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Report on the Future of the San Francisco Bay Area Economy

Part II: The Nature of Interdependence in the Bay Area

Tapan Munroe with Mia Gray, Nancy Mackle, Karen Winter-Nelson, Theresa Selfa, and David Zehnder

Principal Editor: Betsy Morris

April 1992

REPORT ON THE FUTURE OF THE SAN FRANCISCO BAY AREA ECONOMY

Understanding the Implications of Structural Change and Socio-Economic Distribution

Part 2: The Nature of Interdependence in the Bay Area

CP284C: Graduate Research Seminar
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PREFACE TO THE REPORT

This report is the product of a graduate class in city and regional planning. The course evolved from a forecasting seminar into a research studio in which teams of students took on questions of concern to the client, in this case the Bay Area Economic Forum. The students reviewed various published reports on the region's development and hosted a number of speakers, including speakers from The Association of Bay Area Governments (ABAG), Bay Vision 20/20, and the County of Alameda.

The studio focused on the economic structure and dynamics of the San Francisco Bay Area and related public policy concerns facing the region. The students researched a wide range of issues before forming teams to pursue more in-depth studies. One team analyzed the data and forecasts of the region's economic structure and provided both the background and the underlying framework found in Part 1. The other two teams took on in-depth research on two issues: the nature of regional interdependence among the nine counties (Part 2) and the bifurcation of the Bay Area labor force and its socioeconomic consequences (Part 3).

This research will be used by the Bay Area Economic Forum in a follow-up publication to its earlier (1989) work, **The Bay Area Economy: A Region at Risk**. It is being published as part of the Forum's ongoing efforts to promote regional policy and decision-making in the Bay Area.

INTRODUCTION TO THE REPORT

The San Francisco Bay Area has emerged over the past forty years as one of the world's most prosperous, dynamic, and cosmopolitan regions. It has been historically attractive to people and capital. Its industries are among the most globally competitive. Its people are educated and highly skilled, providing a high-quality labor force with incomes among the highest in the nation and the world. Its quality of life is enhanced by a beautiful natural setting.

The Bay Area has a world-class economy. It is a center for high-technology manufacturing and research and development. The region's three international airports, three ports, and its highway and rail systems make it a center for transportation services, transportation equipment manufacturing, and wholesale trade. In addition, the region has three world-class research universities. These have contributed to the region's research and development strengths and the rise of the high-tech electronics, biotechnology, and medical instruments industries. The region has a widespread strength in business services, financial services, and educational and nonprofit services. It also has a strong retail base with higher levels of retail employment in most counties than the nation as a whole.

The region consists of nine counties and three major metropolitan centers. They share, to varying degrees, a strong and diverse set of industries. Santa Clara County ("Silicon Valley") and the city of San Jose have the highest concentration of manufacturing employment in the state. San Francisco is a center for financial services, as well as the nation's third largest apparel industry. Alameda County and the city of Oakland have both the older manufacturing industries, as well as strong transportation (air and water), wholesale, and, most recently, high-tech instruments manufacturing and communications services.

For its residents, the Bay Area economy has provided plentiful job opportunities and a high quality of life. Bay Area residents are among the wealthiest in the nation. Personal income per capita was $25,000 in 1990—20 percent higher than the state, which is in turn 12 percent higher than that of the United States. Payrolls have increased 2 percent a year in the 1980s, contrasted with .9 percent in the United States as a whole. Unemployment has been consistently lower here than other parts of the country. During the 1980s, Bay Area incomes grew faster than any other region, and are expected to continue do so into the 1990s. Historically, housing has been abundant and affordable, and the educational systems among the best in the nation.

The result is that the Bay Area attracts people from all over the world. Highly educated individuals have come in large numbers, and, coupled with graduates of the region's universities and colleges, provide a large workforce of technical and professional workers. Even larger numbers

of immigrants who arrive relatively poor and unskilled have come seeking greater economic opportunity. These immigrants enable the expansion of the service and manufacturing sectors, stimulate urban retail sectors, and promote international ties through trade and capital investment.

The region's economy then, is a synergistic blend of competitive export industries serving international markets, and an even larger set of domestic industries serving regional markets. Both are supported by a large, diverse, and relatively affluent population.

The attractiveness of the region and its dynamism, however, are also the source of a number of trends which may undermine long-term viability of the economy. An earlier report by the Bay Area Economic Forum identified a number of factors which put the Bay Area "at-risk"— increasingly vulnerable to stagnation or even decline. These included high housing costs, severe traffic congestion and air quality problems, stagnating incomes, and potential labor shortages.

The region's strength in high technology, for example, may be leading to a narrowing of the economic base. Even as this is written, Silicon Valley has entered the most severe recession in its history, with employment cutbacks and firm relocations occurring among the largest of employers. The implications of this contraction is as yet unknown, but it will be felt throughout all the counties in the region.

The authors of this report have tackled the question of regional economic viability in several ways:

- Part 1 provides an overview of the regional economy and the factors contributing to its viability. It focuses particularly on the region's labor force and the ability of the local public sector to provide the basic social and physical infrastructure necessary to sustain the economy.

- Part 2 provides a method for understanding and analyzing regional interdependence based on firm-to-households and firm-to-firm linkages. Using existing data sources on regional employment, trade flows, and regional commute patterns, the counties are assessed on four measures: jobs, housing, industrial suppliers, and industrial customers. Part 2 also gives a county-by-county description of each county's patterns of interdependence.

- Part 3 supplies a detailed analysis of the distributional aspects of the Bay Area economy. It documents job and payroll growth, occupational and wage mix in the economy, and then discusses changes in the distribution of incomes and poverty levels among Bay Area counties. The authors' findings reiterate national studies that indicate an overall bifurcation of the workforce into high-skill and low-skill segments, and the decline of middle-income workers.

The report's findings suggest a number of opportunities and concerns for future regional development. It reiterates the key role of high-tech manufacturing in the economy, and its links to rapid growth in business services. The high-tech medical instruments, communications industries, and business services are spreading throughout the region, and large firms in several counties, notably San Francisco and Solano, are pursuing a buy local/buy regional policy.

The region still has a diversified set of industrial strengths, however. Study of key industries shows that "old-tech" and other types of service firms are both more dispersed through the counties and generate more linkages with other firms than do high-tech firms. High-tech manufacturing (except instruments) remains concentrated in Silicon Valley and is relatively independent of linkages with other counties. Other industries, notably petroleum, apparel, and rubber and leather manufacturing, have more potential linkages within the region. This suggests that retaining these old-tech industries is at least as important as supporting high-tech growth. It also suggests that the regional economy has further opportunity to develop internally by taking advantage of potential linkages among firms to buy or sell within the region.

The report also finds that regional economic success has not been evenly distributed. This has resulted in a growing disparity in income between the richest and the poorest members of the population, and an erosion of the middle class. Although Bay Area jobs are increasingly in higher value-added sectors, more than half of all new jobs are in the lowest-paid and lowest-skilled categories. Many have limited health benefits, job security, or opportunities for upward mobility. This is particularly true in the largest and fastest-growing sectors of services and retail trade.

The dominant role of services and trade in job growth overall has particular socio-economic implications. It has meant that low- (< $24,000) and very-low- (< $14,000) income households are the fastest-growing segment of the population and constitute a majority of nearly every county's tax base. Their children are a majority in many financially strapped school systems. The numbers of persons in poverty has increased in the Bay Area, while the ability of local governments to provide needed services has declined.

The loss of mid-skill, middle-income production jobs as a result of a shrinking manufacturing sector is another cause for re-thinking our reliance on high-technology. A narrowing industrial base may mean fewer economic opportunities in the future. As skills and work opportunities polarize, the ability of firms to adapt to dynamic international conditions narrows further. While firms may save costs by transferring labor-intensive production jobs to overseas locations, the region may lose over time the related knowledge and skills in its labor pool, limiting the ability of industries to adapt in the long run. Another disturbing finding is that the shift away from

manufacturing toward lower-income occupations may have disproportionately affected Blacks and Latinos. Given that a majority of the region's population will be "minorities" in the next fifteen years, the social consequences of persistent economic disparities among ethnic groups loom large.

The authors argue that investment in social and physical infrastructure is essential if the region's economy is to continue to be competitive and sustainable in the long term. However, they suggest that the political outlook for regional governance remains uncertain. Many counties are experiencing fiscal crises and are competing among themselves for new industry and higher-income residents. Growing intra-regional disparities in jobs, income, and tax base may not provide a climate for "regional problem-solving."

On the whole, the findings of this report suggest a variety of ways that the nature of inter-dependence and the implications of economic change for the region might be understood. They provide a further basis for citizens and regional and local decision-makers to evaluate their prospects in the future, and begin to devise common strategies that will enhance the economic well-being and quality of life for residents and businesses alike.

These studies provide a detailed and critical look at key issues in the Bay Area economy. They raise a number of warning flags and point out disparities as well as commonalities among the region's counties and cities. But problems and crises do not have to be taken in a negative light if they can promote realistic and constructive discussion among the many actors whose cooperation is necessary to bring about useful regional problem-solving.

PART 2:

THE NATURE OF INTERDEPENDENCE IN THE BAY AREA

ABSTRACT

This report assesses the levels of regional interdependence among the nine Bay Area counties. Using the ABAG 1987 Input/Output Table and transportation data for 1987, counties were ranked by their reliance on other counties in four areas: jobs, housing, business suppliers, and industrial customers. Taking all four measures into account, Contra Costa and San Mateo are most dependent and Santa Clara and Sonoma least dependent on the region.

I. INTRODUCTION

Local government leaders, policy makers, economists, and academics are debating the future of the Bay Area region. Issues under discussion include whether the Bay Area can maintain its economic vitality and quality of life, whether the economic structure and physical layout of the region will lead to further polarization between rich and poor populations or between the counties, and whether the nine Bay Area counties can and should address these issues as a region.

This report is an attempt to assess whether the nine Bay Area counties have a common stake in these issues by measuring the existence and nature of interdependency among them. We discuss how households are linked to firms by reviewing the transportation patterns of employed residents in all nine Bay Area counties. We also examine intra-regional relations between firms by examining the potential linkages between different sectors of the economy using the 1987 ABAG Input-Output table for the Bay Area. Based on our study, we argue that continued economic viability of the region will depend on strengthening these economic and physical links among counties.

The paper begins with background information on how economic and transportation linkages among firms and households can affect overall vitality and quality of life in the Bay Area. It provides the foundation of our findings on the nature and extent of interdependence in this region. The methodologies used for measuring firm-to-firm and firm-to-household linkages are described in the next section. Next, the relative interdependency of each county is presented in an overall ranking system. Finally, each county's economic linkages are summarized.

II. THE IMPORTANCE OF ECONOMIC INTERDEPENDENCE TO A REGION

A. Firm Relations and Regional Economic Viability

The long-term economic vitality of a region is closely tied to the diversity of its economic base and to the level of interdependence among its industries. Concentration in a single sector can be a great liability to a region. If that industry fails or experiences a downturn, the entire economy also suffers. A diversified economy is one that contains a variety of healthy sectors. A diversified economy can maintain its overall position in a dynamic international environment without being vulnerable to the cycles affecting any one sector.

Conversely, economic concentration can provide the impetus for regional economic development if it enables other industries to grow there. The key element of regional interdependency is the connection between firms that exists when one sector buys its supplies from, or sells its final product to, another industry in the region. For example, the high-tech sector in the Bay Area depends heavily on the region's financial sector. Additional growth in the high-tech sector increases demand for these services. If a sector is independent of the regional economy and these links are not present, a firm will only contribute its own jobs, payroll, and taxes to the local economy with minimal regional impact.

Relationships between firms can link places that otherwise would not necessarily be thought of as economically related. Geographic proximity does not necessarily create economic linkages, nor do strong economic linkages require close physical proximity. However, a region will have a strong and vibrant economy if economic interdependence is related to geographic proximity. The strength of a region's economy is based on this interplay between economic and physical links.

B. Transportation and Regional Interdependence

The transportation links among jobs, housing, and commercial centers are the lifeline in any regional economy. The ability to physically move between these sectors seems crucial to the current economic viability of the Bay Area and, even more importantly, to the future economic viability of the region. How important is transportation access to the economic viability of the region? How does it affect the quality of life in the Bay Area? How serious is traffic congestion in the Bay Area? These questions are addressed below.

In the Bay Area, the physical links between places have grown with the economy and have become increasingly strained. Transportation issues have consistently been cited by Bay Area residents in the last six years as the number one problem facing the region (Bay Area Economic Forum,

1989). The Economic Forum's survey of 165 Bay Area business executives showed that businesses consider transportation to be a critical factor to further economic development in the region (BAEF, 1989).

The Bay Area Economic Forum estimates that failure to solve transportation problems in the Bay Area is costing nearly $2 billion annually, both in the value of lost time and environmental damage (BAEF, 1990). Bay Area residents are delayed in traffic nearly 100 million hours each year, and congestion levels have risen 25 percent between 1987 and 1990 (BAEF, 1990). Businesses will factor in the cost of lost time when deciding to locate or remain in the Bay Area.

In addition, in order to meet the stringent air quality standards mandated by the 1988 California Clean Air Act, the Bay Area must adopt "transportation control measures" to reduce traffic congestion. Improved air quality will enhance the region's economy as well as the quality of life for its residents.

There are numerous locations in the Bay Area which experience congestion during morning and evening peak periods, defined as the locations on the highways at which travel is limited to 35 miles an hour for at least 15 minutes. According to the Institute of Transportation Engineers (ITE) Journal, the Bay Area is the most congested region in the western United States as measured by the "congestion severity index," which is the ratio of total hours of delay to million vehicle-miles of travel (BAEF, 1990). The ratio for the Bay Area is about 7:1, as compared to 6:1 for Los Angeles and 2.5:1 for San Diego.

The dispersion of jobs to suburban locations in the 1980s has intensified the regional commute problem (Metropolitan Transportation Commission [MTC] data, 1991). Commuters now generate traffic on suburban downtown streets and between suburban locations as well as to the historically urban central business districts. Transportation improvements have not been adequate to support this increased level of activity on Bay Area roads and highways. Billions of dollars of investments in transportation improvements are needed to simply maintain the current levels of mobility (BAEF, 1990).

The transportation problem is exacerbated by the fact that housing costs in the Bay Area core counties are so high that people are forced to locate in the outlying communities and commute to the core. The Bay Area Economic Forum estimates that between 200,000 and 330,000 people now commute from outside the nine-county Bay Area to jobs within the region (BAEF, 1990).

C. The Regional Jobs-Housing Balance

Planners often rely on a goal of local parity between the number of jobs and the number of housing units as the solution to intra-regional transportation problems. If people worked close to where they lived, many transportation and air quality problems would be resolved. The jobs-housing ratio is a rough and misleading measure, however. Among other things, it fails to determine whether a county's workforce can afford the county's housing supply. Even a 1:1 ratio of employed residents to housing units in any one county is not necessarily an indication of balance.
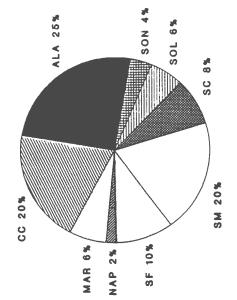
For example, the jobs-housing ratio for Alameda County is nearly equal to one (.94), suggesting that the county is providing adequate jobs and housing for its residents. However, transportation data show that Alameda County produces the largest number of out-commuters in the region, and it is second (after San Francisco) in volume of in-commuters (see Figure 1). Having a jobs-housing ratio nearly equal to one is not an indication that county residents work in that county. Nor does it necessarily reflect a lesser need for transportation infrastructure. Alameda County plays a major regional role as a "transit center" because of its physical location; it contains numerous freeways and BART connections to other counties. Local conditions in Alameda then are the result of both its geographic position and the economic relationships its residents and businesses have with other parts of the region.

The ratio of local jobs to housing does not address the issue of regional interdependence since local choices respond to larger-than-local conditions and have repercussions to the larger area as well. As the example illustrates, regional linkages among firms and households mean that local household or firm choices involve opportunities and constraints of the larger environment. To understand regional interdependence, we need to use measures of the interactions among counties, not simply internal levels of performance. Several such measures are discussed below.

III. METHODS USED TO ASSESS ECONOMIC INTERDEPENDENCE

In order to assess the nature of economic interdependence in the Bay Area, the researchers examined two kinds of relationships: "firm-to-firm linkages" and "firm-to-household linkages." Firm-to-firm linkages are measured by potential business relationships among buyers (inputs) and sellers (outputs) of goods and services. These linkages reflect the nature of economic concentration and diversity in the Bay Area. Firm-to-household linkages are measured by transportation data on intercounty commuting patterns; they reflect the mobility and access to resources of Bay Area residents. The counties were then ranked according to their reliance on other counties in four critical areas: jobs, workers, buyers, and suppliers.

FIGURE 1

TOTAL INTERCOUNTY TRIPS

ALA 26%

SON 4%

SOL 6%

SC 8%

SM 20%

SF 10%

NAP 2%

MAR 6%

CC 20%

% BY COUNTY
OF ORIGIN

ALA 19%

SON 1%
SOL 3%

SC 15%

SM 15%

SF 33%

NAP 1%
MAR 4%

CC 9%

% BY COUNTY
OF DESTINATION

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

A. Firm-To-Firm Linkages

To assess firm-to-firm linkages, the researchers devised a method to identify potential relationships among Bay Area industries across counties. The method, illustrated in Figure 2, is described in detail below.

1. *Determine the key sectors for each county in the Bay Area.* This was done by identifying industries for each county with location quotients greater than 1.2 (see Appendix A). Location quotients greater than 1 indicate industries that provide a disproportionately large share of local employment in comparison to the same industries in the United States as a whole. The location quotient is not a measure of how large a sector is in an absolute sense, and will not necessarily indicate the largest industry or employer in the county. We used location quotients to select nineteen key industries concentrated in the Bay Area.

2. *For each key industry identified in Step 1, determine the major sectors from which it buys (inputs) or to which it sells (outputs) goods and services within the Bay Area.* These linked sectors were identified using the 1987 ABAG Input/Output Table. All regional inputs contributing at least 1 percent to each unit of output in an industry were included in the analysis.

3. *Identify the Bay Area counties with significant concentrations (location quotient greater than 1.2) of the input/output industries identified in Step 2.*

4. *Specify potential linkages between counties.* A potential linkage exists between one county and another for each input (backward linkage) or output (forward linkage) relationship found among the industries located in each. (The linkages are "potential" because no quantitative information on the geographic distribution of trade flows within the Bay Area is as yet available.)

5. *Total the potential linkages for each county.* The sums of all the forward and backward linkages identified in Step 4 were tabulated for each county. For example, in looking at the heavy construction sector, we identified two inputs— business services and miscellaneous services —that could potentially be received from firms located in San Mateo County, which has a concentration of employment in these services. One may assume that these two sectors are potentially linked to any county that is strong in the heavy construction industry, as is San Francisco.

   The tabulation of potential backward and forward linkages for all 19 key industrial sectors was repeated for each county. Internal linkages were also tallied by county. If a San Francisco industry has 3 major local inputs and the input industries are concentrated in 4 Bay Area counties, San Francisco will have 12 backward linkages for that industry. For each county, we created a matrix of potential links in its selected key industries to every other county (see Appendix C).

   It is important to remember that a large number of linkages does not indicate anything about the size of a sector in that county. Rather, it measures economic interdependence:

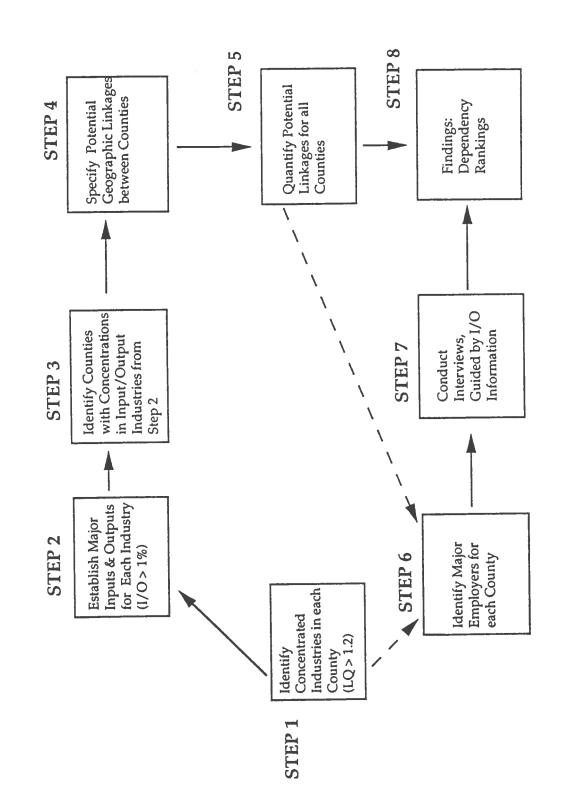# DEPENDENCY RANKING METHODOLOGY
FIRM TO FIRM LINKAGES

FIGURE 2

the potential range of relationships with other sectors in other counties. Hence, counties with a high number of linkages to other counties are considered to be economically diversified and regionally dependent.

6. *Verify findings through interviews with key county employers.* Key employers in each county were asked to specify the location of their major input suppliers. We then asked them to identify the major locations for sales or output. Finally, we asked whether these buyer-supplier relationships have changed over time. (Appendix E contains a list of the top employers in each county.)

Appendix B contains the summary table of the 19 significant industries, their forward and backward linkages, and the counties with significant concentrations in all three categories. Appendix C contains a county-by-county summary of industry linkages.

B. Firm-To-Household Linkages

Interdependence among Bay Area counties is revealed not only by the firm-to-firm economic linkages discussed above; it is also evident in firm-to-household and other kinds of household interactions. To what extent do industries located in a particular county rely on a local or a regional labor market? To what extent do county employees rely on a local or regional housing market? To what extent do households rely on local or regional resources for visiting friends and family, shopping, and recreation? Using data on intercounty trips (ones that begin and end in different counties), we can determine the relative degree to which each county "needs" the rest of the region, although not how much the region "needs" any particular county.

Transportation data on journey-to-work and non-work-related trips show the intercounty linkages of workers to jobs and of consumers to goods and services. Work and non-work trip data for 1980, as well as projections for 1987 and 2000, have been compiled by the Metropolitan Transportation Commission (MTC, 1985). These data are organized by the number of trips originating and ending in 34 MTC transportation planning superdistricts. The number of trips by superdistricts was collapsed into county-by-county summaries in order to analyze travel patterns in the Bay Area. The transportation data tells us what percent of all daily trips begin in a particular county and what percent of all daily trips end in a particular county. (See Appendix E for county-by-county data.)

C. County Rankings

The counties were ranked in each of four measures of regional interdependence. The first two were: (1) total number of potential backward and (2) total number of potential forward industrial linkages with other counties. In each case, larger numbers implied relatively greater depen-

dency. (See Figures 3 and 4.) The nine counties were also ranked on the firm-to-household linkages: (3) dependence on other counties for jobs or (4) for housing. Counties for which a large percentage of work trips originated in other counties were considered to be dependent on the region for housing; the larger the percentage of work trips leaving a county, the greater the county's dependence for jobs. Figure 5 summarizes the rankings for each type of linkage.

County rankings for each of the categories were combined into an overall dependency ranking (Figure 6). The final rankings capture the notion of a continuum of regional integration or interdependence. Counties on the "dependent" end show a high level of regional involvement, but often in some specialized direction, indicating a one-way "need." Consistent mid-level rankings suggest an "interdependence" involving a quid pro quo among counties rather than extreme specialized status of one county over the others. Independence indicates a relatively low degree of involvement with counties in the region. Regional independence can mean one of two things: either the county is relatively self-sufficient in providing for the various needs of its residents and firms, or that it is more tied to regions outside the Bay Area.

IV. REGIONAL FINDINGS

Overall ranking in the four measures, indicates that Contra Costa and San Mateo are the most dependent of the nine counties, while Santa Clara and Sonoma are the least dependent counties (Figure 6). Contra Costa ranks as relatively dependent because it relies on the region for buyers, suppliers, and jobs; however, it is relatively self-sufficient regarding the supply of workers. For San Mateo, other Bay Area counties are important as labor markets; the county imports and exports relatively high percentages of workers to other parts of the region. Its firm-to-firm linkages with the rest of the Bay Area do not indicate a particularly dependent relationship. The least dependent county, Sonoma, ranks consistently low in each category of linkage.

A. Firm-to-Firm Linkages

Table 1 lists 19 key regional industries. These are quite diverse. They reflect the region's strong domestic economy, large population and overall growth (construction, communications, retail, wholesale, and transportation services), its historical manufacturing and resource-based industries (food processing, rubber and leather, and petroleum), and include regional specializations in high-technology manufacturing and apparel. In addition, the list shows the extent and strength of the region's service industries.

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FIGURE 3

LABOR/JOB DEPENDENCE

1987 WORK TRIPS

Source: MTC

FIGURE 4

CONSUMER DEPENDENCE

1987 SHOPPING/SOCIAL/RECREATIONAL TRIPS

■ % Going Out
▨ % Coming In

Source: MTC

FIGURE 5

BAY AREA COUNTIES DEPENDENCY RANKINGS *

	Dependency for buyers		Dependency for suppliers	
	Forward Linkages		Backward Linkages	
CONTRA COSTA	1	SOLANO	1
NAPA	2	CONTRA COSTA	2
ALAMEDA	3	NAPA	3
SOLANO	4	ALAMEDA	4
SAN MATEO	5	MARIN	5
SANTA CLARA	6	SAN MATEO	6
SAN FRANCISCO	7	SAN FRANCISCO	7
SONOMA	8	SONOMA	8
MARIN	8	SANTA CLARA	9

	Dependency for workers		Dependency for jobs	
	In -Commute		Out-Commute	
SAN FRANCISCO	1	SAN MATEO	1
SAN MATEO	2	CONTRA COSTA	2
MARIN	3	MARIN	2
ALAMEDA	4	SOLANO	4
CONTRA COSTA	5	ALAMEDA	5
NAPA	6	NAPA	6
SOLANO	7	SAN FRANCISCO	7
SANTA CLARA	8	SONOMA	8
SONOMA	9	SANTA CLARA	9

* A rank of 1 indicates more dependency, and a 9 indicates less dependency on other Bay Area counties.

FIGURE 6

BAY AREA COUNTIES DEPENDENCY INDEX

County	Rank of Dependency	
CONTRA COSTA	1	Most Dependent
SAN MATEO	2	
ALAMEDA	3	
SOLANO	4	
NAPA	5	
MARIN	6	
SAN FRANCISCO	7	
SANTA CLARA	8	
SONOMA	9	Most Independent

TABLE 1

PARTICIPATION IN BAY AREA ECONOMY BY INDUSTRY

	Backward Linkages	Forward Linkages
Construction	18	0
Heavy Construction	16	0
Food and Beverage	19	9
Textiles & Apparel	5	5
Petroleum	50	19
Rub. & Lea. Mfg.	10	8
Non-elec. Machinery	5	14
Electronics	8	9
Transp. Equip. Mfg.	16	8
Instruments	5	12
Transportation Svcs	36	5
Communication	34	20
Wholesale	41	10
Retail	39	20
F.I.R.E.	20	5
Motion Pict./Recreat.	38	0
Health Services	39	7
Bus.&Prof.Services	32	12
Educ/Nonprofit Svcs.	16	3

Source: Appendix C; County Business Patterns, 1987; ABAG 1988 Imput/Output Update.

Note: Linkage selected if input contributes $0.01 for every $1 of output.

This table provides a relative ranking of the industries with the greatest number of regional ties. According to Table 1, the petroleum industry generates the greatest number of backward linkages and the second greatest number of forward linkages within the region, followed by retail and health services and communications. High-technology manufacturing— nonelectronic machinery, transportation equipment manufacturing, and instruments — are considerably less integrated into the regional industrial structure.

Table 2 summarizes the level of regional buying and selling among counties used in determining their interdependency rankings. The size of the numbers reflect both the diversity and the level of activity of each county's economy. The "internal links" figure reflects the percent of potential buying and selling that could occur among industries in the same county.

Table 3 lists the counties which have significant concentrations of employment in the 19 key industries. Most industries can be found in at least four counties. The exceptions are Santa Clara's high-tech manufacturing, San Francisco's apparel industry, and Napa's health care specialization. This last is more an artifact of the relatively small scale of Napa's economic base, so that a single large employer (Kaiser Permanente) appears as an "exporter" of services. Education and nonprofit services is the most widely shared among the counties, with seven out of nine having employment shares greater than the nation in this sector. Other industries are more in light of being regional concentrations and specialties: Food Processing; Finance, Insurance, and Real Estate (henceforth, F.I.R.E.); Business and Professional Services; and Education and Nonprofit Services.

Firm-to-Household Linkages

In transportation terms, regional interdependence means there are several distinct destination counties and distinct sending counties. As Figure 3 indicates, twenty-five percent of all work trips in the region cross county boundaries. However, the counties vary considerably. San Francisco imports 45 percent of its workforce from the region, while Sonoma imports only 5 percent of its workforce. San Mateo, Marin, and Contra Costa are roughly comparable in the degree to which residents commute out (41-42 percent), while only about 8 percent of Santa Clara County residents do so.

The region is less interdependent and varied in terms of shopping, social, or recreational trips (Figure 4). Only 10 percent of these trips cross county boundaries. The counties generating the most trips out, San Francisco and San Mateo (17 percent and 15 percent, respectively), also attract the most trips (19 percent and 17 percent, respectively). This finding suggests that household wage-earning activities are more regional in scope than other sorts of private household activities.

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TABLE 2

PARTICIPATION IN BAY AREA ECONOMY
BY COUNTY

	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano	Sonoma
Total Backward Linkages	201	250	199	229	197	184	75	252	98
Internal Links (%)	10%	11%	18%	3%	22%	16%	13%	14%	3%
Net Backward Linkages	181	223	163	221	153	154	65	241	95
Total Forward Linkages	68	93	45	67	56	63	58	61	44
Internal Links (%)	15%	12%	7%	9%	14%	14%	10%	11%	5%
Net Backward Linkages	17	82	42	61	48	54	52	54	42

Source: Appendix C; County Business Patterns, 1987; ABAG 1988 Imput/Output Update.

Note: Linkage selected if input contributes $0.01 for every $1 of output.

TABLE 3

19 KEY BAY AREA INDUSTRIES BY COUNTY

LOCATION OF EMPLOYMENT

SIC	INDUSTRY	Alameda	CC	Marin	Napa	SF	SM	SC	Solano	Sonoma
15	Construction	X	X	X	X				X	X
16	Heavy Construction	X	X		X	X			X	
20	Food and Beverage	X			X				X	X
23	Textiles & Apparel					X				
29	Petroleum		X						X	
30-31	Rub. & Lea. Mfg.				X		X			
35	Non-elec. Machinery							X		
36	Electronics							X		
37	Transp. Equip. Mfg.							X		
38	Instruments	X	X					X		X
41	Transportation Svcs	X	X	X		X	X		X	
48	Communication	X	X		X	X	X			
50	Wholesale	X					X			
52	Retail		X	X	X				X	X
60-67	F.I.R.E.		X	X		X	X		X	
78-79	Motion Pict./Recreat.			X	X	X			X	
80	Health Services				X					
81	Bus.&Prof.Services	X	X	X		X	X	X		
82	Educ/Nonprofit Svcs.			X	X	X	X	X	X	X

LOCATION OF POTENTIAL SUPPLIERS*
Backward Linkages

SIC		Alameda	CC	Marin	Napa	SF	SM	SC	Solano	Sonoma
15	Construction	X	X	X	X	X	X	X	X	X
16	Heavy Construction	X	X	X		X	X	X	X	
20	Food and Beverage	X	X	X	X	X	X	X	X	X
23	Textiles & Apparel	X	X				X	X		
29	Petroleum	X	X	X	X	X	X		X	X
30-31	Rub. & Lea. Mfg.	X	X		X		X	X		X
35	Non-elec. Machinery	X			X		X	X		
36	Electronics	X	X	X	X			X		X
37	Transp. Equip. Mfg.	X					X	X		
38	Instruments	X					X	X		
41	Transp. Service	X	X	X		X	X	X	X	X
48	Communication	X	X	X		X	X	X	X	X
50	Wholesale	X	X	X	X	X	X	X	X	X
52	Retail	X	X	X	X	X	X	X	X	X
60-67	FIRE	X	X	X	X	X	X	X	X	X
78	Motion Pictures	X	X	X	X	X	X	X	X	X
80	Health Services	X	X	X	X	X	X	X	X	X
81	Bus.&Prof.Services	X	X	X	X	X	X	X	X	X
82	Ed./Nonprofit Ser.	X	X	X	X	X	X	X	X	X

LOCATION OF POTENTIAL PURCHASERS*
Forward Linkages

SIC		Alameda	CC	Marin	Napa	SF	SM	SC	Solano	Sonoma
15	Construction									
16	Heavy Construction									
20	Food and Beverage	X	X	X	X	X	X		X	X
23	Textiles & Apparel	X	X		X	X	X		X	X
29	Petroleum	X	X	X	X	X	X		X	X
30-31	Rub. & Lea. Mfg.	X	X	X	X	X	X	X		X
35	Non-elec. Machinery	X	X	X		X	X	X		X
36	Electronics	X	X		X		X		X	X
37	Transp. Equip. Mfg.	X	X	X	X	X	X		X	X
38	Instruments	X	X	X		X	X	X		
41	Transport. Services	X	X		X				X	
48	Communication	X		X	X	X	X	X		
50	Wholesale	X	X		X			X	X	X
52	Retail	X	X	X	X	X	X	X	X	X
60-67	FIRE	X		X	X	X	X	X		
78	Motion Pictures									
80	Health Services	X	X		X				X	X
81	Bus.&Prof.Services	X	X	X	X	X	X	X	X	X
82	Ed./Nonprofit Ser.				X	X	X			

* COUNTY SELECTED IF IT HAS SUPPLING OR BUYING INDUSTRIES WITH LOCATION QUOTIENTS >=1.2

V. COUNTY-BY-COUNTY FINDINGS

A. Alameda County

Firm-to-Household Linkages:

Alameda County is one of the most integrated counties among the nine, consistently ranking third or fourth in the dependency measures. Of all trips from residence to work originating in Alameda County, 30 percent are to another Bay Area county. Alameda is also dependent on other counties for workers: 24 percent of work trips entering Alameda come from other counties. The dependence on both outside workers and outside jobs signals a possible imbalance between the skills of Alameda residents and the requirements of Alameda employers. A majority (57 percent) of workers commuting into Alameda comes from Contra Costa County. The next most important labor suppliers are San Francisco (15 percent) and Santa Clara (10 percent). Alameda residents who commute out of the county are more widely dispersed. About one-third each go to San Francisco and to Santa Clara, and smaller percentages go to Contra Costa and to San Mateo.
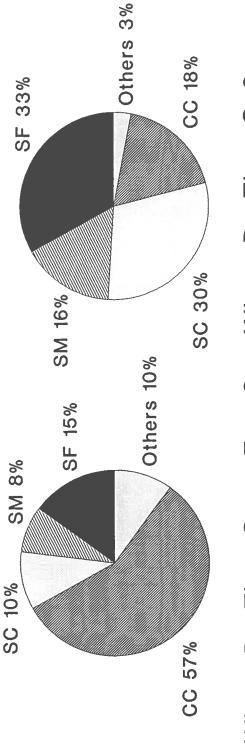
For inter-country social, recreational, and shopping trips, Alameda is moderately linked to other counties, possibly because it has many established communities well served by recreational and shopping facilities. Eleven percent of Alameda County residence-based non-work trips are to another county, and 9 percent of non-work trips coming into the county originate elsewhere. Contra Costa is the most important source for non-work trips coming into Alameda (53 percent); additional trips come mostly from Santa Clara, San Mateo, and San Francisco. Social, recreational, and shopping trips leaving Alameda go to San Francisco (28 percent), Contra Costa (31 percent), Santa Clara (20 percent), and San Mateo (17 percent).

Firm-to-Firm Linkages:

Alameda County has concentrations in 8 of the 19 key Bay Area industries. These eight sectors were studied for potential linkages: heavy construction, business and professional services, instruments, local transportation, wholesale, food and beverage processing, and communication. These sectors appear to be represented by the county's largest employers, which include University of California at Berkeley, Kaiser Permanente, Lawrence Livermore Laboratories, Alameda Naval Air Station, and AT&T.

The count of Alameda County's key economic sectors totalled 181 potential backward linkages with other Bay Area counties, and 20 internal backward linkages. This placed Alameda fourth in terms of potential dependence on the Bay Area for inputs. San Francisco, Marin, and San Mateo

FIGURE 7

ALAMEDA
REGIONAL WORK TRIPS

Where Do They Come From?   **Where Do They Go?**

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

appear to be the major contributors to Alameda's economy. This indicates that Alameda is relatively dependent in comparison to other Bay Area counties.

Kaiser Permanente, a major employer in the county, buys most of its equipment from large suppliers throughout Northern California and the United States. According to Kaiser's Office of Regional Material Management, the largest role of local firms is limited to distribution and ware-housing. However, even these local distributors are progressively being cut out of the process, as vertical integration is becoming more common among medical suppliers.

One of Kaiser's major inputs, medical diagnostic equipment, is often purchased from Hewlett-Packard. This may not represent a link to the South Bay, however, as much of HP's high-technology equipment is produced abroad (i.e. Germany), according to firm sources.

Bay Area links are primarily through Kaiser's Minority Vendors Program, which makes pur-chases at the local level. Local-level purchases include computers from a San Mateo minority vendor. In addition, the firm gets temporary help, training services, repair and maintenance, and miscellaneous consulting from Bay Area firms.
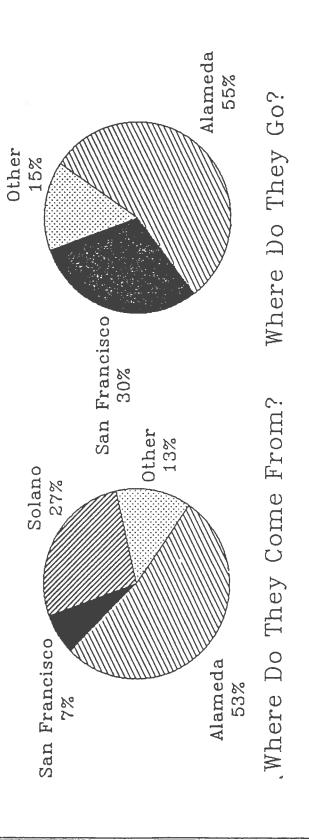
The county's forward linkages displayed a similar tendency toward interdependence. Alameda County totalled 58 forward linkages, the third-largest tally of forward linkages in our study. Although the county's potential linkages are widely dispersed throughout the Bay Area, the com-munications sector (utilities, media, phone services, and so on) offered the greatest number of potential forward links for the county.

B. Contra Costa County

Firm-to-Household Linkages:

Contra Costa County ranks as one of the most dependent counties in the region. Contra Costa is primarily a residential county, with significant shares of work and non-work trips from local residences leaving the county. Forty-one percent of work trips originating in Contra Costa leave the county, while only 23 percent of work trips coming into Contra Costa enter from other counties. Thirteen percent of social, recreational, and shopping trips begun in Contra Costa go to other counties, with only ten percent coming from other counties. Contra Costa is highly depen-dent on other counties for employment, recreational, and shopping opportunities. It does not appear to be a significant destination for other counties in either work or non-work trips.

FIGURE 8

CONTRA COSTA

Solano 27%

San Francisco 7%

Other 13%

Alameda 53%

Where Do They Come From?

Other 15%

San Francisco 30%

Alameda 55%

Where Do They Go?

Source: MTC

Work trips leaving Contra Costa go primarily to Alameda; San Francisco is also a significant destination. Alameda takes on slightly more importance as a destination for 56 percent of all non-work trips. San Francisco's share is 17 percent and Solano County amounts to 10 percent of non-work trips leaving Contra Costa.
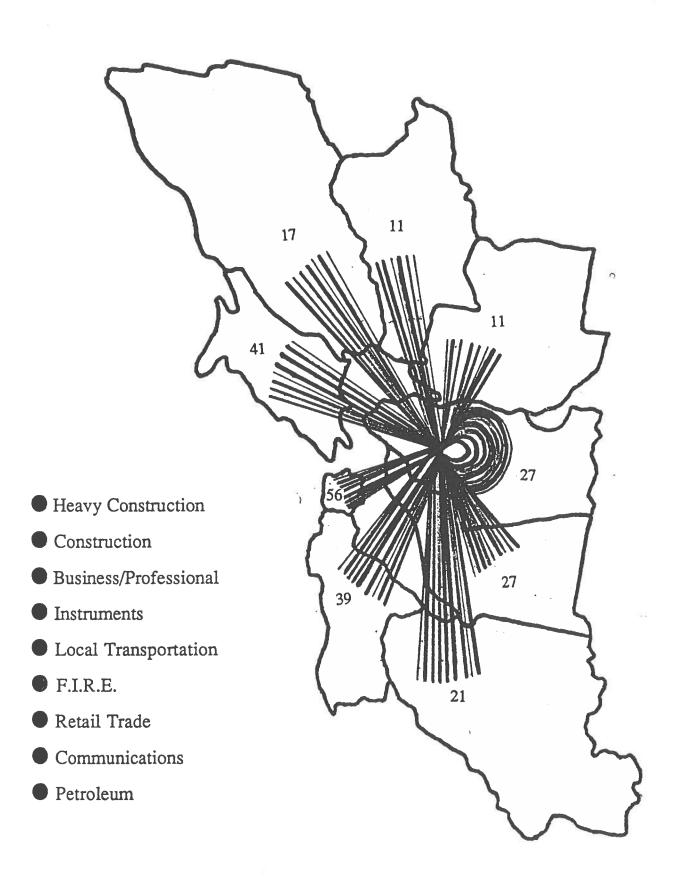
Firm-to-Firm Linkages:

Of the 19 sectors with location quotients greater than 1.2, nine were studied for potential linkages: heavy construction, business and professional services, instruments, local transportation, F.I.R.E., retail, communication, and petroleum. These nine sectors capture the economic activity of most of the county's largest employers, which include Chevron, Pacific Telesis, Bank of America, Kaiser Permanente, and Safeway. These industries get approximately 80 percent of their employees from within the county, if their employment distributions are consistent with the MTC data.

Contra Costa's key economic sectors included 223 potential backward linkages with other Bay Area counties and 27 internal backward linkages. This placed Contra Costa second (after Solano County) in terms of potential dependence on the Bay Area for its inputs. Figure 9 shows the distribution of backward linkages from Contra Costa. San Francisco is the major contributor (25 percent of potential inputs) to Contra Costa's economy. The retail and petroleum industries are the driving force behind these inputs. Marin County and San Mateo County also contributed a large volume of potential inputs to Contra Costa County. This indicates that Contra Costa may be very dependent on other Bay Area counties for suppliers.

Bank of America's Technology Development Office, located in Concord, handles most of the hardware, software, and services purchasing for the corporation. According to this office, Santa Clara County firms provide approximately half of its mechanized equipment purchases. Much of its major hardware and software purchases are from IBM, although ATM machines are purchased from out-of-state.

The relative economic dependence discussed above is confirmed by the tabulation of Contra Costa's forward linkages, which totalled 82, the greatest number in the Bay Area. Its main sales are to San Francisco and Alameda Counties, which together comprise 25 percent of Contra Costa's forward linkages. The petroleum, retail, and communication sectors produce the most forward linkages for the county.

FIGURE 9

CONTRA COSTA BACKWARD LINKAGES

17

11

11

41

27

56

39

27

21

● Heavy Construction

● Construction

● Business/Professional

● Instruments

● Local Transportation

● F.I.R.E.

● Retail Trade

● Communications

● Petroleum

C. Marin

Firm-to-Household Linkages:

Marin trip data show a higher-than-average dependence on the region for jobs and housing. Over 40 percent of work-related travel leaves the county, primarily to San Francisco. Almost one-third of work trips ending in Marin begin in other counties. Half of these come from Sonoma; San Francisco, Contra Costa, Solano, and Alameda also supply workers.

For intra-regional shopping, social, and recreational trips, Marin is about average. Marin residents leaving the county go to San Francisco (41 percent), Alameda (23 percent), Contra Costa (17 percent), and Sonoma (9 percent). Non-work trips enter Marin from San Francisco, Contra Costa, and Alameda.
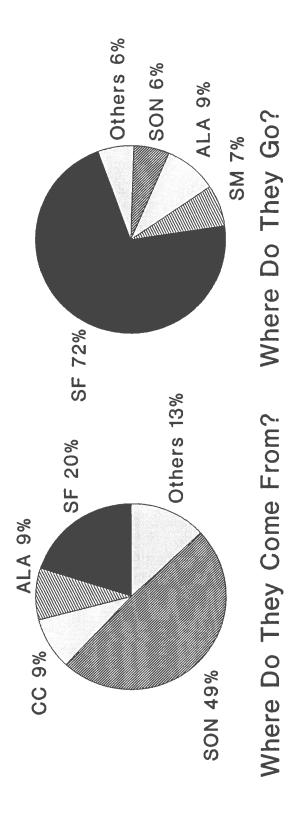
Firm-to-Firm Linkages:

Marin had concentrations (location quotient greater than 1.2) of 29 industrial sectors. Seven had potentially strong linkages with the Bay Area: construction, business and professional services, motion pictures, local transportation, F.I.R.E., retail, and educational and nonprofit services. The largest employers include Fireman's Fund, San Quentin Prison, Kaiser Permanente, Marin General Hospital, and Safeway.

Marin County's key economic sectors totalled 163 potential backward linkages with other Bay Area counties, and 36 internal backward linkages. This placed Marin fifth in terms of potential dependence on the Bay Area for its inputs. San Francisco and San Mateo Counties appear to be the major contributors to Marin's economy, particularly in regard to business and professional services, motion pictures, local transportation, and retailing. This indicates that Marin is somewhat independent in comparison to other Bay Area counties. This is interesting in light of the relative dependence of Marin County on the Bay Area in terms of firm-to-household linkages.

This independence appears to be confirmed by the results of the potential input tabulations. Marin County totalled 42 forward linkages, one of the smallest tallies in our study (tied with Sonoma for 8th place). Its main outputs are apparently sold to Alameda, San Mateo, and Napa Counties, which together comprise nearly half of Marin's forward linkages, which are predominantly in retail.

FIGURE 10

MARIN
REGIONAL WORK TRIPS

Where Do They Come From?

SON 49%

CC 9%

ALA 9%

SF 20%

Others 13%

Where Do They Go?

SF 72%

Others 6%

SON 6%

ALA 9%

SM 7%

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

D. Napa

Firm-to-Household Linkages:

With by far the lowest population (about 110,000), Napa residents produce the fewest regional trips of any Bay Area county. The level of trip activity overall may be much lower than in counties located in the core of the Bay Area, but data analysis indicates that Napa County is moderately linked to the region. The percentage of all trips ending in Napa that originate elsewhere, and of all work trips originating in Napa that go to another county, are very close to the Bay Area average of 23 percent each. Napa is also close to the Bay Area average for non-work trips. However, it receives more visitors for social and recreational purposes than it sends out, reflecting its regional position as a tourist destination.

Napa County trips are primarily to and from Solano County. Solano is particularly important as a source of work and nonwork trips to Napa County. Of secondary importance are Contra Costa as a work and non-work destination and Sonoma and Alameda as non-work trip destinations.
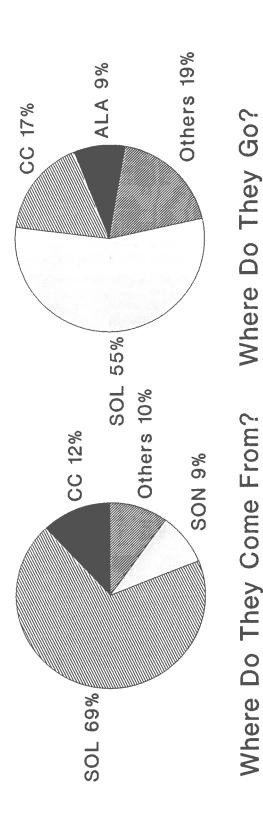
Firm-to-Firm Linkages:

Of the 20 sectors with location quotients greater than 1.2, nine were studied for potential linkages: heavy construction, motion pictures, health, food and beverage (wine), retail, education/nonprofit, communication, and rubber/leather. These nine sectors appear to represent the economic activity of several of the county's largest employers, which include Napa State Hospital, Veterans Home of California, Queen of the Valley Hospital, St. Helena Hospital, and Pacific Telesis. In addition, the county generates a sizable income from its numerous wineries, which constitute the single largest land use.

Napa County's key economic sectors totalled 221 potential backward linkages with other Bay Area counties, and 8 internal backward linkages (a relatively small number compared to the rest of the Bay Area). This placed Napa third in terms of potential dependence on the Bay Area for its inputs. San Francisco County appears to be the major contributor to Napa's economy, especially in providing inputs to the health, communication, and retail sectors. This appears to confirm Napa's dependence on the Bay Area, as discussed above.

An interview with Beringer Vineyards indicates that the wine industry is primarily linked with the North Bay for its inputs. Included in these inputs are glass from Benicia (Solano County) and chemicals distributed from Sonoma County. In addition, the winery contracts its trucking and its forklift service to firms in Sonoma County.

FIGURE 11

NAPA
REGIONAL WORK TRIPS

CC 17%

ALA 9%

Others 19%

SOL 55%

Where Do They Go?

CC 12%

Others 10%

SON 9%

SOL 69%

Where Do They Come From?

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

Contacts with several other small wineries produced similar findings. Some minor deviations included glass supplies from Oakland (Calglass), barrels from Calistoga, labels from Alameda and Marin (designed in San Francisco), and advertising from San Francisco.

The relative dependence discussed above is also confirmed by the analysis of forward linkages. Napa County totalled 61 such linkages, the second largest tally in our study. It provides inputs to many sectors in other Bay Area counties. This was verified by our interviews with Napa's wineries, since they all indicated they distribute their wines throughout the Bay Area and Northern California.

E. San Francisco

Firm-to-Household Linkages:

To no-one's surprise, San Francisco is the Bay Area county that most relies on other counties for workers. Almost half of work trips ending in San Francisco originate in other Bay Area counties. As a destination, San Francisco also has the highest percentage of inter-county non-work trips. San Francisco also produces one of the highest percentages of inter-county non-work trips.
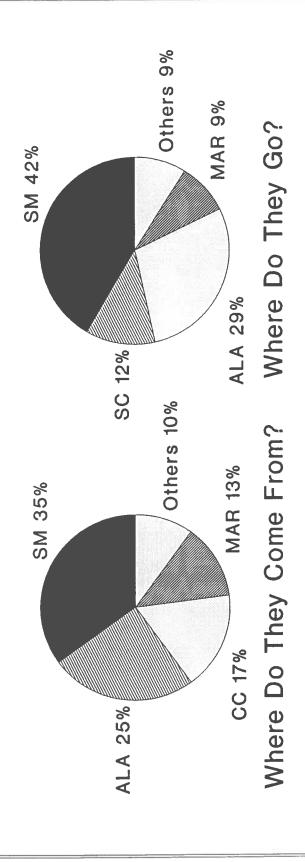
Workers commuting to San Francisco from other counties come primarily from San Mateo, Alameda, Contra Costa, and Marin. Non-work trips entering San Francisco are from the same four counties. A majority of San Francisco residents leaving the county for shopping, socializing, and recreational trips go to San Mateo County; Alameda and Marin are also important destinations.

Firm-to-Firm Linkages:

Of the 21 sectors with qualifying location quotients, eight were studied for potential linkages: heavy construction, business and professional services, motion pictures, local transportation, F.I.R.E., apparel, education/nonprofit, and communication. These sectors appear to capture the activity of the county's largest employers, which include the University of California at San Francisco, Bank of America, PG&E, Wells Fargo, and Pacific Telesis.

San Francisco's key economic sectors totalled only 153 potential backward linkages with other Bay Area counties and 44 internal backward linkages. This placed San Francisco 7th in terms of potential dependence on the Bay Area for its inputs. In a pattern similar to that found with the firm-to-household linkages, Marin County, San Mateo County, and Contra Costa County appear to be the major contributors to San Francisco's economy. Yet, the low number of potential links indicates that San Francisco is relatively independent in comparison to other Bay Area counties, in contrast to the results of the transportation data, which showed dependence on San Mateo and Alameda Counties.

FIGURE 12

SAN FRANCISCO
REGIONAL WORK TRIPS

SM 35%

ALA 25%

CC 17%

MAR 13%

Others 10%

Where Do They Come From?

SM 42%

SC 12%

ALA 29%

Others 9%

MAR 9%

Where Do They Go?

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

An interview with personnel from the University of California at San Francisco yielded some interesting results. The university is contributing to Bay Area interdependence by pursuing a policy of "sourcing locally as much as possible." The result is that over 50 percent of all out-of-house purchases are from the Bay Area. For example, monitoring equipment is purchased from Hewlett-Packard in Santa Clara (probably manufactured in Germany), scientific equipment is purchased from "various firms in Santa Clara," and other equipment is bought from General Electric in San Mateo. Higher-end printing jobs are contracted out to a firm in San Francisco.

The Levi-Strauss Company reaffirmed this pattern of regional purchasing where possible. Office equipment is mainly purchased from the Bay Area, including computers and supplies, as well as printing services. The main locations of these support firms were Oakland (Alameda County), San Francisco, and Menlo Park (Santa Clara County). A sourcing buyer for Levi-Strauss stated that chemicals were bought wholesale from Contra Costa, Alameda, and San Francisco.

In another example, a San Francisco-based securities firm indicated that they purchase most of their computers, and even some legal services, from Silicon Valley. The dependence of the two firms and the educational institution on other Bay Area counties is interesting, especially in light of our finding that San Francisco receives fewer potential inputs from the Bay Area than most counties.
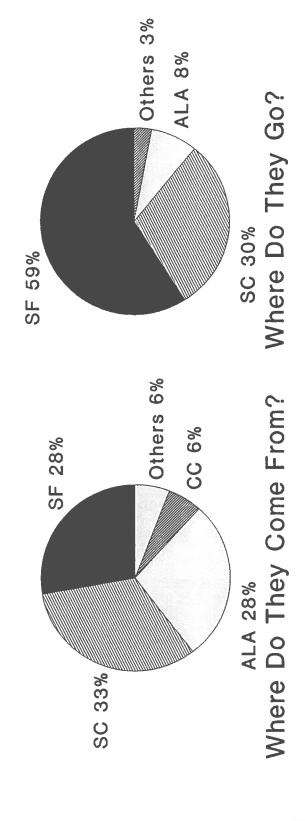
San Francisco County totalled 48 forward linkages, one of the smallest tallies in our study (seventh place). Its main relationships are with Napa and San Mateo Counties, which together account for nearly half of San Francisco's potential regional outputs, with a concentration possibly going to the communication industry.

F. San Mateo

Firm-to-Household Linkages:

San Mateo ranks as the most region-dependent county in the Bay Area for both jobs and housing. The percentages of both work and non-work trips leaving the county are among the highest in the area (42 percent and 15 percent). It is also a major regional destination for work, social, recreation, and shopping trips, second only to San Francisco. Most out-commuters go to San Francisco. For shopping, social, and recreational trips, residents go to Santa Clara and San Francisco. Work trips entering San Mateo come from San Francisco, Santa Clara, and Alameda in equal proportions. These three counties are also the most important originators of non-work trips, with San Francisco represented most heavily, followed by Santa Clara and Alameda.

FIGURE 13

SAN MATEO
REGIONAL WORK TRIPS

SF 28%

Others 6%

CC 6%

SC 33%

ALA 28%

Where Do They Come From?

SF 59%

Others 3%

ALA 8%

SC 30%

Where Do They Go?

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

Firm-to-Firm Linkages:

Of the 16 sectors in San Mateo County that registered location quotients of over 1.2, seven sectors were selected for further study: business and professional services, local transportation services, F.I.R.E., wholesale, education and non-profit organizations, communications, and rubber and leather. The largest employers in the County are United Airlines, Raychem, Kaiser Permanente, SRI International, and Oracle Computer Systems.

San Mateo's key sectors totalled 159 potential backward linkages with other Bay Area counties, and 30 potential internal links. This places San Mateo sixth in terms of the Bay Area counties. San Francisco, San Mateo, and Marin Counties appear to be major contributors to San Mateo County's economy. Based on the relatively low ranking of this county in terms of potential input volume, and the fact that approximately 20 percent of its inputs are potentially derived from within the County, it appears that San Mateo is relatively independent in comparison to the other counties of the Bay Area.

An interview with United Airlines revealed that the majority of its aircraft parts purchases are from Boeing and McDonnell Douglas, which are both located outside of the Bay Area. However, San Mateo machine shops do handle 5 percent of United's parts repair activities. In addition, secondary supplies and services such as plumbing, electrical, paper, and maintenance items are all purchased from San Mateo, San Francisco, and the East Bay. Equipment leases are generally from a San Francisco firm.
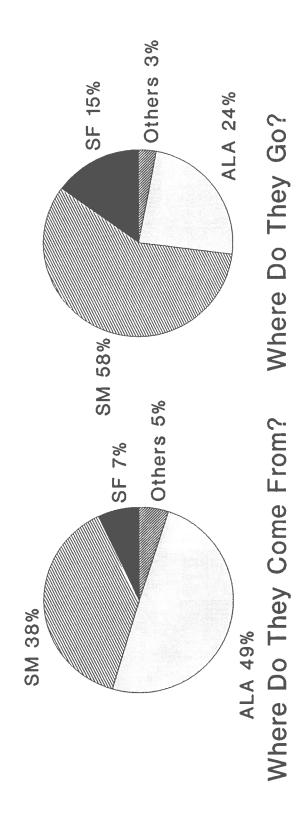
This relative independence is supported by the results of the forward linkages tabulation. The county totalled 54 potential forward linkages from the 19 key sectors, placing it in the 5th position in the Bay Area. Alameda (10) and Napa (11) appear to contain the most diverse and highest number of potential buyers of San Mateo goods and services.

G. Santa Clara

Firm-to-Household Linkages:

Santa Clara produces the greatest number of work trips in the Bay Area, but is one of the counties most independent of the region in terms of both jobs and workers. Only 14 percent of the county's workforce is imported from the other eight counties, the lowest proportion overall. Most work trips stay within the county. Santa Clara and San Francisco are the only two counties that import more workers than they export, but despite Santa Clara's larger population, its percentage of regional in-commuters (14 percent) is less than a third that of San Francisco's (47 percent).

FIGURE 14

SANTA CLARA
REGIONAL WORK TRIPS

SM 38%

SF 7%

Others 5%

ALA 49%

SF 15%

Others 3%

ALA 24%

SM 58%

Where Do They Come From?   Where Do They Go?

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

Santa Clara receives the greatest number of workers from Alameda, San Mateo, and San Francisco; it depends most heavily on Alameda and San Mateo for workers (see Figure 10). Santa Clara is also relatively independent of the other counties for shopping, social, and recreational purposes. It is important to note that the MTC data are limited to trips within the nine Bay Area counties; therefore, trips from and to Santa Cruz County and elsewhere, which are fairly numerous, are not included in these data.

Firm-to-Firm Linkages:

Only nine Santa Clara sectors registered location quotients greater than 1.2, which indicates in itself the relative concentration of this county's economy in comparison to more diversified counties of the Bay Area. Of these nine, six were found to have potentially strong linkages with the region. These are business and professional services, scientific equipment, transportation equipment, education and non-profit organizations, non-electrical machinery, and electronics. The major employers in the county are Lockheed, Hewlett-Packard, IBM, Sun Microsystems, and Stanford University.
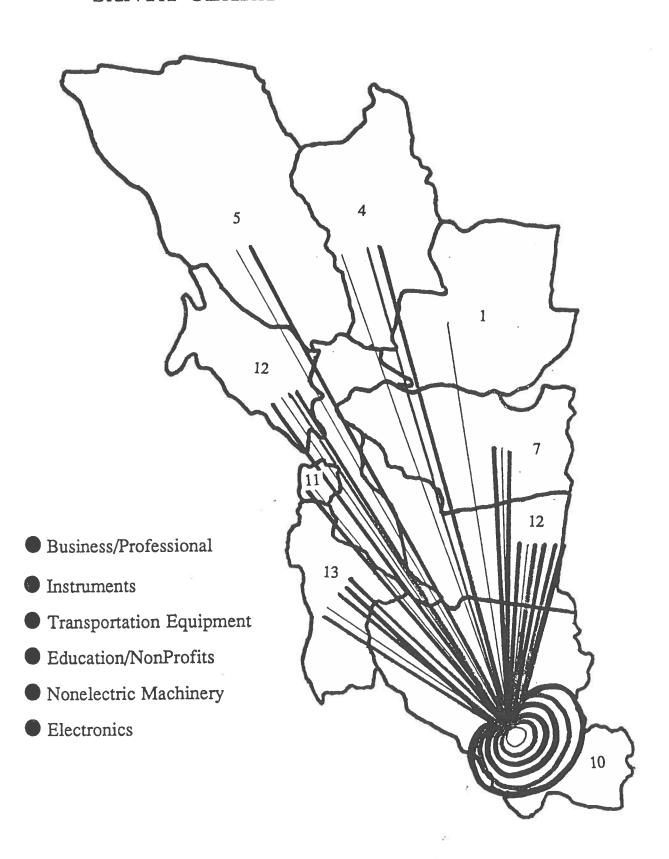
Santa Clara's key economic sectors, as described above, totalled only 63 potential backward linkages, the lowest in the Bay Area. A large percentage of these inputs originate within the county (see Figure 15). One may infer from these results that Santa Clara County's economy is potentially less reliant on the rest of the Bay Area than any other county in the region. However, Santa Clara County is very dependent on the core counties, specifically on San Francisco, San Mateo, and Alameda, for business and professional services.

Interviews with two major computer manufacturers provide an explanation as to why Santa Clara County has such a great number of internal linkages. The manufacturers confirm the importance of proximity of their suppliers and of their product-testing divisions. In addition, the importance of achieving a rapid turn-around with small support companies to build and test products necessitates that these firms be in close proximity.

Business services are mostly drawn from San Francisco. For example, Hewlett-Packard contracts much of their accounting work to Price-Waterhouse of San Francisco. Similarly, legal services are imported from San Francisco, although two major electronics manufacturers indicated that a handful of specialized law firms have cropped up in Santa Clara County.

Aside from business and professional services, the firms interviewed indicated that they derived most of their manufacturing inputs from abroad. Many of the instruments needed for production are imported from abroad. According to one manufacturing representative, "Most of

FIGURE 15

SANTA CLARA BACKWARD LINKAGES

● Business/Professional

● Instruments

● Transportation Equipment

● Education/NonProfits

● Nonelectric Machinery

● Electronics

the equipment we use isn't even made in the United States, we don't have the technology to make it any more . . . we're behind in technology."

Santa Clara County totalled 52 potential forward linkages, sixth in the Bay Area. The most important potential destinations for its goods and services in the Bay Area appear to be San Francisco, San Mateo, and Contra Costa counties. These counties are presumably the heaviest users of the computers and scientific equipment produced in Silicon Valley.

H. Solano

Firm-to-Household Linkages:

Solano County is somewhat reliant on other Bay Area counties for jobs. The percentages of trips, both work and non-work, that leave Solano are above the Bay Area average. Relatively fewer intercounty trips end in Solano County, suggesting that there is some room for Solano to expand its importance as a regional shopping and recreation destination. For work trips, Solano County residents leave the county for Contra Costa, San Francisco, Alameda, and Napa counties.
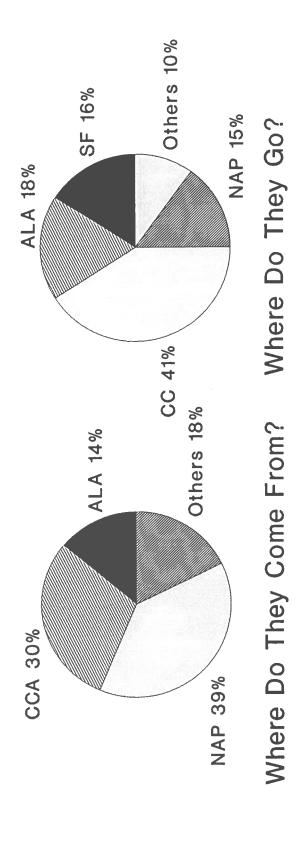
Firm-to-Firm Linkages:

Of the 25 sectors in Solano County with location quotients of over 1.2, nine showed potential for significant economic links throughout the Bay Area. These were heavy construction, residential construction, motion pictures, local transportation, F.I.R.E., food and beverages, retail, education and non-profit organizations, and petroleum refining. The major private employers in Solano County are Kaiser Permanente and Lucky Stores. Other large employers include the Mare Island Naval Base, Travis Air Force Base, and the Vacaville Prison.

Solano County's key economic sectors totalled 241 potential backward linkages with other Bay Area counties. This was the most tabulated for any county in our analysis, suggesting that Solano is potentially a significant purchaser of goods and services from many sectors of the regional economy. Major receiving industries include petroleum refining and retailing.

An interview with the manager of the Levi-Strauss factory in Benicia revealed that the factory buys 90 percent of its manufacturing machines and equipment from the Bay Area.

As a supplier to other sectors around the Bay Area, Solano County was less significant, although it still ranked 4th among Bay Area counties with 56 potential forward links. Potential

FIGURE 16

SOLANO
REGIONAL WORK TRIPS

ALA 14%

CCA 30%

NAP 39%

Others 18%

Where Do They Come From?

ALA 18%

SF 16%

Others 10%

CC 41%

NAP 15%

Where Do They Go?

Source: Metropolitan Transportation
Commission, 1980 Transportation Survey

purchasers are primarily in San Mateo and Contra Costa counties. Again, these linkages are primarily channeled through the petroleum refining industry.

I. Sonoma

Firm-to-Household Linkages:

Sonoma County is the most regionally independent county in the Bay Area. Sonoma chiefly relies on the rest of the region for jobs; 18 percent of work trips leave the county, with a majority ending in Marin and a significant share going to San Francisco. These counties are also the most important destinations for social, recreational, or shopping trips. Sonoma-based trips to Marin provide a greater share of Marin's work trips than they do to Sonoma, suggesting that Sonoma may be more important to Marin as a source of workers and housing than Marin is a source of jobs to Sonoma.
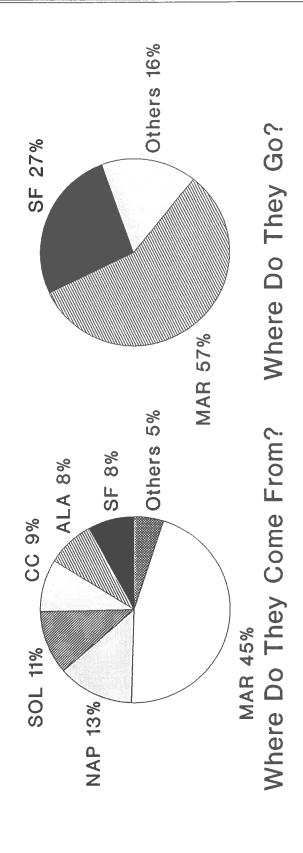
Firm-to-Firm Linkages:

Of the 25 sectors with location quotients greater than 1.2, five were studied for potential linkages: construction, scientific instruments, food and beverages, and education and non-profit organizations. The county's largest private employers include Hewlett-Packard, State Farm Insurance, Kaiser Permanente, PG&E, and the Optical Coating Laboratory.

Sonoma County's key sectors totalled 95 potential backward linkages. This placed Sonoma County eighth out of the nine Bay Area counties, confirming suspicions that the county's economic base is still relatively independent of the regional economy. However, the county appears to rely on San Francisco, San Mateo, and Marin Counties for inputs into its economy. The county has very few internal linkages in the industries examined, suggesting opportunities for local economic development.

An interview with the Optical Coating Laboratory confirms this interpretation. The company's primary input is glass, which it purchases from outside of the Bay Area. As for secondary inputs, the company gets all of its reformed plastic from Sonoma sources, but purchases nearly all of its injection-molded plastic from San Mateo County. The company expects to lessen its dependence on San Mateo County in the future, however, and obtain more supplies from within Sonoma County.

Sonoma totalled 42 forward linkages, matching Marin County for the fewest number of regional purchasers for local products and services. Possible customers are located in San Mateo and Santa Clara. Again our interview confirms this potential linkage, as the Optical Coating Laboratory sells products to equipment manufacturers in Santa Clara, including Inmac and IBM.

FIGURE 17

SONOMA
REGIONAL WORK TRIPS

SOL 11%

NAP 13%

CC 9%

ALA 8%

SF 8%

Others 5%

MAR 45%

Where Do They Come From?

SF 27%

Others 16%

MAR 57%

Where Do They Go?

VI. CONCLUSIONS

This report shows that counties within the region differ in their particular relationships with each other. It also questions the idea of "regionalization." Although there are distinct regional industries, the Bay Area economy has historically been quite diverse. Recent development in outer counties, however, is much more closely tied to the core counties of Santa Clara and San Francisco. The notion that a single economic sector maintains clear loyalty from the other sectors may be increasingly true without yet being a dominant factor in each county.

One factor is that the dominant counties economically— San Francisco and Santa Clara— have among the weakest regional business ties. Santa Clara relies very little on the rest of the Bay Area for jobs or housing (proportionately, though not in absolute terms). San Francisco, however, is quite reliant on the region for its workforce.

On the other hand, the older suburban counties, Marin and San Mateo, reflect a considerable disparity between its local economic base and where its workforce lives.

The outer counties appear to be increasingly dependent on the core counties for jobs, while several of the core counties are generating far greater demands on regional systems of transportation. The ability of people and firms to gain access to resources located throughout the region is crucial to the current economic success of the Bay Area and, even more importantly, to its future viability. To understand regional interdependence, we need measures of regional interdependence, ways of observing the quality and degree of relationship among countys, not simply the performance of any one county relative to each other. The ratio of local jobs to housing does not yet account for the nature of regional interdependence.

Regional linkages among firms and households mean that individual household or firm choices involve the opportunities and constraints of the larger environment. Local choices respond to larger-than-local conditions and have repercussions to the larger area as well. Because local conditions are produced by wider relationships, the problems of growth, development, and transportation cannot be resolved by any one county alone. Every county has its own distinctive economic and geographic character, of course. However, regionalization means that patterns of local development become more of a response to regional forces rather than to some internal or independent course local citizens might set for themselves.

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Appendix A - 1985 Location Quotients greater than 1 for Bay Area Counties

Appendix B - Backward and Forward Linkages for Industries with L.Q. greater than 1.2 by County

Appendix C - Backward and Forward Linkages of 19 Key Industries

Appendix D - Top County Employers

Appendix E - 1987 Home-Work Trips by County

Appendix A

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		ALAMEDA
----	Total	
4400	Water	2.17
4700	Transp Serv	1.67
1600	Heavy	1.64
2000	Food	1.59
700	Ag Services	1.54
4800	Commun	1.49
5100	Nondurable	1.48
4200	Trucking	1.45
07--	Ag/for/fish	1.44
7300	Business	1.41
7600	Misc Repair	1.41
50--	Wholesale	1.37
5000	Durable	1.35
3200	Stone/Cl/Gl	1.30
40--	TCU	1.29
6100	S&Ls	1.29
4500	Air	1.27
7500	Auto	1.26
99--	Nonclass	1.24
3800	Instruments	1.23
1700	Spec.	1.22
8300	Social	1.22
5900	Misc	1.18
15--	Constructior	1.16
3400	Fab. Metals	1.11
2800	Chemicals	1.08
6500	Real Est.	1.04
52--	Retail	1.03
70--	SERVICES	1.03
5700	Furniture	1.01
5800	Eating/Drink	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		CONTRA COSTA
- - - -	Total	
2900	Petroleum	14.64
4600	Pipelines	4.48
4800	Commun	2.48
6100	S&Ls	2.03
3800	Instruments	1.78
700	Ag Services	1.77
07--	Ag/for/fish	1.70
1500	General	1.65
6500	Real Est.	1.54
1600	Heavy	1.51
4900	Electric	1.49
15--	Construction	1.47
99--	Nonclass	1.44
5600	Apparel	1.42
5700	Furniture	1.38
1700	Spec.	1.37
5200	Bldg Mat	1.36
40--	TCU	1.35
8900	Misc	1.31
5500	Auto	1.28
2800	Chemicals	1.28
7200	Personal	1.27
5300	Gen Merch	1.27
52--	Retail	1.25
60--	FIRE	1.24
7300	Business	1.19
5900	Misc	1.17
5800	Eating/Drink	1.14
6400	Insur. Ag.	1.12
5400	Food	1.09
4700	Transp Serv	1.08
8600	Memb. Orgs	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES

Location Quotients Greater than 1.0

SIC		NAPA
- - - -	Total	
3100	Leather	6.11
2000	Food	4.95
8200	Education	2.44
5200	Bldg Mat	2.37
700	Ag Services	2.07
07--	Ag/for/fish	1.93
4100	Local Trans	1.86
1600	Heavy	1.80
3200	Stone/Cl/Gl	1.78
4900	Electric	1.75
8300	Social	1.72
8000	Health	1.64
4800	Commun	1.60
99--	Nonclass	1.59
1500	General	1.53
5800	Eating/Drink	1.53
7000	Hotel	1.51
7900	Amus/REc	1.42
5400	Food	1.38
5900	Misc	1.37
6500	Real Est.	1.29
15--	Constructior	1.26
70--	SERVICES	1.26
52--	Retail	1.24
3300	Primary Met.	1.22
5500	Auto	1.17
7200	Personal	1.15
4700	Transp Serv	1.07
7500	Auto	1.01
40--	TCU	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		MARIN
- - - -	Total	
7800	Motion Pic	4.85
6300	Insur. Car.	3.24
700	Ag Services	2.53
07--	Ag/for/fish	2.48
4400	Water	2.28
8300	Social	2.18
3900	Misc. Mfg.	1.96
900	Fisheries	1.92
99--	Nonclass	1.85
1500	General	1.76
60--	FIRE	1.68
5700	Furniture	1.60
8900	Misc	1.57
7500	Auto	1.56
6500	Real Est.	1.56
6100	S&Ls	1.53
5900	Misc	1.48
6400	Insur. Ag.	1.47
5800	Eating/Drink	1.45
7900	Amus/REc	1.39
5200	Bldg Mat	1.39
4700	Transp Serv	1.38
7200	Personal	1.37
8400	Museums	1.30
6700	Holding Co.	1.30
5400	Food	1.29
52--	Retail	1.27
70--	SERVICES	1.25
7300	Business	1.22
8200	Education	1.16
6200	Securities	1.14
5500	Auto	1.13
5600	Apparel	1.11
15--	Constructior	1.07
8000	Health	1.06
2700	Printing	1.02

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		SAN FRANCISCO
- - - -	Total	
4400	Water	5.99
6200	Securities	4.12
1600	Heavy	3.57
8400	Museums	3.52
6000	Banks	3.40
8100	Legal	3.05
6700	Holding Co.	2.89
4700	Transp Serv	2.87
6400	Insur. Ag.	2.52
60 - -	FIRE	2.50
4800	Commun	2.10
7000	Hotel	2.06
6500	Real Est.	1.85
8900	Misc	1.83
4100	Local Trans	1.79
4900	Electric	1.78
7300	Business	1.70
40 - -	TCU	1.63
2300	Apparel	1.46
6100	S&Ls	1.43
7800	Motion Pic	1.42
6300	Insur. Car.	1.33
10 - -	Mining	1.30
70 - -	SERVICES	1.23
1000	Metal	1.21
99 - -	Nonclass	1.14
15 - -	Constructior	1.11
8600	Memb. Orgs	1.07
8200	Education	1.04
7900	Amus/REc	1.03

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		SAN MATEO
- - - -	Total	
4500	Air	12.50
4700	Transp Serv	3.49
40 - -	TCU	2.36
6500	Real Est.	2.35
4800	Commun	2.23
8900	Misc	1.91
3000	Rubber	1.84
7500	Auto	1.77
6100	S&Ls	1.77
6700	Holding Co.	1.62
6400	Insur. Ag.	1.56
5100	Nondurable	1.43
50 - -	Wholesale	1.39
5000	Durable	1.36
7300	Business	1.34
5700	Furniture	1.32
7000	Hotel	1.24
60 - -	FIRE	1.24
700	Ag Services	1.18
7200	Personal	1.13
07 - -	Ag/for/fish	1.09
1700	Spec.	1.03
52 - -	Retail	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
 Location Quotients Greater than 1.0
    SIC   SANTA CLARA

    - - - - Total
    3600 Electonics   5.60
    3500 Nonelec Macl   3.63
    3800 Instruments   3.48
    3700 Transp. Eq.   2.22
    7300 Business   1.67
    19 - - Manuf'g   1.65
    8200 Education   1.56
    5000 Durable   1.31
    8900 Misc   1.25
    50 - - Wholesale   1.06

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		SOLANO
- - - -	Total	
2900	Petroleum	5.12
4100	Local Trans	2.31
5500	Auto	1.90
1700	Spec.	1.88
99 - -	Nonclass	1.86
1600	Heavy	1.83
2000	Food	1.83
4400	Water	1.80
5800	Eating/Drink	1.79
15 - -	Constructior	1.67
52 - -	Retail	1.65
6100	S&Ls	1.64
5300	Gen Merch	1.61
700	Ag Services	1.58
5700	Furniture	1.54
5200	Bldg Mat	1.53
7200	Personal	1.50
07 - -	Ag/for/fish	1.47
8300	Social	1.41
7500	Auto	1.39
7900	Amus/REc	1.29
5400	Food	1.26
7600	Misc Repair	1.25
2500	Furniture	1.21
5900	Misc	1.20
8000	Health	1.20
1500	General	1.11
5600	Apparel	1.10
1400	Nonmetal.	1.09
4200	Trucking	1.03
8600	Memb. Orgs	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

1985 LOCATION QUOTIENTS FOR BAY AREA COUNTIES
Location Quotients Greater than 1.0

SIC		SONOMA
----	Total	
3800	Instruments	5.50
700	Ag Services	2.15
800	Forestry	2.11
07--	Ag/for/fish	2.09
2400	Lumber	2.06
4900	Electric	1.93
99--	Nonclass	1.91
5200	Bldg Mat	1.87
5700	Furniture	1.78
1500	General	1.76
2000	Food	1.74
6300	Insur. Car.	1.73
8300	Social	1.68
6100	S&Ls	1.65
15--	Construction	1.39
5900	Misc	1.39
5500	Auto	1.38
6700	Holding Co.	1.37
5400	Food	1.33
1700	Spec.	1.31
5800	Eating/Drink	1.28
1400	Nonmetal.	1.27
52--	Retail	1.27
3900	Misc. Mfg.	1.24
7500	Auto	1.23
4100	Local Trans	1.20
3600	Electonics	1.20
7200	Personal	1.16
4800	Commun	1.13
5300	Gen Merch	1.10
60--	FIRE	1.10
5100	Nondurable	1.09
5600	Apparel	1.03
40--	TCU	1.01

SOURCE: 1985 COUNTY BUSINESS PATTERNS

Appendix B

Bay Area Counties with Location Quotients Greater than 1.2

Industry: Apparel			
SIC: 2300			
I/O Code: 9			
I/O SICs: 22 & 23			

County	LQ	Large Employer
San Francisco	1.46	Levi, Esprit, Koret

Largest Bay Area Backward Linkages:
Output Code: 9

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
12	28	Chemicals	0.016	0.104	15.5%	Contra Costa	1.28
29	50+51	Dur. & Nondur. Whlsle	0.015	0.038	39.8%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
	51	Nondurable				Alameda	1.48

Largest Bay Area Forward Linkages:
Input Code: 9

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
32	70	Hotel & Lodging	0.045	0.012	385.6%	Napa	1.51
						San Francisco	2.06
						San Mateo	1.24
14	30 & 31	Rubber & Leather	0.031	0.033	93.4%	San Mateo	1.84
	30	Rubber				Napa	6.11
	31	Leather					
3	152,153,171, 1721,1751,1752	Construction	0.013	0.009	149.4%	SIC 1700	
						Solano	1.88
						Contra Costa	1.37
						Sonoma	1.31
						Alameda	1.22
10	24 - 26	Lumber, furniture, paper	0.012	0.016	73.2%	Sonoma	2.06
	24	Lumber				Solano	1.21
	25	Furniture					

Industry: Bus & Prof Services
SIC: 8100
I/O Code: 34
I/O SICs: 73, 769, 81, 89
   81 Legal
   73 Busin.
   89 Misc.

Bay Area Counties with Location Quotients Greater than 1.2

County	LQ
San Francisco	3.05

Alameda, Marin, San Francisco, San Mateo, Santa Clara
Contra Costa, Marin, San Francisco, San Mateo, Santa Clara

Largest Bay Area Backward Linkages:
Output Code: 34

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
29	50+51	Dur. & Nondur. Whlse	0.015	0.007	214.3%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
						Alameda	1.48
	51	Nondurable					
31	60 - 67	FIRE	0.052	0.038	136.8%		
	60	Banks				San Francisco	3.40
						All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities				Marin	3.24
	63	Insurance Car.				San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
	67	Holding Co.				Marin	1.30
						San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
27	48	Communication	0.024	0.022	110.6%	Alameda	1.49
						Contra Costa	2.48
						Napa	1.60
						San Mateo	2.23

Largest Bay Area Forward Linkages:
Input Code: 34

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
32	70	Hotel & Lodging	0.059	0.052	112.8%	Napa	1.51
						San Francisco	2.06
						San Mateo	1.24
29	50+51	Dur. & Nondur. Whlse	0.046	0.084	55.1%	See above - backward linkages	
30	52 - 59	Retail Trade	0.034	0.087	39.2%	Contra Costa	1.25
						Marin	1.27
						Napa	1.24
						Solano	1.65
						Sonoma	1.27

Industry: Communication
SIC: 4800
I/O Code: 27
I/O SICs: 48

Bay Area Counties with Location Quotients Greater than 1.2

County	LQ	Large Employer
Alameda	1.49	AT&T
Contra Costa	2.48	Pacific Telesis
Napa	1.60	Pacific Telesis
San Francisco	2.10	Pacific Telesis
San Mateo	2.23	Pacific Telesis

Largest Bay Area Backward Linkages:
Output Code: 27

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
Inputs:							
22	367, 369 36	Elec. Comp/Equip Electronics	0.023	0.009	248.6%	Santa Clara	5.60
31	60 - 67	FIRE	0.032	0.037	86.5%	San Francisco	3.40
	60	Banks				All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities				Marin	3.24
	63	Insurance Car.				San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
	65	Real Estate				San Mateo	1.56
	67	Holding Co.				All counties except Santa Clara, Solano, Sonoma, Alameda	
						Marin	1.30
						San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.018	0.040	45.0%		
	73	Business				All counties except Napa, Solano, Sonoma, Contra Costa	
						San Francisco	3.05
	81	Legal				Contra Costa	1.31
	89	Misc.				Marin	1.57
						San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25

Largest Bay Area Forward Linkages:
Input Code: 27

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
Outputs:							
32	70	Hotel & Lodging	0.038	0.021	181.0%	Napa	1.51
						San Francisco	2.06
						San Mateo	1.24
34	see above	Bus/Prof services	0.024	0.022	109.1%	See list (above) in Backward linkages	
29	50 & 51	Dur. & Nondur. Whlse	0.016	0.019	84.2%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
	51	Nondurable				Alameda	1.48

Industry: Educ/NonProf.
SIC: 8200
I/O Code: 37
I/O SIC's: 82, 83, 84, 86, 892

Bay Area Counties with Location Quotients Greater than 1.2

County	I/O LQ	SIC		County	I/O LQ	SIC
Napa	2.44	SIC 8200		San Francisco	3.52	SIC 8400
Santa Clara	1.56	SIC 8200		Marin	1.57	SIC 8900
Marin	2.18	SIC 8300		San Francisco	1.83	SIC 8900
Napa	1.72	SIC 8300		San Mateo	1.91	SIC 8900
Solano	1.41	SIC 8300		Santa Clara	1.25	SIC 8900
Sonoma	1.68	SIC 8300				

Largest Bay Area Backward Linkages:
Output Code: 37

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
31	60 - 67	FIRE	0.074	0.107	69.2%	San Francisco	3.4
	60	Banks				All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities					
	63	Insurance Car.				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
	67	Holding Co.				Marin	1.3
						San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
	73 (ex7396),769, 81,89 (ex 892)	73 Bus./Prof. Services	0.020	0.057	35.1%		
	73	Business					
34	81	Legal				All counties except Napa, Solano, Sonoma, Contra Costa	
	89	Misc.				San Francisco	3.05
						Contra Costa	1.31
						Marin	1.57
						San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25

Largest Bay Area Forward Linkages:
Input Code: 37

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
32	70	Hotel/Lodging	0.011	0.004	275.0%	San Francisco	2.06
						Napa	1.51
						San Mateo	1.24

Industry: FIRE
SIC: 50 - 67
I/O Code: 31
I/O SICs: 60 - 67

Bay Area Counties with Location Quotients Greater than 1.2

County	LQ	Large Employer/Industry
Contra Costa	1.24	S&L, Real Estate
Marin	1.68	S&L, Insurance
San Francisco	2.50	Misc.
San Mateo	1.24	S&L, Ins., Holding Co.
Solano	0.72	1.64 LQ for S&L

Largest Bay Area Backward Linkages:
Output Code: 31

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
34	73 (ex7396),769, 81,89 (ex 892)	Bus./Prof. Services	0.026	0.041	63.0%	All counties except Napa, Solano, Sonoma, Contra Costa	
	73	Business				San Francisco	3.05
						Contra Costa	1.31
	81	Legal				Marin	1.57
	89	Misc.				San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25
28	49	Utilities	0.009	0.011	82.0%	Contra Costa	1.49
						Napa	1.75
						San Francisco	1.78
						Sonoma	1.93
30	52 - 59	Retail Trade	0.010	0.007	143.5%	Contra Costa	1.25
						Marin	1.27
						Napa	1.24
						Solano	1.65
						Sonoma	1.27

Largest Bay Area Forward Linkages:
Input Code: 31

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
32	70	Hotel & Lodging	0.100	0.046	216.1%	Napa	1.51
						San Francisco	2.06
						San Mateo	1.24
37	82 - 84, 86, 892	Educ, Non Profits	0.074	0.108	68.7%	Napa	2.44
	82	Educational				SantaClara	1.56
	83	Social				All counties except Contra Costa, San Mateo, San Francisco, Santa Clara.	
2	10 - 14	Mining	0.073	0.055	133.7%	San Francisco	1.30

Bay Area Counties with Location Quotients Greater than 1.2

Industry: Health
SIC: 8000
I/O Code: 36
I/O SICs: 80 + 074

	County	LQ	Large Employer
	Napa	1.64	State Hospital

Largest Bay Area Backward Linkages:
Output Code: 36

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 — County	LQ
28	491 - 497	Utilities	0.007	0.022	31.8%	Contra Costa	1.49
						Napa	1.75
						San Francisco	1.78
						Sonoma	1.93
31	60 - 67	FIRE	0.040	0.082	48.8%		
	60	Banks				San Francisco	3.40
	61	S&Ls				All counties except Napa and Santa Clara	
	62	Securities				San Francisco	4.12
	63	Insurance Car.				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
	67	Holding Co.				Marin	1.30
						San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.012	0.049	24.3%		
	73	Business				All counties except Napa, Solano, Sonoma, Contra Costa	
						San Francisco	3.05
						Contra Costa	1.31
	81	Legal				Marin	1.57
	89	Misc.				San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25

Largest Bay Area Forward Linkages:
Input Code: 36

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 — County	LQ
1	01 - 09	Agric., Forestry, Fish.	0.009	0.003	313.6%	All except Santa Clara, San Mateo, San Francisco	
	7	Ag Services				Marin	1.92
	9	Fisheries					

Industry: Non Electric Machinery
SIC: 3500

I/O Code: 18 + 19
I/O SICs: 351, 356-359

Bay Area Counties with Location Quotients Greater than 1.2

County	LQ
Santa Clara	3.63

Largest Bay Area Backward Linkages:
Output Code: 18 only

						Counties w/ LQ's >1.2	
I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	County	LQ
Inputs:							
29	50 & 51	Dur. & Nondur. Whlsle	0.029	0.044	65.3%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
						Alameda	1.48
	51	Nondurable				Napa	1.22
16	33	Primary Metals	0.014	0.114	12.3%		

Largest Bay Area Forward Linkages:
Input Code: 18+19

						Counties w/ LQ's >1.2		
I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	County	LQ	
for Input 19:								
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.023	0.003	766.7%			
						All counties except Napa, Sol., Son.		
	73	Business				San Francisco	3.05	
	81	Legal				Contra Costa	1.31	
	89	Misc.				Marin	1.57	
						San Francisco	1.83	
						San Mateo	1.91	
						Santa Clara	1.25	
for Input 18:								
2	10 - 14	Mining	0.022	0.019	117.0%	San Francisco	1.21	SIC 10
17	34 (excl. 348)	Fabricated Metals	0.020	0.025	80.2%	Sonoma	1.27	SIC 14

Industry: Motion Picture
SIC: 7800
I/O Code 35
I/O SIC's 78-79

Bay Area Counties with Location Quotients Greater than 1.2

County	I.O
Motion Pics:	
Marin	4.85
San Francisco	1.42
Amusement/Rec:	
Napa	1.42
Marin	1.39
Solano	1.29

Largest Bay Area Backward Linkages:
Output Code: 35

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
31	60 - 67	FIRE	0.039	0.064	60.9%	San Francisco	3.40
	60	Banks				All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities					
	63	Insurance Car.				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
						Marin	1.30
	67	Holding Co.				San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.029	0.091	31.9%		
	73	Business				All counties except Napa, Solano, Sonoma, Contra Costa	
						San Francisco	3.05
	81	Legal				Contra Costa	1.31
	89	Misc.				Marin	1.57
						San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
28	49	Utilities	0.013	0.030	43.8%	Sonoma	1.93
						San Francisco	1.78
						Napa	1.75
						Contra Costa	1.49

No Significant Forward Linkages

Bay Area Counties with Location Quotients Greater than 1.2

Industry: Petro
SIC: 2900
I/O Code 13
I/O SIC's 2900

County	LQ	Large Employer/Industry
Contra Costa	14.64	Chevron, Shell, Tosco
Solano	5.12	Exxon, Shelton Oil

Largest Bay Area Backward Linkages:
Output Code: 13

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2		
						County	LQ	
31	60--67	FIRE	0.004	0.007	57.1%	San Francisco	2.5	
						Marin	1.68	
						Contra Costa	1.24	
						San Mateo	1.24	
25	40-41-44--47	Transport Serv	0.014	0.034	41.2%	Solono	2.31	4100/local
						Alameda	2.17	4400/water
						San Francisco	5.99	4400/water
						Marin	2.28	4400/water
						San Mateo	12.5	4500/air
						Alameda	1.27	4500/air
						Contra Costa	4.48	4600/pipelines
						San Mateo	3.49	4700/services
						San Francisco	2.87	4700/services
28	49	Utilities	0.011	0.025	44.0%	Sonoma	1.93	
						San Francisco	1.78	
						Napa	1.75	
						Contra Costa	1.49	
29	50-51	Wholesale	0.012	0.0127	94.5%	San Mateo	1.39	
						Alameda	1.37	
12	28	Chemicals	0.008	0.023	34.8%	Contra Costa	1.28	

Industry: Retail
SIC: 5200
I/O Code 30
I/O SIC's 52-59

Bay Area Counties with Location Quotients Greater than 1.2

County	LO
Contra Costa	1.25
Marin	1.27
Napa	1.24
Solano	1.65
Sonoma	1.27

Largest Bay Area Backward Linkages:
Output Code: 30

Inputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2 County	LO
31	60 - 67	FIRE	0.055	0.072	76.4%	San Francisco	3.40
	60	Banks				All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities					
	63	Insurance Car.				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
						Marin	1.30
	67	Holding Co.				San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.034	0.086	39.5%	All counties except Napa, Solano, Sonoma, Contra Costa	
	73	Business				San Francisco	3.05
						Contra Costa	1.31
	81	Legal				Marin	1.57
	89	Misc.				San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25

29	50 & 51	Dur. & Nondur. Whlsle	0.038	0.028	135.7%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
						Alameda	1.48
	51	Nondurable					

Largest Bay Area Forward Linkages:
Input Code: 30

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
3	152-153-171 172-1751-1752	Res. Construct.	0.052	0.048	108.3%	Solano	1.88
						Contra Costa	1.37
						Sonoma	1.31
						Alameda	1.22
29	50-51	Wholesale	0.038	0.028	135.7%	see above list	
34	73-769-81-89	Bus/Prof. Serv	0.034	0.086	39.5%	see above list	

Bay Area Counties with Location Quotients Greater than 1.2

Industry: Rub/Leath
SIC: 30-31
I/O Code 14
I/O SIC's 30-31

County	LQ
Rubber	
San Mateo	1.84
Leather	
Napa	6.11

Largest Bay Area Backward Linkages:
Output Code: 14

			Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2	
I/O Code	I/O SICs	Description				County	LQ
Inputs:							
12	28	Chemicals	0.069	0.22	31.4%	Contra Costa	1.28
9	22-23	Textiles/Appar	0.03	0.033	90.9%	Apparal (2300)	
						San Francisco	1.46
29	50 & 51	Dur. & Nondur. Whlsle	0.025	0.030	83.3%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
	51	Nondurable				Alameda	1.48
28	49	Utilities	0.012	0.031	38.7%	Sonoma	1.93
						San Francisco	1.78
						Napa	1.75
						Contra Costa	1.49

Largest Bay Area Forward Linkages:
Input Code: 14

			Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2	
I/O Code	I/O SICs	Description				County	LQ
Outputs:							
24	38-39	Prof. Scien. Equip	0.01	0.034	29.4%	SIC 3800	
						Sonoma	5.5
						Santa Clara	3.48
						Contra Costa	1.78
						Alameda	1.23
						SIC 3900	
						Marin	1.96
						Sonoma	1.24
20	361-362	Elec. Transm. & Ind. Appratus	0.009	0.02	45.0%	SIC 3600	
						Santa Clara	5.6
32	70	Hotels/Lodging	0.01	0.006	166.7%	San Francisco	2.06
						Napa	1.51
						San Mateo	1.24

Largest Bay Area Forward Linkages:
Input Code: 13

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2		
						County	LQ	
25	40-41-44-47	Transport Serv	0.079	0.118	66.9%	Solono	2.31	4100/local
						Alameda	2.17	4400/water
						San Francisco	5.99	4400/water
						Marin	2.28	4400/water
						San Francisco	12.5	4500/air
						Alameda	1.27	4500/air
						Contra Costa	4.48	4600/pipelines
						San Mateo	3.49	4700/services
						San Francisco	2.87	4700/services
26	42	Truck Transp.	0.05	0.059	84.7%	Alameda	1.45	
28	48	Utilities	0.054	0.086	62.8%	Sonoma	1.93	
						San Francisco	1.78	
						Napa	1.75	
						Contra Costa	1.49	
38	91--97	Government	0.045	0.043	104.7%	Contra Costa	1.44	Note: Nearly all
						Solano	1.86	counties have
								strong gov't LQ's

Industry: Transp Equipment
SIC: 3700
I/O Code 23
I/O SIC's 37 (excl. 3761,1395)

County	LQ
Santa Clara	2.22

Largest Bay Area Backward Linkages:
Output Code: 23

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	County	LQ
Inputs:							
17	34 (excl. 348)	Fabricated Metals	0.025	0.061	41.0%		
18	351-356,358,359	Non electric Machinery	0.017	0.04	42.7%	Santa Clara	3.63
29	50+51	Dur. & Nondur. Whlsle	0.023	0.031	73.1%		
	50	Durable				Alameda	1.35
						San Mateo	1.36
						Santa Clara	1.31
	51	Nondurable				Alameda	1.48
						San Mateo	1.43

Largest Bay Area Forward Linkages:
Input Code: 23

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	County	LQ
Outputs							
7	34837613795	Fab Metals & Transp	0.013	0.056	23.4%	N/A at this level SIC code.	
33	72,75,762-764,7396	Personal & Repair Serv.	0.013	0.074	17.5%	Contra Costa	1.27
						Marin	1.37
						Napa	1.15
						San Mateo	1.13
						Solano	1.5
						Sonoma	1.16
	72	Personal				Alameda	1.26
						Marin	1.56
						San Francisco	1.01
						San Mateo	1.77
						Solano	1.39
						Sonoma	1.23
	75	Auto					

Bay Area Counties with Location Quotients Greater than 1.2

County	LQ	SIC/Descrip.
Solano	2.31	4100/local
Alameda	2.17	4400/water
San Francisco	5.99	4400/water
Marin	2.28	4400/water
San Francisco	12.5	4500/air
Alameda	1.27	4500/air
Contra Costa	4.48	4600/pipelines
San Mateo	3.49	4700/services
San Francisco	2.87	4700/services

Largest Bay Area Backward Linkages:
Output Code: 25

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
Inputs:							
13	29	Petro Refining	0.079	0.118	66.9%	Contra Costa	14.64
						Solano	5.12
31	60 - 67	FIRE	0.020	0.028	71.4%		
	60	Banks				San Francisco	3.40
	61	S&Ls				All counties except Napa and Santa Clara	
						San Francisco	4.12
	62	Securities				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	63	Insurance Car.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	64	Insurance Ag.				All counties except Santa Clara, Solano, Sonoma, Alameda	
	65	Real Estate				Marin	1.30
						San Francisco	2.89
						San Mateo	1.62
	67	Holding Co.				Sonoma	1.37

34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.018	0.048	37.5%	All counties except Napa, Solano, Sonoma, Contra Costa.
		73 Business				San Francisco 3.05
						Contra Costa 1.31
		81 Legal				Marin 1.57
		89 Misc.				San Francisco 1.83
						San Mateo 1.91
						Santa Clara 1.25

Largest Bay Area Forward Linkages:
Input Code: 25

	I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's >1.2 County	LQ
Outputs	16	33	Primary Metal	0.013	0.022	59.1%	Napa	1.22
	13	29	Petro Refining	0.014	0.022	63.6%	Contra Costa	14.64
							Solano	5.12
	15	32	Stone, Clay & Gl	0.012	0.025	48.0%	Napa	1.78
							Alameda	1.3

Industry: Wholesale
SIC: 50—
I/O Code 29
I/O SIC's 50-51

County	LQ
San Mateo	1.39
Alameda	1.37

Largest Bay Area Backward Linkages:
Output Code: 29

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
Inputs							
31	60 - 67	FIRE	0.043	0.041	104.9%	San Francisco	3.40
	60	Banks				All counties except Napa and Santa Clara	
	61	S&Ls				San Francisco	4.12
	62	Securities					
	63	Insurance Car.				Marin	3.24
						San Francisco	1.33
						Sonoma	1.73
	64	Insurance Ag.				Marin	1.47
						San Francisco	2.52
						San Mateo	1.56
	65	Real Estate				All counties except Santa Clara, Solano, Sonoma, Alameda	
						Marin	1.30
	67	Holding Co.				San Francisco	2.89
						San Mateo	1.62
						Sonoma	1.37
34	73 (ex7396),769, 81, 89 (ex 892)	Bus./Prof. Services	0.046	0.083	55.4%		
	73	Business				All counties except Napa, Solano, Sonoma, Contra Costa	
						San Francisco	3.05
	81	Legal				Contra Costa	1.31
	89	Misc.				Marin	1.57
						San Francisco	1.83
						San Mateo	1.91
						Santa Clara	1.25
30	52-59	Retail	0.038	0.028	135.7%	Contra Costa	1.25
						Marin	1.27
						Napa	1.24
						Solano	1.65
						Sonoma	1.27

Largest Bay Area Forward Linkages:

Input Code: 29

Outputs:

I/O Code	I/O SICs	Description	Bay Area Coefficient	U.S. Coefficient	Bay Area as % of U.S.	Counties w/ LQ's > 1.2 County	LQ
8	20-21	Food & Bev	0.065	0.048	135.4%	SIC 2000 Napa	4.95
						Sonoma	1.74
						Solano	1.83
						Alameda	1.59
3	152-153-171 172-1751-1752	Res. Construct.	0.06	0.046	130.4%	SIC 1700	
						Solano	1.88
						Contra Costa	1.37
						Sonoma	1.31
						Alameda	1.22
16	33	Primary Metals	0.06	0.045	133.3%	Napa	1.22
						SIC 3600	
20	361-362	Elec. Transmision/ Ind. Apprat.	0.061	0.056	108.9%	Santa Clara	5.6

Appendix C

COUNTY NAME	NAPA										
BACKWARD LINKAGES	Heavy Const.	Construction	Mot. Pictures	Health	Food/Bev.	Retail	Educ/Nonprof.	Communication	Rubb/Leather	TOTAL	% NET LINKAGE
SAN FRANCISCO	3	3	9	11	3	10	4	9	2	54	24%
SAN MATEO	2	3	6	6	3	7	3	6	1	37	17%
SANTA CLARA	3	3	2	2	3	3	2	3	1	22	10%
ALAMEDA	2	3	2	2	3	4	1	2	2	21	10%
CONTRA COSTA	3	1	5	4	2	4	3	3	2	27	12%
SOLANO	1	1	1	1	1	1	0	1	0	7	3%
NAPA	0	1	2	2	1	1	0	0	1	8	
SONOMA	0	1	3	4	1	2	0	3	1	15	7%
MARIN	2	2	8	7	2	7	3	7	0	38	17%
TOTAL	16	18	38	39	19	39	16	34	10	229	8 (3% of total linkages)
LESS INTERNAL LINKS	0	1	2	2	1	1	0	0	1	8	
NET LINKAGES	16	17	36	37	18	38	16	34	9	221	100%

FORWARD LINKAGES	Heavy Const.	Construction	Mot. Pictures	Health	Food/Bev.	Retail	Educ/Nonprof.	Communication	Rubb/Leather	TOTAL	% NET LINKAGE
SAN FRANCISCO	0	0	0	0	1	3	1	4	1	10	16%
SAN MATEO	0	0	0	0	1	3	1	4	1	10	16%
SANTA CLARA	0	0	0	0	0	3	0	3	2	8	13%
ALAMEDA	0	0	0	0	1	4	0	3	1	10	16%
CONTRA COSTA	0	0	0	1	1	3	0	2	1	8	13%
SOLANO	0	0	0	1	1	1	0	0	0	3	5%
NAPA	0	0	0	1	1	0	1	2	1	6	
SONOMA	0	0	0	1	1	1	0	0	1	4	7%
MARIN	0	0	0	2	2	2	0	2	0	8	13%
TOTAL	0	0	0	7	9	20	3	20	8	67	6 (9% of total linkages)
LESS INTERNAL LINKS	0	0	0	1	1	0	1	2	1	6	
NET LINKAGES	0	0	0	6	8	20	2	18	7	61	100%

COUNTY NAME	ALAMEDA									
BACKWARD LINKAGES	Heavy Const.	Construction	Bus/Prof Serv.	Instruments	Local Trans.	Wholesale	Food/Bev	Communication	TOTAL	% NET LINKAGE
SAN FRANCISCO	3	3	7	0	8	8	3	9	41	23%
SAN MATEO	2	3	6	1	6	6	3	6	33	18%
SANTA CLARA	3	3	1	2	2	2	3	3	19	10%
ALAMEDA	2	3	4	2	2	2	3	2	20	
CONTRA COSTA	3	1	3	0	5	5	2	3	22	12%
SOLANO	1	1	1	0	1	2	1	1	9	5%
NAPA	0	1	2	0	2	2	1	0	7	4%
SONOMA	0	1	3	0	2	5	1	3	15	8%
MARIN	2	2	5	0	8	9	2	7	35	19%
TOTAL	16	18	32	5	36	41	19	34	201	
LESS INTERNAL LINKS	2	3	4	2	2	2	3	2	20	(10% of total linkages)
NET LINKAGES	14	15	28	3	34	39	16	32	181	100%

FORWARD LINKAGES	Heavy Const.	Construction	Bus/Prof Serv.	Instruments	Local Trans.	Wholesale	Food/Bev	Communication	TOTAL	% NET LINKAGE
SAN FRANCISCO	0	0	1	3	0	0	1	4	9	16%
SAN MATEO	0	0	2	2	0	0	1	4	9	16%
SANTA CLARA	0	0	1	2	0	1	0	3	7	12%
ALAMEDA	0	0	2	1	1	2	1	3	10	
CONTRA COSTA	0	0	1	2	1	1	1	2	8	14%
SOLANO	0	0	1	0	2	2	1	0	5	9%
NAPA	0	0	2	0	0	2	1	2	9	16%
SONOMA	0	0	1	0	0	2	1	0	4	7%
MARIN	0	0	1	2	0	0	2	2	7	12%
TOTAL	0	0	12	12	5	10	9	20	68	
LESS INTERNAL LINKS	0	0	2	1	1	2	1	3	10	(15% of total linkages)
NET LINKAGES	0	0	10	11	4	8	8	17	58	100%

COUNTY NAME	MARIN								
BACKWARD LINKAGES	Construction	Bus/Prof Serv.	Mot. Pictures	Local Trans.	F.I.R.E.	Retail	Educ/Nonprof.	TOTAL	% NET LINKAGES
SAN FRANCISCO	3	7	9	8	4	10	4	45	28%
SAN MATEO	3	6	6	6	2	7	3	33	20%
SANTA CLARA	3	1	2	2	2	3	2	15	9%
ALAMEDA	3	4	2	2	1	4	1	17	10%
CONTRA COSTA	1	3	5	5	3	4	3	24	15%
SOLANO	1	1	1	2	1	1	0	7	4%
NAPA	1	2	2	1	2	1	0	9	6%
SONOMA	1	3	3	2	2	2	0	13	6%
MARIN	2	5	8	8	3	7	3	36	8%
TOTAL	18	32	38	36	20	39	16	199	
LESS INTERNAL LINKS	2	5	8	8	3	7	3	36	(18% of total linkages)
NET LINKAGES	16	27	30	28	17	32	13	163	100%

FORWARD LINKAGES	Construction	Bus/Prof Serv.	Mot. Pictures	Local Trans.	F.I.R.E.	Retail	Educ/Nonprof.	TOTAL	% NET LINKAGES
SAN FRANCISCO	0	1	0	0	1	3	1	6	14%
SAN MATEO	0	2	0	0	1	3	1	7	17%
SANTA CLARA	0	1	0	0	1	3	0	5	12%
ALAMEDA	0	2	0	1	1	4	0	8	19%
CONTRA COSTA	0	1	0	1	0	3	0	5	12%
SOLANO	0	1	0	1	0	1	0	3	7%
NAPA	0	2	0	2	1	0	1	6	14%
SONOMA	0	1	0	0	0	1	0	2	5%
MARIN	0	1	0	0	0	2	0	3	
TOTAL	0	12	0	5	5	20	3	45	
LESS INTERNAL LINKS	0	1	0	0	0	2	0	3	(7% of total linkages)
NET LINKAGES	0	11	0	5	5	18	3	42	100%

COUNTY NAME   SAN FRANCISCO

BACKWARD LINKAGE

	H. CONSTR.	BUS/PROF	MOTION PICT	TRANSPO	FIRE	APPAREL	EDUC/NPO	MMUNICATI	TOTAL	% NET LINKAGE
SAN FRANCISCO	3	7	9	8	4	0	4	9	44	
SAN MATEO	2	6	6	6	2	1	3	6	32	21%
SANTA CLARA	3	1	2	2	2	1	2	3	16	10%
ALAMEDA	2	4	2	2	1	2	1	2	16	10%
CONTRA COSTA	3	3	5	5	3	1	3	3	26	17%
SOLANO	1	1	1	2	1	0	0	1	7	5%
NAPA	0	2	2	1	2	0	0	0	7	5%
SONOMA	0	3	3	2	2	0	0	3	13	8%
MARIN	2	5	8	8	3	0	3	7	36	24%
TOTAL	16	32	38	36	20	5	16	34	197	
LESS INTERNAL LINI	3	7	9	8	4	0	4	9	44	(22% of total linkages)
NET LINKAGES	13	25	29	28	16	5	12	25	153	100%

FORWARD LINKAGE

	BUS/PROF	LOC TRAN:	FIRE	APPAREL	EDUC N	COMMUNI	TOTAL	% NET LINKAGE
SAN FRANCISCO	1	0	1	1	1	4	8	
SAN MATEO	2	0	2	1	1	4	10	21%
SANTA CLARA	1	0	0	1	0	3	5	10%
ALAMEDA	2	1	1	1	0	3	8	17%
CONTRA COSTA	1	1	1	0	0	2	5	10%
SOLANO	1	1	2	0	0	0	4	8%
NAPA	2	2	2	1	0	3	10	21%
SONOMA	1	0	2	0	0	0	3	6%
MARIN	1	0	0	0	1	1	3	6%
TOTAL	12	5	11	5	3	20	56	
LESS INTERNAL LINI	1	0	1	1	1	4	8	(14% of total linkages)
NET LINKAGES	11	5	10	4	2	16	48	100%

COUNTY NAME   SAN MATEO

BACKWARD LINKAGE	BUS/PROF	LOCAL TR	FIRE	WHOLESALE	EDUC/N	COMMUNI	RUBBER/LE	TOTAL	% NET LINKAGE
SAN FRANCISCO	7	8	4	8	4	9	2	42	27%
SAN MATEO	6	6	2	6	3	6	1	30	
SANTA CLARA	1	2	2	2	2	3	1	13	8%
ALAMEDA	4	2	1	2	1	2	2	14	9%
CONTRA COSTA	3	5	3	5	3	3	2	24	16%
SOLANO	1	2	1	2	0	1	0	7	5%
NAPA	2	1	2	2	0	0	1	8	5%
SONOMA	3	2	2	5	0	3	1	16	10%
MARIN	5	3	3	9	3	7	0	30	19%
TOTAL	32	31	20	41	16	34	10	184	
LESS INTERNAL LINK	6	6	2	6	3	6	1	30	(16% of total linkages)
NET LINKAGES	26	25	18	35	13	28	9	154	100%

FORWARD LINKAGE	BUS/PROF	LOCAL TR	FIRE	WHOLESALE	EDUC/N	COMMUNI	RUBBER/LE	TOTAL	% NET LINKAGE
SAN FRANCISCO	1	0	1	0	1	4	1	8	15%
SAN MATEO	2	0	1	0	1	4	1	9	
SANTA CLARA	1	0	1	1	0	3	2	8	15%
ALAMEDA	2	1	1	2	0	3	1	10	19%
CONTRA COSTA	1	1	0	1	0	2	1	6	11%
SOLANO	1	1	0	2	0	0	0	4	7%
NAPA	2	2	1	2	1	2	1	11	20%
SONOMA	1	0	0	0	0	2	1	4	7%
MARIN	1	0	0	2	0	0	0	3	6%
TOTAL	12	5	5	10	3	20	8	63	
LESS INTERNAL LINK	2	0	1	0	1	4	1	9	(14% of total linkages)
NET LINKAGES	10	5	4	10	2	16	7	54	100%

COUNTY NAME   SANTA CLARA

BACKWARD LINKAGE	BUS/PROF	INSTRUMENT	TRANS EQUI	EDUC/NPO	ELEC	MECTRONIC	TOTAL	% NET LINKAGE
SAN FRANCISCO	7	0	4	0	0	0	11	17%
SAN MATEO	6	1	3	2	1	0	13	20%
SANTA CLARA	1	2	2	2	1	2	10	18%
ALAMEDA	4	2	1	2	2	1	12	11%
CONTRA COSTA	3	0	3	0	0	1	7	2%
SOLANO	1	0	0	0	0	0	1	6%
NAPA	2	0	0	0	1	1	4	8%
SONOMA	3	0	0	0	0	2	5	8%
MARIN	5	0	3	3	0	1	12	18%
TOTAL	32	5	16	9	5	8	75	
LESS INTERNAL LINK	1	2	2	2	1	2	10 (13% of total linkages)	
NET LINKAGES	31	3	14	7	4	6	65	100%

FORWARD LINKAGES	BUS/PROF	INSTRUMENT	TRANS EQUI	EDUC/NPO	ELEC	MECTRONIC	TOTAL	% NET LINKAGE
SAN FRANCISCO	1	3	0	1	4	0	9	17%
SAN MATEO	2	2	1	1	2	1	9	17%
SANTA CLARA	1	2	0	0	2	1	6	
ALAMEDA	2	1	1	0	1	2	7	13%
CONTRA COSTA	1	2	1	0	2	2	8	15%
SOLANO	1	0	2	1	0	1	4	8%
NAPA	2	0	0	0	1	1	4	8%
SONOMA	1	0	1	0	1	1	4	8%
MARIN	1	2	2	0	2	0	7	13%
TOTAL	12	12	8	3	14	9	58	
LESS INTERNAL LINK	1	2	0	0	2	1	6 (10% of total linkages)	
NET LINKAGES	11	10	8	3	12	8	52	100%

COUNTY NAME   SOLANO

BACKWARD LINKAGES

	HEAVY CON CONSTR	MOTION PI	LOCAL TRAI	FIRE	FOOD/BEV RETAIL	EDUC/NPO	PETRO	TOTAL		% NET LINKAGES
SAN FRANCISCO	3	9	8	4	3	10	4	12	56	23%
SAN MATEO	2	6	6	2	3	7	3	6	38	16%
SANTA CLARA	3	2	2	2	3	3	2	2	22	9%
ALAMEDA	2	2	2	1	3	4	1	7	25	10%
CONTRA COSTA	3	5	5	3	2	4	3	5	31	13%
SOLANO	1	1	2	1	1	1	0	3	11	
NAPA	0	2	1	2	1	1	0	4	12	5%
SONOMA	0	3	2	2	1	2	0	4	15	6%
MARIN	2	8	8	3	2	7	3	7	42	17%
TOTAL	16	38	36	20	19	39	16	50	252	
LESS INTERNAL LINI	1	1	2	1	1	1	0	3	11 (4% of total linakges)	
NET LINKAGES	15	37	34	19	18	38	16	47	241	100%

FORWARD LINKAGE

	LOCAL TRAI	FIRE	FOOD/BEV RETAIL	EDUC/A	PETRO	TOTAL		% NET LINKAGE
SAN FRANCISCO	0	2	2	0	2	6		11%
SAN MATEO	0	3	1	1	5	11		20%
SANTA CLARA	0	3	1	1	1	7		13%
ALAMEDA	0	3	0	0	0	4		7%
CONTRA COSTA	1	4	1	0	4	11		20%
SOLANO	1	3	1	0	2	7		
NAPA	1	1	1	1	2	6		11%
SONOMA	2	0	1	0	2	6		11%
MARIN	0	1	1	0	1	3		6%
TOTAL	5	20	9	3	19	61		
LESS INTERNAL LINI	1	3	1	0	2	7 (11% of total linkages)		
NET LINKAGES	4	17	8	3	17	54		100%

COUNTY NAME   SONOMA

BACKWARD LINKAGE	CONSTR	INSTRUME	FOOD/BEV RETAIL		EDUC/\	TOTAL	% NET LINKAGE
SAN FRANCISCO	3	0	3	10	4	20	21%
SAN MATEO	3	1	3	7	3	17	18%
SANTA CLARA	3	2	3	3	2	13	14%
ALAMEDA	3	2	3	4	1	13	14%
CONTRA COSTA	1	0	2	4	3	10	11%
SOLANO	1	0	1	1	0	3	3%
NAPA	1	1	1	1	0	4	4%
SONOMA	1	0	1	2	0	4	
MARIN	2	0	2	7	3	14	15%
TOTAL	18	6	19	39	16	98	
LESS INTERNAL LIN|	1	0	1	1	0	3	(3% of total linakges)
NET LINKAGES	17	6	18	38	16	95	100%

FORWARD LINKAGE	INSTRUM	FOOD/BEV RETAIL	EDUC/NPO		TOTAL	% NET LINKAGES
SAN FRANCISCO	2	2	2	0	6	14%
SAN MATEO	3	1	3	1	8	19%
SANTA CLARA	2	1	3	1	7	17%
ALAMEDA	2	0	3	0	5	12%
CONTRA COSTA	1	1	4	0	6	14%
SOLANO	2	1	3	0	6	14%
NAPA	0	1	1	0	2	5%
SONOMA	0	1	0	1	2	
MARIN	0	1	1	0	2	5%
TOTAL	12	9	20	3	44	
LESS INTERNAL LIN|	0	1	0	1	2	(5% of total linkages)
NET LINKAGES	12	8	20	2	42	100%

Appendix D

TOP COUNTY EMPLOYERS

• **SAN FRANCISCO:** Levi Strauss & Co (31,000), Bechtel Group (27,000), UCSF (11,055), Bank Of America (8,865), Arcata Corp (7,200), PG&E (6,372), Wells Fargo (6,136), Pacific Telesis (5,555), Del Monte Foods (4,700), Esprit De Corp (4,000). Source: San Francisco Business Times (December 1990) & San Francisco Chronicle (April, 1991).

• **SAN MATEO:** United Airlines (19,346), DHL Airways (6,000), Ampex Corp (5,000), Raychem (4,340), Kaiser Permanente (2,300), SRI International (2,300), Oracle (2,174), California Casualty Group (1,400). Source: San Francisco Business Times (December 1990) & San Francisco Chronicle (April, 1991).

• **SANTA CLARA:** Lockheed (20,868), Hewlett-Packard (16,880), IBM (14,068), Sun Microsystems (7,750), Stanford University (7,426). Source: San Francisco Chronicle (April 1991).

• **ALAMEDA:** UC Berkeley (11,687), American Protective Services (10,500), Kaiser Permanente (8,543), Lawrence Livermore Laboratories (7,763), Dillingham Construction (7,000), AT&T (4,118), Crowley Maritime (4,000), G.F. Industries (4,000), Spreckels Industries (3,500), American President, Computer Land, Golden West Financial , The Clorax Co.. Source: San Francisco Business Times (December 1990) & San Francisco Chronicle (April, 1991).

• **CONTRA COSTA:** Chevron (10,500), Pacific Telesis (8,217), Contra Costa County (5,990), Bank of America (4,725), Mount Diablo School District (4,311), Kaiser Permanente (3,194), PG&E (2,045), Safeway (3,179), Lesher Communications (1,800), Village Resorts (1,500). Source: Contra Costa Council & San Francisco Chronicle (April, 1991).

• **SOLANO:** Kaiser Permanente (1,325), Marine World Africa (1,100), Lucky Stores (700), Anheuser-Busch (617), Northbay Medical Center (690), Institutional Financial Services (500). Source: Solano Economic Development Corporation.

• **NAPA:** Napa State Hospital (2,300), Wineries (1,560), Napa Unified School district (1,425), Pacific Union College (1,150), Veterans Home of California (1,000). Source: Napa County Administration Office.

• **SONOMA:** Hewlett-Packard (3,630), State Farm Insurance (1,067), Kaiser Permanente (1,032), PG&E (983), Sola Optical (971), Sonoma Developmental Center (over 1,000), Santa Rosa School District (over 1,000), Santa Rosa Junior College (over 1,000), US Government (over 1,000), State of California (over 1,000), Sonoma County (over 1,000). Source: Sonoma Small Business Center & San Francisco Chronicle (April, 1991).

• **MARIN:** Fireman's Fund Insurance (2,900), San Quentin Prison (1,543), Kaiser Permanente (838), Marin General Hospital (834), Novato Unified School District (1,000), AMEX Life Assurance Co. (712), Safeway (700), Westamerica Bancorp (700), PG&E (585). Source: Marin Independent Journal and San Francisco Chronicle (April, 1991).

Appendix E

MTC 1987 WORK TRIPS

ORIGIN	DESTINATION	1987 TOTAL	%87	1987 %INTER-COUNTY
SAN FRANCISCO		------		
SF	SF	400180	53%	
SM	SF	122285	16%	35%
SC	SF	13303	2%	4%
ALA	SF	86452	12%	25%
CC	SF	61191	8%	17%
SOL	SF	9485	1%	3%
NAP	SF	1062	0%	0%
SON	SF	10291	1%	3%
MAR	SF	47433	6%	13%
	SF	751682	100%	100%
SAN MATEO	SAN MATEO			
SF	SM	42978	10%	28%
SM	SM	280111	65%	
SC	SM	50236	12%	33%
ALA	SM	42666	10%	28%
CC	SM	9199	2%	6%
SOL	SM	1845	0%	1%
NAP	SM	401	0%	0%
SON	SM	1520	0%	1%
MAR	SM	4945	1%	3%
	SM	433901	100%	
SANTA CLAR	SANTA CLARA			
SF	SC	11972	1%	7%
SM	SC	62110	5%	38%
SC	SC	994930	86%	
ALA	SC	78571	7%	49%
CC	SC	7257	1%	4%
SOL	SC	253	0%	0%
NAP	SC	99	0%	0%
SON	SC	179	0%	0%
MAR	SC	908	0%	1%
	SC	1156279	100%	
ALAMEDA	ALAMEDA			
SF	ALA	29555	4%	15%
SM	ALA	16261	2%	8%
SC	ALA	20413	2%	10%
ALA	ALA	627816	76%	
CC	ALA	114661	14%	57%
SOL	ALA	10567	1%	5%
NAP	ALA	1690	0%	1%
SON	ALA	1622	0%	1%
MAR	ALA	5989	1%	3%
	ALA	828574	100%	

MTC 1987 WORK TRIPS				1987
		1987		%INTER-
ORIGIN	DESTINATION	TOTAL	%87	COUNTY
CONTRA CO	CONTRA COSTA			
SF	CC	6515	2%	7%
SM	CC	2070	1%	2%
SC	CC	2058	1%	2%
ALA	CC	47742	12%	53%
CC	CC	303200	77%	
SOL	CC	24458	6%	27%
NAP	CC	3118	1%	3%
SON	CC	1331	0%	1%
MAR	CC	2510	1%	3%
	CC	393002	100%	
SOLANO	SOLANO			
SF	SOL	1695	1%	6%
SM	SOL	1088	1%	4%
SC	SOL	225	0%	1%
ALA	SOL	3792	2%	14%
CC	SOL	8034	5%	30%
SOL	SOL	133238	83%	
NAP	SOL	10505	7%	39%
SON	SOL	975	1%	4%
MAR	SOL	741	0%	3%
	SOL	160293	100%	
NAPA	NAPA			
SF	NAP	239	0%	2%
SM	NAP	167	0%	1%
SC	NAP	65	0%	0%
ALA	NAP	731	1%	6%
CC	NAP	1513	2%	12%
SOL	NAP	9134	14%	69%
NAP	NAP	52426	80%	
SON	NAP	1135	2%	9%
MAR	NAP	168	0%	1%
	NAP	65578	100%	
SONOMA	SONOMA			
SF	SON	755	0%	8%
SM	SON	385	0%	4%
SC	SON	91	0%	1%
ALA	SON	759	0%	8%
CC	SON	813	0%	9%
SOL	SON	1039	1%	11%
NAP	SON	1167	1%	13%
SON	SON	174215	95%	
MAR	SON	4123	2%	45%
	SON	183347	100%	
MARIN	MARIN			
SF	MAR	8786	6%	20%
SM	MAR	1745	1%	4%
SC	MAR	269	0%	1%
ALA	MAR	4029	3%	9%
CC	MAR	3980	3%	9%
SOL	MAR	3003	2%	7%
NAP	MAR	664	0%	1%
SON	MAR	21999	16%	49%
MAR	MAR	97229	69%	
	MAR	141704	86%	

MTC 1987 HOME-BASED WORK TRIPS BY COUNTY

Origin	Destination	TOTAL	%	%INTER-COUNTY
---	------	------	------	------------
SAN FRANCISCO				
SF	SF	400180	80%	
SF	SM	42978	9%	42%
SF	SC	11972	2%	12%
SF	ALA	29555	6%	29%
SF	CC	6515	1%	6%
SF	SOL	1695	0%	2%
SF	NAP	239	0%	0%
SF	SON	755	0%	1%
SF	MAR	8786	2%	9%
SF		502675	100%	100%
SAN MATEO				
SM	SF	122285	25%	59%
SM	SM	280111	58%	
SM	SC	62110	13%	30%
SM	ALA	16261	3%	8%
SM	CC	2070	0%	1%
SM	SOL	1088	0%	1%
SM	NAP	167	0%	0%
SM	SON	385	0%	0%
SM	MAR	1745	0%	1%
SM		486222	100%	
SANTA CLARA				
SC	SF	13303	1%	15%
SC	SM	50236	5%	58%
SC	SC	994930	92%	
SC	ALA	20413	2%	24%
SC	CC	2058	0%	2%
SC	SOL	225	0%	0%
SC	NAP	65	0%	0%
SC	SON	91	0%	0%
SC	MAR	269	0%	0%
SC		1081590	100%	
ALAMEDA				
ALA	SF	86452	10%	33%
ALA	SM	42666	5%	16%
ALA	SC	78571	9%	30%
ALA	ALA	627816	70%	
ALA	CC	47742	5%	18%
ALA	SOL	3792	0%	1%
ALA	NAP	731	0%	0%
ALA	SON	759	0%	0%
ALA	MAR	4029	0%	2%
ALA		892558	100%	

Origin	Destination	TOTAL	%	%INTER-COUNTY
CONTRA COSTA				
CC	SF	61191	12%	30%
CC	SM	9199	2%	4%
CC	SC	7257	1%	4%
CC	ALA	114661	22%	55%
CC	CC	303200	59%	
CC	SOL	8034	2%	4%
CC	NAP	1513	0%	1%
CC	SON	813	0%	0%
CC	MAR	3980	1%	2%
CC		509848	100%	
SOLANO				
SOL	SF	9485	5%	16%
SOL	SM	1845	1%	3%
SOL	SC	253	0%	0%
SOL	ALA	10567	5%	18%
SOL	CC	24458	13%	41%
SOL	SOL	133238	69%	
SOL	NAP	9134	5%	15%
SOL	SON	1039	1%	2%
SOL	MAR	3003	2%	5%
SOL		193022	100%	
NAPA				
NAP	SF	1062	1%	6%
NAP	SM	401	1%	2%
NAP	SC	99	0%	1%
NAP	ALA	1690	2%	9%
NAP	CC	3118	4%	17%
NAP	SOL	10505	15%	56%
NAP	NAP	52426	74%	
NAP	SON	1167	2%	6%
NAP	MAR	664	1%	4%
NAP		71132		
SONOMA				
SON	SF	10291	5%	26%
SON	SM	1520	1%	4%
SON	SC	179	0%	0%
SON	ALA	1622	1%	4%
SON	CC	1331	1%	3%
SON	SOL	975	0%	2%
SON	NAP	1135	1%	3%
SON	SON	174215	82%	
SON	MAR	21999	10%	56%
SON		213267	100%	
MARIN				
MAR	SF	47433	29%	71%
MAR	SM	4945	3%	7%
MAR	SC	908	1%	1%
MAR	ALA	5989	4%	9%
MAR	CC	2510	2%	4%
MAR	SOL	741	0%	1%
MAR	NAP	168	0%	0%
MAR	SON	4123	3%	6%
MAR	MAR	97229	59%	
MAR		164046	100%	

MTC 1987 HOME-BASED SHOP & SOCIAL/REC TRIPS BY COUNTY

Origin	Destination	TOTAL	%	%INTER-COUNTY
SAN FRANCISCO				
1	1	567930	83%	
1	2	70515	10%	61%
1	3	3873	1%	3%
1	4	17517	3%	15%
1	5	6537	1%	6%
1	6	385	0%	0%
1	7	90	0%	0%
1	8	332	0%	0%
1	9	15798	2%	14%
1		682977	100%	
SAN MATEO				
2	1	45144	6%	38%
2	2	690461	85%	
2	3	52512	6%	44%
2	4	14799	2%	12%
2	5	3179	0%	3%
2	6	281	0%	0%
2	7	126	0%	0%
2	8	286	0%	0%
2	9	2749	0%	2%
2		809537	100%	
SANTA CLARA				
3	1	6773	0%	12%
3	2	29994	2%	54%
3	3	1705474	97%	
3	4	16369	1%	29%
3	5	1704	0%	3%
3	6	173	0%	0%
3	7	140	0%	0%
3	8	285	0%	1%
3	9	335	0%	1%
3		1761247	100%	
ALAMEDA				
4	1	44110	3%	28%
4	2	27068	2%	17%
4	3	31268	2%	20%
4	4	1304560	89%	
4	5	48859	3%	31%
4	6	1210	0%	1%
4	7	256	0%	0%
4	8	431	0%	0%
4	9	3978	0%	3%
4		1461740	100%	

Origin	Destination	TOTAL	%	%INTER-COUNTY
CONTRA COSTA				
5	1	21748	2%	17%
5	2	6787	1%	5%
5	3	5740	1%	5%
5	4	70727	7%	56%
5	5	870417	87%	
5	6	12601	1%	10%
5	7	863	0%	1%
5	8	743	0%	1%
5	9	6692	1%	5%
5		996318	100%	
SOLANO				
6	1	1945	1%	4%
6	2	646	0%	1%
6	3	724	0%	2%
6	4	4571	1%	10%
6	5	23458	7%	52%
6	6	299419	87%	
6	7	10787	3%	24%
6	8	1090	0%	2%
6	9	1466	0%	3%
6		344106	100%	
NAPA				
7	1	442	0%	4%
7	2	267	0%	2%
7	3	496	0%	4%
7	4	798	1%	6%
7	5	1387	1%	11%
7	6	6154	4%	50%
7	7	137810	92%	
7	8	2114	1%	17%
7	9	660	0%	5%
7		150128	100%	
SONOMA				
8	1	1549	0%	7%
8	2	881	0%	4%
8	3	1571	0%	7%
8	4	1780	0%	8%
8	5	1409	0%	7%
8	6	1161	0%	5%
8	7	2629	1%	12%
8	8	406948	95%	
8	9	10349	2%	49%
8		428277	100%	
MARIN				
9	1	14040	5%	41%
9	2	1666	1%	5%
9	3	680	0%	2%
9	4	7886	3%	23%
9	5	5717	2%	17%
9	6	635	0%	2%
9	7	343	0%	1%
9	8	2907	1%	9%
9	9	274024	89%	
9		307898	100%	

MTC1987 SHOP & SOCIAL/REC TRIPS BY COUNTY

Origin	Destination	TOTAL87	% 1987	% INTER-COUNTY 1987
SAN FRANCISCO				
1	1	567930	81%	
2	1	45144	6%	33%
3	1	6773	1%	5%
4	1	44110	6%	32%
5	1	21748	3%	16%
6	1	1945	0%	1%
7	1	442	0%	0%
8	1	1549	0%	1%
9	1	14040	2%	10%
	1	703681	100%	
SAN MATEO				
1	2	70515	9%	51%
2	2	690461	83%	
3	2	29994	4%	22%
4	2	27068	3%	20%
5	2	6787	1%	5%
6	2	646	0%	0%
7	2	267	0%	0%
8	2	101	0%	0%
9	2	1666	0%	1%
	2	827505	100%	
SANTA CLARA				
1	3	3873	0%	4%
2	3	52512	3%	54%
3	3	1705474	95%	
4	3	31268	2%	32%
5	3	5740	0%	6%
6	3	724	0%	1%
7	3	496	0%	1%
8	3	1571	0%	2%
9	3	680	0%	1%
	3	1802338	100%	
ALAMEDA				
1	4	17517	1%	13%
2	4	14799	1%	11%
3	4	16369	1%	12%
4	4	1304560	91%	
5	4	70727	5%	53%
6	4	4571	0%	3%
7	4	798	0%	1%
8	4	1780	0%	1%
9	4	7886	1%	6%
	4	1439007	100%	

MTC1987 SHOP & SOCIAL/REC TRIPS BY COUNTY

Origin	Destination	TOTAL87	% 1987	% INTER-COUNTY 1987
CONTRA COSTA				
1	5	6537	1%	7%
2	5	3179	0%	3%
3	5	1704	0%	2%
4	5	48859	5%	53%
5	5	870417	90%	
6	5	23458	2%	25%
7	5	1387	0%	2%
8	5	1409	0%	2%
9	5	5717	1%	6%
	5	962667	100%	
SOLANO				
1	6	385	0%	2%
2	6	281	0%	1%
3	6	173	0%	1%
4	6	1210	0%	5%
5	6	12601	4%	56%
6	6	299419	93%	
7	6	6154	2%	27%
8	6	1161	0%	5%
9	6	635	0%	3%
	6	322019	100%	
NAPA				
1	7	90	0%	1%
2	7	126	0%	1%
3	7	140	0%	1%
4	7	256	0%	2%
5	7	863	1%	6%
6	7	10787	7%	71%
7	7	137810	90%	
8	7	2629	2%	17%
9	7	343	0%	2%
	7	153044	100%	
SONOMA				
1	8	332	0%	4%
2	8	286	0%	4%
3	8	285	0%	4%
4	8	431	0%	6%
5	8	74	0%	1%
6	8	1090	0%	14%
7	8	2114	1%	28%
8	8	406948	98%	
9	8	2907	1%	39%
	8	414467	100%	
MARIN				
1	9	15798	5%	50%
2	9	2749	1%	9%
3	9	335	0%	1%
4	9	3978	1%	13%
5	9	6692	2%	21%
6	9	1466	0%	5%
7	9	660	0%	2%
8	9	108	0%	0%
9	9	274024	90%	
	9	305810	100%	