1

Introduction

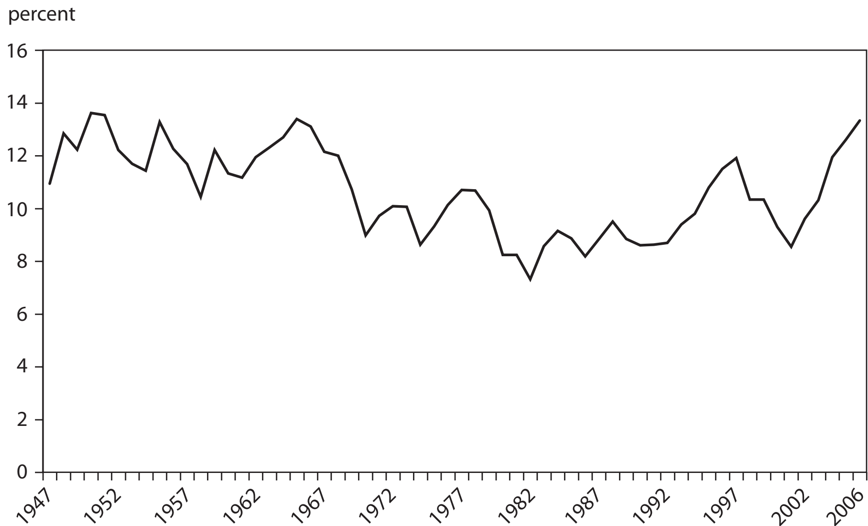
Judging by the aggregate job numbers, American workers should have been pleased with the US economy's performance in 2006, but they were not. Their concerns were not related to jobs but to wages. The economy had fully recovered from the 2001 recession and was generating substantial employment growth—2 million additional jobs between 2005 and 2006—and the unemployment rate at 4.5 percent was close to what many considered to be the lowest level compatible with stable inflation. But for several years, wage and salary growth for all but the highest earners had been poor.

An astonishingly small fraction of workers—just the 3.4 percent with doctorates and professional graduate degrees (JDs, MBAs, and MDs)—fell in a category that sustained an increase in average inflation-adjusted take-home pay between 2000 and 2006. For workers with a college education, the slow real wage growth was a new experience because these workers had seen their real pay rise steadily between 1980 and 2000. But for most other workers, the recent weak wage growth continued a long-run trend in which, with the exception of the late 1990s, average hourly wages had 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 close to the highest levels since 1947 (figure 1.1). This inequality was reflected not just in the behavior of profits: The share of wage income reported in the top 1 percent of US tax returns in 2005 was almost double that recorded in 1980 (figure 1.2).

Contrasting the growth in output per hour with real average hourly earnings over the past quarter century vividly illustrates the concern about the fate of the typical American worker (figure 1.3). One might have

Figure 1.1 Share of corporate profits in US national income, 1947–2006



Source: Bureau of Economic Analysis, National Income and Product Accounts, table 1.12, available at www.bea.gov.

expected the two series to track each other.[1] Yet, they tell strikingly different stories. Labor productivity growth was robust, and output per hour rose by over 50 logarithmic points, or 70 percent.[2] By contrast, average real hourly wages were virtually flat: Measured in 1982 dollars, the series increased just 4.4 percent—averaging $7.88 in 1981 and $8.23 in 2006.[3] Contrasting productivity growth with real annual male earnings tells a similar story: Measured in 2005 dollars, the median annual earnings of full-time male workers of $41,386 were actually below the $41,763 earned in 1980 (US Census Bureau 2005, table A-2, 38). Figure 1.3 also shows real

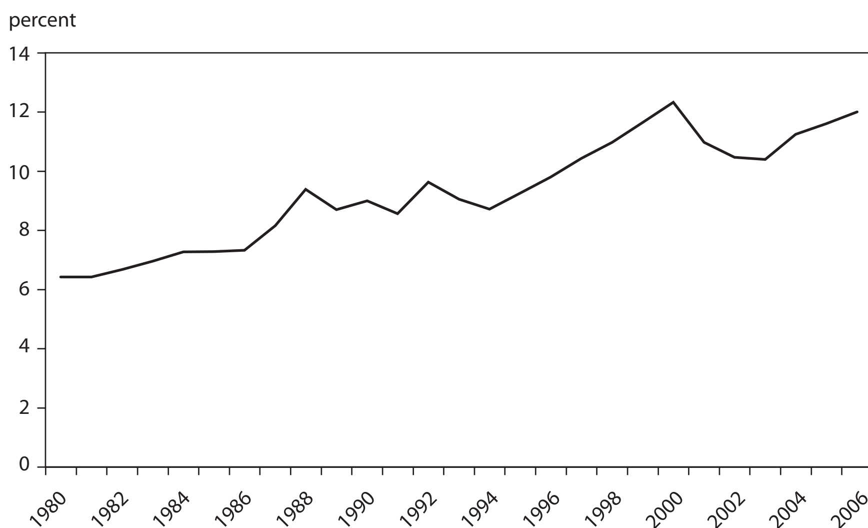
1. In principle, under competitive conditions, workers will be paid their marginal not average product, implying that output per worker need not always rise at the same rate as the marginal product of labor. However, as noted by Robert Topol in his lucid exposition of this issue in his comments on Dew-Becker and Gordon (2005, 135), "The observation that labor's share is fairly constant is one of the foundations of modern theories of economic growth." In general, factor shares in income will remain constant either if the elasticity of substitution is unity—i.e., the production function is Cobb-Douglas or if the supply of capital is perfectly elastic.

2. I use log point measures for expositional purposes. Small changes are close to percent changes.

3. In fact, in 1982 dollars, real hourly wages in 1964 were $7.82, and real weekly earnings in 1964 of $302 were actually higher than earnings in 1987 (Council of Economic Advisers, *Economic Report of the President 2006*, 338).

Peterson Institute for International Economics | www.petersoninstitute.org

Figure 1.2 Share of top 1 percent workers in tax return wage income, 1980–2006



Source: Data obtained from the website of Emmanuel Saez and Thomas Piketty, http://elsa.berkeley.edu/~saez.

wages of blue-collar workers,[4] taken from the employment cost index of the Bureau of Labor Statistics—a series that behaves similarly to average hourly earnings and is used extensively later in this policy analysis.

At face value, the picture suggests something was seriously amiss. On average, workers were producing considerably more, yet most workers seemed to have little to show for it. Where was the rest of the income generated by increased productivity going?[5] The plausible explanation is associated with rising inequality as others receive bigger pieces of the income pie: In particular, despite its name, the *average* hourly wage series actually provides an incomplete picture of worker wages because it reflects only the pay of *nonsupervisory* workers, who are paid by the hour and excludes workers in sales, managerial, professional, and technical occupations.

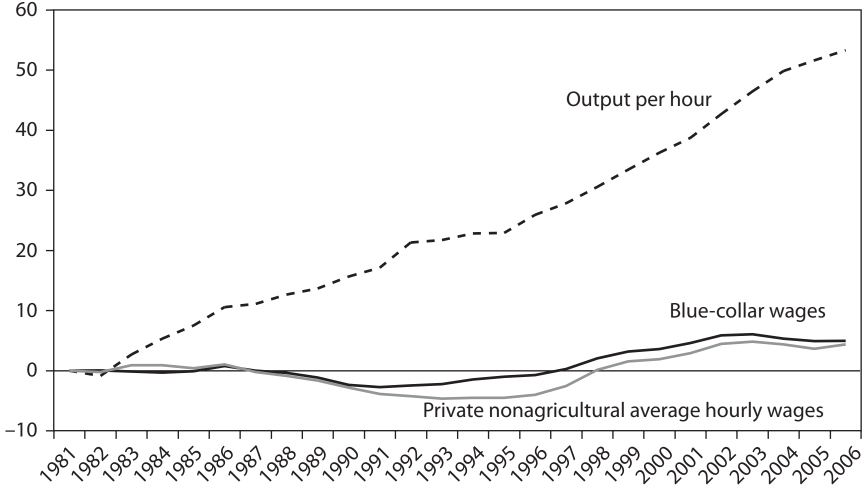
One possible answer is that the difference between nonsupervisory worker wages and total output was going into the (rapidly increasing)

4. Blue-collar workers comprise four major occupational categories: precision production craft and repair; machine operators, assemblers, and inspectors; transportation and material moving and handlers; and equipment cleaners, helpers, and laborers. In 1990 they constituted 29.8 percent of the labor force. See Schwink (1997).

5. Indeed, according to Robert Gordon and Ian Dew-Becker (2005), "half of the income gains went to the top 10 percent of the income distribution, leaving little left over for the bottom 90 percent."

Peterson Institute for International Economics | www.petersoninstitute.org

Figure 1.3 Business-sector output per hour and real hourly wages, 1981–2006



Note: Output per hour for business sector; average hourly wages in 1982 dollars for private non-agricultural industries; employment cost index for blue-collar wages in 1982 dollars.

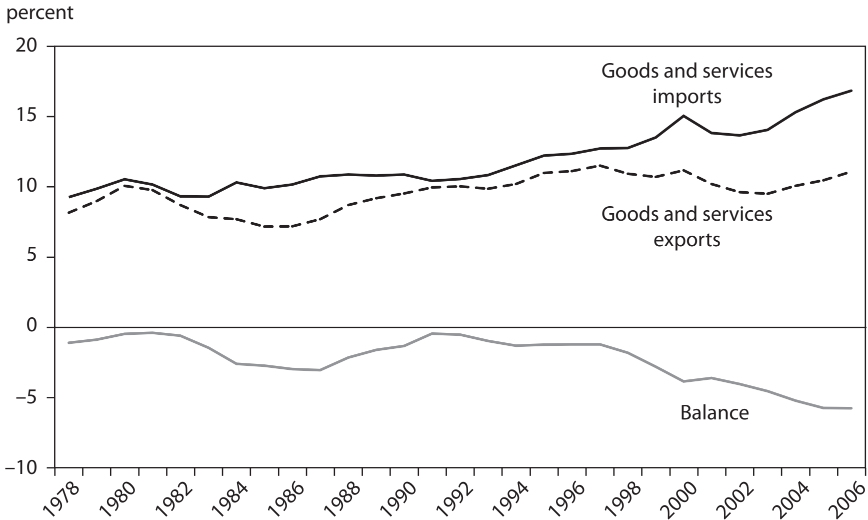
Source: Bureau of Labor Statistics.

compensation of the workers whose earnings are excluded when average hourly wages are calculated. A second possibility is that the difference was going into the wage compensation of the very rich 1 percent of workers such as chief executive officers (CEOs) and others who command especially high salaries and whose pay often includes stock options. Most labor earnings measures also do not accurately reflect these earnings. A third possibility is that the difference was going into profits or other forms of capital income. Chapter 2 provides quantitative estimates of the role each of these three components has played in increasing income inequality.

What explains this weak wage growth? One answer often given is globalization. At the same time as inequality has increased, the United States has certainly become more integrated into the global economy. This correlation leads many to ascribe causation. The sum of exports and imports of goods and services has increased from 20 percent of GDP in 1980 to 28 percent of GDP in 2005 (figure 1.4), with recent import growth heavily concentrated in goods and services from developing countries. International financial markets have also undergone explosive growth. US multinationals have continued to expand abroad, and many domestic firms have increased their reliance on offshored inputs. The United States has also become the world's largest recipient of inward foreign direct invest-

Peterson Institute for International Economics | www.petersoninstitute.org

Figure 1.4 Goods and services trade as a share of US GDP, 1978–2006



Source: Bureau of Economic Analysis, National Income and Product Accounts, tables 1.1.5 and 4.1, available at www.bea.gov.

ment.[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 fairly widely accepted that in the aggregate, trade generates gains and promotes economic growth,[7] but trade can also create winners and losers. In America's case, trade with developing countries could be 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 United States has vigorously imple-

6. Employment in foreign affiliates of US multinationals was up 51 percent between 1982 and 2004 (Bureau of Economic Analysis, *Survey of Current Business*, November 2006). Employment in nonbank majority-owned US affiliates of foreign companies increased by 68 percent between 1988 and 2003 (Bureau of Economic Analysis, *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, US incomes are about 10 percent higher than they would be if the economy were self-sufficient. See Bradford, Grieco, and Hufbauer (2005).

Peterson Institute for International Economics | www.petersoninstitute.org

mented free trade agreements with Mexico (the North American Free Trade Agreement) 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. (Roach 2006)

Similarly, in a recent column, Paul Krugman emphasized the role of China and the increased possibility of trading services and concluded:

> It's no longer safe to assert that trade's impact on the income distribution in wealthy countries is fairly minor. There's a good case that it is big, and getting bigger. . . . It's clear that applying the same models to current data that, for example, led William Cline of the Peterson Institute to conclude in 1997 that trade was responsible for a 6% widening in the college-high school gap would lead to a much larger estimate today. (Krugman 2007)

To be sure, many acknowledge that factors other than globalization (e.g., technological changes, deunionization, changing social norms,[8] modifications in US corporate governance, deindustrialization, and immigration) are causing inequality to rise. Nonetheless, there is polling evidence that Americans are becoming increasingly disenchanted with trade. A 2000 Gallup poll found that 56 percent of respondents saw trade as an opportunity and 36 percent saw it as a threat—but by 2005, the respective percentages shifted to 44 and 49 percent, respectively (Slaughter and Scheve 2007). Especially noteworthy is the drop in support from Americans with college education, a development that has been associated with their sluggish real wage growth.

Some say that precisely because these other 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. Several Democratic candidates for president are opposed to the bilateral trade agreements the George W. Bush administration has negotiated with Peru, Panama, Colombia, and South Korea. And President Bush has had difficulty in renewing his trade promotion authority. Given the fact that the developing countries in particular are awaiting a successful conclusion of the Doha Round, which is supposed to emphasize their needs, these views could be consequential.

This policy analysis explores the links between international trade and increased income inequality. It deconstructs the gap between real blue-

8. For an illuminating analysis of the role of norms and institutions, see Levy and Temin (2007).

Peterson Institute for International Economics | www.petersoninstitute.org

collar wages and labor productivity growth and estimates how much higher these wages might have been had income growth been distributed proportionately and how much of the gap is due to measurement and technical factors about which little can be done. It argues that while increased trade with developing countries may have played some part in causing greater inequality in the 1980s, surprisingly, over the past decade the impact of such trade on inequality has been relatively small.

Distinctions and Qualifications

Before proceeding with the analysis, several prefatory distinctions should be made. First, as this discussion has already implied, the nature of US inequality is complex. While they may be related at times, at least three 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., increase in the income share of the very top wage earners, whose incomes are often heavily related to stock market performance through stock options), and class inequality (i.e., increase in the share of income earned by owners of capital—in particular, corporate profits).

Over the past 25 years, all three types of inequality have increased in the United States, but they have emerged at different times. Moreover, wage inequality in particular has taken different forms. There was a pervasive increase in wage inequality in the 1980s associated with skill levels. In the 1990s, however, 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, meaning that over the past 25 years, blue-collar workers—particularly 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 between 1985 and 1988 and again in the late 1990s, while class inequality appeared only after 2000. Many discussions confound these forms of inequality, but as the timing suggests, they are likely to stem from different causes and in particular to be affected differently by international factors in general and trade and trade agreements in particular.

Another key distinction is between inequality and poverty. While the poorest working Americans did do relatively badly in the 1980s, wage data suggest that since the early 1990s, they have actually been doing comparatively well. This improvement shows up in wages in the 50th percentile rising more slowly than those in the 10th percentile and in the wages of

Peterson Institute for International Economics | www.petersoninstitute.org

high school dropouts rising as rapidly as the wages of high school graduates. It also shows up in the relatively strong rise in real incomes of households with children in the lowest quintile.[9] While the rich are getting (relatively) richer, the poor are not getting (relatively) poorer! Thus the inequality that has arisen is between the very rich and the middle class. This development has important implications for concerns about immigration and low-wage competition.

As mentioned earlier, the discussion on the causes of inequality often refers very loosely to globalization, which is sometimes used as a synonym for structural change. But such references can be a very misleading and dangerous oversimplification, particularly if it leads to policy prescriptions that are motivated by the belief that protectionism could effectively reverse the rise in inequality. The US economy is linked to the rest of the world through trade in goods and services and flows of capital—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, however, I focus mainly on one of these links, international trade, since the current policy debate seems to focus primarily on trade agreements and expansion. But even with respect to trade, chains of causation are complex. Trade is not really an independent variable that one can talk accurately of as necessarily "causing anything" nor can one readily separate trade from other sources of structural change.[10] Faster growth in China or changes in its domestic policies could lead it to trade more with the United States. A crop failure in the United States could lead to more trade. A new trade agreement could lead to more trade, and technological discoveries in the United States could be encouraged by the country's ability to trade and thus result in more trade. All these can affect trade but 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 United States has become even more unequal than the distribution of income. But to keep the scope of the study manageable, I consider only income. In addition, I concentrate on individual pretax incomes. Income inequality is sometimes measured at the level of the family and sometimes the household, and the levels at which this measurement is done

9. A recent Congressional Budget Office (CBO 2007) 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.

10. For an excellent discussion of the endogenous nature of trade, see Deardorff and Hakura (1994).

Peterson Institute for International Economics | www.petersoninstitute.org

can make a huge difference.[11] Decisions on how much to work and whom to marry or live with can alter the link between individual earnings and household incomes.[12]

Similarly, incomes can be affected not only by earnings but also by taxes and transfers. But I focus on pretax and transfer individual earnings because these are most likely to be directly affected by pressures operating through international trade. Earnings are also affected both by how much people work and by what they earn by hour. Trade could affect both, but its major impact is likely to be on factor prices, and thus wherever possible, in considering labor income the study uses data on hourly earnings.

I should also emphasize that, although the terms "equity" and "equality" are sometimes used interchangeably, by focusing on inequality, however, I do not mean to imply it is always undesirable. Higher incomes could, of course, be derived through exploiting others and through unfair behavior, but they could also be an appropriate reward for obtaining new skills and/or working harder and smarter in activities that also increase the welfare of others. Nonetheless, keeping in mind the importance of providing incentives for greater productivity, it might still be appropriate to ask those who make more to pay proportionately more in taxes.

For much of the study I adopt the perspective of a typical blue-collar US worker. The central question I ask is, how much better off would this worker have been had income inequality not increased? Answering this question requires not only comparing the relative growth of this worker's earnings to those of richer workers but also taking account of how much additional income would have been available to individual blue-collar workers had inequality not increased. In other words, what is important is not simply the percentage increase in the relative earnings of one group compared with another, but what share of total income this increase constitutes.

Finally, I argue that trade with developing countries is not a particularly important contributor to US inequality. But I do not intend to imply either that trade has played no role at all in these developments or that, more

11. This distinction may be important. According to Peter Gottschalk and Sheldon Danziger (2003), the 1990s were a period in which wages became more equal but family income inequality continued to increase. For the purposes of this policy analysis, the focus will be on wages and incomes.

12. Gottschalk and Danziger (2003) write: ". . . long-run changes in society's living arrangements have taken place, also tending to exacerbate household income differences. For example, divorces, marital separations, births out of wedlock, and increasing age at first marriage have led to a shift away from married-couple households to single-parent families and nonfamily households. Since non-married-couple households tend to have lower income and income that is 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."

Peterson Institute for International Economics | www.petersoninstitute.org

Table 1.1 Accounting for the gap between real wage and labor productivity growth, 1981–2006

Source	Log points
Growth in real ECI blue-collar wages, 1981–2006	4.9
Growth in business-sector output per hour, 1981–2006	53.3
Difference	48.4
Due to	
Technical factors	33.8
Of which	
Benefits (compensation versus take-home pay)	11.9
Prices (product versus consumption)	17.7
Skills (relatively rapid white-collar skills growth)	4.2
Inequality	14.6
Of which	
Wage inequality	6.8
Super rich inequality	3.1
Class inequality (profits)	4.7

ECI = employment cost index

generally, increasing US income inequality or the dislocation of US workers, firms, and communities are not serious issues that require policy responses. To the contrary, I hope that by understanding that trade is not the major driver, either of inequality or displacement, US policymakers will be led to focus on crafting effective policy responses to these problems rather than taking counterproductive or ineffective protectionist actions.

Plan of the Study

Chapter 2 quantifies the sources of the gap between blue-collar wages and productivity over the past 25 years. These sources are decomposed into those that actually do result from greater inequality and those that reflect measurement issues (table 1.1 and appendix table A.1). Two measurement issues account for 60 percent of the 48.4-log-point gap—i.e., 29.6 log points. The first is that the wage measures fail to take account of benefits; the second is that the real wage and output per worker measures are obtained using different price deflators. Another 10 percent of the gap—4.2 log points—reflects the increased skills of non-blue-collar workers. About half of the remaining 14.6 log points (6.8 log points) is attributable to higher wage inequality—i.e., relatively more rapid increases in non-blue-collar hourly wages—with the remainder split between increased wage earnings of the super rich (3.1 log points) and recent increases in profits (4.7 log points).

Peterson Institute for International Economics | www.petersoninstitute.org

Chapter 3 deals with both the theory and evidence on the links between trade and wage inequality. Conventional trade theory predicts that wage inequality along the lines of skill 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 in the United States—typically on the order of about 10 to 20 percent of the historic increase in the ratio of the wages of skilled to unskilled worker. Though some studies argue for larger effects, almost all find that in raising skill premiums, skill-biased technological change was far more important than trade.

But almost all studies focused on the period through the mid-1990s, and the experience between 1999 and 2006 has been different: By many quantity and price indicators, powerful globalization forces were operating during this period. Yet US relative wage and compensation measures indicate very little evidence of increased inequality by skill, education, unionization, or occupation and sector—indeed, if anything, compensation in manufacturing increased relatively rapidly. Apparently, neither trade nor technological change (nor anything else) has continued to increase conventional wage inequality.[13]

This is surprising given the growing scale of competition from low-wage countries. There are three lines of explanation: One is that the goods that the United States imports are actually very sophisticated and produced in the United States by relatively skilled workers. While it may cause displacement and could put downward pressure on wages generally, competition from low-wage countries 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 and do not exert downward pressure on US wages or cause dislocation of US workers. A third view is that while US imports may be produced using labor-intensive methods abroad, when produced in the United States, capital- and skilled-labor-intensive methods are used.

It appears that US trade today combines these 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, the data indicate that manufactured imports overall, and even those from developing countries such as China and Mexico, are concentrated in US manufacturing sectors that pay significantly higher than average US wages. This means that import displacement does not fall disproportionately on less-skilled workers. While there has been considerable displacement from trade during this period, it has not increased wage inequality.

13. There is still some evidence of wages rising relatively rapidly recently for those with advanced degrees (or at or above the 90th percentile).

Peterson Institute for International Economics | www.petersoninstitute.org

At more disaggregated levels, however, the data reveal that goods imported from developing countries such as China *are* associated with relatively less-skilled labor inputs and—judging by their unit values—are qualitatively different from those produced by developed countries such as the United States. This provides support for the view that much of this trade reflects more complete specialization and as such does not result in either wage inequality or downward pressure on wages generally.

Chapter 4 explores class inequality—changes in the income shares of profits and wages. 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 decline could, in principle, be the result of increased trade pressures such as offshoring, which 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 1997, 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, if offshoring to China and other developing countries were the major driver of labor's depressed share, the fall would be especially apparent in tradable goods, but recent profit growth has not been especially concentrated in manufacturing. Indeed, it has been concentrated in financial corporations. In fact, between 2000 and 2005, the share of compensation in manufacturing (or traded goods) did not decline more rapidly than in the rest of private industry, and manufacturing compensation has actually increased relatively more rapidly than compensation in general.

Similarly, offshoring of services, for example, to India, has actually been much smaller than public headlines suggest and too small to account for the pervasive slow real wage growth since 2000. A crucial question that will be resolved only 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.

Chapter 5 considers super rich inequality. The traditional channels that operate through trade do not appear to be an important driver of this development. Globalization more broadly construed has played some role in increasing the size of relevant markets and thus incomes of CEOs, sports stars, entertainers, and software producers. But this effect does not seem to be disproportionately large. Remarkably, the share of income and value-added produced by US multinational corporations in their overseas affiliates has remained fairly constant as has the share of US corporate profits earned abroad. Super rich inequality is also being driven by technological changes, institutional developments such as financial deregulation, changes in US corporate governance practices, and rising asset markets, most of which have domestic origins.

Peterson Institute for International Economics | www.petersoninstitute.org

Chapter 6 briefly considers a second source of worker anxiety: job loss and dislocation. Trade is found to have been a factor in the dislocation of manufacturing workers, but it is only one of a host of forces causing job loss. Some dislocation in the future could also occur as a result of increased electronic offshoring. While such offshoring could be extremely painful for the workers involved, in aggregate terms the US labor force should be able to adjust to these changes without disruption that is unusually large in historic terms.

The central conclusion of the study is that international trade is responsible for a relatively small share of growing income inequality and labor-market displacement in the United States. Even if this study had concluded that trade was a major cause, it would not necessarily have followed that increased trade protection would be the correct policy response. But the minor role played by trade suggests that any policy that focuses narrowly on trade to deal with these problems is likely to be ineffective. Instead, the response should be (a) to use the tax system to improve income distribution and (b) to implement adjustment policies to deal more generally with worker and community dislocation.

Peterson Institute for International Economics | www.petersoninstitute.org

2

The Wage-Productivity Gap, 1981–2006

This chapter focuses on the earnings of US workers in blue-collar occupations.[1] I show that while about 30 percent of the gap between wages and productivity between 1981 and 2006 is associated with increased inequality, much of it reflects measurement issues.

The blue-collar group includes craft workers, operatives, and laborers, most of whom have less than a college degree and whose earnings are relatively concentrated in the middle of the earnings distribution.[2] The employment cost index (ECI) from the Bureau of Labor Statistics (BLS) for these workers is ideal for exploring these earnings 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 occupations and industries.[3]

In fact, as shown in figure 1.3, over the 1981–2006 period, the blue-collar ECI wage series actually behaved very similar to the average hourly wage series for all nonsupervisory workers. The ECI indicates that real

1. For a similar analysis, see Rose (2007).

2. In 2006, for example, less than 7 percent of workers in blue-collar occupations had a college degree compared with 30 percent in the overall labor force (Bureau of Labor Statistics and US Census Bureau, Current Population Survey, Educational Attainment data, available at www.census.gov). Estimates based on Llg (2006) indicate that in 2000, 60 percent of these workers' earnings fell between the 25th and 75th percentiles of national earnings.

3. The ECI measures quarterly changes in compensation costs for civilian workers (nonfarm private industry and state and local government workers). The ECI uses data collected from business establishments, which are weighted to represent the universe of establishments and occupations at a particular point in time.

Peterson Institute for International Economics | www.petersoninstitute.org

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 4.34 log points.) By contrast, output per hour in the business sector was up 53.3 log points—a 48.4-log-point gap (figure 1.3).

My analysis of this gap involves five steps. First, it is necessary to deal with two measurement issues: One is that real wages and real outputs are deflated with different price measures and another is that wages do not include benefits. Second, the role played by wage inequality (i.e., blue-collar versus other wages) can be estimated by comparing the growth in blue-collar wages with that of the overall ECI. Third, the effects of changing labor force skill composition must be taken into account. Fourth, the role of profits can be obtained by comparing the growth of business-sector value-added with the most comprehensive measure of business-sector compensation. Finally, the share of labor income going to wages that are not included in the ECI can be obtained as a residual.

Measurement Adjustments

When one contrasts measures of real wages and output per worker and implies that they should rise in tandem, one is basically comparing apples and oranges. Even aside from the fact that in theory these could deviate for reasons such as differences between the average and marginal product of labor, two important measurement issues should not be overlooked.

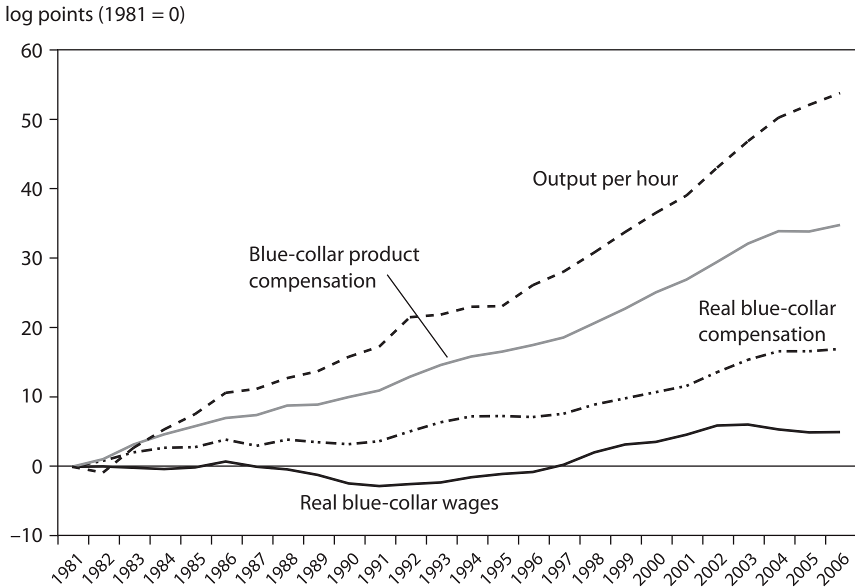
Benefits

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 receives in the form of Social Security contributions, life insurance, retirement benefits, and health care. Over much of the 1981–2006 period, benefits have been rising faster than wages, which implies that the wage growth alone underestimates the full value of increases in worker pay. The practice of referring to hourly wages (or take-home 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.

The same is true of the many studies of wage trends undertaken by labor economists and others using the BLS and Census Bureau's Current Population Survey (CPS) data. If benefits such as health care are relatively similar for high- and low- or (more likely) median-wage workers and if they are shifted backward into wages, their rapid growth could well in-

Peterson Institute for International Economics | www.petersoninstitute.org

Figure 2.1 Blue-collar pay and business-sector output per hour, 1981–2006



Source: Bureau of Labor Statistics, Employment Cost Index, Consumer Price Index, and Productivity and Related Data on the Business Sector, available at www.bls.gov.

crease wage inequality, even though compensation inequality was unaffected.[4] Moreover, if workers at the bottom are more likely to have lost their benefits over time, then considering only their wage increases could overstate the increase in their compensation.

However, the full costs of nonwage benefits *are* taken account of in measures of total compensation. By using the real ECI for blue-collar compensation, which includes benefits, and comparing it with the corresponding real ECI for blue-collar wages, one can readily estimate the difference taking account of benefits makes. As indicated in figure 2.1, between 1981 and 2006, the rise in the real ECI for blue-collar compensation was 16.8 log points—compared with just a 4.9-log-point increase for real blue-collar wages. This implies that increased benefits account for 11.9 log points—roughly a quarter—of the 48.4-log-point gap. Taking account of benefits also indicates there has been less "wage" inequality than the take-home pay (wage) data indicate. Between 1981 and 2006, for example,

4. For the theory of shifting of benefits, see Summers (1989). For evidence on the incidence of health benefits, see Baicker and Chandra (2006).

Peterson Institute for International Economics | www.petersoninstitute.org

while blue-collar wages fell by 14 log points relative to white-collar wages, blue-collar compensation fell by only 11 log points relative to white-collar compensation.[5]

Deflators

A second measurement issue relates to the way in which output per worker and compensation 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., $w = MP \times P$. The relevant real wage ($w/P = MP$) that should track marginal product is known as the product wage—i.e., nominal wage rate divided by the prices of the products that workers actually 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) used to measure productivity and the consumer price index used to measure real wages are different. Over the past 25 years, the prices of goods and services workers actually produced in the business sector have risen more slowly than the prices of goods and services workers consume. In particular, the PBUS 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 imports (such as petroleum), whose prices have increased more rapidly.[6]

When measures of real output that deflate nominal output by the PBUS are compared with those of real wages that deflate nominal wages by the consumer price index), the productivity-wage gap is exaggerated. The difference between the growth in the two series between 1981 and 2006 amounts to 17.7 log points. Thus, taking account of the faster growth in the costs of benefits and using the PBUS to measure the real (product) compensation of blue-collar workers, I find an increase in the ECI for blue-collar compensation of 34.5 log points rather than just 4.9 log points (figure 2.1).

Thus, these two adjustments (11.9 log points for benefits and 17.7 log points for deflators) explain about 60 percent of the gap—i.e., 29.6 log

5. By contrast, Brooks Pierce (2001) reports a greater increase in compensation inequality than in wage inequality between 1981 and 1997, but as is suggested by figure 4.3, which shows several cycles in the share of benefits in compensation, this finding is likely to be very sensitive to the observation period. Over the 1981–2006 period as a whole, there is a clear upward trend in the share of benefits in compensation.

6. For more detail, see Lawrence and Slaughter (1993) and Bosworth and Perry (1994).

Peterson Institute for International Economics | www.petersoninstitute.org

points. This estimate means that in fact, blue-collar workers have actually made significant real gains over the past 20 years. Certainly, their earnings have lagged behind those of white-collar workers (up 46 log points over the same period when similarly deflated) 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. But it still leaves 18.8 log points unaccounted for.

Role of Wage Inequality

Using the ECI measures, I estimate the role of increased wage inequality in explaining the blue-collar wage-productivity gap. Between 1981 and 2006, deflated by the PBUS, the ECI for blue-collar compensation increased by 34.5 log points. When similarly deflated, the aggregate ECI increased by 41.3 log points. Since both these are fixed weight measures, these differences reflect pure compensation price effects. If there had been no change in relative compensation between 1981 and 2006 and all workers had received the average increase, blue-collar workers would have been 6.8 log points better off (41.3 log points minus 34.5 log points). This is my estimate of the impact of wage inequality.

Rise in Skills of Non-Blue-Collar Workers

Relative increases in worker skills is another element to be considered. Education is likely to make workers more productive. For example, if one out of 10 workers with only a high school education obtained a college education, the earnings of that worker would be expected to increase. One would also expect total and average output per worker to increase. But one would not expect the wages of the nine other workers to rise. Thus, if some workers are improving their skills particularly rapidly either because of education or experience, then it could be a reason why wages of *other* workers (i.e., those not experiencing such improvements) might not rise as fast as overall output per worker.

In fact, the United States has undergone precisely such a change over the 1981–2006 period. 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 (and thus high-skilled) occupations expanded relatively rapidly.[7] Moreover, the growth in the share of white-collar workers with a college education was much larger than the growth in the share of blue-collar workers with a college education. Thus, one would expect the relative

7. See US Census Bureau, *Statistical Abstract of the United States*, 2007, table 605 on Occupations of the Employed by Selected Characteristics, available at www.census.gov.

Peterson Institute for International Economics | www.petersoninstitute.org

increase in the share of college-educated workers in the white-collar labor force to account for some part of the gap. But how much adjustment should be made for these changes in labor force composition?

The BLS takes account of changes in labor force composition when estimating multifactor productivity.[8] Instead of simply entering hours as a crude measure of labor input, the bureau derives a labor input measure that accounts for changes in labor force quality. In undertaking this estimate, the BLS classifies workers by a number of characteristics (experience, education, and sex for males and in addition, for females, number of children and marital status). It then weights the growth rates in the hours of different types of workers by their share in total compensation. It uses a Tornqvist chained index to estimate changes in the quality of labor inputs annually.[9] This implies that over time the BLS measure will capture *both* changes in the relative supplies of different types of workers and changes in their relative wages.[10] All told, over the 1981–2006 period, this measure increased by 12.4 log points.

Since I am interested in changes in the skill levels of non-blue-collar workers, this measure is not exactly what I want. First, because it captures *both* changes in relative wages of different types of workers and changes in skills and second, because it takes account of changes in the composition of the *entire* labor force and thus includes the impact of improvements in the composition of blue-collar workers as well as other workers. But I can use the BLS measure to get a rough estimate of what I am interested in by making two adjustments to remove these effects.

I require an estimate of the impact of pure price changes on relative wages. I have already obtained this estimate by comparing the behavior of the real product blue-collar compensation with the behavior of the overall real product ECI for all private industry.[11] This comparison yielded 6.8 log

8. These estimates are available at the Bureau of Labor Statistics website at www.bls.gov/mfp.

9. The hours at work for each of the 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 workforce.

10. "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 have increased faster than the earnings of high school graduates since the early 1970s. As a 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" (Bureau of Labor Statistics, *Labor Input and Labor Composition Growth*, chapter 2, 13).

11. Another possibility that was considered was to compare the ECI with the Employer Costs for Employee Compensation (ECEC), which uses a similar sample but reflects actual costs rather than fixed weights and therefore could indicate the effects of changes in composition. However, inconsistencies in methodologies make this comparison inappropriate.

Peterson Institute for International Economics | www.petersoninstitute.org

points as an estimate of the impact of changes captured by relative wage changes over the period. This estimate suggests that 5.6 log points (12.4 minus 6.8) could be ascribed to additional improvements in total labor force composition. However, this number also includes the improvements in the composition (educational level, etc.) of the blue-collar labor force. 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.[12] This markdown suggests that over the entire period, 4.2 log points (0.75 × 5.6) can be ascribed to non-blue-collar improvements in labor force composition.

Adding the 4.2-log-point estimate for the pure skills composition effect and the 6.8 log points for the effects of changes in relative wages to the previously obtained estimate of 34.5 for the increase in blue-collar compensation deflated by PBUS implies I can now account for 45.5 log points. However, I still need measures of the shares going to the very top wage earners and to profits to reach the 53.3 total for the increase in output per hour.

Profits and Top Wage Earners

The BLS Office of Productivity and Technology provides a second compensation measure known as hourly compensation.[13] This measure covers the business sector, but it differs from the ECI in not being a fixed weight index and in its coverage and 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 (e.g., 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, which are not included in the ECI measure. In particular, the hourly compensation measure includes gains on so-called nonqualified stock options, which are counted as compensation when they are exercised, not when they are paid (Ruser 2001). This more comprehensive compensation series, when deflated by the PBUS, increases by 48.6 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

12. The share of blue-collar workers has declined from 31 percent in 1981 to 24 percent in 2005 (Bureau of Labor Statistics and Census Bureau, Current Population Survey).

13. These measures of productivity and costs are available at the Bureau of Labor Statistics website, www.bls.gov/lpc.

Peterson Institute for International Economics | www.petersoninstitute.org

series indicates the share of the gap attributable to profits. It implies that increased profit share can account for 4.7 log points (53.3 minus 48.6) of the gap. On the other hand, the difference between this comprehensive series (48.6) and the 45.5 log points I have already estimated—i.e., 3.1 log points—can be used as indicating the increase in private-sector compensation that is neither captured in the ECI nor attributable to increased skills. This difference likely includes the increased earnings of the 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. I will therefore refer to this 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 this residual is likely to overstate their share.

Is my estimate of the share going to the super rich reasonable? The CPS of wages is top coded, and the earnings of workers above the highest threshold are simply entered as greater than a particular amount—say, $100,000. Accurate and comprehensive data for the super rich—those earning in the top 1 percent or so—can be obtained only from tax or Social Security returns.

However, even when referring only to wage incomes, these data will not be strictly comparable to the corporate-sector labor earnings data. First, the Internal Revenue Service (IRS) data are for tax returns rather than for individuals and include married couples and could therefore be affected by decisions on filing status. The Social Security data still include earnings of nonincorporated (self-employed) professionals. Another problem with both these data sources is that they may well be influenced by changes in the tax code, which could affect the decision to incorporate.

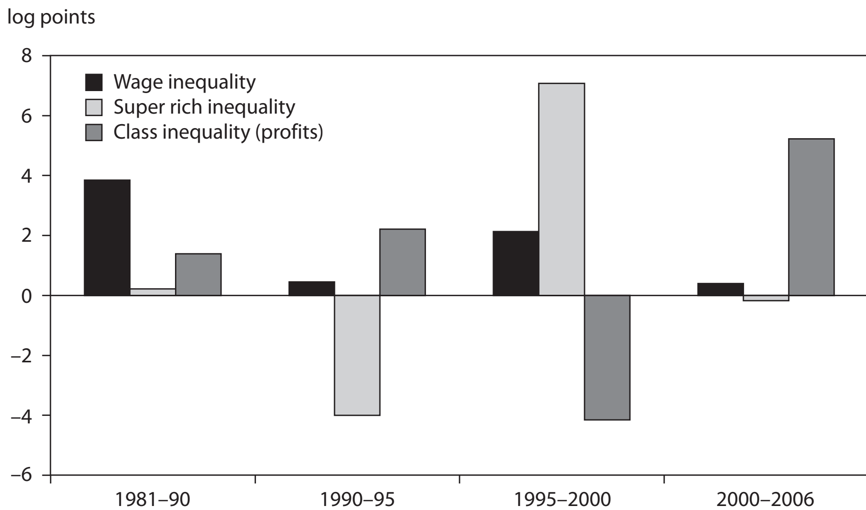
However, the estimate obtained above actually tracks those obtained using tax returns fairly well since 1990 but not before. According to that data assembled by Emmanuel Saez and Thomas Piketty, between 1990 and 2000, the share of the top 1 percent of tax filers in wage income increased from 8.99 to 12.33 percent, an increase of 3.34 percentage points.[14] According to my estimates, over the same period, the increase was 3.1 log points.

For the 1980s, however, my method fails to find a significant increase in super rich incomes, whereas they find an additional increase of 6.43 to 8.99 percent—i.e., 2.47 percent. Much of this change occurs between 1985 and 1988 and, as Alan Reynolds (2007) has pointed out, may heavily 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

14. These income tax statistics are available at http://elsa.berkeley.edu/~saez.

Peterson Institute for International Economics | www.petersoninstitute.org

Figure 2.2 Contributions of inequality to the productivity-wage gap, 1981–2006



Source: Appendix table A.1.

an incentive to shift their incomes from corporate to individual tax returns. But it should have been captured in the average hourly measure.[15]

Table 1.1 summarizes these estimates, and appendix table A.1 reports annual time-series in greater detail. For the full quarter century from 1981 to 2006, of the 48.4-log-point gap between productivity and real blue-collar wages, 33.8 points are not related to inequality. These reflect measurement issues (prices and benefits) and increased skills. The remaining 14.6 log points are associated with the three distinct forms of wage inequality: 6.8 log points is attributable to increased wage inequality as captured by the ECI, 3.1 log points to the residual—much of which accrues to the super rich—and 4.7 log points to the increase in profit share.

The timing of each form of inequality can be tracked as indicated in figure 2.2, which is derived from the data in appendix table A.1. And it is interesting that they do not correspond. The biggest changes in the impact of wage inequality took place in the 1980s (3.8 log points), although there were substantial increases in the second half of the 1990s as well (2.1 log points). By contrast, there has been almost no increase in the wage

15. The tax returns data show a large increase in the share of the top 1 percent in wages but also a major decline in the income share from capital. In 1982, for example, the top 1 percent received 48 percent of their income from capital income and dividends; by 1992, this income declined to 22 percent—similar to their current share. So clearly, there was massive reclassification, calling the long-run estimates into serious question.

Peterson Institute for International Economics | www.petersoninstitute.org

inequality gap since 2000 (just 0.4 log points)—a remarkable result that I explore in some depth. The story for profits is the opposite: More than the full impact occurred between 2000 and 2005 (5.2 log points). The small increase in the 1980s and early 1990s was more than offset by a decline in the second half of the 1990s.

The super rich increases took place late in the second half of the 1990s, particularly when the stock market boomed. They then subsided during the recession and recovered between 2003 and 2006. 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 mainly before 2000, super rich inequality mainly over the past decade, and profits/wages inequality after 2000.

Conclusion

In sum, this chapter has been an exercise in measurement. I have shown how the various aggregate data series compiled by the BLS can be used to derive a fairly complete accounting of the role of measurement factors, increased skills, and the three types of increased inequality in accounting for the gap between real blue-collar wages and output per hour over the past quarter century. The approach is useful in providing some perspective both on the relative magnitudes and on the timing of these different forces at play.

Overall, it suggests that about 70 percent of the gap has nothing to do with inequality, but the remaining 30 percent (14.6 log points) can be ascribed to wage inequality (6.8 log points), class or profits inequality (4.7 log points), and the super rich (3.1 log points). In the rest of this analysis, I ask what role international trade is likely to have played in generating each type of inequality.

Peterson Institute for International Economics | www.petersoninstitute.org