

# THE MICROSOFT ECONOMIC IMPACT STUDY

Prepared for

Microsoft Corporation

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December 1996



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## EXECUTIVE SUMMARY

Over the past ten years, Microsoft Corporation, the world's leading producer of software for personal computers, has been one of the fastest growing companies in Washington. Today, Microsoft not only employs several thousand people in the greater Seattle area but supports many more jobs in the local economy because of its indirect impact on business activity. The objective of this study is to assess Microsoft's total impact on (i.e., its total contribution to) the Washington and King County economies.

With \$7.3 billion in sales in 1995, Microsoft was twice as large as its nearest competitor in the production of packaged software:

- Microsoft revenue attributable to Washington operations amounted to \$4.3 billion in 1995, up from less than \$200 million ten years earlier.
- Of the 17,800 Microsoft employees worldwide, 9,940 worked in Washington, including 7,790 on the company's Redmond campus in King County.
- Microsoft employees in Washington earned \$585.1 million in labor income (wages, salaries, and non-wage benefits) in 1995. In addition, employees received \$789.3 million in income from stock options exercised.
- Not counting stock option income, the average income at Microsoft was \$58,860, virtually double the state standard and comparable to the average income at The Boeing Company. Including income from exercised stock options, Microsoft employees received an average income of \$138,270.
- To support production, the company purchased \$667.7 million in goods and services from Washington suppliers. This amounted to \$67,170 per employee.

Microsoft's employment impact in Washington extended well beyond the 9,940 people working for the company, since its employee compensation (\$1.4 billion in labor earnings and income from stock options exercised), other operating expenditures (including \$667.7 million for in-state purchases), and capital expenditures (including \$195.9 million in building construction) created job opportunities in other state businesses through the multiplier process:

- Not counting the impact of stock options or capital expenditures, Microsoft accounted for \$2.2 billion of Washington Gross State Product in 1995, according to simulations with the Washington Projection and Simulation Model.
- The total economic impact of Microsoft amounted to 43,530 jobs and \$1.8 billion of personal income or 1.4 percent of total Washington employment and income.
- The employment multiplier was 4.4, implying that every job at Microsoft supported 3.4 jobs elsewhere in the economy. The multiplier is higher than that found in most industries, including aerospace, because Microsoft in effect pumps more money per employee into the state economy.

- Directly and indirectly, Microsoft generated \$216.8 million in Washington state and local taxes.
- Including income from stock options exercised and capital expenditures, the company's impact on Washington amounted to 66,140 jobs (2.1 percent of total employment) and \$3.5 billion in personal income (2.7 percent of total income). Note that this impact should not be considered the company's "permanent impact," since stock option income and capital expenditures vary substantially from year to year and are therefore not dependable in the future.
- Taking into account its indirect impact, Microsoft was the single largest contributor to economic growth in Washington between 1990 and 1995, accounting for 11.8 percent of the increase in Gross State Product and 14.7 percent of the gain in employment.

Microsoft has made a noticeable difference in the Washington economy, but its relative impact on King County has been even greater:

- In 1995, Microsoft accounted for 30,400 jobs or 2.5 percent of the total employment in King County, not counting the impact of income from exercised stock options or capital expenditures.
- The company was responsible for \$1.3 billion of personal income or 2.7 percent of total county income. Without Microsoft, King County per capita income would have been \$83 lower.
- Directly and indirectly, Microsoft generated \$45.8 million in taxes for King County tax jurisdictions.
- Between 1990 and 1995, Microsoft was responsible for one half of King County's employment growth. The lift from the software company kept the county out of recession in 1993.

Washington State, whose fortunes have been largely tied to the aerospace and forest products industries, has had a history of ups and downs. In recent years, however, the emergence of new high technology businesses, led by Microsoft and other software companies, has broadened Washington's economic base. In particular, Microsoft has been a stimulus for growth at a time when the greater Seattle area has flirted with recession.

Forecasting Microsoft's future role in the economy is difficult at best, given the rapidly changing nature of computer and information technologies. Nevertheless, Microsoft's willingness to diversify coupled with its immense financial resources and talented personnel make it a good bet that the company will remain a growth force for some time to come.

# THE MICROSOFT ECONOMIC IMPACT STUDY

## 1. INTRODUCTION

The emergence of Microsoft Corporation as the leading producer of software for personal computers is nothing short of phenomenal. Michael Cusumano of the Massachusetts Institute of Technology and Richard Selby of the University of California point out that "Microsoft is by far the world's largest and richest company dedicated to PC software development, and thanks to an expanding stream of new products it continues to grow with astounding speed."<sup>1</sup> In the words of *The Economist*, "Microsoft dominates the software world like no other company in a major consumer industry. More than three-quarters of PC productivity applications--the largest packaged-software category, including word processors, spreadsheets, and databases--sold today comes from its campus in Redmond, Washington."<sup>2</sup> In a bit of an understatement on Microsoft's twentieth anniversary, William Gates, Chairman of the Board, wrote to shareholders that "with the help of our partners and the great work of our employees, we have come a long way."<sup>3</sup>

While the impact of Microsoft has been felt worldwide, nowhere has it been greater than in Washington State. Over the past ten years, Microsoft has been one of the fastest growing companies in the state. Today, it not only employs several thousand people in the greater Seattle area but supports many more jobs in the local economy because of its indirect impact on business activity.

The objective of this study is to assess Microsoft's impact on (i.e., its total contribution to) the Washington and King County economies in 1995. More specifically, the investigation covers the following topics:

1. The history of Microsoft.
2. The economic characteristics (production, employment, income, and markets) of the company.
3. The impact of Microsoft on the Washington and King County economies.
4. The impact on state and local taxes.
5. The company's contribution to economic growth.
6. Microsoft's prospects and the implications for the Washington economy.

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<sup>1</sup>Cusumano, M. A. and R. W. Selby. *Microsoft Secrets*. New York: The Free Press, 1995, p. 1.

<sup>2</sup>"The Software Industry Survey," *The Economist*, May 25, 1996, p. 7.

<sup>3</sup>"Microsoft Corporation 1995 Annual Report," Microsoft Corporation, 1995, p. 3.

The study draws upon the analytical capabilities of the Washington Projection and Simulation Model (Bourque, Conway, and Howard, 1977; and Conway, 1990). Developed at the University of Washington, WPSM is an interindustry econometric model designed for forecasting and impact analysis. Through its depiction of the interrelationships (i.e., purchases and sales) among the sectors of the state economy (businesses, households, and government), the model has the ability to measure the impact of changes in one industry (such as computer software) on the rest of the economy.

The study begins in Section 2 with a brief history of the company. The discussion highlights Microsoft's product development, its growth over the past 20 years, and its current operations. The third section, which is the centerpiece of the study, presents estimates of the company's impact on the Washington economy. Several sources of Microsoft's impact are analyzed, including employee wages and salaries, purchases from Washington suppliers, income from stock options exercised, and capital expenditures. Section 4 presents estimates of Microsoft's impact on King County. The county impact, like that of the state, is expressed primarily in terms of jobs, personal income, and tax revenue. The study concludes with some observations on Microsoft's prospects and its future role in the Washington economy.

## **2. MICROSOFT CORPORATION**

### *History*

Microsoft was founded as a partnership in Albuquerque, New Mexico, by William H. Gates and Paul G. Allen in 1975. The company had one product, three employees, and sales of less than \$25,000 during its first full year of operation. Gates and Allen had moved to Albuquerque to be next to MITS Computer, which had developed the Altair microcomputer kit. Their first product was Microsoft BASIC, a programming language for the Altair. Microsoft BASIC was an adaptation of BASIC, a main-frame computer language, which Gates and Allen had learned in high school in Seattle, Washington.

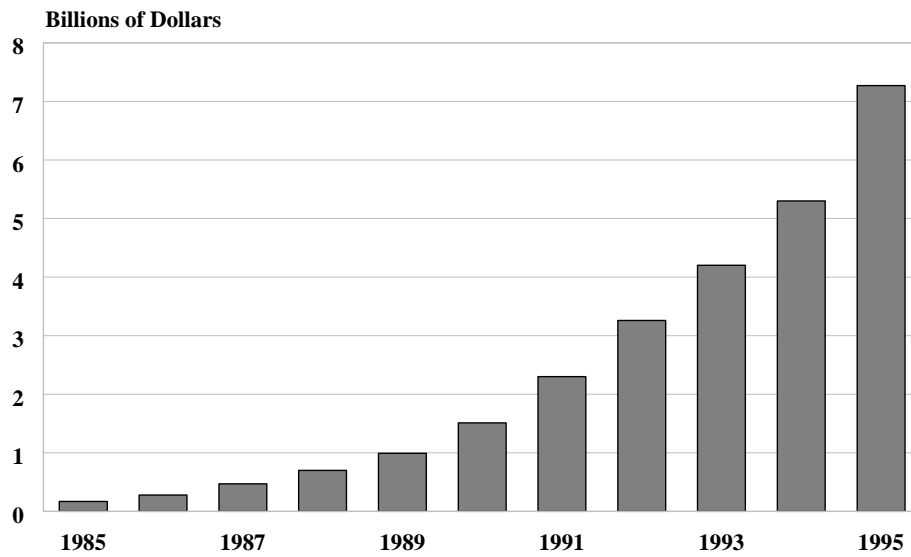
During the next few years, Microsoft not only improved BASIC but adapted other programming languages to the microcomputer. It released a version of FORTRAN, a scientific language, in 1977 and a version of COBOL, a business language, in 1978. By 1979, when the company moved to Washington, it had more than \$3 million in annual revenues and employed 30 people.

The following year marked a major milestone for the company. In 1980, Microsoft signed a contract with IBM to help develop the personal computer. IBM asked Microsoft to develop versions of BASIC, FORTRAN, COBOL, and Pascal (another programming language) for the IBM personal computer. Later in the year, Microsoft signed another contract with IBM to provide the operating system for the personal computer.

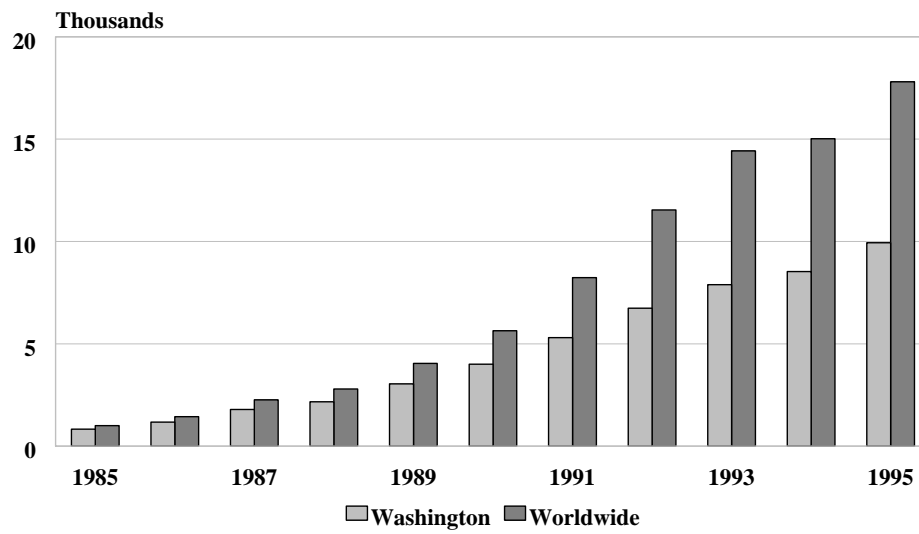
Computer analysts describe the operating system as the heart of the computer; it has also been the key to Microsoft's fortune. Microsoft released DOS 1.0 for the IBM personal computer in 1981, but IBM failed to maintain exclusive rights. When companies, such as Compaq, learned to make IBM compatible computers, it opened up a multi-billion dollar market for Microsoft's disk operating system (renamed MS-DOS) and other personal computer software. Recognizing its vast market potential, Microsoft incorporated in 1981 and established a national sales network.

Both the personal computer industry and Microsoft have grown at astonishing rates since 1981, when the IBM personal computer revolutionized the computer industry. Industry revenue has

**Figure 1**  
**MICROSOFT REVENUE**



**Figure 2**  
**MICROSOFT EMPLOYMENT**



climbed at a 30-40 percent annual rate, while Microsoft sales have soared at a 50 percent rate (Figure 1). In 1995, Microsoft was by far the largest producer of packaged software for the personal computer in the world (Table 1). With sales of \$7.3 billion for the calendar year, Microsoft sold nearly twice as much software as its nearest competitor, Oracle.

Taking a page out of the marketing handbook of The Boeing Company, the world's number one commercial aircraft manufacturer, Microsoft has succeeded in the software industry by developing a product for virtually every need. Over the years the company has not only introduced several operating systems (DOS in 1981; Windows in 1985; OS/2, developed with IBM, in 1987; Windows NT in 1993; and Windows 95 in 1995) but also many software applications (Word, a word processor, in 1983; Project, a project management program, in 1984; Excel, a spreadsheet initially introduced for Apple's Macintosh computer, in 1985; PowerPoint, a graphical presentation program acquired from Forethought, Inc., in 1987; Publisher, a desktop publishing program, in 1988; Mail, an electronic mail program, in 1990; Office, which combined Word, Excel, PowerPoint, and Mail, in 1990; and Access, a database management program, in 1992).

**Table 1**

**SOFTWARE COMPANY REVENUES, 1995\***

Billions of Dollars

	<u>Revenue</u>
Microsoft	7.3
Oracle	3.8
Computer Associates International	3.2
Novell	2.0
SAP AG	1.9
Sybase	1.0
Adobe Systems	0.8
Informix	0.7
American Management Systems	0.6
Sterling Software	0.6

\*Companies for which packaged software accounts for 50 percent of total revenue.

Source: Broadview Associates

In addition to being the top producer of software, Microsoft has become a major employer. When the company entered into agreements with IBM in 1981, it employed 100 people. Four years later, the number reached 1,000. For the next eight years, Microsoft employment doubled every two years, reaching 14,430 in 1993. While employment growth has slowed more recently, Microsoft continues to add two or three thousand employees per year. In 1995, employment worldwide hit 17,800.

As Microsoft has expanded, it has devoted an increasingly greater proportion of its personnel to marketing and service, resulting in a geographical shift of its workforce away from Washington (Figure 2). In 1985, 83 percent of the company's employees worked in the state. Today, the share is below 60 percent. During the past decade, there has been a 100-fold increase in Microsoft employment outside Washington but only a 12-fold increase inside it.

Nevertheless, Microsoft's employment growth in Washington has been substantial, and the company has emerged as one of the state's largest employers. In 1995, Microsoft employed close to 10,000 people in Washington, making it the state's fifth largest private employer (behind Boeing with 75,000 employees, Safeway with 16,000, McDonald's with 13,000, and Sisters of Providence Hospital with 11,000).

### *Current Operations*

Headquartered in Redmond, Washington, Microsoft currently has offices throughout the United States and in more than 50 countries. In 1995, company revenue totaled \$7.3 billion (Table 2).<sup>4</sup> Washington operations accounted for \$4.3 billion, nearly three-fifths of the company total. Microsoft's product divisions are organized under two umbrella groups: the Platforms Group, which develops operating systems; and the Applications and Content Group, which develops business and consumer products, such as Word, Excel, and Encarta, the CD-ROM encyclopedia. As the company has grown, it has turned increasingly to applications and content as its principal source of income. In 1995, led by strong sales of Office, applications and content garnered 60 percent of total company revenue (Figure 3).

**Table 2**

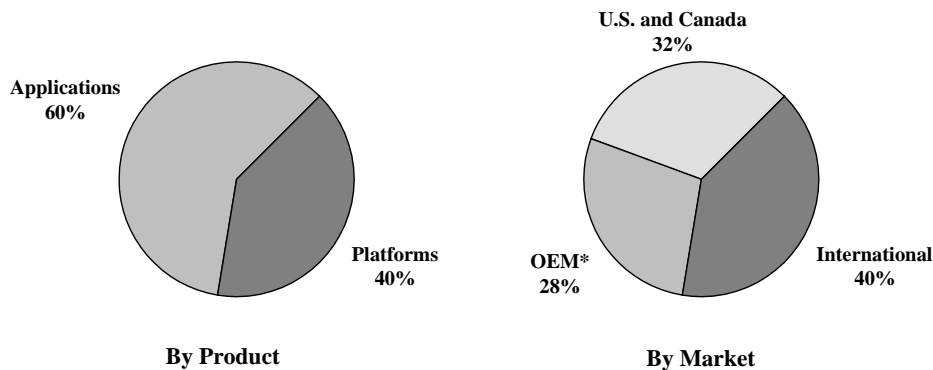
**MICROSOFT REVENUE, EMPLOYMENT,  
AND LABOR INCOME, 1995**

Revenue (mils. \$)	7,270.0
From Washington operations	4,292.8
From other operations	2,977.2
Employment	17,800
In Washington establishments	9,940
In other establishments	7,860
Labor income* (mils. \$)	585.1
Average labor income* (\$/employee)	58,860

\*Washington only.

<sup>4</sup>Microsoft typically reports revenue for the fiscal year ending June 30. For purposes of this study, revenue as well as other economic variables (e.g., employment, labor income, and Gross State Product) are measured on a calendar-year basis. Employment is the average monthly employment over the calendar year.

**Figure 3**  
**MICROSOFT REVENUE, 1995**



\*Original Equipment Manufacturers

Last year, Microsoft employed 17,800 people worldwide, including 9,940 in Washington. Most Washington employees worked either on the Redmond campus or in offices located in neighboring Bellevue. In 1995, they earned a total of \$585.1 million in wages, salaries, and non-wage benefits (excluding income from exercised stock options). The average income was \$58,860, more than double the state standard, which was \$27,320. Microsoft's average labor income was just \$1,500 below that of Boeing, which offers one of highest compensation packages in Washington.<sup>5</sup>

In addition to its remarkable success and well paid employees, there are two characteristics that distinguish Microsoft from most businesses. The first is its strong orientation to international markets. Like Boeing, Microsoft sells products all over the world. Microsoft software is written in 30 languages and available in 50 countries. In 1995, 40 percent of company revenue was earned from the sales of corporate software licenses and packaged software outside the United States and Canada (Figure 3). Even this figure, which is high by most standards, understates the importance of international markets, since a portion of OEM (original equipment manufacturers) license sales was made to foreign computer makers as well as to domestic computer makers who in turn sold computers abroad. Considering the ultimate destination of Microsoft software, international markets overall accounted for 58 percent of company sales in 1995.

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<sup>5</sup>As noted later, stock options provide a healthy supplement to Microsoft's labor income. In that regard, the comparison with Boeing's average pay is misleading.

The second distinguishing characteristic is Microsoft's emphasis on research and development. This is not only evident by the large number of computer scientists and programmers walking the halls of its Redmond campus but also by the financial resources devoted to turning out new products. Over the past several years, approximately one out of every seven dollars of revenue has been poured back into research and development. In 1995, this amounted to roughly one billion dollars. In Washington, only Boeing spends more on research and development than Microsoft. At the height of the 777 development program, Boeing spent \$1.8 billion per year. But that represented only 6 percent of the airplane manufacturer's revenue. Microsoft allocates 14 percent of its revenue to research and development, more than twice as much as Boeing.

### 3. WASHINGTON STATE IMPACT

#### *Note on Methodology*

Not only is Microsoft the world's leading producer of software for personal computers, it also plays a critical role in the Washington State and King County economies. In 1995, Microsoft's job impact in Washington extended well beyond its nearly 10,000 employees, since the company's payroll and other operating expenditures created employment opportunities in other businesses around the state.

The immediate impact of Microsoft sales falls on company production, employment, and income. However, Microsoft operations also lead to demands in other local businesses, such as printing and publishing and computer repair services, to help supply the goods and services needed to support software production. Through the operation of their so-called backward linkages, these businesses in turn stimulate activity in other sectors of the economy. Simultaneously, the income earned by workers at Microsoft and its supporting businesses generates a demand for consumer goods and government services that imparts yet another round of economic activity in the state through the so-called multiplier (responding) process.

The Washington Projection and Simulation Model provides a means of measuring the total (direct and indirect) impact of Microsoft on the state economy.<sup>6</sup> The impact-estimating procedure is a straightforward exercise. Using WPSM, the behavior of the economy is first simulated with Microsoft output (as well as its employment, labor income, and in-state purchases) to produce a baseline projection of the Washington economy over a period of time. The simulation is then repeated but without Microsoft output to yield a conditional projection. The difference between the two projections is a measure of the total economic impact (the so-called multiplier effect) on Washington of the software company. Since WPSM is a comprehensive model of the state economy, the impact can be expressed in terms of output (production or sales), employment, and labor income by industry, labor force, the unemployment rate, resident population, personal income, consumption expenditures, state and local government spending, and fixed investment, among other economic and demographic variables.

A second economic model is used to conduct the King County impact analysis. Due to data limitations, this model is simpler and less precise than the state model. Nevertheless, when used in conjunction with the state model, the county model provides reasonable estimates of the local economic impact of Microsoft.

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<sup>6</sup>Refer to the appendix for technical notes describing the impact estimating procedure.

*Direct Economic Impact*

The impact of Microsoft stems from its employment and labor income as well as its expenditures for goods and services in the state. This is termed the company's direct economic impact.

According to Microsoft's books, operating expenditures in Washington totaled \$4.3 billion in 1995 (Table 3).<sup>7</sup> This figure does not include capital expenditures for buildings and equipment. The company employed 9,940 workers, who earned \$585.1 million in labor income (wages, salaries, and non-wage benefits). In addition, Microsoft paid out \$2.1 billion for goods and services, of which \$667.7 million was spent in Washington. Imported goods and services amounted to \$1.4 billion. Another \$1.6 billion of the company's operating expenditures covered non-wage categories of value added, such as employer's contribution to social insurance, depreciation, rent, net interest payments, indirect business taxes, and profit.

**Table 3**  
**MICROSOFT OPERATING EXPENDITURES, 1995**

Millions of Dollars

	Total	Supplied in Washington	Imported
Goods and services	2,077.1	667.7	1,409.4
Printing and publishing	252.8	101.1	151.7
Nonelectrical machinery	149.1	57.8	91.3
Electrical machinery	165.5	3.9	161.6
Communications	106.8	23.5	83.3
Wholesale and retail trade	117.5	53.8	63.7
Computer and data processing services	480.8	62.8	418.0
Other business services	220.0	125.6	94.4
Other services	277.5	118.7	158.8
Other industries	307.1	120.5	186.6
Value added	2,215.7	2,215.7	0
Labor income	585.1	585.1	0
Other value added*	1,630.6	1,630.6	0
Total expenditures	4,292.8	2,883.4	1,409.4

\*Includes employer's contributions to social insurance, depreciation, rent, net interest payments, indirect business taxes, and profit.

<sup>7</sup>When profit is included, total operating expenditures equal total value of production or sales.

Of the in-state expenditures for goods and services, \$125.6 million went for other business services (e.g., temporary employment agencies), \$101.1 million for printing and publishing (e.g., manuals), \$62.8 million for computer and data processing services (e.g., contract programming), and \$57.8 million for nonelectrical machinery (e.g., computer parts and repair). The \$53.8 million purchase from wholesale and retail trade is largely the mark-up on goods procured from in-state vendors. The cost of the goods themselves are shown as in-state purchases or imported purchases from the industries that produce them depending upon the locations of the manufacturers.

### *Washington State Economic Impact*

Tables 4 and 5 show Microsoft's total impact on the Washington economy, taking into account the multiplier effect. The first column in Table 4 shows the actual level of the Washington economy in 1995 (i.e., with Microsoft). The second column is a projection of what the economy would have looked like without Microsoft. The difference between the two columns is an estimate of Microsoft's total economic impact. Table 5 separates the total impact into two parts: the impact due to Microsoft's employment and labor income; and the impact due to Microsoft's in-state purchases. Also shown in Table 5 is the company's total impact as a percent of Washington's total economic activity.

For the aggregate measures of economic activity, such as Gross State Product, total employment, and personal income, Microsoft directly and indirectly supported about 1.5 percent of the state's economy in 1995:

1. Gross State Product. Gross State Product, like its national counterpart (Gross Domestic Product), is the broadest measure of economic activity in the state. In 1995, Washington Gross State Product was estimated to be \$148.3 billion. Microsoft directly and indirectly accounted for \$2.2 billion or 1.5 percent of total Gross State Product.
2. Output. The impact of Microsoft on total output in the private sector amounted to \$6.2 billion. This figure includes the output of Microsoft. Thus, its impact on other industry output is \$1.9 billion. Most of the indirect impact fell on nonmanufacturing industries, chiefly trade and services.
3. Employment. Including the indirect impact, 43,530 jobs (wage and salary employment and proprietors) in the state depended upon Microsoft. This represented 1.4 percent of the 3.1 million jobs in Washington. Most of the indirect jobs were found in trade, services, and government. The employment multiplier was 4.4 ( $=43,530/9,940$ ), implying that for every Microsoft job there were 3.4 supporting jobs in the economy. The wage and salary employment multiplier, which excludes proprietors, was 3.5 ( $=34,700/9,940$ ).
4. Personal income. Directly and indirectly, Microsoft accounted for \$1.8 billion in personal income or 1.4 percent of the state total income (\$128.4 billion). Without Microsoft, Washington per capita income would have been 38 dollars lower, according to the WPSM simulation.

**Table 4**  
**MICROSOFT IMPACT ON WASHINGTON ECONOMY, 1995**

	1995 Washington	Without Microsoft	Impact (Difference)
<b>DIRECT IMPACT</b>			
Output (mils. \$)	4,292.8	0	4,292.8
In-state expenditures (mils. \$)	667.7	0	667.7
Employment	9,940	0	9,940
Labor income (mils. \$)	585.1	0	585.1
<b>TOTAL IMPACT</b>			
Gross State Product (mils. \$)	148,288.3	146,126.2	2,162.1
Output (mils. \$)	224,766.3	218,559.6	6,206.6
Resources	7,018.8	6,996.1	22.7
Manufacturing	71,933.5	71,526.7	406.9
Nonmanufacturing	145,813.9	140,036.8	5,777.1
Employment	3,126,460	3,082,930	43,530
Proprietors	553,990	545,160	8,830
Wage and salary employees	2,572,470	2,537,770	34,700
Resources	52,590	52,430	160
Manufacturing	334,320	331,410	2,910
Nonmanufacturing	1,672,700	1,645,910	26,790
Construction	128,300	128,030	270
Transportation's services	86,410	85,910	500
Communications	26,280	25,790	490
Utilities	9,620	9,510	110
Wholesale and retail trade	598,350	592,140	6,210
Finance, insurance, and real estate	129,280	127,650	1,630
Services	694,460	676,880	17,580
Government	512,860	508,020	4,840
Unemployment rate (%)	6.4	6.4	-0.0
Personal income (mils. \$)	128,383.3	126,564.8	1,818.5
Labor income	91,857.2	90,470.7	1,386.5
Other income	36,526.1	36,094.1	432.0
Per capita income (\$)	23,626	23,589	38
Population, July 1	5,433,900	5,365,450	68,450

**Table 5**  
**MICROSOFT IMPACT ON WASHINGTON ECONOMY, 1995**

	Employment and Labor Income Impact	In-State Purchases Impact	Total Impact	Percent of Washington
<b>DIRECT IMPACT</b>				
Output (mils. \$)	4,292.8	---	4,292.8	1.9
In-state expenditures (mils. \$)	---	667.7	667.7	---
Employment	9,940	---	9,940	0.3
Labor income (mils. \$)	585.1	---	585.1	0.6
<b>TOTAL ECONOMIC IMPACT</b>				
Gross State Product (mils. \$)	1,585.2	576.9	2,162.1	1.5
Output (mils. \$)	5,036.0	1,170.6	6,206.6	2.8
Resources	14.2	8.5	22.7	0.3
Manufacturing	95.5	311.4	406.9	0.6
Nonmanufacturing	4,926.3	850.8	5,777.1	4.0
Employment	30,020	13,510	43,530	1.4
Proprietors	6,560	2,270	8,830	1.6
Wage and salary employees	23,460	11,240	34,700	1.3
Resources	100	60	160	0.3
Manufacturing	450	2,460	2,910	0.9
Nonmanufacturing	19,430	7,360	26,790	1.6
Construction	110	160	270	0.2
Transportation's services	170	330	500	0.6
Communications	210	280	490	1.9
Utilities	60	50	110	1.1
Wholesale and retail trade	3,500	2,710	6,210	1.0
Finance, insurance, and real estate	790	840	1,630	1.3
Services	14,590	2,990	17,580	2.5
Government	3,480	1,360	4,840	0.9
Unemployment rate (%)	-0.0	-0.0	-0.0	-0.2
Personal income (mils. \$)	1,300.2	518.3	1,818.5	1.4
Labor income	1,016.5	370.0	1,386.5	1.5
Other income	283.7	148.3	432.0	1.2
Per capita income (\$)	40	-2	38	0.2
Population, July 1	45,800	22,650	68,450	1.3

5. Population. The equivalent of 68,450 people living in the state depended upon Microsoft in 1995. The implied population multiplier was 6.9 ( $=68,450/9,940$ ), meaning that each Microsoft employee directly and indirectly supported 6.9 Washington residents.

The implied Microsoft employment multiplier is higher than that found for most industries. Wage and salary employment multipliers, for example, typically range between two and three. In a 1989 study by the author and others, the Boeing wage and salary employment multiplier was estimated to be 3.2.<sup>8</sup> Today, it is estimated to be 3.1. The corresponding Microsoft multiplier at 3.5 is a little higher.<sup>9</sup> On a per employee basis, Microsoft's impact on the economy stemming from its labor income is somewhat smaller than Boeing's, since Microsoft workers earn on average \$1,500 less per year than Boeing employees. On the other hand, Microsoft spends substantially more per employee than Boeing for locally produced goods and services, since the aerospace company imports most of the components that make up its commercial aircraft. In 1995, Microsoft spent \$67,170 per employee for Washington produced goods and services, compared to roughly \$20,000 for Boeing. Thus, on balance, Microsoft pumped about \$46,000 more per employee into the economy than Boeing, giving rise to the software company's higher multiplier.<sup>10</sup>

As shown in Table 5, the impact of Microsoft's purchases of goods and services from Washington suppliers, which totaled \$667.7 million, was substantial. In 1995, in-state purchases supported 13,510 jobs, including 2,990 in services, 2,710 in wholesale and retail trade, 2,460 in manufacturing, and 1,360 in government. But the impact of Microsoft's employment and labor income was even greater. Last year, the impact emanating from Microsoft employment and income amounted to 30,020 jobs, including 14,590 in services, 3,500 in wholesale and retail trade, and 3,480 in government. In other words, the induced impact of Microsoft's employment and labor income accounted for two-thirds of the company's total impact on Washington employment.<sup>11</sup> Comparing the impacts in terms of Gross State Product and personal income leads to a similar conclusion.

### *State Tax Impact*

Microsoft's contribution to state and local government tax revenues is much more than its direct tax payments. Most of the company's tax impact stems from its role as an employer of a large

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<sup>8</sup>Pascall, G., D. H. Pedersen, and R. S. Conway, Jr. "The Boeing Company Economic Impact Study," The Boeing Company, 1989.

<sup>9</sup>Note that there is no single multiplier for an economy. Multipliers vary across industries and over time. There are also different types of multipliers. In addition to employment and population multipliers, there are output, income, and tax multipliers. For a given multiplier, such as the Microsoft employment multiplier, there is even a short-run multiplier (measuring the short-run impact of a specific change in economic activity) and a long-run multiplier (measuring the long-run impact). The multipliers presented in this study are long-run multipliers.

<sup>10</sup>Typically, a dollar of income has a greater impact on the Washington economy than a dollar of in-state purchases. However, the impact of Microsoft's higher level of in-state spending (about \$47,000 more per employee) far outweighs the impact of Boeing's higher labor income (\$1,500 more per employee).

<sup>11</sup>Since Boeing has a high propensity to import goods and services for production, its employment and labor income account for four-fifths of the company's total impact on the economy.

and well paid workforce as well as from the effect of both the company and its employees in supporting other jobs and businesses in the economy.

The total impact of Microsoft on state and local taxes in Washington amounted to \$216.8 million in 1995 (Table 6). This figure includes taxes collected by state government as well as by all local governments (counties, cities, and special tax districts) in Washington. Microsoft generated \$85.1 million in sales and use taxes, \$70.6 million of which flowed into state coffers. Directly and indirectly, Microsoft contributed \$55.8 million in property taxes, \$54.0 million in business and occupation taxes, and \$21.9 million in miscellaneous taxes. Overall, Microsoft accounted for 1.6 percent of all state and local taxes paid in Washington.

**Table 6**

**MICROSOFT IMPACT ON WASHINGTON  
STATE AND LOCAL TAXES, 1995**

Millions of Dollars

	Washington State and Local Taxes	Total Impact	Percent of Washington
Sales and use taxes	5,353.8	85.1	1.6
Business and occupations taxes	1,935.7	54.0	2.8
Property taxes	4,174.0	55.8	1.3
Other taxes	1,742.9	21.9	1.3
Total	13,206.4	216.8	1.6

*Impact of Stock Options and Capital Expenditures*

Tables 4 and 5 provide a conservative estimate of Microsoft's impact on the Washington economy, since the analysis excludes the effect of exercised stock options and capital expenditures. As it turns out, last year was a banner year for income from stock options exercised as well as for money spent on equipment and construction. Stock option income and capital expenditures pumped more than one billion dollars into the local economy in 1995.

Microsoft employees are known for working long days. No doubt their dedication is partly due to the excitement of belonging to the leading company in one of the world's fastest growing industries. It also comes from the financial incentives offered by Microsoft. One key element in the company's compensation program is stock options, which were first offered to employees in 1982. After working for a period of time, an employee has the option of purchasing a limited number of Microsoft shares at the price that the stock sold for when the employee was hired. If the stock price has increased during that period, the employee stands to make a profit.

Table 7

**MICROSOFT IMPACT ON WASHINGTON ECONOMY CONSIDERING  
INCOME FROM STOCK OPTIONS EXERCISED, 1995**

	Total Impact	Percent of Washington
<b>DIRECT IMPACT</b>		
Output (mils. \$)	4,292.8	1.9
In-state expenditures (mils. \$)	667.7	---
Employment	9,940	0.3
Labor income (mils. \$)	585.1	0.6
Income from stock options exercised (mils. \$)	789.3	---
<b>TOTAL ECONOMIC IMPACT</b>		
Gross State Product (mils. \$)	2,943.8	2.0
Output (mils. \$)	6,521.1	2.9
Resources	28.0	0.4
Manufacturing	444.1	0.6
Nonmanufacturing	6,049.0	4.1
Employment	50,590	1.6
Proprietors	10,070	1.8
Wage and salary employees	40,520	1.6
Resources	190	0.4
Manufacturing	3,090	0.9
Nonmanufacturing	30,850	1.8
Construction	320	0.2
Transportation's services	570	0.7
Communications	580	2.2
Utilities	140	1.5
Wholesale and retail trade	7,670	1.3
Finance, insurance, and real estate	1,970	1.5
Services	19,600	2.8
Government	6,390	1.2
Unemployment rate (%)	-0.0	-0.3
Personal income (mils. \$)	2,847.6	2.2
Labor income	2,361.3	2.6
Other income	486.3	1.3
Per capita income (\$)	180	0.8
Population, July 1	79,630	1.5

The stock option program has generously supplemented employee income in the 1990s because of Microsoft's rising stock price. In fact, income from exercised stock options sometimes exceeds wages and salaries. In 1995, stock option income for Washington employees amounted to \$789.3 million, one-third more than their total labor income. This meant that, when both stock option income and labor income are counted, total employee compensation averaged \$138,270.

Not all of the money from exercised stock options is spent. About 30 percent goes for taxes, while another 30 percent is saved.<sup>12</sup> But in 1995 this still left more than \$300 million to buy cars, homes, and other consumer goods.

Table 7 shows that the size of Microsoft's impact increases appreciably when the spending effects of exercised stock options are considered.<sup>13</sup> For example, the impact on jobs rises from 43,530 (1.4 percent of Washington total employment, as shown in Table 5) to 50,590 (1.6 percent), while the impact on personal income rises from \$1.8 billion (1.4 percent) to \$2.8 billion (2.2 percent). In other words, the income from exercised stock options supported an additional 7,060 jobs and \$1.0 billion in personal income (including the \$789.3 million in stock option income) in 1995.

**Table 8**

**MICROSOFT CONSTRUCTION**

Millions of Dollars

	<u>Construction</u>
1990	18.6
1991	58.0
1992	79.3
1993	21.8
1994	99.5
1995	195.9

When expenditures on equipment and buildings are counted, Microsoft's impact balloons even more. In 1995, Microsoft spent millions of dollars on computers and office buildings for its burgeoning workforce. While equipment procurement tends to have little impact on the

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<sup>12</sup>A study of King County household consumption (Conway, 1992) showed that when per capita income increased from \$24,790 to \$43,916, per capita spending increased from \$21,334 to \$30,013. In other words, these households spent only 45 percent of their additional income. In the present study, it is assumed that Microsoft employees, who have higher incomes and, presumably, higher propensities to save, spend just 40 percent of their stock option income.

<sup>13</sup>Note that the stock options and capital expenditures impacts should not be considered Microsoft's "permanent impact," since stock option income and capital expenditures vary substantially from year to year and are therefore not dependable in the future. In that regard, the first impact (Tables 4 and 5) is the most appropriate one to use for forecasting and policy analysis.

Table 9

**MICROSOFT IMPACT ON WASHINGTON ECONOMY CONSIDERING INCOME  
FROM STOCK OPTIONS EXERCISED AND CAPITAL EXPENDITURES, 1995**

	Total Impact	Percent of Washington
<b>DIRECT IMPACT</b>		
Output (mils. \$)	4,292.8	1.9
In-state expenditures (mils. \$)	667.7	---
Employment	9,940	0.3
Labor income (mils. \$)	585.1	0.6
Income from stock options exercised (mils. \$)	789.3	---
Construction (mils. \$)	195.9	1.1
<b>TOTAL ECONOMIC IMPACT</b>		
Gross State Product (mils. \$)	3,663.3	2.5
Output (mils. \$)	7,524.0	3.3
Resources	61.4	0.9
Manufacturing	599.2	0.8
Nonmanufacturing	6,863.4	4.7
Employment	66,140	2.1
Proprietors	13,410	2.4
Wage and salary employees	52,730	2.0
Resources	430	0.8
Manufacturing	3,940	1.2
Nonmanufacturing	40,320	2.4
Construction	3,580	2.8
Transportation's services	720	0.8
Communications	720	2.7
Utilities	170	1.8
Wholesale and retail trade	10,240	1.7
Finance, insurance, and real estate	2,430	1.9
Services	22,460	3.2
Government	8,040	1.6
Unemployment rate (%)	-0.0	-0.3
Personal income (mils. \$)	3,464.1	2.7
Labor income	2,822.8	3.1
Other income	641.3	1.8
Per capita income (\$)	189	0.8
Population, July 1	103,960	1.9

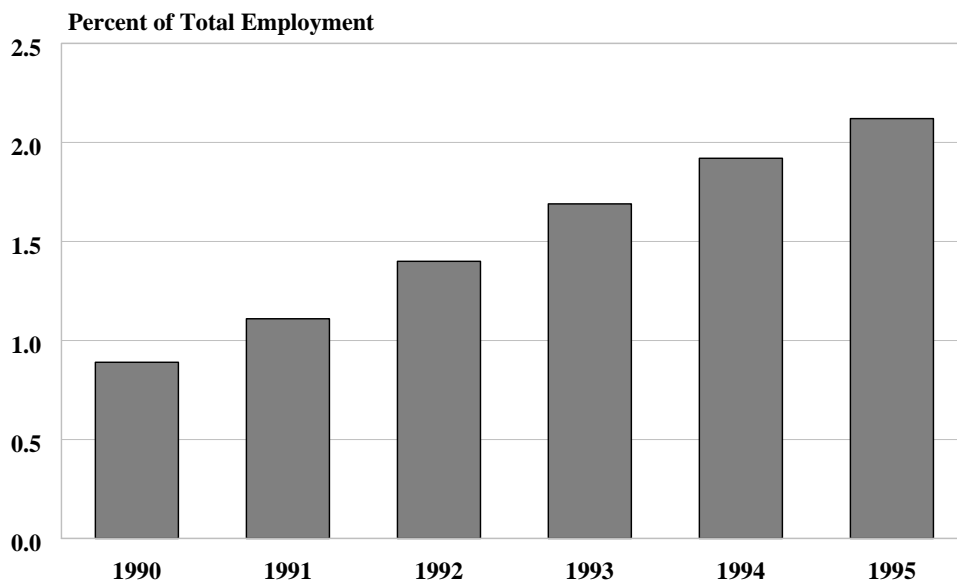
economy, since most equipment is imported, building construction can create hundreds of local jobs. In 1995, Microsoft spent \$195.9 million on new construction, most of which went for office buildings on the Redmond campus. This level of spending was sufficient to support approximately 1,500 full-time construction jobs (Table 8).

But there is more to the capital expenditures impact than what Microsoft spends. For example, when Microsoft hires new employees, as it has recently, population increases, spurring the construction of new homes. When Microsoft's new employees spend their earnings, they boost retail sales, putting pressure on merchants to expand their floor space. Investment spending is triggered throughout the economy, as it attempts to build up capital stock in order to operate at a higher level.

The rapid expansion of Microsoft and the growth that it imparted to the rest of the economy induced \$720 million in capital expenditures for equipment and structures in 1995, according to a simulation with the Washington Projection and Simulation Model. This in turn had a substantial impact on employment and income in the state. Taking into account capital expenditures and exercised stock options, Microsoft's total impact amounted to 66,140 jobs or 2.1 percent of total state employment (Table 9). In other words, all things considered, Microsoft directly and indirectly accounted for one out of every fifty jobs in the state. This is a remarkable achievement for a company that has been operating in Washington for less than twenty years. Microsoft's impact on Gross State Product and personal income was even higher. The company accounted for \$3.7 billion of Gross State Product (2.5 percent of the state total) and \$3.5 billion of personal income (2.7 percent) in 1995.

**Figure 4**

**MICROSOFT IMPACT ON WASHINGTON EMPLOYMENT**



### *Impact on Growth*

Due to its rapid ascendancy, Microsoft more than doubled its economic impact in just five years (Figure 4). In 1990, the company employed 4,000 people in Washington and indirectly supported another 21,270 jobs. Altogether this amounted to 0.9 percent of the state's 2.8 million jobs. Five years later, after adding nearly 6,000 people to its Washington payroll, Microsoft accounted for 2.1 percent of total state employment, according to the impact considering stock option income and capital expenditures.

This means that Microsoft has made a significant contribution to recent growth. Between 1990 and 1995, Washington employment expanded at a 1.9 percent annual rate, adding 277,340 jobs (Table 10). While the state continued to grow faster than the nation, its growth rate had been cut in half by a downturn at Boeing. During the five-year period, Boeing eliminated 30,000 aerospace jobs, costing the state approximately 90,000 jobs altogether.

**Table 10**

**MICROSOFT IMPACT ON WASHINGTON GROWTH, 1990-1995\***

	Washington Change	Change Due to Microsoft	Percent of Washington Change
Microsoft employment	5,940	5,940	100.0
Gross State Product (mils. \$95)	19,840.7	2,347.0	11.8
Output (mils. \$95)	30,440.4	4,961.6	16.3
Employment	277,340	40,870	14.7
Personal income (mils. \$95)	19,084.4	2,263.6	11.9
Population, July 1	532,800	65,320	12.3

\*Based on impact considering stock option income and capital expenditures.

The airplane company's slump would have hurt a lot more had it not been for the lift provided by Microsoft and its 5,940 new employees. Taking into account its indirect impact on the economy, Microsoft generated a total of 40,870 new jobs between 1990 and 1995, effectively offsetting half of the Boeing slide. Microsoft, which accounted for 14.7 percent of the state's total job gain, was the single largest contributor to growth during the first half of the 1990s.

## **4. KING COUNTY IMPACT**

### *King County Economic Impact*

With 1.6 million residents and 1.2 million jobs, King County is the largest manufacturing and commercial center west of Minneapolis and north of San Francisco. It is the headquarters for Boeing and Weyerhaeuser, world leaders in aerospace and forest products. Downtown Seattle is a center for businesses that offer specialized financial, legal, engineering, and management services to customers all over the Pacific Northwest. The ports of Seattle and Tacoma make up

the nation's third largest port complex (behind New York and Los Angeles/Long Beach). The University of Washington consistently ranks among the top three universities in federal funds for research. And, in spite of competing attractions such as Mount Rainier, the county is the focus of the state's visitor and convention industry.

**Table 11**

**MICROSOFT EMPLOYMENT BY  
PLACE OF RESIDENCE, 1995**

	Average Employment
King County	9,060
Redmond	2,450
Seattle	2,080
Bellevue	1,640
Kirkland	830
Bothell	470
Issaquah	410
Woodinville	380
Renton	220
Other King County	580
Snohomish County	780
Pierce County	50
Other Washington	50
Washington	9,940

King County is also the home of Microsoft. Last year all but about 650 of its Washington employees worked in King County. More significantly, from the standpoint of the company's impact on the county, nine out ten employees lived and spent their money in the county (Table 11). Seventy percent of the workforce lived on an east-west line running through the heart of the county, in Redmond, Bellevue, Kirkland, and Seattle. One out of every four employees resided in Redmond, where the company is headquartered. The 9,060 employees living in King County brought home an estimated \$533.1 million in labor income and another \$719.4 million in stock option income. These employees, representing just one percent of the total number of persons employed in King County, accounted for 2.6 percent of the county's personal income.

As the center of Microsoft operations as well as the home of most its employees, King County has been the primary beneficiary of the company's impact on the Washington economy, as evident in Table 12. Whether measured in terms of employment or income, the county garnered about 70 percent of the state impact.<sup>14</sup> In 1995, Microsoft accounted for 30,400 jobs or 2.5

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<sup>14</sup>The other 30 percent of the impact was spread around the state. There are several mechanisms for this dispersal: state taxes generated by the impact pay for jobs in Olympia; the demand for food creates employment opportunities in

**Table 12**  
**MICROSOFT IMPACT ON KING COUNTY ECONOMY, 1995**

	1995 King County	Total Impact	Percent of King County
<b>DIRECT IMPACT</b>			
Employment	---	9,290	0.8
Labor income (mils. \$)	---	546.9	1.3
<b>TOTAL IMPACT</b>			
Employment	1,218,000	30,400	2.5
Proprietors	187,330	4,930	2.6
Wage and salary employees	1,030,670	25,470	2.5
Resources	3,690	10	0.3
Manufacturing	134,240	1,230	0.9
Nonmanufacturing	744,580	21,760	2.9
Construction	51,820	200	0.4
Transportation's services	47,210	390	0.8
Communications	14,920	400	2.7
Utilities	3,720	70	1.9
Wholesale and retail trade	247,590	5,010	2.0
Finance, insurance, and real estate	73,510	1,400	1.9
Services	305,810	14,290	4.7
Government	148,160	2,470	1.7
Personal income (mils. \$)	49,489.3	1,329.5	2.7
Labor income	42,711.4	1,029.3	2.4
Other income	6,777.9	300.2	4.4
Per capita income (\$)	30,865	83	0.3
Population, July 1	1,603,400	38,880	2.4

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Yakima; and people who commute to King County for work support retail jobs in their home counties. Commuters play a big role in determining the size of an impact when the geographical area under study is small.

**Table 13**  
**MICROSOFT IMPACT ON KING COUNTY LOCAL TAXES, 1995**

Millions of Dollars

	King County Local Taxes	Total Impact	Percent of King County
Sales and use taxes	453.6	12.2	2.7
Business and occupations taxes	180.2	2.5	1.4
Property taxes	1,143.0	27.7	2.4
Other taxes	150.6	3.4	2.3
<b>Total</b>	<b>1,927.4</b>	<b>45.8</b>	<b>2.4</b>

percent of the total employment in King County, not counting the impact of exercised stock options or capital expenditures.<sup>15</sup> The company was responsible for \$1.3 billion of personal income or 2.7 percent of the county total. Without Microsoft, county per capita income would have been \$83 lower.

The Microsoft employment multiplier for King County was 3.3 (=30,400/9,290), implying that each Microsoft job supported 2.3 other jobs in the county. Of the 21,110 jobs indirectly generated by Microsoft, there were 5,010 wage and salary employees in trade and another 5,000 in services. In addition, there were 4,000 proprietors who had businesses in trade and services. The average labor income of all workers indirectly supported by Microsoft was \$22,850, which was well below the county average of \$35,070 because of the large number of trade and service jobs.

#### *County Tax Impact*

Including its indirect impact on taxes (through the output, jobs, and income created in other county businesses), Microsoft generated \$45.8 million in King County local taxes in 1995 (Table 13). This includes all taxes paid to local governments (county, cities, and special tax districts) in the county. Reflecting the size of Microsoft's economic impact on the county, the amount constituted 2.4 percent of all local taxes collected in 1995. More than half of the revenue came from property taxes paid by businesses and households, while one fourth came from sales and use taxes. Business and occupations taxes and other taxes contributed smaller amounts.

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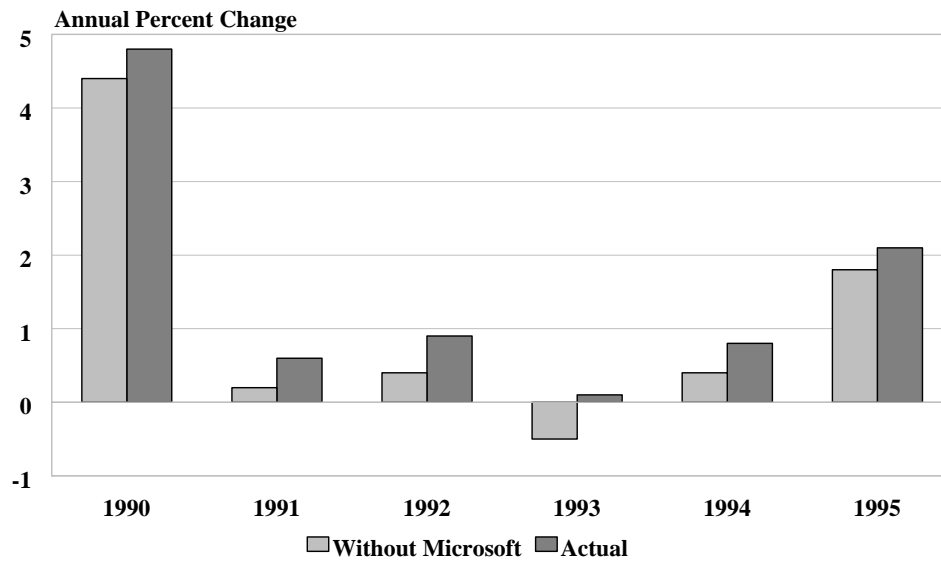
<sup>15</sup>The economic impact presented for King County in Table 12 does not consider stock options or capital expenditures. As a consequence, it is comparable to the Washington impact reported in Tables 4 and 5. As noted previously, these impacts more fairly characterize Microsoft's "permanent impact" on the economy, since stock options and capital expenditures vary widely from year to year.

**Table 14****MICROSOFT IMPACT ON KING COUNTY GROWTH, 1990-1995\***

	King County Change	Change Due to Microsoft	Percent of King County Change
Microsoft employment	5,290	5,290	100.0
Employment	53,380	28,540	53.5
Personal income (mils. \$95)	6,343.6	1,648.5	26.0
Population, July 1	87,460	36,830	42.1

\*Based on impact considering stock option income and capital expenditures.

**Figure 5**  
**KING COUNTY EMPLOYMENT GROWTH**



### *Impact on Growth*

Because of its highly developed state, King County is the slowest growing county in the Puget Sound region. The county was especially hard hit by the recent aerospace downturn. Not counting the machinists strike at the end of last year, King County lost 32,000 aerospace jobs (including 6,000 transfers to Everett) between 1990 and 1995. Taking into account the ripple effect, the downturn cost the county roughly 80,000 jobs or 7 percent of its total employment. As a result, the county created only 53,380 jobs during the five-year period, as employment grew at a disappointing 0.9 percent annual rate. By comparison, King County employment grew at a 4.4 percent rate between 1985 and 1990.

What is remarkable is that King County did not succumb to a recession during the first half of the 1990s. Early in each of the past three decades (1964, 1970-71, and 1982), under similar circumstances (an aerospace downturn accompanied by a national recession), the county fell into recession. This time around there was enough lift to keep the economy afloat.

Providing the timely boost was Microsoft. During this critical period, Microsoft increased employment at its facilities east of Lake Washington by 5,290 (Table 14). The direct and indirect impact of this expansion amounted to 28,540 jobs or 53.5 percent of the total gain in county employment between 1990 and 1995.<sup>16</sup> This meant that for five years Microsoft was responsible for one out of every two new jobs in King County.

Microsoft had a noticeable effect on the county employment growth rate, as shown in Figure 5.<sup>17</sup> Without the boost from Microsoft, King County employment would have expanded at a 0.4 percent annual rate between 1990 and 1995, less than half the actual rate. In 1993, when the economy nearly stalled, Microsoft was raising the county employment growth rate by 0.6 percentage points. Without the Microsoft expansion county employment would have declined 0.5 percent. The drop in employment would not have been as bad as the fall in 1982 (1.0 percent), but it would have qualified as a recession.

## **5. CONCLUSION**

Washington State, whose fortunes have been largely tied to the aerospace and forest products industries, has had a history of ups and downs. In recent years, however, the emergence of new high technology businesses, led by Microsoft and other software companies, has broadened Washington's economic base. In particular, Microsoft has been a stimulus for growth at a time when the greater Seattle area has flirted with recession.

Forecasting Microsoft's future role in the economy is difficult at best, given the rapidly changing nature of computer and information technologies. One fundamental problem is the uncertainty about the computer industry itself. The industry as we know it today evolved in three stages, each starting with a new type of computer: the IBM mainframe computer around 1950; the minicomputer developed by companies like Digital Equipment in the mid-1960s; and the IBM personal computer in 1981, which gave rise to companies like Intel, Compaq, and Microsoft.

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<sup>16</sup>This analysis does take into account stock options and capital expenditures.

<sup>17</sup>The bars on the right in Figure 5 show the actual employment growth rates for King County. The bars on the left show what the growth rates would have been without the boost from Microsoft. These growth rates are calculated from simulations of Microsoft's impact taking into account stock options and capital expenditures.

Some observers believe that with the emergence of the Internet the industry has embarked upon a fourth stage.

The Internet is not a new computer but a way of linking computers around the world to share information and software applications like word processors and spreadsheets. The Internet has been promoted as a "new 'platform,'--a fundamental technology on which a new market can be built."<sup>18</sup> A few detractors, on the other hand, see the Internet as nothing more than a throwback to the old computer system: dumb terminals connected to a central computer. While the Internet is undoubtedly growing in popularity, catching the attention of the personal computer industry, it is still unclear whether the Internet is a competing or complementary technology.

Apart from keeping up with a constantly changing industry, Microsoft faces other challenges, not the least of which stems from its past success. As the number one producer of software for personal computers, Microsoft revenue has increased at a 50 percent annual rate since 1981. Today, it controls 85 percent of the market for personal computer operating systems and 25 percent of the market for applications. These extremely high market saturation rates make it increasingly difficult for the company to grow faster than the industry, as it has in the past. Since analysts expect that the growth rate of the personal computer industry will drop below 20 percent, some slowing at Microsoft appears inevitable.

Of course, Microsoft is not one to sit back on its heels. Recognizing the opportunities offered by the Internet, it has developed a "browser," which is a program to navigate around the Internet. Microsoft has also begun to diversify outside its traditional software business into a related one: the media. Microsoft has a partnership with NBC, called MSNBC, which will include a cable television news channel and an Internet news service. In addition, Microsoft has produced *Slate*, a political magazine on the Internet, and invested in Dreamworks, Hollywood's newest studio.

Microsoft's willingness to diversify coupled with its immense financial resources and talented personnel make it a good bet that the company will continue to thrive. This also means that Microsoft will remain a growth force in the Washington economy for some time to come. And there is already evidence to support this contention. This year Microsoft is adding 2,000 more people to its Washington workforce. Furthermore, in perhaps the most telling sign of its future intentions, the software producer continues to break ground for new office buildings on its Redmond campus.

For the local economy this means nothing but good news, since Microsoft's expansion will coincide with an upturn in the aerospace industry. If Microsoft and Boeing create 20-30,000 jobs by the end of the decade, as expected, employment in the greater Seattle area will grow at a three

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<sup>18</sup>"The Software Industry Survey," *The Economist*, May 25, 1996, p. 4.

percent annual rate.<sup>19</sup> This will be a marked improvement over the past five years, when the local economy crawled along at a one percent rate and, in the process, almost fell victim to recession.

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<sup>19</sup>See the August 1996 issue of *The Puget Sound Economic Forecaster* published by Conway Pedersen Economics for a ten-year economic outlook for the greater Seattle area (King, Pierce, Snohomish, and Kitsap Counties).



## **Appendix**

### **TECHNICAL NOTES**

#### **A-1. DEFINITIONS AND CONVENTIONS**

##### *Gross State Product*

Gross State Product is Washington's counterpart to U.S. Gross Domestic Product (GDP). It is the value of Washington's total production of goods and services for final use. Gross State Product can be measured in two ways. First, it is the sum of goods and services purchased by households (personal consumption expenditures), government (federal, state, and local government expenditures), the capital sector (gross private domestic investment), and the foreign sector (net exports). Second, it is the sum of value added (gross product originating) in industry, households, and government. Gross State Product, which in this study is valued in 1995 dollars, is the most comprehensive indicator of economic activity in the state.

##### *Output*

Except for wholesale and retail trade and transportation services, industry output is the value of production or sales. Output is valued at producers' prices in 1995 dollars. For trade and transportation, output is the value of trade and transportation margins (mark-ups). Output measured in purchasers' prices equals output measured in producers' prices plus trade and transportation margins.

##### *Employment*

Adopting the concept used by the U.S. Bureau of Economic Analysis, employment is the annual average number of full and part-time wage and salary employees and self-employed workers (proprietors). In a given year, total employment exceeds the number of persons employed, as measured by the U.S. Bureau of Labor Statistics, because of workers holding more than one job.

##### *Personal Income*

The major components of personal income are labor income, property income (dividends, interest, and rent), transfer payments, and contributions to social insurance. Labor income includes wages, salaries, proprietors' income, and other labor income earned by job-holders. Personal income is valued in 1995 dollars. Following standard conventions, the U.S. implicit price deflator for personal consumption expenditures (1995=1.000) is used to convert current-dollar personal income estimates into 1995 dollars.

#### **A-2. IMPACT ANALYSIS METHODOLOGY**

##### *Input-Output Models*

The input-output model, as represented by the table of output (production or sales), employment, and income multipliers, is the analytical method most commonly used to measure economic

impacts. Five survey-based input-output models for Washington State have been constructed, the most recent one being for 1987 (Chase, Bourque, and Conway, 1993).

An input-output model shows how industries and households in the economy are interrelated. When one industry expands or declines, the model estimates the production, employment, and income changes in other industries affected directly or indirectly by the demands of the original industry. For example, an increase in Microsoft production raises the demand for printing and publishing. The increase in activity in printing and publishing leads to higher levels of employment and income in that industry, which in turn mean more spending for consumer goods.

Although the Washington input-output model attempts to capture the interactions among industries and households in the state, it still represents a somewhat simplified depiction of economic behavior. In particular, the model is subject to four restrictions that affect the precision of the impact estimates: (1) a static depiction of impacts; (2) constant input-output coefficients; (3) a simple specification of the interactions among production, income, and personal consumption; and (4) a neglect of the effects of induced private investment, state and local government spending, and population change on economic activity. In estimating impacts, the fourth restriction is the most significant. Since the input-output model does not take into account induced investment, public expenditures, or migration, it tends to significantly understate the magnitude of economic impacts. For a more complete account of the properties of the Washington input-output model in the context of an impact study, refer to Conway (1991).

#### *Washington Projection and Simulation Model*

The Washington Projection and Simulation Model (Bourque, Conway, and Howard, 1977, and Conway, 1990) is a regional interindustry econometric model designed for forecasting and impact analysis. With a comprehensive specification of the structure of the state economy, WPSM is formulated to overcome many of the shortcomings of the input-output model. WPSM IV, whose structure is described here, is the fourth generation of a model originally developed at the University of Washington.

The features of WPSM IV are shown in Table A-1. The model generates economic forecasts on an annual basis, the projection horizon extending up to 25 years. The system of equations is formulated to predict the behavior of 151 endogenous variables. The model consists of 123 behavioral equations, 28 accounting identities, and 68 exogenous variables, the last of which primarily express economic conditions in the United States. WPSM identifies 26 Washington industries (Table A-2) and three public sectors. For each industry, there are projections of output, employment, and labor income. Among the other economic and demographic variables predicted by the model are Gross State Product, personal consumption expenditures, investment, state and local government expenditures, labor force, the unemployment rate, personal income, population by age and sex, and the Seattle consumer price index.

#### *Impact Estimation Procedure*

This study draws upon the simulation capabilities of the Washington Projection and Simulation Model to measure the direct and indirect economic impact of Microsoft. The impact estimation procedure is, in general, a straightforward exercise. Employing WPSM, the behavior of the state economy is first simulated with Microsoft output (and thus its employment and labor income) to produce a baseline projection over a period of time. The simulation is then repeated but without

**Table A-1****FEATURES OF WASHINGTON PROJECTION AND SIMULATION MODEL IV**

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## Projection Horizon

1-25 years

## Model Size

151 endogenous variables  
 68 exogenous variables  
 123 behavioral equations  
 28 identities

## Industry Detail

26 industries, each having projections of  
 output  
 employment (wage and salary employees and proprietors)  
 labor income (wages, salaries, proprietors' income, and other labor income)

## Other Selected Endogenous Variables

Gross State Product  
 personal consumption expenditures  
 housing construction  
 nonresidential investment  
 state and local government expenditures  
 exports (including federal government expenditures)  
 imports  
 labor force  
 unemployment rate  
 personal income  
 per capita income  
 net migration  
 population by age and sex  
 Seattle consumer price index  
 price of single-family home

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Table A-2

**CLASSIFICATION OF INDUSTRIES IDENTIFIED IN  
WASHINGTON PROJECTION AND SIMULATION MODEL IV**

<u>Industry</u>	<u>SIC Code</u>
Agriculture	01-02
Forestry and fishing	08-09
Mining	10-14
Food products	20
Apparel	23
Lumber and wood products	24
Paper products	26
Printing and publishing	27
Chemical products	28
Petroleum products	29
Stone, clay, and glass products	32
Primary metals	33
Fabricated metals	34
Nonelectrical machinery	35
Electrical machinery	36
Aerospace	372,376
Shipbuilding	373
Other transportation equipment	371,374,375,379
Other manufacturing	22,25,30,31,38,39
Construction	15-17
Transportation services	40-42,44-47
Communications	48
Utilities	49
Wholesale and retail trade	50-59
Finance, insurance, and real estate	60-67
Services	07,70-89

Microsoft output to yield a conditional projection. The difference between the two sets of projections is a measure of Microsoft's total (direct and indirect) impact on the state economy. Since WPSM is a comprehensive model, the impact can be expressed in terms of employment and income by industry, population, personal income, household expenditures, state and local government spending, and fixed investment, among other economic and demographic variables.

Since WPSM defines the service industry (SIC 07 and 70-89) but not specifically Microsoft (i.e., the packaged software industry, which is SIC 7372), it is necessary to take into account the differences between Microsoft and services (in terms of their interindustry purchases, employment, and wages) in simulating the economic impact of Microsoft. Although Microsoft is part of services, simulating changes in services as a whole would not give the desired impact results. After taking note of the Microsoft employment-output ratio, for example, one can enter WPSM and alter the service industry employment-output ratio through the use of an ADD-FACTOR to yield a ratio that is equal to that for Microsoft (as determined by company records). Similar adjustments to the model can be made to take into account differences in wage rates (income-employment ratios) and in-state expenditures for goods and services (in-state expenditures-output ratios). In effect, the ADD-FACTOR adjustments are tantamount to introducing a new business, in this case Microsoft, into the simulation model.

#### *Employment Multiplier*

Employment multipliers are one means of standardizing the measurements of economic impacts for purposes of comparison. The employment multiplier for a given industry is defined as the ratio of its total employment impact to its direct employment impact. In 1995, for example, Microsoft sales of \$4.3 billion directly supported 9,940 jobs in Washington and indirectly supported 33,590 jobs in other state industries, according to a simulation with WPSM (see Table 5). Note that this impact does not consider the effects of stock options or capital expenditures. The Microsoft employment multiplier is 4.4 ( $= [9,940 + 33,590] / 9,940$ ). In this case, the multiplier can be interpreted to mean that, on average, each Microsoft job indirectly supported 3.4 other jobs in the state economy. Microsoft's wage and salary employment multiplier, which excludes proprietors, is 3.5 ( $= 34,700 / 9,940$ ). Compared to other industries, Microsoft has high multipliers because of its above-average wages and its high level of in-state expenditures per employee.

#### *King County Impact*

Estimating the economic impact of Microsoft on King County is a two-step procedure:

1. Estimate the direct employment and income impacts on the county.
2. Using an economic model of the county, estimate Microsoft's total employment, income, population, and tax impacts.

The county impact analysis is conducted with the Seattle City Light Model (SCLM), an econometric model of King County and the Seattle City Light service area (Conway, 1993). Although SCLM has more than five hundred forecasting equations, its simulation properties are not as strong as those of WPSM, since it does not have an explicit input-output framework. It is therefore necessary to adjust SCLM's simulations in order to maintain consistency between the county and state impact estimates. As a whole, however, the adjustments to SCLM are minor.

### A-3. MICROSOFT DATA

Microsoft's direct economic impact on Washington is its employment, labor income, and expenditures for goods and services procured from state businesses in 1995. This information, which is critical to the analysis, was provided by the company.

### A-4. REFERENCES AND DATA SOURCES

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# ADDENDUM

## THE MICROSOFT ECONOMIC IMPACT STUDY, 2001

The following findings are drawn from The Microsoft Economic Impact Study (Dick Conway & Associates, May 2003), an analysis of Microsoft's economic impact on Washington State, King County, and the City of Redmond in calendar-year 2001.

### **Washington State Impact**

- Microsoft Corporation, the world's leading producer of software for desktop computers, was founded in Albuquerque, New Mexico in 1975 by William H. Gates and Paul G. Allen.
- When the company moved to Washington in 1979, it had just \$3 million in revenue and employed 30 people.
- In 2001, following two decades of rapid growth, Microsoft operated in nearly 80 countries, registered \$26.8 billion in sales, and employed 48,030 people.
- About one-half of Microsoft's operations were located in King County, mainly on its Redmond campus, where the company is headquartered.
- Microsoft revenue attributable to Washington operations amounted to \$14.1 billion in 2001, up from \$1.1 billion in 1990.
- In 2001, Microsoft employed 23,180 people in the state.
- Microsoft employees earned \$2.4 billion in labor income (wages, salaries, and non-wage benefits) and received an additional \$3.5 billion in stock option income.
- Not counting stock option income, the average labor income at Microsoft was \$102,980 per year, more than twice the state standard of \$43,100. Including stock option income, average employee compensation came to \$256,000.
- In 2001, despite its relatively short existence, Microsoft was the second largest private employer in Washington behind only Boeing (78,000 employees).
- While Microsoft had only one-third as many workers as Boeing, the software company's labor compensation, amounting to \$5.9 billion (including stock option income), was virtually the same as Boeing's.
- In 2001, Microsoft and Boeing were the two largest sources of labor income in the state.
- To support operations, the company purchased \$1.1 billion in goods and services from Washington producers.

- In-state purchases amounted to approximately \$50,000 per Microsoft employee, which was well above average for businesses in Washington.
- Including the \$5.9 billion in employee compensation and \$1.1 billion in operating expenditures for locally produced goods and services, Microsoft pumped \$7.0 billion into the Washington economy, which in turn created job opportunities in other state businesses through the so-called multiplier process.
- Excluding the impact of stock option income and capital expenditures, Microsoft accounted for an estimated \$13.1 billion of Washington Gross State Product or 5.9 percent of the total in 2001, taking the multiplier effect into account.
- The total economic impact of Microsoft amounted to 104,410 jobs (wage and salary employees and proprietors) or 2.9 percent of Washington employment.
- Microsoft supported the equivalent of one out of every 34 jobs in the state in 2001.
- The implicit employment multiplier was 4.5, implying that every job at Microsoft supported 3.5 jobs elsewhere in the economy, most of which were in trade, services, and government.
- The Microsoft employment multiplier is relatively large, as employment multipliers in other industries typically range from two to three.
- Microsoft's personal income impact amounted to \$5.7 billion or 3.0 percent of Washington personal income.
- The equivalent of 161,510 people living in the state depended upon Microsoft in 2001.
- The implied population multiplier was 7.0, meaning that each Microsoft employee directly and indirectly supported the economic livelihoods of seven Washington residents.
- Microsoft's employment and labor income was the source of four-fifths of the company's total impact on the state economy. In-state purchases accounted for the other one-fifth.
- Considering the multiplier effect, Microsoft generated \$473.9 million in Washington state and local taxes, including \$211.2 million in sales and use taxes and \$139.2 million in property taxes.
- Including stock option income and capital expenditures, the company's impact on Washington amounted to 142,890 jobs (4.0 percent of total employment) and \$10.8 billion in personal income (5.6 percent of total income). [Note that this impact should not be considered the company's "permanent impact," since stock option income and capital expenditures are uncertain in the future.]
- Counting the impact of stock option income and capital expenditures, Microsoft supported one out of every 25 jobs in the state.

- Microsoft created an estimated 117,620 new jobs in the Washington economy between 1990 and 2001.
- Microsoft was the single largest contributor to economic growth in Washington during the eleven-year period, accounting for one-sixth of the total gain in state employment.
- Due to its rapid rise, Microsoft more than quadrupled its employment impact, increasing it from 25,270 jobs in 1990 to 142,890 jobs in 2001.

### **King County Impact**

- Virtually all of Microsoft's operations in Washington are located in King County, the largest and most prosperous county in the state.
- In 2001, excluding the impact of stock option income and capital expenditures, Microsoft accounted for 72,280 jobs or 5.1 percent of the total employment in King County.
- Microsoft's impact was felt widely around the county, in part because company employees resided not only in Redmond (the home of 6,370 employees) but also in Seattle (5,160), Bellevue (4,220), Kirkland (2,120), Woodinville (940), Bothell (900), and other King County (2,080).
- Microsoft supported the equivalent of one out of every 20 jobs in the county, not counting the impact of stock option income and capital expenditures.
- The Microsoft employment multiplier for King County was 3.1, implying that each company job supported 2.1 other jobs in the county.
- Microsoft generated \$3.8 billion in personal income or 4.8 percent of total county income.
- The software company raised King County per capita income by \$243.
- Directly and indirectly, Microsoft generated an estimated \$123.5 million in taxes for King County tax jurisdictions (county, cities, and special tax districts).
- Taking into account stock option income and capital expenditures, Microsoft was responsible for nearly one-third of King County's employment growth between 1990 and 2001.
- In 1993, the lift from the software company helped counteract a Boeing downturn and kept the county out of recession.

### **City of Redmond Impact**

- Microsoft's impact is centered on the City of Redmond, where the company employs 20,680 people.
- In 2001, Microsoft's total impact on the Redmond amounted to 35,760 jobs or two-fifths of the city's employment.

- Microsoft accounted for \$1.0 billion of the city's estimated \$2.3 billion in personal income.
- In 2001, the software company raised the per capita income of the city by \$4,820 or 9.7 percent.
- An estimated 13,580 residents, nearly one-third of the 45,630 people living in Redmond, were directly or indirectly dependent upon Microsoft.
- Microsoft generated an estimated \$20.9 million of the city's \$46.3 million in tax revenue in 2001.

While these findings are impressive, they still do not adequately describe the role of Microsoft in the economy. Indeed, it is not an overstatement to say that Microsoft has had an *immeasurable* impact on the local economy. In addition to supporting thousands of jobs, Microsoft has created great wealth in the community. Moreover, like a magnet, it has drawn other software companies to the area. Finally, several former Microsoft employees have tapped their riches and expertise to start new enterprises.