

# **INFORMATION TECHNOLOGY LABOR MARKETS: REBOUNDED, BUT SLOWLY**

**A Report to the Washington Alliance of Technology Workers,  
Communications Workers of America, Local 37083, AFL-CIO**

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# Information Technology Labor Markets: Rebounding, but Slowly

## Introduction

The technology sector is widely regarded as one of the most dynamic sectors of the U.S. economy and an important source of innovation, employment, and profits (see Kask and Sieber, 2002; Jorgensen, 2001). Productivity increases in IT-producing firms during the early 1990s swiftly lowered the prices of IT products and processes, helping speed the adoption of information technology by U.S. businesses. The spread of IT generated significant economy-wide benefits such that information technology is commonly considered to have formed “the foundation of the American growth resurgence” during the 1990s (Jorgensen, 2001: 2). In response to the growing demand for IT products and processes, employment in the IT industry, especially in the computer and data processing subsector, increased rapidly. Between 1989 and 1999, the computer and data processing industry was the nation’s second fastest growing as it added more than 1 million jobs over the period, an increase of 149 percent (Hatch and Clinton, 2000).

However, the IT industry,<sup>1</sup> which was at the center of the 1990s boom, also was caught in the midst of the 2001 recession, as well as the ensuing “jobless recovery” which lingered on years after the recession’s end. IT industry employment stagnated after 2000 and tumbled quickly at the onset of the recession. Between March 2001 (the beginning of the recession) and November 2001 (the official end of the recession), the IT industry shed (187,100) jobs, or 8.7 percent of total employment. Moreover, the industry fared no better throughout most of the recovery. By March 2002 (one year after the start of the recession) IT industry employment had declined by more than 270,000 jobs. Significant losses continued such that by March 2003 IT industry employment had fallen by an additional 113,000 jobs. Technology sector employment losses slowed by March 2004, though the industry still suffered a decline of 12,500 jobs during the previous 12-month period. All told, these mounting losses have meant that the IT industry lost – 395,600 jobs between March 2001 and March 2004 – 208,500 (53 percent) of which were lost during the economic *recovery*.

Following our earlier study of IT labor markets in the United States (Srivastava and Theodore, 2004), this report examines the state of the IT industry during the period March 2004 to

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<sup>1</sup> The IT industry has been defined to include the following North American Industry Classification System (NAICS) codes: NAICS 5112 (Software Publishers); NAICS 5180 (ISPs, Web Search Portals, and Data Processing); and NAICS 5415 (Computer Systems Design and Related Services).

February 2006 (the most recent month for which data are available). We examine employment trends in the industry both at the national level and in eight key metropolitan labor markets. We find that although IT industry employment is finally recovering, the current period is characterized by slow and faltering growth. For workers in this industry, employment prospects have improved somewhat, though many have been unable to secure jobs that allow them to use the full range of their skills and expertise.

### **A Long Jobless Recovery**

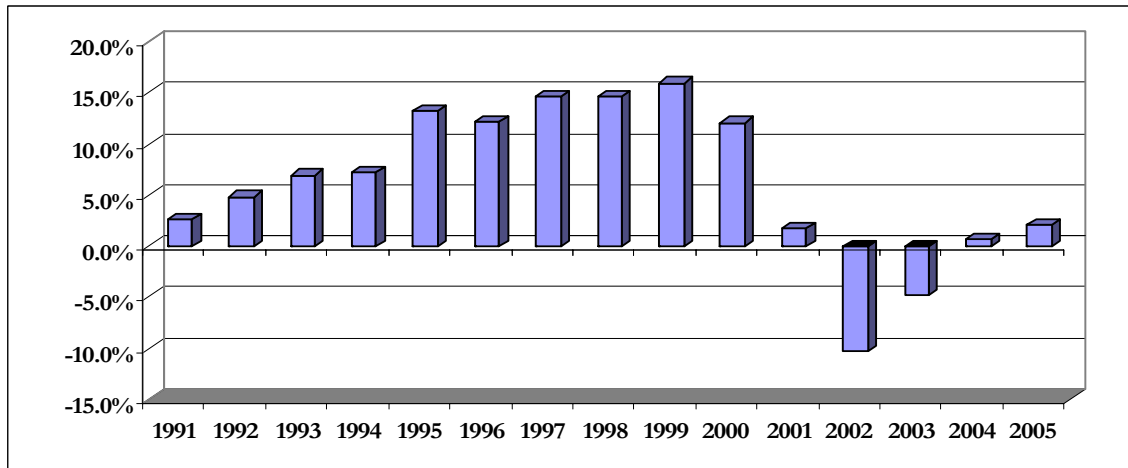
After a protracted period of employment decline following the onset of the 2001 recession, the IT industry is showing signs of a turnaround (Chabrow, 2006; Forrester, 2006; Gartner, 2005; Koprowski, 2005). Prodded by increased spending on information technology products and services, the IT industry labor market has been expanding slowly since May 2004. During the 12-month period March 2004 – February 2005, the IT industry added 34,600 jobs nationwide (2.0 percent of employment). This period was marked by volatility in employment levels throughout 2004 and growth in the first quarter of 2005. The following 12-month period March 2005 – February 2006 saw the continued rebound of IT industry, as employment increased by 54,000 jobs (3.0 percent), with most of this growth occurring during the last five months.

Much of the recent hiring in the IT industry reflects a cyclical recovery in IT labor markets, not a sustained trend of secular growth. Faced with a slowing economy during and immediately after the 2001 recession, many employers delayed implementation of IT projects. The headcount reductions that followed led to rising unemployment of IT professionals, creating considerable slack in IT labor markets (Srivastava and Theodore, 2004). But beginning in early 2005 “Strong gains in CIO confidence about the health of their budgets and future spending prospects” (ITAA, 2005) have led to increases in IT spending. Renewed confidence on the part of IT managers, it seems, has largely been due to improving corporate profit expectations and rising stock prices of U.S. technology vendors. IT projects that were put on hold earlier in the decade are now moving forward, and this has corresponded with modest levels of new hiring of IT workers.

It is important not to overestimate the strength of this recovery. IT employment declined in 23 of 24 months between April 2001 and March 2003, during which time 383,100 jobs were lost in the IT industry. From that point onward, employment levels have been volatile. Employment

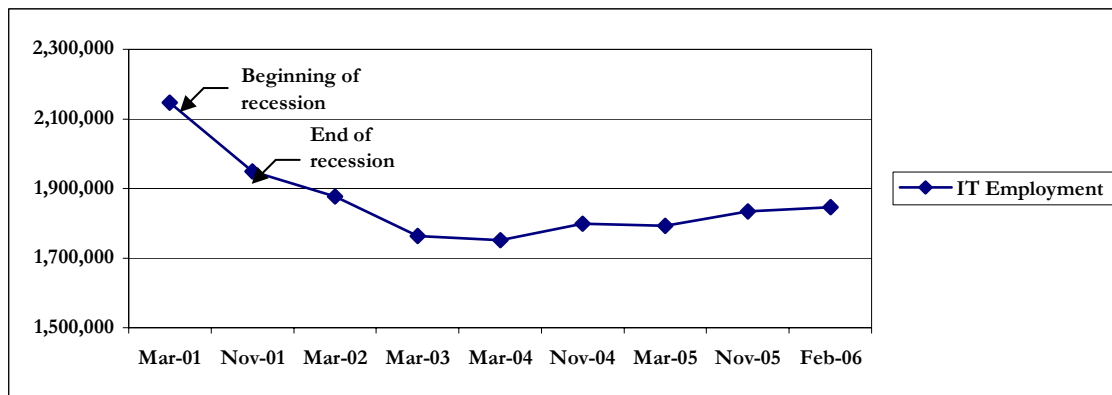
expanded in 21 of the following 35 months while it contracted in the other 14 months. Overall employment during this period of recovery (April 2003 to February 2006) increased by just 76,300 jobs, recouping less than one-quarter of the number of jobs lost earlier in the decade. When viewed in historical context, IT industry annual growth rates in the current period are anemic (Figures 1 & 2). After enjoying strong growth throughout the 1990s, the IT industry endured a deep recession. Though annual employment increases have been registered in 2004 and 2005, they have been modest in comparison.

**Figure 1: Annual Percentage Change in IT Industry Employment**



Source: CUED analysis of Current Population Survey data.

**Figure 2. Change in IT Employment Levels**



Source: CUED analysis of Current Population Survey data.

In light of the employment increases that have been registered during the past several months, some industry observers have been quick to declare that a dramatic rebound in IT

employment is underway. However, Figures 1 & 2 indicate otherwise, as net employment increases have been modest. Perhaps one upside for employers is that there remains considerable slack in IT labor markets, so they should be able to fill new vacancies rapidly if the recovery continues.

### **Regional IT Labor Markets**

Although aggregate trends point toward a gradually improving IT labor market, employment growth in the technology sector has been uneven across regional labor markets and over time (Figure 3). In most regional labor markets, employment patterns have mirrored national trends. Most metropolitan areas experienced rapid IT industry employment growth throughout the 1990s and to 2001. This was followed by sharp declines in employment between 2001 and 2003. The IT labor market remained stagnant throughout 2003 and 2004 and experienced a moderate, cyclical recovery in 2005.

The notable bright spots are Seattle and Washington, DC, two of the most important regional IT labor markets in the United States. In the Seattle and Washington, DC metropolitan areas, IT industry employment has in fact surpassed the highs achieved in March 2001. The recovery also seems to be well under way in the San Francisco area. San Francisco was one of the biggest losers of IT jobs, in percentage terms, between 2001 and 2003, but it has also been one of the biggest gainers of IT employment between 2003 and 2005 – a gain of 3,000 IT jobs. With this said, however, IT employment levels in San Francisco remain well below 2001 levels.

**Figure 3. Annual Change in IT Industry Employment**

	1999-2001	2001-2003	2003-2004	2004-2005
Nation	253,100 (14.0%)	-302,400 (14.7%)	10,300 (0.6%)	36,600 (2.1%)
Boston, MA-NH NECTA Division <sup>2</sup>	7,100 (13.5%)	-16,300 (-27.3%)	-1,200 (-2.8%)	2,000 (4.7%)
Chicago, IL Metropolitan Division <sup>3</sup>	4,200 (7.9%)	-10,200 (-17.7%)	0 (0%)	2,000 (4.2%)
Dallas, TX Metropolitan Division <sup>4</sup>	2,800 (5.5%)	-11,200 (-21.0%)	1,200 (2.9%)	1,400 (3.2%)
Los Angeles, CA, Metropolitan Division	7,400 (16.9%)	-7,600 (-14.8%)	-1,700 (-3.9%)	-400 (-1.0%)
San Francisco, CA Metropolitan Division <sup>5</sup>	13,100 (39.5%)	-18,000 (-38.9%)	500 (1.8%)	2,500 (8.7%)
San Jose, CA	21,900 (34.9%)	-20,600 (-24.3%)	0 (0%)	3,500 (5.5%)
Seattle, WA Metropolitan Division <sup>6</sup>	11,700 (25.5%)	-6,200 (-10.8%)	2,500 (4.9%)	3,400 (6.3%)
Washington, DC-VA-MD-WV Metropolitan Division <sup>7</sup>	11,400 (13.7%)	6,300 (6.7%)	9,000 (8.9%)	4,800 (4.4%)

Source: CUED analysis of Current Population Survey data.

In contrast to the recovery that is underway in Seattle, Washington, DC, and San Francisco, many other regional labor markets remain characterized by stagnate employment levels and slow growth. Metropolitan areas such as Boston, Chicago, Dallas, and San Jose have experienced only modest increases in IT industry employment, while employment levels have continued to fall in the Los Angeles metropolitan area. In Boston, Chicago, and Dallas, employment gains have been fairly steady since March 2005, following modest employment growth in the preceding year. Employment levels in the San Jose metropolitan area have been more volatile, with monthly employment

<sup>2</sup> Employment data for NAICS 5180 (ISPs, Web Search Portals and Data Processing) is not available for the Boston metropolitan division and therefore undercounts total IT employment in the region.

<sup>3</sup> Employment data for this series for the Chicago metropolitan division includes employment in NAICS 5180 (ISPs, Web Search Portals, and Data Processing) and NAICS 5415 (Computer Systems Design and Related Services). It does not include NAICS 5112 (Software Publishing), for which employment data is unavailable.

<sup>4</sup> Employment data for NAICS 5112 (Software Publishers) is not available for the Dallas metropolitan division.

<sup>5</sup> Employment data for this series for the San Francisco metropolitan division includes employment in NAICS 5180 (ISPs, Web Search Portals, and Data Processing) and NAICS 5415 (Computer Systems Design and Related Services). It does not include NAICS 5112 (Software Publishing), for which employment data is unavailable.

<sup>6</sup> Employment data for NAICS 5180 is unavailable for the Seattle metropolitan division.

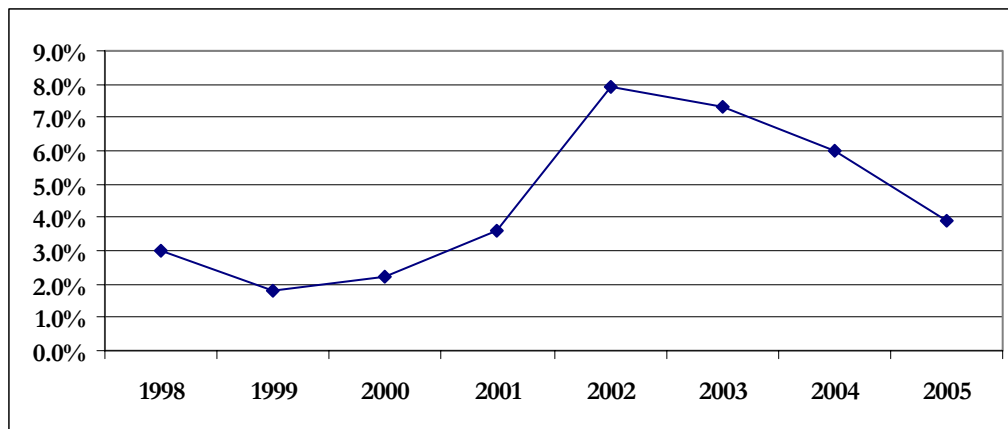
<sup>7</sup> Employment data for NAICS 5112 (Software publishing) and NAICS 5180 (ISPs, Web Search Portals, and Data Processing) is not available for the Washington, DC metropolitan division.

fluctuations through mid-2005. However, consistent employment growth has been registered since October 2005. IT industry labor markets remain depressed in the Los Angeles metropolitan area. Following the loss of 7,600 IT jobs between 2001 and 2003, the Los Angeles area lost an additional 2,100 IT industry jobs (4.8%) between 2003 and 2005. Employment losses have continued into 2006, though appear to be slowing.

### **Unemployment Rates in the IT Industry**

National unemployment rates for workers in the IT industry rose sharply between 1999 and 2002, peaking at 7.9% in 2002 (Figure 4). Since that time, the unemployment rate declined, falling to 3.9% in 2005. Although a perceptible decline, the unemployment rate remains above the 2001 rate of 3.6%. It is likely that large numbers of IT workers have sought employment in other sectors of the economy, though it is not known whether these workers are able to capitalize on their skills and expertise that was developed when they held IT industry jobs. In this sense, many may be underemployed – holding positions that do not allow them to make use of their IT skills.

**Figure 4. National IT Industry Unemployment Rate**



Source: CUED analysis of Current Population Survey data.

### **IT INDUSTRY LABOR MARKETS AFTER THE 2001 RECESSION**

November 2005 marked the beginning of the fifth year of recovery for the U.S. economy. But this has been no ordinary recovery. Gross domestic product (GDP), the broadest indicator of economic activity, has been up significantly since the second quarter of 2003, productivity gains have been robust, and the Dow Jones has been trading over 11,000. Yet employment growth has been

much weaker than in earlier recoveries and nonfarm employment has lagged GDP growth considerably. Historically, GDP growth following a recession has been accompanied by growth in total employment (Bernstein, 2004; Langdon *et al*, 2004; Pollin, 2004; Schreft and Singh, 2003). Robert Pollin (2004) has shown that in the nine previous recoveries since 1949, GDP grew at an average annual rate of 4.3 percent in the first nine quarters following the trough of the recession. During these recoveries, employment increased at an average annual rate of 1.8 percent. In contrast, in the nine quarters following the trough of the 2001 recession, when GDP grew at an annual rate of 3.4 percent, employment growth was actually *negative* (-0.1 percent).

Although GDP growth since the end of the 2001 recession has been weaker than in previous cycles, what sets this recovery apart is that the downturn in employment has been particularly severe and protracted (Langdon *et al*, 2004). Even compared to the 1990-91 recession, the only other recession in the U.S. postwar period to be followed by a jobless recovery, the 2001-04 recovery has been weak. Whereas the recovery following the 1990-91 recession saw employment growth lag GDP growth by four quarters, the lag increased to eight quarters following the trough of the 2001 recession. The divergence between the steadily growing economic sector (GDP, productivity, and capital investment) and the sluggish labor market has been especially pronounced in the IT industry, where several factors have contributed to declining employment in this industry which already has been hard hit by economic restructuring.

Like most major sectors of the U.S. economy, the technology sector endured heavy job losses as the U.S. economy slipped into recession in 2001. Employment conditions in IT labor markets further deteriorated as technology companies aggressively pursued global sourcing strategies, business moves that lead to the offshoring of a wide range of IT functions. Since the mid-1990s, a growing array of processes and services formerly conducted in the U.S., including code writing, software design, data processing, claims processing, and customer service, have been outsourced to providers in low-wage countries (see Dossani and Kenney, 2003; Amoribieta *et al* 2001). U.S. imports of business, professional, and technical services associated with offshore outsourcing rose from \$21.2 billion in 1997 to approximately \$37.5 billion in 2002, an increase of 77 percent (U.S. GAO, 2004). The most widely cited estimate of the scale of white-collar offshore outsourcing is a Forrester (2002) projection that “over the next 15 years, 3.3 million U.S. services industry jobs and \$136 billion in wages will move offshore to countries such as India, Russia, China,

and the Philippines.” Though it has proven to be notoriously difficult to quantify, the jobs impact of offshoring is considerable. It is inconceivable that investment outflows on the order estimated by Forrester and other industry analysts would not lead to domestic job losses, further slowing the recovery of IT industry labor markets in the United States. This has significantly undermined the employment prospects of technology workers.

The recent improvements in IT industry labor markets that have been observed can be accounted for by renewed spending by U.S. firms on technology projects. As organizations implement projects that were put on hold during the economic slowdown, technology spending within the public and private sectors has increased. Gartner forecasts that in 2006, U.S. businesses will increase their spending on IT by 5.5%, while Forrester estimates that IT spending by U.S. businesses will increase by 7% (Gartner, 2005; Forrester, 2006). A portion of the increase in IT spending is devoted to hiring additional IT professionals, leading to a demand-side “pull effect” on the IT labor market (Chabrow, 2006; Koprowski, 2005). Employers are investing in in-house applications development and integration, fuelling demand for technologists with appropriate business and domain skill sets. This has led to an employment rebound, particularly in Seattle, San Francisco, and Washington, DC.

The IT industry, which saw sustained employment gains throughout the 1990s, saw its fortunes reverse with the onset of the 2001 recession and the jobless recovery that followed in its wake. Since late 2005, however, there are signs of a weak recovery in the IT industry as small gains in employment have been registered. But underlying weaknesses in IT labor markets remain. Cautious hiring by employers and the rapid rise of offshore outsourcing likely mean that hiring by technology companies will remain volatile for the foreseeable future.

## **METHODOLOGY**

Data on IT employment and unemployment were retrieved from the Current Employment Statistics (CES) survey and the Current Population Survey (CPS).

Employment - Employment data were retrieved from the 1999-2006 Current Employment Statistics (CES) survey for the following metropolitan divisions/metropolitan statistical areas:

Boston-Quincy, MA Metropolitan Division

Chicago-Naperville-Joliet, IL Metropolitan Division

Dallas-Plano-Irving, TX Metropolitan Division

Los Angeles-Long Beach-Glendale, CA Metropolitan Division

San Francisco-San Mateo-Redwood City, CA Metropolitan Division

San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area<sup>8</sup>

Seattle-Bellevue-Everett, WA Metropolitan Division

Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division

The information technology industry was defined to include the following North American Industry Classification System (NAICS) codes:

NAICS 5112 – Software Publishers

NAICS 5180 – ISPs, Web search Portals, and Data Processing

NAICS 5415 – Computer Systems Design and Related Services

Unemployment - Unemployment data were retrieved from the 1998-2005 CPS Annual March Supplement to produce single-year national unemployment rate estimates for 1998-2005.<sup>9</sup>

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<sup>8</sup> The Office of Management and Budget (OMB) has replaced the 1990 standards for identifying statistical areas in the U.S. with the 2000 standards that identify the following statistical areas in the U.S. and Puerto Rico: Metropolitan Statistical Area (which can be further divided into metropolitan divisions); Micropolitan Statistical Area; Combined Statistical Area; New England City and Town Area (NECTA); and Combined NECTA. For the purposes of this study, we have chosen the metropolitan division as our unit of analysis, with the exception of the San Jose-Sunnyvale-Santa Clara area, which is a metropolitan statistical area with no metropolitan divisions. The decision to select metropolitan divisions as the unit of analysis was based on the fact that metropolitan divisions are the closest possible geographic unit to the primary metropolitan statistical areas (PMSAs) unit used in our previous study – Srivastava and Theodore (2004).

<sup>9</sup> 2005 Annual Demographic Survey is the latest annual survey available from the CPS.

**Note:** Beginning in 2003, the March Supplement made a switch to an industry classification system based on the 2002 North American Industry Classification Systems (NAICS),<sup>10</sup> unlike the previous March Supplements, which relied on the earlier Standard Industrial Classification (SIC) to classify industries. As a result, the unemployment rate estimates since 2002 are not directly comparable with estimates from earlier years.

The information technology sector has been significantly revised under NAICS and is not directly comparable with the earlier Standard Industrial Classification (SIC) 737 – Computer and Data Processing Services, which encompassed the core of information technology firms.

This report relies on a crosswalk program created by the U.S. Census Bureau to identify the following industries that correspond with SIC 737:

NAICS 5112 – Software Publishers

(Corresponds with SIC 7372 – Software Publishers)

NAICS 5415 – Computer Systems Design and Related Services

(Corresponds with SIC 7371 – Computer Programming Services

SIC 7373 (partially) – Computer Integrated Systems Design

SIC 7376 – Computer Facilities Management Services

SIC 7379 (partially) – Computer Related Services, NEC

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<sup>10</sup> Beginning in 1997, the Standard Industrial Classification (SIC) was replaced by the North American Industry Classification System (NAICS). This revision provides for newer industries, particularly in the service sector, and also reorganizes the categories on a production/process-oriented basis. This new, uniform, industry-wide classification system has been designed as the index for statistical reporting of all economic activities of the U.S., Canada, and Mexico. The two systems are not directly comparable. For instance, of the 1,170 NAICS industries, 36 percent have direct SIC counterparts, 33 percent are significantly revised, and 31 percent are newly-created industries. Of these new NAICS industries, almost two-thirds have no comparable classification under SIC - Minnesota Employment Review, September 2001. (<http://www.mnwfc.org/lmi/review/0901supp.htm>)

NAICS 5181 – Internet Service Providers

(Corresponds with SIC 7375 – Internet Service Providers and Internet Access Providers)

NAICS 5182 – Data Processing, Hosting & Related Services

(Corresponds with SIC 7374 – Computer Processing and Data Preparation and Processing Services)

Two small component sub-sectors of SIC 737 (SIC 7377 – Computer Rental and leasing and SIC 7378 – Computer Maintenance and Repair) have been excluded from this report due to lack of direct correspondence between these 4-digit SIC codes and 4-digit NAICS.<sup>11</sup>

Reliability of Summary Statistics: In any sample survey, variations in the data can occur by chance because a sample, rather than the whole of the population, is surveyed. The standard error is a measure of such potential variation. The chances are about 68 out of 100 that an estimate from the survey differs from a figure that would be obtained from a complete census by less than one standard error. The chances are about 90 out of 100 that such a difference would be less than 1.6 standard errors. All population estimates in this report are significant at 1.6 or more standard errors.

Although the present CPS sample is a state-based design, the sample size of the CPS is sufficient to produce reliable monthly estimates at the national level only. The sample does not permit the production of reliable monthly estimates for the sub-national geographies.

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<sup>11</sup> For instance, SIC 7377 corresponds partially with NAICS 5342, which includes not only computer rental and leasing, but also heavy construction equipment rental and leasing, rental of railroad cars etc., which are outside the domain of information technology.

## APPENDIX 1 – LIST OF METROPOLITAN DIVISIONS

<b>DIV. CODE</b>	<b>COUNTY CODE</b>	
14484		<b>Boston-Quincy, MA Metropolitan Division</b>
	25021	Norfolk County, MA
	25023	Plymouth County, MA
	25025	Suffolk County, MA
16974		<b>Chicago-Naperville-Joliet, IL Metropolitan Division</b>
	17031	Cook County, IL
	17037	DeKalb County, IL
	17043	DuPage County, IL
	17063	Grundy County, IL
	17089	Kane County, IL
	17093	Kendall County, IL
	17111	McHenry County, IL
	17197	Will County, IL
19124		<b>Dallas-Plano-Irving, TX Metropolitan Division</b>
	48085	Collin County, TX
	48113	Dallas County, TX
	48119	Delta County, TX
	48121	Denton County, TX
	48139	Ellis County, TX
	48231	Hunt County, TX
	48257	Kaufman County, TX
	48397	Rockwall County, TX
31084		<b>Los Angeles-Long Beach-Glendale, CA Metropolitan Division</b>
	06037	Los Angeles County, CA
41884		<b>San Francisco-San Mateo-Redwood City, CA Metropolitan Division</b>
	06041	Marin County, CA
	06075	San Francisco County, CA
	06081	San Mateo County, CA

41940 <sup>12</sup>		<b>San Jose-Sunnyvale-Santa Clara, CA Metropolitan Statistical Area</b>
	06069	San Benito County, CA
	06085	Santa Clara County, CA
42644		<b>Seattle-Bellevue-Everett, WA Metropolitan Division</b>
	53033	King County, WA
	53061	Snohomish County, WA
47894		<b>Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Division</b>
	11001	District of Columbia, DC
	24009	Calvert County, MD
	24017	Charles County, MD
	24033	Prince George's County, MD
	51013	Arlington County, VA
	51043	Clarke County, VA
	51059	Fairfax County, VA
	51061	Fauquier County, VA
	51107	Loudoun County, VA
	51153	Prince William County, VA
	51177	Spotsylvania County, VA
	51179	Stafford County, VA
	51187	Warren County, VA
	51510	Alexandria city, VA
	51600	Fairfax city, VA
	51610	Falls Church city, VA
	51630	Fredericksburg city, VA
	51683	Manassas city, VA
	51685	Manassas Park city, VA
	54037	Jefferson County, WV

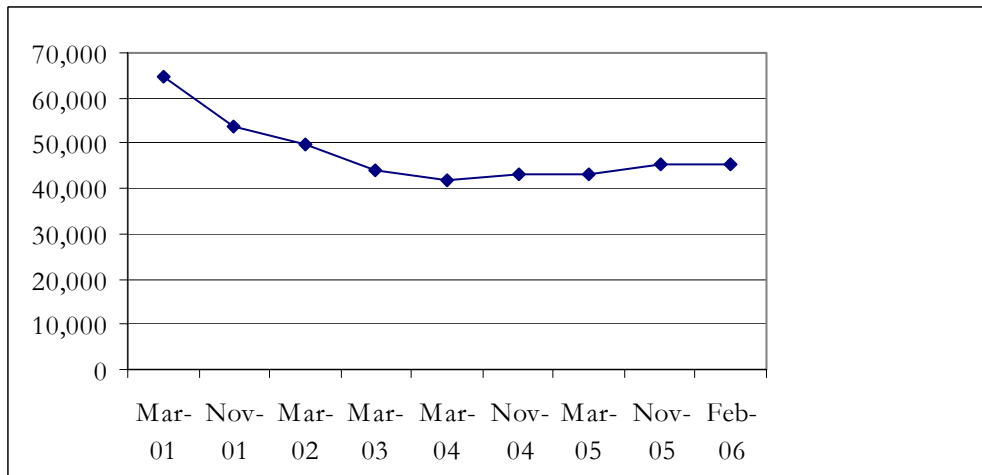
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<sup>12</sup> The code refers to the Core Based Statistical Area (CBSA) code and not the metropolitan division code because the San Jose-Sunnyvale-Santa Clara region is a metropolitan statistical area that does not have a metropolitan division and therefore does not have a division code.

## APPENDIX 2 – THE METROPOLITAN BOSTON DIVISION

The Boston metropolitan division saw IT employment levels increase by 8.9% between March 2004 and February 2006, resulting in a total gain of 3,700 jobs. However, employment levels in February 2006 remained lower than the March 2002 levels. Between March 2004 and February 2005, the Boston metropolitan division added 1,400 jobs. During the following 12 months (March 2005-February 2006), the region added 2,100 jobs, with most of the job gain occurring since March 2005 (Figure A2-1).

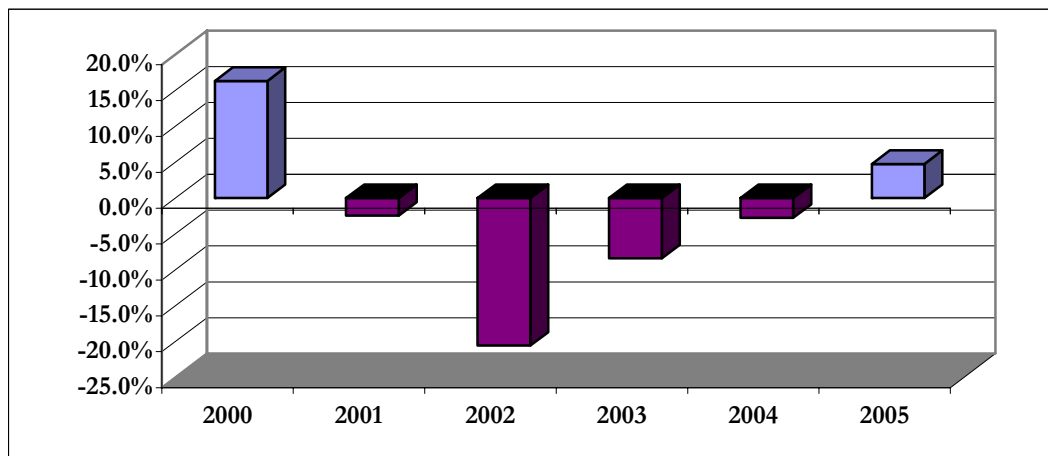
**Figure A2-1. Monthly IT Employment Levels in the Boston Region**



Source: CUED analysis of Current Population Survey data.

Annual IT employment in Boston declined each year between 2000 and 2004, with the sharpest drop occurring between 2001 and 2002, when employment fell by 20.6%. Employment declines continued through 2004 and a slight increase in employment (4.7 percent) occurred between 2004 and 2005 (Figure A2-2).

**Figure A2-2. Percentage Change in Annual IT Employment Levels**

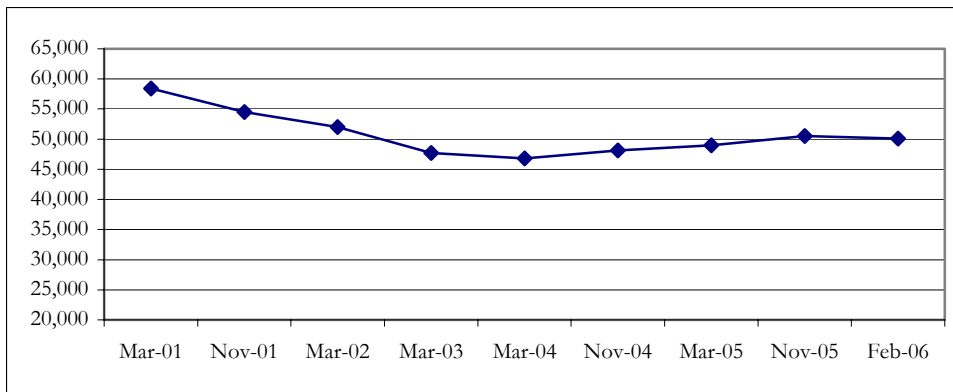


Source: CUED analysis of Current Population Survey data.

### APPENDIX 3 – THE CHICAGO METROPOLITAN DIVISION

IT employment in the Chicago metropolitan division increased by 7.1 percent between March 2004 and February 2006 (Figure A3-1). Employment gains were split evenly between 2004 and 2005, with Chicago adding 1,700 jobs (3.6% of total employment) between March 2004 and February 2005 and another 1,600 jobs between March 2005 and February 2006.

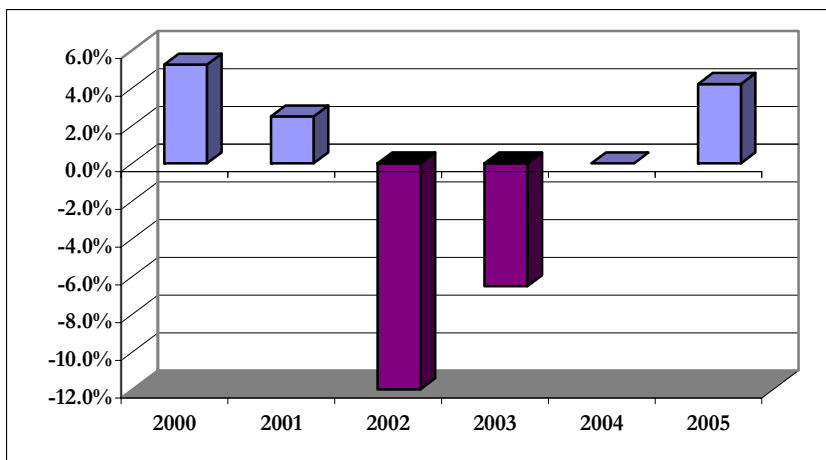
**Figure A3-1. Monthly IT Employment in the Chicago Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual IT employment trends in the Chicago metropolitan division mirrored national trends with employment increasing in 2000 and 2001, declining sharply in 2002 and 2003, remaining stagnant in 2004 and rising moderately in 2005 (Figure A3-2). Although the area experienced moderate growth, annual IT employment in 2005 remained lower than the 2002 level.

**Figure A3-2. Percentage Change in Annual IT Employment Levels**

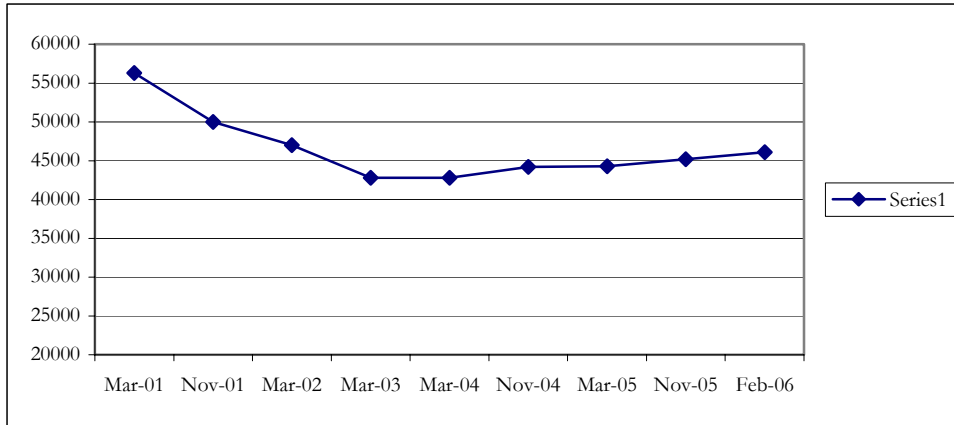


Source: CUED analysis of Current Population Survey data.

## APPENDIX 4 – THE DALLAS METROPOLITAN DIVISION

The Dallas metropolitan division added 1,100 jobs between March 2004 and February 2005 and gained an additional 1,800 jobs between March 2005 and February 2006, resulting in a 7.7% increase in 24 months (Figure A4-1). Increases in employment levels remained unsteady in Dallas through out 2004. However, employment grew consistently after the first quarter of 2005.

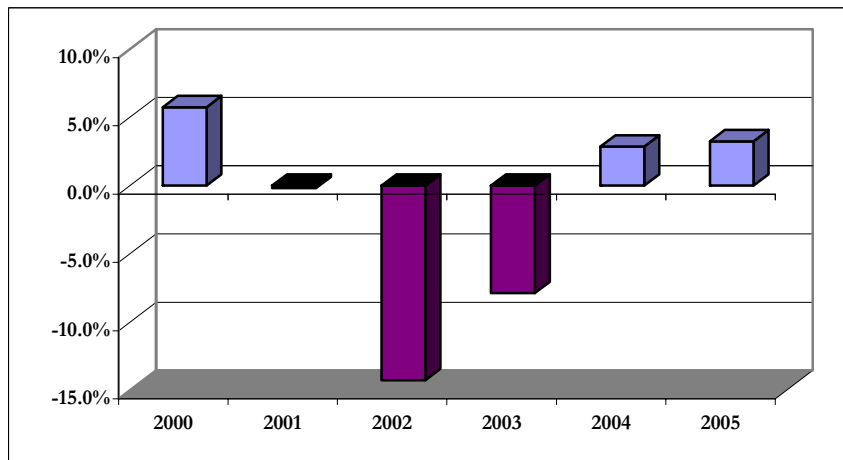
**Figure A4-1. Monthly IT Employment in the Dallas Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual IT employment trends indicate that employment growth in Dallas remained moderate, with employment levels declining in 2001, 2002, and 2003, and rising slightly in 2004 and 2005 (Figure A4-2). Despite the growth, employment remained lower than the 2002 levels.

**Figure A4-2. Percentage Change in Annual IT Employment Rates**

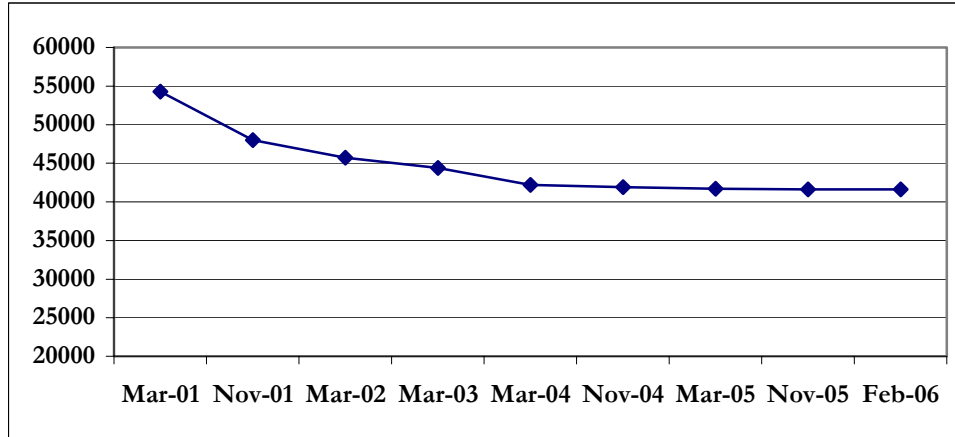


Source: CUED analysis of Current Population Survey data.

## APPENDIX 5 – THE LOS ANGELES METROPOLITAN DIVISION

Los Angeles is the only area in the study that lost jobs between March 2004 and February 2006. The area lost 500 jobs between March 2004 and February 2005 and an additional 100 jobs between March 2005 and February 2006, resulting in a total job loss of 600 jobs (1.3% of total IT employment) over the 24-month period (Figure A5-1).

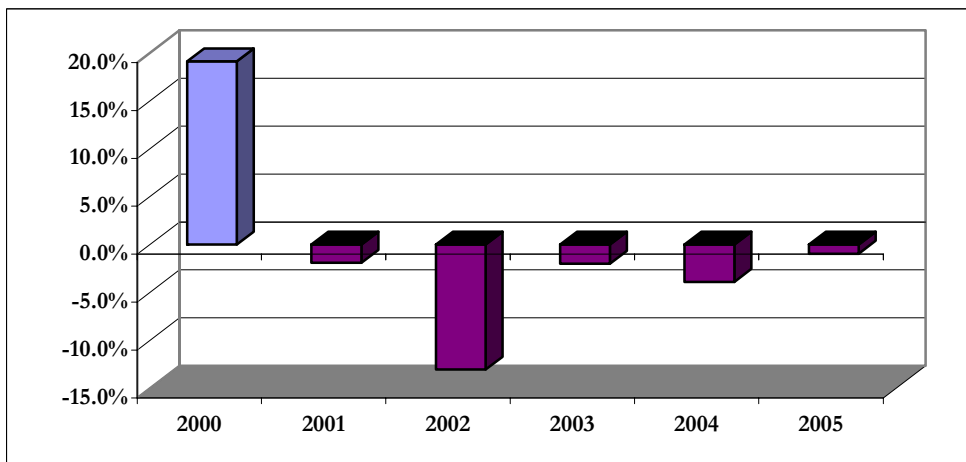
**Figure A5-1. Monthly IT Employment Levels in the Dallas Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual IT employment level in the Los Angeles metropolitan division grew sharply between 1999 and 2000 – a growth rate of 19 percent, but has been declining ever since (Figure A5-2). This has resulted in a loss of 10,700 jobs between 2000 and 2005 (a 20.5% decline).

**Figure A5-2. Percentage Change in Annual IT Employment Levels**

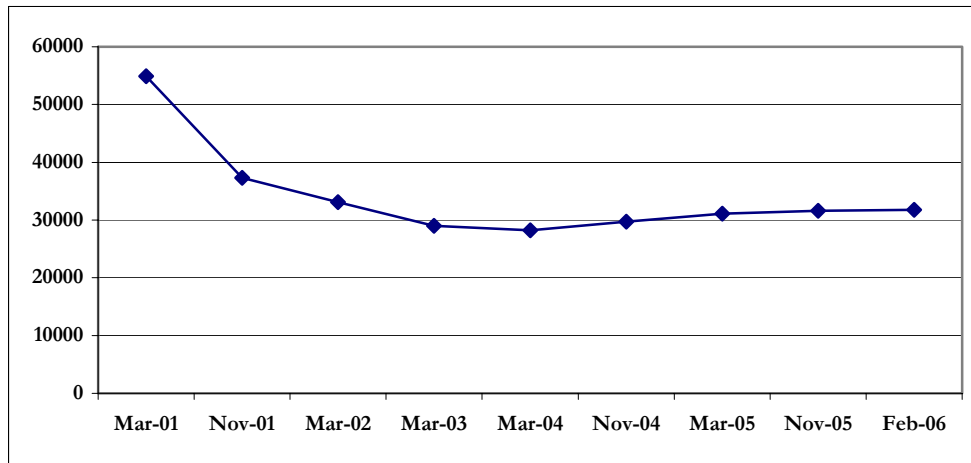


Source: CUED analysis of Current Population Survey data.

## APPENDIX 6 – THE SAN FRANCISCO METROPOLITAN DIVISION

The San Francisco metropolitan division witnessed a growth of 2,700 jobs between March 2004 and February 2005 (9.5%) and an additional 700 jobs between March 2005 and February 2006, resulting in a total job gain of 3,600 jobs - an increase of 12.8% over the 24-month period (Figure A6-1). Although employment growth has been impressive, it has remained volatile with monthly employment levels fluctuating throughout the period.

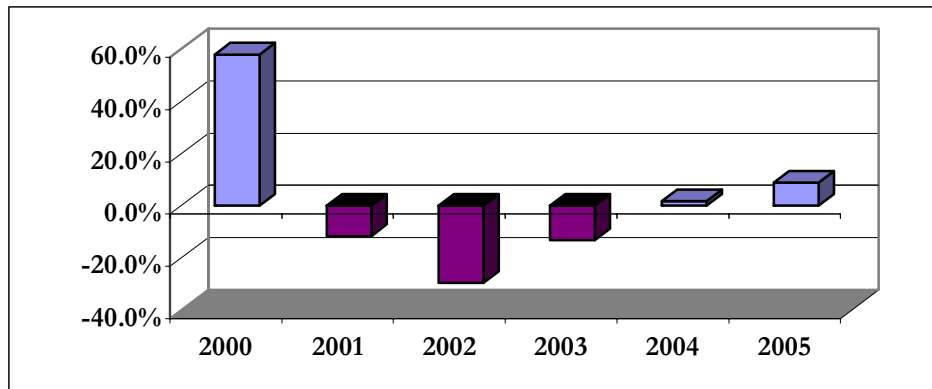
**Figure A6-1. Monthly IT Employment in the San Francisco Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual IT employment trends in the San Francisco region indicate that employment skyrocketed between 1999 and 2000, with an addition of 19,200 jobs – a 57.8% increase. However, employment declined in the following three years. Employment levels registered small gains in 2004 with a 1.8% increase, and strong growth occurred in 2005 as the region added 2,500 jobs in that year alone (Figure A6-2).

**Figure A6-2. Percentage Change in Annual IT Employment Levels**

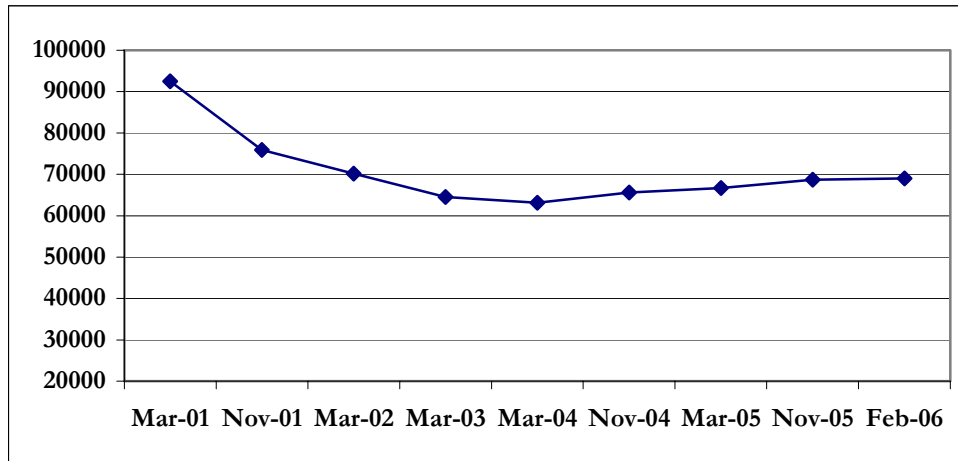


Source: CUED analysis of Current Population Survey data.

## APPENDIX 7 – THE SAN JOSE METROPOLITAN STATISTICAL AREA

Although IT employment growth has been registered in the San Jose area, with employment increasing by 9.5% between March 2004 & March 2006, there has been some volatility in the labor market with monthly fluctuations throughout much of the 24-month period. However, employment has been growing consistently since October of 2005 (Figure A7-1).

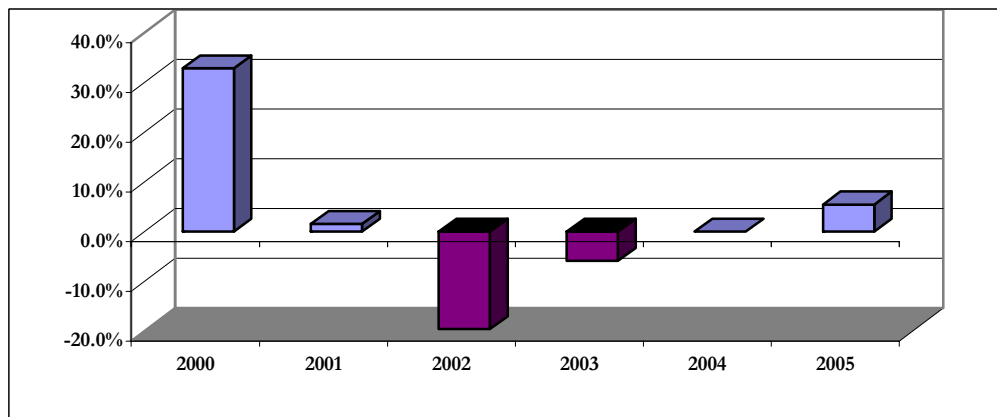
Figure A7-1. Monthly IT Employment in the San Jose Area



Source: CUED analysis of Current Population Survey data.

Annual employment trends indicate that IT employment grew strongly between 1999 and 2000, stagnated in 2001, and declined in the next two years. The situation stabilized in 2004 and employment grew by 5.5% (an addition of 3,500 jobs) between 2004 and 2005 (Figure A7-2).

Figure A7-2. Percentage Change in Annual IT Employment Levels

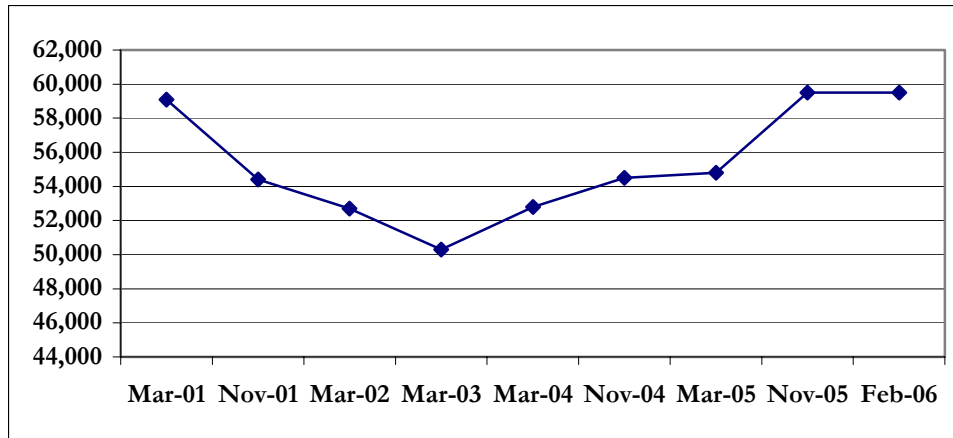


Source: CUED analysis of Current Population Survey data.

**APPENDIX 8 – THE SEATTLE METROPOLITAN DIVISION**

Seattle remains one of the IT bright spots in the U.S., with February 2006 IT employment levels surpassing the highs of March 2001. The metropolitan division added a total of 6,700 jobs between March 2004 and February 2006, with most (4,700) of the growth taking place between March 2005 and February 2006 (Figure A8-1).

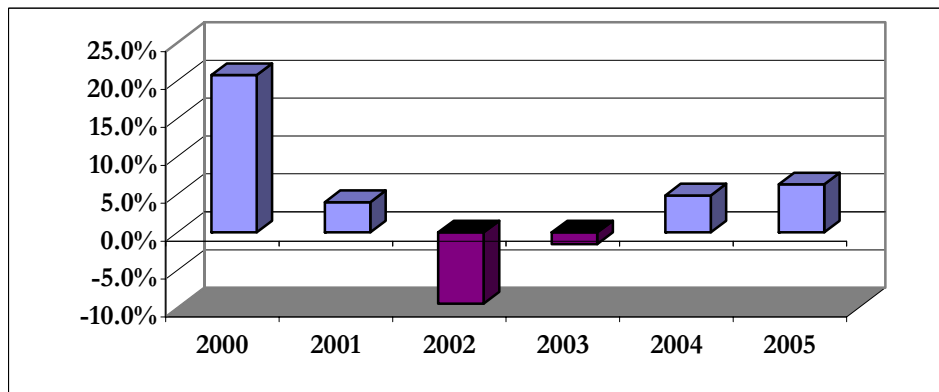
**Figure A8-1. Monthly IT Employment Levels in the Seattle Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual employment trends also point to robust growth in the Seattle area with only moderate declines in employment levels in 2002 and 2003, and a substantial recovery in 2004 and 2005 (Figure A8-2). Although the area has performed very well, the 2005 annual IT employment still lags the highs of 2001.

**Figure A8-2. Percentage Change in Annual IT Employment Levels**

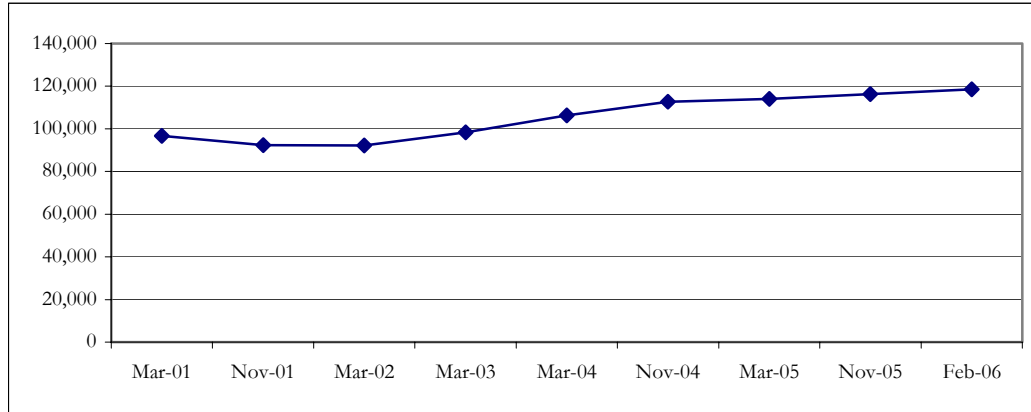


Source: CUED analysis of Current Population Survey data.

## APPENDIX 9 – THE WASHINGTON, D.C. METROPOLITAN DIVISION

In the Washington, D.C. region IT labor markets have been very strong, with the February 2006 employment levels surpassing the highs of March 2001 by 21,800 additional jobs – a 22.5% increase. The area has seen an additional increase of 12,200 jobs between March 2004 and February 2006 and employment has increased consistently during the 24-month period (Figure A9-1).

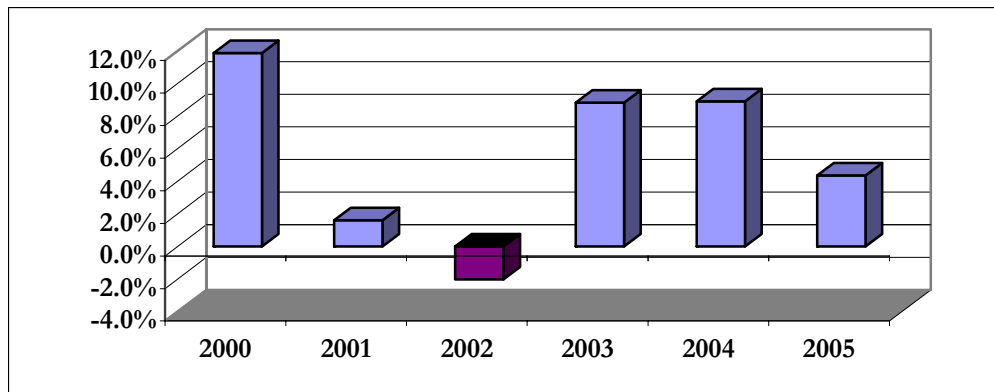
**Figure A9-1. Monthly IT Employment in the Washington, D.C. Metropolitan Division**



Source: CUED analysis of Current Population Survey data.

Annual trends indicate that the employment levels declined only between 2000 and 2001 and have since grown substantially. Rapid growth took place in 2003 and 2004, with the 2005 growth rate being slower than those in the earlier two years (Figure A9-2).

**Figure A9-2. Percentage Change in Annual IT Employment Levels**



Source: CUED analysis of Current Population Survey data.

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