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# Globalization and the Labor Market

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In this paper I survey the effects of international trade and other influences on the US labor market. First, I examine the move toward globalization and its various manifestations. Second, I trace out the main labor market changes that have occurred over the last two or three decades – declines in manufacturing and industrial employment and in the demand for less skilled workers along with increases in earnings inequality and slow real earnings growth. I then move on to examine the extent to which increases in international trade, especially from Less Developed Countries (LDCs), have contributed to these phenomena. Rather than emphasize the theoretical and technical basis for such calculations I concentrate on surveying the empirical evidence that has considered the importance of trade flows<sup>1</sup>. That is not my comparative advantage, rather I will describe a number of empirical strategies that have been used to tease out any labor market effects<sup>2</sup>. The conclusion I reach is that no matter which of these methods is used, it does not appear that globalization is the smoking gun. It is appropriate then to look elsewhere for the culprit. There is no single factor, but it seems that several influences have been at work -- technological change; immigration; declining unionization; declining levels of the real minimum wage as well as reductions in the supply of college-educated workers.

### *1. Globalization*

Concerns about globalization – the increasing international integration of markets for goods, factors and technology – are widespread. Globalization has arisen both through an increased trade in goods plus easier movements of factors of production –

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<sup>1</sup> The interested reader is referred to papers by Deardorff and Haikura (1994) and Johnson and Stafford (1999) for a theoretical treatment.

<sup>2</sup> A number of earlier papers have also surveyed the empirical literature on how the ‘openness’ of an economy affects a country’s labor market (e.g. Blanchflower and Slaughter, 1999; Katz and Autor, 1999; Slaughter and Swagel, 1997; Gottschalk, 1997 and Levy and Murnane, 1992).

capital and labor – across national boundaries. The United Nations (1999) recently identified a number of fascinating features about the expansion of world trade.

1. World exports of goods and services almost tripled between the 1970s and 1997 in real terms.
2. Foreign direct investment topped \$400 billion in 1997; seven times the level in real terms in the 1970s.
3. The daily turnover in foreign exchange markets increased from around \$10-20 billion in the 1970s to \$1.5 trillion in 1998.
4. Between 1983 and 1993 cross-border sale of US Treasury bonds increased from \$30 billion a year to \$500 billion.
5. Portfolio and other short-term capital flows in gross terms at the end of the 1990s totaled more than \$2 trillion – almost three times the level in the 1980s.
6. People travel more – tourism increased from 260 million travelers a year in 1980 to 590 million in 1996. The number of international tourism departures in the US between 1985 and 1995 increased 46%.
7. Time spent on international phone calls increased from 33 billion minutes in 1990 to 70 billion minutes in 1996.
8. International bank lending grew from \$265 billion in 1975 to \$4.2 trillion in 1994.

Table 1 presents evidence on the growth of US international trade in goods and services from 1960-1999. The growth in the size of the trade balance deficit in goods from around 1983 is particularly notable. Alongside that is the growing surplus in services from approximately 1988. It should be pointed out, however, that Krugman (1995) and Irwin (1995) have both noted that only since the 1970s has the flow of trade achieved the levels pertaining at the end of the nineteenth century. Table 2 shows that for

the US the degree of openness  $((\text{exports}+\text{imports})/2)/\text{GDP}$  was approximately the same in 1973 as it was in 1913 (Johnson and Stafford, 1999). The long run trend in trade (1913-1992) is also flat for a few other advanced countries, (Australia, Denmark, Finland, Switzerland and the UK). Japan was less open to trade at the end of the century than at the beginning. The major growth in openness in the US has occurred since 1973. Interestingly, only a few of the advanced countries have had a substantial growth in openness from 1973-1992 – the main exceptions are Belgium, Finland, the Netherlands and West Germany. By the end of the period there remain considerable differences between countries in their degrees of openness, ranging from the least open (Japan and the USA) to the most open (Belgium and the Netherlands)<sup>3</sup>. Over the period 1973-1992 Canada and the US had the same increase in the degree of openness (+4.1%): as we show later, they had very different labor market outcomes over these years. Even though the US has seen a large proportionate growth in its degree of openness, the level of trade is still very low by international standards<sup>4</sup>. However, looking at just imports and exports divided by GDP tells us little about how open an economy is with respect to the ease of entry for imports or FDI. Looked at in terms of ease of entry, the U.S. is clearly a much more open economy than Japan. And, this de facto openness is critical to the extent to which trade may influence outcomes in the economy. Some qualification is needed to explain the limits of the cited openness measure. In the case of the EU countries, when looking at exports and imports and making international comparisons, there is a fairly sound basis for counting intra-EU trade as “domestic” rather than international trade. When this is done, the import and export data of the major EU countries do not look that different than the United States.

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<sup>3</sup> As Johnson and Stafford note (1999, p.2218), such differences arise due to the close proximity of trading partners in the cases of Belgium and the Netherlands because of low transport costs via rail and water to these trading partners, and a supportive financial infrastructure while a large country like the US has sufficient intra-country variability to promote internal trade.

<sup>4</sup> I am grateful to Allan Mendelowitz for this point.

Concerns about the growing influence of trade (exports or imports or both together), with less-developed countries (LDCs) is also particularly widespread in the US. Borjas et al (1997) show that US manufacturing imports from less developed countries have grown substantially over the last thirty years: 0.8% of GNP in 1970 to 2.3% in 1980 to 2.8% in 1990 and 4.1% in 1996. As can be seen from Table 3, the proportion of manufactured imports that comes from developing countries continues to rise. In 1991 imports from developing countries accounted for 35% of imports compared with 44% in 1998. The main developing countries that have seen substantial increases in their share of imports during the 1990s are Mexico and China (Table 4). In 1991 Mexico accounted for 5.09% of the value of all imports compared with 8.92% in 1999; China had 3.1% in 1991 and 6.65% in 1999. There is some evidence that across countries from 1970-1990 the change in net imports of manufactures from developing countries is negatively correlated with changes in the share of manufacturing in total employment (Wood, 1995). However, the numbers are small – the largest rise in developing country net import penetration ( $[\text{imports} - \text{exports}]/\text{GDP}$ ) across a group of advanced countries examined by Wood was not much over 2% and the average about 1%. The fact that trade with developing countries is such a small proportion of GDP is emphasized by economists who dismiss the influence of trade. We return to this point below.

Table 5 examines changes in the source of imports for the US as well as separately for Japan, Europe and the OECD as a whole. Source countries for these imports are distinguished within the OECD (Europe, North America and Other) and from non-OECD countries, separately for the Dynamic Asian Economies (DAE's)<sup>5</sup> and China and OPEC. Four main findings emerge from this table.

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<sup>5</sup> The Dynamic Asian Economies are Chinese Taipei; Hong Kong; Korea; Malaysia; Singapore and Thailand.

1. US imports from the DAE's and China have risen dramatically in the years between 1962 and 1998 (0.14% of GDP in 1962 to 2.03% in 1998). The European Union has seen a large increase in its trade with these countries (0.26% in 1962 to 1.49% in 1998).
2. By 1998 the US and Japan had a similar percentage of their imports from the DAE's and China (2.03% of GDP for the US compared with 1.98% for Japan). By 1998 overall imports from non-OECD countries also account for a similar percentage of nominal GDP in the two countries (3.4% and 3.5% respectively).
3. Increases in the price of oil in the 1970s and 1980s raised the share of imports from OPEC countries to all areas but particularly to Japan.
4. Excluding the trade with OPEC countries, the European has a higher proportion of imports from non-OECD countries – that are primarily developing – than does the USA or Japan. In 1962 the USA had imports valued at 0.76% of GDP from non-OECD countries compared with 2.71% in 1993: Europe had 3.08% compared with 3.42% in 1993.

To summarize, the US has seen a growth in its trade deficit since 1983. Imports from developing countries have grown particularly rapidly. However, even after this increase in trade, by international standards the US is a relatively closed economy.

There seems to be little doubt that a process of globalization is taking place. What are its consequences for the US? Are they as large as Ross Perot or Pat Buchanan would have us believe? Is the solution to the country's ills to become more protectionist? At the same time as there has been a rapid increase in international trade there have been a number of important changes in the labor market. Is the fact that these changes have coincided with one another a coincidence or is there something causal? First we need to identify what labor market changes have occurred. We do so in the next section. In the

following section we look at the relationship between the growth of international trade and its consequences (if any) in the labor market. Alternative explanations are also examined in subsequent sections.

## *2. Labor market changes*

Over the last few decades increases in globalization have been accompanied in the US by four main labor market trends – declines in manufacturing and industrial employment and in the demand for less skilled workers along with increases in earnings inequality and slow real earnings growth especially at the low end of the earnings distribution<sup>6</sup>. The first two of these are found in most OECD countries. The combination of rapidly rising earnings inequality and low real wage growth are essentially a US phenomenon. The UK also experienced rapidly rising earnings inequality but had strong real wage growth across the earnings distribution. In many countries that did not experience growth in earnings inequality, unemployment increased in its place. However, there are a number of countries that experienced neither rising inequality nor increased unemployment. Examples are Denmark, the Netherlands and Norway, all of which are small, highly open, economies. I will consider each of these labor market trends in turn.

### *2.1. A decline in manufacturing and industrial employment,*

In comparison with employment in services there has been a relative decline in industrial employment in most advanced countries and been an absolute decline in numbers in many. Table 6 illustrates. Column 1 shows the percentage change in the number of workers employed in industry in 1998 compared to the starting year of 1970. The absolute number of industrial workers declined in a majority of countries -- the main

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<sup>6</sup> As might be expected, changes in earnings closely track changes in income because for most people their wages are their primary, and often only, income source.

exceptions are Canada, Greece, Iceland, Japan, Portugal, USA and Turkey. As a proportion of total employment, industrial employment fell in virtually all countries from 1970-1998 (columns 2 and 5) with the exceptions of only Portugal (+15%) and Turkey (+45.1%). Within the OECD industrial employment as a percentage of total employment fell by nearly a quarter over these years.

It does appear that the movement of workers out of manufacturing to sectors with higher levels of skill intensity has some part to play in the decline in the demand for less skilled workers. But, as Katz and Autor (1999) have noted, the rate of between-industry shifts did not seem to show any rapid acceleration in the 1980s compared to other recent decades when, as we will show below, there was the most rapid rise in US earnings inequality.

## 2.2. *A decline in the demand for less skilled workers.*

Over the last few decades in the US there has been an increase in the levels of skills required by workers. This has been particularly true in US manufacturing, which is the branch of the economy for which trade and foreign outsourcing are most important<sup>7</sup>. relative demand shifts to skilled workers. However, ‘upskilling’ has occurred in *all* industries, tradeable and nontradeable. This in combination with the fact that the volume of trade is quite small suggests that the source of most of the observed demand shifts is something other than globalization.

A number of studies point to big declines in the proportion of *production* workers employed in manufacturing over this period<sup>8</sup>. Figure 1 shows that the trend in the

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<sup>7</sup> Murphy and Welch (1993) argue that over 20% of the total skill upgrading in the 1980s occurred in manufacturing.

<sup>8</sup> Examples include Berman, Bound and Griliches (1994), Sachs and Shatz (1994), Lawrence and Slaughter (1993).



proportion of production workers was essentially flat during the 1920's and 1930's, but then had a quick decline in its share of total manufacturing employment from 1925-1930. This was then followed by a steady increase of approximately ten percentage points from 1930 to the mid 1940s. From the end of WW2 the share of production workers fell steadily until the early 1980s: the share of production workers fell from nearly 86.1% in 1943 to 67.8% in 1982, a fall of just over 18 percentage points. What is less well known is that, since the early 1980s the proportion of production workers has remained roughly *constant*: by 1999, 68.7% of manufacturing employees were production workers. In part this is probably driven by the Clinton boom of the 1990s, as it is well known that the fraction of employment that is production is pro-cyclical, since production employment is more cyclically sensitive than non-production employment (Berman, Bound and Griliches, 1994). However this does not explain why the seemingly inexorable decline in the share of production workers in total manufacturing employment was apparently halted during the 1980s. It is unclear what explains this reversal. It could have arisen because in the 1990s firms were increasingly outsourcing non-production intensive activities to contractors. Another possibility is that computer use initially boosted skilled labor demand but is now raising the demand for unskilled labor. The documented change may be a statistical illusion reflecting the fact that ongoing skill upgrading is resulting in the production/non-production split being a worse and worse measure of skills.

Another way to measure the intensity of low-skill production is to look at employment to population rates by level of education and gender. Table 7 shows the decline in the relative employment of the least educated over the last two decades for the

US and a number of OECD countries<sup>9</sup>. This table makes clear that there are marked differences by gender across countries. Employment-population rates fell for both low and highly educated men in *all* of the countries reported except Portugal<sup>10</sup>. In most of the countries the employment-population rates of low-educated men declined more than was the case for high-educated men. In a number of countries, however, the employment-population rate for women rose for *both* low and the high education group (e.g. USA, Australia, New Zealand and Sweden). Relative to high-educated women, the employment-population rates of low-educated women deteriorated in the USA, Canada, Denmark, Finland, France, New Zealand, Norway, Portugal, and the UK, but improved in Australia, Austria, Belgium, Italy and Spain. As we show below, there are a number of other important differences between the male and female labor markets in virtually all advanced countries.

### *2.3. A widening of earnings and income inequality and sluggish real wage growth.*

Since the early 1970's earnings in the US have become much more unequal between more-skilled and less-skilled workers as well as between workers with high and low levels of education and those with many years of labor market experience compared to those with few<sup>11</sup>. For example, in 1979 male college-educated workers earned on average 30% more than male high-school-educated workers. By 1995 this premium for college-educated workers had risen to about 70%. Table 8 shows the increase in earnings inequality that has occurred since the 1960s. An increase in the standard deviation of the log of weekly wages suggests a widening of the income distribution for both men and

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<sup>9</sup> The exact dates vary by country.

<sup>10</sup> The results are similar when unemployment rates are examined: see OECD, 1997.

<sup>11</sup> For discussions of changes in income and earnings inequality in earlier periods in a number of countries see Phelps Brown (1977, 1988).

women. The most rapid changes that have occurred have been at the tails of the wage distribution, hence in the last three columns of the table differences between the earnings of individuals at the 10<sup>th</sup>, 50<sup>th</sup> (median) and 90<sup>th</sup> percentile are compared. In 1963 an male at the 90<sup>th</sup> percentile earned 3.3 times those of an individual at the 10<sup>th</sup> percentile<sup>12</sup>. By 1995 the gap had increased to 4.7 times. Further, the weekly earnings of workers at the 90th percentile of the wage distribution increased by over 25 log points (28%) compared with workers at the 10th percentile between 1979 and 1995 (Table 8)<sup>13</sup>. Over these years the ratio of the earnings of a worker at the ninth decile compared with a worker at the median rose by about a quarter. However, earnings at the median compared with those at the tenth percentile only grew by about 12%. The gap between the earnings of those at the top of the distribution and the rest has thus widened considerably over time.

Figure 2 and Table 8<sup>14</sup> suggests that the most rapid rise in wage inequality occurred in the years since 1979, and especially from 1979-1987, for both men and women. On the vertical axis is the 90-10 log weekly wage differential plotted as in the second row of Table 8 but now for each year. The widening of the wage distribution appears to have slowed but not reversed itself into the 1990's.

The main findings about changes in earnings inequality have come from observations of the labor market earnings of millions of individuals in various data

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<sup>12</sup> To get the percentage change take the log points (1.19) and take natural anti-logs and deduct one = 3.29.

<sup>13</sup> These data are taken from Katz and Autor (1999) who use the March files from the Current population Survey. The wage data are taken from the 1964-1996 surveys and relate to the years 1963-1995 because they relate to the year prior to interview (see Blanchflower and Oswald, 1994 for further details). The data relate to full-time, full-year wage and salary workers, working 35 hours or more a week and at least 40 weeks in the previous calendar year. The sample is further restricted to individuals prior to retirement age (19-65) without allocated earnings, who earned at least \$67 per week in 1982 dollars. Weekly earnings are imputed by multiplying the value by 1.5.

sources. Katz and Autor (1999) make it quite clear that the wage trends that are identified are robust across data sources including the March Current Population Surveys, Census PUMS and the CPS May Samples and Outgoing Rotation Group files. Similar data files are available in many other advanced countries, and there has been a growing effort to compare and contrast the evidence for those countries with those for the United States (for some of these papers see Freeman and Katz, 1995, and OECD, 1996).

Wages are only a part of the total compensation package: non-wage benefits such as employer pension contributions, employer provided health insurance represent a large part of total compensation, and especially so for those high up the earnings distribution. Pierce (1997), for example, estimates that non-wage compensation amounted to 27.3% of total employer compensation costs in 1994. There is evidence that “changes in the distribution of non-wage benefits and non-pecuniary workplace amenities tend to reinforce rather than offset observed increases in US wage inequality” (Katz and Autor, 1999, p. 1489). This is primarily due to the decline over time in the likelihood of coverage of the least educated and low wage workers. Pierce (1997) finds that compensation inequality is greater than wage inequality: a 90-10 log hourly compensation differential of 1.75 in 1994 compared with a 90-10 log hourly wage differential of 1.57. He also finds a greater rise in compensation inequality over the period 1986-1994 than was found in wage inequality. Hamermesh (1999) has found evidence that industries between from 1979 to 1995 that have had rising relative earnings have had declining injuries. Also he has found that the incidence of work at unattractive hours has increased relatively for low paid workers. Farber and Levy (2000) show that between 1979 and

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<sup>14</sup> The source for both this figure and table as well as figures 3-5 is Katz and Autor (1999). I am grateful to Larry Katz for providing me with these figures

1997 the proportion of workers who were high school dropouts that had health insurance fell from 67% to 50% compared with a decline from 85% to 76% for college graduates. Bloom and Freeman (1992) also report declines in pension coverage for those at the lower part of the earnings distribution.

A similar picture is found when data on income, rather than on labor market earnings or total compensation, are examined. Examples of papers that look at changes in the income distribution are Blackburn and Bloom (1994), Gottschalk (1995, 1997); Gottschalk and Smeeding (1997); Karoly (1994); Atkinson (1996); Feldstein (1998); Hoxby and Terry (1999); Deaton (1999). Most people have small levels of savings (Browning and Lusardi, 1996) and hence for them earnings are a very large component of total income. Analyzing income rather than earnings has the benefit though that non-wage income such as the Earned Income Tax Credit, food stamps, dividend income etc. can be included. When income measures are examined the unit of observation often moves from the individual to the household or the family. Gottschalk (1993) has summarized well why changes in the earnings and income distributions have moved quite closely together.

“Changes in the distribution of other family members’ earnings and other private and public income sources were not sufficient to offset the increase in inequality of heads of households. While the earnings of spouses were mildly equalizing, their impact did not offset the trends in male earnings inequality. Furthermore, government tax and transfer policies did little to offset the increase in earnings inequality. As a result of the retrenchment in transfer policy, government actions failed to change significantly the underlying trend toward greater inequality. (1993, p.136)

The rise in U.S. earnings and income inequality is indeed far from being a global phenomenon. While many OECD countries experienced increases in earnings inequality during the 1980s, with the exception of the United Kingdom, the orders of magnitude

were well below those experienced in the U.S. It should also be noted that the rise in U.S. inequality appears to pre-date increases occurring elsewhere. Table 9 reports the ratios of earnings at the ninth decile to the median and the median to the first decile for men for the years 1979, 1985 and 1994/5. Only the United Kingdom and the United States have continued to experience a rapid rise in inequality into the 1990s, albeit it at a slower rate than had occurred in the 1980s. With the exception of Germany and Norway, earnings dispersion increases at the top of the earnings distribution (D9/D5) from 1973-1994/5. At the lower part of the distribution, the earnings of the median worker rise a lot in comparison to the worker at the first decile over the period rise only in the UK and the USA but actually *fall* in five countries (Belgium, Finland, France, Germany and Norway)<sup>15</sup>. Interestingly, referring back to Table 2, Belgium, Finland, France, and Germany had some of the largest *increases* in openness over the period 1973-92.

Other indicators besides those looking at earnings inequality suggest that the US is much more unequal than other OECD countries. Table 10 provides a number of data series taken from the 1999 Human Development Report of the UN which provide further details on the wide levels of inequality that exist in the United States, and to a lesser extent the UK and New Zealand which both embarked on programs in the 1980s and 1990s to “Americanize” their labor markets<sup>16</sup>. The first column presents country rankings for 1997 based on the Human Development Index (HDI). The index attempts to recognise that human welfare is not adequately captured by GDP per capita. It is a

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<sup>15</sup> Data on male inequality are not available for Denmark but those for overall inequality for the years 1980-90 are available and also suggest a fall in earnings inequality at the low end between 1980 and 1990 – D5/D1 in 1980=1.41 compared with 1.38 in 1990. There was a small increase at the top end - D9/D5 in 1980=1.52 compared with 1.57 in 1990 (OECD, 1996, Table 3.1).

<sup>16</sup> For a discussion of the lack of success of the Thatcher reforms of the UK labor market see Blanchflower and Freeman (1994). Maloney and Savage (1996), Chapple et al (1996) and Maloney (1997, 1998) all document the lack of success of the labor market reforms in New Zealand.

composite of three main factors: longevity, knowledge, and standard of living. Longevity is measured by life expectancy. Knowledge is measured by a combination of adult literacy (given two-thirds weight) and mean years of schooling (given one-third weight). Standard of living is measured by real GDP per capita, after adjustment for the local cost of living as captured by purchasing power parity PPP prices. The three factors are then averaged to form the HDI index. On the HDI the US is ranked third, behind Canada and Norway despite the fact that the US ranks higher than Canada on GDP per capita (column 10). The US has the lowest ranking on the Poverty Index<sup>17</sup> (column 2) and is ranked near or at the bottom on the proportion of people expected to survive to age 60 (column 3), the proportion of adults that are functionally illiterate (column 4) and the proportion of the population below the poverty line (columns 8 & 9). Real GDP per capita for the richest 20% is highest in the USA (column 6).

In the United States real wage growth has been much greater at the top of the earnings distribution than at the bottom (Figure 3)<sup>18</sup>. In the hundred years to 1973, real average hourly earnings rose by 1.9% per year. Between 1973 and 1997 CPI-deflated real wages have *fallen* by about 0.4% per year. The combination of flat average wages and rising inequality means that large numbers of American workers have experienced stagnation or even absolute declines in their real earnings in recent decades. U.S. workers

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<sup>17</sup> The human poverty index for industrialized countries concentrates on deprivations in four dimensions of human life, quite similar to those reflected in the HDI — longevity, knowledge, a decent standard of living and social exclusion. The first deprivation relates to survival—vulnerability to death at a relatively early age. The second relates to knowledge—being deprived of the world of reading and communication. The third relates to a decent standard of living in terms of overall economic provisioning. And the fourth relates to non-participation or exclusion. In constructing the index deprivation in longevity is represented by the percentage of people not expected to survive to age 60 (P 1), and the deprivation in knowledge by the percentage of people who are functionally illiterate as defined by the OECD (P 2 ). The deprivation in standard of living is represented by the percentage of people living below the income poverty line, set at 50% of the median disposable personal income (P 3 ). And the fourth deprivation, in non-participation or exclusion, is measured by the rate of long-term (12 months or more) unemployment of the labor force. See Human Development Report, 1999, page 163.

at the low end of the earnings distribution have suffered the most, particularly those in the lowest decile. For example, the real hourly earnings of high-school-educated males fell by 20% from 1979 to 1993.<sup>19</sup> In contrast, there has been considerable growth in real earnings at the top of the earnings distribution. Senior managers and executives have experienced large increases in real earnings over the last couple of decades, and especially so when total compensation including stock options are included.

In contrast to the United States, in most OECD countries, including the United Kingdom, there has been strong real earnings growth across the wage distribution. For only one or two countries (New Zealand and Australia) has a rise in earnings inequality implied weak growth, or even declining real wages for workers at the bottom half of the earnings distribution<sup>20</sup>. The low-paid in most industrial countries have experienced real earnings growth over the last two decades.<sup>21</sup> Gottschalk (1993) shows, using data from the Luxembourg Income Study for the 1980s in a comparison of seven OECD countries (Australia, Canada, France, Netherlands, Sweden, UK, USA) that only in the US did the inequality of family income rise more than the inequality of earnings. In these countries government actions through social expenditures mitigated somewhat the impact of increasing wage inequality

Second, the earnings of women in the US increased relative to the earnings of men from 1963 to 1995, although the main period of growth was post 1979. Real wages for men were flat over the period 1963-1995 for those in the lowest 25% of the earnings distribution (Figure 3). This contrasts with the high (>30%) real wage growth for males

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<sup>18</sup> I am grateful to Larry Katz for providing me with his various graphs from Katz and Autor (1999).

<sup>19</sup> Freeman (1995) and Mishel and Bernstein (1994) report declines of this magnitude.

<sup>20</sup> For more information on changes in real wages see OECD (1996) and Katz et al (1995) for the UK, USA, France and Japan.



in the top 10% of the wage distribution. The pattern was very similar for men and women. However, real wages for women were much greater than for men. The lowest quartile had real earnings growth of around 25%: the top decile had earnings growth of over 50%. More generally, over the last couple of decades, the labor market position of women has started to move closer to that of men, both in terms of their earnings and their employment, relative to that of men. Interestingly, as women's relative labor market position has improved the reported happiness levels of women in the US has *fallen* over time (Blanchflower and Oswald, 1999). In the 1970s the happiness levels of women were well above those of men: happiness levels of women have declined steadily since the 1970s while those of men have remained roughly constant in both the US and the UK. In contrast, the job satisfaction ratings of both men and women have remained roughly equal – and constant -- over the period 1972-1998 (Blanchflower and Oswald, 2000).

The earnings of the most educated and those with the highest amounts of labor market experience also increased strongly between 1963 and 1995 (Figure 4). Panel A of the Figure shows changes in the male/female log wage differential which widened during the 1960s but has narrowed considerably since then both for high school and college graduates. Panel B shows that the college/high school log wage differential grew significantly post-1979. Panel C shows a steady increase in the relative earnings of those with experience (25-35 yrs) compared to those with 5 years of experience.

While most OECD countries did not experience a sharp rise in inequality, many confronted increased unemployment in its place. Table 11 presents the range of unemployment outcomes from 1973 through 1998 for a number of OECD countries. It is certainly true that on average earnings inequality did increase less whilst unemployment

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<sup>21</sup> See OECD (1996).

increased more in Europe than it did in North America from 1979-1994. However, there are a number of countries that are important exceptions. Of particular interest is the United Kingdom which experienced *both* a rise in earnings inequality *and* a rise in unemployment. Countries with a similar mix (albeit with less inequality) are Australia, New Zealand, and Canada. The unemployment experience of Belgium looks much like that in the United Kingdom despite the fact it experienced a *decline* in inequality over the period. Unemployment in the Netherlands has been low and declining in the 1990s, alongside only a small rise in earnings inequality. Similar to the Netherlands are Austria, Norway and Denmark all of which are highly open economies which have had low unemployment and little increase in earning inequality. The experience of other OECD countries has been more varied. If globalization is such a pervasive phenomenon why have these countries avoided its more harmful effects?

Third, there has been an increase in *residual* or within-group wage inequality over the period 1963-1995. Wage inequality among those with similar education and experience increased for both men and women in the United States over this period. Figure 5 and table 12 summarize the time series pattern of changes in the log wage differential between the 90<sup>th</sup> and the 10<sup>th</sup> percentile in the residual wage distribution. These residuals were obtained by Katz and Autor (1999) from separate regressions by sex each year of log weekly wages on a full set of 8 education dummies, a quartic in experience, interactions of the experience quartic with 3 broad education categories, 3 region dummies, and 2 race dummies. Residual wage inequality increased by over 27 log points (31%) for men and 25 log points (28%) for women from 1963-1995. In the United States, rising residual inequality accounts for approximately *half* of the overall rise in wage inequality. Even if the differences between groups, such as the educational or wage

premium were to return to their 1979 levels (perhaps through an increase in the supply of skilled workers) overall inequality in the United States would still be higher than in earlier years. In contrast to the situation in the US, residual inequality declined in Great Britain in the 1970s but rose in the 1980s and was generally flat throughout the 1970s and 1980s in France (see Katz, Loveman and Blanchflower (1995)).

As Katz and Autor note

“the rise in wage inequality suggests that the ‘least skilled’ or ‘least lucky’ workers within each category as well as less educated and less experienced workers have seen their relative earnings decline substantially over the past two decades” (1999, p.1480).

Exactly.

Fourth, there does not appear to have been an increase in the mobility of workers out of the lowest deciles, that dissipates the impact of rising earnings inequality on the poor. The same people appear to be suffering stagnating or falling wages - the lower deciles do not appear to represent changing pools of people in different years. Movement up the earnings distribution appears to be little different in the US than in other OECD countries. This issue has been examined using longitudinal information on the same individuals over time to see how their position in the earnings distribution changes. Gottschalk and Moffitt (1994) use data from the Panel Study of Income Dynamics on male heads of households to examine whether the impact of mobility has changed much over time. They subdivide their data into two 9-year periods, 1970-1978 and 1979-1987 and find little change in earnings mobility between the two periods. In a comparison of inequality in the US and Germany in the 1980s using longitudinal data from the PSID as well as the German Socio-Economic Panel respectively Burkhauser et al (1997) rather surprisingly found very similar patterns of quintile-to-quintile mobility in the two

countries. For example, they found that the proportion of individuals remaining in the lowest quintile in the United States was 75% after 1 year; 66% after two years and 55% after five years. For Germany the comparable estimates were 79%, 70% and 53% (Table 6). Analogously, OECD (chapter 2, 1997) finds that mobility reduces inequality by broadly similar amounts in each of the six OECD countries they examined (France, Germany, Denmark, Italy, UK, USA). Interestingly, they also find no evidence “that countries with more liberalized labour and product markets, as exemplified by the UK and the USA, have higher mobility which offsets their higher levels of cross-sectional inequality” (1997, p.32). Nor do they find any evidence that low-paid workers in these two countries experienced more upward mobility.

OECD (1997) also found that the young in most countries were the ones that experience the greatest movement up the earnings distribution, with this being particularly pronounced in Germany where high proportions of the young spend a number of years in low paying apprenticeships. Buchinsky and Hunt (1999) using data on young people from the National Longitudinal Survey of Youth from 1979-1991 find that the level of inequality in the US for the young is lower by 12-26% once mobility is taken into account. However, Buchinsky and Hunt also find that the sharp increase in inequality during the 1980s is actually *worse* for the young than it appears, due to *falling* mobility over time.

What are the consequences for families of the increased income and earnings inequality that has been observed in the US? To what extent does this directly impact standards of living? Have families altered their consumption patterns or turned to alternative income sources? There is some disagreement on whether families in the US are able to mitigate the impact of increased earnings variability. Dynarski and Gruber

(1997) report that households have responded to earnings variation by smoothing their consumption. They find that roughly half of this consumption smoothing occurs through offsetting income flows, in particular through the tax and transfer system, with the other half coming through savings and dissaving. This consumption smoothing is fairly complete: Dynarski and Gruber report that only about 10% of the variation in a household head's earnings is translated into variation in non-durables consumption and 17% in durables. Consumption expenditures, particularly on durables, do appear to be much more responsive to unemployment-induced earnings reductions for low-education or low wealth groups than for high-education or high-wealth groups. In contrast, however, Attanasio and Davis (1996) report for the United States that among the less educated, real household consumption fell sharply during the early 1980s in parallel with sharp declines in real wages for these groups. Among the college educated both real consumption and real earnings rose throughout the 1980s.

To summarize: there has been a decline in employment in manufacturing and industry alongside a decline in the relative demand for male unskilled workers but not for females. These changes are common to most advanced countries. The US, and the UK have experienced a much more rapid increase in earnings inequality than other OECD countries. The increase in inequality came much earlier in the US than it did in the UK or elsewhere. Some countries that did not experience increased inequality had rising unemployment in its place. Other countries like Austria, the Netherlands, Norway and Denmark, for whom trade constitutes a very high proportion of GDP, had neither rising unemployment nor rising earnings inequality. Mobility up the earnings distribution does not appear to have changed much over time in the US, and the amount of mobility in the US appears to be comparable to that of a number of European countries. We now move

on to examine the factors that account for these changes. Any comprehensive explanation for the changes in labor market behavior that have occurred over the past two decades has to be consistent with the rather different experiences that have occurred across countries and through time.

### *3. The Framework of Causes: Demand, Supply, and Institutions*

The quest has been on to ascertain the culprits for the declining relative position of the least skilled. There are three main candidates to explain the labor market changes outlined above: shifts in relative labor demand; shifts in relative labor supply; and changes in labor-market institutions. Within the set of demand-side and institutional explanations, those that have received the most attention are international trade, technological change, the composition of aggregate demand, the decline in the real minimum wage and de-unionization. On the supply-side, changes in the supply of educated workers have been emphasized as an important influence.

Over the last couple of decades the structure of demand and supply in the labor market can be characterized as follows. In the case of skilled workers there has been an outward shift in the labor demand schedule which has been accompanied by an outward shift in the labor supply curve. This has resulted in an increase in both the equilibrium price and quantity of skilled workers. In the case of the less skilled the labor supply curve remained roughly constant while the labor demand curve moved down, resulting in a lower price and quantity (Johnson and Stafford, 1999).

Katz and Murphy (1992) document that for the U.S. economy, supply changes alone cannot explain rising income inequality. The main reason is that for most time periods and skill groups, both the relative earnings and relative supply of more-skilled workers have been rising. Relative earnings can increase along with relative supply only

if relative demand is increasing as well. Katz and Murphy conclude that demand growth has been an important component of the change in factor prices since 1963 and particularly during the 1980s. Autor, Katz, and Krueger (1997) also report an acceleration of the demand shift between the 1970s and 1980s relative to earlier decades. Looking at just the manufacturing sector, Berman, Bound, and Griliches (1994) and Lawrence and Slaughter (1993) find the same trend: that even though the relative wage of more-skilled workers has been rising, within most industries firms have been employing relatively more of these workers. These facts point strongly toward a shift in labor demand as an important part of the explanation for observed changes in the labor market.

### *3.1 The Influence of International Trade on Labor Demand*

The theoretical economic model used to test the effect of international trade on labor demand is the Heckscher-Ohlin framework. The standard assumptions are that all countries make the same sufficiently diversified mix of products under perfect competition and with all factors (in particular, skilled and unskilled labor) perfectly mobile across industries. Trade liberalization changes relative prices and shifts the pattern of production in line with comparative advantage which increases welfare. Hence the Stolper-Samuelson theorem predicts that international trade influences relative factor demands and thus factor prices<sup>22</sup>. In the two-good, two-factor model, each economy exports the good that is intensive in its most widely available factor. According to the Stolper-Samuelson theorem international trade affects the prices of products which, in turn, affect factor prices by changing relative factor demands. Any trade-induced change in a country's product prices alters the relative profit opportunities facing its price-taking

firms, who respond by shifting their resources towards (away from) the industries whose relative profitability has risen (fallen). This entails a shift in country-wide demand for factors of production: demand rises (falls) for the factors used relatively intensively in the now relatively-profitable (unprofitable) sectors. Given fixed factor supplies, changed factor demands mean changed factor prices. Thus trade influences relative factor prices via changes in the terms of trade -- which may result from trade liberalization and other causes. US trade patterns will vary by trading partner: those countries that are low-wage should follow this prediction most closely. The US exports skill-intensive goods to them in exchange for imports of goods that are less skill-intensive.

For the Stolper-Samuelson theorem to hold, certain conditions need to be present (OECD, 1997). First, trade with relatively low-wage countries is assumed to be of the inter-industry type. Advanced countries are assumed to export skilled-labor intensive products and import unskilled-labor intensive products. This trade is motivated by differences in endowments. If trade were of the intra-industry type involving the export and import of similar products the impact on the demand for labor is ambiguous (Oliveira Martins 1994). Second, there should be incomplete specialization of production. If there were complete specialization of production Bhagwati (1995) has shown that increases in trade with low skilled countries would be beneficial to all workers including the unskilled. Third, the theorem assumes perfect wage flexibility but if that is not the case then the shift in trade prices will translate into relative employment changes rather than relative wage changes.

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<sup>22</sup> See Deardorff (1994) for a discussion of the Stolper-Samuelson theorem.



A number of papers have tested whether the Stolper-Samuelson process has contributed to the changes in the labor market that were described above<sup>23</sup>. Several of these papers have examined changes in U.S. product prices to see whether the prices of unskilled-labor-intensive products have fallen relative to the prices of skilled-labor-intensive products. Performing convincing analyses of product prices is a difficult task. Quality of products can vary. Wholesale prices differ from retail prices, list prices are often different from transaction prices. Prices can vary because of differences in delivery time (“I need this product now and I am prepared to pay for it”). Left-handed golf clubs do not compete with right-handed golf clubs. Size 17 shirts do not compete with size 16 shirts, and so on. I for one have concerns about the usefulness of any work of this kind because of the difficulty of data aggregation. Others seem less concerned. Bhagwati (1991) analyzes the aggregate U.S. terms of trade (i.e., the price of U.S. exports relative to the price of U.S. imports) and finds they fell during the 1980s. This is evidence that skilled-labor-intensive products did not have relatively higher price increases (assuming exports employ skilled labor intensively relative to imports). Lawrence and Slaughter (1993) analyze various samples of industry-level U.S. manufacturing prices over the 1980s. They find no clear evidence that skilled-labor-intensive products had relatively larger price increases. Sachs and Shatz (1994) argue that computer prices should be excluded from any analysis because these prices are measured poorly. For this restricted sample, Sachs and Shatz find that skilled-labor-intensive products had slightly higher relative price increases in the 1980s. Leamer (1998) allows for various degrees of pass-through from technology changes (as measured by total-factor productivity growth) to product prices; he also analyzes the 1960s and 1970s as well as the 1980s. For all pass-

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<sup>23</sup> Slaughter (2000) provides a more complete survey.

through specifications for the 1980s and the 1960s he finds no concentration of price increases in skilled-labor-intensive industries. But for the 1970s he consistently finds relative price increases for the skilled-labor-intensive products. Baldwin and Cain (1997) also control for the effect of technology on product prices, and they also conclude that trade seems not to have contributed to widening income inequality during the 1980s. Krueger (1997) finds that for a sample of 150 of the 450 4-digit SIC industries, from 1989 to 1995 skilled-labor-intensive industries did experience slightly higher product-price increases. Feenstra and Hansen (1999) examined 446 of the 450 4-digit industries from 1972-1990 and found that outsourcing resulted in increases in wage inequality. Revenga (1992) examines a panel of 38 US manufacturing industries (1977-1987) and finds that import competition had a small but significant impact on both wages and employment. A 10 per cent reduction in the price of competing imports is associated with a 2.5%-4% drop in employment and a 0.5% to 1% fall in wages.

There has also been work for other countries besides the US on whether the prices of unskilled-labor-intensive products have fallen relative to the prices of skilled-labor-intensive products. Neven and Wyplosz (1998) find no evidence that the relative price of unskilled labor-intensive commodities has fallen since 1975 in France, Italy, Germany or the UK. Overall there is no significant impact of LDC competition on sectoral wages and employment, although there are some differences by country. In Germany wages and employment were both lowered by import competition from developing countries: in Italy and the UK they were more influenced by imports from advanced countries. However, they did find evidence that for unskilled labor-intensive commodities relative domestic production prices fell more than import prices plus some evidence of downsizing and skill upgrading in unskilled labor-intensive industries in the face of increased

international competition. Freeman and Revenga (1968) for OECD countries find some moderate effects of import competition but weak evidence that the impact of within OECD trade is more important than the impact of non-OECD trade. Desjonqueres et al (1999) examine the relationship between skill mix and import prices for six countries – UK, USA, Germany, Sweden, Denmark, Japan. Only for the US are they able to find any positive, statistically significant effects.

OECD (1997) collected data on the evolution of import prices of import-competing sectors and export prices of export-competing sectors, 1980-1990 in OECD countries. They found evidence (Table 13) that the unweighted average increase in import prices over the period 1980-1990 was 18%, but ranged from a decline of 7.5% in Japan to over 30% in Australia. The average import price in import-competing sectors declined relative to the export price in export sectors in all countries except the Netherlands, Norway and Australia. The unweighted average decline of the relative trade price (export price minus import price) of import competing sectors was 12%. In order to assess whether the behavior of computer prices affects the estimated trade-price gap the results were re-estimated excluding the price of the office and computer sector (column 4). The main result remained unaltered and the OECD average gap falls to almost 9%. The OECD then conducted an econometric analysis for nine countries (Australia, Canada, Denmark, Finland, Germany, Japan, Sweden, the UK, and the USA) to try to quantify the extent to which trade-price changes contributed to explaining the labor market changes identified earlier. Estimated elasticities suggested that the fall in relative trade prices of import-competing sectors was small and

“would explain less than 10% of the widening earnings inequalities recorded in the United states and the United Kingdom. Likewise trade-price changes are estimated to have accounted for only a small proportion

of the observed” worsening in the relative employment position of unskilled workers...(T)he trade-price changes would have generated a cut in the relative employment of unskilled workers ranging between 1% for Finland to 7% for Japan” (OECD, 1997, p.122).

On balance, then, these product-price studies generally find little evidence that trade contributed much at all to the loss of jobs or increased income inequality during the 1980s. Some studies do find evidence of relative-price declines for unskilled-labor-intensive products during the 1970s and the 1990s. However, on many measures these were not periods of rapidly rising earnings inequality or job loss. Even where evidence of trade effects are found they are generally small in magnitude.

In contrast to these product-price studies, many labor economists and some trade economists have analyzed the effect of trade flows -- exports and imports. The difference in focus can be attributed in part to the fact that many labor economists have expressed concern about the quality of aggregate price data. For example, Freeman worries that

"price data is subject to serious measurement problems. Import prices exist for relatively few industries and cover only some goods in those industries. Output prices suffer from an aggregation problem, since the sectors with imports presumably include domestic goods that differ in important dimensions from the imports. Changes in the quality of products not captured in the indices create measurement error, which may be correlated with the skill intensity of production" (1995, pp. 28-29).

In addition to concerns about data quality, many economists also worry that product-price studies do not control adequately for non-trade influences on these prices. Given these concerns, various authors have searched for effects of trade in output or employment quantities. The most commonly used method of estimating the effects of trade on labor markets is to measure its *factor content*. The approach consists of identifying the extent to which skilled and unskilled labor are used to produce a country's exports and how much would have been used to produce its imports. The difference is then interpreted as

the impact of trade on the demand for skilled and unskilled workers, absent trade. Increased trade will hurt the less skilled to the extent that import-competing industries employ the less skilled while export sectors tend to be more skill-intensive. As Borjas et al (1997) note, this pattern is seen for US trade with LDCs but the characteristics of workers in industries with high imports and exports with other developed countries are broadly similar.

Sachs and Shatz (1994) use this method to estimate the effect of trade on the employment of production and non-production workers in 51 US manufacturing sectors from 1978-1990. They do so by first calculating the effect of a change in net exports or imports on the level of output: an important assumption is that both types of labor change in the same proportion of output. Summing across the various sectors they show that trade from developing countries reduced manufacturing employment particularly of the less skilled because the main output declines came in sectors where less skilled workers dominated. Wood (1994) has criticized these, and most other factor content calculations, for being biased downward because they understate the extent to which trade shifts relative demand against unskilled workers. He goes on to argue that a more appropriate calculation involves measuring the amount of labor used to produce these imports in developing countries. These inputs then have to be adjusted to allow for the much higher wages operating in the developed countries as well as for the fact that the goods would cost more if they were produced domestically and hence that people would buy fewer of them. Wood then recalculates Sachs and Shatz (1994) results using this method and finds much greater impacts of trade (>3 times larger) on the employment of unskilled workers.

Bound and Johnson (1992) treat trade as a product-demand shock and find that it explains very little of the rise in inequality. Berman, Bound, and Griliches (1994) assume

that trade operates by shifting demand *across* industries only (which could be true, for example, with fixed-input production technologies and an unchanging set of industries). Yet they calculate that the large majority of the manufacturing-wide demand shift for the period 1959-1987 occurred *within* industries. From this they conclude trade played no important role. Dunne, Haltiwanger and Troske (1997) find similar evidence over the period 1972-1988. Kletzer (1996) uses industry-level data on US drawn from the March Annual Demographic Files of the Current Population Survey and finds that foreign competition accounts for a relatively small share of employment and wage changes. Furthermore, Davis, Haltiwanger and Schuh (1996) examine firm and plant level data from the Census of Manufactures over many years and find no evidence that either job creation or job destruction varies across industries according to the trade flows in those industries. The evidence they present “is highly unfavorable to the view that international trade exposure systematically reduces job security” (1996, p.49).

Kletzer (2000) examines the relationship between increasing foreign competition and job displacement in US manufacturing, 1975-94. She finds that imports displace some domestic jobs. In industries long identified as import-competing, such as Footwear: Leather Products: Radio & TV; Watches and Clocks and Toys there is strong evidence of a positive relationship between increasing foreign competition and job displacement<sup>24</sup>. At the same time there were a number of import-competing industries, such as Office and Accounting Machines and Photographic equipment with below average rates of job loss. Further considerable job losses were also present in industries facing little or no change in import competition (Guided Missiles and Space Vehicles; Wood Buildings and Mobile

Homes: Optical and Health Services). Kletzer concludes that “across industries, increasing foreign competition accounts for a very small share of job displacement” (2000, p.33). The ability of firms to relocate production in low wage countries does potentially involve the loss of higher wage jobs from the US to the low wage country.

Feenstra et al (2000) examined whether outsourcing has contributed to rising wage inequality. They examined outsourcing by US industry conducted through the Offshore Assembly Program which allows US firms to export component parts and have them assembled overseas. Feenstra et al (2000) hypothesize that as US firms disperse production overseas through the OAP program they will raise the ratio of skilled/unskilled workers. Of the five industries they examined, they found support for this hypothesis in apparel and machinery industries but found the opposite result in electrical machinery and transportation equipment and no significant effects in the footwear industry. As Berman et al (1994) have noted, if trade and foreign outsourcing explain little of the skill upgrading in manufacturing “it seems implausible that they can explain much skill upgrading in other branches” (1994, p.392).

Other studies on the impacts of international trade have focused on trade volumes. Krugman (1995) calibrates a simple general-equilibrium model of the U.S. economy to consider what changes in relative product prices and wages would be consistent with the observed increase in imports from less-developed countries (LDCs). In his model, the small amount of imports that enter the U.S. from LDCs (1.6% of total OECD output in 1990) correspond to very small changes in relative product prices and relative wages--magnitudes he terms well within measurement error. Borjas, Freeman, and Katz (1992)

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<sup>24</sup> The data on displacement are taken from the Displaced Worker Surveys of the CPS. The term “displacement” refers to a job loss in the preceding 5 years due to “a plant closing, an employer going out

argue that the effect of trade on labor markets can be thought of as working through factor supplies, not factor demands: imports from developing countries are treated as an increase in the U.S. relative endowment of less-skilled labor while exports reduce it. Using input-output tables to infer from observed U.S. trade flows the implicit quantities of factor services embodied in these flows, they calculate that the large U.S. trade deficits from 1980 to 1985 can account for approximately 15%-20% of the total rise in income inequality. But they also conclude this effect dissipated in later years as the trade deficit shrank relative to total output. Using a similar methodology, Borjas, Freeman, and Katz (1997) conclude that U.S. trade -- particularly trade with less-developed countries -- accounts for less than 10% of either the rise in the college/high-school wage differential or the drop in relative wages of high-school dropouts. Wood (1995) uses this method to estimate how much of the decline in demand for labor in manufacturing in advanced countries is due to increased imports from the developed world. He finds that such trade resulted in a 20% reduction in demand with the effect concentrated primarily on the unskilled. Why are Wood's estimates of the impact of trade so much larger? He argues that most calculations using factor contents are biased downwards because of the way they calculate the labor content of imports. The numbers of skilled and unskilled workers displaced by a dollar of imports in each sector are taken to be the same as the numbers required to produce exports. Wood argues that the implicit assumption here, that the imports in each statistical category are goods of the same types and skill intensity as the goods produced in the corresponding domestic sector (Wood, 1995, pp.64-5) is unreasonable because most manufactured imports from developing countries are no longer produced on a significant scale in advanced economies. Hence, Wood contends, it

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of business, a layoff from which he/she has not been recalled or other similar reasons”



is more appropriate to measure the amount of labor used to produce these imports in developing countries and then adjust to allow for the much higher levels of wages in developed economies and the fact that these goods would cost more if they were produced domestically. These adjustments generate much larger displacement effects than suggested by conventional factor content calculations. However, Slaughter and Swagel have noted, these assumptions are rather questionable

“since it is likely that differences in factor prices between developed and developing countries are in fact connected to different factor usages, so that it is not appropriate to assume identical production functions across countries – had the imported goods been produced in the advanced economies, they would in fact have been produced using relatively less unskilled labor” (1997, p.15).

Many trade economists have responded that these quantity studies--particularly the trade volume studies -- have serious problems. A major issue has been the conditions under which trade volumes correctly identify the effect of trade on relative factor prices.<sup>25</sup> One serious problem with relying on trade volumes is they are endogenous outcomes: that is, trade flows are the outcome of decisions of producers and consumers worldwide. Trade volumes are not exogenous causes, and they can change for non-trade reasons such as a rise in aggregate demand triggered by higher government spending. Of course, as Krugman (2000) has noted, *prices* are also endogenously determined.

Trade economists have criticized the technique used by labor economists such as Borjas et al (1992) of measuring the skilled and unskilled labor content of trade and then comparing it to quantities in the relevant factor markets as having no theoretical basis (Bhagwati and Dehejia, 1994). Indeed, Leamer (1994) rejects factor content calculations as “measurement without theory”. It was subsequently noticed that the paper by

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<sup>25</sup> Comprehensive surveys of many of the issues include Bhagwati and Dehejia (1994), Deardorff and

Deardorff and Staiger (1988) provided such a rationale. Panagariya (2000) and Deardorff (2000) present theoretical contributions where they further examine the value of factor contents of trade analysis. Both conclude that the model developed by Deardorff and Staiger, which demonstrated that if all production functions and the utility functions are Cobb-Douglas factor content analysis can be generalized to the CES case with an identical elasticity of substitution. However, Panagariya warns that even then a highly restrictive set of assumptions are needed and concludes that

“personally, I take a skeptical view of the approach: the assumptions required to implement it are much too strong to inspire confidence in the estimates it generates” (2000, p.94).

In contrast Deardorff (2000) is less concerned about the restrictiveness of the model's assumptions

“Is the factor content of trade of any use? Yes. It must be used with careful attention to both the questions that it answers, and to the assumptions needed for these answers to be informative. These assumptions are not trivial. But they are not quite as special as may be alleged, and one can understand and deal with the biases that departures from these entail” (2000, p.89).

Skepticism about the effects of trade on wages derives from the observation that, despite the fact that it has grown, trade is quite small. Imports of manufactured goods from developing countries are only about 2% of the combined GDP of the OECD. It is hard to see how trade flows of this limited magnitude explain very much of the roughly 30% rise in the wage premium associated with a college education that has taken place in the United States since the 1970s (Krugman, 2000, p.52). Wood (1995) counters, unconvincingly, that trade can hurt unskilled labor even when it does not raise import penetration by depressing the prices of labor intensive goods and by forcing firms to find

ways of using less unskilled labor to remain competitive. In addition Wood claims, for reasons laid out above, that imports from LDCs are highly labor intensive goods and thus displace more domestic workers than might be supposed by simply comparing their dollar value to that of the US GDP. Leamer (1998, 2000) argues that factor content analysis tells us nothing about the impact of trade from LDCs because it fails to understand basic trade theory.

“In a Heckscher-Ohlin Stolper-Samuelson framework it is prices of tradables and only prices of tradables that carry news of changes in the international product markets. The message of this model is quite clear: if you are interested in determining the effects that trade with low-wage countries is having on wages, look first and look carefully at changes in product prices. Factor contents at best are only proxies for these price movements. Once you understand fully the product price movements trade factor contents become entirely irrelevant” (2000, p. 46).

Krugman (2000) counters convincingly that trade volumes are not irrelevant and ultimately one must “return to the data”. Krugman goes further and warns that

“classroom exercises that explore the effects of technical change in a small price-taking economy do not address the issues posed by technical change occurring in the OECD as a whole; the absence of trade volumes in the statement of the Stolper-Samuelson theorem, which implicitly involves a thought experiment in which prices are changed exogenously, does not mean that such volumes are irrelevant to attempts to infer the impact of trade on factor prices when the impact of trade on goods prices is part of the question” (2000, p.70).

Which do you believe, the theory or the data? In a 1991 paper Treasury Secretary Larry Summers’ was critical of “the scientific illusion” in economics and the fact that in the profession it is “much easier to demonstrate technical virtuosity than make a contribution to knowledge”. His comments seem pertinent to this debate,

“theoretical research divorced from the problems of empirical generalization is unlikely to be fruitful. There is a still greater danger however in research directed at internal consistency starting from first principles without explicit regard for empirical observation. It is all too easy to confuse what is tractable with what is right. There is a tendency to

reason that since the world must be consistent, and since all full-blown models derived from optimizing behavior share a common prediction, that prediction must have some validity. This form of illogic is a modern development” (1991, p.145).

Topel (1997) has raised other difficulties for the trade model because if trade causes factor prices to be determined on international markets, and if technical changes have not raised the demand for high-skill labor, then firms ought to respond to a reduction in the relative price of low-skilled labor by substituting toward it. However, this does not appear to have been the case as the factor ratio of skilled/unskilled workers has shifted in favor of the skilled in virtually all major industries and countries. Topel concludes that “(T)he idea that trade has caused inequality does not square with these facts” (1997, p.68). Topel goes on to argue, with factor price equalization across borders, all factor prices would be determined in international markets. Changes in the domestic supply of college-educated workers shouldn't matter much for the determination of relative wages since prices are set in world markets. The same applies to immigration, cohort size etc.. As we will show below, there is growing evidence across countries that changes in domestic factor proportions *do* affect domestic wages.

The vast majority of studies to date -- *regardless of their methodology* -- find only a small role for international trade in general, and trade from the LDCs in particular, in rising U.S. income inequality and job loss. Product prices, labor shifts, trade flows: all these data have been analyzed in different ways with the recurring conclusion that trade hasn't mattered much.

### *3.2. Other Influences on Labor Demand: Skill-Biased Technological Change*

It is fair to say that at present, many economists think that the biggest single cause of changes in the U.S. income distribution is technological change. In most studies, the

conclusion that technology is the main culprit has not been drawn from direct observation or measurement. Rather, it is the residual explanation -- it is largely a name for our ignorance. The often-made argument is "it isn't X, Y or Z so it must be skill-biased technical change".

There are a few recent papers providing direct evidence of this technological shift and to link it to wage outcomes. Various direct measures of technology, such as computer investment or computer usage seem to do a better job in explaining differences across industries in the pace of skills upgrading than do indicators of outsourcing activity, import pressures or changes in export activity (Autor et al, 1997). Berman, Bound, and Griliches (1994) present several case studies documenting the technological changes that have occurred in industries experiencing large shifts toward more-skilled workers. Following this work, Berman, Bound, and Machin (1997) present evidence that many OECD countries have experienced rising relative employment of more-skilled workers within the same industries. This, they argue, is evidence that the skill-biased technological change is a global phenomenon. Machin and Van Reenan (1998) for seven OECD countries (USA, Denmark, France, Germany, Japan, Sweden and the UK) find evidence of a significant association between skill upgrading and both R&D intensity and computer usage in all seven countries. Krueger (1993) demonstrates evidence that people who use computers on the job tend to earn more than similar workers who do not use computers on the job. And Autor, Katz, and Krueger (1997) analyze several plausibly direct measures of technological change (e.g., rising investment in office equipment) and find a high correlation across industries between these direct measures and indirect measures such as rising skilled-labor shares of the total wage bill. Studies using plant-

level data such as Bernard and Jensen (1997) and Doms et al (1997) also find strong positive relationship between skill upgrading and R&D intensity.

But the evidence in favor of the skill-biased technological change hypothesis is not without its own set of problems. DiNardo and Pischke (1997) emphasize the difficulty in inferring causation between income inequality and measures of computer usage. Rather than the computers causing higher wages for the users, it might be that the more-skilled, higher-paid workers tend to choose jobs using computers. Also, the technology story is not easily reconciled with sluggish growth in average U.S. real wages. Real wages approximately equal labor productivity, and if massive investments in new computer technologies have been made why haven't these investments lifted average labor productivity and, thus, wages? Also, one might wonder why, if technological changes have been similar across countries (as suggested by Berman, Bound, and Machin), they have not produced similar inequality outcomes. It certainly does appear that changes in technology are a good deal more important than international trade as a source of relative demand shifts in favor of the more highly skilled.

Allan Mendelowitz has suggested to me that the real impact on productivity has been relatively recent in character, arising through networking technologies and not computers per se. These networking technologies, he argues, have made possible major changes in business processes and productivity improvement in service functions. The impact would only show up in the later half of the 1990s with the opening of the Internet to commercial uses and the advent of the graphical user interface for the web. In international comparisons, beginning in the mid 1990s, U.S. performance should diverge from the rest of the world because of the rapid diffusion of access to the Internet in the

U.S. made possible by cheap (zero marginal cost) access to local phone lines and flat-rate ISPs. It is too early to test this hypothesis empirically!

Research currently has not demonstrated that labor-demand factors, while important in absolute terms, explain much of the *differential* growth of wage inequality among countries. In fact, all advanced countries have experienced large, steady shifts in the industrial and occupational structure of employment towards sectors and job categories that use a greater proportion of more educated workers. Also, the share of employment in manufacturing declined everywhere except in Japan. It might be the case that differential labor-demand shifts help explain different countries' experiences. But if this is the case, it will need to be demonstrated that different countries have experienced different combinations of trade-policy changes, the rate of new-technology adoptions, fiscal policies, and other factors affecting the demand for products and factors.

#### *4. The Role of Supply Changes*

In contrast, current research does indicate that differences among countries in growth in the supply of workers has contributed to the greater rise in skill premiums in the United States than in other countries. In the United States in the 1970s, the baby-boom cohort moved from college to the labor market, increasing the relative supply of more-skilled workers. But in the 1980s the baby boom busted and growth in the relative supply of more-skilled workers slowed considerably. These changes help explain why the U.S. college-high school wage differential fell during the 1970s and then reversed around 1979. But fluctuations in the rate of growth of the relative supply of more highly educated workers seems to be an important part of the explanation of the time series

changes in educational wage differentials<sup>26</sup>. Table 14 illustrates the differential growth rates of college educated workers in the United States, the United Kingdom, Japan, and France. Katz, Loveman, and Blanchflower (1995) found that, under a set of plausible assumptions, such differences can account for a large portion of the declining U.S. skill premium in the 1970s and its rise in the 1980s.

Variations in the rate of growth of the supply of the more educated appears to be important in explaining the increase in educational wage differentials.

“A deceleration in the rate of growth of the relative supply of college workers appears to be an important determinant of the sharp increase of the US educational wage differential in the 1980s and especially rapid growth in the relative skill supply a key determinant of the narrowing of the college wage premium in the 1970s. Countries with decelerations in relative supply growth in the 1980s are those with the largest increase in educational wage differentials” (Katz and Autor, 1999, p. 1539).

Katz and Murphy (1992) show that almost half of the 2.9 log points per year difference in the increase in the log wage premium in the 1980s from the 1970s is explained by a slowdown in the relative supply growth with the remaining 1.54 log points accounted for by unmeasured (residual) increases in relative demand growth. Katz and Autor (1999) note that countries that experienced some increases in educational wage differentials in the 1980s (principally the US and the UK) experienced declines in the rate of growth of the supply of college graduates in the 1980s. In contrast countries whose educational differentials did not expand in the 1980s – France Germany and the Netherlands – had roughly the same rate of growth of the supply of college educated workers in the 1980s as in the 1970s (Freeman and Katz, 1994). Freeman and Needels (1993) show that the more rapid increase of more highly educate workers in Canada helps to explain why the rate of

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<sup>26</sup> As a proportion of full-time employment, based on Census data, college graduates were 6.4% in 1940, 7.8% in 1950; 10.6% in 1960, 13.8% in 1970, 20.4% in 1980; 25.4% in 1990 and 28.3% in 1996 from the



return to schooling in Canada rose more slowly than it did in the USA. Murphy et al (1998) have a similar result.

Card and Lemieux (2000) have shown that the college premium for young workers in the US and the UK has risen substantially, while the premium for older workers is about the same as it was in the mid-1970s. The college high school wage gap in Canada remained roughly constant while that of older men declined substantially. Card and Lemieux argue that this shifting structure can be largely explained by the increasing relative demand for skilled workers alongside a dramatic slowdown in the rate of growth of college educated workers in all three countries. The success of this explanation is all the more remarkable given the very different levels of educational attainment in the three countries, along with the fact that the average college wage premium moved rather differently in the three countries studied.

There are other supply changes that need to be considered -- changes in cohort size, increase in female labor force participation and immigration which reflects a non-trade aspect of "globalization".

#### *4.1. Cohort size changes.*

Changes in cohort size have had some effect on the labor market. Both Welch (1979) and Berger (1985) found that increases in the relative numbers of young workers that occurred in the 1970s caused their relative wages to fall. Since the 1970s there have been declines in the size of the youth population but youth wages have continued to fall in all OECD countries (see Korenman and Neumark, 2000 and Blanchflower and Freeman, 1999).

#### *4.2. Female labor force participation.*

Female labor force participation rates have risen in most countries over most of the post-war period while male wage inequality has risen. Topel (1993, 1994) and Juhn and Kim (1995) find some evidence of a pattern of high wage women substituting for low wage men. There are some problems with attributing a large role for increased female participation, however, because women who entered the labor market work in different occupations and industries than low-skilled men whose wages have fallen. Also the surge of female labor supply occurred in the 1970s while men's wages continued to fall through the 1980s. Finally, the increased participation of women coexists with rising relative wages for women. If the demand for women's skills were increasing and low-skilled men are substitutes then demand for low-skilled men should be rising also. As Freeman (1999) has noted, "it is difficult to see why more women workers adversely affected men's wages but not their own (1999, p.47).

#### *4.3. Immigration.*

There are two key facts here. First, immigration rates have risen sharply since around 1970. Second, since about that time U.S. immigrants' average skill levels have been declining. Today one-third of U.S. high-school dropouts are foreign-born (Freeman, 1996). Recent immigrants might have helped expand the relative supply of less-skilled workers during the 1980s and thus put downward pressure on the wages of less-skilled U.S. natives who compete with these immigrants for jobs.

The evidence on immigration's contribution to rising income inequality is mixed. Some studies find that immigration-driven supply shifts have *not* contributed very much to wage dispersion. Lalonde and Topel (1991) find that new immigration lowers the wages of recent immigration cohorts (those who have been in the US less than 10 years) but has no impact on other workers. Altonji and Card (1991) find broadly similar results.

Card (1990) finds little or no effects of the Mariel boatlift on relative wages or employment in Miami. However, Topel (1993, 1994) finds a substantial impact of immigration on relative wages and inequality in the western part of the US.

The ballpark figure is that a 10% increase in the fraction of immigrants in an area appears to reduce native wages by less than 1%. But there is a methodological debate among labor economists on this point. Most of these studies have used cities (or metropolitan statistical areas) as the unit of observation. Borjas (1995) argues that this approach ignores the possibility that workers move across cities and regions. This mobility can diffuse the impact of immigrants from their destination city throughout the national labor market. If native workers can leave a city when immigrants arrive or if outside native workers can choose not to relocate to that city, then the labor-supply change in the destination city can be much smaller than the total immigrant inflow. Thus wages decline everywhere, not just in the destination city (although presumably the nationwide decline is much smaller than the destination-city decline would be if native workers were immobile). To measure accurately the impact of immigrants on wages, one must study the entire United States. With this national perspective, Borjas, Freeman, and Katz (1997) find that immigration has sharply pressured the earnings of the least-skilled Americans. Specifically, post-1979 immigration can account for between 27% and 55% of the decline in the relative wages of high-school dropouts. However, immigrants can explain no more than 10% of the decline in the wages of high-school graduates relative to college graduates. Borjas et al (1997) show that increased unskilled immigration had bigger effects on the relative supply of the least skilled than did trade with LDCs from 1980-1995.

Immigration seems to have mattered less in the rest of the OECD. Immigration flows have been small in the United Kingdom in the years since 1980 when earnings inequality showed its most dramatic increases. Yet immigration flows from the Commonwealth – Jamaica, Pakistan, India, Kenya, Uganda -- were substantial in the period of declining wage inequality before 1970. Similarly, immigrant flows into France and Germany appear to have coincided with a narrowing, not a widening, of the earnings distribution.

#### *4.4. The Role of Labor-Market Institutions*

In addition to supply and demand, a third possible influence on relative wages are labor-market institutions interacting with supply and demand. The two most important ones are labor unions and minimum wages. And the broad evidence here is that both have mattered: in the two OECD countries with the strongest rise in inequality during the 1980s (the United States and the United Kingdom) both of these institutions weakened in ways that tended to exacerbate inequality.

##### *a) Trade unions*

The decline in trade unions might be an important explanation of rising inequality. Unions reduce inequality by standardizing pay rates among workers within an establishment and across establishments. The threat of unionization also forces non-union employers to raise pay or benefits to keep unions out. Thus, strong unions generally mean less inequality<sup>27</sup>.

Table 15A reports union density rates across European countries and the USA. In the United States, union density has declined steadily since 1950 (Blanchflower and

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<sup>27</sup> The evidence is much more mixed on whether trade unions influence unemployment (Blanchflower, 1999).

Freeman, 1992; Blanchflower, 1996). With the exception of France, the U.S. decline is greater than in other countries and predates declines elsewhere -- as does its rise in inequality. The French case is special as union coverage is close to 100% - there is no need to belong to a union as they will bargain for you anyway. In the other country with rapidly increasing earnings inequality in the 1980s, the United Kingdom, unionization rose strongly from 1950 to 1980 and then declined subsequently. Again, this trend closely tracks the inequality changes over the period -- both the decline in unionization and the upward move in earnings inequality occurred in the 1980s and not in the 1970s as occurred in the US. Other countries which experienced steady declines throughout the period are Austria and Switzerland: union density fell in the Netherlands through to 1990s but has remained steady throughout the 1990s. In the rest of the OECD the evidence is more mixed. Six European countries (i.e., Belgium, Denmark, Finland, Ireland, Norway and Sweden) actually saw *increased* union density throughout the half century. In part B of Table 15 union density rates for 4 other non-European OECD countries are reported (Australia, Canada, Japan and New Zealand), the first three of which experienced dramatic declines in union density, while Canada experienced an increase from 31% in 1970 to 37% in 1993. Indeed, the decline in earnings inequality in the 1990s that occurred in a number of countries (Belgium, Canada and Germany) is associated with stabilizing or even slight *increases* in union density in a number of countries (Japan, Netherlands, Norway, Canada and Germany).

Freeman (1993) attributes about 20% of the overall increase in male earnings inequality in the US to the fall in union density in the 1980s. He also shows that the movement to increased earnings inequality across countries was much less pronounced in the more unionized economies than in the least unionized. Freeman concludes that

“The fall in union density in the United States contributed to the rise in inequality on a par with most other measurable factors such as changes in the industrial mix of employment save possibly for the deceleration in the growth of relative supplies of skilled labor. Overall declining unionization was a supporting player in the story of the increase in inequality – not the main character: Rosencrantz or Guildenstern, not Hamlet” (1993 p.159).

Card (1998) adjusted Freeman’s estimates to account for the non-random selection of workers into the union sector and concludes that unions accounted for about 12% of the increase in male inequality and little if any for females. Blau and Kahn (1996) argue that more-decentralized wage-setting mechanisms in the United States accounts for its greater rise in male wage inequality than in other countries. Fortin and Lemieux (1997) find that the variance of log wages would have risen by 21.3% for men between 1979 and 1988 if the rate of unionization had remained at its 1979 level, but they could find no effect for women. DiNardo, Fortin, and Lemieux (1996) examined data for the same years but used a more sophisticated reweighting method that takes account of possible changes in the characteristics of workers and broadly similar effects that varied between 14 percent and 20 percent on the standard deviation of wages.

Bronfenbrenner (2000) undertook a survey on the impact of plant closings and threats of plant closings on more than 400 NLRB union certification election campaigns in the US private sector. She found that overt threats to relocate manufacturing to low-wage countries by employers reduced the success of union organizing drives. More than half of all employers faced with a union organizing campaign threatened to close the plant during the drive. However, employers followed through on their threats in and shut down all or part of their facilities only 3% of the campaigns. This does suggest the possibility that changing unionization may actually not be independent of trade. However, it is hard to come up with a reason why the threat of transferring production overseas impacted the

US so much more than elsewhere. Countries like Sweden, Norway, Finland and Belgium that as we have shown above are considerably more open than the US have had rising unionization rates (Table 15A). Canada also experienced rising unionization rates over the period 1970-1993 (Table 15b). These countries presumably are also subject to similar competitive pressures to locate their production abroad.

b) *Minimum wages*

Setting a minimum wage that bites obviously tends to reduce inequality (at least among the employed). The fall in the real minimum wage also seems to have contributed to rising inequality in the United States and United Kingdom. The value of the minimum has risen in other countries such as France, the Netherlands and Spain (Dolado et al, 1996; Abowd et al, 2000). Its real value in the United States declined substantially over the period 1970-1990, and even with recent increases it remains very low by historical standards. In the United Kingdom, Wages Councils, which set sectoral pay rates for the young and the unskilled, were gradually abolished during the 1980s. Even though the abolition appears to have had little impact on employment it appears to have reduced wages at the low end. Here again the United States and the United Kingdom look different from other OECD countries. For example, strong rises in France's minimum wage appear to have prevented a sharp erosion in real wages at the low end of the French wage distribution (Katz et al, 1995; Abowd et al, 2000).

DiNardo et al (1997) find that the decline in the real value of the minimum wage can account for *most* of the increase in the 50-10 log wage differential for men and women and 17-25% of the growth in the standard deviation of log hourly wages for men and 25-30% of the increase for women. Fortin and Lemieux (1997) attribute 39% of the change in the variance of log wages, for both men and women, to changes in the real

value of the minimum wage. Lee (1999) also finds evidence across states that the minimum wage is responsible for a compression of the lower part of the wage distribution. Indeed, he concludes that the decline in the real value of the minimum is responsible for much of the increase in residual earnings inequality in the 1980s. Card and Krueger (1995) find that 20%-30% of the rise in wage dispersion in the 1980s is attributable to the erosion of the real value of the minimum wage. Card and Krueger (1995) also compared changes in the wage distribution at the state level for 1989-1992 according to the percentage of workers who were directly affected by the 1990 and 1991 minimum wage increases and found that these increases measurably *lowered* earnings inequality.

Minimum wages have generally remained low in most European countries except France, where they appear to have had some employment effects. Neumark and Wascher (1999) report evidence in the raw data that increases in minimum wages have reduced youth employment rates in Canada, the Netherlands, Luxembourg, and to a lesser extent in the US and the UK. They also found evidence that declines in minimum wages were accompanied by declines in youth employment rates in Italy, Belgium, Spain, Greece and Portugal. They could find no relation between these two variables in Germany, Sweden, France and Japan. Both patterns were evident at various times in New Zealand and Denmark. There is stronger evidence for employment reducing effects of minimum wages in a number of Latin American countries.

A possible criticism of the role of these institutions is that de-unionization reflects the competitive pressures generated by international trade. Minimum wage changes are more immune to this criticism because they can be traced explicitly to legislative action. It does seem that the pattern of institutions across countries is hard to reconcile with the



view that institutions are purely endogenous as the relevant demand and supply shocks appear to be roughly comparable across countries (Fortin and Lemieux, 1997, Card and Lemieux, 2000). A further argument is that factors like the minimum wage and unionization have employment effects that need to be considered in any analysis of distributional changes. If a higher minimum wage reduces wage inequality among those with jobs, but increases unemployment among the low-skilled, it may not reduce overall inequality. There is indeed some evidence of a negative effects of unions on employment growth (Blanchflower et al, 1991 for the UK; Leonard, 1992 for California and Long, 1993 for Canada). There has been an ongoing, and sometimes acrimonious, debate over the employment effects of the minimum wage (Card and Krueger, 1995; Neumark and Wascher, 1992, 1994; Card, Katz and Krueger, 1992)). A number of years ago Brown et al (1982) concluded that the employment effects of the minimum wage were small. Brown (1999) updated the evidence from the earlier paper and came to essentially the same conclusion.

##### *5. Evaluation of Current Evidence*

Research to date does not allow one to allocate precisely the relative contribution of demand, supply, and institutional forces to rising U.S. wage inequality and job loss. Most economists do seem to agree that trade has *not* been a major factor in the shift in labor demand away from less-skilled and towards more-skilled workers or for the increases in inequality observed in the US and the UK but not elsewhere. Other factors playing an important role seem to be demand shifts from skill-biased technological change; a deceleration in the growth of skilled-labor supply; and institutional factors such

as declining unionization and falling real minimum wages<sup>28</sup> alongside shifts in the supply of college-educated workers.

There are some important differences in thinking between the two groups of economists who have been examining these issues – labor economists and trade economists as well as the role of theory versus empirical work. As the research has progressed, methodological debates have emerged – some quite spirited at times. It is probably fair to say that many of the "trade versus labor" debates reveal fundamental methodological differences between the two fields. Trade economists tend to value clear general-equilibrium theoretical thinking, whereas labor economists tend to value careful empirical work. The reason for this difference in relative values is not entirely clear. History might explain part of it. For a long time labor economists have had more and higher-quality data sets available than trade economists. Perhaps over time those lacking data concentrated on theoretical issues while those with data focused on empirical issues. Whatever the reasons for these taste differences, they clearly have driven a lot of the methodological debates. Some trade economists fault labor economists for being atheoretical while some labor economists fault trade economists for sloppy empirical work and untestable theories.

In particular, some trade economists argue that labor economists miss many of the important general-equilibrium insights of trade theory. Trade economists tend to prefer thinking about – and analyzing empirically – many markets simultaneously. This is crucial, because many of trade theory's key insights such as the Stolper-Samuelson theorem rely upon interactions among product and factor markets. Labor economists who focus on an individual labor market or markets will necessarily miss these general-

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<sup>28</sup> This section draws heavily on Blanchflower and Slaughter, 1999.

equilibrium issues. Some labor economists respond that because there are few appropriate instruments in the labor market to solve endogeneity problems, identification is difficult to achieve. When set alongside the serious aggregation and omitted variable biases associated with estimating general equilibrium models there is a widely held view that such models are unlikely to produce useful insights. More generally, there also seems to be skepticism among labor economists about the validity of some of the basic assumptions of most trade theories.

For example, standard trade theory assumes that factor markets are perfectly competitive – i.e., that every factor earns its marginal revenue product. There is a good deal of evidence, however, that rent-sharing is prevalent and hence that labor markets should be characterized as non-competitive (Oswald, 1997). This is especially true in Europe (Blanchflower, Garrett and Oswald, 1990; Van Reenen, 1996), and a growing body of evidence finds this even in the United States and Canada (Blanchflower, Oswald and Sanfey, 1996; Christofides and Oswald, 1992; and Abowd and Lemieux, 1993). Similarly, standard trade theory assumes perfect inter-industry factor mobility within countries. This implies, among other things, that the same factor should earn the same wage in all industries. Yet labor economists have assembled a large body of evidence that inter-industry wage differentials are sizable, persistent over time, and stable across countries (see, for example, Krueger and Summers (1987, 1988) and Katz and Summers (1989)). Such evidence has led Nobel Laureate Robert Solow (1986) to conclude that “in the case of the labor market, our preoccupation with price-mediated market clearing as the natural equilibrium condition may be a serious error”.

The literature's near consensus that trade has played a smaller role than other factors such as skill-biased technological change depends so strongly on research from

one perspective: the Heckscher-Ohlin model. The model's detailed analysis of multiple factor and product markets makes it a natural tool to study a general-equilibrium problem such as trade and wages. However, there are many issues regarding how trade – and globalization more generally – affects labor markets that remain understudied.

What has not been looked at? Many non-trade aspects of globalization. We still know very little about how the U.S. labor market may have been affected by exchange-rate volatility or increased international capital mobility. It may be that "non-trade" influences on labor demand are themselves driven by international trade. Might not the pace of technological change depend (among other things) on the competitive pressures generated by international trade? Wood (1994) calls this type of technological change "defensive innovation": firms innovate only when forced to defend existing market positions by international competitors. Couldn't the declines in unionization or the lowering of the real minimum wage simply arise as a result of competitive pressures from abroad? These aspects of globalization seem plausible. There are anecdotes of firms adopting information-technology in order to remain internationally competitive. Similarly, there are anecdotes of firms gaining bargaining strength against unions by threatening to hire foreign factors of production (via foreign-direct investment or outsourcing to foreign suppliers). What is the role of intra-firm trade? What are the consequences if multinational enterprises are increasingly able to shift production locations in response to changes in costs. The difficulty is to find appropriate empirical tests to distinguish between these competing explanations.

Some researchers have moved beyond Heckscher-Ohlin models and factor-content studies to analyze the effects of globalization. For example, Feenstra and Hanson (1995, 1996) consider the factor-price implications of Ricardian trade among countries making

different sets of products (distinct from the standard Heckscher-Ohlin assumption that all countries make the same set of products). Slaughter (1995) considers whether foreign direct investment by multinational corporations has contributed to U.S. income inequality. Borjas and Ramey (1995) analyze whether international trade has pressured imperfectly-competitive industries to squeeze the rents earned by less-skilled workers in those industries. And Slaughter (1997) considers whether international trade has pressured U.S. labor markets not by changing the prices of factors but by changing the elasticities of demand for factors. It is worth noting that in some cases, the results suggest a slightly more important role for trade in explaining rising inequality.

More attention certainly needs to be paid to explaining residual (within-group) inequality. This fact will likely be difficult to reconcile with models which group factors of production based on observable characteristics. This problem affects not only standard trade models but also many labor models as well. A comprehensive trade-based explanation of residual inequality will have to expand standard trade models to incorporate some explanation of this dimension of inequality.

## 6. *Conclusions*

On the basis of the empirical analysis that is available at the time of writing (September 2000), globalization does not appear to have had a *major* influence on the US labor market. The size of the US trade balance has increased strongly since the early 1980s as have imports from LDCs. In comparison with other countries, the US is a fairly closed economy measured by the degree (or the change in the degree) of openness since 1973 (Table 2). The extent of trade with the Dynamic Asian Economies and China is comparatively high in the US in comparison with other OECD countries but still small as a proportion of GDP (US=1.84% in 1993 compared with 1.49% for the OECD as a

whole). The magnitude of these trade flows do not appear to be enough to explain the dramatic changes in labor markets that have appeared over the last couple of decades, and especially the rise in earnings inequality and the growth in the college-high school wage differential that has occurred in the US since the early 1970s (Figure 2) and which predate the increase in trade flows in the US.

With the exception of the UK, a number of OECD countries did not experience large increases in inequality, but instead had large rises in the unemployment rate. If ‘globalization’ is the big culprit in all the labor market changes we have seen it is perhaps surprising then that a number of the most open economies, particularly Austria, the Netherlands, Norway and Denmark, experienced *neither* a large increase in inequality *nor* an increase in unemployment over the period 1973-1998.

There is a good deal of both direct and indirect evidence that suggests that technology is an important factor in explaining the shift in the demand away from the less skilled. A number of papers have shown that there is evidence of rising relative employment of skilled workers within the same industries in many OECD countries (Berman, Bound and Machin, 1997). There is also evidence of a significant association between skill upgrading and both R&D intensity and computer usage across a number of OECD countries.

Supply-side changes seem to be important. The rapid increase in the growth rate of college educated workers appears to be a major contributor to the sharp decrease in the US educational differential in the 1970s: a deceleration in the rate of growth of the supply of college educated workers in the 1980s appears to be a key factor in explaining the widening of the college wage premium (Katz et al, 1995; Katz and Autor, 1999; Card and Lemieux, 2000). Countries whose educational wage differentials remained constant in

the 1980s such as France, Germany and the Netherlands did experience increases in the relative supply of college educated workers in the 1980s as compared to the 1970s.

There is little evidence that cohort size changes or a change in the labor force participation rate of women matters much. Borjas et al (1997) have shown that a non-trade aspect of globalization – immigration – has had bigger effects on the relative supply of the least skilled than trade with LDCs. Immigration sharply lowers the wages of the least skilled. A 10% increase in the fraction of immigrants in an area appears to reduce native wages by under 1%.

Institutions also seem to matter a lot – declining unionization rates alongside a fall in the real value of the minimum wage have been important in the United States. A variety of studies suggest that between 10% and 20% of the overall increase in male earnings inequality in the US is due to the fall in union density in the 1980s (Freeman, 1993; Card (1998). Declines in earnings inequality are associated with increased union density in Belgium, Denmark, Finland, Ireland, Norway and Sweden. The fall in the value of the real minimum wage, which occurred notably in the US and the UK, appears to have contributed a good deal to declining earnings inequality. Fortin and Lemieux attribute 39% of the change in the variance in log wages in the U.S. to changes in the value of the real minimum. Lee (1999) argues that much of the increase in residual earnings inequality arises directly from declines in the real value of the minimum wage.

Globalization does not appear to be the main, or even one of the major, causes of the labor market changes that occurred in the United States or elsewhere since the 1970s. It is appropriate then to look for other culprits. There is no single factor, but it seems that several influences have been at work -- technological change; immigration; declining unionization; declining levels of the real minimum wage as well as reductions in the

supply of college-educated workers. The empirical evidence suggests that the increase in imports from LDCs and the rising deficit on the trade balance have both had relatively minor consequences for the US labor market.



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Table 1. U.S. international trade in goods and services - balance of payments (BOP) basis (billions of dollars), 1960-1998

	Exports			Imports			Trade Balance		
	Total	Goods	Services	Total	Goods	Services	Total	Goods	Services
1960	25.9	19.7	6.3	22.4	14.8	7.7	3.5	4.9	-1.4
1961	26.4	20.1	6.3	22.2	14.5	7.7	4.2	5.6	-1.4
1962	27.7	20.8	6.9	24.4	16.3	8.1	3.4	4.5	-1.2
1963	29.6	22.3	7.3	25.4	17.0	8.4	4.2	5.2	-1.0
1964	33.3	25.5	7.8	27.3	18.7	8.6	6.0	6.8	-0.8
1965	35.3	26.5	8.8	30.6	21.5	9.1	4.7	5.0	-0.3
1966	38.9	29.3	9.6	36.0	25.5	10.5	2.9	3.8	-0.9
1967	41.3	30.7	10.7	38.7	26.9	11.9	2.6	3.8	-1.2
1968	45.5	33.6	11.9	45.3	33.0	12.3	0.2	0.6	-0.4
1969	49.2	36.4	12.8	49.1	35.8	13.3	0.1	0.6	-0.5
1970	56.6	42.5	14.2	54.4	39.9	14.5	2.3	2.6	-0.3
1971	59.7	43.3	16.4	61.0	45.6	15.4	-1.3	-2.3	1.0
1972	67.2	49.4	17.8	72.7	55.8	16.9	-5.4	-6.4	1.0
1973	91.2	71.4	19.8	89.3	70.5	18.8	1.9	0.9	1.0
1974	120.9	98.3	22.6	125.2	103.8	21.4	-4.3	-5.5	1.2
1975	132.6	107.1	25.5	120.2	98.2	22.0	12.4	8.9	3.5
1976	142.7	114.7	28.0	148.8	124.2	24.6	-6.1	-9.5	3.4
1977	152.3	120.8	31.5	179.5	151.9	27.6	-27.2	-31.1	3.8
1978	178.4	142.1	36.4	208.2	176.0	32.2	-29.8	-33.9	4.2
1979	224.1	184.4	39.7	248.7	212.0	36.7	-24.6	-27.6	3.0
1980	271.8	224.3	47.6	291.2	249.8	41.5	-19.4	-25.5	6.1
1981	294.4	237.0	57.4	310.6	265.1	45.5	-16.2	-28.0	11.9
1982	275.2	211.2	64.1	299.4	247.6	51.7	-24.2	-36.5	12.3
1983	266.0	201.8	64.2	323.8	268.9	54.9	-57.8	-67.1	9.3
1984	290.9	219.9	71.0	400.1	332.4	67.7	-109.2	-112.5	3.3
1985	288.8	215.9	72.9	410.9	338.1	72.8	-122.1	-122.2	0.1
1986	309.7	223.3	86.4	450.3	368.4	81.8	-140.6	-145.1	4.5

1987	348.8	250.2	98.6	502.1	409.8	92.3	-153.3	-159.6	6.2
1988	431.3	320.2	111.1	547.2	447.2	100.0	-115.9	-127.0	11.1
1989	489.4	362.1	127.2	581.6	477.4	104.2	-92.2	-115.2	23.0
1990	537.2	389.3	147.9	618.4	498.3	120.0	-81.1	-109.0	27.9
1991	581.3	416.9	164.3	611.9	490.7	121.2	-30.7	-73.8	43.1
1992	615.9	440.4	175.6	652.9	536.5	116.5	-37.0	-96.1	59.1
1993	641.8	456.8	185.0	711.7	589.4	122.3	-69.9	-132.6	62.7
1994	702.1	502.4	199.7	800.5	668.6	131.9	-98.4	-166.2	67.8
1995	793.5	575.8	217.6	891.0	749.6	141.4	-97.5	-173.7	76.2
1996	849.8	612.1	237.7	954.1	803.3	150.8	-104.3	-191.3	87.0
1997	938.5	679.7	258.8	1,043.3	876.4	166.9	-104.7	-196.7	91.9
1998	933.9	670.2	263.7	1,098.2	917.2	181.0	-164.3	-246.9	82.7
1999	958.5	683.0	275.5	1,229.8	1,030.2	199.7	-271.3	-347.1	75.8

NOTE: 1. Compiled from official statistics of the U.S. Department of Commerce, Bureau of Economic Analysis. Data reflect revisions through February 18, 2000. 2. Balance of Payments (BOP) basis for goods reflects adjustments for timing, coverage, and valuation to the data compiled by the Census Bureau. The major adjustments concern: military trade of U.S. defense agencies, additional non-monetary gold transactions, and inland freight in Canada and Mexico. 3. Goods valuation are F.a.s. for exports and Customs value for imports.

Source: Office of Trade and Economic Analysis, International Trade Administration, US Department of Commerce.  
<http://www.ita.doc.gov/td/industry/otea/usfth/aggregate/H99t01.txt>

Table 2. Changes in the degree of openness (1950-1992)

	1913	1950	1973	1987	1992	1973-92
USA	6.1	4.2	6.8	9.8	10.9	+4.1
Australia	18.3	25.4	19.7	17.4	19.0	-0.7
Austria	8.2	16.6	30.3	35.3	38.9	+8.6
Belgium	50.9	31.0	54.5	67.8	68.5	+14.0
Brazil	-	7.9	8.9	7.8	8.3	-0.6
Canada	15.1	10.3	22.9	26.1	27.0	+4.1
Denmark	26.9	28.7	29.5	30.5	33.2	+3.7
Finland	25.2	18.2	16.8	25.6	26.3	+9.5
France	13.9	14.1	17.1	20.6	22.4	+5.3
Germany	17.5	9.3	20.4	26.5	30.0	+9.6
Italy	12.0	9.3	18.4	19.2	19.8	+1.4
Japan	12.3	9.2	10.0	8.8	9.0	-1.0
Netherlands	38.2	40.7	43.8	48.5	50.6	+6.8
Norway	22.7	42.4	43.8	36.6	39.5	-4.3
Sweden	20.8	21.4	25.7	31.5	27.0	+1.3
Switzerland	31.4	26.0	31.5	35.1	34.2	+2.7
UK	20.9	23.3	24.9	26.0	24.5	-0.4

Source: Johnson and Stafford (1999).

Notes:  $[(\text{exports} + \text{imports}) / 2] * \text{GDP}$  (at current international prices)

Table 3. Source of U.S. Manufactures Imports, 1991-99  
(Census Basis; General Imports, Customs; Millions of Dollars)

	World	Developed Countries	Developing Countries	% US imports from Developing Countries
1991	393,820	256,223	137,596	34.9%
1992	434,256	273,481	160,775	37.0%
1993	480,016	297,470	182,546	38.0%
1994	557,871	338,255	219,616	39.4%
1995	629,632	371,781	257,851	41.0%
1996	659,867	380,550	279,318	42.3%
1997	728,574	411,736	316,839	43.5%
1998	792,422	444,206	348,216	43.9%
1999	882,729	491,059	391,670	44.4%
1990-99 % change	224.1%	191.7%	284.7%	

Note: Data are based on the Harmonized System of commodity classification and converted to other classification systems using recent Census data concordances to produce consistent time series.

Source: Office of Trade and Economic Analysis, International Trade Administration, US Department of Commerce and  
<http://www.ita.doc.gov/td/industry/otea/usfth/aggregate/H99t15.txt>

Table 4. Source countries for US imports, 1991 and 1999 (% of total)

	<b>1991</b>	<b>1999</b>		<b>1991</b>	<b>1999</b>
Canada	14.88	16.13	Finland	0.18	0.24
Japan	14.95	10.68	Denmark	0.27	0.23
Mexico	5.09	8.92	Honduras	0.09	0.22
China	3.10	6.65	Turkey	0.16	0.21
Germany	4.27	4.48	Argentina	0.21	0.21
United Kingdom	3.01	3.19	Angola	0.29	0.20
Taiwan	3.76	2.86	Guatemala	0.15	0.18
Korea, South	2.78	2.54	Peru	0.13	0.16
France	2.18	2.11	Bangladesh	0.09	0.16
Italy	1.92	1.82	Hungary	0.06	0.15
Malaysia	1.00	1.74	Algeria	0.34	0.15
Singapore	1.63	1.48	Ecuador	0.22	0.15
Thailand	1.00	1.16	<i>Top 50 countries</i>	<i>77.00</i>	<i>80.76</i>
Philippines	0.57	1.01			
Brazil	1.10	0.92			
Venezuela	1.34	0.92			
Ireland	0.32	0.89			
Hong Kong	1.52	0.86			
Israel	0.57	0.80			
Switzerland	0.91	0.78			
Belgium/Luxembourg	0.67	0.77			
Indonesia	0.53	0.77			
India	0.52	0.74			
Netherlands	0.79	0.69			
Saudi Arabia	1.78	0.67			
Sweden	0.74	0.66			
Colombia	0.45	0.51			
Russia	0.00	0.47			
Australia	0.65	0.43			
Spain	0.47	0.41			
Nigeria	0.84	0.35			
Dominican Republic	0.33	0.35			
Iraq	0.00	0.34			
Norway	0.27	0.33			
Costa Rica	0.19	0.32			
South Africa	0.28	0.26			
Chile	0.21	0.24			
Austria	0.21	0.24			

Source: <http://www.ita.doc.gov/td/industry/otea/usfth/aggregate/H99t11.txt>  
<http://www.ita.doc.gov/td/industry/otea/usfth/aggregate/H99t05.txt>

Total value of imports 1991=\$611.9, 1999=\$1229.8 (billions of current dollars)



Table 5. Source of OECD imports (% nominal GDP)

		<b>1962</b>	<b>1972</b>	<b>1982</b>	<b>1992</b>	<b>1997</b>	<b>1998</b>
OECD	OECD	5.85	7.77	10.13	10.67	12.79	13.18
	of which European Union	3.33	4.54	5.70	6.13	6.98	7.27
	United States	1.19	1.25	1.61	1.64	2.20	2.22
	Other	1.33	1.97	2.82	2.89	3.61	3.69
	Non-OECD	2.26	2.28	4.46	3.03	4.13	3.89
	of which DAE's + China	0.24	0.34	0.75	1.19	1.83	1.84
	OPEC	0.63	0.77	2.07	0.69	0.78	0.59
USA	OECD	1.80	3.45	4.94	5.74	6.97	7.03
	of which European Union	0.69	1.15	1.45	1.60	1.90	2.01
	Other	1.11	2.30	3.49	4.14	5.08	5.02
	Non-OECD	0.99	1.03	2.55	2.67	3.51	3.40
	of which DAE's + China	0.14	0.30	0.72	1.45	2.01	2.03
	OPEC	0.24	0.21	0.90	0.49	0.53	0.39
	Japan	OECD	5.43	4.21	4.72	3.38	4.04
of which European Union		0.90	0.73	0.79	0.91	1.07	1.03
United States		2.97	1.95	2.21	1.40	1.80	1.77
Other		1.56	1.52	1.71	1.07	1.16	1.08
Non-OECD		3.84	3.62	7.35	2.89	4.03	3.52
of which DAE's + China		1.09	0.76	1.45	1.25	2.11	1.98
OPEC		1.11	1.50	4.44	1.04	1.19	0.91
European Union	OECD	10.28	12.39	16.62	16.39	19.95	20.35
	of which European Union	6.92	9.27	12.10	12.31	14.73	14.95
	United States	1.66	1.37	1.92	1.46	2.00	2.07
	Other	1.70	1.76	2.60	2.62	3.22	3.33
	Non-OECD	4.00	3.53	5.87	3.23	4.34	4.21
	of which DAE's + China	0.26	0.27	0.54	0.91	1.41	1.49
	OPEC	1.15	1.30	2.64	0.66	0.70	0.56

Source: OECD Economic Outlook, December 1999, Annex Table 64. DAE's are Dynamic Asian economies of Chinese Taipei, Hong Kong, Korea, Malaysia, Singapore and Thailand

Table 6. Employment in industry as a % total employment

	% change in industrial employment <i>1970-98</i>	% total employment in industry			
		<i>1970</i>	<i>1980</i>	<i>1993</i>	<i>1998</i>
Australia	-39.8	36.4	30.7	23.5	21.9
Austria	-26.6	41.4	40.3	35.0	30.4
Belgium	-37.1	41.5	33.9	27.2	26.1*
Canada	-26.8	30.6	28.3	22.2	22.4
Denmark	-27.8	37.1	30.1	26.0	26.8**
Finland	-18.3	33.9	34.0	26.5	27.7
France	-34.0	38.2	35.0	27.1	25.2
Germany	-27.7	48.4	42.8	29.7	35.0
Greece	-8.4	25.0	30.2	24.2	22.9*
Iceland	-26.6	34.6	35.8	24.8	25.4**
Ireland	-4.1	29.6	32.1	28.6	28.4**
Italy	-13.5	38.4	36.9	32.7	33.2
Japan	-10.4	35.7	35.3	34.3	32.0
Luxembourg		44.3	38.0	31.3	n/a
Netherlands	-41.6	38.0	30.8	24.3	22.2**
Norway	-35.2	36.1	29.1	22.7	23.4
New Zealand	-38.0	38.9	33.4	23.4	24.1
Portugal	+15.9	31.4	35.8	32.8	36.4
Spain	-11.4	34.3	34.7	30.1	30.4
Sweden	-33.1	38.4	32.2	25.4	25.7
Switzerland	-43.0	46.0	38.1	33.2	26.2
Turkey	+45.3	16.1	19.7	21.2	23.4**
UK	-39.7	44.1	37.2	25.9	26.6
USA	-29.6	33.5	30.0	23.8	23.6
Total OECD	-23.7	36.3	33.3	27.3	27.7**

Source: Labour Force Statistics, 1973-1993, OECD, 1995, Table 7.0; Labour Force Statistics, 1977-1997, OECD, 1995, Table 7.0; and for 1998 Quarterly Labour Force Statistics OECD 1999 #4.

Industry defined as Major divisions 2-5 of the ISIC. \*=1996; \*\*=1997

Table 7. Employment-population rates by level of education and gender.

Education level		Males			Females		
		Low	High	Difference	Low	High	Difference
USA	1981	69.8	91.8	22.0	38.7	71.6	32.9
	1994	62.4	90.6	28.2	39.2	80.1	40.9
Australia	1989	76.7	90.9	14.2	44.2	74.1	29.9
	1994	73.0	90.2	17.2	50.5	78.3	27.8
Austria	1989	73.4	92.3	18.9	39.6	82.1	42.5
	1994	70.0	91.6	21.6	47.0	83.9	36.9
Belgium	1989	68.4	91.9	23.5	29.6	79.9	50.3
	1994	64.6	88.0	23.4	31.7	80.8	49.1
Canada	1981	79.6	94.6	15.0	39.5	73.7	34.2
	1994	71.9	91.8	19.9	42.2	80.3	38.1
Denmark	1981	77.1	93.1	16.0	59.5	86.9	27.4
	1994	65.7	89.8	24.1	55.5	87.9	32.4
Finland	1982	79.2	96.6	17.4	67.6	87.7	20.1
	1994	54.6	86.5	31.9	50.9	84.0	33.1
France	1981	80.3	92.5	12.2	47.6	78.7	31.1
	1994	62.1	86.0	23.9	44.0	76.2	32.2
Italy	1989	78.0	91.0	13.0	30.5	79.9	49.4
	1994	72.2	88.0	15.8	28.5	75.0	46.5
New Zealand	1981	88.3	94.8	6.5	47.9	69.4	21.5
	1994	71.4	92.1	20.7	51.7	78.5	26.8
Norway	1981	83.1	94.5	11.4	52.8	85.4	32.6
	1994	69.2	93.2	24.0	51.6	89.1	37.5
Portugal	1989	78.7	79.5	0.8	56.2	61.3	5.1
	1994	81.1	92.6	11.5	54.8	92.5	37.7
Spain	1981	81.3	89.8	8.5	23.8	67.8	44.0
	1994	67.3	82.0	14.7	26.1	68.2	42.1
Sweden	1981	85.3	95.2	9.9	68.7	93.2	24.5
	1994	81.8	90.8	9.0	74.8	89.5	14.7
UK	1984	71.7	91.3	19.6	53.1	72.6	19.5
	1994	61.0	90.0	29.0	52.0	84.3	32.3

Source: OECD Employment Outlook, 1997, Table 4.1b.

<sup>1</sup> The classification of educational attainment is based on the International Standard Classification for Education (SCED). A low level of education corresponds to ISCED levels 0, 1 and 2, that is up to lower secondary education. A high level corresponds to ISCED levels 6 and 7, that is up to tertiary education.

The employment rate is the share of employed workers aged 25-64 in the total population aged 25-64 years.

Table 8. Measures of weekly wage inequality in the United States, 1963-1995.

	SD of Log Wage	Percentiles of log wage distribution		
		90-10	90-50	50-10
A) Male				
1963	.469	1.19	.51	.68
1971	.495	1.16	.55	.61
1979	.517	1.27	.55	.72
1987	.579	1.47	.65	.82
1995	.616	1.54	.74	.79
B) Female				
1963	.406	1.04	.50	.54
1971	.430	1.08	.54	.55
1979	.432	1.05	.54	.51
1987	.506	1.30	.61	.69
1995	.544	1.38	.68	.70
A) All males and females				
1963	.502	1.27	.57	.70
1971	.530	1.31	.62	.68
1979	.539	1.35	.66	.69
1987	.580	1.44	.70	.74
1995	.603	1.54	.76	.78

Notes: Full-time, full year workers, March CPS  
Source: Katz and Autor (1999).

Table 9. Male earnings inequality since 1979 across the OECD.

	<b>1979</b>	<b>1986</b>	<b>1994/5</b>	<b>1979</b>	<b>1986</b>	<b>1994/5</b>
		<b>D9/D5</b>			<b>D5/D1</b>	
Australia	1.69	1.70	1.75	1.62	1.64	1.68
Austria	1.62	1.65		1.63	1.57	1.67
Belgium		1.72	1.57		1.39	1.38
Canada	1.67	1.68	1.73	2.07	2.40	2.18
Finland	1.67	1.73	1.73	1.46	1.50	1.46
France	2.04	2.10	2.13	1.66	1.61	1.61
Germany	1.63	1.66	1.64	1.46	1.42	1.37
Italy	1.46	1.53	1.65	1.57	1.44	1.60
Japan	1.63	1.69	1.73	1.59	1.64	1.60
Netherlands		1.64	1.66		1.55	1.56
New Zealand		1.61	1.79		1.69	1.77
Norway	1.46	1.49	1.50	1.41	1.45	1.32
Sweden	1.61	1.60	1.62	1.31	1.34	1.36
U.K.	1.58	1.73	1.86	1.55	1.66	1.78
U.S.A.	1.73	1.87	2.04	1.84	2.07	2.13

Notes: D9/D5 is the value of the ninth decile over the fifth (median); D5/D1 is the value of the fifth decile over the first decile.

Source: OECD Employment Outlook, July 1996, Table 3.1.

Table 10. Human poverty in industrialized countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Canada	1	9	9.3	16.6	5,971	42,110	7.1	11.7	5.9	22,480
Norway	2	4	9.1	16.8	6,315	37,379	5.9	6.6	2.6	24,450
United States	3	17	12.6	20.7	5,800	51,705	8.9	19.1	14.1	29,010
Japan	4	8	8.2	16.8	8,987	38,738	4.3	11.8	3.7	24,070
Belgium	5	11	10.1	18.4	7,718	35,172	4.6	5.5	12.0	22,750
Sweden	6	1	8.7	7.5	7,160	33,026	4.6	6.7	4.6	19,790
Australia	7	12	8.9	17.0	4,077	39,098	9.6	12.9	7.8	20,210
Netherlands	8	2	9.3	10.5	7,109	31,992	4.5	6.7	14.4	21,110
United Kingdom	10	15	9.8	21.8	3,963	38,164	9.6	13.5	13.1	20,730
France	11	7	11.3	16.8	5,359	40,098	7.5	7.5	12.0	22,030
Switzerland	12	..	9.8	18.9	5,907	50,666	8.6	..	..	25,240
Finland	13	6	11.3	16.8	5,141	30,682	6.0	6.2	3.8	20,150
Germany	14	3	10.7	14.4	6,594	37,963	5.8	5.9	11.5	21,260
Denmark	15	10	12.8	16.8	5,454	38,986	7.1	7.5	7.6	23,690
Austria	16	..	10.9	..	..	..	..	..	8.0	22,070
Luxembourg	17	..	10.6	..	..	..	..	5.4	4.3	30,863
New Zealand	18	13	11.1	18.4	4,264	37,369	8.8	9.2	..	17,410
Italy	19	5	9.0	16.8	6,174	37,228	6.0	6.5	2.0	20,290
Ireland	20	16	10.0	22.6	..	..	..	11.1	36.5	20,710
Spain	21	14	10.1	16.8	15,669	24,998	4.4	10.4	21.1	15,930

Column 1. Human Development Index rank, 1997.

Column 2. Human Poverty Index rank, 1997.

Column 3. People not expected to survive to age 60 as % of total population, 1997

Column 4. People who are functionally illiterate as % age 16-65, 1995

Column 5. Real GDP per capita (PPP\$) poorest 20%, 1980-94.

Column 6. Real GDP per capita (PPP\$) richest 20%, 1980-94.

Column 7. Real GDP per capita (PPP\$) richest 20% to poorest 20%, 1980-94.

Column 8. Population below poverty line (%) – 50% of median income, 1989-94.

Column 9. Population below poverty line (%) – \$14.40 a day (1985 PPP\$), 1989-95.

Column 10. Real GDP per capita (PPP\$), 1997.

Source: Human Development Report, United Nations, 1999, Table 5, p.149 and GDP per capita Table 1, p.134.

Table 11. Unemployment Rates 1973-1998 (%)

	<b>1973</b>	<b>1979</b>	<b>1985</b>	<b>1989</b>	<b>1993</b>	<b>1998</b>
OECD	3.3	5.1	7.8	6.4	8.0	7.0
OECD Europe	3.0	5.6	9.9	8.5	10.4	9.7
of which EU	2.7	5.4	10.5	8.7	11.0	10.0
Australia	2.3	6.1	8.1	6.1	10.8	8.0
Austria	1.0	2.1	3.6	3.1	4.2	4.7
Belgium	2.4	7.5	12.3	9.3	10.3	8.8
Canada	5.5	7.4	10.4	7.5	11.2	8.3
Denmark	0.9	6.0	7.3	8.1	10.7	5.1
Finland	2.3	5.9	5.0	3.4	17.7	11.4
France	2.7	5.9	10.2	9.4	11.5	11.7
Germany	1.0	3.2	8.0	6.8	8.8	9.4
Italy	6.2	7.6	10.1	11.8	10.8	12.2
Japan	1.3	2.1	2.6	2.3	2.5	4.1
Netherlands	2.2	5.4	10.9	8.3	6.2	4.0
New Zealand	0.2	1.9	4.1	7.1	9.4	7.5
Sweden	2.5	2.1	2.8	1.3	8.2	8.2
U.K.	2.2	4.6	11.5	6.1	10.2	6.3
U.S.A	4.8	5.8	7.1	5.2	6.7	4.5
European Union	2.7	5.4	10.5	8.7	11.0	10.0

Source: Labour Force Statistics, 1973-1993, OECD (1995) & for 1998 OECD Employment Outlook, 1999 table A p.224.

Table 12. Between and within group components of changes in wage inequality in the United States, 1963-95

	Total change	Between group change	Within group change	% explained	% residual
A) Males					
1963-1995	.159	.067	.092	42	58
1963-1979	.047	.014	.033	33	67
1979-1995	.112	.053	.059	47	53
B) Females					
1963-1995	.131	.048	.083	37	63
1963-1979	.022	-.001	.023	-5	105
1979-1995	.109	.049	.060	45	55
A) All males and females					
1963-1995	.111	.028	.083	25	75
1963-1979	.037	.010	.027	27	73
1979-1995	.074	.018	.056	24	76

Notes: full-time full-year workers, March CPS  
 Source: Katz and Autor (1999)



Table 13. Evolution of trade prices, 1980-1990

	Import prices	Export prices	Trade price gap	Trade price gap minus prices of office & computer equipment
Australia	31.3	9.5	-21.8	-21.3
Canada	14.0	38.0	24.0	10.0
Austria	26.4	27.8	1.4	-3.5
Belgium	18.0	26.5	8.5	7.3
Denmark	10.9	39.1	28.2	25.4
Finland	27.6	34.0	6.4	5.5
France	20.9	38.0	17.1	17.8
Germany	20.2	40.4	20.2	18.7
Italy	24.0	32.7	8.7	7.7
Netherlands	19.3	14.8	-4.5	-5.7
Portugal	15.9	21.2	5.3	5.7
Spain	21.0	33.9	12.9	11.6
Sweden	25.2	37.6	12.4	14.0
UK	19.3	28.2	8.9	8.9
Japan	-7.5	43.2	50.7	55.7
New Zealand	23.1	25.0	1.9	2.1
Norway	14.4	10.6	-3.8	-18.1
USA	0.7	30.3	29.6	14.6
EU	20.7	31.2	10.5	9.5
OECD	18.0	29.5	11.5	8.7

Source: OECD (1997)

Notes: import prices are average unit values [the ratio of imports at current prices (in US\$) to imports at constant prices) of import competing sectors

Export prices are average unit values [the ratio of exports at current prices (in US\$) to exports at constant prices) of export sectors

Trade price gap is the difference between column 2 and column 1. A positive (negative) indicates that export prices rose (fell) with respect to import prices.

Table 14. Growth Rates of College Educated Workers in Four Countries

Group and Ages (Males &amp; Females)

	<i>Annual Log Growth Rates</i>	
<b>A) United States</b>		
	<i>1969-1979</i>	<i>1979-1989</i>
Employees age 18-64	.043	.023
Population age 18-64	.043	.026
<b>B) Britain</b>		
	<i>1973-1979</i>	<i>1979-1989</i>
Employees age 16-60	.068	.037
Population age 16-60	.068	.037
<b>C) France</b>		
	<i>1970-1980</i>	<i>1980-1989</i>
Labor force age 15+	.039	.050
Population age 15+ (males)	.045	.039
Population age 15+ (females)	.026	.046
<b>D) Japan</b>		
	<i>1971-1979</i>	<i>1979-1987</i>
All Employees age 15+	.050	.029

Source: Katz et al (1995).

Table 15A. Union Density Rates, 1950-1997 (wage and salary workers).

	1950	1960	1970	1975	1980	1985	1990	1995	1997
Austria	62	60	57	53	52	52	47	41	39
Belgium	43	42	42	52	53	51	50	53	
Denmark	56	62	63	69	79	78	75	77	76
Finland	30	32	51	65	69	69	73	89	78
France	30	24	20	22	22	19	14	10	10
Germany (West)	38	35	32	35	35	34	32		
Germany							36	29	27
Great Britain	44	44	47	50	52	43	38	32	30
Greece				36	36	37	34	24	
Ireland	42	50	59	62	64	63	59	52	
Italy	45	28	37	48	50	42	39	39	37
Netherlands	43	42	37	38	35	28	24	24	24
Norway	45	52	50	52	55	56	56	55	55
Portugal					52		40	30	
Spain				30	8	10	12	18	17
Sweden	67	71	67	73	78	82	82	88	86
Switzerland	40	39	30	32	31	28	27	24	23
United Kingdom	45	45	50	54	56	50	43	36	
United States	32	31	27	26	22	21	18	17	16

Source: Ebbinghaus and Visser, 2000; Statistical Abstract of the United States, 1999, table 718 and Blanchflower (1996)

Table 15B. Union density rates in non-European OECD countries.

	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>1993</b>
Australia	44.2	49.9	40.8	35.0
Canada	31.0	36.1	35.8	37.4
Japan	34.7	30.8	25.2	24.2
New Zealand	40.8	47.7	45.5	30.1

Source: Blanchflower, 1996.

Figure 1. % production workers in manufacturing

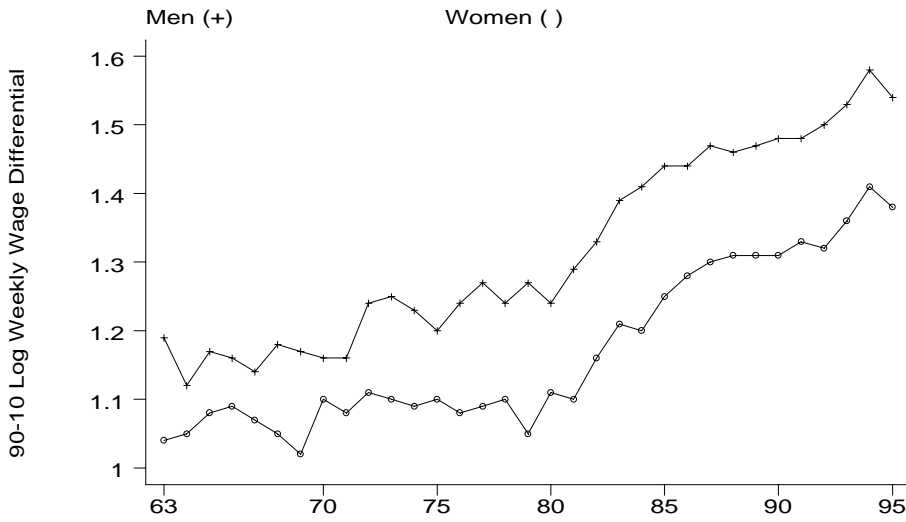
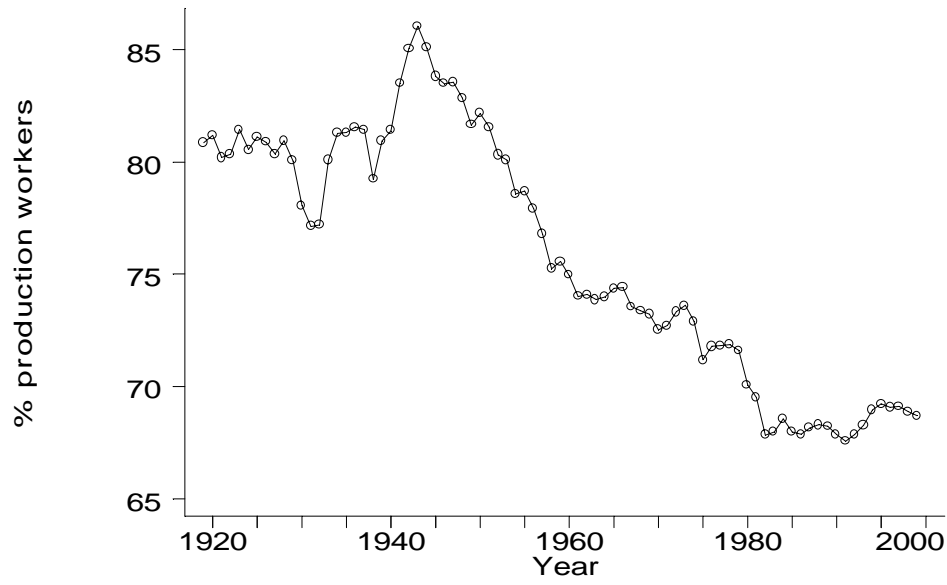


Figure 2: Overall US wage inequality, 1963-95

Source: Katz and Autor (1999, Figure 4)

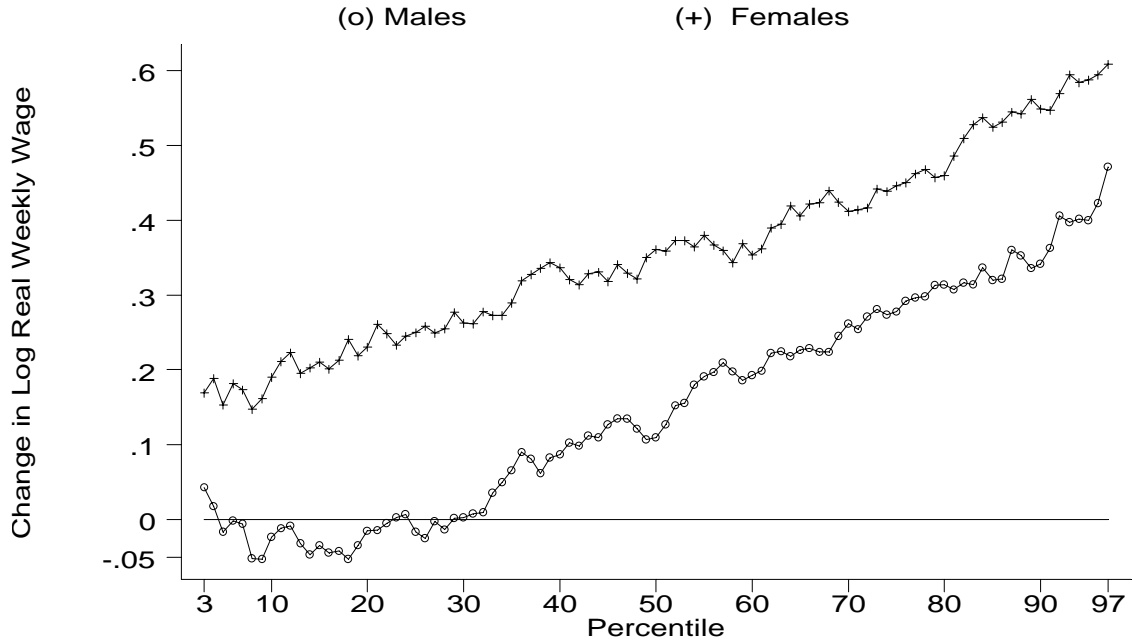


Figure 3: change in log real weekly wage by percentile, 1963-95

Source: Katz and Autor (1999, Figure 1)

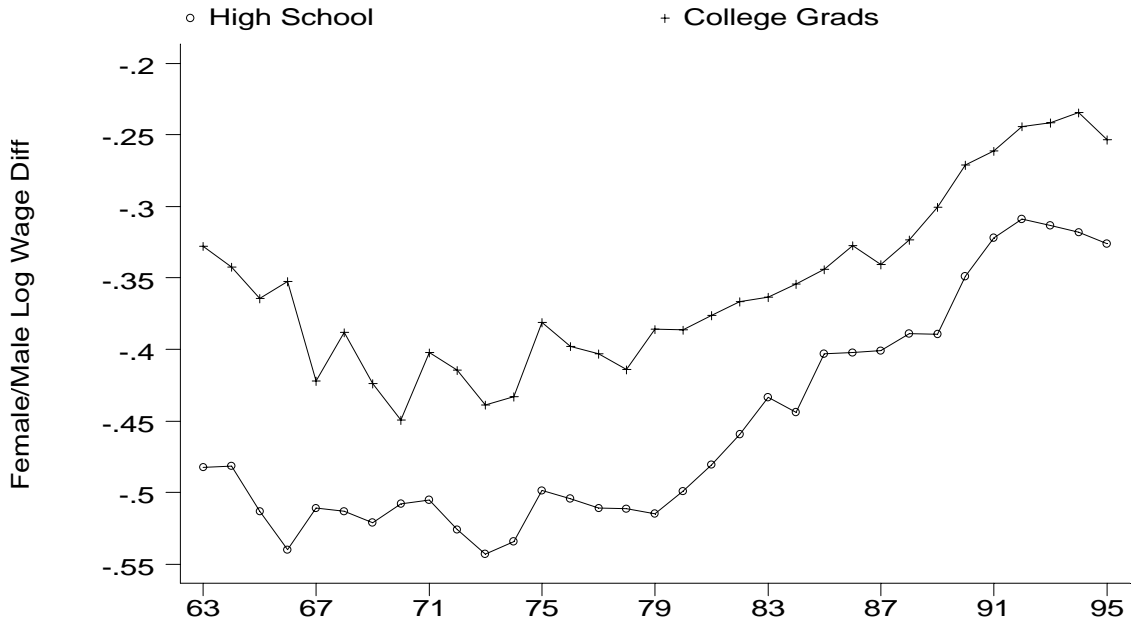


Figure 4a: Female/male log wage differential, 1963-95

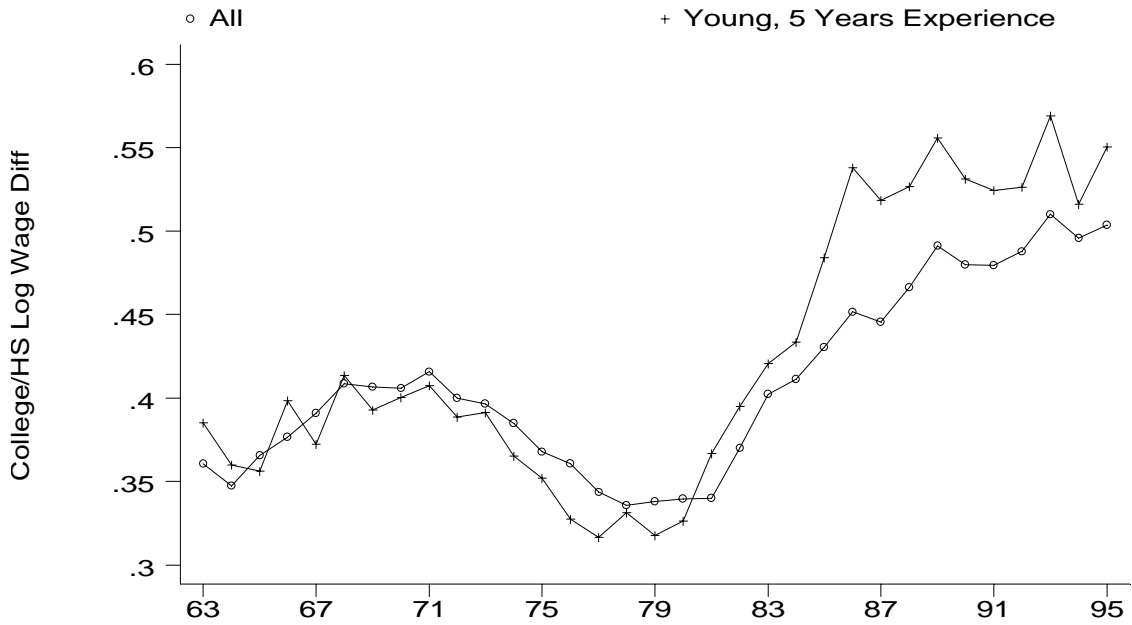


Figure 4B: College/HS log weekly wage differential, 1963-95

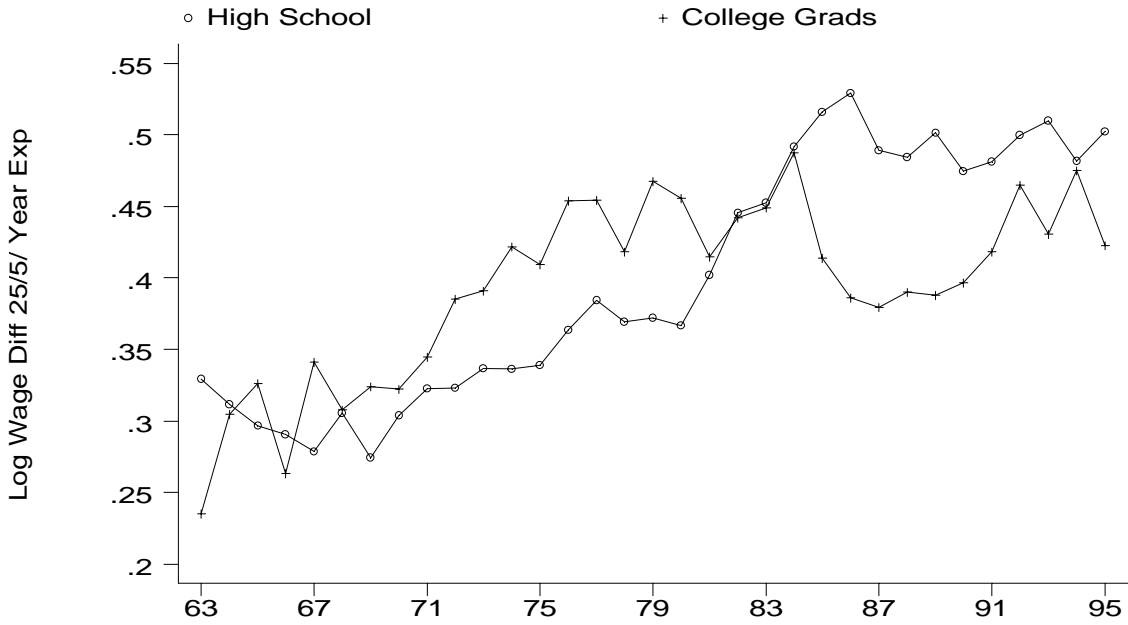


Figure 4C: Returns to experience, males, 1963-95

Source: Katz and Autor (1999, Figure 5a-c)

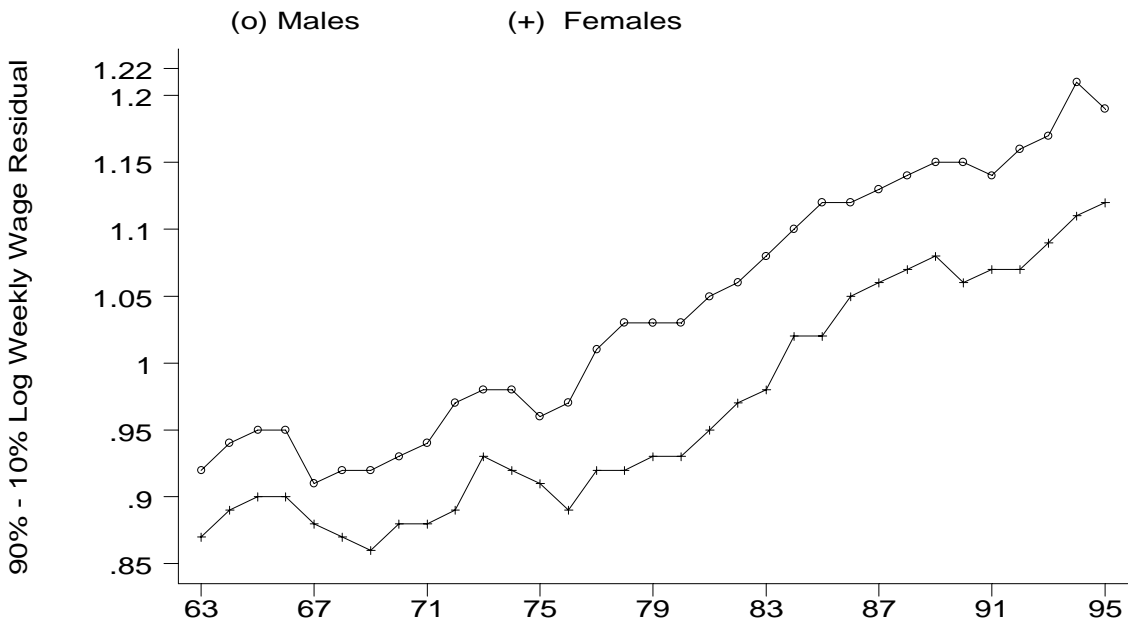


Figure 5: 90%-10% Log weekly wage residual, 1963-95

Source: Katz and Autor (1999, Figure 5d)