761	$237,892,999	4147	$402,246,036	134	$49,128,856	9042	$689,267,891
1989	1	183	$8,649,297	153	$16,915,876	1	$40,000	337	$25,605,173
	2	196	$9,077,684	151	$7,159,260	0	$0	347	$16,236,944
	3	242	$9,603,039	216	$22,025,646	0	$0	458	$31,628,685
1st quarter		621	27330020	520	46100782	1	40000	1142	73470802
	4	200	$10,440,264	160	$5,298,890	4	$160,000	364	$15,899,154
	5	188	$8,483,621	202	$8,292,411	7	$2,303,000	397	$19,079,032
	6	229	$11,247,174	222	$20,350,064	22	$2,168,000	473	$33,765,238
2nd quarter		617	30171059	584	33941365	33	4631000	1234	68743424
	7	206	$8,662,828	219	$15,052,710	1	$400,000	426	$24,115,538
	8	211	$12,090,582	212	$23,270,378	9	$96,000	432	$35,456,960
	9	202	$10,705,589	207	$9,814,647	2	$677,800	411	$21,198,036
3rd quarter		619	31458999	638	48137735	12	1173800	1269	80770534
	10	172	$7,662,591	282	$107,481,790	6	$240,000	460	$115,384,381
	11	190	$9,522,841	190	$6,655,378	3	$446,155	383	$16,624,374
	12	114	$5,237,291	179	$7,740,876	15	$5,985,366	308	$18,963,533
4th quarter		476	22422723	651	121878044	24	6671521	1151	150972288
1989 Total		4190	$200,342,879	4135	$378,237,808	116	$18,361,121	8441	$596,941,808
1990	1	223	$11,478,932	181	$8,034,024	3	$1,178,164	407	$20,691,120
	2	197	$11,150,637	175	$8,207,064	2	$80,000	374	$19,437,701
	3	212	$11,441,908	249	$8,153,947	3	$2,563,000	464	$22,158,855
1st quarter		632	34071477	605	24395035	8	3821164	1245	62287676
	4	239	$10,079,336	158	$55,193,463	5	$86,000	402	$65,358,799
	5	228	$12,477,597	229	$32,315,383	1	$31,200	458	$44,824,180
	6	187	$7,262,213	236	$16,467,658	34	$448,000	457	$24,177,871
2nd quarter		654	29819146	623	103976504	40	565200	1317	134360850
	7	200	$12,553,180	187	$9,782,500	16	$40,745,419	403	$63,081,099

APPENDIX C2

Quarterly Building Permit Statistics for Austin, Texas for 1985 to 1990

8	177	$7,439,599	195	$7,838,779	20	$882,460	392	$16,160,838
9	183	$9,044,455	181	$8,035,031	2	$69,000	366	$17,148,486
3rd quarter	560	29037234	563	25656310	38	41696879	1161	96390423
10	182	$8,724,637	200	$13,969,471	13	$1,033,500	395	$23,727,608
11	160	$9,073,073	199	$15,015,315	4	$1,124,750	363	$25,213,138
12	135	$6,549,978	143	$9,111,619	1	$71,000	279	$15,732,597
4th quarter	477	24347688	542	38096405	18	2229250	1037	64673343
1990 Total	4169	$210,203,402	4124	$346,152,103	190	$94,395,736	8483	$650,751,241