Increasing Earnings Inequality and Unemployment in Developed Countries: Markets, Institutions and the ‘Unified Theory’

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Abstract

It is widely accepted that global forces of technology and trade have caused a profound shift in labor demand towards the most highly skilled, generating sharply rising earnings inequality in flexible labor markets (the U.S.) and persistently high unemployment in rigid labor markets (Europe). This paper critically assesses the evidence for this “Unified Theory.” It finds little compelling empirical support for either the skill-biased demand shift explanation for high U.S. earnings inequality or the rigid labor markets explanation for high unemployment in Europe. This assessment challenges the policy orthodoxy of the 1990's that developed economies feature a strict inequality-unemployment tradeoff and that policy options are therefore limited to skills enhancement in the U.S. and labor market de-regulation in Europe. It is suggested that the theoretical dominance of the textbook supply/demand model has contributed to the neglect of labor market institutions for U.S. wage outcomes and tight macroeconomic policy for European unemployment.

By the early 1990's, earnings inequality in the United States and unemployment throughout much of Europe had risen to unprecedented levels and concern over the economic well-being of less-skilled workers appeared at the top of the policy agenda. At about the same time, a broad consensus had been reached about the source of this decline: global forces had generated a protracted imbalance in demand and supply in the labor market, a mismatch caused mainly by computerization in the workplace. As Paul Krugman put it, “the growth of earnings inequality – and quite possibly therefore much of the rise in structural unemployment in Europe – has been the result of technological changes that just happen to work against unskilled workers.” Various characterizations as the “Unified Theory” and the “Trans-Atlantic Consensus,” this account has been enormously influential in policy circles for all the obvious reasons: the story is simple, it is consistent with the economist’s supply/demand model of the labor market, and the policy implications are clear. In our computerized global economy, vastly higher cognitive skills are required of a large fraction of the U.S. workforce and far greater labor market flexibility is needed in Europe.

Is this elegant and highly influential vision of recent labor market outcomes strongly corroborated by the facts? This paper assesses the empirical evidence for several key predictions of the Unified Theory. The first concerns the growth in earnings inequality across countries. If the source of the earnings and employment problems of the less-skilled can be found in skill-biased demand shifts, we should observe a strong tendency for wage inequality to increase across the developed world. This should be the case even in countries with strong institutional protections for the least skilled, since skill-biased demand shifts that dominate changes in supply will produce rising relative wages for the most skilled.

Second, since the Unified Theory points to constraints on labor market flexibility as a primary cause of high unemployment, we should observe a clear tradeoff between earnings inequality and unemployment across countries – relatively high wages for the less skilled earnings will price them out of jobs. Similarly, high earnings inequality should be associated with high employment rates.

Third, the Unified Theory explains high European unemployment as a consequence of the labor market rigidities imposed by Welfare State regulations and institutions. Several dimensions of this claim can be addressed with the available evidence: 1) because of the rigidities imposed
by European welfare states, the European unemployment experience should be clearly
differentiated from that of the U.S. over a substantial period of time; 2) because skill-biased
demand shifts are at the heart of the story, the rise in European unemployment should have been
driven by the less-skilled, with declining unemployment rates for the more highly skilled (for
whom demand has risen); and 3) statistical tests should show that unemployment is accounted for
in large part by “employment unfriendly” labor market institutions.

Finally, a fourth empirical prediction is that the growth of earnings inequality and the
collapse of low-skill wages in the United States can be explained mainly by the demand shifts
casted by skill-biased technological changes stemming from the use of information technologies
(IT) in the workplace.

This paper assesses the evidence for these four fundamental predictions of the Unified
Theory. The main conclusion of the paper is that supportive evidence has remained remarkably
thin, particularly given its widespread acceptance. In short, wage inequality growth is not
pervasive across the OECD countries and the evidence for a tradeoff between unemployment
and inequality is ambiguous at best. Concerning European unemployment, there are numerous
anomalies: trends across the OECD are far from uniform; the U.S. did not show distinctively
lower unemployment until the late 1980’s and European unemployment rates have lately shown
strong convergence towards U.S. levels; where unemployment has risen, it has done so across
skill groups, not just for the least skilled; and unemployment rates across countries are not
impressively accounted for by the usual welfare state suspects (measures of wage rigidity and the
generosity of unemployment benefits), particularly in the 1990s.

On the U.S. side, the skill-biased demand-shift story of the wage collapse founders on at
least three counts. The first is the timing of changes in the skill mix of employment, the effective
use of IT in the workplace, and the growth in wage inequality. The second is the failure of recent
research to convincingly explain much of the change in relative earnings with measures of
computer-based technological change. And the third is the failure to confirm with direct evidence
that large relative demand shifts distinguished the 1980’s and that these shifts, in fact,
‘overwhelmed’ relative supply shifts.

This absence of compelling empirical support for the Unified Theory challenges the
current policy orthodoxy, that high European unemployment must be addressed with a strong
dose of the American model of labor market de-regulation and that any attempt to address high wage inequality in the U.S. with labor market institutions will only produce European levels of unemployment. This review of the evidence suggests that the continued status of the Unified Theory as conventional wisdom can be explained less by the compelling nature of the evidence than by the power of the simple demand/supply vision of the labor market. This vision, in turn, has limited research into alternative accounts. I suggest that pro-market ideological shifts played a central role on both sides of the Atlantic, resulting in political decisions that have eroded institutional protections for lower skill workers in the U.S. and constrained the growth in job opportunities in Europe.

The next section outlines the Unified Theory, in which shifts in supply and demand schedules are shown to generate rising inequality in flexible labor markets (the U.S.) and unemployment in rigid markets (Europe). The following sections consider the evidence bearing on cross-national trends in earnings inequality; the association of these trends with the incidence of unemployment (the “jobs-equality tradeoff”); the consistency of the conventional wisdom with evidence regarding both the sources of unemployment and employment rate trends in OECD countries; and trends in skill mix, computerization, demand and supply shifts, and relative wages in the United States.

THE TEXTBOOK MODEL AND THE CONVENTIONAL WISDOM

At the heart of the Unified Theory is a skill mismatch story: since the 1970s the skills demanded by employers have been far greater than the skills supplied. In the flexible U.S. labor market, the result has been collapsing wages and rising earnings inequality. As Rebecca Blank has explained, “Fundamentally, the demand for less-skilled workers appears to be declining faster than the number of less-skilled workers, and their wages are therefore drawn downward.”5 In Europe, labor market institutions (the collective bargaining system) and government policy (minimum wage and employment protection laws) keep wages from adjusting, causing slow employment growth and high unemployment rates. Reflecting the conventional wisdom on both sides of the Atlantic, the OECD Jobs Study explains that the root cause of the decline in economic well-being of the least skilled is “the failure to adapt satisfactorily to change. In the U.S., workers have not upgraded their skills fast enough. In Europe, by contrast, such low-wage
jobs were, by and large, disallowed by society, whether through state-imposed or union-negotiated wage floors and employment protection.⁶

Although the recent literature offers some evidence for skill-biased demand shifts, the demand-shift explanation for the massive growth in earnings inequality is one that depends upon the dominance of demand over supply shifts. The stylized fact that the shift in demand toward higher skilled workers must have overwhelmed shifts in relative supplies is deduced from the simple competitive model: since we know that the relative wage of skilled workers increased with an increase in their relative supply (at least as measured by educational attainment), there must have been an even larger increase in the relative demand for their services. The European side of the story - high unemployment - is then shown by placing a floor on downward movements in wages.

This conventional demand-shift story rests on two crucial assumptions. The first is that wage-setting is viewed to occur along demand and supply schedules which are characterized by a set of unique wage and employment points - there is little or no range of indeterminacy in which bargaining power determines outcomes (a view that sharply contrasts with the views of several generations of institutionalists and labor relations specialists).⁷ In this vision, if low skill workers experience declining wages and employment relative to high-skill workers, the explanation must be a collapsing demand for their services that has overwhelms any decline in supply.⁸ The second is that we have, in fact, measured the supply shifts correctly. How well do increases in the educational attainment of the workforce, measured by, for example, a decline in the share of those with less than a high school degree, capture increases in the supply of skill in the workplace?⁹

At least part of the reason for the success of the Unified Theory is its simplicity and consistency with the textbook vision of the labor market. A convenient way to demonstrate this appears in Diagrams 1 and 2. There are two categories of workers, those with high skills (the left side) and low skills (the right side, read from right to left). The horizontal axis shows employment shares for these two groups. The shift of the vertical line from “skill mix 1” to “skill mix 2” shows a movement towards greater “skill intensity.”¹⁰

At the same time, we know that during the 1980's, high-skill workers (college or more) experienced a real wage increase of about 5 percent, while low-skill workers were faced with a
much larger 20 percent wage decline.\textsuperscript{11} Within this framework, these wage outcomes require sizable demand shifts: upwards for high-skill workers and downwards for the least skilled. With the high-skill wage on the left axis and the low-skill wage on the right, wage change for each group is depicted as an upward movement between points HS1 to HS2 for high-skill workers, and a downward movement from LS1 to LS2 for low-skill workers. The growth in wage inequality is shown by comparing the gap between LS1 and HS1 at ‘skill mix 1’ to that between LS2 and HS2 at ‘skill mix 2.’ What could cause such a massive shift in the demand for skill? There is a broad consensus that the main culprit can be found in computer-based production technology.\textsuperscript{12}

Diagram 2 is similar, but here social policy and social norms prevent real wages from falling. Without wage flexibility, employers move up their demand curve (on this graph, to the right), reducing the number of jobs available to the least skilled. Thus, with a large skill-biased demand shift in an inflexible labor market, skilled workers remain fully employed but a large share of the least skilled become redundant. This is, according to many economists, precisely what explains the rise of European unemployment in the 1980's. As Larry Katz has recently put it, “One can say the Europeans have made a political decision that they are unwilling to tolerate as much income inequality as in the United States. But equity comes at the cost of job creation.”\textsuperscript{13} Agreeing with this diagnosis, Nobel Prize winner Gary Becker has used his \textit{Business Week} column to take European policymakers to task for making the choice to “drown in joblessness” rather than accept some wage inequality.\textsuperscript{14} The remaining sections critically evaluate the empirical evidence for this conventional wisdom.

**EARNINGS INEQUALITY TRENDS**

If technology-driven skill-biased demand shifts explain the massive increase in inequality in the U.S., similar shifts ought to be observed in other advanced economies. As George Johnson points out, “Profound changes in production techniques would spill across national boundaries fairly quickly....”\textsuperscript{15} Even in countries with substantial institutional protections against wage
competition among the less-skilled, the increasing payoff to high cognitive skills alone should raise the relative wages of higher skilled workers, and consequently, earnings inequality.

Indeed, it is widely accepted that the last two decades have been characterized by a pervasive growth in earnings inequality across the OECD countries. For example, Blau and Kahn write that “changes in the demand for skilled labor appear to have led to a widening of the wage structures in many countries during the 1980s.” For authority, they cite a paper by Katz, Loveman and Blanchflower, which examined changes in the wage structures of four countries, the U.S., the U.K., France and Japan. They found that “all four countries share a pattern of rising wage inequality among both men and women in the 1980s, but the magnitudes of the increases differ substantially.”

It is well known that the relatively unregulated labor markets of the U.S. and U.K. experienced substantial growth in earnings inequality in the 1980s. Katz et al. provides evidence for just two of other nations, France and Japan. They find positive but negligible earnings inequality growth in Japan, while the growth in inequality in France turns out to be limited to the last 3 years of the period they cover, 1984-87 - there is absolutely no growth in their earnings inequality measure in the 1970s or early 1980s.

For evidence on a wider sample of countries, one of the most authoritative papers is by Gottschalk and Smeeding. They list four “stylized facts” which nicely summarize the Unified Theory: while supply shifts have varied in magnitude across developed countries, there has been a pervasive skill-biased demand shift that produced a strong tendency towards growing inequality. This in turn has resulted in at least some increase in male wage inequality in “almost all industrial economies,” and where institutional constraints on wage flexibility are substantial there has been a rise in the relative unemployment rates of the least skilled.

The authors document the stylized fact that “almost all industrial economies experienced some increase in wage inequality among prime age males in the 1980's” from data on 11 OECD member nations. Apart from Germany and Italy, which show no increase in inequality, another four nations exhibit “positive but quite small” increases in inequality. On the other hand, the U.S., the U.K. and Canada experienced large increases in the 1980's. Gottschalk and Smeeding place the remaining country, Australia, in the “moderate inequality growth” category. But one can argue that Australia, in fact, exhibited negligible inequality growth.
their data show that only three of these 11 developed nations (the U.S., U.K., and Canada) experienced notable increases in wage inequality in the 1980s.

Figures 1a and 1b show trends in the male 90/10 earnings ratio for a slightly different set of 11 OECD nations between the early 1980s and mid-1990s. Figure 1a shows that three English-speaking countries were characterized by fairly persistent growth in earnings inequality over this period. But it is evident that the most notable growth was in the two largest of these, the U.S. and the U.K. Figure 1b shows countries with stable or declining earnings inequality. It shows that the d9/d1 trend in Canada reversed itself and fell noticeably between 1990 and 1994. Inequality declined in West Germany between 1983 and 1993, was unchanged in both France (1979-94) and Japan (1984-94), and rose only slightly in Sweden (from about 2.1 to 2.2 between 1980 and 1993).

Like the case for men, Figures 1c and 1d report that female inequality rose in the over the period for both the U.S. and U.K.. Earnings inequality also increased for female workers in France and Austria, but was stable or fell in the nine nations that appear in Figure 1d (Italy shows a U-shaped pattern, with about the same level of inequality in 1993 as a decade earlier).

Another perspective is offered by reading off the vertical axis of Figures 2a and 2b. This provides a summary measure of the change in earnings inequality (the ratio of the 90th to the 10th percentile worker) for the 1980-95 period for all workers (male and female). The sixteen nations for which there are data can be placed in five groups:

- The U.S. and U.K., which experienced high inequality growth.
- A group of seven nations with small average annual increases: the Netherlands, Australia, Canada, Italy, New Zealand, Austria, and Sweden.
- Three nations with negligible change: Japan, Denmark and France.
- Two nations, Norway and Finland, with modest declines in earnings inequality.
- Two nations, Belgium and Germany, with notable earnings inequality declines.

This wide range of inequality outcomes does not provide much support the Unified Theory and conventional wisdom that there has been a pervasive rise in earnings inequality across the OECD. Other researchers have come to similar conclusions. A summary paper by OECD staff concluded that “the United Kingdom and the United States stand out as the only
countries where there has been a continuation of a pronounced rise in earnings inequality.”

Similarly, a leading authority on the measurement of earnings inequality, Anthony Atkinson, has written that “It is misleading therefore to talk of a general “trend” towards increased dispersion, and even in countries where dispersion has increased the historical record is better described as consisting of ‘episodes’ of widening income differences rather than as following an inexorable trend.”

AN INEQUALITY-UNEMPLOYMENT TRADEOFF?

In the conventional view, strong egalitarian institutions and social policies produce unemployment by promoting wage rigidity and by reducing incentives for effective job search. Societies can choose more jobs or more equality. But the statistical facts tell a more complicated story. Figures 2a and 2b show scatter plots of the change in earnings inequality against the change in unemployment for 16 OECD member countries over the 1979-97 period (percentage point and percent, respectively) These data show no simple tradeoff. There are two high inequality growth countries (the U.S. and U.K.), two low inequality growth countries (Belgium and Germany), and many countries with little inequality growth but widely varying changes in unemployment. For example, despite similar increases in earnings inequality, the Netherlands experienced declining unemployment, Denmark shows modestly rising unemployment, and France and Sweden experienced relatively high increases in unemployment. To view it from another angle, with substantial declines in earnings inequality, Belgium and Germany experienced smaller increases in unemployment than the U.K., Canada, Austria and New Zealand, countries with at least some increase in earnings inequality.

Another way to examine the tradeoff hypothesis is to compare earnings inequality with unemployment inequality - the ratio of the unskilled unemployment rate to the skilled rate. Protective labor market institutions that produce wage rigidity and limit the incentives for job search lead to adjustments on the employment side. On the other hand, less skilled workers in flexible labor markets respond to shocks mainly through wage adjustments and should therefore have unemployment rates not greatly dissimilar to those of high skilled workers. So faced with the same shocks, the U.S. should show rising earnings inequality and European welfare states should show rising unemployment inequality. More generally, across countries that vary in labor
market rigidity we should observe a tradeoff between relative wage inequality and relative unemployment inequality.

If anything, the data show the reverse. Figure 3a shows earnings inequality (d9/d1) and unemployment inequality (ratio of low to high skill unemployment rates) for male workers in selected years over the 1979-93 period for the eight OECD member countries for which data were available. The U.S. appears in the upper right with the highest earnings inequality and the highest unemployment inequality. Canada experienced comparable levels of earnings inequality but lower unemployment inequality, while France, the U.K., Germany, Australia and Italy were all superior on both dimensions of inequality. Figure 3b also compares these two measures of inequality, but does so for all workers (male and female) using a different measure of unemployment inequality for the early 1990s.25 The pattern is similar. Again, the U.S. had the highest levels of both earnings and unemployment inequality, about twice those of Germany and Sweden. Compared to ratios of about 4.5 in the U.S., the earnings and unemployment ratios in France were far smaller, around 3.4 for earnings and 2.5 for unemployment. This evidence directly challenges a fundamental tenet of the conventional wisdom: countries with lower earnings inequality also tend to have lower unemployment inequality.

EUROPEAN UNEMPLOYMENT AND LABOR MARKET RIGIDITY

The previous sections have shown that standard OECD data indicate neither large, pervasive increases in earnings inequality across countries nor an unambiguous earnings inequality-unemployment tradeoff. Another key prediction of the Unified Theory is that while shocks (e.g., productivity slowdown, energy prices, and technological change) initially raised unemployment levels across the developed world, the persistence of high unemployment can be accounted for by the rigidities imposed on the labor market by various welfare state institutions.26 At the heart of the story is wage rigidity, which reduces labor demand, and generous unemployment benefits, which reduce incentives for job search. Worse yet, the resulting unemployment becomes long-term as the skills and work habits of the unemployed tend to atrophy.

This simple vision of the European unemployment crisis as a labor market problem caused by government policy interventions appears in nearly all popular discussions by
economists of wide-ranging political persuasions. For example, the liberal American economist, Robert Haveman, poses the issue as a choice between wage stagnation ("the U.S. model") and double-digit unemployment ("the European model"): "a European-style policy package comprises generous and accessible social benefit programs, high minimum wage levels, and relatively stringent labor market regulations and constraints. It is accompanied by high unemployment and joblessness, slow employment growth....".27 Similarly, Horst Siebert, a conservative German economist, attributes the unemployment problem in Europe to "an array of institutional arrangements that form a complex web of incentives and disincentives on both sides of the (labor) market." The solution can only be to "undertake major reforms of the institutional setup of the labor market."28

At the heart of this conventional account are four stylized facts about the European unemployment problem. The first is that it is meaningful to speak of a "European" unemployment rate and accurate to understand the U.S. unemployment experience as distinct and consistently superior to the "European" one for more than a few years. The second stylized fact is that the underlying problem can be found in skill-biased demand shifts against the less-skilled. Third, it is the wage rigidity and job search disincentives imposed by welfare state institutions that are mainly responsible for the persistence of high unemployment. As a result, "search effectiveness" has declined, which can be shown by an outward shift in the Beveridge Curve (an increase in vacancies and unemployment). The section concludes with a brief assessment and alternative perspective.

"European" Unemployment and U.S. Distinctiveness

How similar are national levels, trends, and sources of unemployment across Europe? If there is significant heterogeneity in the unemployment experience, a handful of countries with entirely country-specific explanations for rising unemployment may have played a major role in driving up the average unemployment rate for the entire region. Further, to the extent that there are similar levels of unemployment across European economies, this may reflect more the economic integration of the continent than the similarity of labor market institutions and their effects. As Stephen Nickell points out, "while it is sometimes convenient to lump all the countries of western Europe together in order to provide a suitable contrast to North America,
most of the time it is a rather silly thing to do.”

Figures 4a and 4b show a wide range of unemployment rates across Europe. Indeed, there is no obvious grouping of European nations in either of these bar charts. In the 1983-88 period, Sweden, Norway, Switzerland and Austria had rates that were much closer to those of Japan (less than 3 percent) than such close European neighbors as Denmark, France, the Netherlands and Belgium (9-12 percent unemployment). The same holds true for the more recent 1989-94 period, as Figure 4b shows: several European nations with highly developed welfare states - Austria, West Germany, Sweden, and Norway - had unemployment rates that averaged between 4 and 6 percent, while Ireland and Spain had rates of about 15 and 19 percent. Clearly, the European unemployment varies enormously across, and in some cases – for instance, the U.K. and Italy - within countries.

These figures also suggest that the U.S. experience is less distinctive than commonly believed. Several European countries with strong labor market institutions had lower unemployment rates than the United States in both the 1983-88 and the 1989-95 periods. These included Sweden, Austria, West Germany, Switzerland and Norway. At least through the early 1990s, the U.S. was not the outlier in unemployment the way it was for both real wages (low) and inequality growth (very high).

It is also notable that recent data show a marked convergence in unemployment rates across the developed world. Figure 5 compares unemployment rates in 1994 and 2001 for 14 OECD member countries. Apart from Austria (3.8%), the standard measure of unemployment was lowest in the U.S. (6.1%) in 1994. But by the first quarter of 2001, six of the countries shown here shared with the U.S. the distinction of rates below 5 percent. Indeed, three countries achieved unemployment rates substantially below the 4.5 percent U.S. rate: Austria (3.7%); Ireland (3.8%); and the Netherlands (2.3%). By late 2001, Sweden’s unemployment rate was below that of the United States.

**European Unemployment and Skill-Biased Demand Shifts**

At the center of the conventional wisdom is a story about a demand shift away from the less skilled of such magnitude that it is frequently referred to as a “collapse” in the literature. It is also widely recognized that the severity of the unemployment problem in many countries is due
to its long-term nature, and the persistence of unemployment may reflect not only wage rigidity and disincentives for active job search, but also the deterioration of the skills of those out-of-work for long periods. For these reasons, in this account the unemployment problem should be concentrated among the least skilled. This section addresses three dimensions of this part of the Unified Theory.

Unemployment Rates by Skill

If an important part of the unemployment problem is skill-biased demand shifts in rigid labor markets, we should see at least two empirical patterns. Across countries, unemployment among the least skilled should be greatest relative to those with higher skills in those countries with the most rigid labor markets. After all, workers in countries like the U.S. have adjusted to the new economy with wage cuts. Within countries, if skill-biased technological change is the fundamental problem, we should observe a rising ratio of low-skilled to high-skilled unemployment over time, caused by rising low-skill rates and stable or declining high-skill rates.30

Evidence pertaining to the first of these predictions has already been presented. Figures 3a and 3b show that the probability of being unemployed for low skill workers relative to their high skill counterparts is greatest in the U.S., widely regarded as the country with the most flexible labor markets. This result appears to directly contradict the demand shift/rigid labor markets prediction. Other data confirm this result. For example, the OECD Jobs Study, perhaps the most authoritative voice of the conventional wisdom, compares white-collar and blue-collar unemployment rates from the mid-1970s through the early 1990s for eight nations.31 The report finds that lower skilled workers in the U.S. have consistently had far higher unemployment rates relative to skilled workers than has been the case in France or most other northern European nations. The blue- to white-collar ratio remained unchanged from 1982 to 1991 in France (at 1.51) while increasing slightly from 1979 to 1990 in the U.S. (2.08 to 2.28). Given the growth in U.S. earnings inequality by skill group, the unemployment ratio should have declined from a lower level.

Like the results for blue- and white-collar workers, the unemployment rate for poorly educated workers was far higher relative to that for highly educated workers in the U.S. than in
any other OECD nation examined save the U.K., whose labor market is on the U.S. side of the flexibility spectrum. Despite substantial downward adjustments in wages, low-skilled U.S. workers appear worse off in unemployment relative to high-skilled workers than in most other major OECD nations. Depending on the measure, this unskilled-skilled ratio was either stable or worsened in the U.S. over the 1980s.32 These data offer no support for the conventional view; in contrast to Europe, wage flexibility should have protected low-skilled U.S. workers from relatively high unemployment.

Nor does the evidence support the related prediction, that the unemployment problem is driven by the less skilled (and not the higher skilled). While the OECD Jobs Study concludes that “the labour market situation for low-skilled workers, as measured by educational attainment, declined over the 1980s relative to that of more skilled workers,”33 the same data show that high-skilled unemployment rates also increased over the 1980s for every nation they consider except Japan for both men and women. For example, the rate for high-skilled (“upper secondary or higher”) workers in France increased from 2.6 in 1979 to 4.1 percent in 1990; in Germany, the increase in this rate was even sharper, from 1.8 in 1978 to 5.0 in 1987.34

There is even less support in the more comprehensive data for male workers assembled by Nickell and Bell.35 Seven of the eight nations for which they present data do not even show an increase in the ratio of low- to high skilled unemployment over the 1979-93 period, and where low-skill unemployment increased, so did high-skill unemployment. France shows an upward trajectory in the skill ratio through 1990 and in the low-skilled unemployment rate over the entire period. But even here, in the rigid labor-markets of France, the level of low-skilled unemployment is comparable to or below the rates of the more flexible markets of Canada, the U.K., and the United States (the high overall unemployment rate in France is due to exceptionally high rates for women).

Of course, as Glyn and Salverda emphasize, low-skill workers are undoubtedly made worse off relative to high-skill workers when both experience increasing unemployment rates, since the probability of getting a job for low-skill workers becomes much lower.36 But this fact does not support the conventional view that the unemployment problem is due to rigidities in low-skilled labor markets. Comparing unemployment rates by education level, an ILO report concluded that
While it is true that unemployment affects the least skilled workers disproportionately, it is difficult to attribute this phenomenon to a shift in the demand for labour towards higher skills, for if this were so the rise in unemployment of the unskilled should have been accompanied by a real shortage of skilled labour. But this has not been in evidence, since the rise in unemployment of skilled workers has also been observed (table 3.1). ... 

*Skill shortages do not appear to have contributed significantly to the rise in unemployment* (emphasis added).  

In sum, while the least skilled have borne the brunt of rising unemployment, the trends by skill level do not, by themselves, demonstrate that a “collapse in demand” for low skilled workers is at the heart of the European unemployment problem. Countries with rising unemployment tend to also experience substantial increases in high-skilled unemployment. As Stephen Nickell has concluded: “Overall, therefore, there is no evidence that these skill shifts have made a substantial contribution to the rise in European unemployment....”. Indeed, the data are perfectly consistent with an alternative story, recently advanced by the International Labor Organization, that “in an environment of widespread unemployment, trained workers apply for jobs for which they are overqualified and, given the choice, firms recruit them first, with the natural outcome that unemployment is transferred to the least skilled workers.”

**Employment Rates by Skill**

Drawing conclusions from changes in unemployment rates can be misleading because, faced with worsening job prospects, workers may drop out of the labor force altogether. For this reason it may be more revealing to evaluate the demand shift/rigid labor markets hypothesis is to compare the growth in employment-population rates by skill across countries. Employment rates should be lowest among the least skilled, which is generally true and not something particularly new. But the demand shift/rigid labor markets prediction is different: the less-skilled will tend to have the lowest employment rates and the gap in employment rates between the least and most skilled will tend to be the greatest in countries with labor market institutions that prevent downward wage flexibility. The reasoning is that without wage adjustments, the least skilled will be priced out of their jobs.

Comparing employment rates by skill across different OECD countries using different methodologies, both Nickell and Bell and Card, Kramarz and Lemieux found little support for
this fundamental prediction of the conventional wisdom. Comparing growth in employment rates for “skill” groups defined by age and education for the U.S., Canada and France, Card et al. leaves no doubt about the lack of support for the conventional view: “Taking the evidence for the United States, Canada, and France as a whole, we conclude that it is very difficult to maintain the hypothesis that the ‘wage inflexibility’ in Canada and France translated into greater relative employment losses for less-skilled workers in these countries.”40 Similar results have been found for Germany and Sweden.41 Indeed, Krueger and Pischke point out that “If demand fell for less skilled workers, we would expect to find employment declining most among the lowest wage groups; instead, there appears to be little relationship.” 42

These studies attempt to compare skill groups using educational attainment levels, a difficult task – after all, how comparable is a “high school degree” in France, the U.K., Sweden, Germany and the U.S.? To deal with this problem, Andrew Glyn has examined employment rates for different quartiles of the education distribution. Again, the employment rate gap between the most and least educated should be greatest in the most rigid labor markets. Glyn’s analysis of employment differences using this measure of skill shows that for 25-64 year old men, the employment rate skill differential (the most skilled quartile rate less the least skilled rate) for the U.S. was 14.6 percentage points in 1999, lower than that for France (19.3 points in 1998) and the Netherlands (17.7 points in 1998), but higher than Switzerland (11.9 in 1998), Sweden (13.4 in 1997) and West Germany (14.3 in 1996). Usually placed at the flexible end of the spectrum, the U.K. shows a much higher employment rate gap than many European welfare states (23.2 in 2000).43 In sum, Glyn’s results show that while the employment rate for the less educated is relatively high in the U.S., it is also quite high for the most educated workers, and there seems to be little association across countries between employment rates by “skill” and the strength of labor market institutions.

**European Unemployment: The Welfare State as Culprit**

Central to the conventional wisdom is the view that what distinguishes the U.S. unemployment experience from the European is the relative rigidity of the European labor market. This rigidity is blamed on “labor market institutions” that reduce the demand for less skilled labor and reduce the incentives of less-skilled workers to search for jobs. As Blanchard
and Wolfers explain, “With the persistence of high unemployment for now more than two decades, explanations based on adverse institutions (‘labor market rigidities’) have become steadily more popular.”

A critical problem with the simple rigidities account is that most countries suffering high unemployment in the 1980s and 1990s had these adverse institutions back in the 1960s, when unemployment was well below that of the United States. The solution in the mainstream literature has been to explain “the general evolution of unemployment over time” by shocks (e.g., the productivity slowdown, oil price hikes, and declining labor demand due to skill-biased technological change), while “cross-country variation” in unemployment rates is accounted for by “employment-unfriendly” labor market institutions. In the language of mainstream economics, the European welfare state “adversely affects the dynamic responses to economic shocks and to increasing turbulence in the economic environment.”

Given the focus of this paper, I only note here that the “shocks” part of this conventional wisdom is not entirely convincing. Perhaps the biggest problem concerns timing. Why did productivity and energy price shocks that took place in the 1970s not translate into a U.S.-Europe unemployment gap until the mid- to late 1980s? Indeed, why did the West German unemployment rate wait to rise above the U.S. rate until the early 1990s?

Given a variety of shocks to the developed world, has the case been made that differences in employment performance since the early 1980s are attributable to institutions that interfere with competitive market processes? Not only should these adverse labor market institutions account for the cross-national pattern of unemployment, but they should do so throughout the last two decades of high unemployment. That is, if the problem is the adverse effects of labor market institutions on the market’s facility for “dynamic responses,” measures of these institutions should do a good job of accounting for unemployment over the course of the last two decades of high unemployment, including the change from the early 1990s to the end of the decade (Figure 5). The conventional wisdom answers this in the affirmative. As a major OECD report puts it, "Developments in structural unemployment over the 1990s to a large extent reflect the progress made in implementing the OECD Jobs Strategy." At the core of the Jobs Strategy is the adoption of the “American model” of highly competitive labor markets.

Absent a prior belief in the labor market rigidity story, the empirical case against
“employment-unfriendly” labor market institutions as the source of the unemployment problem seems remarkably unconvincing. As noted above, Figures 4a and 4b show a number of central and northern European nations with highly developed welfare states (Sweden, Austria, Switzerland, West Germany, and Norway) with lower average unemployment rates than the U.S. in both the 1983-88 and the 1989-94 periods. This superior performance took place despite collective bargaining coverage rates between 77 to 90 percent in the early 1990s (the U.S. had an 18 percent rate), unemployment benefit duration rates between 1.2 to 4 years (U.S.: 0.5 year), and employment protection scores that ranged from 11-16 on a scale of 20 (U.S. score: 1).47 Apart from 4 years in the mid-1990’s, the U.S. has consistently shown higher unemployment levels than the Netherlands. By 2001, Figure 5 shows that Sweden, the Netherlands, Austria, Denmark, and Austria all had similar or lower unemployment levels than the United States.

There is an extensive literature that has attempted to statistically link unemployment levels with measures of various labor market institutions. The results appear quite impressive, with nearly all variables statistically significant with the right signs (effects are in the correct direction). For example, in a recent paper, Fitoussi et. al. are able to account for 65 percent of the variation in unemployment (1983-88) across 19 developed countries with the following variables (coefficient and “t” statistic in parentheses): unemployment benefits replacement ratio (.12, 2.95), duration of unemployment benefits (.79, 2.13), union density and coverage (.08, 1.68), union coordination (-3.06, 2.35), employer coordination (-3.95, 3.46), and labor market expenditure (-.09, 2.14).48 While other measures, such as employment protection and taxation have been employed in some studies, both the theoretical justification and the empirical results for them are rather weak.49

It is worth noting that these kinds of tests are used in the literature to support the position that once the shocks pushed unemployment up, the persistence of high rates has been accounted for by “adverse” labor market institutions. But in fact, much of the strength of these regressions - their explanatory power - is due to institutions that reduce unemployment. This can be seen above in the last three variables listed above. Institutions that promote coordination and help train workers and provide job search assistance are costly interventions in the labor market, but they tend to lower unemployment. The literature that uses empirical tests of this sort to conclude that welfare state institutions provide a good explanation for the persistence of high
unemployment do not distinguish the “good” from the “bad” institutions! In the Fitoussi et. al. test reported above, only the two unemployment benefits measures support the conventional institution-as-culprit story.

Second, the key measure of wage rigidity - union density and coverage - is not statistically significant, a common result. According to an OECD study, “evidence presented in this chapter does not show many statistically significant relationships between most measures of economic performance and collective bargaining.” Other institutions can compress wages (reduce wage inequality) but there is little evidence that they have detrimental impacts on unemployment. For example, in cross-country tests, OECD researchers have concluded that minimum wage levels appear to have no effect on young adult employment, and while they find small negative effects on teenage employment, there is no evidence of any association with unemployment. Since the greatest employment impacts should be felt by youth, the conclusion regarding employment rates is telling: “it is important to note that these estimated effects are relatively insignificant in terms of explaining the large decline that has occurred in the teenage employment-population ratio in some countries… the substantial difference across countries in teenage employment trends can only be marginally attributed to differences in the evolution of minimum wages…”.

If wage rigidity were as important as claimed by the conventional wisdom, unemployment and its change over time ought to be strongly negatively associated with earnings inequality, unit labor costs, and wage shares (in total income). In fact, as discussed above (Figures 2a and 2b), the data shows no clear tradeoff between changes in unemployment and changes in earnings inequality. Nor is there a negative association for levels. For example, for 17 countries, the simple correlation coefficient between a standard measure of earnings inequality (d9/d1) and unemployment rates for the early 1990's was .101, a statistically insignificant relationship. Substituting an alternative inequality measure, the ratio of median earnings to the 10th percentile level (d5/d1), shows an even lower association (.085). Nor have aggregate wage costs been rising: wage shares in nearly all countries have been on a downward trend since the early 1980s.

The two unemployment insurance variables are key measures of “employment unfriendly” labor market institutions. While the replacement rate and benefit duration variables
are usually found to be statistically significant in the published literature, their importance and robustness are open to question. Table 1 presents simple OLS regression results for different measures of unemployment over the course of the last decade or so. Panel A shows results for 1989-94 for 20 countries. The institutional variables are the standard ones with one exception. The usual duration measure is subjectively defined, from 0-4. Spain provides an example of the difficulty of constructing such a measure. The standard Nickell-Layard data set assigns Spain a benefit duration value of 3.5 years. But as Munoz de Bustillo comments, “the 3.5 years of duration considered is only the maximum, subject to strict eligibility criteria and associated with a much lower benefit replacement ratio. In fact 40% of the unemployed receiving unemployment compensation have a benefit duration of 1 year or less. On the other hand 44% qualify for a benefit duration from 1.5 to 2 years ...”.53 This suggests that perhaps a 1.5 value would be more appropriate. Separate results are shown for a duration variable in which Spain’s value has been changed from 3.5 to 1.5.

Panel A of Table 1 shows a fairly similar pattern to the Fitoussi et. al. results reported above. Union density is insignificant for both total and long-term unemployment. Coordination tends to reduce unemployment, but is insignificant for long-term unemployment. Active labor market policies also show the standard negative effect, but again the effects are not reliably measured (low “t” statistics). Typically, the two unemployment insurance benefits measures have the expected positive effects on total unemployment. The replacement rate is insignificant for long-term unemployment. A key result for our purposes appears in columns 2 and 5, where Spain’s duration measure has been changed from 3.5 to 1.5. The coefficient, “t” statistic, and adjusted R squared all drop, with a substantial decline in the explanatory power of the total and long-term equation (over 10 percentage points in each case). As would be expected, the declines are slightly smaller if a value of 2 is used (not shown). Clearly, the results are highly sensitive to judgements about what duration value to attach to each country.

Panel B shows results for tests of the same equation for unemployment in 1995 and 2001, and for young female unemployment in 1995. For 1995, the standard institutional variables perform poorly. Our alternative duration measure is not significant at the 10% level for 1995, and neither duration measure is statistically significant for young female unemployment in 1995 or for total unemployment in 2001. The predictive power of this key institutional measure declines
sharply between the early and late 1990s.

But even in the 1980s and early 1990's, when the benefits duration measure appears to have been most strongly associated with unemployment, and ignoring questions concerning the construction of this variable, the evidence for this lynchpin of the conventional story is less convincing that at first glance. Emphasizing the centrality of this disincentive for job search, Layard et. al. write that “It is noticeable … that all the countries where long-term unemployment has escalated have unemployment benefits of some kind that are available for a very long period, rather than running out after 6 months (as in the USA) or 14 months (as in Sweden).”\textsuperscript{54} This is certainly one way to view the data. But their figure can also be read to show that the nine countries with “indefinite benefits” have widely varying propensities for long term unemployment, with the share of the unemployed out of work for over a year ranging from 20\% (Finland) to over 70\% (Belgium). Through this lens, the fit between benefits and long-term unemployment in the mid-1980s does not look very close. Then, of course, there is the problem of causation. It would be perfectly sensible for countries to make benefits available for longer periods the greater the long-term unemployment problem, particularly in the absence of other safety net programs.

\textit{The Beveridge Curve: Rising Labor Market Mismatch?}

If labor market rigidities are the source of the rise in European unemployment, we should observe evidence of labor market mismatch – both high joblessness and high job vacancies. This relationship between unemployment and vacancy rates is known as the “Beveridge Curve.” If the conventional account is right, that technologies are shifting demand against the least skilled and welfare state institutions limit wage flexibility and the incentives for job search, we should see rising vacancies and rising unemployment – an outward shift in the Beveridge Curve (up and to the right). In an important survey of the unemployment literature, Bean points out that “if the mismatch hypothesis were correct, one should observe unemployment being concentrated in certain occupational groups or regions and vacancies concentrated in others.”\textsuperscript{55} He finds little support for this hypothesis.

So the empirical question is whether welfare states of central and northern Europe been characterized by outward shifting Beveridge curves, particularly relative to countries with
flexible labor markets. Over a decade ago, Katherine Abraham examined 12 studies of the correspondence between unemployment and vacancy rates at the occupation level for five nations (Germany, Spain, the U.S., the U.K., and Sweden) and found no empirical support for increased mismatch of this sort, although she did not rule out a role for skill mismatch since the results “are so fragile that it is difficult to place much confidence in them.”

On the other hand, Layard, Nickell, and Jackman find some support for a rigidity explanation in the Beveridge Curve relationship for the 1980s, concluding that “there has been a considerable increase in many European countries in the level of unemployment at given vacancies.” But the presence of more unemployed workers per job opening (a rightward shift) is consistent with a variety of explanations, including inadequate aggregate demand. Although they do not comment on it, their figures also show rightward shifts for the U.K. and U.S., but no shift for the much more institutionalized Sweden - a result not consistent with their interpretation. It might also be noted that the vast differences in vacancies across countries in their figures raise questions about the reliability of their data.

More recently, Robert Solow has reviewed the Beveridge curve data for the U.S., U.K., France and Germany. He concludes that the message from the data goes squarely against the cliche that high and persistent European unemployment is entirely or mainly a matter of “labor-market rigidities.” It is precisely in France and Germany, where unemployment has been higher and more persistent, that there is no sign of a big adverse shift in the Beveridge curve. It is precisely in the U.S. and the U.K., where unemployment has been at least more variable and, in the case of the U.S., lower, that one can detect a substantial adverse shift, followed by a favorable one.

**European Unemployment: An Assessment**

This review of the evidence suggests that the conventional labor market rigidity explanation of the European unemployment problem is not strongly supported by the data. The preoccupation by economists with labor market rigidity explanations has taken a toll on research that takes alternative explanations seriously. While the principal aim of this part of the paper is critical assessment of the mainstream account, here I briefly outline an alternative, potentially more convincing account.

Since unemployment increased dramatically and nearly universally across developed countries between the mid-1970s and mid 1980s, it is hard to imagine that productivity and
energy price shocks did not play central roles. Faced with rising inflation, countries responded with tight fiscal and monetary policies and most agree that these contributed to the high unemployment of the early 1980s. Relying on a vision of a textbook competitive economy, the standard story is that these shocks temporarily raised the “natural” rate of unemployment (or NAIRU - the nonaccelerating inflation rate of unemployment), which would have returned to its pre-shock levels but for adverse labor market institutions. As Lawrence Ball puts it, “the conventional wisdom holds that the NAIRU is unaffected by aggregate demand, and thus that demand does not influence long-run unemployment trends.” Ball argues to the contrary, that the aggregate demand matters for both short- and long-run movements in the unemployment rate:

In some countries, such as the United States, the rise in unemployment was transitory; in others, including many European countries, the NAIRU rose and unemployment has remained high ever since. I argue that the reactions of policymakers to the early-1980s recessions largely explain these differences. In countries where unemployment rose only temporarily, it did so because of strongly counter-cyclical policy.... In countries where unemployment rose permanently, it did so because policy remained tight in the face of the 1980s recessions.... labor market policies are not important cases of the unemployment successes and failures since 1985.”

It is increasingly recognized that, in sharp contrast to U.S. policy, under the leadership of the German Bundesbank and then the European Central Bank an increasingly integrated Europe was saddled with contractionary fiscal and monetary policy for much of the last two decades. Studies by Ball, Schmitt and Baker, and Palley find empirical support for substantial aggregate demand effects on the cross-national pattern of unemployment, while Bertola, Blau and Kahn find modest effects.

While the conventional account relies on adverse labor market institutions to explain the persistence of unemployment since the early 1980s, a more convincing explanation might point to policy-induced differences in aggregate demand, supplemented by the adverse timing of employment restructuring across sectors and demographic shifts, and country-specific idiosyncratic factors.

After the productivity and energy price shocks of the 1970s, the developed world experienced de-industrialization in the 1980s, but regions with large shares of agricultural employment (e.g., Spain, Portugal, Ireland, Italy and France) were also faced with de-ruralization. At the same time, they experienced a late demographic bulge from the baby boom.
The regression results summarized in Table 1 show that a high agricultural share of employment was significantly associated with high unemployment in every test - five of the twenty countries had far higher agricultural shares than the rest: Spain, Portugal, Ireland, Finland and Italy.

While the demographic variable in these tests – the ratio of the 20-24 year old population to the 25-59 population - approached statistical significance only for 1989-94 long-term unemployment, it consistently had the right sign (the higher the young adult population share, the higher the unemployment). Part of the reason for its weakness in these tests may be that there is a notable overlap between countries with a high agricultural share of employment and those with a high youth share of the population. In addition, countries with high agricultural shares show relatively small declines in the youth share over this decade: while the ratio of 15-19 to 25-59 year olds dropped dramatically in the U.S. from 21.2% to 14.6% between 1980 and 1990, Ireland saw a decline from 25.4% (1980) to just 23.4% (1990), Spain’s teen ratio fell from 20% to 19.3%, Italy’s from 17.8% to 16%, and France’s from 17.9% to 16.4%.64

In a simple regression for unemployment in 1997 (not shown), three demographic and demand variables accounted for over half (54%) of the unemployment variation across 20 countries: the 1990 young adult share of the population (positive and significant), the 1990-97 real interest rate (positive and significant), and the 1990-97 change in investment spending (negative and significant).65 No combination of labor market institution variables came close to this explanatory power for the 1997 unemployment rate. An adequate accounting of unemployment levels and changes over time would also have to include country-specific events, such as the return migration to Spain and the economic restructuring after Franco’s death, the huge outmigration by Portuguese to France, the German unification, the early 1990's Swedish fiscal crisis, the role of corruption in hindering economic development in Southern Italy, and so on.

In sum, the empirical evidence surveyed in this section, coupled with the fact that there has recently been a dramatic decline in unemployment rates across Europe to levels approaching or even below that of the U.S. (Figure 5), points to the need to move beyond the simple labor market rigidity story. Of course, labor market institutions may have had adverse employment impacts, but the available evidence does not make a strong case for giving it the leading role.
LOW WAGES AND SKILL-BIASED DEMAND SHIFTS IN THE U.S.

The conventional answer to the European unemployment problem has been to promote labor market flexibility, with the U.S. as the model. Just as the simple textbook model provided the intellectual framework for the labor market rigidity explanation for high European unemployment, it has framed the debate over the growth in earnings inequality in the U.S.. The prevailing view is that in the flexible labor markets of the U.S., the fundamental problem can be found in relative demand shifts against the least skilled since the late 1970s, which in turn have been caused, it is said, by computer-based technological change in the workplace. As Bresnahan, Brynjolfsson and Hitt put it,

An impressive body of empirical studies shows that the proximate cause (of increases in income inequality) has been a shift in the demand for labor. Employers’ demand has shifted from low- and middle-wage occupations and skills toward highly rewarded jobs and tasks, those requiring exceptional talent, training, autonomy, or management ability... The shift in labor demand appears to be approximately a quarter of a century old.66

If this body of empirical studies is really so impressive, we should observe support in the data for several fundamental predictions, which include: 1) workplace-relevant skill upgrading whose timing is consistent with technology (computerization) trends; 2) trends in computerization and other measures of technological change distinctive to the 1980s whose timing is consistent with relative wage changes across occupations and industries; and 3) measured demand shifts that “overwhelm” supply shifts in the 1980s and 1990s. After describing the wage collapse, this section assesses the evidence for these three sets of expectations. The last part of this section offers an assessment in which an alternative account is outlined.

The Wage Collapse

Figures 6 and 7 report wage and inequality trends for all workers (male and female) between 1973 and 1999. Indices of wage trends appear in Figure 6 for workers at the 10th (bottom of the wage distribution), 50th (median), and 95th percentiles. Four periods are distinguished: the severe recessions of the early 1980s, the Reagan boom (1983-89), the recession and slow recovery of the early 1990s (1989-96), and the so-called “technology-led new economy” boom of the late 1990s. During the early 1980s recessions, wages collapsed at the 10th
percentile, declined modestly at the 50th, and rose substantially at the 95th. During the Reagan boom these trends continued, with a huge gap opening up between wages at the top and bottom of distribution. This gap appears in Figure 7 – the ratio between them rose from about 4.3 in 1981 to almost 5.0 in 1988. After stability in the early 1990s, inequality rose again between 1993 and 1996 and then fell during the late 1990s boom. What stands out is that the growth in inequality is located solidly in the 1980s and not in the 1990s, the decade widely heralded as marking the “new economy” in which the effective use of information technology in the workplace took off. With its focus on skill-biased technological change, it is notable that this timing problem is rarely addressed in the conventional literature.

Much of the decline in the economic well-being of the less skilled has been generated by collapsing wages for male workers. Peter Gottschalk presents a stark picture of which income groups gained and lost over the 1973-94 period. He shows that the entire bottom 78 percent of the male distribution in 1994 earned less than their counterparts in 1973. Equally striking, the typical male worker in the 15th percentile in 1994 earned 24 percent less than his counterpart in the same percentile in 1973. Indeed, the evidence indicates that the explosion in inequality since the late 1970s was driven in large part by this decline in real earnings of workers with the least education. As Gotschalk puts it, “Between 1979 and 1994, the real weekly earnings of college graduates increased by 5 percent, and the earnings of high school graduates declined by 20 percent, which is what caused the college premium to more than double.”

Robert Topel offers another angle from which to view recent earnings inequality trends in the United States. Indexed to 1969, real wages at the 90th percentile (high wage workers) rose slightly while falling substantially at the 50th percentile; at the bottom of the distribution – the 10th percentile – wages simply collapsed. In Topel’s words,

As a measure of inequality, then, the “90-10” wage differential among American men expanded by a startling 49 percent (40 log points) in 26 years, with over two thirds of this gap attributable to a decline in real wages among those in the 10th percentile. In a nutshell, this is the problem of rising wage inequality in the United States.

This spectacular rise in the relative wage of skilled men since the late 1970's is mainly the result of a collapse in the wages of the less-skilled. Another well-documented fact is that there has been a sharp decline in the supply of workers with low educational credentials: from 1970 to
1990, the share of the workforce with less than a high school degree fell from 37.5 percent to just 14.5 percent. Although it is far from obvious that this huge upward shift in educational attainment reflects a comparable upgrading in work-related skills, the inequality literature nearly always makes this assumption. With any substantial upward supply shift, accounting for the observed collapse in the real earnings of lower skilled workers with the demand-supply model requires a truly prodigious downward demand shift (see Diagram 1).

Computers and the Skill Mix of Employment

The most commonly used indicator of changes in skill intensity in this literature is the ratio of nonproduction (roughly, nonmanual office workers) to production workers in the manufacturing sector. Although admittedly crude, this measure is held to capture much of the change in the mix of occupations that takes place as profound shifts in production techniques occur. George Johnson explains that the demand shift driving the increase in wage inequality “primarily reflects extensive skill-biased technological change,” which he defines as “skilled workers becoming more efficient in jobs that were formerly done by unskilled workers.” For example, Johnson notes that under extensive technological change the demand for engineers increases as the demand for ditch diggers declines. As this occurs throughout the economy, the ratio of nonproduction to production workers increases.

In a highly influential paper, Berman, Bound and Griliches (BBG) examined the 1959-89 trend in the nonproduction share of total manufacturing employment. They report that this share accelerated in the 1980s, rising slightly from .234 in 1973 to .248 in 1979 and then jumping to .286 in 1989. The authors conclude that technological change in the workplace explains this acceleration. As they put it, “We infer a predominant role for production-labor-saving technological change in explaining the shift of demand toward skilled labor in the 1980s.” The problem, however, is that the entire increase took place between 1980 and 1982; between 1983 and the early 1990s the nonproduction share remained essentially unchanged. A similar measure for the entire private, non-farm economy, shows a pronounced long-term upward trend from 1948 through 1982, after which the nonproduction share stabilizes and, in the first half of the 1990's, actually declines.

The timing of these changes in “skill composition” poses an obvious challenge for the
technology part of the skill-biased demand shift story since computerization does not begin to take-off until just about the same time stability in the skill measure sets in - the mid-1980s.\textsuperscript{75}

Further, much of the decline in the wages of those at the bottom of the wage distribution between the late 1960s and the mid-1990s occurs between 1979 and 1983 (see Figure 6) – again, before computerization could have possibly produced the wholesale restructuring of the workplace presumed by the skill-biased technological change explanation.

Appeal has also been made to international evidence. If skill-biased demand shifts explain the massive increase in inequality in the U.S., similar technology-generated skill shifts ought to be observed in other advanced economies. A study by Machin, Ryan and Van Reenan employs the same nonproduction employment share measure of skill. This study contrasts two countries with deregulated labor markets and large increases in inequality (the U.S. and the U.K.) with two others that are characterized by strong welfare states, much more regulated labor markets and stable wage structures (Denmark and Sweden). Like the U.S., both the U.K. and Sweden show large increases in “skill-intensity” through 1982, but the nonproduction employment share remains essentially unchanged between 1982 and 1989.\textsuperscript{76} Only Denmark shows an increase after 1982 that comes close to matching the increase in the earlier decade.

To get a more detailed and meaningful picture of shifts in skill composition, I extended the approach taken by BBG by distinguishing skilled from unskilled occupations separately for white-collar and blue-collar occupations in manufacturing, in services, and in five relatively computer intensive industries (two in manufacturing, three in services). Skilled white-collar workers were defined as those employed in managerial, professional and technical occupations; low-skilled white-collar workers comprised those employed in administrative support occupations; skilled blue-collar jobs included mechanics and repairers, construction and extractive trades, and precision production occupations; and low-skilled blue-collar jobs consisted of operators and assemblers, transportation and material moving occupations, laborers and guards. Grouped in this way, there was almost no change in the occupational mix of employment between 1983 and the early 1990s. The only employment shifts among low-skill workers whose nature and timing were consistent with technology-driven skill-shift thesis was the decline in administrative support (predominantly female) shares in the last half of the decade.\textsuperscript{77}
Educational attainment data show similar trends. Andrew Glyn groups employment into educational quartiles and compares the employment rate of the top quartile with the bottom quartile for those ages 25-64. He finds that this ratio shifts sharply in favor of skilled workers only through 1981: “The employment position of low-educated Americans deteriorated sharply over the period 1973-81, when wage dispersion grew modestly, but barely declined any further after 1981 when wage dispersion rocketed.” Again, the conventional computerization story would predict a very different trend - the impact on skill composition should increase with the diffusion and effective use of computers in the workplace.

Several studies have extended BBG’s work on the link between technology and skills with statistical tests in which various measures of skill composition (occupation shares, the growth in the college wage-bill, and the growth in the nonsupervisory wage-bill) are regressed on measures of computerization. For example, in one test, Berman, Bound and Machin regress the change in occupation employment shares between 1980 and 1990 on the 1984-89 change in computer use in the workplace. Just two of the five female occupations, and none of the six male occupations show any effect from computerization. According to the authors, “Increased use of personal computers in the U.S. is correlated with the decline of female clerks and the rise of female professionals.” This seems plausible, but it is a slim reed on which to rest a skill-biased technological change explanation for the collapse in low-skilled wages, which was particularly severe for blue-collar men.

To take another example, Autor, Katz and Krueger find that while the level of computer investment (or in some cases computer use) at the beginning of a given period produces a strong positive coefficient in their tests of changes in skill composition, the change in the computerization measure does not. These results were interpreted by the authors as broadly supportive of the skill-biased technological change explanation, but their conclusion was cautious: “Although these conditional correlations of computer measures and the growth in the utilization of college workers and nonproduction workers may not reflect causal relationships, it is clear that whatever is driving increases in the rate of growth of demand for skilled labor over the past twenty-five years is concentrated in the most computer-intensive sectors of the U.S. economy” (p. 33).

These mixed results for the effects of the level and change in computerization on skill
intensity appear consistent with the findings of an influential study that made use of plant level data for the 1977-92 period. Doms, Dunne and Troske conclude that, while high-tech plants tend to require higher skilled workers, "our time-series results show little correlation between changes in the plant-level skill mix of workers and technology adoption. Plants which adopt a large number of new technologies do not appear to shift toward the use of more skilled workers relative to plants which adopt a small number of new technologies."81

Several statistical studies have cited a small number of qualitative case studies of the employment effects of technological change for supportive evidence. For example, in their recent review of this literature, Gottschalk and Smeeding point out that one of the two main “critiques” of the technology-driven skill-biased demand-shift hypothesis is that there is little direct evidence for it - the case has been built largely on the absence of other plausible explanations within a neoclassical (demand-supply) framework. They respond that “While this critique does have a ring of truth, there are by now a variety of studies of specific technological changes that have increased the demand for the more skilled.”82 Yet none of the four studies they cite address the central question. The issue is not whether technological advances often require high or even increasing demands for cognitive (or other) skills, but whether the changes observed since the late 1970s have been so strong and pervasive that they can explain much of the observed explosion in earnings inequality and collapse in the real earnings of the least skilled in the 1980s. The same critique can be made of the citation of a few case studies by Berman, Bound and Griliches.

In fact, a perusal of the literature outside economics turns up many case studies on both side of the technology-skills debate. A balanced and nuanced assessment of the case study evidence is provided by Cappelli and Rogovsky:

Systems of work organization are in effect choice variables for employers. Research shows that the same technology, for example, can be applied in very different ways, with different effects on skill requirements and job design. Firms may vary considerably in the ways they solve the same problem of obtaining workers with adequate skills: some ‘deskill’ or make jobs simpler, some ‘upskill’ and introduce high performance work systems....”83

Much like the selective citation of favorable case studies, casual observation has also been employed in support of the skill-biased demand shift account. Consider, for example, the
following passage by Danziger and Gottschalk:

[Beginning in the 1980s] firms substituted computers and more-skilled workers for lower-skilled workers whose tasks could now be performed more efficiently with computers. Insurance companies could lay off file clerks...checkout clerks no longer had to enter prices in the cash register. Inventory control was simplified and reordering could be done automatically. In these and other ways, technology (or automation) decreased the value of the skills of workers with lower levels of education and increased demand for workers with more education.84

The problem is that the data do not entirely support these assertions. Michael Handel has taken a close look at employment trends for these occupations. He found that the share of cashiers in all grocery workers was nearly unchanged over a decade and a half, falling slightly from 29.6% in 1983 to 28.96% in 1997, but this was far higher than the 24.3% cashier share in 1979. To take another example, clerks as a share of all retail and wholesale workers declined from 1.56% to just 1.4% from 1983 to 1997. Postal clerks declined by just 1 percentage point over these 14 years, from 34.6% to 33.5%. Even bank tellers show little decline in this era of mass computerization: from 19.78% of all bank workers in 1983 and 18.03% in 1997. For many of these occupations, the 1970s show greater declines in employment share than the 1980s.85 These examples offer little support for the skill-biased demand shift anecdotes provided in the Gottshalk/Danziger passage.

In sum, the belief that recent decades have been characterized by massive computer-generated demand shifts against the less-skilled seems more a reflection of theoretical expectations and intuition than of a balanced assessment of the available data. A convincing computer-driven skill-biased demand shift story must explain the failure of conventional measures of skill-intensity to increase much, if at all, over precisely the period in which computers became increasingly prevalent and powerful in the workplace. Organizations are no doubt being transformed, but neither aggregate measures nor case studies have produced unambiguous evidence of a profound shift in workplace skill requirements, much less a transformation that can account for unprecedented increases in wage inequality in the 1980s.

Computers and Earnings

It is well established that the relative wages of more educated workers have risen dramatically since the late 1970's. In one of the few efforts to test the skill-biased technological
change explanation of the wage collapse with direct measures of skills, Murnane, Willett and Levy examined the association between the mathematics test scores of a sample of high school seniors with their wages six years later. They concluded that their results suggest that between the late 1970s and mid 1980s there was a “growing importance” of cognitive skills for relative wages.\(^8\) It is not obvious, however, whether this growing importance using one test score measure over such a short period qualifies as a “skill-biased demand shift,” much less whether the use of new information technologies would account for it.

A number of studies have turned directly to the statistical link between computerization (and other measures of technological change) and changes in relative earnings. A study by Alan Krueger has been widely cited as direct evidence that computerization has caused the rise in earnings inequality in the U.S. Indeed, Krueger argues that the return to computer use may have been as high as high as 18 percent in the 1980s, a figure far higher than conventional estimates of the return to a year (or even two years) of schooling. Equally striking, he suggests that differences in computer use alone can explain some 40 percent of the increase in the returns to schooling (the growth in the college/high school differential) between 1984 and 1989.\(^8\)

But Krueger’s interpretation of his results has been strongly challenged by several recent studies. DiNardo and Pischke test this relationship with German data and find “similar wage differentials for the use of pencils at work as for computers.” Their results suggest that the payoff to computer use does not reflect, as they put it, “an actual productivity differential.”\(^8\) In another study that uses U.S. data, Michael Handel concludes that “When the contribution of computer use to all components of the variance of wages are taken into account, computers seem to have had a net equalizing impact in the period Krueger studied. This casts significant doubt on this technology-based explanation of the growth of wage inequality.”\(^8\)

In a study that comes to strikingly different results, Mishel and Bernstein conclude that that technology (as measured by investment in equipment and computers and the share of scientists and engineers in employment) had no greater, and perhaps a lesser, effect on wage inequality in the 1980s than in the 1970s. In fact, they find that increased investment in computers contributes to wage equalization in the bottom half of the distribution.\(^9\) The computerization story is also challenged by comparisons of the 1980s with the 1990s. While inequality took off in the 1980s, it seems likely that the increase in the effective use of computers
was far greater in the following decade. But as Figures 6 and 7 show, low skill wages rose sharply and inequality declined in the late 1990s, at the peak of the “new economy” technology boom. There is a timing problem.

The literature has not yet produced a “smoking gun,” unequivocally linking information technologies to wage inequality. Part of this failure may be due to difficulty of accurately measuring either worker skill or the effective use of information technology in the workplace. The next step is to determine whether there is compelling evidence in support of the necessary condition of the conventional skill-biased demand shift story: that measured demand shifts, whatever their sources, have “overwhelmed” standard measures of supply shifts.

**Did Demand Overwhelm Supply?**

With the failure of hard evidence to confirm the belief that strong and pervasive skill-biased demand shifts characterized the 1980s, there has been a tendency in the literature to move away from a simple “demand shift” story a more general “demand overwhelms supply” account. That is, demand shifts may have been entirely unexceptional, but they were still larger than those of supply. Gottschalk and Smeeding put it this way:

> While it may be sloppy language to attribute the rise in the wage premium to demand side factors, there is nothing inherent in the (technological change) argument that requires acceleration in the shift in demand. Deceleration in supply will do. What is required of any (neoclassical) explanation for the increase in inequality is that the shift in demand be greater than the shift in supply.91

One commonly used approach to estimating the magnitude of demand shifts is to compute them directly from the demand-supply model itself. For example, Johnson lays out a set of stringent “textbook” assumptions and proceeds to calculate the requisite demand shift from the supply shift, the change in relative wages, and an assumed elasticity of substitution. Indeed, this calculation produces a demand shift of “about 60 percent” in the 1980s: “To put it another way, relative supply would also have to have grown by 60 percent for the college/high school relative wage to have remained fixed from 1979 to 1989. Since relative supply only increased by 31 percent, the college/high (sic) relative wage - and earnings inequality generally - rose sharply during the 1980s.”92 Of course, this “60 percent” demand shift is derived from the “31 percent” supply shift under the strong assumptions that the simple textbook model can fully explain wage
setting in the U.S. labor market. As the prominent English economist, Dennis Snower, explains, the move from the textbook to public policy may not be so simple: “There can be no doubt that the conventional preoccupation with supply and demand has a strong laissez faire bias. Thus the empirical conventional methodology... of examining what part of earnings changes can be ascribed to changes in labor supplies and then attributing the rest to changes in labor demands - is certainly not harmless from a policy perspective.”

A second approach has attempted to empirically estimate the relative demand shift and compare it to supply changes. Among the most cited papers in this regard is Katz and Murphy (1992), who define skill groups by distinguishing workers by sex, educational attainment, and experience. Comparing changes in quantities (supplies of workers in each group) and prices (relative wages), they find that “the data appear to be reasonably consistent with the stable demand hypothesis for the 1965-1980 period.” That is, the demand for skill was not accelerating over this period. On the other hand, in the more recent 1979-87 period, the authors find that the groups with the largest wage increases were also those with the greatest growth in supply, suggesting a central role for demand shifts in the 1980's. Yet, when they actually measure the demand shift, it turns out to be smaller than their measures of supply shifts, the reverse of what is required in the demand-supply model. Their answer is that there must have been substantial within-group (unmeasured) demand shifts.

In another paper, Murphy and Welch document changes in the occupational wage and employment structure and interpret them to “support the view that the demand for skill increased significantly over the 1940-90 period.” Again, this reflects “trend demand growth” which is not controversial. There can be little doubt that there has been a long-run upward trend in the cognitive skill requirements of work. While this was caused in large part by the shift away from agriculture and by the rise of large service sector corporations with extensive white- and pink-collar internal labor markets, the same trend can be found in the goods industries since the 1940s. Indeed, the share of semi-skilled and low-skilled manual workers in total employment declined substantially in each decade from 1950 to 1980, well before computerization and the growth in earnings inequality.

For the skill-biased demand shift story, the question is whether an acceleration in this long term trend took place after the late 1970s, whether it in fact “overwhelmed” supply, and
whether it can account for most of the recent growth in earnings inequality. The answer provided by Murphy and Welch is not nearly as affirmative as the conventional wisdom would suggest: “We do not find that the demand for skill grew particularly rapidly during the 1970's and 1980's, a period when wage inequality expanded in comparison to the three earlier decades, when the trend was either toward less wage inequality or when wage inequality increased only modestly.”

The most recent notable effort to empirically estimate and compare demand and supply shifts in the 1980's appears in a paper by Chinhui Juhn. Following the standard methodology, she concludes that there is mixed support for the simple supply and demand explanation of the growth in the education premium, but no support for the ability of the textbook model to explain changes in overall inequality. My reading of her evidence is that this conclusion is overly generous to the conventional model. The magnitude of demand and supply shifts appear nearly identical in the 1960s and 1980s, but relative wages increased by 19.3 percent in the 1980s compared to just 9.3 percent in the 1960s. Juhn points to another inconsistency: “while the supply and demand shifts are of comparable size in the 1950s and 1980s, the college wage premium increased only modestly in the 1950s and increased rapidly in the 1980s.” Most significantly, however, Juhn’s estimates of demand and supply shifts in the 1980's confirm earlier results in the literature: it is supply that overwhelms demand, not the reverse. While relative demand (high to low education levels) shows an increase of 29.9 percent in the 1980s, the relative increase in supply is calculated to be much larger, 51.4 percent. In the textbook model, this should lead to rising relative earnings of the least skilled, just the reverse of what we observe. Indeed, it is nearly the reverse of the figures deduced from the perfect competition model by George Johnson (see above).

Like Murphy and Welch, Juhn suggests that the distinctive demand shifts required by the model - those large enough to overwhelm measured relative supply shifts - must be located at a finer level of occupational detail within industries. She does not test for this possibility, citing lack of data, and refers us to Berman, Bound and Griliches. But as our earlier discussion of that study showed, the requisite within-sector demand shifts were small or nonexistent after 1983. The conventional wisdom to the contrary, there appears to be little if any direct evidence that demand shifts overwhelmed those of supply in the 1980s, the decade in which nearly all of the growth in earnings inequality was concentrated.
The technology-driven skill-biased demand shift story has become so widely accepted that references to the literature for empirical support no longer appear even necessary - it has the standing of stylized fact. But while the attraction of this simple demand/supply story is understandable, compelling empirical evidence is hard to find. The timing simply does not work.

Table 2 summarizes trends for productivity growth, workplace computerization, workplace skill mix, and wage inequality. Since computerization can be assumed to have accelerated over the course of the last two decades, culminating in the “technology boom” of the late 1990s, and productivity growth was strikingly low until the late 1990s, the skill-biased technological change story should predict accelerating increases in skill composition and wage inequality, peaking at the end of the 1990s boom. In fact, standard measures of skill mix exhibit rapid growth only in the early 1980s recessions. And wage inequality shows spectacular growth in the 1980s, stability through the mid-1990s, and a decline at the end of the decade, just the reverse of what the demand shift account would expect (see Figure 7). Compounding these timing problems, the data offer no conclusive evidence that demand in fact “overwhelmed” supply or that technological changes in the workplace can explain the 1980-96 collapse in wages experienced by workers in the middle to the bottom of the earnings distribution (Figure 7).

But in the final analysis, this lack of empirical support has not proven decisive. The conventional explanation for the collapse of low skill wages remains one of skill-biased demand shifts because, through the lens of the textbook model, there is no alternative. Collapsing wages for the less-skilled can happen in the conventional model only if there was an even greater decline in demand for their services. As George Johnson aptly puts it, “Within a conventional supply-demand model, the only plausible candidate that could have done this is skill-biased technological change.”

A satisfactory explanation for the wage collapse of the less skilled requires moving beyond the conventional supply-demand model. A number of recent papers have contributed to doing so, making it increasingly necessary to acknowledge an essential role for labor market institutions in any serious discussion of the U.S. wage problem. Written in full recognition of the dominance of the simple textbook model in professional circles, these papers have adopted a
cautious approach towards moving the story beyond simple, measurable demand and supply shifts. For example, Fortin and Lemieux expressly limit their focus to “quantifiable measures of institutional forces and exclude factors such as cultural or social norms that may play an important role in wage determination, but are difficult to quantify.” They conclude that about one-third of the growth in inequality in the 1980s can be attributed to changes in three quantifiable factors: the real value of the minimum wage, the unionization rate, and economic deregulation.

The conventional view is that these institutional changes are endogenous, reflecting the underlying forces of demand and supply. Although there is surely some truth to this point, particularly for the precipitous decline in unionization in the early 1980s, I find convincing Fortin and Lemieux’s defense of the view that there was a sizable independent effect of changes in these three institutional forces on relative wages. Indeed, my critique comes from the other side - these institutional changes, although essential to a satisfactory explanation of wage restructuring, reflect only the most easily measurable manifestations of the more fundamental sources of the wage collapse, which are at once ideological and structural.

For an alternative approach, it pays to return to the work of the early post-war labor relations specialists like Clark Kerr, Sumner Slichter, Arthur Ross and John Dunlop and Richard Lester, and to the more recent research on efficiency wages, industry rents, unions wage effects, and minimum wages, by economists like Richard Freeman, David Card, Alan Krueger, John DiNardo, and David Blanchflower. This tradition features a willingness to look beyond the intersection of conventionally conceived demand and supply schedules in efforts to explain real world wage and employment outcomes.

In the institutionalist and labor relations traditions, employers are recognized as capable of offering a variety of starting wages and one of many wage-tenure profiles, determined within a range set by demand and supply forces, social norms, and legal constraints. In this view, imperfect information about worker performance, the importance of teamwork in production, the degree of price-making behavior in product markets, the share of labor in total costs, the collective power of workers, managerial preferences over competitive strategy, and government regulations will all influence wage-setting and contribute to different wage outcomes for similarly skilled workers in similarly attractive jobs across establishments. Equally important, as
Akerlof and Bewley have stressed, where changes in worker effort have a substantial impact on productivity and where adherence to community norms matters for competitive success, the perception of fair treatment may be critical for maximizing workplace productivity and wage-setting will consequently reflect social norms of fairness. Changes in any of these factors may alter the wage structure independently of the skill structure. In a world in which product market strategies and social norms matter for workplace organization and performance, substantial differences in wages - and their rates of change over time - can be expected for workers with identical skill attributes across different establishments, firms and locations. Lester referred to this long ago as a “range theory of wages.”

With this institutional vision of the labor market, some conjectures can be made about the wage collapse. It begins with the 1970s, a decade marked by declining productivity growth, rising unemployment and inflation. On top of these difficulties, workers and unions were faced with a marked ideological shift in the late 1970s towards competitive market solutions, much like earlier laissez-faire, anti-government episodes in the 1920s and 1950s. Partly spurred by this ideological shift in the U.S. and other countries (most notably in the U.K.), but also by rapid technological advances in communications and transportation, the pace of globalization of production, trade and financial capital accelerated, which in turn facilitated a rise in product market price competition.

In this new economic environment, labor markets were deregulated, trade barriers dismantled, the minimum wage allowed to decline sharply in real terms, and union power undermined. A critical consequence of these ideological and structural changes was that the “effective” supply of low-skilled labor greatly expanded. Rising trade and capital flows between the U.S. and low-wage and high-wage nations alike made low-skilled workers throughout the world far more easily substitutable with one another, which meant that the demand for U.S. labor became increasingly elastic - hiring became more responsive to changes in labor costs - which in turn reduced worker bargaining power. These new conditions not only allowed, but required, firms in many sectors to cut labor costs through the adoption of such strategies as wage concessions, the use of low-cost temporary labor, and the relocation and/or outsourcing to low labor cost regions.

At the same time, too much can be made of these demand-side effects of globalization.
Many of those who have experienced declining real earnings have been employed in low-skill service jobs, ranging from nurses aides and orderlies to receptionists, general office clerks, janitors and truck drivers.\textsuperscript{112} These workers were probably more affected more by de-unionization and the sharply lower real values of the legal minimum wage than by outsourcing, relocation and trade. The importance of weakened unions and lower minimum wages for recent trends in relative wages has been underscored in separate papers by David Card and David S. Lee.\textsuperscript{113}

Predictably, this increase in effective labor supply, erosion of protective labor market institutions, and intensification of efforts to reduce wage costs, produced declining relative wages for the less-skilled - those most exposed to competitive forces. It is not that low skilled labor is hardly required any more, but that it is now just more highly concentrated in low-wage regions (and countries) and in the service sectors. For example, in the New York metropolitan area, I grouped jobs into three job quality groups: independent primary, subordinate primary and secondary. Between 1980 and 1990, the top tier grew from 39.3\% to 42\% of all employment, the middle tier declined from 27.2\% to 24.9\%, and the bottom tier remained constant at just over 33\%.\textsuperscript{114} There is no evidence of collapsing opportunities for these low-skill, secondary jobs.

Another example can be cited to underscore the plausibility of the view that policy choices that have encouraged the supply of low skill immigrants, outsourcing to low wage regions, and the de-regulation of the labor market have encouraged managers to take a “low-road” approach. Based on his analysis of proprietary data for the manufacturing plants of 3,000 firms with fewer than 500 employees, Dan Luria found that:

\begin{quote}
Clearly, in most industries, firms can now adopt recipes with very different mixes of wages, skill, technology, training, and basic management discipline. They incur no penalty in low profits or slower growth if the choose the low-road or the lean commodity route. Therefore, the markets are not offering meaningful incentives for “good” manufacturing behavior. Yet the low frequency of such behavior in the small-shop economy is costly, resulting in lower wages, lower productivity, less technical change, and a composition of output that has too few products that command price premiums in global trade.\textsuperscript{115}
\end{quote}

Luria’s assessment indicates that the problem may be less an acceleration of skill-biased technological change than the reverse: ideological shifts, labor market deregulation, and global competition have increased the incentive employers have to cut labor costs via wage cuts rather than through investment in advanced technologies.
CONCLUSIONS

The Unified Theory provides an elegant and intuitively plausible explanation for two of the most important labor market developments in recent decades - high wage inequality in the United States and high unemployment in most European nations. At the heart of the story is a global technology-driven demand shift in favor of the most skilled.

But if this were the case, we should observe pervasive increases in earnings inequality by skill group across the developed world. In fact, only the U.S. and U.K. strongly show this pattern, and in the case of the U.S., only in the 1980s. We should also observe growing unemployment inequality, as unemployment for the most skilled declines and the less skilled rises. In fact, we find that the unemployment problem in Europe is characterized by rising unemployment for all skill groups. That the less skilled are disproportionately impacted is consistent with a simple queuing story, in which they bear the brunt of the competition for limited job opportunities.

On the U.S. side, taking a long run perspective (post war), the literature offers little evidence of particularly large or accelerating skill-biased demand shifts that could plausibly account for the unprecedented collapse of low-skill male wages since the 1970s. Nor do measured demand shifts appear to have dominated shifts in relative supply. Making matters worse for the conventional wisdom, the timing of the trend in the standard within-sector measure of skill-intensity of employment (the nonproduction share of employment) does not appear to be consistent with the timing of the effective diffusion of computerization or wage inequality. And there is little unambiguous evidence of a close link between computerization and relative wage change.

On the other hand, if institutions, social norms and morale matter a great deal for wage setting, there is no reason to assume a one-to-one correspondence between skills and wages. In this case, there is no reason to limit ourselves to the perfect competition model of the textbook and insist that unusually strong skill-biased demand shifts must explain recent wage trends. It may be enough that there has been a substantial decline in union membership, coverage, and power; a large decline in the value of the minimum wage; increasing deregulation of formerly high wage industries; fewer high wage opportunities in the public sector; and a rising effective supply of labor (relatively open borders and threats of greater outsourcing, relocation, and
The labor market rigidity explanation for high European unemployment also fails on several grounds. It suggests a tradeoff between wage inequality and the level and change in unemployment, but there is little evidence of such tradeoffs. The rigidity story also does not easily account for the variation in the levels and trends of unemployment since the mid-1980s. Part of the problem is that the distinctiveness of U.S. unemployment performance has been quite recent - even the early 1990's show a number of highly regulated welfare states with unemployment rates near to or below that of the U.S. (such as Norway, Switzerland, West Germany, Austria and Sweden). Indeed, by the end of the 1990s there was a sharp convergence of unemployment rates back towards the U.S. level, despite only minor changes in labor market institutions. Among the standard measures of “employment-unfriendly” labor market institutions, only unemployment benefits generosity (rather crude measures of replacement rates and duration) show much statistical strength in their association with the pattern of unemployment across countries, but even this disappears by the mid-1990s. Significantly, these measures account for none of the variation in the change in unemployment from the 1980s to the late 1990s.

Institutions that produce high wage costs without higher productivity while at the same time reducing incentives for job search can, of course, hinder employment growth and raise unemployment. But this rigidity story does not appear to provide a satisfactory explanation for the European unemployment problem. More convincing is the combined effect of anti-inflation monetary and fiscal policies that have severely constrained aggregate demand (particularly compared to the U.S.), complemented by less fortunate timing in both employment restructuring (away from agriculture and manufacturing) and demographic trends (the U.S. experienced much greater declines in the young adult share of the population in the 1980s and early 1990s than most of Europe). Some have also argued that product market regulations may have limited the ability of some European economies from adjusting quickly to the shocks of the 1970s and early 1980s. Whatever the explanation, the evidence does not support a simple labor market rigidity explanation.

If the empirical basis of the Unified Theory is so shallow, why does it remain the conventional wisdom? Richard Freeman has written that he would “leave it to others to speculate why many economists and government officials give short shrift to institutions in explaining the
failure of the U.S. economy to reward workers in the past two decades. At least part of the answer may lie in the powerful attraction offered by a simple story framed by an intuitively sensible and, in this post-Reagan era, ideologically compatible, textbook model of the labor market. Political interests may also matter. Low wages in the U.S. can be blamed on technological changes in the workplace and on the failure of workers to upgrade their skills rather than on political and managerial decisions that promote low wage strategies in the interests of firms and consumers. High unemployment in Europe can be blamed on the labor market rigidities imposed by the welfare state rather than on policy choices that benefit financial interests.

Schumpeter’s insight may be helpful here: “Analytic work begins with material provided by our vision of things, and this vision is ideological almost by definition...the way in which we see things can hardly be distinguished from the way we wish to see them.” Stepping outside the confines of a simple demand-supply framework, it is possible to imagine that there is much more at work on both sides of the Atlantic than skill-biased demand shifts and inflexible labor markets. There is a less elegant but more convincing story to be told about the declining economic well-being of the less skilled in developed countries, a story in which low-skilled workers have borne the brunt of weak aggregate demand, sectoral and demographic shifts, increased mobility of production and financial capital, and labor market deregulation.
Table 1: Regression Results for Alternative Measures of Unemployment, 1989-2001  
(t statistics in parentheses)

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Explanation variables:
- Union density and union/employer coordination (Nickell and Layard, 1997, Table 3);
- UIB duration and replacement, and active labor market policies (Nickell and Layard, 1997, Table 6);
Table 2. The Timing Problem:
Productivity and IT Trends vs. Skill Mix and Inequality Trends

<table>
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<tr>
<th>Period</th>
<th>Description</th>
<th>Productivity Growth¹</th>
<th>Effective Use of Information Technology²</th>
<th>Change in Workplace Skill Mix³</th>
<th>Change in Wage Inequality⁴</th>
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<td>minor</td>
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<td>Early “New Economy”: recession and slow recovery</td>
<td>low</td>
<td>moderate-high</td>
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<td>1995-2000</td>
<td>Technology-led boom</td>
<td>high</td>
<td>high</td>
<td>?</td>
<td>flat/declining</td>
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1. Mishel, Bernstein and Schmitt, The State of Working America, 2000; Table 2.1, p. 115.
2. Assumed to be accelerating, culminating in Greenspan’s statement that the late 1990s mark one of those “rare, perhaps once in-a-century events - a structural technological advance (quoted by Mishel and Bernstein, “Wage Inequality and the New Economy in the U.S.: Does IT-led Growth Lead to Wage Inequality?”, manuscript, IRPP-CSLS Conference, Ottawa Canada, Jan. 27, 2001).
4. See Figure 7
Diagram 1
Rising Skill Premia (relative wages) and Skill Intensity (employment share of skilled workers): Rising Earnings Inequality in the U.S.
Diagram 2

Rising Skill Premia (relative wages) and Skill Intensity (employment share of skilled workers):
Rising Unemployment in Europe

Diagram illustrating the relationship between rising skill premia and skill intensity in a labor market context.

Key points:
- High skill demand 1
- High skill demand 2
- Low skill demand 1
- Low skill demand 2
- Skill mix 1
- Skill mix 2
- High skill wage
- Low skill wage
- High skill employment: period 1
- High skill employment: period 2
- Low skill employment: period 1
- Low skill employment: period 2
- Unemployment

Legend:
- LS1
- LS2 (US)
- LS3 (Europe)
- HS1
- HS2

The diagram shows the movement from high skill demand to low skill demand over time, with implications for employment and wage structures.
Figure 1a: Trends in Earnings Inequality, Men, 1979-95
Countries with Increasing Inequality

Source: OECD Employment Outlook, July 1996
Figure 1b: Trends in Earnings Inequality, Men, 1979-95
Countries with Stable or Declining Inequality

Australia  Canada  Finland  France  Germany  Italy  Japan  Sweden
Figure 1c: Trends in Earnings Inequality, Women, 1979-95
Countries with Increasing Inequality

- Austria
- France
- United Kingdom
- United States
Figure 1d: Trends in Earnings Inequality, Women, 1979-95
Countries with Stable or Declining Inequality

Source: OECD Employment Outlook, July 1996
Figure 2a: Unemployment Rate and Earnings Inequality
Average Annual Change (Absolute), 1979-1997

Figure 2b: Unemployment Rate and Earnings Inequality
Average Annual Change (Relative), 1979-1997

Figure 3a: Earnings Inequality and Relative Unemployment Rates by Education Level, Men, 1979-1993

Figure 3b: Earnings Inequality and Relative Unemployment Rates by Education Level, Men and Women, 1989-1995

Figure 4a
Unemployment in the OECD, 1983-1988
Figure 4b
Unemployment in the OECD, 1989-1994

Note: Data for Austria refer to total unemployment.
Source: Stephen Nickell, "Unemployment and Labor Market Rigidity: Europe versus North America," Journal of Economic Perspectives, Vol. 11, No. 3. Figures use OECD standardized rates, with the exception of Austria and Denmark (national registered rates) and Italy (U.S. BLS, calculated on "U.S. concepts").
Figure 6: Change in Hourly Wages at the 10th, 50th and 95th Percentiles
for All Workers, 1973-99

Figure 7: Wage Inequality for All Workers, 1973-99
(95th/10th decile)
Notes


4 OECD refers to the Organization for Economic Cooperation and Development, which includes as members the most developed market economy nations.


8. An alternative account, in which collapsing real and relative wages reflects declining bargaining power stemming from ideological, political and structural shifts, is considered below.

9. To the extent that the increase in educational attainment reflects credential inflation, this measure overestimates the growth in the supply of skill. It is, in fact, not so clear that there was a substantial decline in the supply of less skilled labor. I argue below that, at least for some occupations and industries, the effective supply of low-skill workers increased in the 1980's as a result of increases in - or the increased threat of - low-skill immigration, outsourcing to low-skill regions, and low wage import competition.

10. While there is widespread acceptance that the skill requirements of work greatly increased in the 1980's with computerization, there is little convincing supporting evidence (see below).


12. According to Freeman and Katz, “In the 1980's, the increased use of microcomputers and computer-based technologies shifted demand toward more educated workers.... Whether because of
computerization or other causes, the pace of relative demand shifts favoring more skilled workers accelerated within sectors.” Richard Freeman and Lawrence Katz, "Rising Wage Inequality," in Richard Freeman, ed., Working Under Different Rules, (New York: Russell Sage Foundation, 1994), 46. Similarly, Bound and Johnson (1995) write that “Our suspicion is that a secular shift in production functions in favor of workers with relatively high intellectual as opposed to manual ability - a process that accelerated during the 1980s because of computers - is responsible, in concert with the slowdown of the relative supply of skilled labor, for most of the wage phenomena that have been observed.” John Bound and George Johnson, "What are the Causes of Rising Wage Inequality in the United States?", @ Federal Reserve Bank of New York Economic Policy Review, 1 (January): 9-17.


19. Their text is: “1. Almost all industrial economies experienced some increase in wage inequality among prime aged males during the 1980s (Germany and Italy are the exceptions). 2. But large differences in trends also exist across countries, with earnings inequality increasing most in the United States and the United Kingdom and least in Nordic countries. 3. The increasing demand for more skilled workers, coupled with differences across countries in the growth in supply of skilled workers, explains a large part of differences in trends in returns to education and experience. 4. Institutional constraints on wages also seem to matter. The rise in the relative unemployment rates of the least skilled in some, but not all, countries with centralized wage setting institutions suggests that constraints were at least partially responsible for limiting the rise in inequality” (emphasis added).

20. Ibid., 636.

21. Ibid., 652.

22. According to OECD data, the D9/D5 ratio (the typical 90th percentile worker relative to the 50th) was unchanged over the 1980s, and the D5/D1 ratio increased from 1.62 to just 1.67 between 1979 and 1989. OECD, Employment Outlook (Paris: OECD, 1996), Table 3.1. To get some perspective on the magnitude of this latter change, over the same period in the U.S., the D5/D1 ratio increased from 1.73 to 2.05.
23. Ibid, 63.


25. Figure 3a uses unemployment data by skill for males from Stephen Nickell and Brian Bell, who define skill categories differently for different countries (e.g., across educational attainment categories in some cases, across high and low skill occupations in others). In contrast, Figure 3b covers all workers and uses skill categories defined consistently across countries by educational attainment from the OECD.


30. Since the problem is held to lie in the labor market as a result of skill-biased demand shifts and institutional rigidities that work against the least skilled, we should not see rising unemployment rates for skilled workers. Indeed, a queuing story (see Lester Thurow, Generating Inequality. (New York: Basic Books, 1975.) ILO, 1997) is perfectly consistent with a rising ratio of low- to high-skilled unemployment even if a downward demand shift afflicts some group of high skilled jobs. If displaced high-skill workers get preferential treatment in competition for lower skilled jobs, “bumped” lower-skill workers may be left to bear the brunt of the unemployment. Consequently, unambiguous empirical support for the demand-shift story requires not just evidence of a secular rise in the ratio of low to high skill unemployment rates, but a rise generated from rising low-skill rates in the presence of stable or declining high skill unemployment.

31. OECD, OECD Jobs Study, Evidence and Explanations, Part I (Table 1).

32. Ibid., Table 1.16.

33. Ibid., p. 41.

34. Ibid., Table 1.16


43. Andrew Glyn, “Inequalities of Employment and Wages in OECD Countries,” manuscript, Department of Economics, Oxford University (November 17, 2001). In addition, it is likely that part of the high employment rate gap in many European countries stems from a generous pension system that encourages retirement before age 60. If this generosity has a greater impact on the employment rates of the less skilled, as I would suspect, limiting the data to those under 60 would tend to reduce the employment rate gap in the strong welfare state countries, leading to some convergence towards U.S. levels.


49. As Blanchard and Wolfers note, “employment protection both decreases flows of workers through the labour market, and increases the duration of unemployment... the effect of lower flows and higher duration on the equilibrium rate itself is ambiguous” (The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence, c13). According to an OECD study employment protection legislation “has little or no effect on overall unemployment, but may affect its demographic composition” (OECD, “Employment Protection and Labour Market Performance, *Employment Outlook* (June 1999), 50). As for taxation, we again cite Blanchard and Wolfers (Ibid., c13): “Taxes which by their nature apply equally on the unemployed and the employed, such as consumption or income taxes, are likely to be roughly neutral. And if the unemployment insurance system tries to achieve a stable relation of unemployment benefits to after-tax wages - a reasonable assumption - even payroll taxes may not matter very much.”


52. OECD, *Implementing the OECD Jobs Strategy: Member Countries’ Experience*, (Paris: OECD, 1997), Figure 10.


58. Ibid., Figure 13. For example, for the late 1980s, Denmark is shown with a .05-.1 vacancy rate, while France’s is 5-10 times larger (.4-.6) and Germany’s is up to ten times larger still (2-5). Taking the maximum, is it possible that Germany’s rate is 50 times larger than its neighbor’s? Could the flexible U.S. have a rate of nearly 5, like Germany, but Canada only a rate of .8-1.2?


61. Ibid., 190-1.


64. Calculated by the author from the UN’s Women in Statistics database, generously provided by John Schmitt.

65. The investment and interest rate data come from table 8 of Stanford, “Canadian Labour Market Developments in International Context: Flexibility, Regulation, and Demand,” manuscript, CSLS Conference, Ottawa Canada (April 1999).


73. Ibid., Figure 1; David R. Howell, "The Skills Myth," *The American Prospect,* (Summer 1994), 81-90; David R Howell, "Institutional Failure and the American Worker," Jerome Levy Institute Public Policy Brief, No. 29, Bard College (1997).

74. David Gordon, *Fat and Mean: The Corporate Squeeze of Working Americans and the Myth of Managerial Downsizing* (New York: Free Press. 1996), Figure 22.


87. Alan B Krueger, "How Computers Have Changed the Wage Structure: Evidence From Micro Data.,"


96. “Although the measured demand shifts toward more-educated workers and toward women have been substantial, they are significantly smaller than the observed relative supply changes documented in Table II... Demand shifts within our industry-occupation cells are required to explain the observed extent of positive covariation in changes in relative wages and relative supplies.” Lawrence Katz and Kevin Murphy, "Changes in Relative Wages, 1963-1987 - Supply and Demand Factors," Quarterly Journal of Economics, 107 (1), (February 1992), 35-78.


101. Ibid., 435.

102. Ibid., Table 5.

103. This is shown whether measured by either (1) changes in the nonproduction share of employment, or by (2) changes in the high and low skill shares of four skill groups: high and low skill shares of nonproduction and production worker employment. See Howell and Wieler, “Skill Shifts and the Collapse of Low-Skill Earnings in the U.S.: An Industry-Occupation Approach.”

104. George Johnson, "Changes in Earnings Inequality: The Role of Demand Shifts," 47.


107. The indeterminacy of wage-setting can be established within a neoclassical framework with specific skills. As Rodrik (1996, p. 25) explains, “Even without unions and in the absence of other labor-market imperfections, the accumulation of job-specific skills creates a situation of bilateral monopoly between workers and employers ex post. In other words, job specific skills are a form of rent, the distribution of which must be determined via bargaining within the enterprise.” Dani Rodrik, Has Globalization Gone Too Far? (Washington D.C.: Institute for International Economics, March 1997), 27.


