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Slow Real Wage Growth and US

Income Inequality: Is Trade to Blame?

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ABSTRACT

This paper explores the links between slow US real wage growth, increased earnings inequality and trade. It deconstructs the gap between real blue-collar wages and labor productivity growth and estimates (a) how much higher these wages might have been had the distribution of income growth been kept constant and (b) how much of the gap is due to technical and other factors about which little can be done. It also argues that while increased trade with developing countries may have played some part in causing greater wage inequality in the 1980s, surprisingly, over the past decade the impact has been too small to show up in aggregate wage data. Recent US income inequality and slow real wage growth across at all but the very highest levels do reflect strong profit growth, much of which may be cyclical. Increases in inequality over the past decade also result from dramatic income gains for the top one percent, a development that may have a global component but is closely related to asset-market performance and not the result of conventional trade in goods and services.

Slow Real Wage Growth and US Income Inequality: Is Trade to Blame?

Judged by the aggregate numbers, American workers should have been relatively pleased about the economy's performance in 2006, but they were not. Their concerns were not related to jobs but to wages. The economy had fully recovered from the 2001 recession and was generating substantial employment growth – 2 million additional jobs between 2005 and 2006 -- and the unemployment rate at 4.5 percent was close to levels many considered to be close to the lowest level compatible with stable inflation. But for several years, wage and salary growth for all but the very highest earners had been poor. Grouping earnings by education reveals for example that from 2000 to 2006, an astonishingly small fraction of workers—just the 3.4% with doctorates and professional graduate degrees (JD's, MBAs, & MDs) enjoyed any increases at all in average inflation-adjusted take home pay. For workers with a college education, this recent slow real wage growth is a relatively new experience because these workers had seen their real pay rising steadily between 1980 and 2000; but for most other workers, the recent weak wage growth actually continues a longer run trend, in which, with the exception of the late 1990s, average hourly wages have failed to grow.

 At the same time as wages were stagnating, though, rich Americans were clearly getting richer. In 2006, the share of corporate profits in national income was higher than at any time since 1947. And the inequality was not only reflected in the behavior of profits. The share of <u>wage</u> income reported in the very top one percent of US tax returns in 2005 was almost double that recorded in 1980.

One way of vividly illustrating the concern about the fate of the typical worker is to contrast the growth in output per worker against real average hourly earnings over the past quarter century. One might have expected that the two series would track each other. [1]Yet, they tell strikingly different stories. Labor productivity growth has been robust and output per hour has risen by over 50 logarithmic points or 70 percent.[2] By contrast, average real hourly wages have been virtually flat: measured in 1982 dollars, they grew just 4.4 percent-- averaging $7.88 in 1981 and $8.23 in 2006[3] [4]

Taken at face value, the picture suggests something is seriously amiss. On average workers are producing considerably more, yet most workers have little to show for it. Where is the rest of the income generated by increased productivity going?"[5] Plausibly the full explanation is associated with rising inequality: In particular, the so-called *average* hourly wage series provides an incomplete picture of worker wages because it only reflects the pay of *non-supervisory* workers who are paid by the hour and excludes white collar workers in sales, managerial, professional and technical occupations. One possibility therefore is that the gap is being made up by the more rapid increases in the compensation of non-production workers. A second possibility is that the difference is

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[1] In principle, under competitive conditions, workers will be paid their marginal not average product. This implies that output per worker need not rise at the same rate as the marginal product of labor. In general factor shares in income will remain constant only when the elasticity of substitution is unity i.e. the production function is Cobb-Douglas.

[2] I use log point measures for expositional purposes. For small changes they are close to percentage changes.

[3] .In fact, in 1982 dollars real wages in 1964 were also $7.82, and in 1964 real weekly earnings at $302 were actually higher than in 1987! Source: CEA *Economic Report of the President 2006*, page 338.

[4] A similar story can be told by contrasting productivity growth with real annual male earnings -- measured in 2005 dollars, the median earnings of males who worked full time of $41,386 were actually below the $41,763 earned in 1980. US Census *Income Poverty and Health Insurance Coverage in the United States : 2005* P60-231 Table A-2 page 38.

[5] Indeed, according to Robert Gordon and Ian Dew-Becker "Half of the income gains went to the top 10 percent of the income distribution, leaving little left over for the bottom 90 percent." See Ian Dew-Becker and Robert J Gordon. "Where did Productivity Growth Go? Inflation Dynamics and the Distribution of Income" *NBER Working Paper* no. 11842, December 2005.

going to the wage compensation of the very rich whose pay is not accurately reflected

even in more comprehensive labor earnings measures such as the Employment Cost

Index (ECI). Many of these are the top one percent of workers such as CEOs and others

who command especially high salaries and whose pay often includes stock options. And a

third possibility is that it is going into profits or other forms of capital income. In the first

section of this paper I will provide quantitative estimates of the role each of these have

played.

But why are American workers doing so poorly? One answer often given is

"globalization." At the same time as inequality has increased, the US has certainly

become more integrated into the global economy. And this correlation leads many to

ascribe causation. Since 1980, the sum of exports and imports of goods and services has

increased from 20 to 28 percent of GDP with recent import growth heavily concentrated

in goods and services from developing countries.

Goods Imports
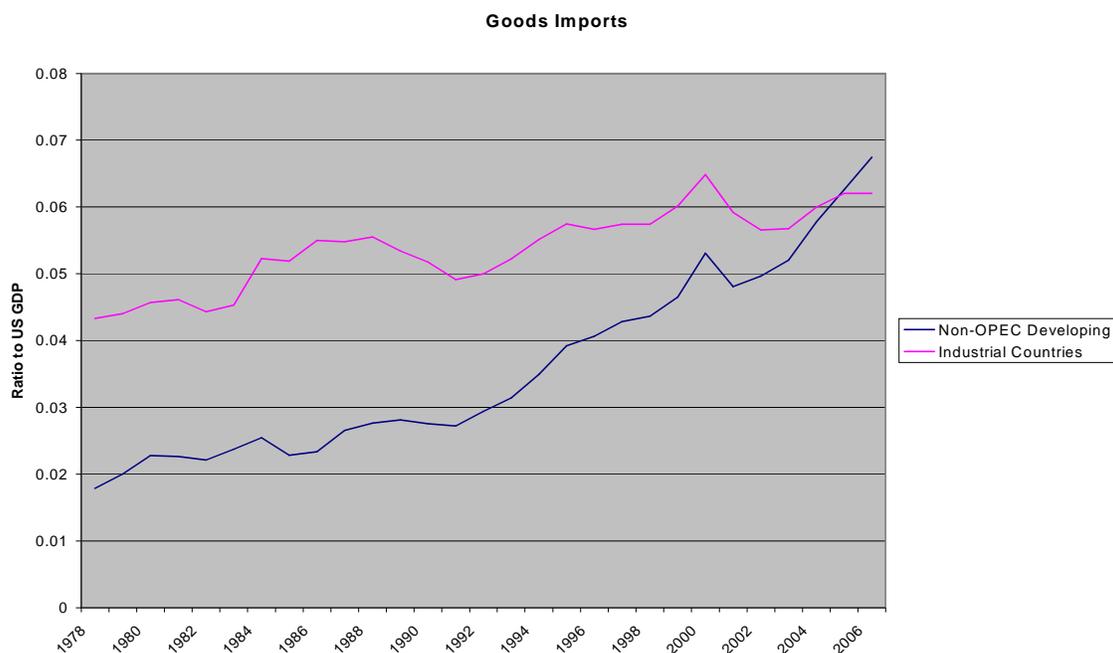
International financial markets have also undergone explosive growth. US multinationals have continued to expand abroad and many domestic firms have increased their reliance on off-shored inputs. The US has also become the world's largest recipient of inward foreign direct investment. [6] Moreover, improvements in computing and telecommunications now make it possible to transmit a wide range of services across the globe instantaneously and at low cost.

It is widely accepted that in the aggregate trade generates gains and promotes economic growth [7] but it can also create winners and losers. In America's case, trade with developing countries is viewed as particularly problematic because it could put downward pressures on the earnings of lower- wage workers. And indeed, it is precisely this type of trade that has expanded especially rapidly over the past decade, partly because countries such as China and India have emerged as major global competitors and partly because the US has vigorously implemented Free Trade Agreements with Mexico (NAFTA), Central America (CAFTA), and other developing countries.

The views of Stephen Roach, chief economist at Morgan Stanley are typical:

"Globalization hasn't exactly lived up to its win-win" billing. While the developing world has benefited from the first win, in the rich countries the spoils of the second win have gone mainly to the owners of capital."…… "The global labor arbitrage has put unrelenting pressure on employment and real wages in the high-cost developed world"[8]

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[6] Employment in foreign affiliates of US multinationals was up 51 percent between 1982 and 2004, (BEA Survey of Current Business November 20006); Employment in non-bank majority - owned US affiliates of foreign companies increased by 68 percent between 1988 and 2003. (BEA *Survey of Current Business* August 2005).

[7] Exporting raises the prices producers can charge for their products and allows for economies of scale. Importing reduces product prices and increases the choices available to consumers. Trade may also intensify competition, thereby encouraging firms to be more productive and innovative. According to one recent estimate, U.S. incomes are some 10 percent higher than they would be if the economy were self-sufficient See Scott C. Bradford, Paul L.E. Grieco, and Gary Clyde Hufbauer, "The Payoff to America from Global Integration," in C. Fred Bergsten, ed., *The United States and the World Economy: Foreign Economic Policy for the Next Decade* (Washington, DC: Peterson Institute for International Economics, 2005).

[8] Stephen S. Roach, "From Globalization to Localization" Morgan Stanley Research Global, December 14 2006.

To be sure, many would acknowledge that rising inequality is also being caused by factors other than globalization (e.g. technological changes, de-unionization, changing social norms, [9]deindustrialization, & immigration) and in any case, the correct policy instruments to deal with inequality are taxes and transfers rather than trade protection. Nonetheless, there is polling evidence that Americans are becoming increasingly disenchanted with trade. A 2000 Gallup poll found that 56% of respondents saw trade as an opportunity and 36 % saw it as a threat – but by 2005, the respective percentages shifted to 44% and 49%. [10] Especially noteworthy is the drop off in support from Americans with college educations.

Some are now saying that precisely because these others forces are at work, the additional pressures due to trade liberalization with developing countries are particularly inopportune and are calling for a "time-out" with respect to new trade agreements. Given the fact that the developing world in particular is awaiting a successful conclusion of the Doha Round, the consequences of this position could be very unfortunate.

This paper explores the links between wage growth, increased inequality and globalization. It deconstructs the gap between real blue-collar wages and labor productivity growth and estimates how much higher these wages might have been had income growth been distributed equally and how much of the gap is due to technical factors about which little can be done. It argues that while increased trade with

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[9] For an illuminating analysis of the role of norms and institutions see Frank Levy and Peter Temin "Inequality and Institutions in 20th Century America" *MIT Department of Economics* Working Paper No. 07-17, May 1 2007.

[10] Matthew J. Slaughter and Kenneth F. Schreve 2007 "A New Deal for Globalization" Foreign Affairs Forthcoming.

developing countries may have played some part in causing greater inequality in the 1980s; surprisingly, over the past decade the impact of such trade has been relatively small

Before proceeding several prefatory distinctions should be made. As this discussion has already implied, the nature of US inequality is complex. While they may be related at times, at least three *different* kinds of inequality need to be distinguished: wage inequality, i.e. increased pay differentials for workers with different levels of education, skill, experience and other characteristics; "super rich inequality" i.e. an increase in the income share of the top one percent of income earners whose incomes are often heavily related to stock market performance through stock options; and "class inequality" i.e. an increase in the share of income being earned by owners of capital -- in particular corporate profits. Over the past twenty-five years, all three types of inequality have increased in the US, but they have emerged at very different times and wage inequality in particular has taken different forms. Wage inequality increased rapidly in the 1980s at all levels of skill; In the 1990s, wages near the top of the income distribution (90th percentile) continued to rise more rapidly than wages at the median but wages at the bottom of the distribution kept up, or actually increased faster than wages in the middle. Since 2000 -- with the exception of the very top -- wages have generally moved in tandem. This has meant that for the twenty five year period, blue-collar workers say those with a high-school education or less have fared poorly while college-educated workers have done relatively well. But over the past six years, almost all workers including those with college degrees have done poorly.

Increased "super-rich" inequality also occurred in spurts in between 1985 and 1988 and again in the late 1990s; while class-inequality has appeared only after 2000. Many discussions confound these forms of inequality, but as this timing suggests, they are likely to stem from different causes and in particular, to be affected differently by international factors.

A third key distinction is between inequality and poverty. It turns out that since the early 1990s, the poorest Americans with jobs have actually been doing comparatively well. This shows up in the ratio of wages in the 50th percentile to those in the 10th percentile and in the relative wages of high-school dropouts. It shows up even more strongly in the rise in real incomes at the bottom.[11] While the rich are getting richer, the poor are not getting poorer and the inequality that has arisen is between the very rich and the middle class. This has important implications for concerns about immigration and low wage competition.

The discussion on inequality often refers very loosely to something called globalization which is often used as a synonym for structural change. But this can be a very misleading and dangerous oversimplification if it leads to policy prescriptions that imply that protectionism could effectively remedy the rise in inequality. The US economy is linked to the rest of the world through trade in goods and services, flows of capital through both direct and indirect foreign investment and through the international diffusion of technology and other forms of communication. And any or all of these connections could influence the US distribution of income. In this study I will focus on

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[11] A Recent CBO Study for example finds that households with children in the lowest quintile have had real income increases of 35 percent between 1991 and 2006, faster than all but the highest quintile. See *Changes in the Economic Resources of Low-Income Households with Children*, Congress of the United States, Congressional Budget Office, May 2007.

trade volumes and prices. But even with respect to trade, chains of causation are complex. Trade is not really an independent variable that we can talk accurately of as necessarily "causing anything" nor can we readily separate trade from other sources of structural change. Faster growth in China or changes in its domestic policies could lead it to trade more with the US, a crop failure in the US could lead to more trade, and a new trade agreement could lead to more trade, and technological discoveries in the US could be encouraged by the ability to trade and result in more trade. We might expect each of these to affect trade, but to have quite different effects on the distribution of income.

Inequality in turn can be measured in a number of ways. One key distinction is between income and wealth. Given rapid increases in asset prices, such as equity and real estate, the distribution of wealth in the US has become even more unequal than the distribution of income. But to keep the scope of the study manageable, I will only consider income. In addition, I will concentrate individual pre-tax incomes. Income inequality is sometimes measured at the level of the family, sometimes the household, and the levels at which this is done can make a huge difference.[12] Decisions on how much to work and who to marry and live with can shift the link between individual earnings and household incomes.[13] Similarly incomes can be affected not simply by earnings but also by taxes and transfers. But I will focus on pre-tax and transfer

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[12] This distinction may be important. According to Gottschalk and Danziger (2003) the 90s were a period in which wages became more equal but family income inequality continued to increase" For our purposes here the focus will be particularly on wages and incomes. Peter Gottschalk, and Sheldon Danziger 2003 "Wage Inequality, Earnings Inequality and Poverty in the U.S. Over the Last Quarter of the Twentieth Century May 2003 (Mimeo)

[13]Danziger and Gottshcalk op. cit. write"…long-run changes in society's living arrangements have taken place also tending to exacerbate household incomedifferences. For example, divorces, marital separations, births out of wedlock, and theincreasing age at first marriage have led to a shift away from married-couple households to single-parent families and nonfamily households. Since nonmarried-couple households tend to have lower income and income that are less equally distributed than other types of households (partly because of the likelihood of fewer earners in them), changes in household composition have been associated with growing income inequality"

individual earnings because these are most likely to be directly affected by pressures operating through international trade. Earnings are affected both by how much people work and what they earn by hour. Trade could affect both, but its major impact is likely to be on factor prices, and thus wherever possible the study uses data on hourly earnings.

Finally I should emphasize that although the terms "equity" and "equality" are sometimes used as if they were interchangeable, by focusing on inequality I do not mean to imply it is always undesirable. Higher incomes could be derived through exploiting others but they could also be an appropriate reward for working harder and smarter in activities that also increase the welfare of others. To be sure, it might still be appropriate to ask those who make more to pay proportionately more in taxes, but this needs to be done with an awareness of the role of incentives motivating higher productivity.

Outline. The first section quantifies the sources of the gap between blue-collar wages and productivity over the past twenty five years. These are decomposed into those that actually do result from greater inequality and those that do not. About 70 percent of the 48.4 log point gap – 33.6 log points – is found to reflect definitional differences and increased worker skills that have nothing to with inequality. About half of the remaining 14.8 points (6.8 points) is attributable to higher wage inequality i.e. relatively more rapid increases in non blue-collar wages, with the remainder split between the increased wage earnings of the super-rich (3.3 log points) and recent increases in profits. (4.7 log points)

Section 2 deals with both the theory and evidence on wage inequality. Conventional trade theory predicts that inequality could increase in developed countries if either they or developing countries liberalize. Most of the studies that test the theory conclude that trade has indeed played some role – typically on the order of about ten to

twenty percent of the historic increase in the ratio of the wages of skilled to unskilled worker in the US. Though some studies argue for larger effects, almost all find that skill-biased technical change was far more important than trade in raising skill premiums.

But almost all of the studies have focused on the period through the mid 1990s, and the experience between 1999 and 2006 has been different: By virtually all quantity and price indicators there were powerful globalization forces during this period. Yet US relative wage and compensation measures indicate very little evidence of increased inequality by skill, education, unionization or occupation and if anything compensation in manufacturing increased relatively rapidly. Apparently, neither trade nor technical-change (nor anything else) has continued to increase conventional wage inequality.

This is surprising, given the concerns about competition from low wage countries. There are two lines of explanation. One is that many the goods that the US imports are sophisticated and produced in the US by relatively skilled workers. While it may cause displacement and could put downward pressure on wages generally, this competition does not increase wage inequality. A second more benign view is that a significant amount of what America imports today is no longer produced domestically. Thus declining import prices simply yield consumer benefits but they do not exert downward pressure on US wages nor cause dislocation of US workers.

It appears that US trade today combines these two elements in proportions that are hard to disentangle particularly at levels of disaggregation that allow for a sufficiently precise matching of products and the wages earned in producing them. At relatively high levels of aggregation it appears that manufactured imports overall, and even those from developing countries such as China, are actually concentrated in US manufacturing

sectors which pay significantly higher than average US wages. This means that import displacement does not fall disproportionately on less skilled workers. There has been considerable displacement from trade during this period, therefore, but there is not increasing wage inequality. Drilling down to more disaggregated levels reveals that goods imported from developing countries such as China *are* associated with relatively less skilled labor inputs and qualitatively different from those produced by developed countries such as the US, providing support for the view that much of this trade reflects more complete specialization.

Section 3 explores class inequality. Since 2000, labor's income share has fallen as wage increases have failed to match productivity growth almost across the entire spectrum of education levels. This could be the result of trade pressure, such as off-shoring, that raises profits and reduces wages in part through affecting labor's bargaining power. But there are reasons to be skeptical: First, the low labor income share in 2006 was actually similar to that in the mid 1990s, suggesting a strong cyclical component in recent performance. Second, while it is plausible that labor's bargaining power and labor rents could be reduced by the ability to offshore, there was no such decline in labor share over either the 1980s or 1990s. Third, we would expect that if off-shoring to China and other developing countries is the major driver of labor's depressed share, it would be especially apparent in tradable goods, but recent profit growth has not been especially concentrated in manufacturing. In fact between 2000 and 2005 the share of compensation in manufacturing (or traded goods) has not declined more rapidly than in the rest of private industry and manufacturing compensation has actually increased relatively more rapidly than compensation in general. Similarly, off-shoring of services

has actually been much smaller than public headlines suggest, and too small to account

for the pervasive slow real wages growth since 2000. A crucial question, therefore that

will only be resolved as the current expansion matures, is how much of the recent shift is

simply cyclical and how much could reflect a new version of "Stolper-Samuelson"

effects in which trade liberalization operates by raising the relative price of capital-

intensive goods. Finally, the paper ends with some observations on super-rich inequality.

The traditional channels that operate through trade are unlikely to be an important driver

of the development. While "globalization" broadly construed could be playing a role, it is

also being driven by technological and institutional developments particularly those in

the US.

Section 1: The Wage-Productivity Gap

In this account of the gap between wages and productivity between 1981 and

2006, I will focus on the earnings of US workers in blue-collar occupations. This allows

me to use the employment cost index (ECI) for these workers which is ideal for this

purpose because it is a fixed weight series that captures pure wage changes and is in

principle unaffected by shifts in labor force composition among workers between its

component categories. The employment cost index is collected from business

establishments. The data are weighted to represent the universe of establishments and

occupations at a particular point in time.

Real Blue-Collar Wages and Output per Hour Business Sector
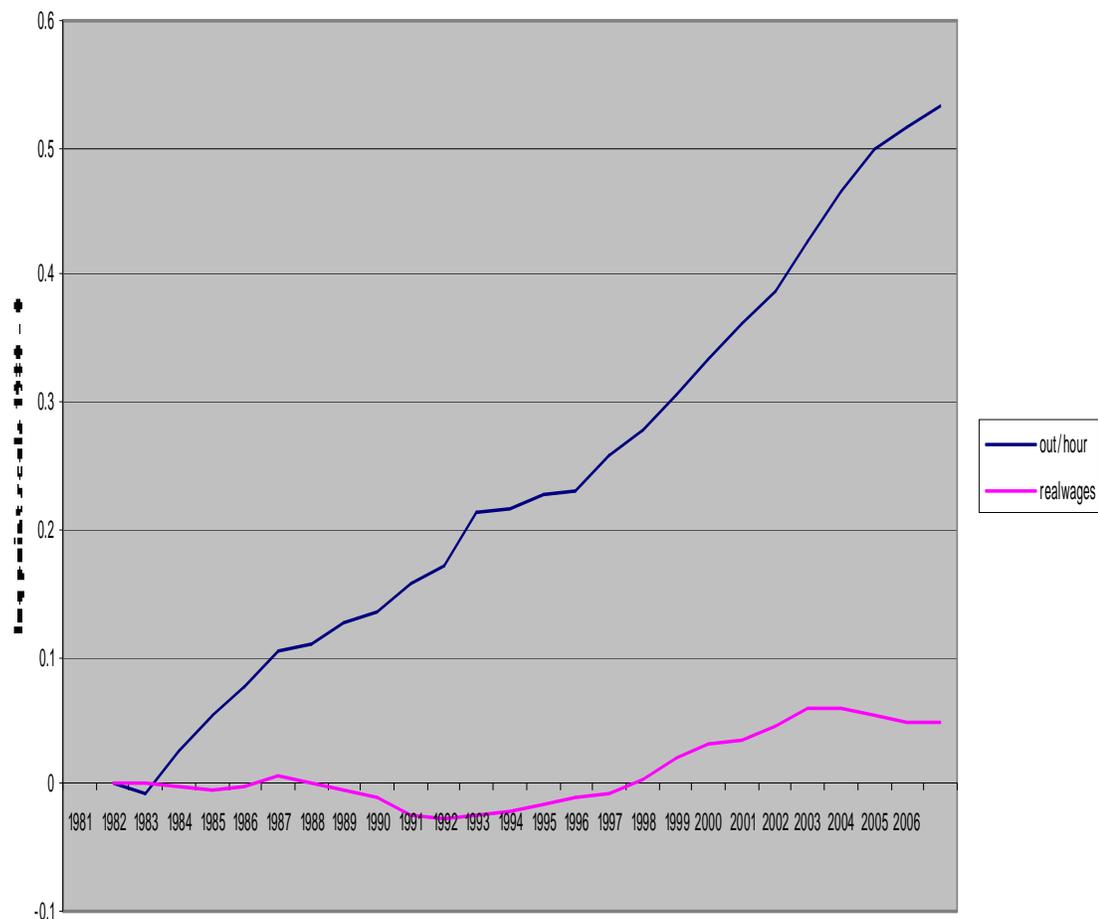
In fact, over the period, the blue-collar ECI wage series actually behaves very similarly to that of the average hourly wage series for *all* non-supervisory workers cited above. The ECI indicates that real wages of blue collar occupations increased by just 4.9 log points between 1981 and 2006. (Over the same period, real average hourly wages were up 4.4 percent). By contrast, output per hour in the business sector was up 53.3 log points -- a 48.2 log point gap.

But there is a problem with this comparison. When people contrast this measure of real wages and output per worker and imply that they should rise in tandem, they are basically comparing apples and oranges. Even aside from the fact that in theory this would only occur if workers average and marginal productivity were equal and factor shares constant, three important measurement issues should not be overlooked. First, the cost of employing a worker that firms will in principle equate to the worker's marginal product is not only the take-home pay, but also the other benefits the worker receive in the form of social security contributions, life-insurance, retirement benefits and health-care. Over much of this period, since benefits have been rising faster than wages, this seriously underestimates the value of increases in worker pay. In fact, the practice of referring to hourly wages (or incomes) without accounting for these benefits is a serious omission, not only for measures of take home pay such as average hourly earnings but also for many of the household income measures that are frequently taken as indicating trends both in real incomes and inequality. This is also true of the many studies of wage trends undertaken by labor economists and others using the Census' Current Population Survey (CPS) data. In fact, if benefits such as health care are relatively similar for high and low or (more likely) median-wage workers and if they are shifted backwards into wages, their growth could well increase wage inequality, even though compensation inequality was unaffected.

The full costs of non-wage benefits *are* however taken account of in measures of total compensation. By using the real ECI index for blue-collar compensation, which includes benefits, and comparing it to the corresponding real ECI index for blue-collar wages we can estimate what difference this makes. And, as indicated in Chart 2, between

1981 and 2006 the corresponding rise in compensation of real ECI blue-collar occupations was actually 16.8 log points -- compared with just a 4.9 log point increase for real blue-collar wages. This implies that that increased benefits accounts for 11.9 log points – roughly a quarter -- of the 48.2 log point gap we are trying to explain, Nonetheless it should be noted that the prospects of future benefits and improved healthcare may not do much for workers sense of wellbeing today.

A second issue relates to the way in which output per worker and compensation measures are deflated to get real measures. Economic theory predicts that under competitive conditions, the wage rate (w) should equal marginal value product which is marginal product (MP) times the *product* price (P) i.e $w = MPP.P$. This means that the relevant real wage (w/P) that should track marginal product is what is known as the product wage i.e. the nominal wage rate divided by the prices of the products that workers produce. It is a *production* concept. By contrast the "real wage" that is generally quoted is a *consumption* concept and measures what workers can buy. It is measured by deflating the wage rate by the *consumer* price index. Both the weights and composition of the Business Sector Price deflator (PBUS) and the Consumer Price Index are different and the differences can mount up. It turns out that over the past twenty five years the prices of goods and services workers actually produce have risen more slowly than the prices of the goods and services they consume. In particular the output deflator has a higher weight for investment goods (such as computers and machinery whose prices have risen slowly –or even declined) while the consumer price index gives a larger weight to housing and import prices (such as petroleum) whose prices have increased more rapidly.

[14] When measures of real output which deflate nominal output by the Business Sector

Deflator are compared with those of real wages which deflate nominal wages the CPI --

the gap productivity-wage gap is exaggerated. The differences between the growth in the

two series between 1981 and 2006 amounts to 17.7 log points. Thus taking account of

benefits and using the Business Sector Deflator to measure the real (product)

compensation of blue-collar workers we find an increase of 34.5 log points rather than

just 4.9 log points Thus, these two adjustments readily explain about sixty percent of the

gap. This means that in fact, blue-collar have actually made significant real gains over the

past twenty years. Certainly, their earnings have lagged behind both those of white collar

workers (up 46 log points over the same period) and behind productivity growth but they

have averaged roughly 1.5 percent per year in real (product) terms and are not as

inconsequential as might be inferred from the average hourly wage series.

Output per Hour and Blue-Collar Product Compensation

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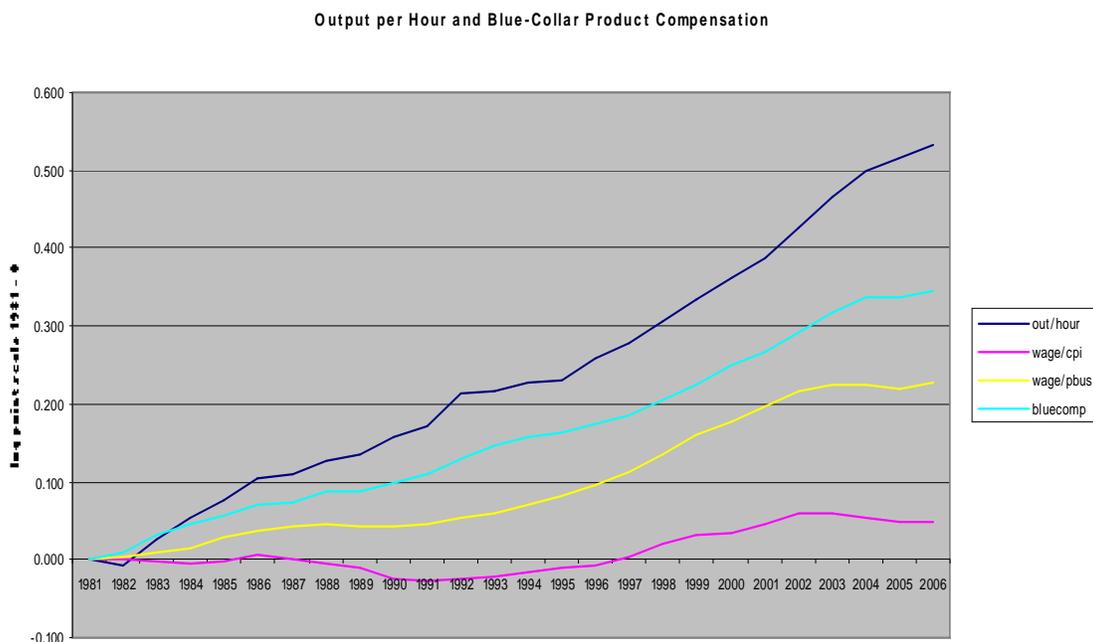
[14] This was more fully explored in Lawrence and Slaughter (1993) and Barry Bosworth and George L
Perry. (1994) Productivity and Real Wages: Is There a Puzzle? *Brookings Papers on Economic Activity*
1994:1 pp 317 – 343.

But this still leaves 18.8 points unaccounted for. A third element that needs to be considered before the role of changes in relative earnings relates to increased worker skills. Education is likely to make workers more productive. For example, if we had 10 workers with only a high school education, and one of them obtained a college education we would expect the earnings of that tenth worker to increase. We would also expect total and average output per worker to increase. But we would not expect the wages of the nine other workers to rise. Thus if some workers are increasing their skills particularly rapidly either because of education, or experience, this could be a reason why the wages of the *other* workers (ie those not experiencing such improvements) might not rise as fast as output per worker. In fact such a change has taken place in the United States over the period that is being considered. Between 1981 and 2005 for example, the share of blue-collar workers in the labor force fell from 31 to 24 percent and high-wage occupations expanded relatively rapidly. [15] Not only is the growth in the share of white collar workers with a college education a larger than the share of blue-collar workers with a college education, but a much higher proportion of the labor force has gone into professional and management occupations. Thus we would expect changes to labor force composition, in particular the increase in the relative size of the educated white-collar labor force, to account for some part of gap. But how much adjustment should be made?

The Bureau of Labor Statistics takes account of changes in labor force composition when undertaking its estimates of multifactor productivity.[16] Instead of simply entering hours as a measure of labor input they derive an estimated labor input

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[15] Source: 2007 Statistical Abstract of the United States Table 605, Occupations of the Employed by Selected Characteristics, http://www.census.gov/compendia/statab/tables/07s0605.xls
[16]

measure which accounts for changes in labor force quality. In undertaking this estimate they classify workers by a number of characteristics (experience, education and sex for males and, in addition, for females, number of children and marital status). They then weight the growth rates in the hours of different types of workers by their share in total compensation and they use a Tornquist chained index to undertake estimates of changes in the quality of labor inputs annually [17] This implies that over time their measure will capture **both** changes in the relative supplies of different types of workers in addition to changes in their relative wages. [18] All told over the period 1981 and 2005 this measure increased by 12 (log points). Since we are interested in changes in the skill levels of non-blue collar workers, for our purposes, this is not exactly what we want for two reasons. First, because it captures *both* changes in relative wages as well as different types of workers and second, because it takes account of changes in the composition of the entire labor force and thus includes the impact of changes in the composition of blue-collar workers as well as others. But we can use it to get a rough estimate of what we are interested in by making two adjustments to remove these effects.

The first adjustment requires an estimate of the impact of pure (price) changes in relative wages. This can be obtained by comparing the behavior of the real product blue-collar compensation with the behavior of the overall real product Employment Cost Index

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[17] …. the hours at work for each of 1,008 types of workers classified by their educational attainment, work experience and gender are aggregated using an annually chained (Tornqvist) index. The growth rate of the aggregate is therefore a weighted average of the growth rates of each type of worker where the weight assigned to a type of worker is its share of total labor compensation. The resulting aggregate measure of labor input accounts for both the increase in raw hours at work and changes in the skill composition (as measured by education and work experience) of the work force.

[18]

The weights can change from year to year because of shifts in the relative compensation of groups of workers. For example, the earnings of college graduates has increased faster than the earnings of high school graduates since the early 1970s. As s result the share of compensation and the weight on the rapidly growing hours of college graduates has increased and spurred labor composition growth in the 1980s"

Page 13, Chapter 2, in Labor Input and Labor Composition Growth. BLS

for all private industry. This index is ideal for capturing pure changes in relative wages since it is compiled using fixed weights. [19]

Between 1981 and 2005, deflated by the Price Deflator for the Business Sector this measure increased by 41 percent. *This is therefore the increase that blue-collar workers would have enjoyed had their compensation not fallen behind the wages of other workers.* Thus we can estimate that increased wage inequality can account for 41.3 – 34.5 i.e. 6.8 log points of the remaining gap.

We can use the 6.8 number as an estimate of the impact of changes captured by relative wage changes over the period. This suggests that 12.4 – 6.8 i.e. 5.6 log points could be ascribed to additional improvements in labor force composition. However, this number also includes the improvements in the composition of the blue-collar labor force as well. Accordingly I mark down this measure by 27.5 percent throughout the period to reflect the improvements in the composition of the blue-collar workforce. [20] This suggests that over the entire period .725 * 5.6 i.e. 4.1 log points can be ascribed to non-blue-collar improvements in labor force composition.

Taking account of the 4.1 point estimates for composition and 6.8 log points for changes in relative wages implies we can us now accounted for 34.5 + 4.1 + 6.8 log points i.e. 45.4 log points.

Top wage earners. There is a second measure productivity by the Bureau of Labor Statistics Office of Productivity and Technology that is known as Compensation per Hour. This measure covers the business sector but it differs from the Employment Cost

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[19] Another possibility that was considered was to compare the ECI with the ECES which uses a similar sample but reflects actual costs rather than fixed weights and therefore could indicate the effects of changes in composition. However there are inconsistencies in methodologies that make this inappropriate

[20] The share of blue collar workers has declined from 31 percent in 1981 to 24 percent in 2005. (CPS).

not only in not being a fixed weight index but also in its coverage and the type of compensation that it includes. In particular, it is more comprehensive because Hourly Compensation includes estimates of the value of labor services provided by business owners and others who set their own wages (i.e. CEOs) – a group that typically includes some very high wage earners and is excluded from the ECI measure. In addition, hourly compensation takes account of compensation such as tips, and, importantly, stock options that are not included in the ECI measure. In particular, the hourly compensation measures, includes the gains on so-called non-qualified stock options that are counted as compensation when they are exercised (not when they are paid). [21]   This more comprehensive compensation series, when deflated by the Business Sector Deflator increases by 48.7 log points between 1981 and 2006. It is particularly useful for completing the gap puzzle. On the one hand, since value added is divided between profits and labor compensation, the difference between output per hour and this series, indicates the share of the gap attributable to profits. It implies that increased profit share can account for 53.3 – 48.7 i.e. 4.7 log points of the Gap. On the other hand the difference between this comprehensive series and the 45.4 log points we have already estimates i.e. 3.3 log points can be used as indicating the increase in private sector compensation not captured in the Employment Cost Index.   It is likely that included in this difference are the very richest American wage earners, many of whom are Business proprietors and whose earnings may be particularly concentrated in stock options. Indeed, the correspondence between the robust growth in these earnings and the stock market boom in the late 1990s is particularly noteworthy. We will therefore talk loosely of this

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[21]See "The Employment Cost Index: what is it? *Monthly Labor Review,* September 2001, John W. Ruser.

difference as reflecting the increased earnings of the Super-Rich, although some poorer workers earn tips and others have earned wage income in the form of exercised stock options so it likely to overstate their share.

Is our estimate of the share going to the super rich reasonable? The CPS survey is top coded and the earnings of workers above the highest threshold are simply entered as greater than a particular amount – say $100,000 dollars. Accurate and comprehensive data for the super rich -- those earning in the top 1 percent or so can only be obtained from tax returns. These can be obtained from either tax or social security returns. However, even when referring only to wage incomes, these will not be strictly comparable to the corporate sector labor earnings data. First, the IRS data are for tax returns, rather than individuals and therefore will include married couples and could therefore by affected by decisions on filling status and the Social Security data will still include earnings of non-incorporated (self-employed) professionals. Another problem with both these data sources is that they may well be influenced by changes in the tax code that could affect the decision to incorporate.

It turns out however, that the estimate obtained above actually tracks those using tax returns to estimate the earnings of the top one percent fairly well since 1990 but not before. According to Saez and Piketty between 1990 and 2000 the share of the top 1 percent of tax filers in wage income increased from 8.99 to 12.33 an increase of 3.34 points. [22]According to our estimates over the same period the increase was 3.1 log points. In the 1980s, however our method fails to find a significant increase in Super-Rich incomes whereas they find an additional increase of 6.43 to 8.99 i.e. 2.47. Much of this change however, occurs between 1985 and 1988 and, as Reynolds has pointed out,

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[22]Saez and Pikkety Data available from http://elsa.berkeley.edu/~saez/TabFig2005prel.xls

may simply reflect a response to changes in the tax code which reduced the top marginal

tax bracket to 28 percent and thereby provided these taxpayers with an incentive to shift

their incomes from corporate to individual tax returns.[23]

Table 1 summarizes these estimates. Of the 48.2 log point gap 33.4 points are not

related to inequality. But the remaining 14.8 is associated with three distinctive forms.

6.8 log points is attributable to increased wage inequality as captured by the ECI, 3.3 log

points to the residual -- much of which accrues to the Super Rich and 4.7 log points to an

increase in profit share. As indicated in chart 3 we can track the timing of each form of

inequality. And what is interesting, is that they do not correspond.

Table 1: Accounting for the Wage-Output Gap 1981-2006 (Log Points)

Real ECI Blue-Collar Wages	**4.9**
Output-per Hour Business Sector	**53.3**
Gap	**48.2**
Technical Factors	
Benefits (Compensation vs. Wages).	**11.9**
Prices (Product vs. Consumer Prices)	**17.7**
Skills Improvements of White Collar Workers	**3.9**
Total	**33.5**
Inequality	
Wages	**6.8**
Super Rich	**3.4**
Profits	**4.6**
Total	**14.8**

Sources of Growth in Output per Hour 1981-2006

Log Point Scale 1981=0
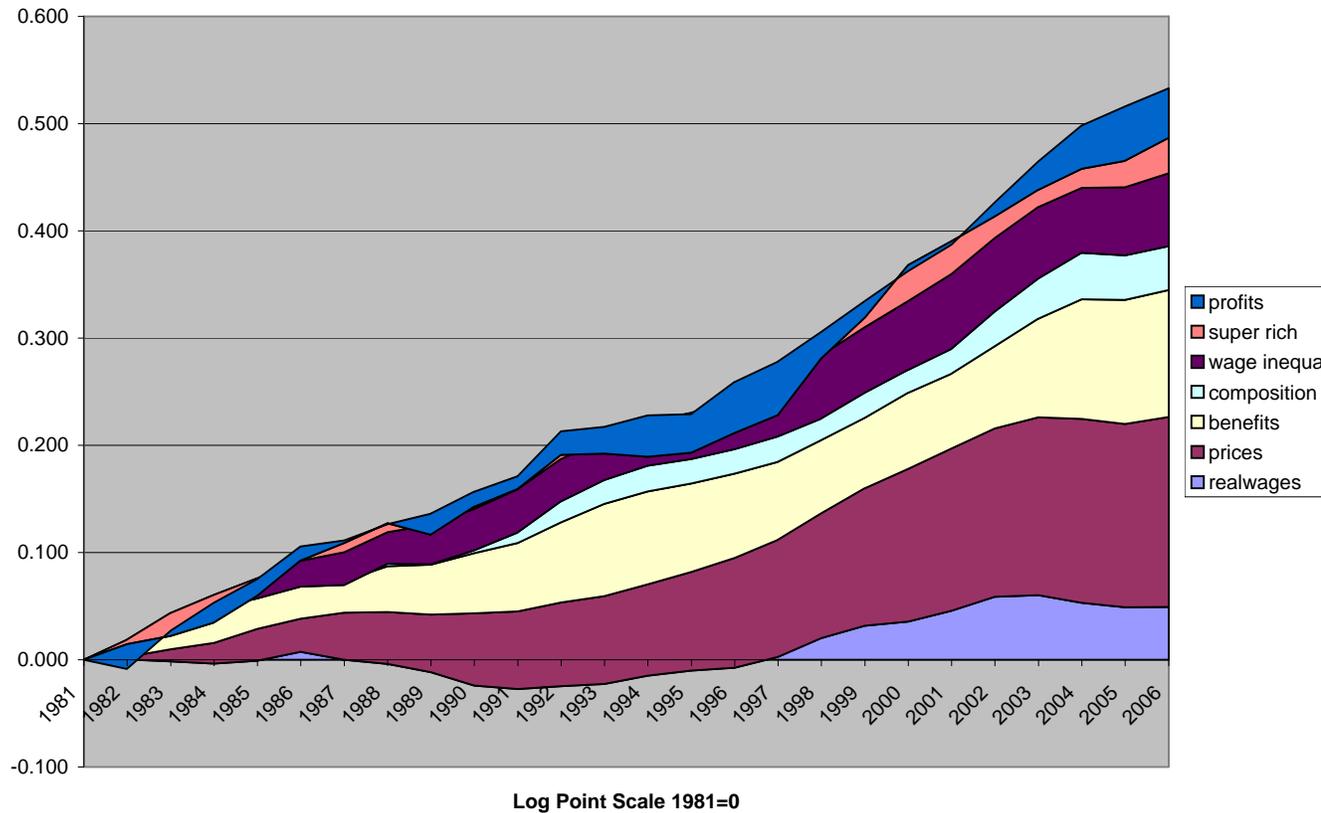
The biggest changes in impact of wage inequality took place in the 1980s (3.8 points) although there were also substantial increases 1990s. (2.4 points) By contrast, there has been almost no increase since 2000 – a remarkable result that we will explore in some depth. The story for profits is the opposite, more than the full impact occurred between 2000 and 2005 (5.2 points). The small increase in the 1980s was more than offset by a decline in the 1990s. The Super-Rich increases took place late in the second half of the 1990s particularly when the stock market boomed. Thus if globalization or any other single cause is the source of all the inequality, it would have to be operating in very

different ways over time, essentially affecting wage inequality only prior to 2000, super rich inequality in the 1990s and profits/wages inequality after 2000.

Section 2: Trade and Wages.

Wage inequality emerged in the United States at a time in when it had become more open to trade and many developing countries were liberalizing their trade regimes. It is not surprising therefore, that many observers argued that these developments were causally connected. Indeed, it was exactly what trade theory would predict. I will show in this section, however, in its most conventional form, the theory is actually a poor predictor of what has happened. The conventional theory is of potential help in the 1980s but for the most part fares badly. Especially intriguing is the experience since 2000 that will be the major focus of the new empirical work introduced in this section. *The key message is that recently, wage inequality of the type predicted by the theory has actually not increased and thus either trade has not had a major impact on wages or that it now exerts downward pressures on almost all wages and causes displacement of workers at all but the highest skill levels.*

Trade theory. The workhorse Hecksher-Ohlin model of international trade forecasts that trade patterns will reflect endowments of factors of production. The model's predictions are clearest when there are two factors of production, in this case skilled and unskilled labor. Since skilled labor will be relatively abundant in developed countries, these countries will have a comparative advantage in skill-intensive products and we would expect skill intensive goods and services to be relatively cheap. Similarly, since unskilled labor would be relatively abundant in developing countries, their comparative advantage should lie in unskilled-labor-intensive products and unskilled-

labor intensive goods will be relatively cheap. Opening up to trade will therefore lead developed countries to export skilled-labor-intensive products and import unskilled-labor intensive products and developing countries to do the reverse.

It follows that trade will raise the relative price of skill-intensive goods and services in developed countries and the relative price of unskilled labor-intensive goods and services in developing countries. These price changes provide the key link in this theory between trade and wages. Under competitive conditions, as shown by Stolper and Samuelson (1941) an increase in the relative price of a good will raise the return to the factor of production used relatively intensively in its production and lower the return to the factor used less intensively. [24]

Applying this theory to the US could in principle help to explain wage inequality since trade should raise the relative price of skilled-labor intensive goods and services in the US and boost skilled-labor wages and reduce unskilled-labor wages. Similar effects would be expected from trade liberalization in the US and/or the developing countries: lower trade barriers in the US will reduce the relative domestic price of unskilled labor-intensive products that the US imports and thus reduce the relative wages of unskilled US workers. Similarly, trade liberalization or uniform growth in the developing countries will raise the world (and US) relative price of skill-intensive products and thus also increase the return to skills and lower the return to unskilled labor in the United States.

The theory is based on the assumption that factors of production are completely mobile within each economy. This means that in the long run, wage rates of workers with given skills must be the same throughout the entire economy. This is a very powerful

[24] Stolper Wolfgang and Paul A. Samuelson 1941 "Protection and Real Wages" *Review of Economic Studies* 9 No 1 November pp 58-73.

assumption because it implies that even if only a small share of the economy participates

directly in trade, the effects of trade will be felt throughout the entire economy, even in

sectors producing goods and services that are not traded internationally. [25] If the classical

Stolper-Samuelson effects are operative therefore we would expect to see inequality

along skill lines throughout the economy. It is also remarkable this is a theory that

suggests "only traded goods (and services) prices matter." While changes in relative

factor supplies will affect the composition of output, unless these are large enough to

affect world prices, they will leave factor prices unaffected.

      Another key assumption, of which more later is that specialization is incomplete,

i.e. that skilled- and unskilled- labor intensive products are both still produced in the US.

When specialization is incomplete, in fact, trade is a substitute for and replicates the

international movement of factors of production. And under the assumption of similar

technologies worldwide, just as the free movement of workers would drive wages to

equality so in this framework trade leads to global factor price equalization. [26]But trade

and factor movements may not be complete substitutes if there is specialization. In this

case, the connection between product and factor prices breaks down. Indeed under such

circumstances, workers in the United States would only be employed in the skilled-labor

intensive sector, and their wages would unaffected by drops in the relative price of the

unskilled-labor intensive product. In this case, domestic demand and relative factor

supplies would influence factor prices.

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[25] If factors are not mobile, however, then the effects of trade on wages could be felt only in the sectors to which the factors are confined. In this case, "specific" factors used in export sectors gain while those in import-competing sectors lose and the degree and nature to which a sector is exposed to trade could matter. This is the so-called specific factors model of trade. For an exposition see Krugman and Obsfeld.
[26] See Samuelson, Paul A. "International Trade and the Equalization of Factor Prices" *Economic Journal* 58, No. 230 (June) 163-84..

Does this theory really do a good job in explaining increasing US wage inequality? The answer is that it had some degree of success in the 1980s but does not work very well when the past quarter century is viewed as a whole. Judged either on the basis of quantity or price evidence, the correlation between increased trade and increased wage inequality is poor.

The Timing of Wage Inequality. The previous section estimated that, between 1981 and 2006, wage inequality accounted for 6.8 log percent of the gap between blue collar product compensation and output per worker. This, in turn, was associated with an 12 percent decline in the compensation of blue-collar workers relative to white collar workers. But the timing of the movement is noteworthy: 3.8 points of the 6.8 point gap occurred in the 1980s, 2.6 points in the 1990s and just 0.4 points in the period since 2000. Similarly of the 12 percentage point decline in relative blue-collar compensation in the ECI, 9 percentage points took place between 1980 and 1990, 3 percentage points between 1990 and 2000 and none after 2000; and of the 25 percent rise in the college-high school premium, 15 percentage points took place in the 1980s and 10 percentage points in the 1990s and none since 2000. Thus the story of wage inequality over the past quarter-century is best told in three phases, and while reversals were rare, in each successive period, the increases in wage inequality were more moderate

In the 1980s, pervasive increases in inequality are evident when workers are grouped by percentiles, education, occupation, experience and in the residuals that remain (so-called within group inequality) once experience, education and demographic characteristics are controlled for. [27] In the 90s, increasing wage inequality was more moderate and more subtle. Workers at the bottom of the earnings distribution were not

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[27] EPI State of Working America 2006/2007 page 141,

particularly disadvantaged. The difference between the decades is captured by comparing earnings in the tenth, fiftieth and 90th percentiles. In the 1980s the story was inequality across the board with the 50-10 and 90-50 ratios both increasing rapidly. But in the 1990s the story is basically 90-50; if anything the 50-10 gap has narrowed.[28] The 1990s puzzle is about the increases at the top end rather than inequality across the board.[29] And whether within-group inequality increased at all in the 1990s is still a matter of some controversy.[30] Strikingly, since the late 1990s, while there are additional increases in the 90/50 ratios, most other measures of wage inequality show little change.

Consider for example, the occupational compensation series in the employment cost index (ECI) reported in the Table below. Between 1999 and 2005, nominal compensation for both blue and white collar workers both increased by 22 log points. This was also the case for the major upper-income occupational sub-categories of Management and Professional Workers as well as the major categories of blue collar workers, both machine operators and handlers and laborers. Only service occupations lagged behind with increases of 2 percent less than the others.

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[28] According to Gottschalk and Danziger op cit "wage growth during the recovery of the 90s was spread more evenly throughout the distribution than it was during the 1980s recovery. For females the line is nearly flat with wage growth between 10 and 15 percent for every point between the 10th and the 80th percentile. For males wages rose most at the bottom and at the top of the distribution – by 21 [percent at the 5th percentile and by 27 percent at the 95th percentiles. Wage growth was between 10 and 17 percent from the 10th through the 90th percentile"

[29] Doing this is problematic because the surveys which have been used for wage behavior have typically "top coded" earnings at the top of the income distribution. For confidentiality and other reasons instead of explicitly entering the highest earnings they have simply been marked down as greater than a particular level, for example $100,000. Since these levels have changed over time, this makes the data for the very highest wages especially unreliable

[30] See Thomas Lemieux "Increasing Residual Wage Inequality: Composition Effects, Noisy Data and Rising Demand for Skill?" *American Economic Review* June 2006 Vol 96(3) pp 461-498.

Employment Cost Index December 1980 - December 2006
(log scale 2005 = 0)

	2002 employment share	Dec-80	Dec-85	Dec-90	Dec-98	Dec-99	Dec-00	Dec-05	Dec-06
Private Industry All Workers		-1.02	-0.73	-0.52	-0.25	-0.22	-0.18	0.00	0.031
White Collar Occupations	0.56	-1.07	-0.76	-0.54	-0.26	-0.22	-0.18	0.00	0.032
Management, Business and Financial	0.15		-0.76	-0.55	-0.27	-0.22	-0.18	0.00	0.034
Professional and related	0.16		-0.76	-0.52	-0.25	-0.22	-0.18	0.00	0.038
Sales	0.12		-0.70	-0.52	-0.23	-0.21	-0.16	0.00	0.023
Administrative Support incl. clerical	0.13		-0.77	-0.50	-0.25	-0.22	-0.18	0.00	0.033
Blue Collar Occupations	0.30	-0.95	-0.69	-0.50	-0.25	-0.22	-0.18	0.00	0.028
Machine Operators assemblers and inspectors			-0.70	-0.50	-0.25	-0.22	-0.18	0.00	
Handlers, and laborers			-0.71	-0.52	-0.26	-0.22	-0.18	0.00	
Service Occupations	0.14	-0.99	-0.68	-0.48	-0.23	-0.20	-0.16	0.00	0.031

The industry data in the Table below provide a similar impression with labor compensation in goods industries (up 23 log points) growing slightly faster than labor compensation in services industries (22 log points). Remarkably given the major decline in manufacturing employment, manufacturing compensation growth was relatively strong. Even more remarkably, perhaps, given the widespread views that globalization has reduced worker bargaining power, was the very strong growth the compensation of *unionized* workers in manufacturing – up 26 log points -- although union members also did relatively better in service providing industries. Indeed, the raises received by blue-collar manufacturing workers were similar to those received by workers in health, education and finance services all of whom also enjoyed rapid increases. By contrast,

perhaps because of a failure to raise minimum wages, the weakest performance was in

retail trade – the quintessential non-traded goods sector.

Employment Cost Index December 1998 - December 2006 Compensation
(log scale 2005 = 0)

	12/1/1998	12/1/1999	12/1/2000	12/1/2005	12/1/2006
Goods Industries	-0.27	-0.23	-0.19	0.00	0.025
Blue-Collar Goods	-0.26	-0.22	-0.18	0.00	0.026
Manufacturing	-0.27	-0.23	-0.19	0.00	0.018
Construction	-0.26	-0.22	-0.17	0.00	0.035
Service Industries	-0.25	-0.22	-0.17	0.00	0.033
Blue collar Service	-0.25	-0.21	-0.18	0.00	0.031
Retail Trade	-0.22	-0.19	-0.15	0.00	0.027
Wholesale Trade	-0.25	-0.21	-0.17	0.00	0.029
Health Services	-0.28	-0.25	-0.20	0.00	0.040
Educational Services	-0.28	-0.25	-0.20	0.00	0.041
Finance, Insurance Real Estate	-0.30	-0.26	-0.21	0.00	0.025
Union	-0.28	-0.25	-0.21	0.00	0.030
Blue-Collar Occupations	-0.28	-0.25	-0.21	0.00	0.025
Goods Producing	-0.29	-0.26	-0.21	0.00	0.022
Manufacturing	-0.29	-0.26	-0.22	0.00	0.008
Blue_collar Manufacturing	-0.28	-0.25	-0.21	0.00	0.007
Service Providing	-0.26	-0.24	-0.21	0.00	0.035
Non-Union	-0.25	-0.22	-0.17	0.00	0.031
Blue_collar Occupations	-0.24	-0.20	-0.16	0.00	0.030
Goods Producing	-0.26	-0.23	-0.19	0.00	0.025
Manufacturing	-0.26	-0.22	-0.19	0.00	0.021
Blue-Collar Occupations	-0.24	-0.21	-0.17	0.00	0.027
Service Providing Occupations	-0.25	-0.21	-0.17	0.00	0.033

Correlations. If the paradigm is that "only traded goods prices" matter, we

should be able to correlate the movements of relative wages with price movements or

with trade flows that can be used as a proxy for price movements. [31] But as a review of

the experience of the past twenty five years suggests, the timing of wage inequality is not

what might have been expected if the increased trade penetration in the US economy

inevitably gives rise to increased wage inequality.

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[31] The justification for using the net factor content of trade as a proxy for price changes is given by
Deardorff Alan V. and Robert W. Staiger (1988) 'An Interpretation of the Factor Content of Trade"
Journal of International Economics 24 no.1/2 (Feb) 93-107. See also Krugman, Paul R. (1995) Growing
World Trade: Causes and Consequences *Brookings Papers on Economic Activity* no 1: 327-77.

Between 1947 and 1970, the US economy remained fairly closed with the sum of exports plus imports equal to around 10 percent of GDP. Over the decade of the 1970s, however, the share of trade in GDP doubled, reaching 20.6 percent of GDP by 1980. In part this reflected the impact of the two large oil price increases which boosted US import costs and several dollar devaluations which helped generate the export earnings required to pay for them. The price data for the 70s also suggest increased global pressures. In the According to Leamer (1999) relative prices of textiles and apparel-- the paradigmatic unskilled-labor intensive goods fell by 30 percent.[32] *Yet the 70s were not a period with rising wage inequality.* If anything college premiums fell and towards the end of the decade and wage growth was strong, particularly for unionized workers.

In the 1980s, even though the trade shares did not increase, the composition of imports changed significantly, as oil prices declined, and manufactured imports grew rapidly. Charting the ratio of exports plus non-oil imports suggests that the trend towards increased openness continued in the 1980s but still by not as much as in the 1970s. Between 1980 and 1990, for example the ratio of non-oil imports of goods to GDP increased from 6.1 to 7.5 percent. This growth in the 80s was evenly split between imports from developing and developed countries: Imports from non-OPEC developing countries increased from 2.2 to 2.8 percent of GDP, while imports from industrial countries increased from 4.6 to 5.2 percent. While the import penetration growth in the 1980s was not insignificant, therefore it was considerably smaller than in the 70s or the 90s. For the 1980s, there is some dispute over the price evidence: Bhagwati (1991)

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[32] Leamer, Edward E. 1998. "In Search of Stolper-Samueson Linkages between international trade and lower wages" In *Imports, exports and the American Worker* ed Susan Collins, 141-214. Washington DC: Brookings Institution. Baldwin, Robert E. and Glen G. Cain, 1997 Shifts in U.S. Relative Wages: The Role of trade, technology, and factor endowments. NBER Working Paper no. 5934, Cambridge NBER.

Lawrence and Slaughter (1993) and Leamer (1998) and Baldwin and Cain (1997) found little evidence that unskilled- labor intensive products declined in relative price.[33] Sachs and Shatz (1994) found some evidence but only after computer prices were dropped from their sample. [3435] . [36] So in this period virtually all measures of wage inequality show substantial increases but, compared with the 70s or 90s, the trade pressures appear to be relatively modest.

The 90s were a second major period of increased opening, with imports of goods rising as a share of GDP from 8.6 to 12.5 percent. This was not as large as the 70s, but this time the increase was concentrated in imports from developing countries (non-OPEC merchandise imports were up from 2.8 to 5.3 percent of GDP a rise that was almost double that of the growth in imports from industrial countries (which increased from 5.2 to 6.5 percent). Kreuger (1997) found that the relative prices of skill-intensive products increased between 1989 and 1994. Slaughter (2000) pointed out that his sample included only a third of manufacturing and found that when all manufacturing prices were sampled, Kreuger's result was reversed. Yet, over this period wage inequality continued to rise, though at a smaller pace than in the 80s, and mainly due to rapid wage growth of the highest wage earners.

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[33] Bhagwati, Jagdish (1991) "Free Traders and free immigrationists: Strangers or friends?" Russell Sage Foundation Working Papers, New York: Russell Sage Foundation. Kreuger, Alan B. 1997 Labor market shifts and the price puzzle revisited. NBER Working Paper no. 5924, Cambridge Mass: National Bureau of Economic Research.

[34] An excellent survey is provided by Slaughter (2000) Matthew J. Slaughter What Are the Results of Product-Price Studies in Robert C Feenstra (ed) *The Impact of International Trade on Wages*, NBER report, Chicago: University of Chicago Press 2000

[35] Sachs, Jeffrey D and Howard Shatz, 1994 "Trade and jobs in U.S. Manufacturing" *Brookings Papers on Economic Activity* no 1: 1 -84. Feenstra Robert C. and Gordon H. Hanson "The impact of outsourcing and high-technology capital on wages: Estimates for the United States, 1979 -1990." *Quarterly Journal of Economics,* 114: 907-40.

[36] James Harrigan "International Trade and American Wages in General Equilbrium 1967-1995".in Robert C Feenstra (ed) *The Impact of International Trade on Wages*, NBER report, Chicago: University of Chicago Press 2000 pp 171-196.

Since 1989, the Bureau of Labor Statistics has reported separate import price data for manufactured goods from developed and developing countries. The ratio of these prices could serve as a proxy for the relative price of unskilled-labor intensive goods. As shown in the Chart below there is a substantial downward trend in the relative prices of manufactured goods from developing countries. Since 1990, the relative prices of imported manufactured goods have been declining, both with respect to US nonagricultural export prices and with respect to US imports from developed countries. So this evidence may be of some help in explaining some of the equality of the 1990s. But it also creates a puzzle for the period after 2000 in which wage inequality failed to show significant increases.

Ratio of Manufactured Goods Import Prices

Source:BLS Import Price Dat

Since 2000, the share of imports from non-OPEC–developing-countries has also

continued to grow rapidly, while the share of imports from developed countries has

actually fallen. By 2006, the value of imports from developing countries actually passed

that of industrial countries. Yet this has been a period of slow wage growth for almost all

workers with very little additional inequality.

Controlling for other Causes. Finding some association in timing between trade

volumes and/or prices and relative wages is of course only a starting point. The real

challenge lies in coming up with more precise estimates of the effects of trade and in

isolating within a general equilibrium framework with the numerous other factors that

could influence relative wages. These include technological change, relative supplies of

skilled and unskilled workers, and changes in final product demand. Three distinct

approaches have been used. One is to measure the net factor content of trade, a second to use econometric techniques to control for other variables and isolate the relative wage changes mandated by price changes and the third is to use simulation models to explore the effects of reducing trade barriers.

All three methods have been used to study wage inequality until the mid 1990s. Many studies find some, but not a dominant role, for trade. William Cline (1997) provided an extensive summary of these studies and concludes that "a reasonable estimate based on the literature would be that international influences contributed about 20 percent of the rising wage inequality in the 1980s."[37] Most studies conclude that a much higher weight should be attributed to skill-biased technical change".[38]

All in all therefore, if I combine the estimate that blue-white collar wage inequality accounts for 6.8 log points of the blue-collar wage – productivity gap with estimates that "trade" accounted for about twenty percent of the increased premium on skill wages, *we can conclude that without the impact of trade on wage inequality real blue collar workers would have been 1.4 percent higher but almost all this took place prior to 2000.*

The Paradox of recent wage behavior. Given the trade pressures, the comparative stability of relative wages at broad skill levels since 1998 and the stability of relative wages of the least skilled workers since 1993 are particularly noteworthy. In particular, this has been a period with rapid penetration of imports from developing countries. It seems reasonable to assume that these imports are particularly intensive in

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[37] William R. Cline *Trade and Income Distribution* Washington DC: Institute for International Economics 1997 (page 144). In his own work based on simulations Cline himself concludes that "a third of net increase in the skilled/unskilled ratio from 1973-93 was attributable to trade and an additional one-ninth was attributable to immigration." (page145)
[38] For an excellent summary see Cline Table 2.3

the use of unskilled workers and thus their expansion would have a particularly adverse impact on the wages of the least skilled American workers. Yet these workers have not actually fared particularly poorly. But there is a way of explaining this outcome and it suggests a surprising paradox. *Trade may cause less incremental inequality as it expands.*

Adrian Wood (1995) argued that the early effects of trade on the wages of unskilled workers were larger than anyone else because the products that were displaced were far more unskilled labor intensive than others had estimated. [39]His insight also led him, presciently, to reject the forecasts of those who argued that the impact of trade on the relative wages of unskilled workers in developed countries would become increasingly pronounced over time. (e.g Sachs and Shatz (1994) Slaughter (1994) [40] The process Woods envisaged works like this: At the start, "Stolper-Samuelson" effects prevail because imports and domestic products are perfect substitutes and the expansion of developing country exports has adverse effects on the wages of unskilled workers in the US. But over time, the production of the most unskilled-labor intensive products moves abroad, and eventually the US economy becomes fully specialized. Technically, the economy moves out of the cone of diversification and no longer produces unskilled-labor intensive goods. The strong link between trade prices and factor prices is broken. If there are additional declines in the relative price of imported unskilled-labor intensive goods and services US consumers gain but relative US factor prices are unaffected.

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[39] For a critique see Robert Z Lawrence *Single World, Divided Nations*. Brookings Institution

[40] Adrian Wood wrote "I do not expect unskilled workers in developed countries to be much hurt by even major new entry into the world market for low-skill intensive manufacturers, simply because these goods are no longer produced in developed countries. The entry of China and India, pushing down the world prices of these goods, will benefit developed-country workers, skilled and unskilled alike." Adrian Wood "How Trade Hurt Unskilled Workers" *Journal of Economic Perspectives* Volume 9, Number 3 –Summer 1995 pp 57-80. page 77,

This process of specialization could of course continue and the economy could become increasingly specialized as foreign countries increase the range of products in which they can compete. This in turn could eliminate additional US production. [41] Nonetheless, since the activities that are displaced are increasingly more skill-labor intensive, the impact of each additional expansion of trade on relative wage inequality diminishes since the ratio of skilled to unskilled workers that are displaced and have to be absorbed into the labor force increases.

Another variant of adaptation to international competition is to produce the same products using different production techniques. A key assumption behind the application of Stolper-Samuelson is the absence of factor intensity reversals. i.e. that we talk of goods as skilled-labor and unskilled-labor intensive. But it is possible that in the US firms could be driven by competition to use capital and skilled-labor intensive production methods. Once this occurs, in the US, competition from developing countries might not have a particularly adverse impact on unskilled labor.

In addition to complete specialization, a considerable amount of trade also occurs *within* industries -- so-called intra-industry trade -- in which the US imports and exports similar types of differentiated goods and services. The expansion of this type of trade too may not involve increased wage inequality because simultaneously imports and exports of the same kinds of products expand; even if imports do displace domestic goods and services, the skill-mix of the displacement could resemble that of the rest of the economy.

Trade in high-wage products. Estimates at reasonably high levels of dis-aggregation suggest that by and large US trade occurs in goods that are produced using

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[41] For a description of a model of this type involving outsourcing see Robert C. Feenstra (2004) Advanced *International Trade: Theory and Evidence* Princeton: Princeton University Press Chapter 4.

US workers who earn wages that are higher than the average. The 2005 Occupational

Earnings Survey (OES) reports earnings by occupation and industry at the level of four

digit NAIC industry categories.[42] For each industry, we can obtain earnings at the tenth,

25th, 50th, 75th and 90th percentiles. These earnings have been matched and weighted

using trade data by 4-digit NAIC trade values which are available from 1997 through

2005. Data are reported for total US manufactured imports and exports as well as imports

from China and Mexico. Also reported are the earnings distributions for manufacturing as

well as the entire US economy again based on the OES.

As reported in the Table below, this analysis confirms that US international trade

is concentrated in US manufacturing industries that pay high wages. In 2005, mean

earnings in manufacturing as a whole were just 8 percent above the national average.

However, earnings weighted by manufactured exports and imports were 22 and 18

percent above the national average respectively. Mexico import weighted earnings match

those for manufacturing manufactured goods. Chinese 2005 import-weighted earnings are

lower than imports in general but still 14 percent above the national earnings average and

10 percent above the manufacturing average. The analysis also indicates that China has

been upgrading its imports over time. Using 1997 Chinese import weights generates

mean earnings of 18.20 per hour, basically equal to the national average earnings of

18.21 per hour in 2005. This suggests that if trade from any of these sources causes

displacement it is likely to be of workers with relatively high wages.

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[42] "The OES survey provides earnings on an hourly and annual basis, including mean and median earnings for all areas--national, State, and MSAs--as well as 10th, 25th, 75th, and 90th percentile wage rate estimates for the nation. source: http://www.bls.gov/oes/oes_ques.htm#Ques28

2005 Weighted Occupation Earnings Distribution

	mean	10th	25th	median	75th	90th
			Percentile			
man exports 2005 weights	22.26	10.36	13.83	19.32	27.31	37.89
man imports 2005 weights	21.57	10.09	13.50	18.75	26.18	36.39
china 2005 man Import weights	20.85	9.31	12.19	17.48	25.61	36.56
Manufacturing 2005	18.87	8.7	11.07	15.31	22.43	33.62
USA 2005	18.21	7.26	9.46	14.15	22.2	33.74
Ratio to National Earnings.						
Manufacturing Exports	122	143	146	137	123	112
Manufacturing Imports	118	139	143	133	118	108
Mexico 2004	118	139	143	132	119	108
China 2005	114	128	129	124	115	108
Manufacturing Total	104	120	117	108	101	100
Economy Wide Total	100	100	100	100	100	100

Exploring the earnings distribution within industries in greater detail is also illuminating. Manufacturing wages are not only higher on average than wages in the rest of the economy but they are more concentrated in the middle of the earnings distribution. [43]Workers at the bottom of the earnings distribution in manufacturing earn substantially more than those in a similar position in the national distribution. Indeed those in the lowest 10th percentile in manufacturing earn 20 percent more than workers in the corresponding national percentile. This manufacturing premium declines monotonically as percentiles increase with workers in the 90th percentile in manufacturing earning the same as those in the 90th percentile nationally.

An even stronger distributional pattern with these characteristics is evident with respect to manufactured goods that are traded. 2005 Export- and Import-weighted earnings in the 10th percentile are 43 and 39 percent above the national average

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[43] This is consistent with the views of Yellen (2006).

respectively. The premium diminishes in higher percentiles to 12 and 8 percent in the 90th percentile for exports and import respectively. Again on average the US manufacturing workers employed in industries that are most engaged in international competition earn relatively high wages at all percentiles with the highest percentage differences at the lowest percentiles. In 2005 the median US wage rate was 14.15 an hour. The wage distributions here suggest that almost 70 percent of all workers involved in exports or competing with imports earn wages that are above or at least close to the median level. All in all, therefore, this exercise confirms that when produced in the US, the goods the US imports pay relatively high wages to workers earning median wages or higher.

    Displacement. Thus far we have characterized the wage mix of employment in the US, but what have the effects of trade been in changing that mix? Following the methodology of Baily and Lawrence (2004), I have undertaken an analysis which, taken productivity growth as given, allows me to attribute employment changes to changes in trade and domestic demand for 3 digit NAIC industries between 2000 and 2005. I then use the 2003 OES data to estimate the average wages and the distribution of wages of the jobs that were lost due to trade over this period. Over this period the jobs lost due to trade paid average wages that were 13.7 percent above the national average and 9 percent above the national average. *A rough estimate suggests that two thirds of the jobs lost due to trade paid more than the national average wage*. Clearly, these numbers indicate that displacement due to trade should not be expected to exert a disproportionate downward influence on the relative wages of less-skilled workers and instead could be some of the explanation for the relatively weak performance of wages in the middle.

A similar analysis has been undertaken by Economists at the Economic Policy Institute.[44] They estimate that job displacement due to trade between 2000 and 2004 was 1.9 million -- about the same as the 1.8 million between 1979 and 1989. But the composition was very different. In particular in the 1980s 12.2 percent of those displaced were college graduates, and 28 percent had less than high school educations. 19.7 percent had jobs in wage percentiles above 75 percent, while 37.9 percent were in the lowest quintile. Displacement since 2000 is very different: 21.3 percent of the displaced are college graduates, 31.9 percent are in jobs that would have fallen above the 75th wage percentile in 1979 and just 14.2 percent in the lowest quintile. Particularly noteworthy is that the composition of the displacement is remarkably similar to the overall composition of employment generally.

In the 1980s it was possible, using input-output analysis and other data at fairly high levels of aggregation to detect trade displacement of skilled and unskilled workers in proportions that were significantly different from the labor force in general. In particular, displacement due to trade was relatively concentrated among unskilled workers. But in both the 90s and after 2000 this has not been the case. *The net factor content of trade looks increasingly like the factor content of the US economy in general.*

Nonetheless, there is also evidence that by undertaking the analysis at a reasonably high level of disaggregation could miss an important part of the story. The fact that many of the products imported from developing countries are no longer produced in the US.

There is empirical support for the view that products imported from developing countries for example are qualitatively different from those made in the United States or

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[44] Mishel et. al (ed) *The State of Working America 2006/2007* Table 3.30 page 175

imported from developed countries. Peter Schott (2003) for example has studied highly disaggregated unit value data and concluded that while the US increasingly sources the same products from both high and low wage countries, the unit values within products varied systematically with exporter relative factor endowments and exporter production techniques. He concludes "These facts reject factor proportions specialization across products but are consistent with such specialization within products"[45] Similarly Bernard et. al (2003) show how US firms are able to survive in labor-intensive sectors by adopting more capital- intensive methods and using more technologically sophisticated production techniques. [46] Thus both the notion of complete specialization and the ideas of factor-intensity reversals are apparent in the disaggregated data.

The idea that a more nuanced picture emerges with more disaggregated data is supported by the following analysis. See Table below. I collected data from 385 six-digit industries from the 2002 census and trade values for 2006 and 1997. Average wages for each industry was calculated for 20002 and the industries were ranked by average wage. In 2002 the median manufacturing industry had a wage of 15.69 per hour and the average wage in manufacturing was 16.55 cents. When the six-digit industry average wages are weighted by 2006 import shares the result is an average wage of $19.72 -- 19 percent above the manufacturing average. This again suggests that manufactured imports into the US are skewed towards industries paying relatively high wages. This might have been expected for imports from *developed* countries and in fact, using the shares of imports from developed countries produces an average wage of $21.35 -- 29 percent above the

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[45] Peter K Schott (2003) Across Product Versus Within-Product Specialization in International Trade. Yale University (mimeo) October

[46] Bernard, Andrew., J. Bradford Jensen and Peter K. Schott (2003) " Survival of the Best Fit: Competition from Low_Wage Countries and the (uneven) Growth of U.S. Manufacturing Firms" Institute for International Economics Working Paper 03-3, Washington DC.

manufacturing average in 2006. But even using the weighted of import shares from developing countries produces an average wage of $17.42 -- five percent higher than the $16.55 average for manufacturing. Weighting by the 2006 shares of imports from China, however, yields an average of 15.14 which is nine percent lower than the manufacturing average. So in contrast to the more aggregated estimates, at this more disaggregated level it does appear that imports from China are in relatively low wage industries.

It is also evident that imports from all sources are increasing relatively rapidly in higher wage sectors, since in all cases the use of 2006 imports as weights produces higher averages than those for 1997. The acceleration has been largest in the case of China up from 80 to 91 percent of the manufacturing average but is also evident in the case of imports from all developing countries –up from 0.99 to 1. 05 percent of average US wages and from developed countries up from 1.25 to 1.27. All in all, the analysis suggests that imports into the US overall compete with US industries paying higher than average wages.

Estimates of hourly production worker wage distribution 2002 wages $ per hour

	manimp97	manm2006	Dev 97	Dev06	LDC97	LDC06	China97	China06	manu
25th Percentile	13.55	13.67	15.48	15.64	11.31	12.53	9.95	12.49	
50th Percentile	18.38	19.06	20.06	20.10	14.00	15.57	12.68	13.47	
75th Percentile	22.62	23.59	24.11	24.73	20.55	20.55	14.67	19.08	
90th Percentile	32.11	32.11	33.15	33.15	23.62	28.07	19.52	20.55	
mean	19.35	19.72	20.77	21.35	16.37	17.42	13.28	15.14	
%manmean	1.17	1.19	1.25	1.29	0.99	1.05	0.80	0.91	

source: census and itc.

In sum, the evidence here confirms that the US has responded in part to import competition from developing countries either by no longer producing unskilled-labor intensive goods and services or by adopting more skill-intensive production methods. At the same time, the manufactured goods the US imports from both developed and especially developing countries have become more sophisticated. The result is that when produced in the United States, imported products are not relatively intensive in unskilled labor. This means that lower imported prices of goods from developing countries do not generally increase US wage inequality because either they simply provide benefits to US consumers or they displace US workers with skills that are similar to those in the rest of the workforce.

This analysis not only helps to explain why the rapid import penetration by developing countries has not been associated with unusually weak wages among the least skilled Americans. It also suggests that unlike the earlier period trade has not been reinforcing the effects of immigration of these workers wages. Most immigrants to the United States have less than a high school education and earn significantly less than the median wage distribution. As noted by George Borjas, according to the 2000 Census 32 percent of the immigrant population had not completed 12 years of schooling as compared to just 11 percent of the native population. [47] Borjas also estimates that immigrants comprise around 25 percent of the workers in each of the bottom two deciles. If immigration was having a dominant impact it should show up primarily in the gap between the relatively unskilled and the most unskilled workers i.e. between high-school and less than high school and in the 50/10 ratio widening. The declining inequality in the

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[47] George Borjas, "Comments" in James J. Heckman and Alan B. Kreuger, *Inequality in America: What Role for Human Capital Policies?"* Cambridge MIT Press 2003

1990s with respect to the earnings of the poorest workers is particularly noteworthy, therefore, both for those concerned with immigration and about import competition from developing countries.

Ratio of Annual Earnings: High-School Dropouts/High School Graduates.

Ratio of Annual Earnings of Drop Outs to High School Graduates
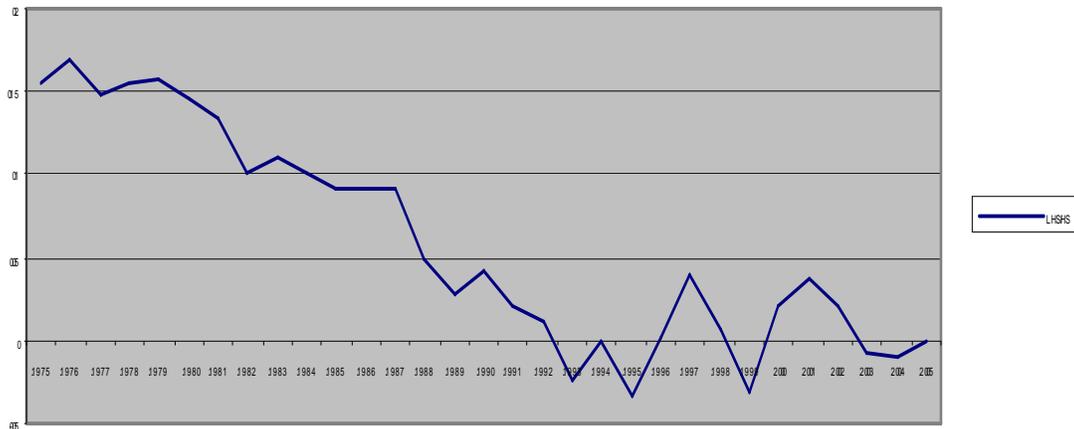
Section 3: Class Inequality.

Is seems fair to say that America is driven more by greed than envy. Americans appear have a considerable tolerance for income inequality in part because they believe, notwithstanding evidence to the contrary that the US economy provides for a considerable amount of mobility and those who are poor today will be rich tomorrow. In addition, according to Edward Glaeser the failure of the welfare state in the US to expand to the degree in has in Europe is attributable to America's political institutions and its ethnic diversity. [48] Nonetheless, Americans do care deeply about their own economic wellbeing, and in this respect, for most of them, the period between 2000 and 2006 has been deeply disappointing. As measured by the employment cost index, private real

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[48] See Edward L Glaeser "Inequality" Harvard Institute of Economic Research, Discussion Paper Number 2078 July 2005. and Alesina, Alberto and Edward Glaeser (2004) *Fighting Poverty in the US and Europe: A World of Difference* Oxford: Oxford University Press.

wages and real compensation are up by just 2.1 and 5.6 percent respectively. Particularly striking has been the fact that the wage growth of workers at all but the very highest levels of skill and education has been equally poor. For most blue-collar workers, the recent weak wage growth continued a longer run trend of slow real wage increases, that had been interrupted by the second half of the 1990s, but for workers with a college education, the recent slow real wage growth is a relatively new experience because these workers had seen their real pay rising steadily between 1980 and 2000. It is therefore not surprising that real wages and incomes have become a matter of great concern.

Since 2000, the big story is the shift in income shares from labor to capital. The estimates derived in section 1 suggest that had income gains been divided in proportion to shares in 2000, real compensation of blue collar workers which actually increased by 4.9 percent would have been higher by another 5.2 percent. Given that white collar compensation increased at about the same pace as blue-collar compensation by 5.4 percent, a similar improvement would have occurred in white collar compensation. The aggregate data are certainly compatible with the view that global forces have induced a structural change in the income shares of labor and capital. But there are also reasons to be skeptical that this effect reflects such forces.

First, while the US economy has been globalizing for a long time, the share of labor compensation in income has been relatively stable. [49] After rising steadily between 1950 and the late 1960s the share has basically fluctuated within a fairly narrow range of around sixty six percent (averaging 65.6 percent between 1970 and 1999). Globalization in the US increased most dramatically over the 70s –the years in which labor's share in income increased significantly, and taking the period 1970 through 2006 as a whole,

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[49] A similar conclusion is reached by Ian Dew-Baker and Robert Gordon op. cit.

there is no evidence of a major trend in either direction. It is only in the period since

2000, that labor's share has declined: (In the first three quarters of 2006, the

compensation share was relatively low – 63.95 percent -- about 2.2 percent below its

peak share in 2001 and 1.6 percent below the long run average.)

Compensation Share in National Income

If global forces are responsible for the recent shift, the character of the recent

wage pressures has to be very different from that prevailing earlier. One possibility is that

recent wage behavior differs because trade pressures have expanded up to higher levels

of the wage distribution. One source could be the India effect: that whereas earlier trade

pressures affected only unskilled workers, trade now puts downward pressures on the

earnings of workers of all kinds because of the increased ability to offshore services

electronically. But the evidence is that while they have grown rapidly the scale of these

activities is too small and concentrated at the top end (in software) to have already had

such a significant impact. To be sure the potential threat of outsourcing could reduce wages but again this threat is likely to be plausible thus far for a limited number of occupations – such as software programmers. [50] A second could be the China effect: the increased ability to offshore manufacturing. [51]There is certainly evidence that US multinational firms have been expanding their employment shares in their foreign affiliates. In contrast to the experience of the 1990s, in which parent employment increased more rapidly than employment in foreign affiliates, since 1999 employment in US parents has actually been declining, while affiliate employment has been growing. But the employment pattern in US multinationals recently actually reflects developments outside of manufacturing, in industries such as wholesale and retail trade in which off-shoring is not likely to be a major factor.

More generally, if increased off-shoring is responsible for depressing the share of compensation, we would expect to see these pressures operating particularly strongly in tradable goods sectors. The share of compensation should have been especially depressed in manufacturing. But in fact this has not been the case. In 2005 for example the ratio of the share of compensation in manufacturing to the share in services was the same as in 2000. In addition, one might have expected it to be operating by weakening Union bargaining power – yet union compensation of unionized workers has grown relatively rapidly during this period.(See Table)

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[50] There is in fact evidence that wages and employment of software programmers have both declined since 2000, but it is hard to separate the impact of off-shoring from that of the bursting of the internet bubble. See Catherine L Mann *Accelerating the Globalization of America* Washington DC Institute for International Economics 2006.

[51] Robert C. Shelburne (2004) "Trade and Inequality: The Role of Vertical Specialization and Outsourcing," *Global Economy Journal*: Vol. 4 : Iss. 2, Article 2.
Available at: http://www.bepress.com/gej/vol4/iss2/2

It is likely, therefore, that a significant proportion of the low compensation share is cyclical. Profits are far more volatile than wages and fluctuate pro-cyclically. Thus labor's share is at its highest at the end of expansions and the start of recessions; while labor's share falls as the recovery sets in and productivity accelerates. By contrast profit shares are highest in the middle of expansions, and should be expected to fall as the expansion matures. This was clearly what happened in the expansion from 1992 through 2000 in which labor's share fell from 65.9 in 2001 to 63.9 percent in 1997 before returning to a peak of 66.2 percent in 2001. Thus the experience between 2001 and 2006 is quite similar in magnitude to that between 1992 and 1997, and if the past is prologue, labor's prospects should improve as the current expansion matures. If labor returned to its more typical share of 66 percent, compensation would be 2/66 i.e. 3 percent higher than in 2006. This would a reasonable estimate of the impact of the current cycle on earnings.

Finally, it should be noted that the strength of corporate profits since 2001 is not only reflective of weak compensation. The 4.0 percent rise in the share of corporate profits in national income between 2000 and 200603 is far greater than the decline in share of compensation (2.2 percent). This has been possible because there have also been large declines in the share of net interest payments (1.9) and rental incomes (1.0). So a sizable share of the redistribution recently has actually taken place among capitalists rather than between capital and labor and is particularly affected by the unusually low interest rates that have been a characteristic of the recent expansion.

In sum, American workers of all skill levels are understandably concerned about their slow income growth, and the idea that global wage arbitrage has been downward pressure on that income growth is certainly plausible. But the sectoral patterns are not

compatible with this interpretation and since there are reasons to believe the depressed share of labor compensation has a strong cyclical component, before concluding that this force has been the principle reason for wages lagging behind productivity growth it will be necessary to see what happens as this expansion matures and the labor market tightens.

Globalization and the "super-rich." The Super-Rich did exceptionally well in the late 1990s because their incomes are closely tied to the performance of the booming stock market and while their incomes shares declined during the recession, they are again doing well, approaching their previous peak shares. Given the tie to stock options, these earnings are also likely to impart additional volatility to aggregate compensation shares, since they show up as wage income only when exercised.

It is likely that the very richest and most talented Americans owe some of their success to their increased ability to sell in global markets but much less clear that their prosperity is directly to trade in a narrow sense. Larger and freer global markets due to digitization, technological improvements in communications and deregulation do give more scope for higher incomes for entertainers and sports stars, film-makers, and producers of products with large upfront costs such as software. It is also true that increased opportunities are available for traders and others who operate and invest in international financial markets. But these opportunities are only very peripherally linked to liberalization through trade agreements, Moreover there are more important technological and institutional forces operating in the domestic economy that are providing opportunities for "winners" to do particularly well.

Many of the highest US earners have benefited from strong US equity markets, since they are paid in form of (non-qualified) stock options that count as wage incomes when exercised, while others have made killings as venture capitalists in initial public offerings. But again, the booming domestic economy in the late 1990s was the strongest force driving the stock market. Similarly, the soaring pay of successful professionals and proprietors has an international component, but many have made their money in successful domestically oriented businesses. And finally the large increases in the pay of Chief Executive Officers could in part, as Yellen suggests reflect increased returns to skills in managing international firms, but since similar pay increases have not been observed in other countries, this development have been heavily influenced by US institutions and corporate governance practices. Thus in a more general sense "globalization" plays a role in this inequality, but its marginal contribution is difficult or impossible to quantify, and it is not strongly linked to trade liberalization. Moreover, it is very unlikely that traditional forms of protection will be able to influence it.

Concluding Comments

As time has gone on, it appears that simplistic applications of both the trade and the technology stories have run into trouble because skill premiums have not changed in the manner that might have been predicted. As the new patterns have emerged, some labor economists have increasingly begun to question or refine the role that skill-biased technical change has played.[52] In particular Card and DiNardo (2002) undertake numerous tests, all of which suggest that the connection between the spread of information technology and wage inequality is weak. They demonstrate that the timing of the growth in wage inequality is hard to reconcile with the SBTC and emphasize the role

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[52] Mishel was an early skeptic.

of the failure to raise minimum wages in the early 1980s. [53] Thomas Lemieux similarly finds that "the growth in both residual and between group wage inequality is all concentrated in the 1980s" and questions the idea of a trend movement in skill-biased technical change[54]

Autor, Katz and Kearney (2005) and (2006) [55] however emphasize the continuation of increased inequality at the top of the wage distribution in the 1990s and the relative decline in both jobs and wages in the middle of the income distribution. And they develop a new theory of skill-biased technological change in which computers complement non-routine cognitive tasks, substitute for routine tasks but have little effect on manual tasks found at the bottom. Janet Yellen (2006) brings globalization into the mix and argues that it has similar properties. [56] She argues that suppliers of personal services at the low end escape the downward pressures, those at the top are rewarded and those in the middle. More work is clearly required to obtain a clearer picture of the ways in which trade now impacts on wages.

This paper has answered some questions and raised some others. The most surprising conclusion is that the recent increases US inequality have little to do with global forces that might be expected to especially affect unskilled workers- - namely immigration the expanded trade with developing countries. A second is that much of the

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[53] David Card and John E. DiNardo "Skill-Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles" *Journal of Labor Economics*, 2002, 20 (4) pp 733-83.

[54] Thomas Lemieux "Increasing Residual Wage Inequality: Composition Effects, Noisy Data and Rising Demand for Skill?" *American Economic Review* June 2006 Vol 96(3) pp 461-498.

[55] David H Autor, Lawrence F. Katz and Melissa S. Kearney "The Polarization of the U.S. Labor Market" Working Paper 11986 NBER January 2006. And David H Autor, Lawrence F. Katz and Melissa S. Kearney. Trends in U.S. Wage Inequality: Re-Assessing the Revisionists, NBER Working Paper No. 11627 September 2005

[56] Janet L. Yellen, "Economic Inequality in the United States" Speech to the Center for the Study of Democracy University of California, Irvine November 6, 2006.

recent pervasive slow growth in most real wages is cyclical. However it could certainly

turn out that more persistent forces are at work, but before we can be certain, the current

expansion will have to run its course. While this paper has not focused on policy

responses, the complex nature of this sources of inequality suggest that trade protection is

a poor instrument for dealing with them and instead a more progressive system of income

redistribution would be more appropriate.

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