A Quarterly Review of Washington State Labor Market Information

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Washington State Employment Security Department
Carver Gayton, *Commissioner*

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The purpose of the *LMI Review* is to provide timely information and analysis of the state labor market conditions in support of public and private activities that expand employment opportunities and reduce unemployment.

Questions and comments concerning any aspect of the publication may be directed to Gary Bodeutsch, *Director*, Labor Market and Economic Analysis Branch, Employment Security Department, Mail Stop: 6000, Lacey Complex, Olympia, WA 98507-9046, telephone (360) 438-4800.

Subscriptions and single copies may be obtained by writing to the *LMI Review Editor,* Robert Wm. Baker, at the address above, or ***rbaker@esd.wa.gov*.**

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A Proud History in the Making

Commissioner
Carver Gayton

COMMENTARY

Last year when we were just beginning Washington's welfare reform, I used this column to announce what steps we would be taking to successfully get WorkFirst up and running.

The first year of WorkFirst is now history. I am proud to report it was a very good year for the thousands of former welfare clients we introduced to WorkFirst. More than 34,600 people entered jobs during the year, enabling many of them to get off public assistance. This was a major increase over the previous year.

Employer's support has been outstanding. B.F. Goodrich TRAMCO hired welfare participants and provided them opportunities to move up the career ladder. The Washington Restaurant Association made their member's job openings available for WorkFirst clients. Other employers joined us in pioneering a new approach for bringing workers and employers together at job match events that allowed employers to interact directly with clients and begin interviews on the spot. An estimated 28,000 different employers have hired WorkFirst clients.

We had to move very quickly to plan, create and implement the most sweeping changes in welfare in 60 years. The number of people who found work during the initial year of WorkFirst was 72 percent higher than during the year before under the previous program.

It couldn't have happened without the strong dedication and cooperation of employers, clients and state employees.

More than 36,350 persons received job search assistance during the year, a 95 percent increase that reflects the great emphasis being placed on employment instead of welfare.

Participation in the program became mandatory for welfare recipients on November 1, but they began to voluntarily attend job search workshops in August. There were 28,074 participants in workshops through June 30, 1998.

In line with Governor Gary Locke's commitment to WorkFirst, Employment Security's program placement goals for the new program year have been expanded. We will also provide services and incentives to stay employed, reinforcing the principal of personal responsibility.

However, we won't be alone. Our agency partners will again include Department of Social and Health Services; Department of Community, Trade and Economic Development; and State Board for Community and Technical College. And, of course, we will be working alongside thousands of our neighbors and business partners. ■

Cruising Altitude

First Quarter 1998 *QUARTERLY ANALYSIS*

Washington's job growth ratcheted up a notch in the first quarter of 1998 after a bit of a breather in the preceding two quarters. Payroll employment surged ahead at a 4.2 percent seasonally adjusted annual rate following a 2.9 percent gain in the last quarter of 1997. The first quarter pace was a return to the pattern of the first half of 1997, which averaged 4.3 percent annual employment growth. More striking, however, was the fact that this resurgence took place in the face of a dramatic slowing in aircraft and parts employment after two years of steady 1,300-workers-a-month average gains. Hiring in the rest of the economy for all intents and purposes simply reflected the ripple effects of earlier job growth in the basic traded sectors. And that pattern is expected to continue. Joblessness plummeted in the course of these employment developments. The rate of unemployment stepped down yet another notch to average 4.2 percent in the first quarter.

Most of the major industry divisions contributed to this job expansion. Only government and wholesale trade posted negative changes between the fourth quarter of 1997 and the first quarter of 1998. And even these were either noneconomic phenomenon or of modest consequence.

In terms of percent growth, construction, transportation, and finance recorded the greatest change in the first quarter of 1998. Thanks to an unseasonably mild winter (El Ninó?), construction activity, and its financing, got an early start. In all likelihood, this will mean a second quarter gain that is not quite up to snuff; so be prepared. Transportation gains were centered in the air transportation sector; even though a large chunk of that gain was related to a coding change, increases in personal income and burgeoning business activity resulted in real job gains in air cargo, courier, and passenger travel industries.

Diverse Double Digits

In addition to the transportation sector, a number of other industries recorded double-digit job growth rates in the first quarter of 1998. Furniture and fixtures enjoyed a brisk first quarter. Furniture is such a small sector that an addition of 200 jobs constitutes a double-digit pace.

Fabulous Fabricated Metal

Fabricated metal products added workers at a 14 percent pace in the first quarter. High levels of commercial building activity normally push up demand for structural steel products. Question of the quarter: How much structural steel goes into a retractable-roof baseball stadium? In addition, cans for food processing are a big item in this sector. As goes food processing so goes fabricated metal.

Speaking of Food Processing…

Food processing was another sector adding jobs at a double-digit pace in the first quarter. Though it is tough to seasonally adjust a sector that varies so much from year to year, it appears, nonetheless, that food processing firms boosted employment at over an 11 percent annual pace during the winter months. Does this mean most of the gains were in frozen foods?

Lightning Pace

Electronic and other electrical equipment payrolls expanded at a 19.2 percent annual rate in the first three months of 1998. A common misconception is that this industry includes computer manufacturers, but that sector is coded under industrial machinery and equipment. This sector manufactures electrical transmission equipment, motors and generators, electrical industrial apparatus, household appliances, lighting equipment, and other stuff, but not computers. Much of the output from this industry is used by other businesses. As a result of the high level of economic activity nationwide, this industry is booming as well.

So Much Communication

Communications employment enjoyed double-digit growth in the first quarter of 1998. The addition of 1,100 new jobs represented a 16.1 percent annual growth rate. While technological advances in communications have been impressive, the industry is not renowned as a high employment growth sector. But with the combination of high in-migration and the essential home-building, and declining cellular phone rates and the expansion of cellular usage, the demand for new phone lines, cable TV hook-ups, and the like has seen robust expansion.

Hotels Hot

Hotels and lodging places have been adding a lot of capacity as of late, particularly in the Seattle-Bellevue-Everett area. This sector tends to experience a unique expansion absorption cycle in which the building of new lodging places expands capacity well beyond the current need, and then employment holds relatively steady as business catches up. In graphical terms, this is a stair-step job growth pattern.

Business is Good

If you thought that the 19.2 percent job gain posted by electronic and other electrical equipment couldn't be beat, you were wrong. Once again business services lead the pack in percentage growth. The 7,600 job gain recorded by business services in the first quarter of 1998 represented a 21.9 annualized percent increase, the highest of any industry sector. This sector has been pushed forward by burgeoning demand by computer software firms, temporary help firms, and others providing services to businesses.

Engineering and Management Services

With the shake-up at the Hanford Nuclear reservation a few years back, payrolls in engineering and management services fell by 6,300 jobs (based on quarterly tallies). In the subsequent quarters, employment has climbed back to within striking distance of the earlier peak. As of the first quarter of 1998, employment stood at 60,700. This was a gain of 5,100 jobs since the low-point in the first quarter of 1997. This is all the more impressive when you realize that the recoding of Hanford activity out of engineering and into toxic waste clean-up precipitated much of the downturn. In addition, first quarter employment growth broke into the double-digit range at an annualized 11.8 percent. The torrid pace of commercial construction, and the need for infrastructure improvements to accommodate the growing population has spurred demand for these services.

But beyond the sheer weather phenomenon of El Ninó or whatever, the dynamic strength in business services and engineering and management services in particular underscores the intensity of the present upcycle.

LABOR FORCE AND UNEMPLOYMENT

Washington's unemployment rate fell three-tenths of a percentage point between the fourth quarter of 1997 and the first quarter of 1998 to 4.2 percent—down over a full percentage point from the first quarter of 1997. This marked the third consecutive quarter in which the state jobless rate fell below the national average. Throughout the postwar era, the norm has been for Washington's unemployment rate to track above the national average. For instance, at no time between 1967 and 1989 did Washington's quarterly jobless rate fall below the national average. During this period the state's jobless rate surpassed the nation by an average of 1.8 percentage points. But in 1990 and 1991, the state quarterly unemployment rate fell below the national rate for eight consecutive quarters. And since 1990, the unemployment rate gap between the state and the nation has averaged a mere 0.2 percentage points.

As Washington's economy has become larger and more diverse, and as demographic trends point towards a lesser supply of new workers, the more local joblessness has come to emulate the national norm. This is known as economic convergence. Nevertheless, even in the future, it is unlikely that the state and national unemployment rates will consistently match

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throughout an entire business cycle; there are distinct characteristics of Washington's economy that are not likely to change.

OVER-THE-YEAR DEVELOPMENTS

Between the first quarter of 1997 and the first quarter of 1998, total nonfarm wage and salary employment in the state increased by 92,400 jobs, for a 3.7 percent gain.

Thanks to the continued hiring by the aircraft and parts industry, gains in manufacturing payrolls out-paced the state average with a growth rate of 4.6 percent, not a common occurrence. Needless to say, the aircraft sector carries a lot of weight in the manufacturing division. By discounting the aircraft sector entirely, the balance of manufacturing takes on a different light, growing at a slight 1.3 percent over the year; primarily because several industries posted significant job losses.

Wots of Wood

Lumber and wood products employment was down 1,000 between the winter quarters of 1997 and 1998. Believe it or not, an over supply of lumber has emerged in the last year. As a result Pacific Northwest wood product manufacturers are pulling back production and cutting prices in the face of a lumber glut on the market. A robust economy and low interest rates are keeping domestic demand up. But mills in the U.S. and Canada pumped out more than 61 billion board feet of softwood lumber in 1997—the highest since 1989. The economic crisis in Asia has exacerbated the problem by sharply curtailing exports. Lumber prices have fallen over the past four quarters from $464 to $398 per thousand board feet for framing-grade lumber.

Aluminum Soft

As of the first quarter of 1998, over-the-year changes in aluminum manufacturing jobs were in the minus column. Though the decline was a relatively modest 100 jobs, the current quarterly change portends further weakness.

Computers Crash

Computer and office equipment payrolls were weak over the year and are expected to weaken further. Between the first quarter of 1997 and the first quarter of 1998, computer and office equipment employment fell 2.9 percent. With computer prices on a downward path, profitability has sunk. Hewlett Packard in Vancouver is expected to reduce staffing by 1,000 workers by year-end. Closure of Intel assembly operations in Du Pont will result in the loss of some 650 jobs.

Paper Plastered

The pulp and paper industry lost some 1,200 jobs between the first quarter of 1996 and the first quarter of 1998. Continued over-supply of pulp and paper products on the national and international markets have had a deleterious impact on local industry employment. Symptomatic of this weakness was the closure of the Rayonier plant in Port Angeles last spring.

These were the weakest sectors in Washington's goods production inventory. But goods production did not have a monopoly on those sectors experiencing job losses, there was some instability in a select few service producing sectors as well.

Asian Crisis Hits Home

Water transportation services have been the most obvious local impact point to date of the Asian Crisis. Other industries are affected as well, particularly agriculture, but the sector dealing hands-on with imports and exports is more visible than others. Container traffic to and from west coast ports has shown marked shifts; as of April, year-to-date exports were down 16 percent while imports were up 19 percent. For Puget Sound ports, exports were down 22 percent while imports were up 23 percent. And of the top 50 export commodities, 36 show decreases over the year. Of the top 50 import commodities, 48 report increases over the year. As a result of all this,

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Figure 1
Nonagricultural Wage and Salary Workers
Washington State, Seasonally Adjusted, In Thousands, Benchmarked: March 1997
Source: *Employment Security, Revenue Forecast Council, & Office of Financial Management*

				Numeric Change	
	1st Qtr 1998	4th Qtr 1997	1st Qtr 1997	4th Qtr 1997 to 1st Qtr 1998	1st Qtr 1997 to 1st Qtr 1998
TOTAL NONAGRICULTURAL EMPLOYMENT	2,571.6	2,545.3	2,479.2	26.4	92.4
MANUFACTURING	379.2	376.3	362.6	2.9	16.5
Durable Goods	269.6	267.7	252.9	1.9	16.7
Lumber & Wood Products	34.6	35.3	35.6	-0.7	-1.0
Logging	7.3	7.6	7.8	-0.3	-0.4
Sawmills & Plywood	23.5	23.9	24.1	-0.4	-0.5
Furniture & Fixtures	4.1	4.0	3.9	0.2	0.2
Stone, Clay & Glass	9.5	9.8	9.4	-0.3	0.1
Primary Metals	11.6	11.8	11.5	-0.1	0.2
Aluminum	7.5	7.7	7.6	-0.1	-0.1
Fabricated Metals	15.0	14.6	14.1	0.5	1.0
Industrial Machinery & Equipment	27.3	27.0	26.3	0.3	1.1
Computer & Office Equipment	8.1	8.3	8.3	-0.2	-0.2
Electronic & Other Electrical Equipment	18.4	17.6	16.4	0.8	2.0
Transportation Equipment	126.1	124.8	112.8	1.3	13.3
Aircraft & Parts	111.6	110.2	98.5	1.4	13.0
Instruments & Related	14.3	14.5	14.4	-0.2	-0.1
Miscellaneous Manufacturing	8.6	8.4	8.6	0.1	0.0
Nondurable Goods	109.6	108.6	109.7	1.0	-0.2
Food & Kindred Products	42.4	41.3	41.9	1.1	0.5
Preserved Fruits & Vegetables	14.2	14.0	13.7	0.2	0.5
Textiles, Apparel & Leather	10.2	10.1	10.2	0.1	0.0
Paper & Allied Products	16.0	16.2	16.6	-0.2	-0.6
Printing & Publishing	24.2	24.2	24.3	0.0	-0.1
Chemicals & Allied Products	5.6	5.5	5.5	0.0	0.0
Petroleum, Coal, Plastics	11.2	11.2	11.2	-0.1	0.0
MINING & QUARRYING	3.3	3.4	3.5	-0.1	-0.2
CONSTRUCTION	140.4	137.5	135.3	2.8	5.1
General Building Contractors	39.5	38.7	39.2	0.8	0.2
Heavy Construction, ex. Buildings	19.1	18.7	18.9	0.4	0.1
Special Trade Contractors	81.8	80.1	77.1	1.7	4.8
TRANSPORTATION, COMMUNICATION & UTILITIES	138.7	134.4	131.8	4.3	6.9
Transportation	93.0	89.9	87.7	3.1	5.3
Trucking & Warehousing	30.1	30.9	31.1	-0.8	-1.0
Water Transportation	9.0	9.4	9.7	-0.4	-0.7
Transportation by Air	29.0	25.0	23.3	4.0	5.7
Communications	29.8	28.7	28.2	1.1	1.6
Electric, Gas & Sanitary Services	15.9	15.7	15.9	0.1	0.0
WHOLESALE & RETAIL TRADE	616.7	611.2	601.1	5.5	15.5
Wholesale Trade	152.5	152.6	147.2	-0.1	5.3
Retail Trade	464.2	458.6	454.0	5.6	10.3
General Merchandise	45.6	44.9	44.5	0.7	1.2
Food Stores	72.9	72.4	73.6	0.5	-0.7
Eating & Drinking	169.5	167.2	166.8	2.3	2.6
FINANCE, INSURANCE & REAL ESTATE	132.2	130.0	125.8	2.2	6.4
Finance	57.0	56.0	54.0	1.0	3.0
Insurance & Real Estate	75.2	74.0	71.8	1.2	3.4
SERVICES	702.5	691.6	666.1	10.8	36.4
Hotels & Lodging	29.6	28.9	28.2	0.7	1.4
Personal Services	22.4	22.2	22.3	0.2	0.1
Business Services	157.5	149.9	139.6	7.6	17.8
Health Services	179.5	180.4	176.8	-0.9	2.7
Educational Services	33.5	33.2	32.3	0.4	1.3
Social Services	59.6	58.7	56.3	0.9	3.3
Engineering & Management Services	60.7	59.1	55.6	1.7	5.1
GOVERNMENT	458.7	460.8	453.0	-2.1	5.7
Federal	67.0	68.0	67.8	-1.1	-0.9
State	132.7	132.7	130.3	0.0	2.5
State Education	71.1	71.0	68.7	0.0	2.4
Local	259.0	260.0	254.9	-1.0	4.1
Local Education	139.6	137.4	135.6	2.2	4.0
Workers in Labor Management Disputes	0.0	0.0	0.0	0.0	0.0

Excludes proprietors, self-employed, members of the armed forces, and private household employees. Includes all full- and part-time wage and salary workers receiving pay during the period that includes the 12th of the month.

Labor Market And Economic Indicators

Figure 2
Total Nonagricultural Employment Change
Washington State & Nation, Seasonally Adjusted
Source: *Employment Security Department*

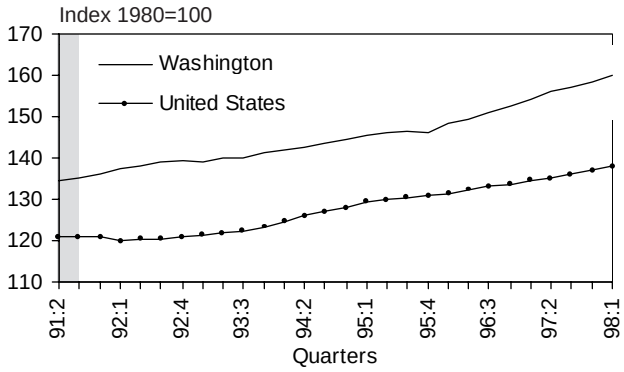


Figure 3
Manufacturing & Nonmanufacturing Employment Change
Washington State, Seasonally Adjusted
Source: *Employment Security Department*

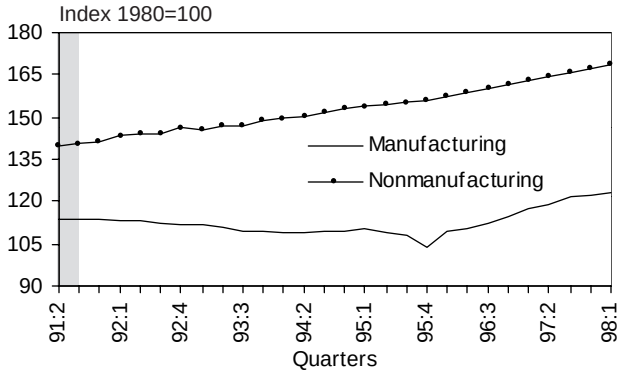


Figure 4
Unemployment Rates
Washington State & Nation, Seasonally Adjusted
Source: *Employment Security Dept., U.S. Dept. of Labor*

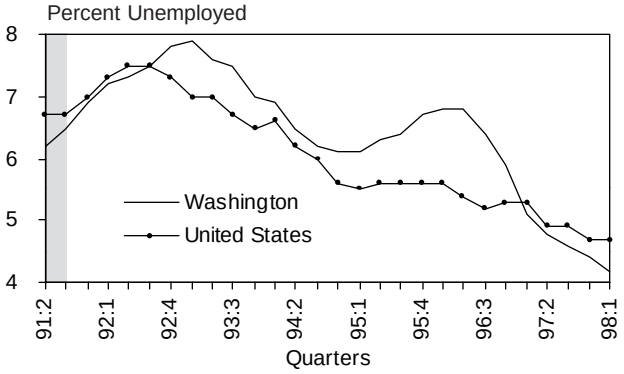


Figure 5
New Housing Units Authorized
Washington State, Seasonally Adjusted
Source: *U.S. Department of Commerce*

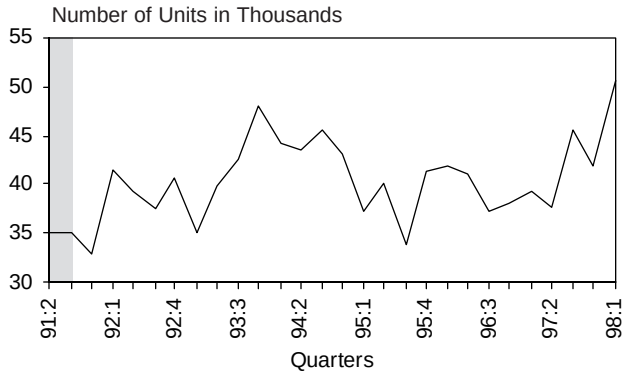


Figure 6
Consumer Price Index
All Urban Customers
Source: *Bureau of Labor Statistics*

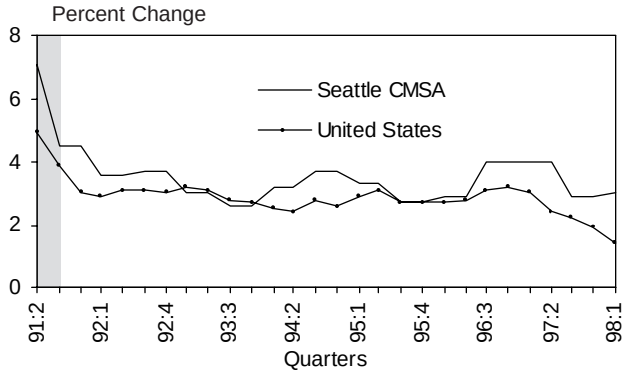
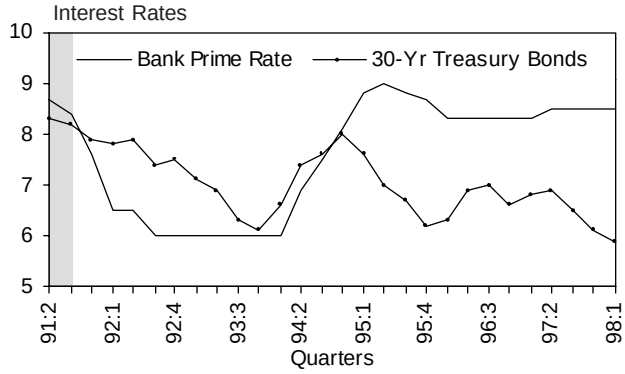


Figure 7
Selected Interest Rates
Percent Annual Rate
Source: *Federal Reserve Board*



NOTE: Shaded areas represent national economic recessions as designated by the National Bureau of Economic Research

employment has declined almost 700 over the year in water transportation services.

INDUSTRY NOTES

Washington Ranks Fourth in '97

Washington's commodity exports jumped 25 percent last year to $36 billion—the fourth highest in the nation next to California, Texas, and New York. The increase of $7 billion over the year was the greatest of any state in the top ten and shifted Washington above Michigan which ranked fourth in 1996. Shipments of aircraft, trucks, and recreational equipment increased $7.4 billion or 53 percent to $21.4 billion. Industrial and computer equipment went up 30 percent to $1.5 billion. And pluses were also recorded in electronics, aluminum, instruments, and fabricated metals—all of which offset losses in farm products, lumber and wood products, and paper, which have been driven down principally by the Asian crisis.

How About That… Straight **A**'s

The Corporation for Enterprise Development (CFED) recently issued its economic development report card for 1998 and beyond. The CFED graded states based on economic performance, business vitality, and development capacity. Guess who got straight A's… only Colorado and Washington! Apparently only one state in the nation received straight F's—West Virginia.

NATIONAL INDICATORS

First Quarter GDP Jumps Sharply

The nation's inflation-adjusted output of all goods and services produced in the domestic economy—or Gross Domestic Product—rose at a robust 4.2 percent seasonally adjusted annual rate in the first quarter—the strongest in a year. The previous quarter had come in at 3.7 percent. Most analysts were caught off guard by the strength of the performance going into the eighth year of expansion. Booming electronics and computer purchasing by both individuals and business contributed over a percentage point to the overall growth.

Even more spectacular was the growth in Personal Consumption Expenditures. In the first quarter of 1998, personal consumption expenditures advanced at a 6.1 percent annual rate. That was a giant step up from the 2.5 percent pace of the preceding three months.

Manufacturing Up; Construction Down

A key report on manufacturing performance nationally showed no signs of easing in March. The National Association of Purchasing Managers' monthly index of business activity rose one-and-a-half percentage points to 54.8 percent from 53.3 percent a month before. Analysts had expected the fallout from Asia to begin showing up in the first quarter manufacturing data. But it appeared to be only scattered. On the other hand, construction took a hit. The value of new construction contracts nationally slipped in March driven by declines in both residential and nonresidential building. It should be noted, however, that unseasonably warm weather in February pushed the readings up sharply and any adjustments in March were against a very high base.

Leading Indicators Point to Continued Expansion

The Conference Board's index of leading indicators advanced further in March signaling a likely strong economic expansion through year-end. The index moved up from 105.0 to 105.2 over the month with most of the increase centered in 2 of the 10 components: stock prices and money supply. Both of these reflect the current strength in the financial markets and are considered highly reliable measures of future economic growth. Gains were recorded also in orders to manufacturers of consumer goods and suppliers' delivery time. Declines came in big-ticket orders to manufacturers excluding defense work.

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Permanent or Temporary

One of the hot button issues in today's labor market is the use of temporary or contract workers. In the parlance of the Bureau of Labor Statistics, these are *contingent workers* and workers with *alternative work arrangements*. The issue is so new that available data are only available for two points in time; February 1995 and February 1997.

Though it only takes two points to make a line, the trend for the use of these workers is less than crystal clear. For instance, the use of contingent workers nationwide—workers who expect that their jobs will last a year or less—declined between February 1995 and February 1997, from 4.9 percent of total employment in 1995 to 4.4 percent in 1997. On the other hand, the use of workers with alternative work arrangements—independent contractors, temporary help, on call, or day laborers—remained at 9.9 percent for both points in time.

Regional use of contingent and alternative work arrangements differ considerably (data are not available for the states). Use of contingent workers in the Pacific region rose from 5.8 percent in 1995 to 6.1 percent in 1997. And the use of workers with alternative work arrangements rose from 12.8 percent in 1995 to 13 percent in 1997. Truth be told; neither of these may constitute a statistically significant trend.

More interesting is the fact that use of contingent and alternative work arrangements in the Pacific region are the highest in the nation. Assuming that such practices are cyclical, and recognizing that California was still at an economic low-point in1995, could help explain the difference. In addition, high tech firms tend to make extensive use of contingent and alternative work arrangements. Seeing as the Pacific region is home to a disproportionate share of high tech firms, could also go a long ways in explaining this region's greater use of contingent and alternative work arrangements.

On the down side, use of these methods for hiring non-permanent workers is relatively new, and as a result, employers oftentimes have been breaking new ground over the past several years. Needless to say, some workers and some labor unions have resisted these policies, viewing them as ways that employers can avoid paying benefits.

Consumers Pay More

But not much more. At the national level, inflation, as measured by the Consumer Price Index, has been effectively held in check. Consumer prices rose at an annualized 1.4 percent in the first quarter of 1998, the lowest quarterly gain in 12 years.

At the local level the story is a bit different. As of the first quarter of 1998, consumer prices were rising at double the national pace—an estimated annual rate of 3.0 percent. A booming Washington economy and strong population gains have brought with them the inevitable price pressures. These have been most noticeable not necessarily at the checkout counter but at the realtor's office. The cost of housing has been increasing well above the average for all expenditure categories.

There are new developments on the CPI front as well. The local index has been expanded geographically to include Kitsap and Thurston counties. In addition, it is now being released every other month instead of just twice a year. Unfortunately, this does cause a break in series, but the significant weight of King, Snohomish, and Pierce counties should help protect against any untoward disruption of price trends from the earlier series.

OUTLOOK

Growth this year is expected to slow from the exemplary pace in 1997. The latest projection from the Office of the Forecast Council calls for 3 percent employment growth on average for the state in 1998 compared to 4 percent last year with the bulk of the slowing in manufacturing and a repeat of very strong job gains in services and trade. The national economy is now in its 85th month of expansion with good growth and low

inflation. Fallout from the Asian crisis to date appears to be relatively contained centered primarily in lower exports of agriculture and lumber and wood products. And some settling out in electronics is being countered by a run-up of new firms in the same industry as the production base expands.

Dennis Fusco
Chief Economist

The Solow Productivity Paradox: *What do Computers do to Productivity*?

FEATURE ARTICLE

"You can see the computer age everywhere but in the productivity statistics."

Robert Solow (1987)

Solow's aphorism, now more than ten years old, is often quoted. Is there a paradox? And if so, what can be said about it? This paper reviews and assesses the most common "explanations" for the paradox. It contains separate sections evaluating each of the following positions.

(1) *You **don't** see computers "everywhere," in a meaningful economic sense.* Computers and information processing equipment are a relatively small share of GDP and of the capital stock.

(2) *You only **think** you see computers everywhere*. Government hedonic price indexes for computers fall "too fast," according to this position, and therefore measured real computer output growth is also "too fast."

(3) *You may not see computers everywhere, but in the industrial sectors where you most see them, output is poorly measured*. Examples are finance and insurance, which are heavy users of information technology and where even the concept of output is poorly specified.

(4) *Whether or not you see computers everywhere, some of what they do is not counted in economic statistics*. Examples are consumption on the job, convenience, better user-interface, and so forth.

(5) *You don't see computers in the productivity statistics **yet**, but wait a bit and you will*. This is the analogy with the diffusion of

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electricity, the idea that the productivity implications of a new technology are only visible with a long lag.

(6) *You see computers everywhere but in the productivity statistics because computers are not as productive as you think.* Here, there are many anecdotes, such as failed computer system design projects, but there are also assertions from computer science that computer and software design has taken a wrong turn.

(7) *There is no paradox: Some economists are counting innovations and new products on an arithmetic scale when they should count on a logarithmic scale.*

Background

On its face, the computer productivity paradox concerns the question: Why isn't U.S. output growing faster as we invest more in computers? But Solow's aphorism gains its resonance from a different, though related, question: Will the growing investment in computers and information technology reverse the post-1973 productivity slowdown? From 1948 to 1973, multi-factor productivity increased 1.9 percent per year in the U.S., and labor productivity grew at the rate of 2.9 percent; after 1973, these productivity growth rates were 0.2 percent and 1.1 percent.

Another part of the context is the mechanism for diffusion of technical change in the economy. In a view held by many economists, productivity improvements are carried into the workplace through investment in new machinery. On this view, any technical change we are now experiencing must be embodied in the economy's investment in information technology, because that is the kind of machinery investment that is growing. Investment in information processing equipment accounted for about 34 percent of producer durable equipment in 1997, which is more than the share of industrial machinery (22 percent).

The computer-productivity paradox also resonates because we have become, it is often said (but not often quantified), an information economy. If it is true that the use of information as a productive input is growing, or that information has become a more productive input than it was in the past, then this heightened role for information heightens as well the importance of information technology in a modern economy.

The following numbered sections review seven positions on the computer productivity paradox.

I. You *don't* see computers "everywhere," in a meaningful economic sense.

In this view, what matters is the share of computers in the capital stock and in the input of capital services. These shares are small. An input with a very small share cannot make a large contribution to economic growth, and so we should not expect to see a major impact on growth from investment in computers.

As *Figure 8* shows, computer equipment made a relatively small contribution to economic growth, even during the period of the 1980s when computer technology became so widely diffused throughout the economy. In the growth accounting framework, even very rapid rates of input growth make only relatively small contributions to growth when the share of this equipment is small. As *Figure 9* on the next page shows, computer equipment still accounts for only around 2 percent or less of the physical capital stock, and under 2 percent of capital services.

Figure 8
Contributions of Computers, Information Equipment, and Software to Economic Growth
1970-1996 Select Years
Source: *Oliner & Sichel, Jorgenson & Stiroh*

	1970-1979	1980-1992	1979-1985	1985-1990	1990-1996
Output growth rate (annual average)	3.42%	2.27%	2.35%	3.09%	2.36%
Contributions of computing equipment	0.09%	0.21%	0.15%	0.14%	0.12%
Information processing equipment	0.25%	0.35%	na	na	na
Computing hardware, software, and labor	na	0.40%	na	na	na

Figure 9
Computer, Information Equipment, and Software Shares
1993
Source: *Oliner & Sichel, Jorgenson & Stiroh*

	Oliner and Sichel		Jorgenson and Stiroh	
	Capital Stock	Income	Capital Stock	Capital Services
Computing equipment	2.0%	0.9%	0.5%	1.8%
Information processing equipment	11.7%	3.5%	na	na
Computing hardware, software, and labor	na	2.7%	na	na

In the growth accounting framework, computer growth is simply the response of input demand to the great fall in the price of computers. The enormous price decline in computing power has led to its substitution, in a standard production analysis framework, against all other inputs, including other kinds of investment. On this view, the economic impact of the computer is not a productivity story at all.

In summary, computers make a small contribution to growth because they account for only a small share of capital input. Does the same small share suggest that they likewise cannot have an impact on productivity? Perhaps. But the paradox remains a popular topic for other reasons, which are discussed in the following sections.

II. You only *think* you see computers everywhere.

The contention that computer price indexes fall too fast (and therefore computer deflated output rises too rapidly) has several lines of logic. A major line of reasoning points to what is actually done with the personal computers that sit on so many of our desks. Many users have noted something like the following: "I used perhaps a quarter of the capacity of my old computer. Now I have a new one for which I use perhaps a tenth of its capacity. Where is the gain?" In other words, ever faster and more powerful personal computers, with ever larger memory sizes, wind up being used to type letters, and the letters are not typed appreciably faster. Is that not evidence that the computer price indexes are falling too fast?

I do not think it is evidence. Typing a letter uses computer hardware, computer software, and the input from the person (increasingly, not a secretary) who types it. The technical bottleneck is often the human input. But this hardly justifies revising upward the price index for the computer: The computer is purchased, the capacity is paid for, and any assertion that the purchaser could have made do just as well with an earlier vintage is, even if proven, not relevant. And indeed, it is also not proven: Increased computer capacity has been employed in an effort to make computing more efficient and user-friendly, not just faster.

Another issue is that price indexes for software typically do not exist, and it is speculated that software prices decline less rapidly than computer prices. Actually, price indexes for word processing packages, spreadsheets, and database software have been estimated. This research confirms the speculation: Software prices have been declining steadily, but not at computer-like rates.

The contention then is that because software is often bundled with computers the slower price decline of software must mean that computer price indexes are biased downward. "The overall quality of a computer package (hardware and all the associated software) has not been rising as rapidly as that of the hardware input characteristics on which the hedonic estimates of quality improvement are based. As a result, the quality adjustments being used in the estimation of the price deflators for computer investment are being overstated which leads to the price falls in computer investment also being overstated" (McCarthy, 1997, paragraph 18).

But considering the actual calculations, omission of software biases the computer price indexes *upward*, which is the opposite direction from McCarthy's contention. Computer price indexes are actually calculated by quality adjusting observed computer prices for the value of changes in hardware characteristics.

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Whether software prices are declining faster than hardware prices, or whether the quantity of software (bundled with the hardware) grows less rapidly than the rate of improvement in hardware characteristics like speed and memory, are neither one the issue. The price index for the computer-software bundle does not decline fast enough because no adjustment is made for the value of the increased quantity of software included in the bundle. Its quantity is implicitly treated as zero.

In conclusion, neither evidence nor reasoning indicates a serious downward bias to the computer price indexes.

III. You may not see computers "everywhere," but in the industrial sectors where you most see them, output is poorly measured.

More than 70 percent of private sector U.S. computer investment has been concentrated in wholesale and retail trade, finance, insurance, and real estate, and services. These are exactly the sectors of the economy where output is least well measured, and where in some cases even the concept of output is not well defined.

Why has this [computer investment] not translated itself into visible productivity gains? The major answer to this puzzle is very simple: This investment has gone into our 'unmeasurable sectors,' and thus its productivity effects, which are likely to be quite real, are largely invisible in the data (Griliches 1994, page 11).

That there are serious measurement problems in all of these areas is well established. Of course, services include many—such as household utilities, bus transportation, barber and beauty shops and so forth—that have probably not benefited appreciably from output-enhancing productivity improvements caused by computers. Nevertheless, a relatively small amount of mismeasurement in some of the larger services categories would impact the productivity statistics substantially.

Banking, for example, is measured badly: The output measure in national accounts makes questionable economic sense. A considerable amount of research has accumulated on measuring banking output in alternative ways. These alternative measures of banking output make more sense to me than either of the measures that are used in U.S. government statistics. But they do not seem to imply a higher rate of growth of banking output and productivity.

Some economists have approached the measurement problem in services by examining circumstantial evidence of anomalous behavior of the statistics in some of these badly measured areas—wholesale and retail trade, finance, insurance, and real estate, and services.

One study found that noncomputer input growth decreased as the use of computer capital services increased in these computer intensive sectors. Cheaper computers substituted for other inputs, including labor. But measured output growth rates increased less rapidly as well. An inverse correlation between computer investment and multifactor productivity growth does seem anomalous. Either computers are not productive, or output growth is undercounted. This anomaly is consistent with the "badly measured services" hypothesis. However, it also emerges in computer-intensive manufacturing industries, such as stone, clay, and glass, where output measurement problems are, if not absent, not well publicized.

The Boskin Commission estimated that the CPI (which provides deflators for many components of PCE) was overstated in recent years by 1.1 percent, of which approximately 0.4 percentage points was mismeasurement of prices for consumer services. Most of that would translate into error in deflated output of services in the productivity measures. For measurement error to explain the slowdown in economic growth, productivity, or real consumption, requires either that measurement error increased after 1973, or that the shares of the badly measured sectors increased. There is little evidence for the former, and although services have increased, their shares have not grown by as much as productivity declined. Moreover, increasing measurement error, if it did increase over time, must have occurred gradually; the productivity slowdown, on the other hand, was abrupt.

I doubt that *increasing* mismeasurement of services consumption can explain the post-1973 slowdown of real per capita consumption, and therefore of productivity. Mismeasurement might, however, account for loss of some of the computer's contribution to growth in the past two decades or so.

Overall, mismeasurement of services probably has the right sign to resolve the paradox. But not enough strength to resolve the paradox.

IV. Whether or not you see computers everywhere, some of what they do is not counted in economic statistics.

"Windows fills the screen with lots of fun little boxes and pictures. DOS is for people who never put bumper stickers on their cars." (*Windows for Dummies*, page 12)

The Windows for Dummies manual also points out that pictures require much more computing power, so using Windows 95 requires a relatively powerful computer. An enormous amount of recent computer and software development has been directed toward making computers easier to use.

Where do we count the value of increased convenience and better user interface in economic statistics? If they are productive, if pictures and icons result in more work being done, then the improvement will show up in the productivity figures, or at least in the labor productivity data.

On the other hand, if the pictures are just more "fun," then I suppose that new software incorporating screen graphics, "point and click" controls, and so forth has created more consumption on the job, compared with earlier software. Consumption on the job is not counted anywhere in economic statistics. If more advanced computer software contributes partly to output and partly to making the workers more content when they are working, some of that gain will be lost in economic statistics.

Even conceding that a little fun has value, I suspect the technologists have oversold these "fun little boxes and pictures." Whether the newest developments in software and computers have in fact made computers that much more user-friendly is an unresolved issue. Whether the benefits are worth all the changeover cost is another unsettled issue.

The computer facilitates the reorganization of economic activity, and the gains from reorganization also may not show up in economic statistics. Suppose a not so hypothetical toy company that once manufactured toys in the United States. Today, the company's head office (in the U.S.) determines what toys are likely to sell in the United States, designs the toys, and plans the marketing campaign and the distribution of the toys. But it contracts all toy manufacturing to companies in Asia. When the toys are completed, they are shipped directly from the Asian manufacturer to large U.S. toy retailers. The billing and financial transactions are handled in some offshore financial center, perhaps in the Bahamas. From the standpoint of the stockholders and company management, the computer has permitted vast increases in the profitability of this company. But where do these gains show up in *U.S.* productivity statistics?

In this case, the computer may have increased the productivity of Asian toy manufacturers, of Liberian shipping companies, and of Caribbean banking and payments establishments, by giving them better access to American markets and American distribution. The only activity left in the United States is the toy company's head office. What is the measure of "output" of a head office?

V. You don't see computers in the productivity statistics *yet*, but wait a bit and you will.

This position is based on an analogy between the diffusion of electricity and computers. Because of their network parallels, it is predicted that computer diffusion and the effects of computers on productivity will follow the same protracted course as electricity:

"Factory electrification did not...have an impact on productivity growth in manufacturing before the early 1920s. At that time only slightly more than half of factory mechanical drive capacity had been electrified.... This was four decades after the first central power station opened for business" (David, 1990, page 357).

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This idea has received very widespread diffusion in the popular press.

Whether or not the computer's productive potential has yet to be realized fully, I doubt that electricity provides an instructive analogy. Mokyr (1997) warns us that: "Historical analogies often mislead as much as they instruct and in technological progress, where change is unpredictable, cumulative, and irreversible, the analogies [are] more dangerous than anywhere." The networking properties of computers and electricity may or may not be analogous, but the computer differs fundamentally from electricity in its price behavior, and therefore in its diffusion pattern.

More than four decades have passed since the introduction of the commercial computer. The price of computing power is now less than *one-half of one-tenth* of 1 percent (0.0005) of what it was at its introduction *(see Figure 10)*. No remotely comparable price decreases accompanied the dawning of the electrical age.

In the diffusion of any innovation, one can distinguish two sources of demand for it. The innovation may supplant an earlier technology for achieving existing outcomes—new ways of doing what had been done before. An innovation may also facilitate doing new things.

The introduction of electricity did not initially affect what had been done before by water power or steam power. The manufacturing plant that had been located by the stream and that transformed waterpower to mechanical energy directly did not convert to electricity because waterpower remained cheaper. Electricity, however, made it possible to locate manufacturing plants away from the streamside. That is, the diffusion process for electricity was initially the diffusion to *new ways* of doing things. Only after a long lag did electricity generation affect the things that had been done before with water or steam power.

Figure 10
Computer Equipment Price Indexes
Selected Years
Source: *Bureau of Labor Statistics*

	Mainframes	PCs	Computer Equipment
1958	142,773.6	---	---
1972	3,750.4	---	---
1982	382.5	578.7	404.9
1987	144.9	217.6	170.4
1992	100.0	100.0	100.0
1996	49.1	37.9	45.5
1997	42.1	25.2	34.6

In the computer diffusion process, the *initial* applications supplanted older technologies for computing. Water and steam power long survived the introduction of electricity; but old, pre-computer age devices for doing calculations disappeared long ago. Do our research assistants still use Marchant calculators? (Or even know what they are?) The vast and continuous decline in computing prices has long since been factored into the decision to replace the computational analogy to the old mill by the stream—electric calculators, punched-card sorters, and the like—with modern computers.

In electricity, extensions to new applications preceded the displacement of old methods because the price of electricity did not make the old methods immediately obsolete. In the computer diffusion process, the displacement of old methods came first, because old calculating machines were rapidly made obsolete by the rapidly falling price of computing power.

The price histories of electric power and computing power during their respective first four decades differ by at least a thousandfold. What is known about the differences in the diffusion processes for electric power and computing power is consistent with that thousandfold price difference. Indeed, it is inconceivable that it would be otherwise. Accordingly, I do not believe that the diffusion story for electric power matches very well the diffusion history—and prospects—of computing power.

VI. You see computers everywhere but in the productivity statistics because they're not as productive as you think.

Dilbert (cartoon of 5/5/97) claimed that the "total time that humans have waited for Web pages to load...cancels out all the productivity gains of the information age." Dilbert is certainly not the only curmudgeon who has questioned whether the spread of information technology has

brought with it benefits that are consistent with either the amount of computer investment or the vast increase in computer speed.

The history of the computer is the constant replacement of one technology with a newer one. The down side of rapid technological advance is the breathtaking rate of obsolescence that has caused the scrapping of earlier waves of investment well before the machines are worn out.

It is not only the hardware. Stories of very expensive "computer systems redesign" projects are legion. Examples are a $3+ billion Internal Revenue Service failure several years ago, and a Medicare record system project that was criticized more recently. The *Wall Street Journal* (April 30, 1998, page 1) reported that "42 percent of corporate information-technology projects were abandoned before completion" and "roughly 50 percent of all technology projects fail to meet chief executives' expectations."

At the personal computing level, there is the constant churning of standardized personal computer operating systems, spreadsheet and word processing packages, and so forth. Is all of this upgrading productive or is it wasteful? Informed opinion is divided. One may do the same word processing tasks with new technology and with old. What is the value of the marginal improvements in convenience and speed? They may not, as some users assert, be worth all that much—but their cost is also not high, in the newest technology. Graphics and icons, for example, take a lot of computer capacity; but because machine capacity is cheap in the newest technology, the incremental cost of providing graphics and icons is low, so they are provided in the newest software. From the technologists' view, they *can* at small cost give users a little animated icon to show when a page is printed, instead of a mundane "job printed" signal, so why not do it? And they can also give software users a tremendous range of menu choices at small cost, so why not do it?

The curmudgeon points to the end result of adding all these features: A far faster computer, with far greater memory capacity, that executes many of its jobs more slowly than the older, slower machine. A 386 machine, with an earlier operating system and earlier version of a word processing package, may be faster for some operations than a Pentium with the latest operating system and word processing upgrade. To get the gains offered by the newest word processing upgrade requires a considerable cost in upgraded operating system and upgraded machine, plus giving up something that the old system provided, which is the opposite way of looking at it, compared with the technologist view of the software designers.

Menu choices, too, have costs. My newest e-mail upgrade has far more choices than the old, but some of the things I did before now require more keystrokes, and the system is much slower in executing the commands that the earlier version performed with alacrity. That is just a computer application of the general economic principle that, while increased opportunities for choice are desirable, making choices is costly.

Then too, the user is conscious, if the software designer is not, that changeover itself is costly. It is not just the acquisition cost of a new package, nor the cost of mounting and debugging it, it is also the substantial cost to the users in unlearning old commands and learning new ones. The time cost of users is undoubtedly a far greater component of the cost of upgrading systems than any of the direct costs associated with the changes. Typically, only the direct costs are recorded in organizations' ledgers, but the "down time" associated with change takes its substantial toll on productivity.

If past decisions on computers have an element of inefficiency, what of the future? One way of looking at it is to say that when we finally learn to use our computers, the future promises to fulfill the hopes so often disappointed in the past. Computers *are* productive, it is only that we humans have not used them productively, and they *will* improve productivity in the future, even if they haven't in the past. That says that the true, potential return to computers is much greater than the return that has been measured so far. If the true or potential return is much greater, then the economy ought to invest far more in computers than it has.

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But if past decisions on computers have been incorrect or inappropriate, that may also suggest that we have already invested too much in computers. Computers are less productive than they were thought to be when decisions were made to "computerize." That bodes less well for the future. As with most of the debate on this topic, research knowledge at present does not go much beyond the insights of Dilbert.

VII. There is no Paradox: Some economists are counting innovations and new products on an arithmetic scale when they should use a logarithmic scale.

For many economists, and especially business economists, the preceding discussion will not be satisfactory. They believe there is a paradox because they believe they see more technical changes, more new products, more changes in consumer service, in methods of delivery, and in other innovative areas than is consistent with government productivity numbers. We are a "new economy," in this view, inundated with an unprecedented flow of innovations and new products, and none of this flow of the new is reflected in the productivity numbers.

In the new economy view, the productivity paradox is not really a computer paradox. Rather, people are stacking up and cumulating anecdotes, whether from within their own companies or from what they read in the newspapers or hear other people saying. Those cumulated anecdotes do not seem consistent with the modest rise in the aggregate productivity numbers. From this point of view, it is not so much a belief that the computer has increased productivity, but rather a belief that productivity has improved, based on other evidence. Indeed, the sentence in Solow (1987) immediately preceding the widely-quoted aphorism makes the same point: "[The authors] are somewhat embarrassed by the fact that *what everyone feels to have been* a technological revolution, a drastic change in our productive lives, has been accompanied everywhere...by a slowing-down of productivity growth, not by a step up" (emphasis supplied).

Thus, the computer was a signal or perhaps a symbol for all this innovation-new product productivity that people thought was happening. The computer provided a rationale that explained why this perception that the rate of technical change was accelerating in the economy was correct, and why the productivity statistics were wrong.

Those anecdotes about new products, new services, new methods of distribution, and new technologies are no doubt valid observations. Yet, these anecdotes wholly lack *historical perspective*, and for that reason are misleading as evidence on productivity.

To have an impact on productivity, the *rate* of new product and new technology introductions must be greater than in the past. A simple numerical example makes the point. Suppose all productivity improvements come from the development of new products. Suppose, further, that in some initial period 100 products existed and that ten percent of the products were new. In the following period, there must be 11 new products just to keep the rate of productivity growth constant, and in the period after that 12 new products are required. At the end of 10 years, a constant productivity rate requires 26 new products per year, and after 20 years, 62 new products and so on, as the arithmetic of compound increases shows. As the economy grows, an ever-larger number of new products is required just to keep the productivity growth rate constant.

Most of the anecdotes that have been advanced as evidence for the "new economy" amount to assertions that there are a greater *number* of "new" things, which is not necessarily a greater rate. As an example, many economists have cited the number of products carried in a modern grocery store as evidence of increased consumer choice, of marketing innovations, and so forth. In 1994 there were more than twice as many products in the average grocery store than in 1972 (19,000, compared with 9,000). But the 1948-72 rate of increase (from 2,200 in 1948 to 9,000) was over four times as great as the 1972-94 increase (the intervals 1948-72 and 1972-94 are roughly equal). Thus it is true that in 1994 there were many more products in grocery stores

than there were two decades before; but the rate of increase had fallen.

The same proposition holds for quality change. It is amazing to see quality improvements to automobiles in the 1990s, great as they have been, held up as part of this unprecedented improvement story. Quality change in autos is a very old problem in economic statistics, it did not emerge in the 1990s as a characteristic of the new economy. Hedonic price index methodology was developed in the 1930s to deal with quality change in automobiles. The study by Raff and Trajtenberg (1997) suggests that the rate of quality improvement in automobiles was greater in the first decade of the twentieth century than in its last decade.

We look at the new products and new technical changes at the end of the 20th century, and they tremendously impress us. We should be. It is clear those new products are increasing welfare, and the technical innovations are contributing to output. But are they increasing at an increasing rate? Is the number of new products increasing more rapidly on a logarithmic scale? That is not clear at all. For the "new things" to improve productivity, they must be increasing at an increasing rate. I think it safe to assert that the empirical work in economic history that would confirm the increasing rate hypothesis has not been carried out.

■ *Jack E. Triplett*
Brookings Institution

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Births, Deaths, Expansions, and Contractions: *Washington and the U.S., 1994-1995*

INDUSTRY DEVELOPMENTS

The title of this piece could easily apply to a discussion of population, demographics, vital statistics, or even a Woody Allen movie. Instead, this covers the latest dynamics in the formation, expansion, and ultimately the dissolution of business establishments; or in the current parlance—the *births, deaths, expansion, and contraction* of firms and the employment therein.

Between calendar years 1994 and 1995, total private employment in Washington State increased by over 54,800 on an annualized basis. This, however, is a *net* figure. In order to reach that 54,800 net increase in jobs, some 318,100 jobs were added through business births and expansions and over 263,300 jobs were lost due to business deaths and contractions.

Figures for the nation are quite similar. Total private employment rose almost 3.6 million between 1994 and 1995. This employment gain was a result of almost 16.4 million in additions due to births and expansions, and 12.8 million in losses because of deaths and contractions.

This analysis is based on tabulations by the U.S. Census Bureau. The data are a bit different than those gathered by the Employment Security Department. Census data are based on Social Security tax tallies while Employment Security data are based on Unemployment Insurance tax counts.

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Setting

"Half of all businesses in operation today did not exist 10 years ago." And, "The majority of new businesses don't make it beyond their 5th year." How many times have you heard those economic conventions? While they may seem shocking, simple extrapolation of the previous data can easily lead to those conclusions. While 1994-1995 may not be representative of the entirety of the last decade, the marked amount of business and industrial restructuring that occurred during this period lends further credibility to these conventions.

It has long been known, at least by the number crunchers, that the net job-growth analysis done each year has been of only modest value in describing the dynamic elements in the labor markets. As a result, efforts have been made by many states, and now the Census Bureau, to deconstruct these figures.

Deconstruction is the process of determining the specific elements that result in the net change figure. These dynamic elements are the number of establishments that added jobs, those that eliminated jobs, jobs related to brand new establishments, and jobs lost from establishments that closed entirely.

This analysis is an elaboration on that of an earlier article dealing with Labor Market Churning (May 1996). In that article, aggregate covered employment data were examined to determine how many establishments increased or decreased their employment at some time during the year. The overall rate at which this activity occurred at the labor market level was called the rate of churning. Establishment births and deaths is more detailed compared to the rather gross churning analysis.

This kind of labor market analysis has distinct parallels with demographics. The birth or death of a firm has similarities with that of an individual. The expansion or contraction of a firm has similarities with migration. In demographics, births less deaths are called the natural increase, and the combination of in-migration and out-migration is called net migration. Natural change is an appropriate term to describe the birth and death of establishments. Net migration is not a straightforward translation, however. In this application, the term net hiring may be a better fit.

Births vs. Deaths

In a growing economy, as with the demographic trends of a growing population, the number of establishment births out-paces the number of deaths *(see Figure 11)*. And, in general, the rate of natural change in establishments out-paces the rate of natural change in employment. These generalizations may not hold in each industry division, but overall they work pretty well.

The overall establishment birth-death rate tends to confirm that Washington is more economically volatile than the nation as a whole. Even though the rate of natural change in establishments was lower in Washington during 1994-95, the rates of births and deaths both surpassed the national averages *(see Figure 12)*.

BIRTHS AND DEATHS BY INDUSTRY

The pattern and rates of establishment births and deaths at the major industry division tend to be quite similar when comparing Washington and the nation. What differences there are can be tied to cyclical positioning *(see Figures 13 and 14)*.

Mining

Mining, for instance, though miniscule, exhibited a more variable character in Washington during the reference period. At the national level, the number of mining establishments declined by 2.3 percent while employment rose 3.5 percent. In Washington, the count of mining firms dropped by 3.5 percent and employment declined by 0.1 percent. This is likely related to weakness in the precious metals markets that drives a significant share of local mining activity.

Figure 11
Establishment Births, Deaths, Expansions, and Contractions
By Industrial Division, United States, 1994-1995
Source: *Bureau of the Census*

	1994	Net Change (1994-1995)	Births	Deaths	Expansions	Contractions
				With Corresponding Employment Change		
All Industries						
Establishments	5,770,090	108,310	695,657	-587,337	1,769,311	1,472,703
Employment	96,697,346	3,591,567	5,763,600	-4,530,705	10,593,050	-8,234,378
Agr., Forestry, Fishing						
Establishments	80,735	4,212	12,466	-8,254	27,212	19,882
Employment	585,601	42,180	42,747	-32,354	99,538	-67,751
Mining						
Establishments	25,782	-603	2,427	-3,030	7,158	7,127
Employment	607,689	20,701	65,566	-43,995	70,160	-71,030
Construction						
Establishments	513,987	19,961	86,618	-66,657	171,089	134,830
Employment	4,707,263	320,001	354,038	-299,142	904,162	-639,057
Manufacturing						
Establishments	356,868	2,490	32,318	-29,828	145,716	102,406
Employment	18,094,984	498,515	540,599	-525,596	1,657,782	-1,174,270
Transp., Comm., Public Utilities						
Establishments	245,330	7,483	34,982	-27,499	77,947	61,568
Employment	5,713,138	201,015	298,149	-245,983	629,862	-481,013
Wholesale Trade						
Establishments	469,123	5,906	47,078	-41,172	155,341	111,335
Employment	6,366,180	276,163	312,009	-288,677	763,918	-511,087
Retail Trade						
Establishments	1,407,666	6,548	158,066	-151,518	439,018	413,771
Employment	20,314,005	734,056	1,670,953	-1,185,456	2,011,028	-1,762,469
Finance, Insurance, Realty						
Establishments	558,779	10,213	66,244	-56,031	127,773	128,672
Employment	6,989,431	-15,982	447,791	-379,175	646,802	-731,400
Services						
Establishments	2,092,321	45,298	238,873	-193,575	615,673	491,261
Employment	33,248,422	1,486,219	1,974,527	-1,497,181	3,800,925	-2,792,052
Nonclassified						
Establishments	19,499	6,812	16,585	-9,773	2,384	1,851
Employment	60,633	28,699	57,221	-33,146	8,873	-4,249

Construction

Washington's construction activity was markedly weaker than the national norm as well during this period. The rate of natural increase in establishments was less than half the national average and the rate of natural increase in employment was zero. Nationwide, the respective rates were 3.9 percent and 1.2 percent. What is significant about construction, though, is its ratios of establishment births and deaths were the highest of all the industrial divisions. This is characteristic of an industry comprised principally of smaller firms.

Manufacturing

The natural change in manufacturing establishments in Washington was above the national average in the 1994-1995 period. But the natural change in employment wasn't an increase at all; it was a decline of 0.2 percent. The aerospace sector in Washington was still shedding workers at this point; otherwise, the results would likely have been positive.

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Figure 12
Establishment Births, Deaths, Expansions, and Contractions
By Industrial Division, Washington State, 1994-1995
Source: *Bureau of the Census*

	1994	Net Change (1994-1995)	Births	Deaths	Expansions	Contractions
			With Corresponding Employment Change			
All Industries						
Establishments	129,966	2,226	17,296	-15,070	39,033	35,166
Employment	1,893,228	54,836	111,831	-93,141	206,326	-170,180
Agr., Forestry, Fishing						
Establishments	2,535	144	451	-307	814	636
Employment	23,047	-989	1,503	-1,477	3,323	-4,338
Mining						
Establishments	173	-6	14	-20	71	49
Employment	3,240	6	81	-84	418	-409
Construction						
Establishments	15,446	230	2,954	-2,724	4,513	4,393
Employment	121,667	2,944	9,366	-9,350	23,122	-20,194
Manufacturing						
Establishments	7,898	81	864	-783	3,111	2,252
Employment	322,041	13,619	7,092	-7,742	32,937	-18,668
Transp., Comm., Public Utilities						
Establishments	5,398	196	769	-573	1,823	1,344
Employment	122,030	5,691	7,367	-4,749	12,169	-9,096
Wholesale Trade						
Establishments	10,310	89	1,073	-984	3,470	2,537
Employment	131,158	3,865	5,748	-7,029	15,971	-10,825
Retail Trade						
Establishments	29,470	48	3,548	-3,500	8,957	9,475
Employment	425,034	6,728	35,143	-28,397	38,684	-38,702
Finance, Insurance, Realty						
Establishments	12,650	251	1,689	-1,438	2,640	3,045
Employment	129,846	-6,918	9,021	-8,767	9,025	-16,197
Services						
Establishments	45,623	1,015	5,514	-4,499	13,599	11,383
Employment	613,902	29,370	35,252	-24,869	70,618	-51,631
Nonclassified						
Establishments	463	178	420	-242	35	52
Employment	1,253	520	1,258	-677	59	-120

TCU

The transportation, communication, and public utilities division was a bit of a standout for Washington during this period. The rates of natural change in establishments and employment were greater than the national average. While the rates of natural change in establishments were not dramatically different, the differences in rates of natural change in employment were. At the national level, a 3.1 percent gain in establishments resulted in a 0.9 percent increase in jobs. In Washington, a 3.6 percent increase in establishments yielded a 2.1 percent gain in jobs.

Wholesale Trade

Wholesale trade was another division with an interesting contrast between local and national patterns. The birth rate of new firms in Washington surpassed the national average, as did the death rate. But the results were uninspired, the natural change in establishments fell short of the national norm, and the natural change in employment was actually negative.

Figure 13
Rate of Establishment Births, Deaths, Expansions, and Contractions
By Industrial Division, United States, 1994-1995
Source: *Bureau of the Census*

	Net Change	Percent Change Relative To			
		Births	Deaths	Expansions	Contractions
All Industries					
Establishments	1.9%	12.1%	-10.2%	30.7%	25.5%
Employment	3.7%	6.0%	-4.7%	11.0%	-8.5%
Agr., Forestry, Fishing					
Establishments	5.2%	15.4%	-10.2%	33.7%	24.6%
Employment	7.2%	7.3%	-5.5%	17.0%	-11.6%
Mining					
Establishments	-2.3%	9.4%	-11.8%	27.8%	27.6%
Employment	3.4%	10.8%	-7.2%	11.5%	-11.7%
Construction					
Establishments	3.9%	16.9%	-13.0%	33.3%	26.2%
Employment	6.8%	7.5%	-6.4%	19.2%	-13.6%
Manufacturing					
Establishments	0.7%	9.1%	-8.4%	40.8%	28.7%
Employment	2.8%	3.0%	-2.9%	9.2%	-6.5%
Transp., Comm., Public Utilities					
Establishments	3.1%	14.3%	-11.2%	31.8%	25.1%
Employment	3.5%	5.2%	-4.3%	11.0%	-8.4%
Wholesale Trade					
Establishments	1.3%	10.0%	-8.8%	33.1%	23.7%
Employment	4.3%	4.9%	-4.5%	12.0%	-8.0%
Retail Trade					
Establishments	0.5%	11.2%	-10.8%	31.2%	29.4%
Employment	3.6%	8.2%	-5.8%	9.9%	-8.7%
Finance, Insurance, Realty					
Establishments	1.8%	11.9%	-10.0%	22.9%	23.0%
Employment	-0.2%	6.4%	-5.4%	9.3%	-10.5%
Services					
Establishments	2.2%	11.4%	-9.3%	29.4%	23.5%
Employment	4.5%	5.9%	-4.5%	11.4%	-8.4%
Nonclassified					
Establishments	34.9%	85.1%	-50.1%	12.2%	9.5%
Employment	47.3%	94.4%	-54.7%	14.6%	-7.0%

Retail Trade

Activity in the retail trade sector was more in tandem with national patterns of births and deaths. Both the birth and death rates for retail establishments in Washington were greater than the U.S. average. Employment changes related to births and deaths were also higher. But unlike the wholesale sector, the natural change for retail employment was positive.

FIRE Falls Behind

The pattern of births and deaths in the finance, insurance, and real estate division in Washington showed a bit of a twist compared to other divisions. The rate of births and the rate of deaths of establishments were greater than the national average, and the resulting natural change was also greater. But the natural rate of change in employment was considerably lower than the national average. The insurance and real estate sectors were experiencing softness in the Washington markets during this period as the local economy lagged the national course.

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Figure 14
Rate of Establishment Births, Deaths, Expansions, and Contractions
By Industrial Division, Washington State, 1994-1995
Source: *Bureau of the Census*

	Net Change	Percent Change Relative To Births	Deaths	Expansions	Contractions
All Industries					
Establishments	1.7%	13.3%	-11.6%	30.0%	27.1%
Employment	2.9%	5.9%	-4.9%	10.9%	-9.0%
Agr., Forestry, Fishing					
Establishments	5.7%	17.8%	-12.1%	32.1%	25.1%
Employment	-4.3%	6.5%	-6.4%	14.4%	-18.8%
Mining					
Establishments	-3.5%	8.1%	-11.6%	41.0%	28.3%
Employment	0.2%	2.5%	-2.6%	12.9%	-12.6%
Construction					
Establishments	1.5%	19.1%	-17.6%	29.2%	28.4%
Employment	2.4%	7.7%	-7.7%	19.0%	-16.6%
Manufacturing					
Establishments	1.0%	10.9%	-9.9%	39.4%	28.5%
Employment	4.2%	2.2%	-2.4%	10.2%	-5.8%
Transp., Comm., Public Utilities					
Establishments	3.6%	14.2%	-10.6%	33.8%	24.9%
Employment	4.7%	6.0%	-3.9%	10.0%	-7.5%
Wholesale Trade					
Establishments	0.9%	10.4%	-9.5%	33.7%	24.6%
Employment	2.9%	4.4%	-5.4%	12.2%	-8.3%
Retail Trade					
Establishments	0.2%	12.0%	-11.9%	30.4%	32.2%
Employment	1.6%	8.3%	-6.7%	9.1%	-9.1%
Finance, Insurance, Realty					
Establishments	2.0%	13.4%	-11.4%	20.9%	24.1%
Employment	-5.3%	6.9%	-6.8%	7.0%	-12.5%
Services					
Establishments	2.2%	12.1%	-9.9%	29.8%	25.0%
Employment	4.8%	5.7%	-4.1%	11.5%	-8.4%
Nonclassified					
Establishments	38.4%	90.7%	-52.3%	7.6%	11.2%
Employment	41.5%	100.4%	-54.0%	4.7%	-9.6%

Services

Of all the divisions, services seem to most closely match when comparing local and national patterns. While the birth and death rates of establishments were still greater in Washington, the differences were modest and the resulting natural rates of change were an identical 2.2 percent. On the employment side, the natural change was greater in Washington, likely a result of more vigorous business services and engineering and management services sectors.

EXPANSIONS AND CONTRACTIONS BY INDUSTRY

Employment change related to expansions and contractions were nearly double that generated via births and deaths *(see Figures 15 and 16)*. This is true for both Washington and the nation as a whole. Of the 54,800 net jobs gained in Washington between 1994 and 1995, over 36,100 were because of net gains in existing firms while 18,700 were because of net new establishments. And, this combination of expansions and contractions, or the net hiring rate, differ between

Figure 15
Natural Increase and Net Hiring
By Industrial Division, United States, 1994-1995
Source: *Bureau of the Census*

	Natural Increase		Net Hiring	
	Number	**Rate**	**Number**	**Rate**
All Industries				
Establishments	108,320	1.9%	296,608	5.1%
Employment	1,232,895	1.3%	2,358,672	2.4%
Agr., Forestry, Fishing				
Establishments	4,212	5.2%	7,330	9.1%
Employment	10,393	1.8%	31,787	5.4%
Mining				
Establishments	-603	-2.3%	31	0.1%
Employment	21,571	3.5%	-870	-0.1%
Construction				
Establishments	19,961	3.9%	36,259	7.1%
Employment	54,896	1.2%	265,105	5.6%
Manufacturing				
Establishments	2,490	0.7%	43,310	12.1%
Employment	15,003	0.1%	483,512	2.7%
Transp., Comm., Public Utilities				
Establishments	7,483	3.1%	16,379	6.7%
Employment	52,166	0.9%	148,849	2.6%
Wholesale Trade				
Establishments	5,906	1.3%	44,006	9.4%
Employment	23,332	0.4%	252,831	4.0%
Retail Trade				
Establishments	6,548	0.5%	25,247	1.8%
Employment	485,497	2.4%	248,559	1.2%
Finance, Insurance, Realty				
Establishments	10,213	1.8%	-899	-0.2%
Employment	68,616	1.0%	-84,598	-1.2%
Services				
Establishments	45,298	2.2%	124,412	5.9%
Employment	477,346	1.4%	1,008,873	3.0%
Nonclassified				
Establishments	6,812	34.9%	533	2.7%
Employment	24,075	39.7%	4,624	7.6%

industry divisions and between the State and the nation. Sometimes this difference is marked and sometimes it is minute.

Fish Floundering

In the agriculture, forestry, and fishing sector, the net hiring rate in Washington was significantly different from the national mean. The net hiring rate at the national level was 5.4 percent. In Washington the net hiring rate was negative to the tune of 4.4 percent. This was likely due to the cutbacks in the fishing sector being experienced during this period.

Flip Flop in Mining

Mining's different character emerges again when examining the net hiring rate. The net hiring rate at Washington's mining establishments was 0.3 percent. Nationally it was negative by 0.1 percent. Recall that the natural increases in employment for Washington's mining sector was negative, while nationally it was in the plus column.

Construction

Construction employment expansions were nearly identical at the state and national level between 1994 and 1995. But employment

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Figure 16
Natural Increase and Net Hiring
By Industrial Division, Washington State, 1994-1995
Source: *Bureau of the Census*

	Natural Increase		Net Hiring	
	Number	**Rate**	**Number**	**Rate**
All Industries				
Establishments	2,226	1.7%	3,867	3.0%
Employment	18,690	1.0%	36,146	1.9%
Agr., Forestry, Fishing				
Establishments	144	5.7%	178	7.0%
Employment	26	0.1%	-1,015	-4.4%
Mining				
Establishments	-6	-3.5%	22	12.7%
Employment	-3	-0.1%	9	0.3%
Construction				
Establishments	230	1.5%	120	0.8%
Employment	16	0.0%	2,928	2.4%
Manufacturing				
Establishments	81	1.0%	859	10.9%
Employment	-650	-0.2%	14,269	4.4%
Transp., Comm., Public Utilities				
Establishments	196	3.6%	479	8.9%
Employment	2,618	2.1%	3,073	2.5%
Wholesale Trade				
Establishments	89	0.9%	933	9.0%
Employment	-1,281	-1.0%	5,146	3.9%
Retail Trade				
Establishments	48	0.2%	-518	-1.8%
Employment	6,746	1.6%	-18	0.0%
Finance, Insurance, Realty				
Establishments	251	2.0%	-405	-3.2%
Employment	254	0.2%	-7,172	-5.5%
Services				
Establishments	1,015	2.2%	2,216	4.9%
Employment	10,383	1.7%	18,987	3.1%
Nonclassified				
Establishments	178	38.4%	-17	-3.7%
Employment	581	46.4%	-61	-4.9%

contractions in Washington State were much greater than average. As a result the net hiring rate locally was less than half the national norm. Again, the less-than-stellar local economy was the principal difference.

Manufacturing

As in mining, Washington manufacturing also exhibited a different character than nationally. The rate of employment expansions was greater in Washington than across the nation. Remember that the rate of natural change was below the national average in Washington. The combination of a higher rate of employment expansion and a lower rate of employment contraction resulted in a 4.4 percent net hiring rate locally compared to 2.7 percent for the U.S. as a whole.

TCU Tie

The net hiring rate in the transportation, communication, and utilities division was a near tie between Washington and the nation. The difference was in employment related to expansions and contractions. The nation had higher absolute rates of expansion and contraction compared to Washington, but the gap between the expansion and contractions rates was nearly equal.

Wholesale Match

The net hiring rate in wholesale trade was an even closer match between the state and the nation than it was for transportation, communication, and utilities. While the rates were within a tenth of a point, the expansion rates and contraction rates were within two-tenths of a point.

Retail a Big Zero

In general, net employment gains from expansions and contractions surpass those from births and deaths. Not so in retail trade. At the national level, the rate of net employment gains from expansions and contractions was only half the natural change rate. In Washington, while the rate of natural change in employment was 1.6 percent, the net hiring rate was zero. In this instance, the rate of employment expansions was 9.1 percent or 38,700 jobs, and the rate of contraction was identical. The relatively modest capital requirements for a new retail enterprise encourage entry into this field; therefore, employment growth related to births would tend to be more vigorous than that related to expansions.

FIRE Doused

If you thought that the birth death data were unkind to the finance, insurance, and real estate division, the expansion contraction figures were downright humiliating. The weakness was primarily on the finance side though real estate recorded no growth during this period. To put it succinctly, there were more contractions than expansions between 1994 and 1995, both locally and nationally. In Washington, employment contractions overwhelmed expansions to the tune of 5.5 percent or almost 7,200 jobs.

Services Similarity

Of all the divisions, services exhibit the most obvious semblance between the state and the nation. The net hiring rates and the actual expansion and contraction rates are, for all practical purposes, identical. Because other Washington divisions fall a bit short in comparison with the nation for 1994-1995, services in Washington represented over half of the net hiring overall; nationwide the ratio was about 43 percent.

Average is Poor

During the 1994-1995 period, the rates of establishment births in Washington State and the nation were very similar. The same holds true for establishment deaths, expansions, and contractions. This is rather counter-intuitive. It is generally perceived that Washington State has a more vibrant and therefore more volatile economy than the nation as a whole. One explanation of the similarities in this data set is the time period; 1994-1995 was a period of national economic rebound and yet of economic sluggishness for Washington.

The Norm

Overall Washington's data are more volatile than the national average. This may simply be the rule of small numbers—their smallness makes them more variable. On the other hand, this may illustrate the greater entrepreneurial vigor of Washington's economic environment. And, no doubt, that vigor would be more evident upon examination of more current data. Job gains in construction, services, and finance, insurance, and real estate have been livelier as of late, surpassing the national averages. The natural change rate in construction would likely be well into the plus column. The current finance and real estate markets would also move that division's net hiring rate up into the positive realm. And services, matching the national natural change and net hiring rates even in the 1994-95 period, would exceed those rates with ease.

318,000 Steps Forward 263,000 Steps Back

Regardless of the similarities or dissimilarities between state and national data, or the point in the business cycle, the value of these data is in their capacity to quantify labor market dynamics. In order for the economy to generate the jobs that appear in the year-to-year calculations, a great deal of coming and going occurs. Understanding

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and appreciating the shear volume of labor market activity, which these data confirm, is important in formulating labor market and economic policies at all levels of government and in private businesses as well.

■ *Robert Wm. Baker*
Senior Economic Analyst

Work at Home in 1997

EMPLOYMENT DEVELOPMENTS

> ***Work at Home***
> *Make $$$ in Just a Few Hours a Week*
> **Call 1-800-123-4567**

Regardless of the doubtful legitimacy of the above kinds of advertisements, there are apparently a goodly number of people who do work at home. More than 21 million persons did some work at home as part of their primary job in May 1997, according to the Bureau of Labor Statistics of the U.S. Department of Labor. The overall number of persons doing job-related work at home did not grow dramatically between 1991 and 1997, but the number of wage and salary workers doing paid work at home did.

These findings are from a special supplement to the May 1997 Current Population Survey (CPS), the monthly survey of about 50,000 households that provides data on the nation's labor force. The information presented here pertains to persons employed in nonagricultural industries who were at work during the May 1997 survey reference week and indicated that they do some job-related work at home. Similar data were last collected in the CPS in May 1991.

Highlights of the 1997 survey include:

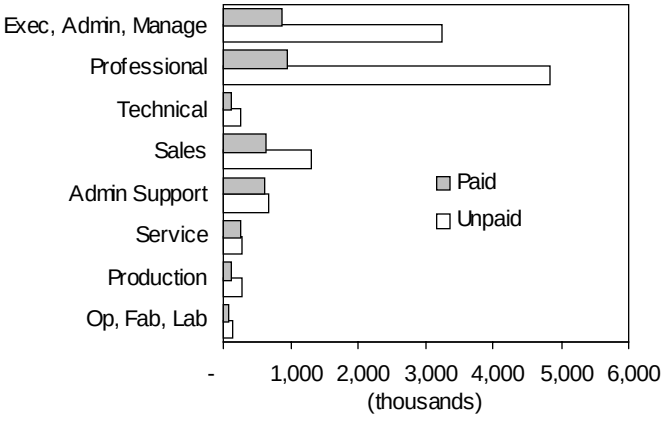
- More than half of those working at home were wage and salary workers who were not paid expressly for their time worked at home. About 17 percent, however, were wage and salary workers who were paid for the hours they put in at home. Virtually all the remainder were self-employed workers, nearly two-thirds of whom had home-based businesses.

- Nearly 9 of 10 workers doing paid work at home were in "white-collar" occupations.
- More than 4.1 million self-employed persons were working in a home-based business.
- About 6 in 10 used a computer for the work they did at home.
- Wage and salary workers who were paid for working at home averaged nearly 15 hours per week at home; those who weren't paid worked about 9 hours at home. Workers in home-based businesses worked 23 hours per week at home, on average.
- Of those who worked at a second job, 37 percent did at least some of their work at home.

Pay Status, Industry, and Occupation

While the number of persons reporting work at home grew by only 1.5 million since 1991, there was a sharp increase in the number of persons who were paid for working at home. In 1997, 3.6 million wage and salary workers—about 3.3 percent of all wage and salary workers—were paid for the work they did at home. In 1991, only 1.9 million wage and salary workers—1.9 percent of the total—were doing work at home for pay. Over that six-year span, the number of wage and salary workers being paid for work at home grew by almost 90 percent.

Figure 17
Wage and Salary Workers with Job-Related Work at Home
Paid and Unpaid by Occupation, May 1997
Source: *Bureau of Labor Statistics*



Of the 3.6 million wage and salary workers doing paid work at home, 88 percent were in "white-collar" occupations *(see Figure 17)*. Nearly a million of these workers were in professional specialty occupations, slightly more than the number of executives and managers. Sales and administrative support occupations also had large numbers of paid home workers.

The Good Old Bad Old Days

It is apparent from these analyses of 1991 and 1997 data that the whole profile of work at home has evolved dramatically. These surveys show that the bulk of paid activity performed by those who work at home is in managerial, professional, technical, sales, and administrative support occupations. Up until the 19th Century, many workers did production and craft piecework out of their homes in a variety of manufacturing industries. The best known of those sectors were apparel and related—cobblers, tailors, weavers, and spinners all engaged in their craft in home. Mass production through mechanization, or in today's lingo—automation, eliminated most of these *cottage industries*.

And while cottage industries may be the third-world norm even today, within the largest industrialized nations there are still vestiges of these cottage industries. High-quality Irish woolen sweaters are still hand knitted on a piecework basis and sold through pricey fashion outlets and catalogs. And the venerable Harris Tweed is still woven by skilled weavers on home-based looms.

By industry, about 1.6 million wage and salary workers in the services industry were doing paid work at home—about 44 percent of the total; more than half a million in manufacturing were paid for work at home. All of the major industry groups except mining had significant numbers of workers doing paid work at home, but then it is difficult to do mining at home *(see Figure 18 on the next page)*.

The number of persons who were simply "taking work home from the office"—that is, wage and salary workers who were not being officially compensated for the work they did at home—was 11.1 million. This was a modest decline from 1991, when 12.2 million wage and

Continued page 28

Figure 18
Wage and Salary Workers with Job-Related Work at Home
Paid and Unpaid, by Occupation, May 1997
Source: *Bureau of Labor Statistics*

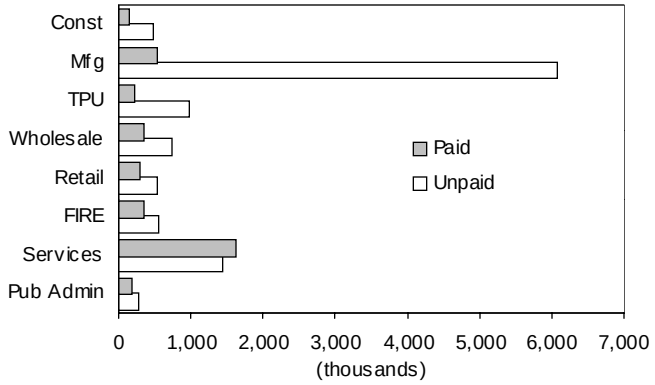
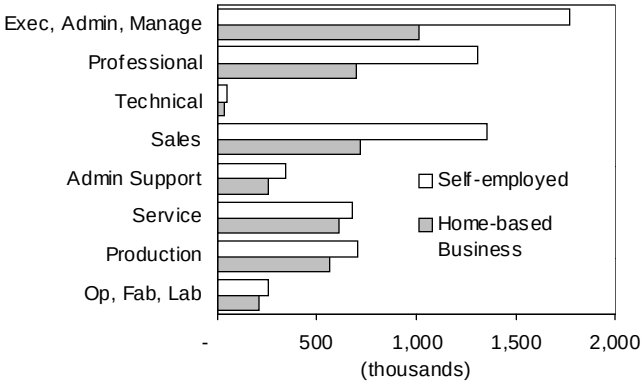


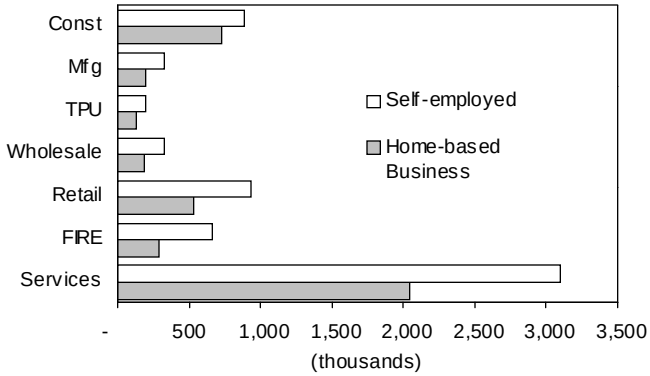
Figure 19
Self-Employed Workers Who Work at Home Including Those
With Home-Based Businesses, by Occupation, May 1997
Source: *Bureau of Labor Statistics*



salary workers worked at home without being paid for that work. As with those paid, persons who were not paid for the work they did at home were overwhelmingly employed in white-collar occupations. Teachers were especially likely to do unpaid work at home; 2.8 million teachers reported doing so in 1997. From an industry perspective, services had the largest number of unpaid home workers (6.1 million), followed by manufacturing (1.5 million).

About 6.5 million self-employed persons did some work at home in May 1997, more than half of all the self-employed who were at work during the survey reference week. More than 4.1 million of the self-employed indicated that they were working in home-based businesses *(see Figure 19)*. This was the first time that the CPS had contained questions specifically designed to gather information on home-based businesses. Managers and professionals accounted for 1.7 million, or two-fifths, of those working in home-based businesses. Sales, service, and precision production occupations also had large numbers of such workers. In terms of industry, 2.1 million persons, or about half, were working in services, while construction and retail trade accounted for 726,000 and 532,000 workers, respectively *(see Figure 20)*.

Figure 20
Self-Employed Workers Who Work at Home Including Those
With Home-Based Businesses, by Industry, May 1997
Source: *Bureau of Labor Statistics*



Demographics

More than 70 percent of persons who did some work at home in 1997 were in married-couple families; compare that to the 58 percent of all those employed in May of 1997 who were in married-couple families. Women and men were about equally likely to work at home. The work-at-home rate for married parents was about the same as the rate for married persons without children. Whites were more than twice as likely to be engaged in some form of home-based work as either blacks or Hispanics.

Computer Use

Just under 60 percent of those who worked at home in 1997 used computers. Among wage and salary workers, computer use was about the same for those who were paid for work done at home (63.3 percent) as for those doing unpaid work at home (61.6 percent). Paid home workers were more likely to use a modem for their work at home (43.2 percent) than were unpaid home workers (32.8 percent). Also, 23.2 percent of paid home workers used a telephone line that was furnished by their employer. Only 54.4 percent of self-employed home workers used a computer for work done at home *(see Figure 21)*.

Work at Home on a Second Job

Of the 8.0 million persons who worked on a second job in May 1997, 37 percent did at least some of that work at home. Men with a second job were slightly more likely than women to work at home on that job, and married people were substantially more likely to work at home than unmarried people. Married parents were about as likely to work at home on a second job as married persons without children. However, single parents, and especially single mothers, had higher work-at-home rates than single workers without children *(see Figure 22)*.

A total of 23.3 million persons were engaged in work at home on either a first or second job in May 1997, including 21.5 million who worked at home on their primary job and 3.0 million who did work at home on a second job. About 1.2 million persons had two jobs and worked at home on both.

I Would If I Could

No doubt there have been many stay-at-home moms in need of some extra income who have been frustrated by the kind of bogus ads at the beginning of this article. It is this very population, along with working families with young children, who are most interested in the prospects of working at home.

While many families may need a supplemental income, many of the available out-of-the-home jobs may not pay enough to provide any real extra income after accounting for additional taxes, work-related expenses, and childcare costs. Plus many families are not comfortable enough with the existing childcare services to join the work force regardless of the availability of jobs. So even with the already high share of two income households, that ratio would, no doubt, be higher still were there a substantial number of real opportunities to work at home.

Everything Old is New Again

The spectrum of work at home activities run the gamut from taking work home from the office, to working at home in a nonagricultural job, to sole proprietors working from home-based businesses. The first and last categories in that

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Figure 21
Workers With Job-Related Work at Home on Primary Job
By Use of Electronic Equipment (in thousands), May 1997
Source: *Bureau of Labor Statistics*

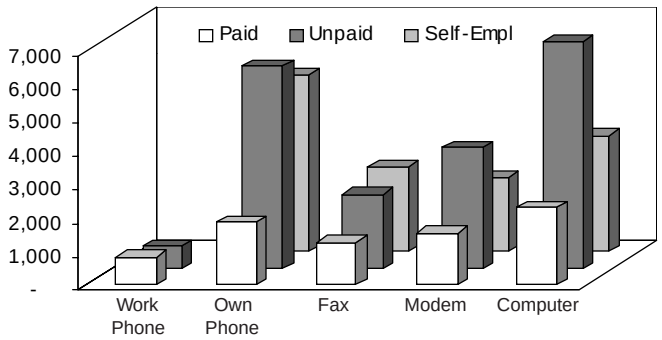
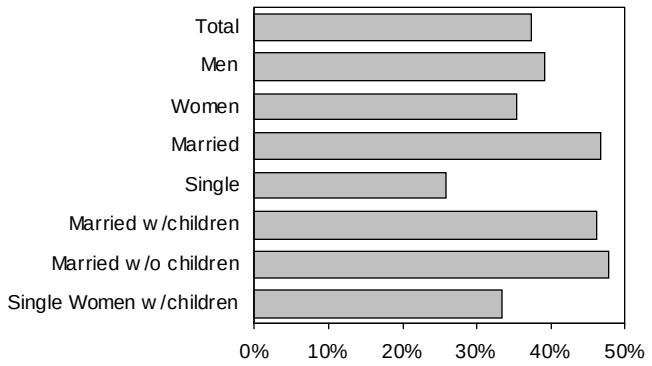


Figure 22
Share of Multiple Job Holders Who Work at Home on 2nd Job
By Selected Characteristics, May 1997
Source: *Bureau of Labor Statistics*



range are both familiar and somewhat expected; it is the middle category that has recently emerged as a subject of interest, particularly as employers have begun to experience increased problems in filling jobs because of the shrinking labor supply.

Currently, doing paid work at home is a relatively modest phenomenon. But what has appeared in this last decade of the millennia may be the beginning of a revolution of sorts. In this instance revolution describes a turning full circle back to an earlier ideal or concept rather than a radical departure from the norm.

With the beginning of the industrial revolution and the advent of the large manufacturing concern, large numbers of workers became beholden to a single job site. Large cities emerged for the purpose of clustering plentiful numbers of workers to supply these big businesses. Of course workers in the earlier agrarian systems were beholden to the land, but in many instances that was a tie to what, in essence, was a small business. Industrialization radically changed the work force landscape—literally and figuratively.

Today, demand for the large clustered work force is moderating. There are still large manufacturing concerns, but they represent an ever-declining share of the total work force. Conversely, the information processing, intellectual property driven services sectors of the economy demand an ever-increasing share of the work force.

Within these sectors, information technology may help businesses rethink the large physical infrastructure and worker-clustering ideal born of the manufacturing age. The fact that a distinct majority of those who work at home use a computer is no mere coincidence. That is simple confirmation that the product of these fast-growing industries is information and the processing thereof.

Unlike manufacturing firms with large fixed physical plants and production lines, these new firms are more likely to have output processes unfettered from their workers proximity. Many word processing, data processing, bookkeeping, accounting, engineering, graphic design, drafting, report writing, and various research processes (to name but a few) can be done on a personal computer or work station and are not dependent on place. A phone line may be the only other infrastructure necessary to link workers in these processes, and even that may go by the wayside with the advent of newer wireless communication technology. Current economic development policies hope to capitalize on this flexibility. The Governor's Rural Economic Development Initiative envisions information technology as a potential boon for lesser-developed regions in this state.

Today, paid work at home is at the fringes of the organizational norm. Most of the employees allowed to partake in these arrangements are those who have "paid their dues." For these privileges to be extended to a higher share of the current nonfarm work force will require a distinct change in supervisory and managerial methods; what remains is the willingness of firms to risk such organizational rethinking. While these risks may be palpable, the benefits in organizational flexibility, minimizing infrastructure costs, and recruiting and retaining a contented and loyal work force may prove worthwhile. Add in the potential social benefits of helping ease the problems of traffic congestion, daycare costs, and unsupervised latchkey kids, and the benefit/cost equation may tip decidedly in favor of work at home.

■ *Robert Wm. Baker*
Senior Economic Analyst

LMI REVIEW

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