

## IT AIN'T OVER TILL IT'S REALLY OVER

### Slow growth will lead to rising unemployment in 2002 and high unemployment in 2003

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According to economic forecasts, the recession will soon be over. These forecasts predict that the economy will start growing, albeit slowly, in the spring of this year.

Most of the media coverage of the current recession has focused on this question of when it will end, as measured by a return to positive GDP growth. But what these public discussions fail to take into account is that the terms “recession” and “recovery” mean different things to different people. For many forecasters, a recovery refers to the point at which the economy stops shrinking and begins expanding as measured in terms of gross domestic product (GDP), or the output of goods and services.

Working families, however, tend to think of recessions more in terms of unemployment, reduced weekly hours, lower wage increases, and loss of family income. From this perspective, a recovery begins when unemployment begins to fall, and this is likely to occur well after GDP reverses course. Absent an effective stimulus package, GDP simply will not grow fast enough to prevent increased unemployment.

For working families to begin to recover from the current downturn, the economy must grow by at least 3.0% to 3.5% to prevent unemployment from rising. This level of growth is necessary for the labor market to absorb new workers and increases in productivity (i.e., the efficiency of the economy). Consequently, attaining positive but slow growth, as some expect in spring 2002, will not prevent unemployment from continuing to grow. In fact, estimates of a spring 2002 recovery are quite consistent with unemployment rising to 6.5% by late 2002. If, as we suspect, growth will be slow in 2003, then the

unemployment rate will likely stay at 6.0% and above, which is well above the low levels of unemployment achieved at the end of the last recovery.

Long after the economy begins to grow again, and even after unemployment stops climbing, it may be years before the jobless rate returns to the 4.0% level enjoyed at the end of 2000, and years more before families see their incomes return to pre-recession levels. In the last two recessions real income for the median family actually declined for three to four years, and it took another three to four years to restore incomes to their pre-recession levels.

If the economy continues along its present course:

- Unemployment will likely reach 6.5% in November 2002 and stay between 6.0% and 6.5% throughout 2003, even though GDP growth is forecasted to return this spring. GDP growth will not grow fast enough to keep unemployment from rising, let alone push it back down to 4.0%.
- When unemployment reaches 6.5% in November, the black unemployment rate will rise to at least 11.3%; the Hispanic rate to 9.0%; the black teenage rate to 35.3%; and the rate for women who head families to 8.6%.
- Several industries and occupations will have higher than average increases in unemployment, especially cyclically sensitive industries like manufacturing and construction as well as other blue-collar occupations. Service industries have also been harder hit in this recession relative to past downturns.
- The rise of unemployment from 4.0% in November 2000 to 6.5% in November 2002 will reduce wage growth and work hours. A 2.5% rise in unemployment reduces a middle-class family's earnings by 4.5% (or \$1,816) from what it otherwise would have been. For families in the lower 40% of the wage scale, the decline in family earnings will be twice as significant, dropping by 9.3%.
- The recession-induced departure from full employment—that is, the increase from 4.0% to 6.5%—will likely end the recent period of persistent hourly wage gains for low- and middle-wage workers, reducing annual real wage growth by 2-3% for low-wage workers and by 1-2% for middle-wage workers.

## **The difference between a recovery in output and unemployment**

The current recession began, according to the National Bureau of Economic Research (NBER), in March 2001. Given that the average GDP downturn in the postwar period has lasted, on average, 11 months, it is not surprising that many forecasters are predicting economic growth will resume sometime in the first half of 2002.

Positive economic growth, however, will not necessarily reverse the recent rise in unemployment (from 3.9% in October 2000 to 5.8% in December 2001). This is not just a matter of a lag in which employers first try to meet growing demand without adding workers but then have to eventually increase hiring. Rather, the slow pace of growth in the early part of the recovery (and perhaps through 2003) will

not be enough to drive unemployment down and will, in fact, contribute to its growth through 2002.

Ultimately, there are two reasons why the economy needs to grow at least 3.0% per year in order to keep unemployment from rising. First, the labor force grows by about 1% annually, as new labor force entrants (e.g., recent high school or college graduates, women reentering the labor market) seek work. Second, productivity growth allows the economy to grow without adding employment. The trend in productivity growth is now approximately 2.0-2.5% annually. This means that the economy could maintain the same production of goods and services (i.e., zero growth) with 2.0-2.5% fewer workers (or hours worked), or, alternatively, the economy can grow by this amount without adding any jobs. In the end, a growth rate of less than 3.0-3.5% (based on 2.0-2.5% productivity growth and 1.0% labor force growth) is not sufficient to provide jobs to new entrants and to move people from unemployment to employment. To be conservative, this analysis will assume a stable unemployment growth rate (SUGR) of 3.0%.<sup>1</sup>

The economy's growth will be slow, at best, in the near future, for a variety of reasons. Investment has been negative despite low interest rates and ample corporate cash-on-hand, primarily because of substantial overcapacity. Foreign growth is expected to be even slower than U.S. growth, making it unlikely that net exports will rise and boost domestic growth. And without a booming stock market driving up consumption, consumer spending will be limited by high debt and sluggish income growth. Savings may also go back to earlier norms, thus slowing consumption growth even further. In addition, the consequences of the September terrorist attacks will still be felt in the travel and hospitality industries. It also seems unlikely that federal fiscal policy will boost growth substantially via new tax cuts or spending. States are also facing fiscal constraints, and many are cutting their budgets, further reducing economic activity. All of these factors suggest that there are no emerging sources of fast-growing demand on the horizon in an economy with substantial overcapacity.

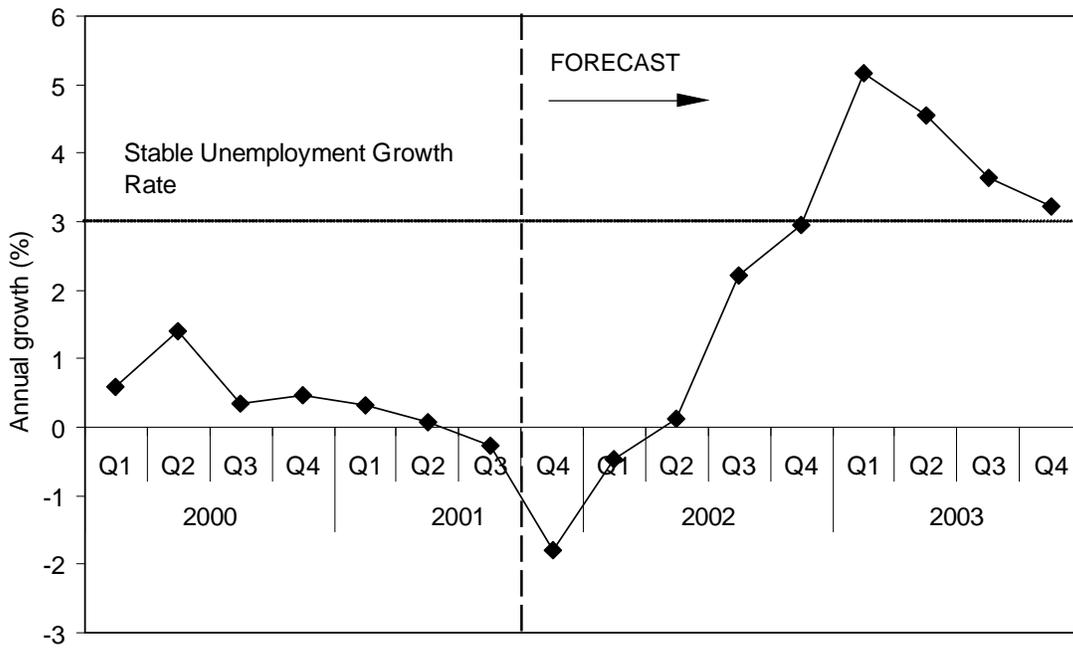
We illustrate the return of positive economic growth accompanied by rising and then sustained high unemployment through an analysis of the projections of a leading macroeconomic forecasting firm, Economy.com.<sup>2</sup> **Figure A** shows GDP growth beginning in early 2000, with negative growth starting in the third quarter of 2001 and forecasted to continue through early 2002. GDP growth is expected to turn positive in the second quarter of 2002 and remain so into 2003.

But what of unemployment? The path of GDP growth in **Figure A** corresponds to the growing unemployment shown in **Figure B**.<sup>3</sup> Because the economy is projected to grow at a rate lower than 3.0% (our assumed SUGR) for the first three quarters of 2002, the unemployment rate will continue growing and reach 6.5% in the fall of 2002. Growth in late 2002 and in 2003 is not expected to be sufficient to drive unemployment down, resulting in an unemployment rate in 2003 of at least 6.0%.

There are ways that this forecast could be either overly pessimistic or optimistic. Unemployment could be even higher than these projections suggest if some of the downside risks in the economy emerge as problems. These problems could include: difficulties in reducing overcapacity in the manufacturing, telecommunications, and high-technology sectors; the dampening of growth due to excessive corporate and household debt; or a drop in foreign growth. This forecast may also be overly optimistic if the assumed stable unemployment growth rate of 3.0% overestimates the productivity of labor force growth. A lower SUGR assumption would also mean somewhat lower unemployment in 2002 and 2003.

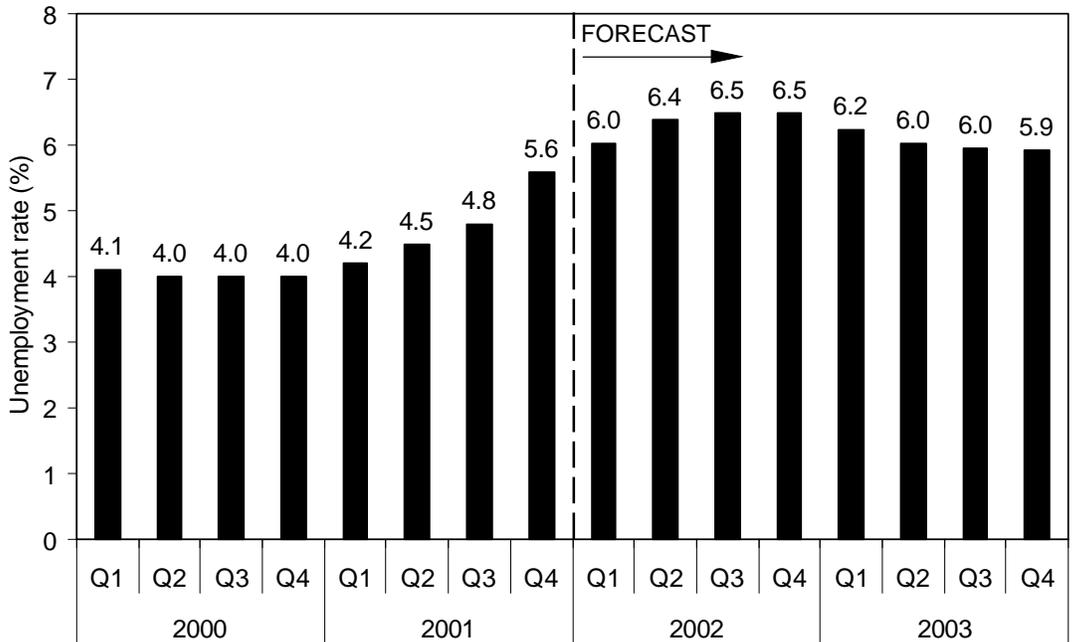
**FIGURE A**

**GDP growth, 2000-03**



**FIGURE B**

**Unemployment rate, 2000-03**



An analysis of the Blue Chip Forecast (from January 10, 2002) suggests that Economy.com's GDP forecast is not out of line with that of other forecasters. The predicted growth of real GDP over the next two years (fourth quarter 2003 over fourth quarter 2001) is actually slightly greater in the Economy.com forecast (6.6%) than in the Blue Chip forecast (6.3%). However, the Economy.com forecast is more pessimistic in the first year (2.2% vs. the Blue Chip's 2.7%), but more optimistic in the second year (4.4% vs. 3.5%). The goal in this analysis is to portray the future assuming there is no federal fiscal stimulus package, both because Congress failed to pass one and because the policy issue is naturally framed by how the economy will look absent a stimulus. We have chosen to rely on the Economy.com forecast of GDP because, unlike the Blue Chip forecast,<sup>4</sup> we can adjust the Economy.com forecast to remove the assumed stimulus.

## **Who bears the burden of high unemployment?**

When national unemployment is at 6.5%, as it may possibly be this fall, unemployment is even higher for more cyclically sensitive occupations, industries and demographic groups. **Tables 1 and 2** present estimates of the structure of unemployment, that is, unemployment rates by race, gender, age, education, industry, and occupation groups, when overall unemployment averages 6.5%. These rates are based on the pattern of unemployment growth in the four preceding recessions, which was used to extrapolate unemployment for each group from the December 2001 rate to the rate that can be expected when the national rate goes to the assumed 6.5% (see appendix for detailed methodology).

When unemployment reaches 6.5%, unemployment among minorities is much higher. The black unemployment rate will be 11.3%, with black male unemployment reaching 11.9%. The Hispanic unemployment rate will be 9.0%. Teenagers will be hard hit, with unemployment rates of 17.9%. The rate for black and Hispanic teens will reach 35.3% and 21.7%, respectively.

The unemployment rate for white women will rise 2.0 points (one of the smallest increases for any group), but for black women it will rise 4.2 points, more than for any group except teens.

Women who maintain families will experience a 3.1 percentage point rise in unemployment to 8.6%. About 70% of this group are single mothers, some of whom previously made up the welfare population. The fact that their unemployment rate is rising faster than average raises the question of how work-based welfare reform will fare when jobs are especially scarce.

As for the mitigating effects of education, unemployment will grow among all education groups, but the greatest growth will be among those without a high school degree (up 3.3% to a 9.8% rate).

As Table 2 shows, cyclical industries such as manufacturing and construction will have unemployment rates of 7.9% and 10.6%, respectively. Even the service industry — which includes personal and business services and is often deemed “recession immune” — will have a 6.0% unemployment rate.

White-collar occupations have already seen a rise in unemployment since October 2000, and this sector will see unemployment climb even higher. But blue-collar occupations will see the larger increase in unemployment (an overall growth of 3.5% or 3.8%) to a rate of 6.8% among the “skilled” blue-collar workforce, or to a rate of 10.1% among the “semi-skilled and unskilled” blue-collar workforce.

**TABLE 1**  
**Unemployment rate by demographic group when unemployment reaches 6.5%**

Group	“Full employment” Oct 2000	Most recent month Dec 2001	Forecast assuming 6.5% unemployment	Change from 3.9% to 6.5% unemployment
<b>RACE / GENDER</b>				
<b>Total</b>	3.9	5.8	6.5	2.6
Male	3.9	5.8	6.6	2.7
Female	3.9	5.8	6.4	2.5
<b>White</b>	3.4	5.1	5.8	2.4
Male	3.4	5.2	5.9	2.5
Female	3.5	5.0	5.5	2.0
<b>African American</b>	7.4	10.2	11.3	3.9
Male	8.2	10.4	11.7	3.5
Female	6.6	10.0	10.8	4.2
<b>Hispanic</b>	5.0	7.9	9.0	4.0
Male	4.5	7.1	8.5	4.0
Female	5.5	8.5	9.2	3.7
<b>AGE</b>				
<b>16 to 19</b>	12.7	16.2	17.9	5.2
African American	24.4	33.4	35.3	10.9
Hispanic	12.5	19.2	21.7	9.2
<b>16 to 24</b>	8.9	11.9	13.0	4.1
<b>25 to 54</b>	3.0	4.7	5.3	2.3
<b>EDUCATION</b>				
Less than high school	6.5	8.8	9.8	3.3
High school	3.5	4.9	5.6	2.1
Some college	2.3	4.3	4.8	2.5
College graduate	1.6	3.1	3.3	1.7
<b>Women who maintain families</b>	5.5	8.0	8.6	3.1

Source: Authors' analysis. See Technical Appendix for details.

## High unemployment brings family income losses

There are a variety of ways the impending increase in unemployment will lead to lower family income. Besides the obvious loss of earnings that is only partially offset by unemployment insurance, higher unemployment also results in greater underemployment. For instance, the share of the workforce working part time but wanting a full-time job (so-called “involuntary part-time workers”) increases. When unemployment is high and job opportunities are scarcer, there is also a slowdown in the number of adults seeking work, a phenomena not captured by official measures of unemployment. Overall, as unemployment rises there is a corresponding deterioration of job quality as people reluctantly accept temporary or part-time jobs, jobs that offer fewer hours, or jobs for which they are overqualified. In fact, this growth in underemployment is larger than the actual growth in unemployment. Higher unemployment also

**TABLE 2**  
**Unemployment rates**  
**by industry and occupation when unemployment reaches 6.5%**

Group	"Full employment" Oct 2000	Most recent month Dec 2001	Forecast assuming 6.5% unemployment	Change from 3.9% to 6.5% unemployment
<b>Total</b>	3.9	5.8	6.5	2.6
<b>INDUSTRIES</b>				
Mining	6.1	6.1	7.0	0.9
Construction	6.5	8.9	10.6	4.1
Manufacturing	4.0	6.8	7.9	3.9
Transportation, communications, and utilities	2.7	6.1	6.6	3.9
Wholesale and retail trade	4.9	7.1	7.7	2.8
Finance, insurance, and real estate	2.4	3.0	3.3	0.9
Services	3.5	5.5	6.0	2.5
Government	2.0	2.4	2.7	0.7
<b>OCCUPATIONS</b>				
<b>White collar</b>				
Managerial and professional specialty	1.7	2.9	3.2	1.5
Technical, sales, and administrative support	3.5	4.7	5.2	1.7
<b>Service</b>				
Service occupations	4.7	6.2	6.8	2.1
<b>Blue collar</b>				
Precision production, craft, and repair	3.3	5.8	6.8	3.5
Operators, fabricators, and laborers	6.3	9.2	10.1	3.8

Source: Authors' analysis. See Technical Appendix for details.

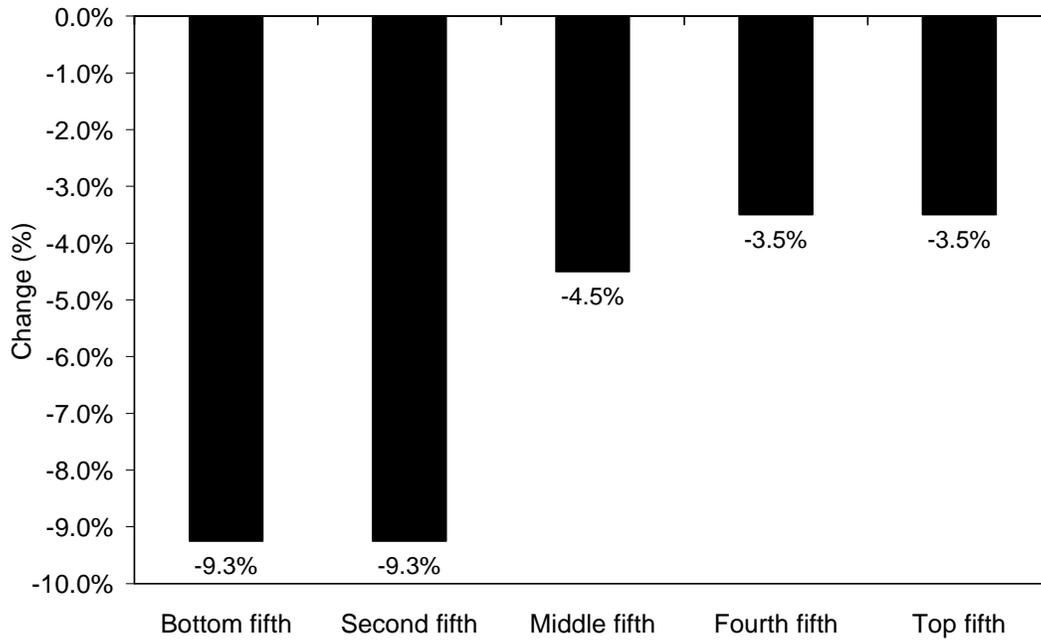
slows down the growth in the wages of still employed workers. **Figures C and D** show the estimated effect of higher unemployment on family earnings (i.e., the total wages earned by family members in a year).<sup>5</sup> These estimates combine the negative impact of higher unemployment on both hourly wages and the amount of time spent working (in terms of weeks and hours worked).

Figure C shows that families in the bottom 40% of the wage scale are the most vulnerable group, with a 6.5% unemployment rate resulting in a 9% loss in annual earnings. This earnings reduction reflects the greater likelihood that low-income family members become unemployed, work fewer hours, and have lower wage growth as unemployment rises. Nevertheless, family earnings are also significantly reduced for other income groups, with earnings declines of 4.5% for families in the middle fifth and over 3% for families in the upper 40% of the wage scale.

Figure D shows these losses in terms of actual dollars.<sup>6</sup> These estimates show that high unemployment will lower a middle class family's earnings by \$1,816 relative to what these earnings would have

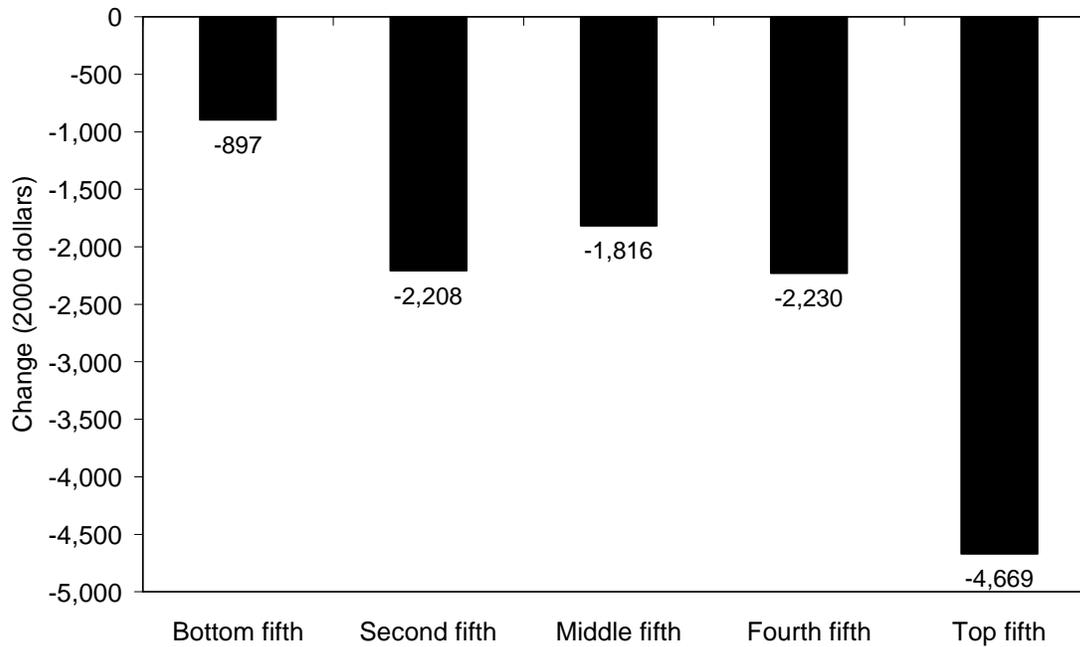
**FIGURE C**

**Effect of 2.5% higher unemployment on family earnings (percent)**



**FIGURE D**

**Effect of 2.5% higher unemployment on family earnings (dollars)**



**TABLE 3**  
**Change in annual real wage growth due to 2.5% increase in unemployment**  
 (low- and middle-wage workers by gender)

	Males		Females	
	Low wage	Middle wage	Low wage	Middle wage
<b>Unemployment rate of:</b>				
4.0%	1.7%	0.8%	1.9%	1.3%
6.5%	-0.4%	-1.2%	-0.9%	0.2%
<b>Impact of 2.5% higher unemployment</b>	-2.1	-2.0	-2.9	-1.1

Source: Authors' analysis. See the Technical Appendix for details.

been if 4% unemployment had been maintained. (Because family earnings are smaller for lower-income families, their absolute dollar losses are smaller than those of upper-income families even though their percentage losses are greater.)

The estimates in Figure D have been constructed to illustrate how a 2.5% increase in unemployment affects families. The actual effect will occur in stages as unemployment rises and will continue until unemployment returns to its prior level of 4%. Thus, the actual losses will be far larger because they will occur for a number of years.<sup>7</sup>

## High unemployment causes slower wage growth

Higher rates of unemployment brought on by the downturn are particularly damaging to the wage growth of low- and middle-income workers. Moving from full employment to recessionary levels is likely to mean the difference between real wage gains and stagnant wage growth.<sup>8</sup>

**Table 3** shows the change in annual real wage growth due to a 2.5% increase in unemployment. The values in the first row of Table 3 represent the predicted growth of real wages at the 20th and 50th (median) percentiles under tight labor markets, with unemployment at 4.0%. Real wages grow at a 1.7% annual rate for low-wage males and 1.9% for low-wage females. Note that in both cases, these gains are greater than those at the median, suggesting that the low unemployment that prevailed in the latter 1990s helped to compress the wage gap between middle- and low-wage workers.<sup>9</sup>

The second row in Table 3 shows the likely growth of hourly wages at 6.5% unemployment. Real wage growth slows in each case, and turns negative (real losses) for males and low-wage females. The impact of a 2.5% higher unemployment rate leads to real annual hourly wage losses of about 2% for both low- and middle-wage males, and a considerably larger loss (2.9%) for low-wage females.

While these effects may seem large, they are actually quite reflective of the actual paths of unemployment and wage growth in the latter 1990s (Bernstein 2002). For the first time in decades, unemployment decreased enough to give the least-advantaged workers the bargaining power they lack when the

unemployment rate is above 5%, where it stayed throughout the 1980s and early 1990s. Only at full employment will the labor market produce the wage pressure needed to generate broad-based wage growth.

## Conclusion

According to numerous forecasts, the recession that began in March 2001 is expected to end by spring 2002. The positive economic growth associated with the next recovery will be a welcome reversal for the economy. But few analysts have noted that, even once the economy begins to grow again, unemployment will continue to rise, most likely by another 0.7 points from its December 2001 rate, to 6.5%, by next fall.

The costs to working families of this high rate of unemployment must not be overlooked. According to these forecasts, the difference between the tight labor markets that prevailed in the latter 1990s and the recessionary conditions likely to occur this year means the difference between rising or stagnating living standards for middle- and low-income working families. It should thus come as no surprise that for many such families, positive GDP growth offers no solace when unemployment is rising.

Moreover, when unemployment is 6.5%, on average, there are vulnerable segments of the workforce with much higher unemployment. Some groups of minority workers are already experiencing double-digit unemployment rates, and their unemployment will continue to rise faster than the average rate. Other vulnerable groups that will likely experience larger than average increases include younger workers, high school dropouts, and those in cyclically sensitive industries like manufacturing and construction. Single mothers are also expected to be disproportionately affected, challenging the welfare-to-work component at the heart of welfare reform.

In order to blunt or even reverse these effects, the Bush Administration and Congress need to act quickly to pass an effective stimulus package. As stressed in Scott and Weller (2001), the purpose of such a bill is to stimulate demand by getting money in the hands of those who will spend it. Useful channels for infusing the economy with this additional funding include the unemployment insurance system and tax rebates targeted at low-income working families who missed out on the first round of rebates. This is also a good time to increase public investment in much-needed areas, including school construction and public safety.

To devote stimulus resources to corporations when sales are sluggish is a clear mistake. Many of these firms already have enough cash on hand and won't begin investing and hiring again until consumer demand resumes.

Finally, given even seemingly optimistic growth projections, the unemployment rate is unlikely to fall back down to below 5%—the rate needed to generate real income gains for most working families—either this year or next. In fact, unemployment in 2003 is likely to remain closer to 6%. Thus, it would be a serious policy mistake to think that, with the recovery imminent, a stimulus package is no longer needed, or that it needs to focus strictly on 2002.

The latter 1990s taught us the vital importance of truly low unemployment. For the first time in decades, real wages and incomes of low-income working families grew persistently. The seemingly inexorable growth of income inequality was halted. Even crime rates fell, as legitimate economic

opportunities finally appeared for many disadvantaged workers. Welfare reform also got a real boost from the strong economic conditions. Now these gains are under siege by the recession and its aftermath. The federal government has a responsibility to do all it can to mitigate and reverse these effects, with the goal of returning to full employment—the 4% level successfully reached just a short time ago—as soon as possible.

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## Endnotes

1. There is also considerable uncertainty as to whether productivity will return to its 2.5% trend growth rate achieved in the second half of the 1990s once the recovery is underway. Furthermore, laborforce growth may be slow at the start of the recovery.
2. These estimates are from December 2001. We adjusted the projections to remove the impact of an assumed \$100 billion stimulus package. We assumed that 70% of the stimulus would have been spent domestically (taking into account imports and saving), and we assumed a multiplier of 1.5, yielding an impact of 1% of GDP. We wedged this into the growth projections over 2002 and into the first half of 2003. The largest impact is assumed to take place in the last half of 2002.
3. We abstract from lags here.
4. The Blue Chip is a consensus of numerous forecasts, and specific information is unavailable on the stimulus assumptions for individual forecasters.
5. We rely on the estimates of Blank and Card (1993) who examined the data for the 1967-91 period.
6. The data from this figure come from the 2001 March Current Population Survey, with annual family earnings for the prior year. Families are sorted by family income, and average family earnings are calculated for each quintile.
7. The annual losses will be less since unemployment will be less than 6.5% in the years before and after the recession trough. Nevertheless, the cumulative loss will far exceed those illustrated in Figures C and D.
8. We use a simple “wage curve” model for the relationship between unemployment and wage levels to examine the potential impact on hourly wages of higher unemployment. Specifically, we estimate how much the real hourly wages of low- and middle-wage workers might be expected to grow in a given year with unemployment at either 4% or 6.5%.
9. The increase in the minimum wage, 1996-97, had a similar, though smaller (than unemployment) impact on low-wage growth, particularly for females (Bernstein 2002).

## Technical Appendix

### *Forecasting unemployment rates for groups*

To project group unemployment rates (Table 1), we examined the historical relationship between the growth in group unemployment rates and the overall unemployment rate over the course of past recessions. In order to capture the entire scope of each downturn, we dated each recession using unemployment rates, with low unemployment dictating the peak and high unemployment the trough. We used monthly data for all categories except education, for which we used annual data from the 1973 and early 1980s recessions only.<sup>1</sup> We combined the two recessions of the early 1980s and considered them one downturn. The earliest recession we used begins in 1969, though in some cases this or other recessions were excluded due to lack of data.

For each recessionary period, we divided the growth in the unemployment rate for each group over the entire downturn by the overall rate, yielding each downturn's "multiplier." We then averaged these multipliers across all of the available recessions. The resulting multipliers represent the relationship between growth in each group's unemployment rate and the growth in the overall rate.

We then estimated future unemployment rates by multiplying a given growth in the overall unemployment rate by the multipliers. This calculation results in a growth prediction for each group's rate, which we then add to the December 2001 unemployment rates to create forecasts for each group. This approach assumes that prior recessionary relationships between the growth in overall and group unemployment rates are reliable predictors for the current recession.

An example of this procedure is as follows: in the recession of the early 1990s the unemployment rate for African Americans grew 4.1 percentage points. The overall rate, on the other hand, grew 2.6 points. The ratio of these values (the multiplier for this recession) is 1.58. Repeating this calculation for each downturn and averaging results produces a multiplier of 1.5, suggesting that, on average, the absolute value of the African American unemployment rate grows 1.5 times that of the overall rate. If we assume that during this recession overall unemployment will rise 0.7 points, from the present level of 5.8% to 6.5%, then we can also estimate that the rate for African Americans will rise by 1.1 points ( $0.7 * 1.5$ ). Adding 1.1 to the present level of 10.2 arrives at a predicted unemployment rate for African Americans of 11.3%.

### *Wage curve regressions*

The wage curve regressions underlying Table 3 use quarterly nominal national wage data from the outgoing rotation group files of the Current Population Survey.<sup>2</sup> The log of these nominal values at the 20th and 50th percentiles are regressed on a 3rd degree polynomial distributed lag (PDL), with eight lags, of the (logged) unemployment rate, seasonal dummies, and two lags of the dependent variable (Bartik's (2000) specification is similar, though he doesn't use a PDL for unemployment).

While the two lags of the dependent variable are necessary for whitening the residuals, they clearly soak up much of the variance in the model (all models have white noise residuals, as shown by both Q-statistics from the correlogram and Breusch-Godfrey Serial Correlation LM tests). Still, the sum of the unemployment coefficients on the PDLs is consistently significant (and negative) and in the range of other estimates in the literature.

For the simulations, we impose two different paths on the unemployment rate and then generate dynamic estimates of the dependent variable (i.e., the model predicts the lagged dependent variables, as opposed to a simulation that plugs in the actual values). For the full employment scenario, unemployment stays at 4% starting in the fourth quarter of 2000 (the actual rate) through the end of the simulation in the second quarter of 2003. For the recessionary simulation, unemployment increases to 6.5% in the third quarter of 2002, as in Figure B. We then hold unemployment at that rate for the rest of the simulation period, thereby allowing the lag structure of unemployment to have its predicted impact on wage levels.

The simulations generate two paths of wage growth, and we calculate the percent change in nominal wages from the second quarter of 2002 to the last simulated observation, the second quarter of 2003, for both series. To generate the real estimates in the table, we subtract the rate of inflation from this nominal growth rate. For the high unemployment scenario we use the consensus consumer price index inflation forecast from the most recent (January 10) Blue Chip forecast, which is 2.3%.

For the low unemployment forecast we increased this inflation rate, based on the assumption that lower unemployment will generate faster price growth.<sup>3</sup> We use Bartik's (2000) estimate that a 1% decline in unemployment raises inflation by 0.4%. Over the period from second quarter 2002 to second quarter 2003, the average

growth in unemployment is about 1%, so we add 0.4% to the inflation rate cited above. Thus, the inflation rate consistent with 4% unemployment is 2.7%, and we subtract this value from the nominal growth rates in the 4% simulation.

## Appendix Endnotes

1. We used published BLS data for unemployment rates by education level. These data are for ages 25-64, whereas the current BLS education series (used in the first two columns of Table 1) are for ages 25-plus.
  2. See the methodological appendix for EPI's Quarterly Wage and Employment Series (available at <http://www.epinet.org/qwes/qwesappendix.html>) for a description of how this series is constructed.
  3. Note that this does not imply acceptance of a model wherein prices continue to escalate due to low unemployment; it simply assumes that prices would increase faster at 4% than at 6.5% unemployment.
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