

**ARE JOBS GETTING WORSE? THE EVOLVING DISTRIBUTION OF WAGES  
AND JOB COMPOSITION OVER THE 2001 TO 2004 PERIOD**

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## **Executive Summary**

This study uses household survey data through August of 2004 (most recent available at the time of writing) to evaluate changes in the average wage, distribution of wages, and differences in the composition of growing and shrinking jobs. This study adds to the state of knowledge about the present recovery by virtue of (1) using up-to-date wage and employment data; (2) using a more informative classification of “jobs” through 440 detailed industry and occupational categories; and (3) producing more reliable findings through analyzing the entire distributions of job composition and wages, instead of just providing averages.

The key findings are:

**1. Wage growth was tepid immediately after the recession (i.e., 2002 and 2003) and turned negative over 2004.** Adjusted for inflation, the average wage grew at 0.06% and 0.6% annually over 2002 and 2003, respectively. During the current year, the real wage *fell* by an annualized 0.42%. Overall, since the 4<sup>th</sup> quarter of 2000, the real wage has grown at an annual average rate of 0.9%, but this was driven primarily by a 3.4% growth during 2001.

**2. Wages throughout the distribution today stand lower than where they were during the 4th quarter of 2001, when the recession ended and the recovery began. However, the hardest hit have been workers at the bottom half of the labor market.** During the recovery period, those earning at the 10<sup>th</sup> percentile saw their wage fall by an annual average of 1.4%; the median wage remained completely static; and those earning at the 90<sup>th</sup> percentile saw an annual growth of 0.1%. Analysis of the current year, the recovery period, and the full period of the study consistently reveal declining wages at the bottom end of the labor market, and a growing gap between the top and the bottom.

**3. Types of jobs that were shrinking paid 10% to 12% more than jobs that were growing throughout the 2001 to 2004 period.** This wage gap between growing and disappearing jobs has been stable over the recovery, and this year stood at \$1.90/hr (or 11.5%).

**4. Growing jobs were relatively more concentrated in the lowest part of the distribution (under \$12/hr) as compared to shrinking jobs throughout 2001 to 2004.** The analysis of the entire distribution shows that the modal (or most prevalent) growing jobs paid around \$9/hr, and were typically composed of service occupations in health services and hospitality industries. The modal shrinking jobs paid between \$12 and \$15/hr and were typically represented by production workers in electronics and machinery manufacturing, as well as administrative workers in industries such as telecommunications, or professional and technical services.

**5. Jobs paying at the bottom third of the distribution saw a surge in net employment growth throughout 2001 to 2004. Although there has been an upturn in middle range jobs during the current year, this has largely come at the expense of jobs paying at the top third.** Looking either at the recovery period or this year alone, job growth at the bottom third outpaced growth in the middle by 2-to-1. Meanwhile, growth at the top third stagnated over the recovery period generally and actually shrank during 2004.

## ***Table of Contents***

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	Executive Summary .....	2
1	Introduction.....	4
2	Wage growth over the recession and recovery .....	6
3	Composition of Jobs .....	10
3.1	Average Wages of Growing and Shrinking Jobs.....	12
3.2	Distribution of Growing and Shrinking Jobs.....	13
3.3	Overall Growth in Jobs throughout the Wage Distribution.....	15

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# 1 Introduction

The depth and breadth of the present economic recovery is a matter of great importance to workers, businesses, as well as policymakers. To understand how the recovery is being felt by various parts of the workforce, I use household survey data through August of 2004 (most recent available at the time of writing) to quantify changes in the average wage, the distribution of wages, and assesses differences in the composition of growing and shrinking industry/occupation groupings in the 2001-2004 period. This study adds to the state of knowledge about this recovery by virtue of (1) using up-to-date wage and employment data; (2) using a more informative classification of “jobs” using detailed industry and occupational categories than other efforts; and (3) producing more reliable findings through analyzing the entire distributions of job composition and wages.

I use household level data from the Current Population Survey (CPS) through August of 2004. Although less reliable than the payroll based Current Establishment Statistics (CES) in terms of overall employment, the CPS allows us to compute wages and employment by detailed industry and occupational classification. Whereas the growth trends in employment differ in the two datasets, at least industrial compositions appear to move together over this period. As a result, we can learn from the changes in the wage composition of jobs, even if the total employment growth suggested by the CPS is biased upwards.

For looking at job composition, I construct “job cells” composed of 50 industries and 10 occupations. 440 of these cells are usable (i.e., have continuous data). For actual industry and occupation names, as well as a discussion of the CPS, see Appendix A.

The structure of the report is as follows. The first section deals with wage growth. I report trends in both average wages as well as wages for different percentiles. The second section is on job composition. I survey the existing studies on the topic. Next I provide the average wages of growing and shrinking jobs, followed by an analysis of the entire distributions of such jobs. Next I estimate *net* employment growth by job wage percentiles – including a simplified analysis which provides growth at jobs paying at the top, middle and bottom terciles (i.e., thirds) in terms of wages. I conclude by reporting growth at jobs at the three wage terciles by quarters throughout this period.

Overall, this study finds the following:

**1. Wage growth was tepid immediately after the recession (i.e., 2002 and 2003) and turned negative over 2004.** Adjusted for inflation, the average wage grew at 0.06% and 0.6% annually over 2002 and 2003, respectively. During the current year, the real wage *fell* by an annualized 0.42%. Overall, since the 4<sup>th</sup> quarter of 2000, the real wage has grown at an annual average rate of 0.9%, but this was driven primarily by a 3.4% growth during 2001.

**2. Wages throughout the distribution today stand lower than where they were during the 4th quarter of 2001, when the recession ended and the recovery began. However, the hardest hit have been workers at the bottom half of the labor market.** During the recovery period, those earning at the 10<sup>th</sup> percentile saw their wage fall by an annual average of 1.4%; the median wage remained completely static; and those earning at the 90<sup>th</sup> percentile saw an annual growth of 0.1%. Analysis of the current year, the recovery period, and the full period of the study consistently reveal declining wages at the bottom end of the labor market, and a growing gap between the top and the bottom.

**3. Types of jobs that were shrinking paid 10% to 12% more than jobs that were growing throughout the 2001 to 2004 period.** This wage gap between growing and disappearing jobs has been stable over the recovery, and this year stood at \$1.90/hr (or 11.5%).

**4. Growing jobs were relatively more concentrated in the lowest part of the distribution (under \$12/hr) as compared to shrinking jobs throughout 2001 to 2004.** The analysis of the entire distribution shows that the modal (or most prevalent) growing jobs paid around \$9/hr, and were typically composed of service occupations in health services and hospitality industries. The modal shrinking jobs paid between \$12 and \$15/hr and were typically represented by production workers in electronics and machinery manufacturing, as well as administrative workers in industries such as telecommunications, or professional and technical services.

**5. Jobs paying at the bottom third of the distribution saw a surge in net employment growth throughout 2001 to 2004. Although there has been an upturn in middle range jobs during the current year, this has largely come at the expense of jobs paying at the top third.** Looking either at the recovery period or this year alone, job growth at the bottom third outpaced growth in the middle by 2-to-1. Meanwhile, growth at the top third stagnated over the recovery period generally and actually shrank during 2004.

## 2 Wage growth over the recession and recovery

In this section, I will examine the evolution of the average wage over the 2001-2004 period, and report growth rates by years. Next, I look at the evolution of wages over this whole period throughout the distribution – at the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentiles. I will also report the growth rates for these percentiles over 3 time periods – “current year” (2004), the recovery period (2002-2004) and the full period (2001-2004). The “current year” compares wages at 2003q4 (i.e., 4<sup>th</sup> quarter of 2003) to 2004q3, where the third quarter uses the months of July and August – as August 2004 is the latest data available. The “recovery period” compares wages at 2002q4 to 2004q3. And the “full period” compares 2000q4 to 2004q3.

Figure 1 reports the quarterly averages from 2000 to 2004, where we see a clear pattern of a slowdown and fall in the real wage over the past year. Over the entire period of recovery (i.e., since the 4<sup>th</sup> quarter of 2001), the average wage has risen by a total of 6 cents/hr. And now for nearly 3 quarters in a row, we have seen a clear pattern of decreasing wages averaging an annualized -0.4% over this year, with a total loss of 4 cents/hr.

**Figure 1: Average Real Wage – 2000 to 2004**

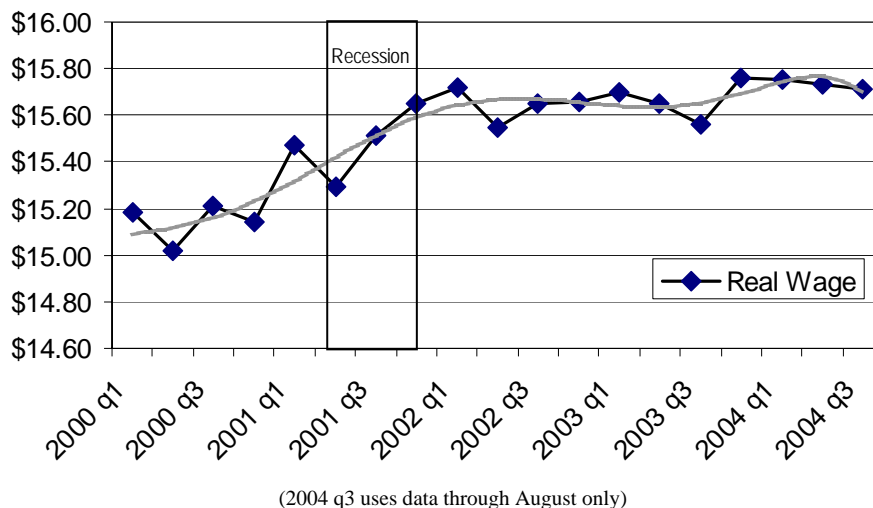
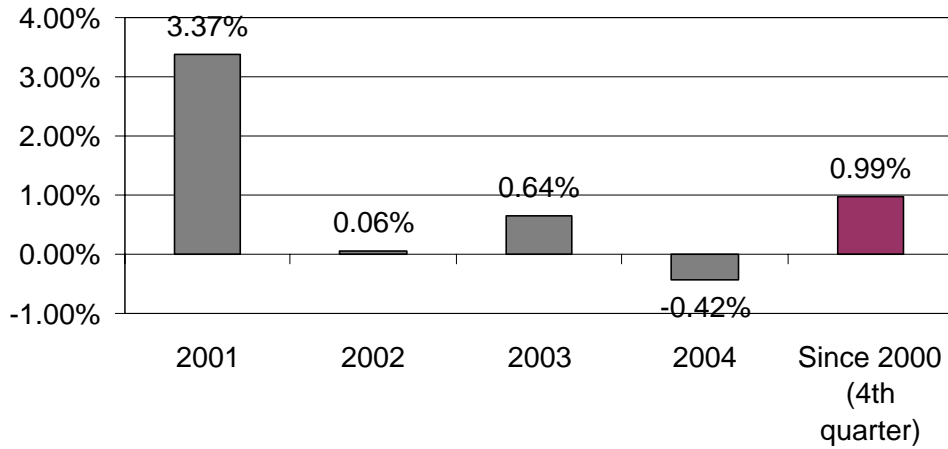


Figure 2 shows the annual growth rates in the real wage. Adjusted for inflation, the average wage has been stagnant over most of the recovery, growing at 0.06% and 0.6% annually over 2002 and 2003. During the current year, the real wage has actually *fallen* by an annualized .42%. Overall, since 4<sup>th</sup> quarter of 2000, the real wage has grown at an annual average of 0.9%, but as one can see, this is driven primarily by the 3.4% growth in 2001.

A study by the Heritage Foundation this month found average earnings for *non-executives* to be 2 percent higher than at the height of the dot-com boom.<sup>1</sup> This is consistent with our findings. However, missing from Heritage’s analysis are the facts that (1) this growth largely occurred in 2000 and 2001; and (2) the current trend is towards a wage slowdown and reversal.

<sup>1</sup> “Job quality has improved since 2000” (<http://www.heritage.org/Research/Economy/wm584.cfm>)

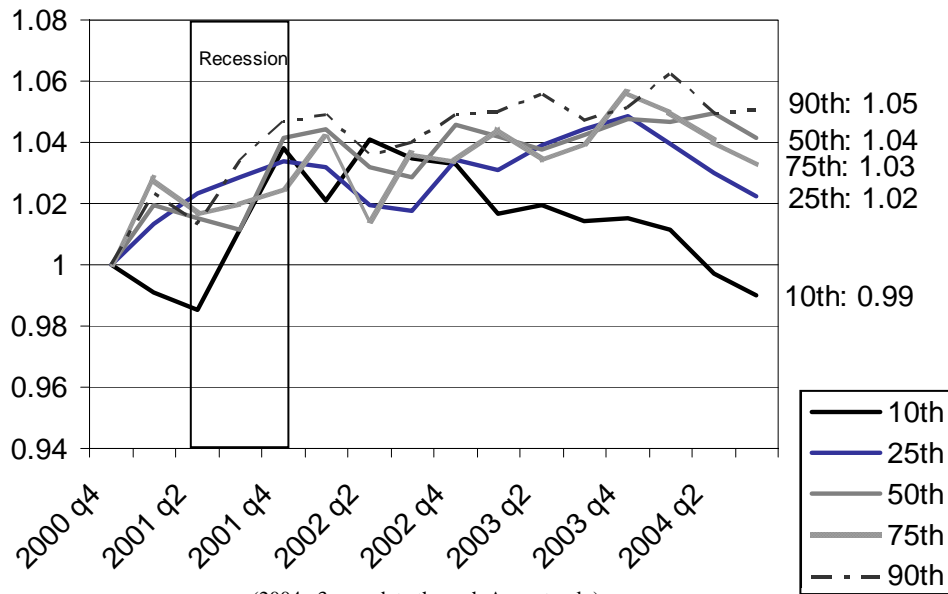
**Figure 2: Real Wages – Annualized Growth Rates**



(2004 uses data through August only)

Next, I examine the wage trends throughout the wage distribution.

**Figure 3: Evolution of Real Wages by Percentiles:**



(2004 q3 uses data through August only)

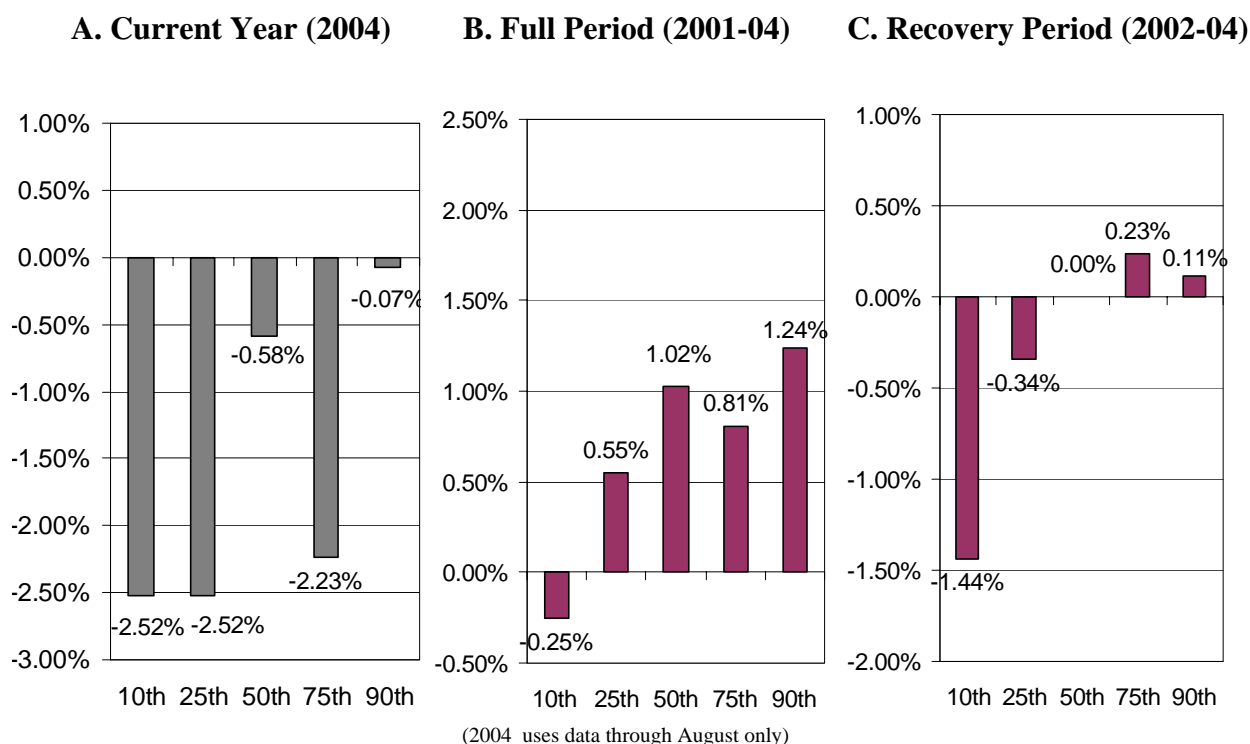
As Fig. 3 indicates, wages throughout the distribution today stand lower than where they were in fourth quarter of 2001, when the recession ended and the recovery began. However, the hardest hit have been workers at the 10<sup>th</sup> and 25<sup>th</sup> percentiles – in other words those at the bottom half of the labor market. Throughout the current year, wages have fallen for the 25<sup>th</sup> and 10<sup>th</sup> percentiles as well as the 75<sup>th</sup> percentile. The 50<sup>th</sup> and 90<sup>th</sup> percentiles have seen smaller wage declines. For the full 2001-2004 period (i.e., starting with the 4<sup>th</sup> quarter of 2000), we see that the wage growth occurred

primarily in 2001, and wages since then have either fallen or stagnated depending on the percentile in question. Moreover, the growing dispersion in wages is also apparent by comparing the last quarter wage to the first quarter of analysis: except for the switch in the 50<sup>th</sup> and 75<sup>th</sup> percentiles, the wage growth has been lower for those at lower wages.

The growth patterns show the following: 1) the bottom half of the labor market has fared particularly poorly during the entire 2001-2004 period as the gap between the top and the bottom grew; 2) during the post-recession period, wage growth was substantially lower throughout the wage distribution as compared to 2001, but those at the lower end of the labor market have done worse comparatively; 3) during the current year, the brunt of the wage *fall* has been borne at the bottom end: the bottom quarter saw their real wage fall by more than an annualized 2%.

The next 3 figures report the annual growth rate of wages for these wage percentiles during the current year, the post-recession period (2002-2004) as well as full period (2001-2004).

**Figure 4: Annualized Growth in Wages by Percentiles (10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, 90<sup>th</sup>)**



During the current year, real wages fell throughout the distribution: wages at the 10<sup>th</sup> percentile fell by an annualized 2.5%, the median wage fell by 0.6%, and the 90<sup>th</sup> percentile saw a wage fall of 0.1%. During the recovery period (2002-2004), the 10<sup>th</sup> percentile saw its wage fall by an annual average of 1.4%; the median wage has remained completely static; and the 90<sup>th</sup> percentile saw an annual growth of .1%. Over the full period (since the end of 2000), the 10<sup>th</sup> percentile saw an annual wage reduction of 0.3%, the median saw an average growth of 1%, and the 90<sup>th</sup> percentile saw a growth of 1.2%.

To sum up, during all three periods, the bottom 10<sup>th</sup> of the workforce saw wage declines, and



generally the bottom half bore the brunt of wage stagnation or declines. Consequently, the gap in wages between the top and the bottom grew larger.

### 3 Composition of Jobs

The falling wages over 2004 and the generally stagnant wages over the entire 2001-2004 period raises the following question: are jobs that are being created of lower “quality” than those that have been lost? This has been a controversial issue, with arguments on both sides. For instance, studies by the USA Today the Economic Policy Institute (EPI) have argued a reduced job quality, while the Wall Street Journal and Factcheck.org have contended otherwise.

First of all, it is important to acknowledge that we lack sufficient data to answer precisely what wages “new” jobs command as compared to “lost” jobs. Most evidence on wages and job quality comes from either household surveys such as the CPS or payroll surveys such as the CES. The publicly available payroll data, however, is not broken down by “new jobs” let alone document wages of “lost jobs.” Similarly, household data such as the CPS surveys workers and not ‘jobs.’ So while the CPS is useful in computing trends in wages, it does not allow us to *fully* understand the dynamics of quality of jobs being destroyed or created.

In absence of such data, most analysis has focused on a more limited set of question: which industries or occupations are expanding, and which ones are contracting? By comparing wages associated with shrinking (or growing) occupations and industries, one can proxy for “growing” and “shrinking” jobs.

There are some limitations to this analysis.

First of all, regardless of the detail of the industry or occupational classification, the proxy is not exact: for instance, if a newly hired janitor working at company A earns less in 2004 than what similar new hires at company A (with exactly the same job description) used to earn, this represents a deterioration of “new job” quality. A methodology based on industries and occupations will not pick up such within-category movements. Unfortunately, this is not an issue that can really be addressed by available data.

Second of all, the usefulness of the analysis will depend on how detailed the ‘jobs’ are defined to be. Some analysis has only looked at industries, while others have only looked at occupations. And most have used relatively aggregate measures of industries and occupations. Here are three well-publicized studies.

- (1.) USA Today found that bad jobs growing faster than good jobs by comparing percentage growth in 16 lower paying industries and comparing that to 11 higher paying industries in the period between March of 2001 and May of 2004.<sup>2</sup> The problem with this analysis is that we do not know what fraction of total employment the high and low wage industries make up. And USA Today admits that it is possible that occupational change within industries could paint a different picture. Finally, a blunt classification of “good” and “bad” jobs does not aid us in understanding exactly where the jobs are growing and shrinking.

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<sup>2</sup> “Low wage jobs rise at faster rate” [http://www.usatoday.com/money/economy/employment/2004-06-29-jobs\\_x.htm](http://www.usatoday.com/money/economy/employment/2004-06-29-jobs_x.htm)

- (2.) Factcheck.org used 154 occupation-industry categories from BLS, and ranked the industries as being above or below the median wage. They subsequently found that the industries paying above the median added more jobs during June 2003-June 2004 than industries paying below the median.<sup>3</sup> The use of the occupational data in addition to industries is an improvement on the USA Today study. However, simply adding up new jobs above and below the median is arbitrary. For instance, if there were 100,000 new jobs being created just above the median wage, and 99,000 new jobs created much below the median wage, the overall “job quality” (my most reasonable definitions) should fall. Yet it does not according to Factcheck.org’s definition.
- (3.) The Economic Policy Institute (EPI) has critiqued Factcheck.org’s analysis. Using the same data as Factcheck.org, they estimated the average wage in expanding and contracting sectors, where the weight is based on the sector’s contribution to the change in employment over the period. They found that overall, expanding sectors paid 7.2% less than contracting sectors during the June 2003-June 2004 period.<sup>4</sup> EPI’s analysis is on more solid grounds than the other two studies.

For this analysis, I use 10 occupations and 52 industries producing 452 usable industry-occupation groupings or “jobs.” (Through the rest of this study, I refer to these industry-occupation groupings as “jobs.”) This is a substantial improvement over all three previous studies as well as others.

In terms of the content of the analysis, this study builds on but goes beyond the previous analyses on this topic. Even EPI’s analysis is limited to calculating the *average* earnings of growing and shrinking jobs. We may want to know more than the average earnings: are “middle wage” jobs growing? Are high wage jobs shrinking? To answer these questions, I provide the full wage distribution of growing and shrinking jobs. One may also ask: what is the *net* employment growth at various parts of the job distribution? The latter question cannot be known simply by looking at average wages of growing and shrinking jobs. I provide distribution of employment growth throughout the percentiles of average wages paid at various jobs. And finally, there is always a nagging question of what base period a researcher uses. To settle this issue, I provide estimates by three periods: current year (2004), recovery period (2002-2004) as well as the full period of study (2001-2004). Furthermore, I provide quarterly series of employment for jobs in the top, middle and bottom wage tercile for the reader to evaluate the robustness of the results.<sup>5</sup>

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<sup>3</sup> “Economy Producing Mostly Bad Jobs? Not So Fast” <http://www.factcheck.org/article.aspx@docID=208.html>

<sup>4</sup> “Assessing Job Quality: How Factcheck.org Got it Wrong” [http://www.epinet.org/content.cfm/issuebriefs\\_ib200](http://www.epinet.org/content.cfm/issuebriefs_ib200)

<sup>5</sup> One might be concerned about small sample sizes within some cells. However, all the statistics reported in this paper are computed at higher levels of aggregation (for instance, average wages of jobs that are “growing”); or are aggregated or weighted (distribution of employment growth by average wage paid in the job). The relatively more disaggregated nature of this analysis allows us to draw firmer conclusions about expanding and contracting sectors. Moreover, any noise created by small sample sizes will have an “attenuation bias” – of *not* finding patterns of difference (say of growth between low and middle wage jobs) when one might exist.

### 3.1 Average Wages of Growing and Shrinking Jobs

In this section, I compute the average wage of shrinking versus growing jobs, where jobs are defined as industry/occupation groupings. In the next section, I will report the entire distributions of these two classes of job categories.

The average wage of all growing jobs is a weighted average of the wage of each job category that is growing. Intuitively, the weight tells us how important a particular growing job should be in computing the average wage. The natural metric for this “importance” is the contribution of this job to the employment growth amongst all growing jobs. We arrive at the weight by dividing the employment increase in that job by total employment increase amongst all growing jobs. More precisely, for job  $j$ , the weight  $g_j = \Delta emp_j / \sum_j (\Delta emp_j | \Delta emp_j > 0)$ . The average wage of all growing jobs is computed by multiplying the wage of each job by its weight and summing across all growing jobs.

$$W_{growing} = E(w | \Delta emp_j > 0) = \sum_j w_j * g_j$$

Similarly, the average wage of all shrinking jobs is computed as:

$$W_{shrinking} = E(w | \Delta emp_j < 0) = \sum_j w_j * s_j$$

where  $s_j$  is the weight of a shrinking job  $j$  and is calculated as

$$s_j = \Delta emp_j / \sum_j (\Delta emp_j | \Delta emp_j < 0)$$

To clarify, the wage associated with a job is the average wage within the industry/occupation grouping averaged over the period of analysis (either 2004 only, or 2001-2004, or 2002-2004). Table 1 reports the average wages of growing versus shrinking jobs:

**Table 1: Average Wages of Growing and Shrinking Jobs**

	Growing Jobs	Shrinking Jobs	Dollar Difference	Percent Difference
<i>Full Period (2001-2004)</i>	\$14.29	\$15.96	-\$1.66	-10.42%
<i>Recovery Period (2002-2004)</i>	\$14.32	\$16.22	-\$1.90	-11.74%
<i>Current Year (2004)</i>	\$14.55	\$16.45	-\$1.90	-11.53%

(2004 q3 uses data through August only)

Regardless of which of these periods one looks at – the full period since the end of the boom, or the economic recovery period after the recession, or just the current year – we find that growing jobs have paid 10-12% lower than shrinking jobs. This gap did not appear to shrink noticeably over time – it stood at 11.5% (\$1.90) during the current year, as opposed to 11.7% over the entire recovery and 10.4% during the full 2001-2004 period. This gap is somewhat larger than what EPI found in its analysis using more aggregated data.

### 3.2 Distribution of Growing and Shrinking Jobs

Besides comparing average wages, it is also instructive to compare the entire distributions of growing and shrinking jobs. In this section I construct the density of growing (and shrinking) jobs, defined as the proportion of growing (and shrinking) jobs at a given pay range. The advantage of estimating the densities is that it provides a clear visual picture of where the jobs are growing and where they are shrinking. I compare these densities for the 3 alternative periods: the current year, the recovery period and the full period.

The wage density of growing jobs is defined as:

$$g(w) = \sum_j (\Delta emp_j | \Delta emp_j > 0, w_j = w) / \sum_j (\Delta emp_j | \Delta emp_j > 0)$$

where each job category is indexed by  $j$ . To clarify, the density (or “weight”) of growing jobs at wage \$10/hr is the employment gain in growing jobs paying \$10/hr, divided by the total employment gain in all growing jobs.

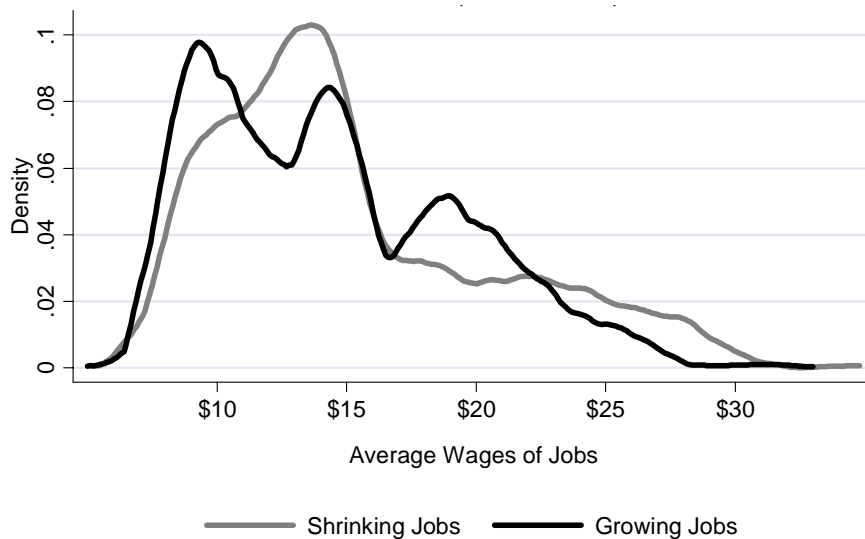
Similarly wage density of shrinking jobs is defined as:

$$s(w) = \sum_j (\Delta emp_j | \Delta emp_j < 0, w_j = w) / \sum_j (\Delta emp_j | \Delta emp_j < 0)$$

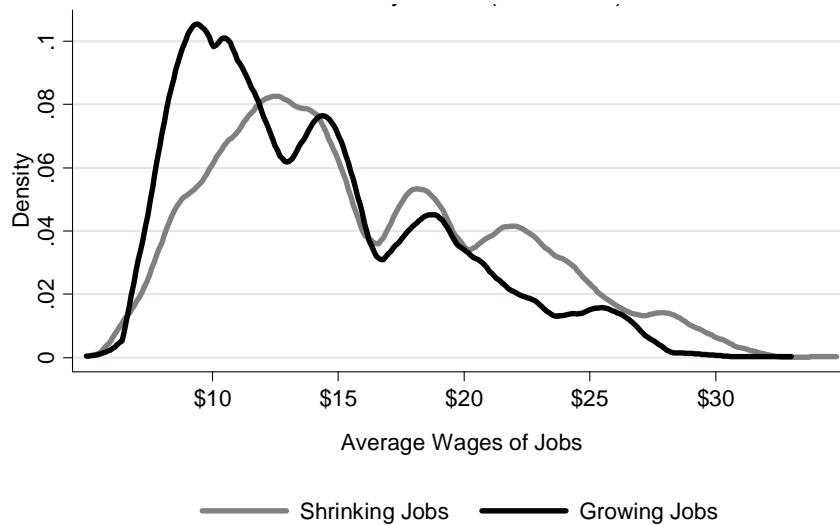
The densities reported here are produced using kernel density estimations, with bandwidth of 0.4; the patterns appear to be robust to a broad range of bandwidth.

**Figure 5: Distribution of Growing and Shrinking Jobs**

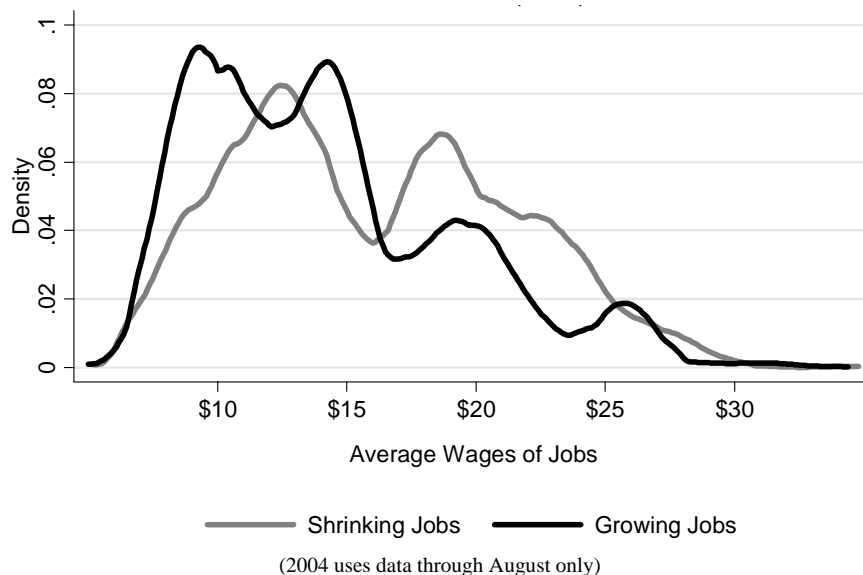
#### A. Full Period (2001 to 2004)



## B. Recovery Period (2002 to 2004)



## C) Current Year (2004)



The key finding from the figure above is as follows. *Regardless of the period in question (current year, the recovery period, or the full period between 2001-2004), growing jobs are disproportionately concentrated in the bottom range – especially below \$10/hr. In fact, growing jobs had a mode (or peak density) at around \$9/hr in all three periods. Growing jobs paying around \$9/hr were overwhelmingly “service occupations” and were concentrated in hospitals, restaurants, health care services, and hospitality industries. In contrast, shrinking jobs were more evenly distributed in terms of wages, and had a mode around \$12 to \$15/hr depending on the period in question. Some important examples of shrinking jobs in this wage range include: production*

workers in computer and electronics manufacturing; production workers in machinery manufacturing; administrative workers in telecommunications; and administrative workers in professional and technical services.

Moving from the entire period of study to either the recovery period or the current year, we see an important trend. In more recent periods, the concentration of growing jobs in the middle-wage range (between \$12 and \$15/hr) has increased. However this is accompanied by a rising concentration of shrinking jobs in the range above \$15/hr. Together, this helps us understand the results of Table 1, which found the average wage gap between growing and shrinking jobs was greater when we just looked at the period of recovery or the current year, as opposed to the full 2001-2004 period.<sup>7</sup>

*All in all, growing jobs seem more concentrated in the bottom end (paying under \$10/hr) than shrinking jobs, which are more concentrated in the \$12-\$15/hr range. In more recent periods, incidence of growing jobs in the middle range (\$12 and \$15/hr) has increased. However, this is countered by a relative increase in the concentration of shrinking jobs above the \$15/hr range.*

### **3.3 Overall Growth in Jobs throughout the Wage Distribution**

The previous analysis reported the wage distribution of growing and shrinking job categories. Although it helps us understand how jobs that are growing are different from jobs that are shrinking, it does not fully settle the issue of whether *in net* there are more jobs at the bottom, middle or the top. For instance, growing jobs may be more concentrated at bottom; but if there are more growing jobs, this complicates the comparison. Moreover, as employment is not evenly distributed over the wage range, the density of shrinking jobs being greater than the density of growing jobs over most of a particular range does not immediately imply jobs are shrinking in that range.

To address these issues, I compute employment gains by the wage percentiles of jobs. In other words, this allows us to answer “during 2004, what was the net gain in jobs whose average wages rank at the 25<sup>th</sup> percentile?” To arrive at this figure, first I ranked all jobs by their wage percentile, where the percentile was using the wages over the entirety of the comparison periods (2001-2004, or 2002-2004, or 2004 only). Next, I calculated the net increase or decrease in employment for each job. Formally, this is represented as:

$$\Delta emp(p) = \sum_j ( \Delta emp_j | \Delta emp_j < 0, w_j \in w(p) ) + ( \Delta emp_j | \Delta emp_j > 0, w_j \in w(p) )$$

Here  $\Delta emp(p)$  is the change in employment at all jobs  $j$  paying wages within the set of wages  $w(p)$  that constitute the  $p$ th percentile.

Using kernel regression (bandwidth=.4), this increase  $\Delta emp(p)$  was regressed on the wage percentiles  $p$  of each job category for the time periods. The predicted increase or decrease for each percentile was divided by the number of base period employees in that percentile to get an aggregate

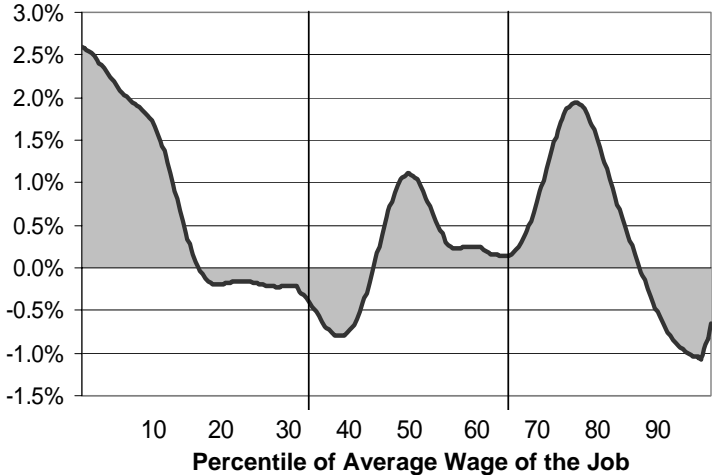
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<sup>7</sup> The distribution also shows the pitfall of picking arbitrary wages for comparisons. For instance, we could ask the following question: during the full period of study, is the proportion of growing jobs paying less than \$15/hr about the same as the proportion of shrinking jobs paying below \$15/hr? The answer would be “yes – about the same.” However, this masks the important point that growing jobs are more concentrated below \$12/hr, while shrinking jobs are more concentrated between \$12 to \$15/hr.

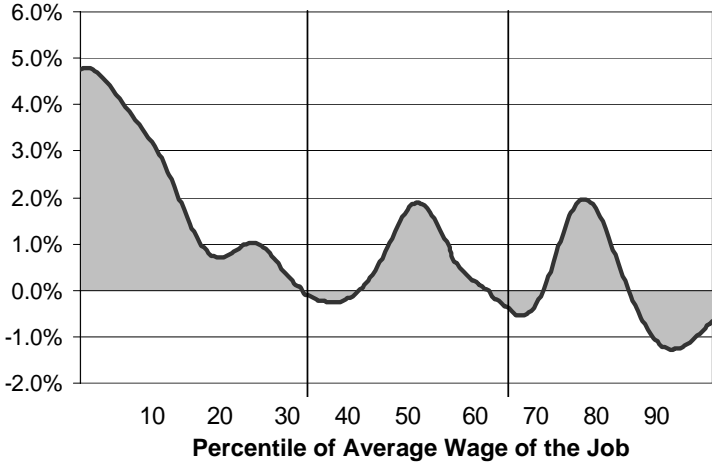
growth. This was in turn converted to an annualized rate which is reported below. Figure 6 below shows this growth rate throughout the wage distribution in the full period of 2001-2004, the recovery period of 2002-2004, and the current year of 2004.

**Figure 6: Annualized Employment Growth throughout the Wage Distribution**

**A. Full Period (2001-2004)**

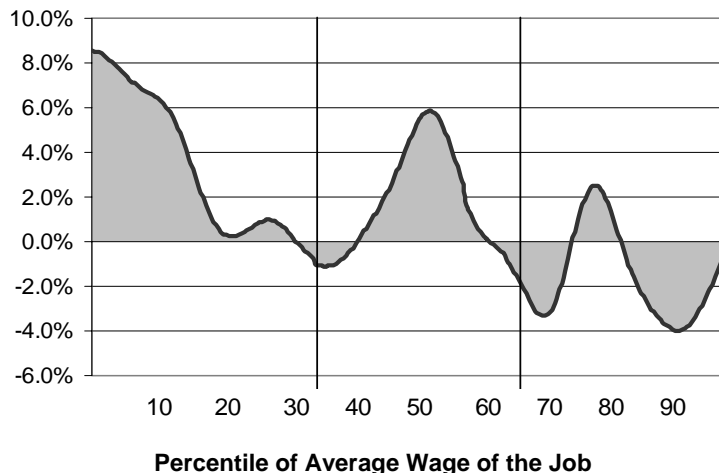


**B. Recovery Period (2002-2004)**





### C. Current Year (2004)



(2004 q3 uses data through August only)

Overall, the results conform to our findings on growing and shrinking jobs. The sharpest employment growth has occurred in jobs typically paying at the bottom third of the distribution; and this story is true for the current period, the recovery period, or the full period of analysis.

The change over the 3 periods occurs in terms of growth at the middle and top tiers. During the full period, there was strong net growth towards the top (between the 70<sup>th</sup> and 90<sup>th</sup> percentiles) although not above 90<sup>th</sup> percentile. In contrast, growth in the middle was relatively flat; there was an increase between the 50<sup>th</sup> and 70<sup>th</sup> percentiles but a decrease between the 30<sup>th</sup> and 50<sup>th</sup> percentiles of the wage distribution.<sup>8</sup>

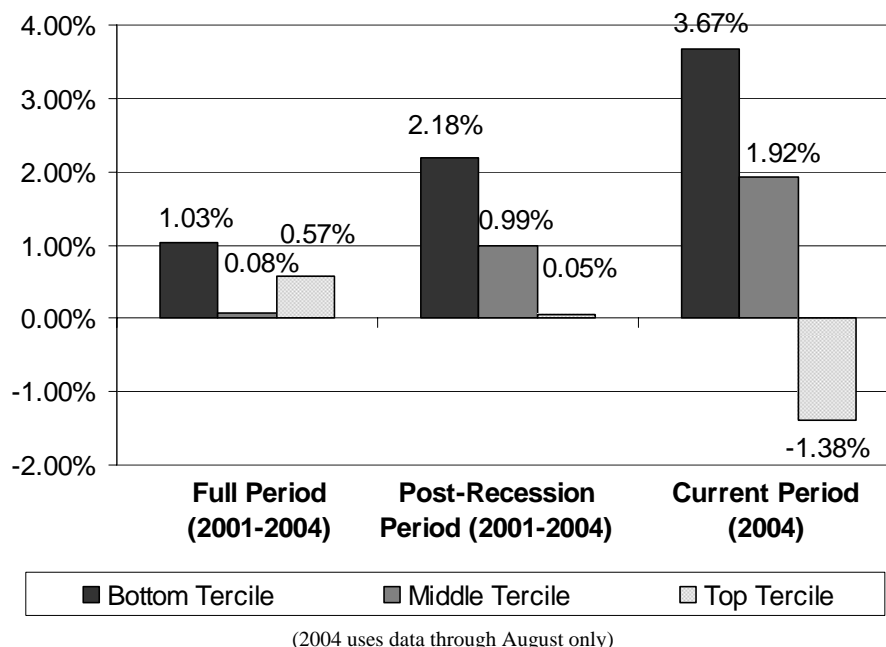
Comparing the recovery period to the full period, we find a greater growth at the middle third (between the 40<sup>th</sup> and 60<sup>th</sup> percentiles) during the recovery. However, there is also a corresponding drop in jobs at the top third. This trend of shrinking jobs in the top third and growing jobs in the middle is even more pronounced when we look just at the current year.

Overall, this confirms the findings from comparing the distributions of growing and shrinking jobs in section 3.2. *During the current year, a rebound in 'middle' jobs has been countered by a continuing surge in 'bottom' jobs and a net loss of jobs in the 'top' third.*

For ease of interpretation, the following figure charts job growth by wage terciles in the three periods.

<sup>8</sup> Overall, the patterns substantiate what one would have intuited from the discrepancy in the distribution of shrinking and growing jobs in Figure 5. The only difference is one might have thought there was no growth in top of the distribution based on Figure 5. Although the distribution of shrinking jobs has more weight above \$18/hr ("top third") than the distribution of growing jobs, the differences in the workers employed by shrinking and growing jobs and the relatively lower employment at high wages lead to an overall increase in that top third.

**Figure 7: Annualized Job Growth by Average Wage Terciles**



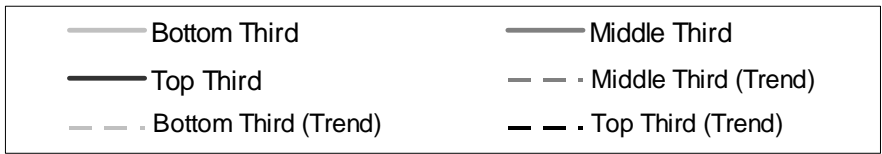
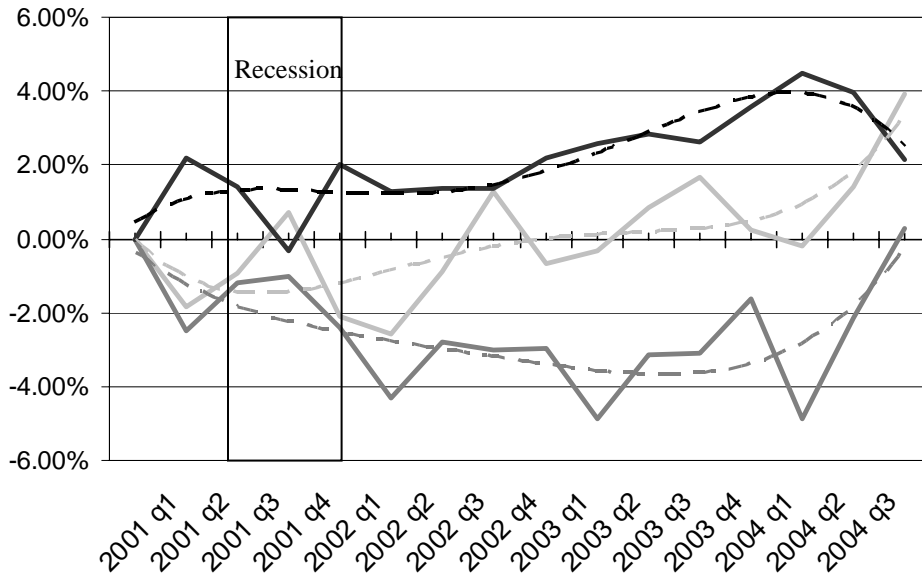
Over the full 2001-2004 period, jobs that typically pay in the middle third of the wage scale stayed flat, while jobs paying at the bottom grew by an annual average of 1.0%. Jobs at the top third saw an increase of 0.6%.<sup>9</sup> The growth pattern shifted in the recovery period. Jobs in the bottom third continued to surge at an annual rate of 2.2%, while those at the middle grew by 1.0%. Jobs at the top tercile grew only by 0.1%. This pattern sharpens over the current year, as jobs at the bottom third grew by an annualized 3.7%, while middle jobs grew by 1.9%, a nearly 2-to-1 ratio. In contrast, jobs paying at the top third shrank by 1.4%.<sup>10</sup>

One may wonder whether these results are driven by the choice of base period, or by idiosyncrasies of particular quarters. In the figure below, I report the employment growth in the three terciles throughout the 2001-2004 period. I also plot polynomial trends for visual aid. Average wages of jobs here are computed using the full 2001-2004 period. During the recession and the early recovery period, generally jobs paying at the top and bottom terciles grew while those at the middle shrank or stayed put. However, the past year has seen a sharp rise in both the bottom and middle terciles while the top tercile has fallen off sharply. Overall, this substantiates the findings above and indicates that the primary results are not driven by the choice of a particular base period.

<sup>9</sup> Note that this figure suggests that overall the number of jobs rose during this period. As noted in the introduction, this reflects the well known differences between the household data used here versus the payroll data. Generally, the payroll data is more reliable when analyzing the overall increases or decreases in employment. However, the household data is needed to do analysis of wage inequality and detailed composition changes.

<sup>10</sup> Over the full 2001-2004 period, the wages at the “bottom third” ranges below \$12.10 /hr; the middle third from \$12.11/hr to \$18.22 /hr, and the top third has average wages of above \$18.23 /hr.

**Figure 8: Aggregate Growth in Jobs at the Top, Middle, and Bottom Wage Terciles – 2001-2004 Period**



(2004 q3 uses data through August only)

## Appendix A: Definition of Jobs.

I use the Current Population Survey (September 2000 to August 2004). August 2004 is the most recent data available. The household survey is known to suffer from flaws in measuring overall job growth; it is well known that the CPS shows overall job growth belied by evidence from more accurate payroll based Current Establishment Statistics (CES). This is because of a number of adjustments to the CPS during the past few years which produced discontinuous jumps in population as well as employment; as well as less statistical precision of the CPS in terms of measuring employment. For this reason, the Bureau of Labor Statistics itself considers CES to be the more accurate gauge of employment trends. However, the publicly available payroll data only allows us to track industries, and is limited in helping us understand the composition of jobs.

A "job" is defined as 500 potential groupings defined as 2-digit industry by 1 digit occupation. 440 are found to have continuous data and used for the analysis. A job's "average wage" is wage over this entire period.

### Industries

Agriculture  
Forestry, logging, fishing, hunting  
Mining  
Construction  
Nonmetallic mineral products manufacturing  
Primary metals and fabricated metal products  
Machinery manufacturing  
Computer and electronic products manufacturing  
Electrical equipment, appliance manufacturing  
Transportation equipment manufacturing  
Wood products manufacturing  
Furniture and fixtures manufacturing  
Miscellaneous and not specified manufacturing  
Food manufacturing  
Beverage and tobacco products manufacturing  
Textile, apparel, and leather manufacturing  
Paper and printing manufacturing  
Petroleum and coal products manufacturing  
Chemical manufacturing  
Plastics and rubber products manufacturing  
Wholesale trade  
Retail trade  
Transportation and warehousing  
Utilities  
Publishing industries (except internet)  
Motion picture and sound recording industry  
Broadcasting (except internet)  
Internet publishing and broadcasting  
Telecommunications  
Internet service providers and data processing  
Other information services  
Finance

Insurance  
Real estate  
Rental and leasing services  
Professional and technical services  
Management of companies and enterprises  
Administrative and support services  
Waste management and remediation service  
Educational services  
Hospitals  
Health care services, except hospitals  
Social assistance  
Arts, entertainment, and recreation  
Accommodation  
Food services and drinking places  
Repair and maintenance  
Personal and laundry services  
Membership associations and organization  
Private households  
Public administration  
Armed forces

### Occupations

Management  
Professional  
Service  
Sales  
Administrative  
Farmworkers  
Construction  
Maintenance  
Production  
Transportation