

McKinsey Global Institute



June 2009

Changing the fortunes of America's workforce: A human capital challenge



McKinsey Global Institute

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Preface

This publication is the result of an effort by the McKinsey Global Institute (MGI) and McKinsey Social Sector Office (SSO) with the support of McKinsey practice experts around the world. This effort builds on nearly two decades of MGI's research experience in conducting detailed analysis on labor productivity, global economic restructuring, the economic impact of offshoring, and other labor market developments.

In an effort to provide a comprehensive, well-founded explanation of income dispersion to policymakers and other interested parties, MGI and SSO conducted a study of changes in income dispersion and their causes from 1991 to 2005. Very specifically, the goals of the study were to provide facts on differential rates of growth in household income, map links between the patchwork US labor market and differential growth in labor incomes (the dominant component of household incomes), and explain the main drivers of differential growth in labor incomes and their relative significance to different groups of workers.

Diana Farrell, former director of MGI, provided strong leadership on this project. Martha Laboissière, an associate principal in our San Francisco office worked closely with us to provide leadership to the project team which included Imran Ahmed, Jan Peter aus dem Moore, Tilman Eichstadt, Lucia Fiorito, Alexander Grunewald (Alum), Jorge Hargrave, James Hoyt (Alum), Diana Kapsa, Tanya Khakbaz (Alum), Thomas Lamatsch, Dorothy Liao, Jenny Liao, Robin Matthias, Sara Parker (Alum), Ying Shi, Claudia Steinwender, and Soyoko Umeno.

Our steering committee, including Martin Baily, a senior academic advisor to MGI, Eric Beinhocker, Heino Faßbender, Axel Borsch-Supen, Dominique Turcq, and Laura Tyson, provided ongoing support to the team.

Many McKinsey colleagues, including Jonathan Ablett, Lowell Bryan, Toos Daruvala, Michael Patsalos-Fox, Ezra Greenberg, Ted Hall, Claudia Joyce, Michael Jung, Nancy Killefer, Jürgen Kluge, Simon London, Paul Mango, Frank Mattern, Tim McGuire, Thomas Mitschke, Stefan Niemeier, Wilhelm Rall, Nick Semaca, Zubin Taraporevala, Patrick Viguerie, Tim Welsh, and Eckart Windhagen, provided valuable insight and advice.

Significant input was provided by outside advisors. We owe a special debt of gratitude to Tammy Johns from Manpower. In addition to providing ongoing support and advice to the team, Manpower shared their data to enrich our analysis. We would also like to thank Sascha Stürze and the team at Analyx for insightful discussions and for providing analytical assistance.

We also benefitted from numerous interviews with public and private sector leaders, including Richard Burkhauser, Carl Camden, M. Susan Chambers, Pablo Farias, Gina Glantz, Allan Goldstein, Ted Grant, Ron Haskins, Robert Lawrence, Matt Miller, Lawrence Mishel, Helen Neuborne, Janice Nittoli, Howard Paster, Judith Rodin, Isabelle Sawhill, and Chris Weller.

We would also like to acknowledge, Gina Campbell, MGI senior editor, and Katherine Hinkebein for their editorial help; Deadra Henderson, MGI's practice administrator; Roberta Blanco and José Carlos de Sousa for their help in report production; our executive assistants, Ixchel Cook and Jacqui Miranda; and Rebeca Robboy in MGI external communications, who supported the effort throughout.

This work is part of the fulfillment of MGI's mission to help inform the global forces shaping business and society, improve performance, and work for better national policies. As with all McKinsey research, results and conclusions are based on the unique outlook that McKinsey experts bring to bear. This perspective is independent and has not been commissioned or sponsored in any way by any business, government, or other institution.

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Executive summary

Rising income dispersion in the United States and other developed nations has become a source of concern. Since the early 1970s, incomes for the highest US earners have raced ahead, while those at the bottom of the income distribution have stood still and those in the middle have increased more modestly than the post-war average. Strikingly, even in the current recession, this underlying trend is not reversing.

Lack of clarity on the causes of the trend has so far hampered progress on what policy responses, if any, may be appropriate. Among the possible causes cited in the public debate, are technology change, free trade, offshoring, immigration and the decline of the unions. Passionate advocates on all sides recommend measures responding to these headline issues. Yet there has so far been no reliable and comprehensive explanation of how these and other factors behind growing income dispersion interact systemically and across the entire workforce. This uncertainty makes it hard to know where best to focus.

In an effort to help build a comprehensive, well-founded explanation of income dispersion for policymakers and other interested parties, the McKinsey Global Institute (MGI) and McKinsey Social Sector Office conducted a study of changes in income dispersion and their causes from 1994 to 2005—over the course of the last full macroeconomic cycle. We believe this study analyzes a broader, deeper data set than previous research in the area. Drawing on earlier research in the field, it analyzes relationships between the demographic, occupational, and industry shifts affecting income dispersion and examines all major potential drivers of the phenomenon. Taking a high resolution “labor market” lens to the forces at work, this is the first study to decompose income dispersion across the entire US workforce into its component parts and identify those drivers of dispersion most relevant to each segment.

We found no single, isolated cause or “silver bullet” remedy for rising income dispersion. But our findings, outlined below, show that US labor market policy coming out of the recession would do well to focus on redeveloping America's human capital, not only for students in schools and colleges but across the current workforce.

Overall, the study shows that widening income dispersion reflects labor market institutions that have been too slow to respond to ongoing structural changes in the US economy. Most of the economy has already shifted from manufacturing to services and that shift continues. The growing complexity of economic activity seen in, for example, global supply chains, just-in-time production, and increasingly precise customer segmentation and channel strategies, has led to higher demand for advanced skills. This is reflected not only in a changing mix of occupations and compensation levels, but also in a greater variation in skill levels and incomes within particular occupations.

Such developments, essential drivers of productivity growth, mean that human capital productivity is now the key to the nation's overall economic growth. The growth sectors of the future, whatever they may be, will certainly need highly developed human capital to succeed. But too few Americans are equipped with the skills required to fill attractive jobs in new growth sectors. The minority with those skills have enjoyed substantial income premiums not least because such capabilities are in short too supply.

Understanding the labor market is the key to understanding income dispersion

Household income dispersion grew unusually wide from top to bottom between 1994 and 2005 because there was very rapid income growth among the top 10 percent of

households,¹ averaging 3.3 percent a year, while incomes among the bottom 10 percent of households grew at an average of only 1.0 percent a year, and income growth for upper and middle income households was also moderate, at 1.5 percent to 1.7 percent a year.

The main elements of household income are labor income, earnings from savings and other financial assets, and government transfers. It is also influenced by tax policies, such as increases in the Earned Income Tax Credit. In addition, demographic trends, such as household size and family structure, could also play a role. We assessed how changes in all these factors had affected overall changes in income growth across the population from 1994 to 2005 and found that changes in labor income were clearly the most important, perhaps not surprisingly since labor income accounts for 75–85 percent of pretax household income across the income distribution.² So, while most previous studies of income dispersion take household incomes as their starting point, we have taken a labor market lens to scrutinize these trends.

Seventy-one percent³ of US workers are in jobs for which there is low demand from employers, an oversupply of eligible workers, or both

To illuminate the changing fortunes of America's workforce, we examined changes in employment and compensation at every intersection of occupation and industry in the US economy—in other words, for almost every kind of job, from repetitive manual workers in the textile industry to managers in the financial services industry. This analysis shows how varying movements in rates of pay and employment for each kind of job in each industry produced the outcome of a rapidly growing economy in which a minority of workers enjoyed unprecedented income gains while the majority experienced average or below average gains.

The study identified eight clusters of industry/occupation pairs or jobs in which employees had experienced similar income levels, income growth, and employment growth over the period (Exhibit 1). The two highest-income clusters, containing 22 percent of the workforce, had experienced high growth in both employment and incomes, reflecting high demand for labor in their job markets.

Exhibit 1

Several clusters had similar labor market experience

Cluster	2005 Income \$'000s in 2003 dollars	Income compound annual growth rate %, 1994–2005	Employment compound annual growth rate %, 1994–2005	2005 Employment share %	Supply & demand interaction
1. Top earners	85.5	3.0	4.4	7.8	▪ Demand-driven
2. White-collar workers	69.7	2.3	1.8	14.0	▪ Demand-driven
3. Front line	52.1	1.6	2.6	6.7	▪ Supply shock and demand-driven
4. Speeding treadmill	40.2	0.8	1.8	17.4	▪ Supply shock
5. Automated away	32.7	0.8	-0.8	13.2	▪ Demand-shock
6. Classic blue collar	31.8	0.2	-3.5	4.5	▪ Demand-shock
7. Semi-skilled servicers	29.0	0.5	3.2	19.9	▪ Supply shock
8. Low earners	25.8	-0.7	0.9	9.0	▪ Supply-shock
National Average	43.7	1.7	1.4	Total: 93.7¹	

1 Difference to 100% given by industry/occupation pairings with insufficient sample size for inclusion in clustering.

SOURCE: CPS; BLS; McKinsey Global Institute analysis

- 1 The household income of the top 1 percent of households grew at 7.2 percent a year between 1994–2005, twice the average of the top 10 percent of households.
- 2 Household pretax income contains labor income, asset income, and transfers. Labor income accounts for 75–85 percent of household pretax income for the top 70 percent of households and accounts for 50 percent of household pretax income for the bottom 30 percent of households.
- 3 Only 94 percent of the labor force could be analyzed given data limitations.

Twenty-seven percent of workers in three clusters lower on the income scale had experienced low growth in both their employment markets and their incomes, reflecting declining demand for their skills in the labor market. They are largely working for employers in shrinking sectors, particularly in manufacturing.

The remaining 44 percent of workers were in three clusters characterized by high employment growth but medium or low income growth, reflecting a market oversupplied with low-skilled workers only qualified to do the lower-skill jobs found in those clusters. Workers in these clusters have too few skills to qualify for more favorable jobs.⁴

Incomes and employment for the top-earning 22 percent of workers grew fast, mostly because new technologies and new opportunities in global markets ramped up demand for advanced skills

We also assessed nine possible drivers of varying rates of labor income growth across the workforce so far identified by economists to understand their relative impact on the incomes of workers in different jobs. The study identified eight clusters of industry/occupation pairs or jobs in which employees had experienced similar income levels, income growth, and employment growth over the period. Of the nine possible drivers of changes in labor income examined by the study, two in particular reshaped demand for labor across the workforce. These were skill-biased technological change (technology, for short) and trade, foreign direct investment (FDI), and offshoring.

Technology combined with increased opportunities for trade, FDI and offshoring, as well as the growing complexity of organizations, fostered rapid growth in demand and compensation for managers and professional services workers with the requisite skills. These occupations employ the bulk of employees comprising the 22 percent of the workforce in the two highest-earning job clusters (Exhibit 2).

Exhibit 2

Cluster	Demand drivers			Institutional drivers			Supply drivers			% workforce
	SBTC	TFO	Org complexity	Perform. Pay	Deunionization	Education	Immigration	FLP	Aging	
1 "Top earner"	↑	↑	↑	↑	↓	↑	-	-	↑	7.8
2 "White-collar workers"	↑	↑	↑	↑	↑	↑	-	-	↑	14.0
3 "Artists and farmers"	Data limitations do not allow for a full analysis									1.1
4 "Front line"	↑	↑	↑	↑	↑/↓	↑/↓	-	-	↓	6.7
5 "Speeding treadmill"	-	↓	-	↓	↑	↑	-	-	↓	17.4
6 "Automated away"	↓	↓	-	↓	↓/↑	↑/↓	↓	-	↓	13.2
7 "Classic blue collar"	↓	↓	-	↓	↓	↑/↓	↓	↓	↓	4.5
8 "Semi-skilled worker"	-	↑	-	↓	↓	↑	↓	-	↓	19.9
9 "Low earner"	↓	↓	-	-	↓/↑	↑	↓	↓	↓	9.0

SOURCE: CPS; BLS; McKinsey Global Institute analysis

At the same time, technology in the form of automation combined with negative effects of trade, FDI and offshoring put direct pressure on labor demand and wages in lower paid job clusters, with some much more severely affected than others. For instance, these factors eroded jobs in manufacturing but barely had any direct effect on employment in the recreation, hospitality and tourism (RHT) sector. As with any of the drivers studied, however, they are likely to have had indirect "ripple" effects on wage levels in other job clusters.

4 Does not total 100 percent. There was insufficient sample of certain industry/occupation pairings, which did not allow for their inclusion in the clustering analysis.

Immigration and deunionization depressed income growth for low-skilled workers and for higher-skilled workers whose skills became obsolete

Our analysis shows that migration and deunionization exerted downward pressure on compensation levels for workers in repetitive manual labor occupations and administrative support roles in the two lowest-earning clusters across all industries. On average, the jobs performed by workers in this group require relatively low levels of skill and education, so they are the jobs that immigrants with few skills are most likely to get. Roughly 60 percent of the jobs in these two groups saw a substantial rise in employment numbers and in the share of employment filled by immigrants.

Deunionization was slightly less important but still considerable in its moderating effect on income growth for the lowest earning labor market clusters. For example, union membership declined by 11.2 percentage points to 11.9 percent from 1991 to 2005 in the recreation, hospitality and transportation industry, while employment in this industry grew by 2.1 percent.

Immigration and deunionization also had a negative effect on incomes for workers in manufacturing production jobs. Immigration of relatively low-skilled workers exacerbated an oversupply of employees with obsolescent skills in manufacturing industries already severely affected by automation and the offshoring of plants to lower-wage locations. For instance, the share of foreign-born migrants in production rose 7.3 percentage points to 23.5 percent between 1993 and 2005, and in machinery, electronic, and furniture manufacturing it was up 7.5 percentage point to 18.4 percent. Meanwhile, union coverage shrank by 8.1 percentage points in production to 15.7 percent in 2005 and by 9.2 percentage points in machinery, electronic, and furniture manufacturing to 12.6 percent in 2005. A bigger labor supply and weakened union bargaining power together exerted downward pressure on workers' wages in manufacturing production jobs. By contrast, immigration did not significantly affect employment or incomes for white collar and managerial workers, except insofar as the innovation generated by migrants may have increased demand and productivity growth, outcomes we did not measure.

Education is the most important mediator of future labor and supply and demand

In light of the growing demand for skills, appropriate education and training plays a critical role in giving workers access to more attractive jobs. Moreover, a shortage of American workers with the skills to fill the jobs fostered by new technologies and more complex organizations has meant that people with those skills have seen substantial income premiums. To illustrate, a purchasing manager in a US manufacturing multinational might be tasked with buying the best value inputs from anywhere in the world to supply factories in Asia. To do that job well, she would need advanced skills in a host of information technologies, the ability to coordinate the activities of colleagues and business partners in a global network, and very likely have a formal education in foreign languages—a scarce skill set, but one in increasing demand from employers. Scarcity of supply has translated into significant income premiums for those with the relevant skills. Improvements in educational attainment and achievement in the P-16 educational system are essential, as will be improvements in the ability of companies, community colleges, and other institutions of adult learning to more rapidly build the skills of the current workforce.

Rebuilding America's human capital

We believe that the experience of the 22 percent of workers qualified for attractive jobs in industries and occupations where demand and incomes have been growing over the past 15 years points to the root cause of the problem of very sluggish income growth for the majority of the workforce: too few have the skills for attractive jobs and, as a consequence, too many workers are employed in industries and occupations where demand has been falling, incomes have stood still, or both.

The challenge raised by the 27 percent of workers in jobs where demand and incomes are both falling is to equip them with skills relevant to sectors that are set to grow in the United States, not to defend failing employers or shrinking sectors. The 44 percent of workers in jobs for which demand is growing but pay is static pose a somewhat different question: how can rates of pay in these sectors and occupations improve? We do not have clear answers, but our research points to topics worth exploring. First, where does the increased supply of workers for low-skill jobs stem from? How much is it fueled by higher rates of high school dropouts with few skills, setting the lower bound of our country's enormous range of academic achievement, and how much by immigration concentrated on these jobs? Second, what role could be played by our labor market institutions that mediate supply and demand, such as unions or performance pay? For example, performance pay is much more concentrated in higher-earning segments of the workforce. Yet the shift to a service economy means that the value of differential performance among front-line individuals or teams, is higher than ever but not necessarily reflected in their incomes. For instance, nursing aides who can genuinely relate to senior patients may have a material impact on their health and quality of life, but the aides' compensation structure today is unlikely to offer them an appropriate bonus. Third, how can the productivity of human capital in these occupations be improved? This may require operations redesign across sectors like healthcare and retail, with numerous low-paid employees, and further automation.

Finally, how could we bring together these multiple drivers into coherent labor market and human capital strategies? For example, one of the fastest growing businesses is the remote data center industry—which stores and provides instantaneous access to the terabytes of data produced by the rising complexity of information-based business processes and consumer information services. Given rising business costs, there is significant economic pressure to manage remote data centers from lower cost locations outside the US. The economics of data center offshoring can be matched or improved, however, by locating these data centers in relatively low-cost US towns with access to an educated workforce from community college-based technical programs. Companies can also apply “lean” techniques to maximize the productivity of those data centers, reinforced by team-based performance pay for front-line workers whose small innovations, reductions of error rates, and culture of continuous improvement generate significant savings. In this microcosm, such an integrated approach leverages the three elements of the labor market: It harnesses the demand drivers of globalization, SBTC and rising organizational complexity; it appropriates investments in education and skills; and it strengthens labor market institutions that allow middle- and low-income front-line workers to reap the benefits of their contributions to productivity improvements. Can the United States replicate such strategies on a national scale, working across business, government, and the social sector?

Unless the mass of America's workers can develop new skills over the next ten years, the nation risks another period in which growth resumes but income dispersion persists, with Americans in the bottom and middle-earning income clusters never really benefiting from the recovery. The redevelopment challenge is enormous. But the country has met such challenges before. More than a century ago, the United States transitioned from a farm-based to an industrial economy by transforming its education system. During the Second World War, legions of unskilled women were trained in weeks to take the place of factory workers who had been enlisted, and production surged. Many different tactical measures may be needed to meet this challenge head on. But their single focus and priority should be to upgrade the skills of the US workforce as rapidly as possible.

Changing the fortunes of America's workforce: A human capital challenge

INTRODUCTION

Rising income dispersion in the United States and other developed nations has become a source of concern. Since the early 1970s, incomes for the highest US earners have raced ahead, thereby increasing top half income dispersion while the gap between low- and middle-income earners has stayed relatively stagnant. Even in the current recession, this underlying trend is not reversing.

Concern about these trends is widespread and understandable. Economists and policymakers are debating possible causes, including changes in demographics, tax policies, profit and wage shares, and the labor market, and looking for policies to strengthen the position of middle- and low-income households. Finding policies that combine acceptable levels of growth with equity will be a significant challenge. Some argue that a less open economy would be a fairer one. Others counter that greater dispersion is a natural consequence of a period of rapid growth, and that the distribution of income and wealth is remarkably stable in the long term.

This debate is hard to resolve without a clear understanding of factors driving the rise in household income dispersion and their relative significance. The research by the McKinsey Global Institute (MGI) and McKinsey Social Sector Office described in this report aims to promote that understanding. The research has three strands: (1) it provides the facts on differential rates of growth in household income and correlates these to demographic changes, (2) it maps differential rates of growth in labor incomes (the dominant component of household incomes) to the very different income and employment experiences of different groups of workers across the US labor market and (3) it explains the main drivers of differential growth in labor incomes and their relative significance to different groups of workers. The trends and interconnections revealed by this research are extraordinarily complex. Our goal has been to clarify this complicated story and help policymakers appreciate the full extent of challenges it presents.

Focus and contribution of research

While most research on income dispersion focuses on different household income groups, our work uses the labor market as a starting point. We strived to gain a more detailed and nuanced picture of income and employment growth than was previously available. In the United States labor income accounts for 75–85 percent of household pre-tax income.¹ Whatever labor market factors explain changes in labor incomes will therefore also largely explain the varying rates of income growth experienced by US households at different income levels.

The study focused on the US labor market from 1994² to 2005,³ measuring the effects of ongoing changes in the economic structure on both the levels and growth of employment and labor incomes. It examined different industries and occupations at the level of specific jobs, for example, from manual workers in the textile industry to managers in

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- 1 Household pre-tax income contains labor income, asset income, and transfers. Labor income accounts for 75–85 percent of household pre-tax income for the top 70 percent of households, and accounts for 50 percent of household pre-tax income for the bottom 30 percent of households.
 - 2 Some analysis were extended to the CPS data from 1991 to make the data comparable to other data sources used.
 - 3 The 2005 data was the most recent information available at the time the research was conducted in 2007–08.

health care. We focused on the differential growth rates of employment and labor at this very detailed level to understand the labor market changes underlying greater overall labor income dispersion.

To do this, we constructed a proprietary database that allowed us to map household (including income) information from the Current Population Survey (CPS) onto the industry and occupation information from the Bureau of Labor Statistics (BLS). This unusually detailed level of analysis made it possible to assess the relevance of industry and occupation to labor income growth for particular jobs across the entire US labor market and correlate these with data describing other characteristics of households and individuals. We were then able to identify clusters of jobs that experienced similar changes in employment and compensation over the period and match the varying fortunes of the clusters to varying rates of growth in household incomes across the US population.

Our study also examined in detail a larger number of the potential drivers of income dispersion than previous research. Several economists and other researchers have studied growing income dispersion in the United States and assessed potential drivers, but usually either one specific driver or in groups of two or three. We used a standardized methodology to review a comprehensive list of the nine most important drivers, which we identified by reviewing the literature and interviewing key thought leaders. The potential drivers for income dispersion that were examined include skill-biased technological change (SBTC); trade, foreign direct investment and offshoring (TFO); organizational complexity; performance pay (including the “superstar” phenomenon); deunionization; education; immigration; female labor force participation; and the aging in the workforce. We strived to verify the relevance of each driver to income dispersion, to measure their relative impact on different groups of workers, and to understand their interactions.

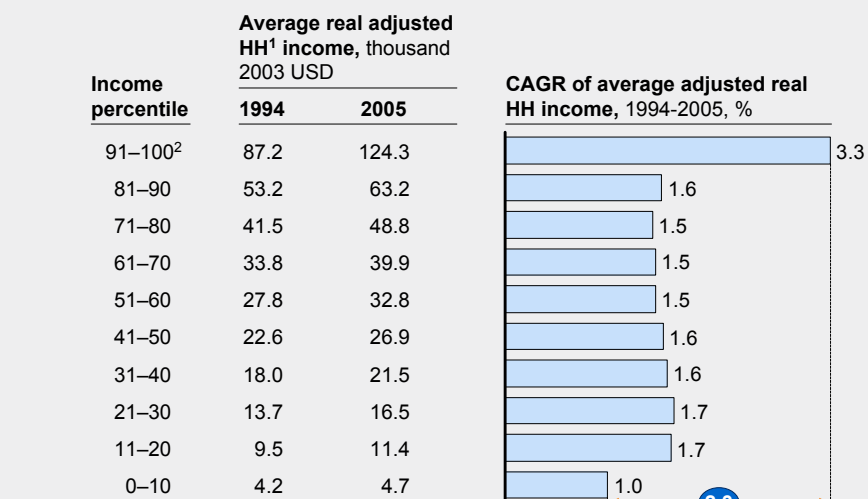
HOUSEHOLD INCOME GROWTH

Changes in labor income explain most of the increase in household income dispersion

In the United States, household income dispersion grew significantly in the period between 1994 and 2005. While average household income grew by 1.7 percent a year, the top 10 percent of households saw annual income growth of 3.3 percent, and the bottom 10 percent grew at 1.0 percent (Exhibit 1). Over 11 years, the difference in average income between the top decile of households and the decile immediately below the mid-point on the income distribution has increased from \$64,600 to \$97,400 per year, an increase of \$32,800.

Exhibit 1

US income distribution covered a wider range in 2005 than in 1994



1 Refers to household hereafter.

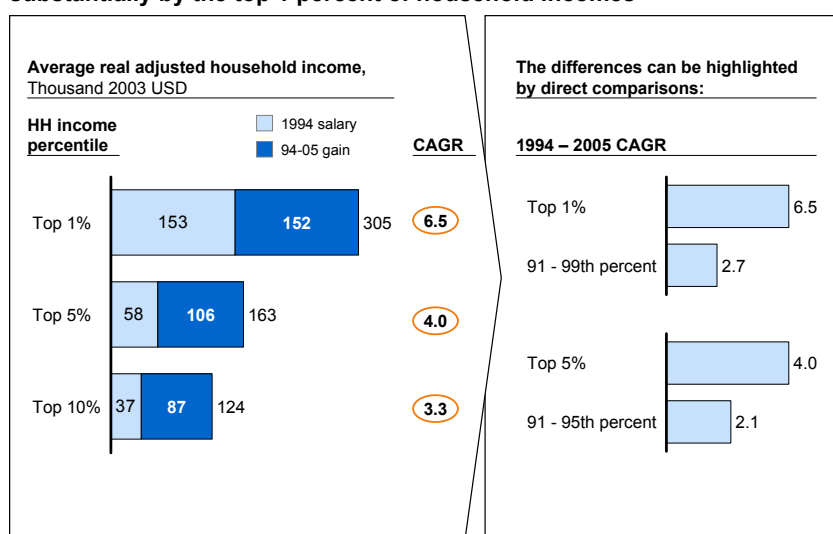
2 Household income of the top 1 percent of households grew at 6.5 percent a year between 1994-2005, 97 percent higher than the average of the top 10 percent of households.

A more detailed look at income of the top 10 percent of households⁴

A more detailed look at the top 10 percent of households shows widely dispersed income growth within the group: the top decile average was lifted by the incomes of the top 1 percent of the households. Over the period 1994–2005 for the top 1 percent, income grew at 6.5 percent a year, two to three times as fast as the next 9 percent of households, which averaged 2.7 percent income growth a year. As a consequence, the gap between the incomes of the 99th and 95th percentile more than doubled. The true growth of the top 1 percent of households is likely even higher than observed in these surveys as the CPS “top-codes” income, masking the actual income levels of the very top (Exhibit 2).

Exhibit 2

A more detailed look shows that the average of the top decile was lifted substantially by the top 1 percent of household incomes



SOURCE: CPS; BLS; McKinsey Global Institute analysis

Incomes across the top 10 percent of households fell slightly from 2000–2003, after the dotcom bubble burst, but not nearly enough to close all of the new gaps between this decile and the others that had appeared during the 1990s.

If one divides US households into four groups defined by broadly similar income levels and income growth histories, each group also has a broadly similar demographic profile. To investigate whether the differential growth of US household income was caused by demographic changes, we examined variations between the groups in demographic factors including household size; age, gender, and educational attainment of the highest-income earner.⁵ Variations between the demographic profiles of each group are certainly apparent (Exhibit 3), and some of these influence the income-earning capacity of households in the group. For instance, higher levels of educational attainment, higher female labor participation, and more labor participation from senior workers are linked to higher earnings. However, changes within each group's particular demographic profile between 1994 and 2005 were so small or so uniform across the groups that they are unlikely to explain the marked differences in income growth rates experienced by the four income groups over the period. To illustrate, labor participation of additional household members in an income group could increase the group's average earnings. However, despite a little upward movement, the percent of full-time employed non-highest-income

4 For detailed discussions of top incomes, please see Piketty, Thomas and Saez, Emmanuel, “The evolution of top incomes: A historical and international perspective,” *American Economic Review*, Vol. 96, Issue 2, May 2006, pp. 200-205.

5 The household highest-income earners account for more than 75 percent of all household income in the United States; therefore, the demographic characteristics of the highest-income earners most significantly affect household income level and growth.

earners increased by less than 1 percent across all income groups between 1994 and 2005⁶ (Exhibit 4).

Exhibit 3

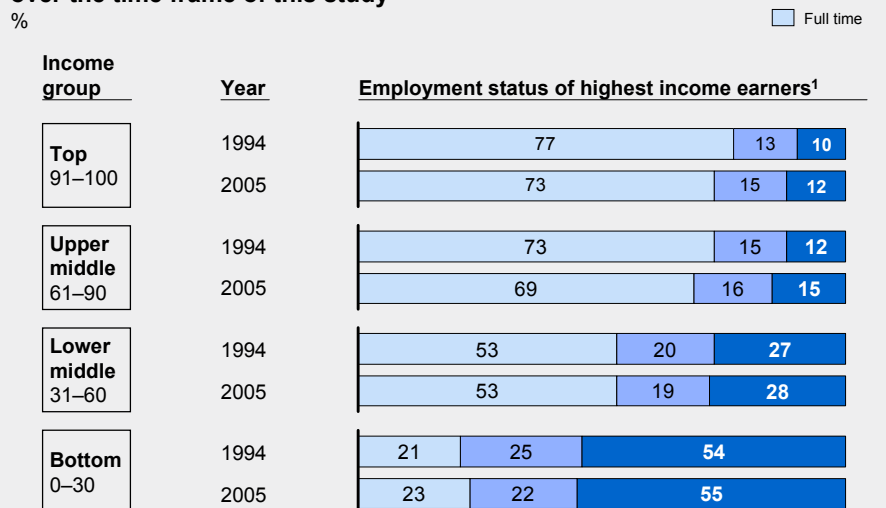
Each income groups has a prevailing demographic profile

	Household characteristics	Characteristics of highest income earner
Top 91–100	- Married couple (69%) - No children (75%) - Average 1.7 children among HH with children - Multiple incomes - Living in West or Northeast	- Male (72%) - Bachelor's (35%) or graduate degree (34%) - Average age: 50.1 years - Employed full-time, full year (83%)
Upper middle 61–90	- Married couple (63%) - No children (69%) 1.7 children among HH with children - Multiple incomes - Living in Midwest or Northeast	- Male (67%) - Some college (29%) or college degree (29%) - Average age: 47.1 years - Employed full-time, full year (80%)
Lower middle 31–60	- Unmarried (47%) or married couple (53%) - No children (65%) 1.8 children among HH with children - Single income - Living in Midwest or South	- Male (62%) - High school (47%) or some college (30%) education - Average age: 47.9 years - Employed full-time, full year (67%)
Bottom 0–30	- Unmarried - No children (67%) 2.0 children among HH with children - Single income - Living in South	- Female (53%) - High school degree or less (66%) - Average age: 50.8 years - Not employed (47%), of which 15% retirees

SOURCE: CPS; BLS; McKinsey Global Institute analysis

Exhibit 4

This demographic profile has not changed significantly over the time frame of this study



¹ Both genders, excluding children 18 and under; figures might not sum to 100 percent due to rounding

SOURCE: CPS microdata; McKinsey Global Institute analysis

Our analysis shows that, in fact, differential rates of growth in labor income were the most significant sources of differences in household income growth rates across the income distribution (Exhibits 5 and 6). Variations in tax policies, asset income, and in social security and transfer payments also modestly contributed to the differences.⁷ However,

⁶ This includes both genders and excludes children 18 and under.

⁷ For instance, rates of tax on long-term capital gains are lower and less progressive than those on ordinary income, benefiting those wealthier households able to derive a significant part of their income from capital gains. The cap on individual social security payments means social security tax becomes regressive at the top of the income scale, since the highest-earning 20 percent of tax payers all pay the same absolute amount. While the majority of households contribute more than 10 percent of their income to social security taxes, the top 2 percent only contribute 2.5 percent. None of these effects can explain a significant portion of the observed trend in income dispersion

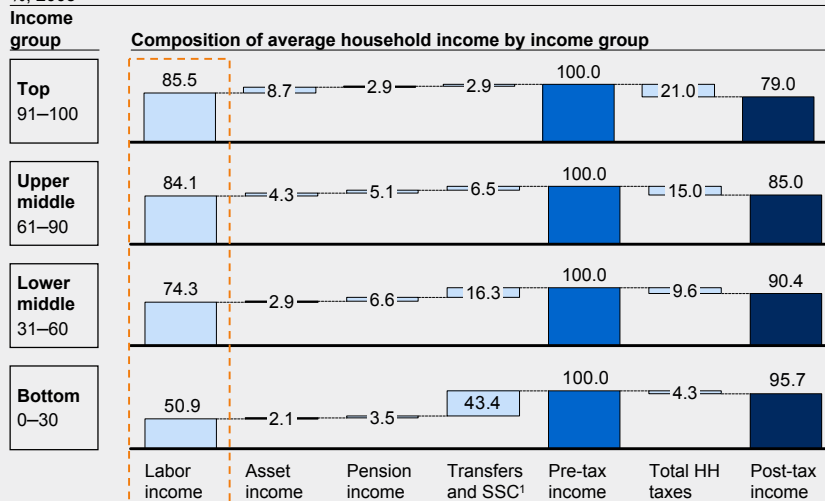
we found that labor income accounts for 75–85 percent of household pre-tax income across the income distribution, and changes in labor income accounted for 85–98 percent of changes in household incomes across the distribution. Therefore whatever factors explain differences in the labor income growth rates will also largely explain the varying rates of income growth experienced by US households at different income levels. Hence, we focused our efforts on understanding differential growth of labor income and its drivers.

Exhibit 5

Labor income is the largest source of income across all income groups

Decomposition of average household income by income group (adjusted)

%, 2005

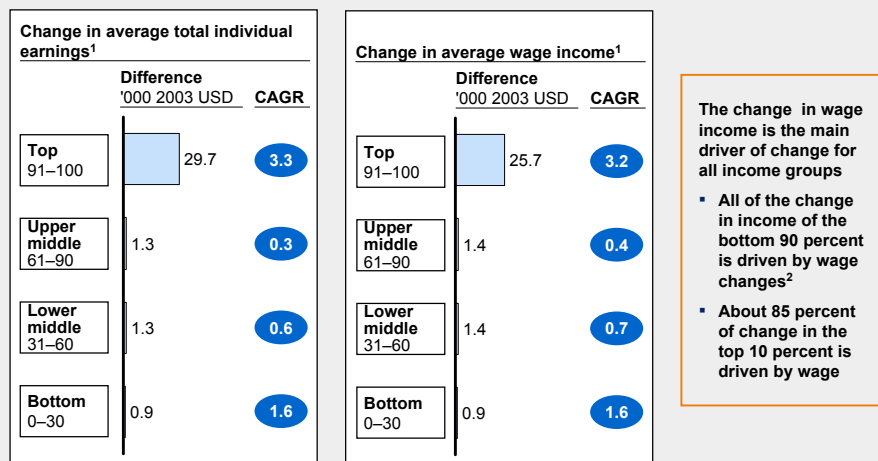


¹ Mainly public transfers, but also including alimony payments, child support, private financial assistance, etc.

SOURCE: CPS; SCF; IRS; McKinsey Global Institute analysis

Exhibit 6

Labor income has contributed the most to overall household income growth between 1994 and 2005



¹ Highest income earner data.

² Change in income is responsible for more than 100% in 31-90 percentile suggesting their other income has actually decreased.

SOURCE: CPS; SCF; BCS; IRS; McKinsey Global Institute analysis

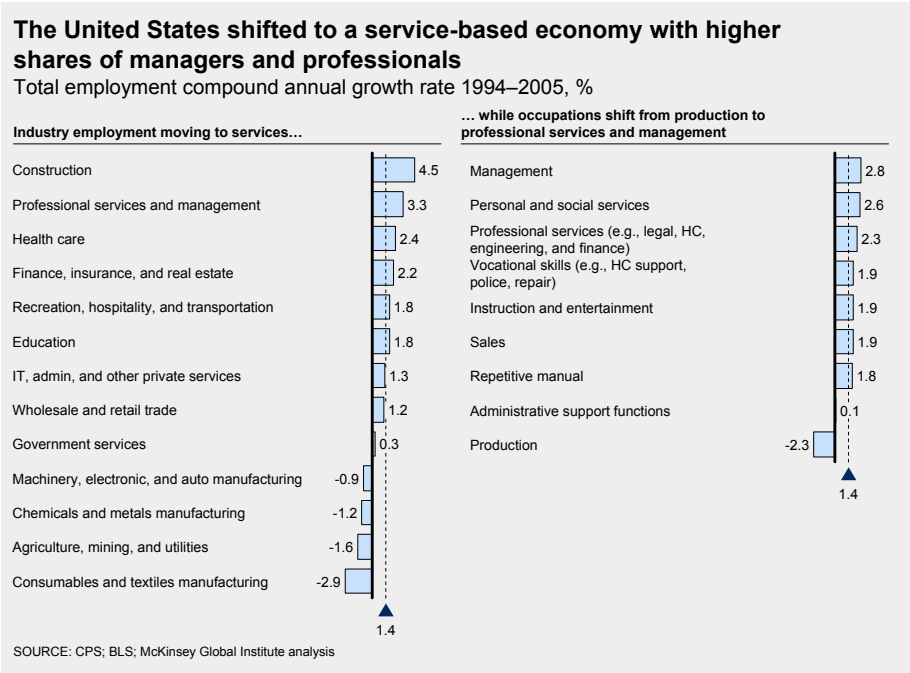
THE “PATCHWORK” LABOR MARKET

Employment growth is industry driven, while income growth is largely determined by occupation

In the past two decades significant structural changes in the economy have occurred, particularly the ongoing shift from manufacturing towards services. At the same time there have been major advances in technology, in opportunities for global trade and expansion, and in the complexity of organizations. Consequently, although US employment has grown at an average of 1.4 percent a year, different industries and occupation categories have been affected differently by these different factors, for instance, the rapid advances in the development and application of technology.

Manufacturing has seen employment reductions of 1–3 percent a year (Exhibit 7). Altogether, by 2005, 3.7 million manufacturing jobs were lost in the United States. Meanwhile, service jobs saw net growth of more than 2 percent a year. Construction was the fastest growing, at 4.5 percent a year over the period or three times the national average, followed by professional services; health care; and finance, insurance, and real estate (FIRE), which grew by 3.3 percent, 2.4 percent, and 2.2 percent a year, respectively.

Exhibit 7



The differences in employment growth rates observed across industries are greater than those across occupations. At the extremes, for example, construction grew at 4.5 percent annual growth while consumables and textile manufacturing contracted at 2.9 percent annually. In contrast management grew at 2.8 percent annually while production contracted at 1.3 percent annually. This shows that the nation’s industry mix is more important than its occupational mix in determining overall employment growth.

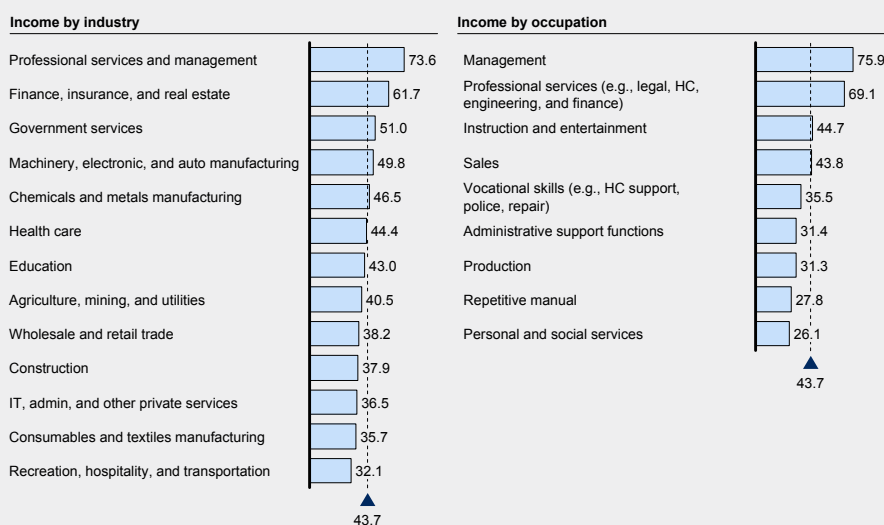
By contrast, changes in income levels and growth were much more significant by occupation than by industry. In 2005, on average, employees in professional services and management and FIRE had the highest incomes among all industries, of \$73,600 and \$61,700, respectively; that is 40–70 percent higher than the national average. Employees in the recreation, hospitality and transportation industries had the lowest income of \$32,100, which was 25 percent lower than the national average (Exhibit 8). The income of American workers grew 1.7 percent annually from 1994 to 2005, with the average American worker making \$43,700 in 2005. This growth rate was not the same for workers in all industries and occupations, however. From an industry perspective,

employees in professional services and management; FIRE; and agriculture, mining, and utilities had income growth of 3.1 percent, 2.9 percent, and 2.7 percent a year, respectively; that is at a pace 60–80 percent faster than the national average. At the other end of the scale, employees in education; recreation, hospitality, and transportation (RHT); and IT and administrative services experienced income growth 35–50 percent slower than the national average (0.7 percent, 1.0 percent, and 1.1 percent a year, respectively (Exhibit 9).

Exhibit 8

Average incomes vary widely among different industries, but even more among occupations

Average income, 2005, thousand

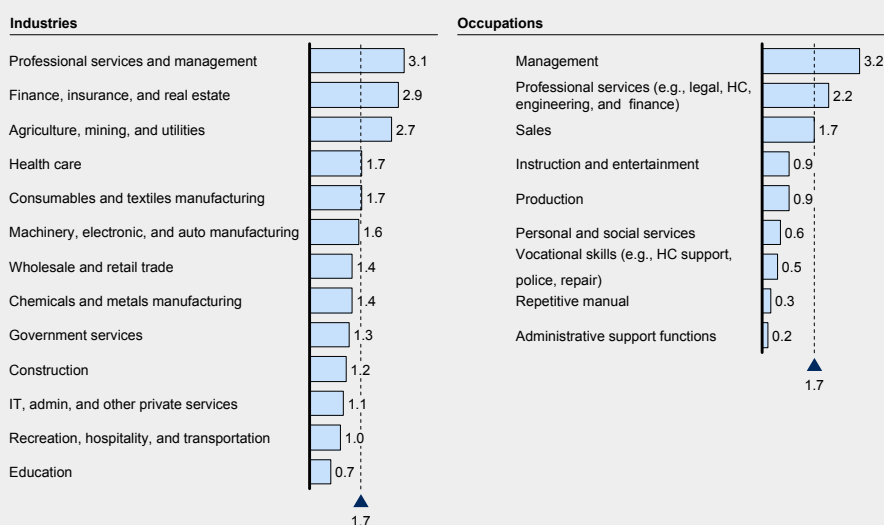


SOURCE: CPS; BLS; McKinsey Global Institute analysis

Exhibit 9

Income growth was the highest for people working in FIRE industries and in management and professional occupations

Total income compound annual growth rate 1994–2005, %



SOURCE: CPS; BLS; McKinsey Global Institute analysis

From an occupation perspective, in 2005, on average, employees in management and professional services occupations had the highest average incomes—\$75,900 and \$69,100, respectively. These were 60–75 percent higher than the national average.

Employees in personal and social services and repetitive manual labor occupations had the lowest incomes of \$26,100 and \$27,800, respectively, which were 40 percent lower than the national average. Management and professional services occupations have seen income growth of 3.2 percent and 2.2 percent a year, respectively, a pace 30–90 percent faster than the national average. On the other hand, administrative support and repetitive manual labor occupations have had income growth of 0.2 percent and 0.3 percent a year, respectively, a pace 80–90 percent slower than the national average.

Unlike levels of employment and employment growth, the differences in income levels and growth observed across occupations are much greater than those across industries. This indicates that occupation plays a bigger role than industry in determining employee compensation.

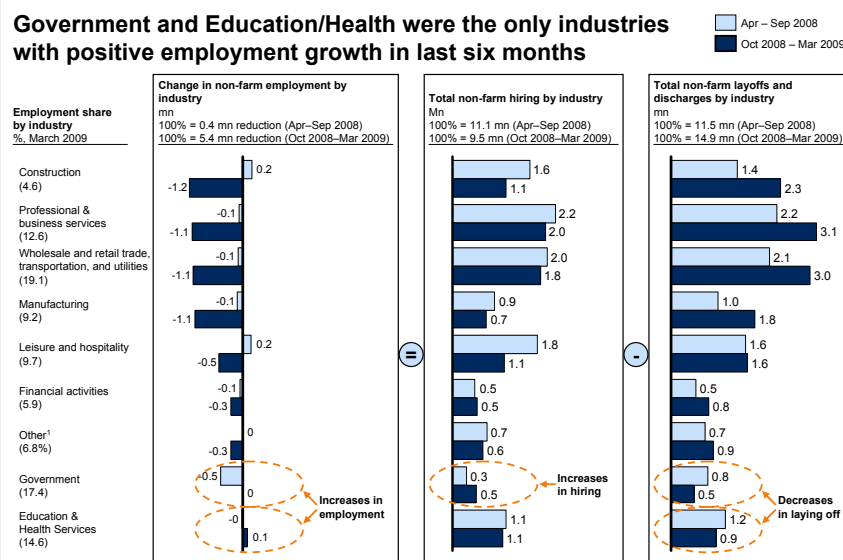
Interestingly, income growth does not completely mirror employment growth. For instance, employment in personal and social services occupations grew at a very fast rate of 2.6 percent a year between 1994 and 2005, 85 percent faster than the national average. However, labor income in these areas grew at only 0.6 percent a year, 65 percent slower than the national average, indicating potentially a relatively large supply of workers with the basic transactional skills required for this kind of work.⁸ Workers in these occupations have thus remained among the lowest paid. They earned an average \$26,100 in 2005, which was 40 percent lower than the national average.

Impact of current downturn on the labor market

The recent economic crisis has had significant impact on the US labor market. In total, 5.4 million jobs were lost between October 2008 and March 2009, 5 million (or 13 times) more than the 0.4 million jobs lost between April and September 2008. One-third of the increased job losses came from decreases in hiring, and two-thirds came from increases in layoffs (Exhibit 10).

Exhibit 10

Government and Education/Health were the only industries with positive employment growth in last six months



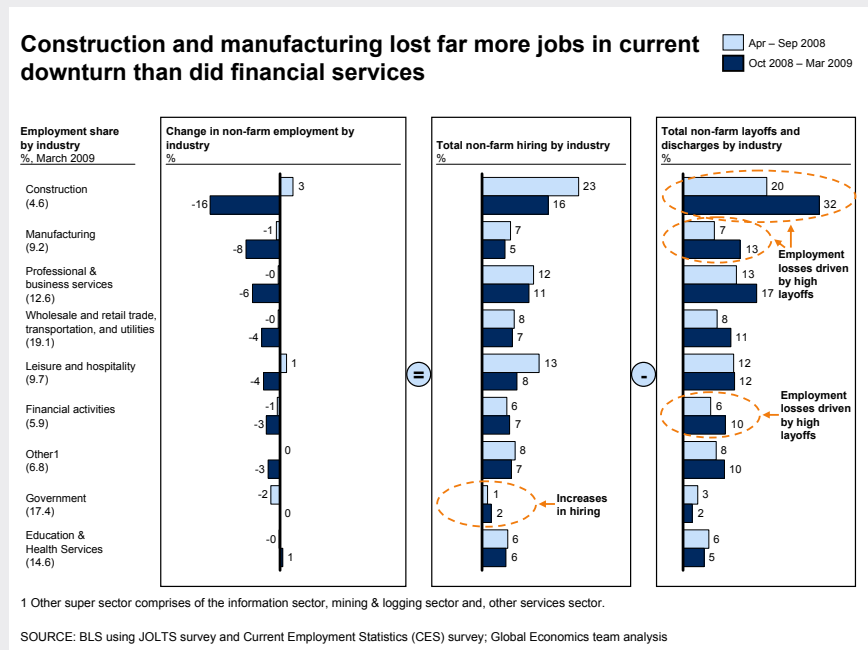
SOURCE: BLS using JOLTS survey and Current Employment Statistics (CES) survey; Global Economics team analysis

All industries experienced job losses except the government, and the education and health services industries. In fact, the government was the only industry that experienced substantial hiring increases. In the six months after September 2008, government hires were 0.5 million, 60 percent up on the 0.3 million hired in the previous six months.

8 See the Technical Notes at the end of this paper for details on transactional skills.

The five industries with the highest number of employment losses were construction; professional and business services; wholesale and retail trade; transportation, utilities, and information; and manufacturing. Altogether, they accounted for more than 80 percent of overall employment losses. In construction and manufacturing, high layoff rates (32 percent and 13 percent, respectively) combined with significantly reduced hiring rates (16 percent and 5 percent, respectively) made them the industries with the highest portion of job losses (Exhibit 11).

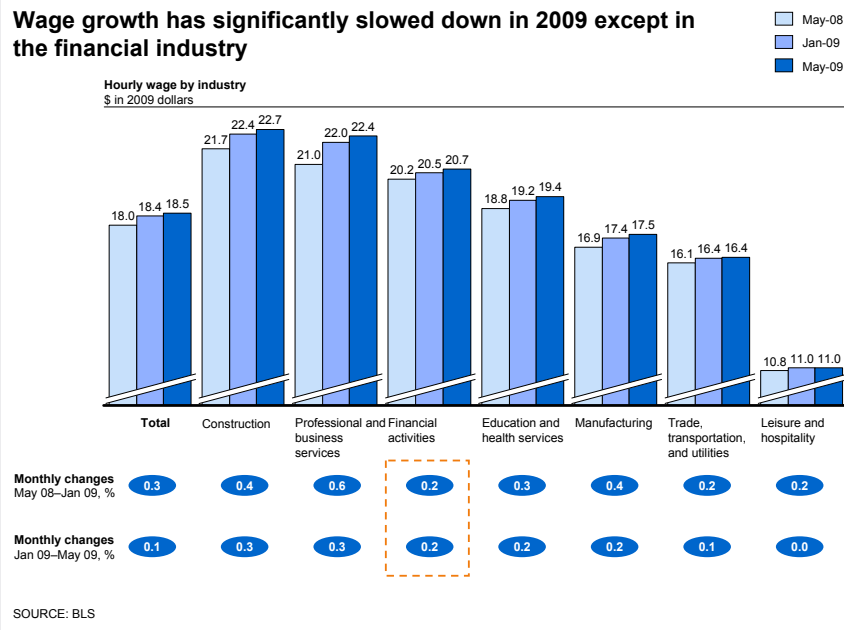
Exhibit 11



Interestingly, the finance industry has had relatively small employment losses compared to most other industries. Layoff rates in the financial industry were significantly higher in the six months after September 2008 than in the six months before (10 percent versus 6 percent). However, hiring rates stayed relatively stable (7 percent after September 2008 versus 6 percent before September 2008), leading to a smaller fraction of employment losses than in construction and manufacturing.

While data on incomes are not yet available for the period of the downturn, the change in hourly wages by industry provides early insights. In 2009, wage growth has significantly slowed down for almost all industries. On average, hourly wages increased 0.3 percent a month from May 2008 to January 2009. But from January 2009 to May 2009, they only increased 0.1 percent a month (Exhibit 12). Among the highest wage industries, professional services saw the rate of wage increases fall from 0.6 to 0.3 percent a month during two time periods investigated above, a significant slowdown, but still leading to greater income dispersion, while wage growth in financial services held steady at 0.2 percent a month before and after January 2009.

Exhibit 12



The fact that the employment trends observed in the 11 years to 2005 have continued in the subsequent downturn confirms that they reflect structural changes in the US economy going on since the early 1990s rather than a cyclical pattern. The manufacturing industry is continuing to lose its share of total employment to service industries. However, updated income information is required to assess the impact of the recent crisis on income dispersion.

The US workforce falls into nine industry/occupation pair clusters with similar income level, income growth, and employment growth

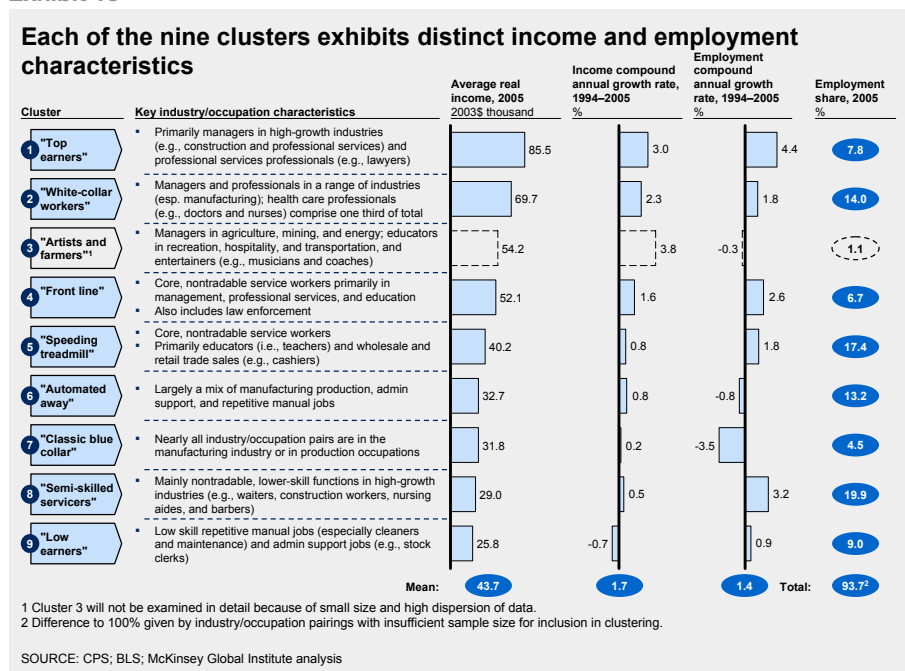
To further investigate the impact of industry and occupation on employment and income growth, we mapped income information from the Current Population Survey (CPS) onto the industry and occupation information from the Bureau of Labor Statistics (BLS). These combined data allowed us to analyze income and employment growth trends within industries and occupations at both the aggregate and individual level. We then used these trends to create clusters of occupations by industry that experienced similar levels of individual income, income growth and employment growth.

As we saw above, in the period between 1994 and 2005, on average, employment and income grew at 1.4 percent and 1.7 percent per year, respectively. Average labor income in 2005 was \$43,700. Applying a statistical algorithm to US labor market data during this period allowed us to identify clusters of industry/occupation pairs that experienced similar rates of change in employment growth and pay over the period, and that had similar levels of compensation in 2005.⁹ Altogether 94 percent of the US workforce was analyzed,¹⁰ and nine such clusters emerged (Exhibit 13). They show how the labor market has developed into a patchwork of groups experiencing notably different employment and income growth trajectories. (The data for one cluster, “artists and farmers,” was too disparate to yield reliable information, therefore we did not include it in the rest of the report.)

9 The algorithm used was the K-means algorithm, which identifies “natural” clusters of objects in a population by searching for maximum variance between clusters and minimizing variance between objects within clusters. See the Technical Notes for detailed information on the method and our procedure.

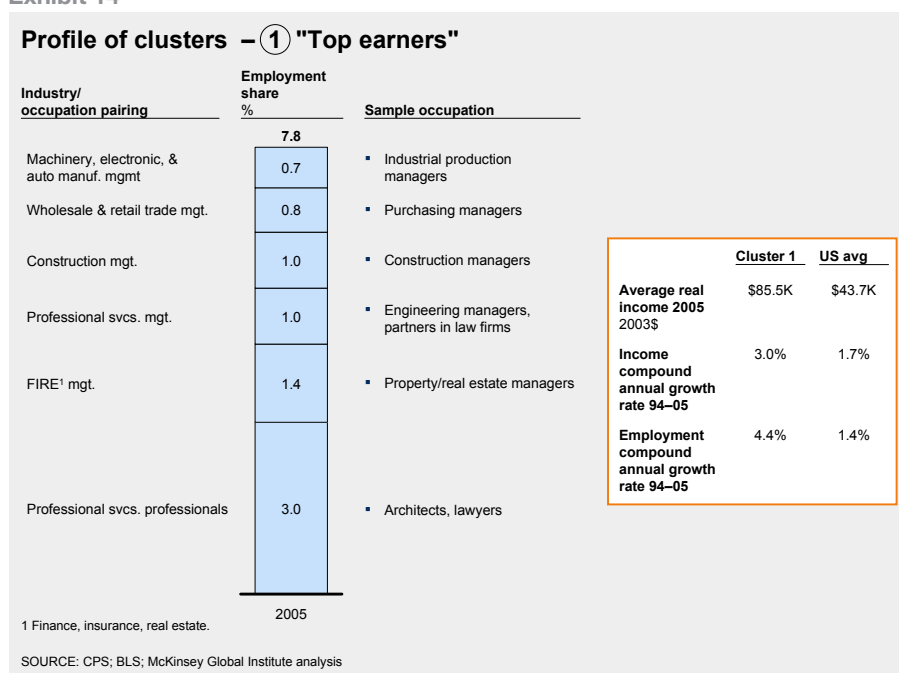
10 Where industry and occupation pairings gave a sufficient sample size.

Exhibit 13



Top earners. Employees in this cluster had the highest income in 2005, averaging \$85,500, and the fastest income and employment growth of 3 percent and 4.4 percent a year, respectively. By 2005 this cluster accounted for 8 percent of total employment (Exhibit 14). By all measures, employees in this group were gaining from the changing economic structure. The distinguishing characteristic of this group is that 100 percent of its workers are employed in occupations of management and professional services (e.g., architects, lawyers). A large majority of employees in this cluster are in two industries: professional services (50 percent) and FIRE (20 percent). An additional 10 percent each are in construction; wholesale and retail trade; and machinery, electronics, and furniture manufacturing. These are executives in global companies, architects, and lawyers who have high educational attainment and have acquired the tacit skills essential for their occupations.¹¹ This skill set includes making judgments and drawing insights that can be applied to complex communications or problem solving, to benefit from the structural economic changes and related new business opportunities.

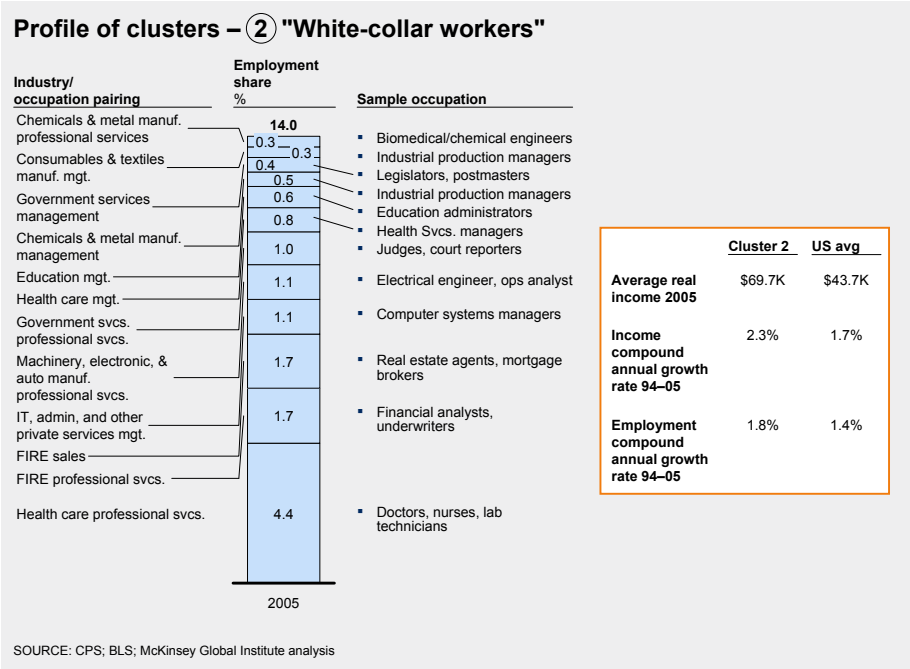
Exhibit 14



11 See the Technical Notes for details.

White-collar workers. As with the first cluster, workers in this group had above-average growth in income and employment, albeit a bit less than the “top earners,” at 2.3 percent and 1.8 percent a year, respectively. By 2005 their mean income was \$69,700, still above the national average of \$43,700, and the category accounted for 14 percent of overall US employment (Exhibit 15). As with the first cluster, 90 percent of the employees in this cluster work in occupations of management and professional services, although they are not as highly paid. What differentiates most of them from the “top earners” is the industries where they are employed: health care, government, IT, and manufacturing.¹² Interestingly, the remaining 10 percent of the “white-collar workers” work in sales occupations in FIRE industries, likely due to the very rapid expansion of the FIRE industries during the period covered in this analysis. From an industry perspective, 35 percent work in the health care industry; 25 percent are in FIRE; 25 percent are in government or private services (IT, administrative); and 15 percent work in the manufacturing industries (e.g., chemical and metal manufacturing, consumables, and textile manufacturing).

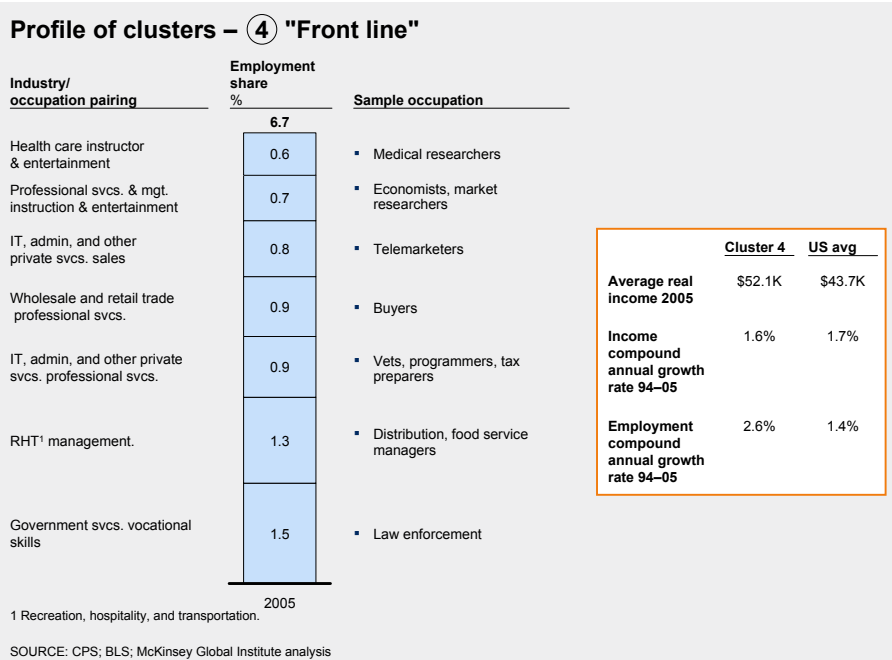
Exhibit 15



12 Net present value of retirement pension was not factored in for government employees in this report. Labor income information is not risk-adjusted.

Front line. Employment in this cluster grew at the vigorous pace of 2.6 percent annually—twice the national average—but their income gains were on par with the average of 1.7 percent a year. This growth rate still managed to put their 2005 income above the average, at \$52,100. By 2005 this cluster accounted for 7 percent of overall US employment (Exhibit 16). This cluster is in transition in terms of occupations. Half of the workers are in occupations of management and professional services (e.g. store managers), but did not map to the two previous clusters, likely because of the level of their positions and the industry they work in (e.g., wholesale and retail trade instead of FIRE). The other half work in vocational occupations (e.g., medical technicians), in the fields of instruction and entertainment (e.g., teachers, musicians), or sales (e.g., telemarketers). Similar to those in the “top earners” and “white-collar workers” clusters, those in the “front line” cluster all work in service industries: 25 percent in IT, administrative, and other private services; 25 percent in government services; 20 percent in recreation, hospitality and transportation; and the remaining 30 percent in wholesale and retail trade, professional services, and health care. Between 1994 and 2005, IT, administrative, recreation, hospitality and transportation, and health care industries experienced fast growth.

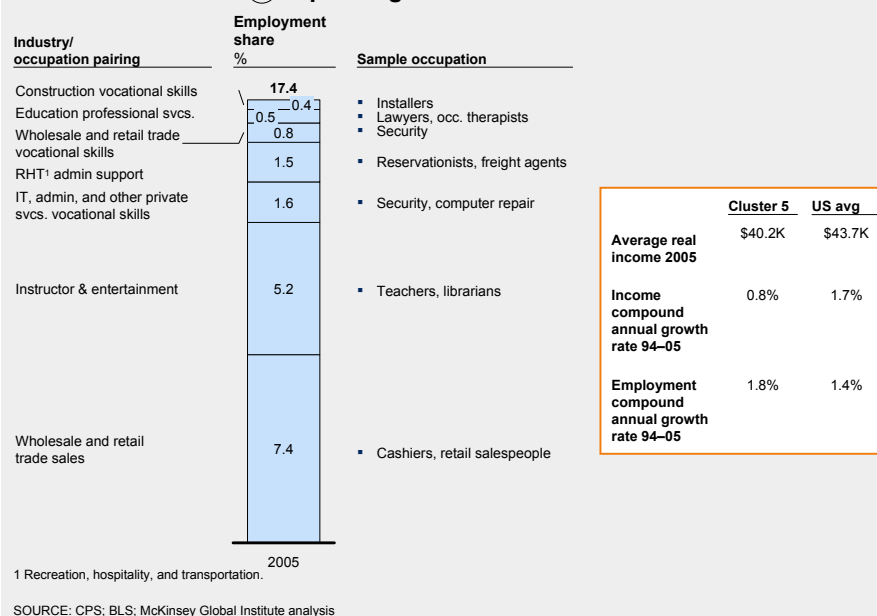
Exhibit 16



Speeding treadmill. Employment in this cluster grew at 1.8 percent a year, slightly above the average. However, workers in this cluster experienced below-average income growth, at 0.8 percent a year, and their 2005 mean income, at \$40,200, was also below the national average. By 2005 this cluster accounted for 17 percent of the national employment (Exhibit 17). All the workers in this cluster work in service industries: 45 percent in wholesale and retail trade, 30 percent in education, and 25 percent in the following three industries: IT, administrative, and other private services; recreation, hospitality and transportation; and construction. The occupations are largely of local nature: 40 percent work in sales, 30 percent in instruction and entertainment, 20 percent in vocational occupations (e.g., computer repair), and 10 percent in administrative support occupations. The nature of these jobs likely accounts for the above-average employment growth: few can be performed by offshore labor. Since these jobs, compared with the previous cluster, require relatively simpler transactional occupation skills (simple communication and interaction without the need to exercise judgments or draw insights), income growth in the cluster lags behind the average.

Exhibit 17

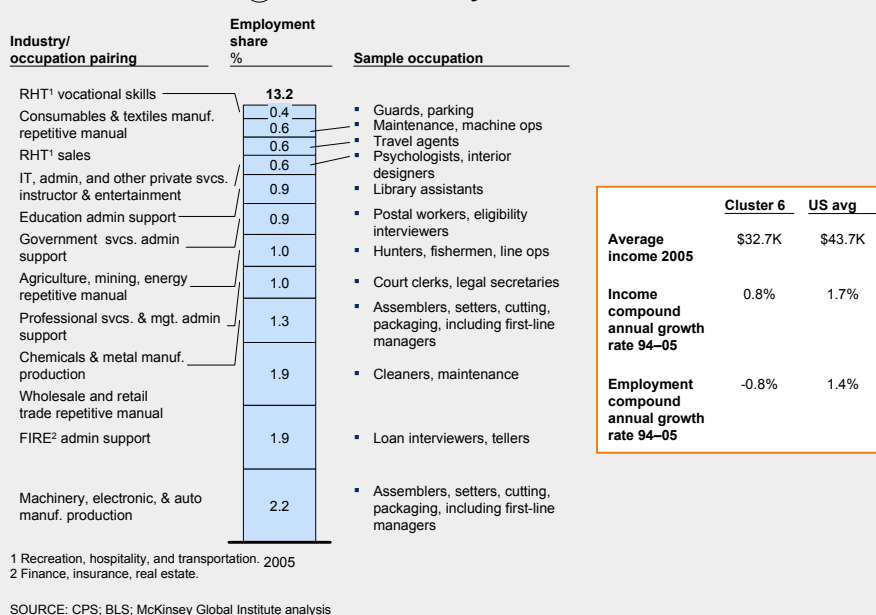
Profile of clusters – ⑤ "Speeding treadmill"



Automated away. This cluster of workers experienced a decline in employment of 0.8 percent a year, and its income growth, at 0.8 percent a year, was only half the national average. The mean 2005 income of workers in this cluster was \$32,700, roughly 25 percent below the national average. In 2005, the cluster accounted for 13 percent of the overall employment (Exhibit 18). In this cluster 40 percent work in a variety of manufacturing industries, while 60 percent work in a broad range of service industries. The great majority of workers in “automated away” work in three occupations: 35 percent in administrative support in both service industries and government services, 30 percent in production, and 25 percent in repetitive manual occupations (e.g., cleaners) in the service industries. The remaining 10 percent of the cluster work in instruction and entertainment, sales, and vocational occupations in recreation, hospitality and transportation (e.g., parking attendants, security guards, and travel agents).

Exhibit 18

Profile of clusters – ⑥ "Automated away"



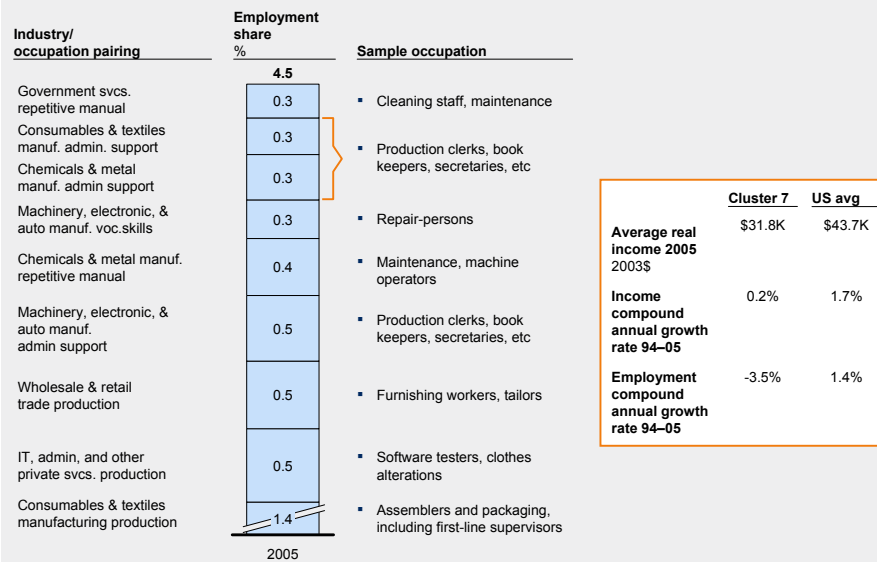
Production or manufacturing jobs in this cluster are those requiring transformational occupation skills, such as extraction and conversion of raw materials into finished goods.¹³ Many of these jobs have been automated or are performed overseas, as the US economy shifts to services, accounting for the employment decrease in this cluster. Indeed, altogether by 2005, cross-border trade has eliminated 3.7 million manufacturing jobs in the United States.

13 See the Technical Notes for details.

Classic blue collar. Employment plummeted by 3.5 percent a year in this cluster, faster than in any other, and income growth, at 0.2 percent a year, was lower than in any other cluster except “low earners,” where incomes fell. The average “classic blue collar” income was \$31,800 in 2005, at which time the cluster accounted for 5 percent of overall employment (Exhibit 19). As with “automated away,” the majority of the workers in this cluster are in manufacturing (70 percent), while 30 percent work in IT, administrative, and other private services; wholesale and retail trade; and government services industries. Also like “automated away,” the majority of “classic blue collar” workers work in three occupations: 55 percent in production, especially in consumables and textiles manufacturing (such as assemblers); 25 percent in administrative support occupations in manufacturing; and 15 percent in repetitive manual occupations in manufacturing. The final 5 percent work in vocational occupations (e.g., repair) in manufacturing. Repetitive manual workers in government services (cleaners, for example) were the only employees in this cluster not directly involved in production or manufacturing.

Exhibit 19

Profile of clusters – ⑦ "Classic blue collar"

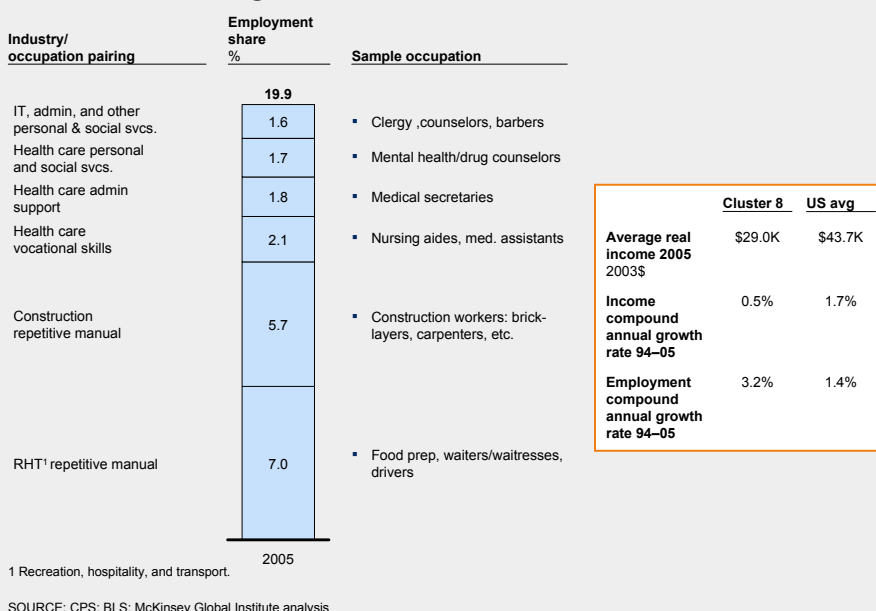


SOURCE: CPS; BLS; McKinsey Global Institute analysis

Semi-skilled servicers. With almost 20 percent of the labor force in 2005, those in the “semi-skilled servicers” cluster had the second fastest employment growth, at 3.2 percent a year (after the “top earners”). This large expansion in employment did not, however, translate into rising incomes: average income for this cluster increased by only 0.5 percent a year, to reach \$29,000 in 2005, or \$14,700 below the national average (Exhibit 20). One-third of the workers in this cluster work in each of three service industries: construction; health care; and recreation, hospitality and transportation. This cluster is where the majority of repetitive manual workers fall: 65 percent of the workers work in repetitive manual (e.g., construction workers, waiters); 15 percent in personal and social services (e.g., barbers); 10 percent in administrative support occupations (e.g., medical secretaries); and 10 percent in vocational occupations (e.g., nurses’ aides). Although employment grew in line with the general shift to higher employment in services, income growth lagged behind the national average, likely a reflection of the lower educational and transactional occupation skill set required for these jobs.

Exhibit 20

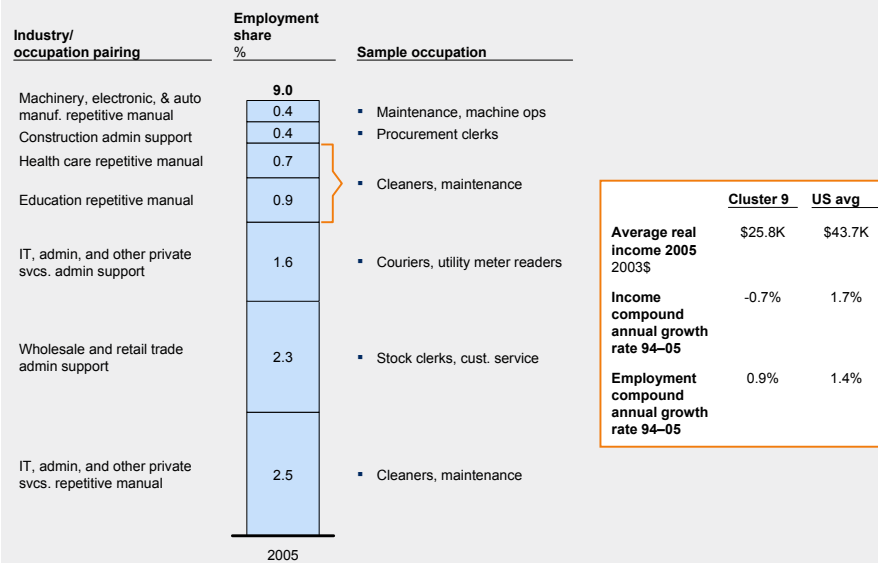
Profile of clusters – ⑧ “Semi-skilled servicers”



Low earners. At the bottom of the income scale, those in this cluster made an average of \$25,800 in 2005. Incomes in this group actually declined at a rate of 0.7 percent a year, although employment was still growing at 0.9 percent a year, slightly less than the national average. By 2005 this cluster accounted for 9 percent of employment (Exhibit 21). Almost all workers in this cluster work in service industries: 45 percent in IT, administrative, and other private services; 25 percent in wholesale and retail trade; 25 percent in education, government services, and construction; and 5 percent in manufacturing. The cluster is completely defined by two occupations: 50 percent do repetitive manual labor (e.g., maintenance), and 50 percent provide administrative support (e.g., customer services), both requiring less demanding transactional occupation skills.

Exhibit 21

Profile of clusters – ⑨ "Low earners"



SOURCE: CPS; BLS; McKinsey Global Institute analysis

Artists and farmers

The “artists and farmers” cluster is very small, representing only 1.1 percent of the total working population, and the data on its few members are widely dispersed. These factors limited the reliability of any conclusions drawn from this group, and for this reason we chose not to include it in any further analysis. The cluster had the fastest income growth of any group, at 3.8 percent a year, pushing average incomes to the upper-middle level of \$54,200 by 2005. Despite rising incomes, however, employment growth for this cluster was the third lowest, declining at a rate of 0.3 percent a year. It is an interesting cluster nonetheless for the variety of jobs it encompasses. From an industry standpoint, 65 percent of workers in the “artists and farmers” group work in agriculture, mining, and energy industry, and 35 percent in recreation, hospitality and transportation. As for occupations, 65 percent work in management and 35 percent in instruction and entertainment.

The patchwork labor market is defined at its extremes by the occupations of employees, while the middle is defined by the industry of employees

The “top earners” and “white-collar workers” have experienced high growth in both employment and income, reflecting high labor market demand¹⁴ (Exhibit 22). These two clusters of workers outperformed the rest of the labor market by a wide margin on both employment and income measures. They had the fastest income growth, faster than average employment growth, and higher 2005 incomes, although “white-collar workers” trailed the “top earners” substantially in all three categories. Together these clusters account for 22 percent of the US workforce. Employees in both clusters could attribute their prosperity to their occupation: 95 percent have either management or professional services jobs, categories that benefited tremendously from the shift from manufacturing to services in the economy. High demand from service firms for suitably qualified employees enabled managers and highly skilled workers in service sectors to negotiate high wages, as the market for their kinds of jobs expanded. What differentiates these two clusters somewhat is the industry where individuals were employed. Specifically, while the majority of the workers in the “top earners” work in professional services (50 percent) and FIRE (20 percent), the majority of “white-collar workers” work in health care (35 percent) but also in FIRE (25 percent) industries.

Exhibit 22

Cluster	2005 Income \$'000s in 2003 dollars	Income compound annual growth rate %, 1994–2005	Employment compound annual growth rate %, 1994–2005	2005 Employment share %	Supply & demand interaction
1. Top earners	85.5	3.0	4.4	7.8	▪ Demand-driven
2. White-collar workers	69.7	2.3	1.8	14.0	▪ Demand-driven
3. Front line	52.1	1.6	2.6	6.7	▪ Supply shock and demand-driven
4. Speeding treadmill	40.2	0.8	1.8	17.4	▪ Supply shock
5. Automated away	32.7	0.8	-0.8	13.2	▪ Demand-shock
6. Classic blue collar	31.8	0.2	-3.5	4.5	▪ Demand-shock
7. Semi-skilled servicers	29.0	0.5	3.2	19.9	▪ Supply shock
8. Low earners	25.8	-0.7	0.9	9.0	▪ Supply-shock
National Average	43.7	1.7	1.4	Total: 93.7¹	

1 Difference to 100% given by industry/occupation pairings with insufficient sample size for inclusion in clustering.

SOURCE: CPS; BLS; McKinsey Global Institute analysis

“Front line” has experienced high growth in employment but medium growth in income. This cluster represents 7 percent of the labor market and is in transition in terms of occupations. Half the workers in this cluster work in management and professional services occupations but with lower incomes than the two clusters above. The other half work in vocational (e.g., store managers), instruction and entertainment, and sales occupations, similar to workers who are in the “speeding treadmill” cluster. “Front line” managers and professional services workers had slower income growth compared to those in the “top earners” and “white-collar workers” clusters often owing to prevailing circumstances in the industry in which they work (e.g., recreation, hospitality and transportation rather than FIRE). Similarly, “front line” workers in vocational, instruction and entertainment, and sales occupations saw faster income growth than those in the “speeding treadmill” category, often because they worked in high-growth industries (e.g., health care rather than wholesale and retail trade).

¹⁴ “High” and “low” employment and income growth is defined as being 30 percent higher or lower than the national average; everything in between is described as “medium” growth.

The “speeding treadmill” and “semi-skilled servicers” have experienced high growth in employment but low growth in income. All workers in these clusters were employed in core nontradable service industries (e.g., education, wholesale and retail trade, health care, construction). Employment in these clusters increased in line with the general shift to higher employment in services; however, income growth lagged behind national average, likely due to oversupply of those with less demanding transactional skills required for the jobs. Altogether, workers in these clusters represent 37 percent of the labor market. They are the “new” middle class in the changing economic structure with growing employment and slower income growth. The “front line” cluster represents the upside opportunity for those on the “speeding treadmill” if they move to higher-growth industries, while the “semi-skilled servicers” cluster represents the potential downside, if they move from vocational skilled to repetitive manual jobs.

The “automated away” and “classic blue collar” clusters have experienced negative growth in employment and low growth in income. These were the only clusters to have experienced declines in employment, reflecting their industry and occupations: these clusters represent the intersection between manufacturing industries (50 percent of workers in this industry), hit hardest by the structural shift to services in the US economy, and production jobs (35 percent of workers in this occupation), the occupations most vulnerable to automation and offshoring. Not only has the number of jobs been reduced, but those remaining have been the focus of increased competition from an expanding pool of remaining workers. “Automated away” did slightly better as a cluster because, unlike “classic blue collar,” it includes some jobs in fairly high-growth industries, such as recreation, hospitality and transportation; FIRE; and professional services. Altogether, the two clusters represent 18 percent of the labor force. They were the middle class in the “old” economic structure, which is shrinking in the changing economic structure. The “low earners” cluster represents the potential downside for these workers, as they move into increasingly administrative or repetitive manual jobs.

The “low earners” cluster has experienced low growth in employment and negative growth in income. Nine percent of the workforce is in this cluster. It is the only cluster with negative income growth, which was primarily a result of the occupations it comprises: 50 percent of workers are in repetitive manual occupations (e.g., maintenance), while the other 50 percent work in administrative support occupations (e.g., customer services). This cluster represents the least educated workers, with less demanding transactional occupation skills, occupying the bottom of the labor market in both the “new” and “old” economic structure.

Incomes are subject to industry-based premiums, especially in more highly compensated occupations

Not surprisingly, workers in different occupations within an industry have very different income levels and growth (e.g., senior executive versus maintenance staff within health care). However, our results show a high variation in income level and growth for the same occupation across different industries. In general, for a given occupation, professional services and FIRE industries offer higher income and income growth, while education, IT and administrative, recreation, hospitality and transportation industries offer lower income and income growth. Furthermore, industry-based income premiums are larger both absolutely and proportionately in more highly paid occupations.

For instance, management and professional services occupations primarily fall in the top three clusters (“top earners,” “white-collar workers,” and “front line”). “Front line” managers in recreation, hospitality and transportation industries averaged \$51,900 in income in 2005, while “white-collar workers” managers in health care averaged \$68,300: a 30 percent premium. “Top earners” managers in the professional services industry averaged \$100,000 in income. This represents an additional 60 percent premium, totaling a 90 percent premium over “front line” managers.

Similarly, administrative and repetitive manual occupations primarily fall in the lower four clusters (“automated away,” “classic blue collar,” “semi-skilled servicers,” and

“low earners”). The average incomes in these clusters are \$32,700, \$31,800, \$29,000, and \$25,800, respectively. Yet moving from the IT, education, health care, as well as recreation, hospitality and transportation industries (which are dominant in the last two clusters “semi-skilled servicers” and “low earners”), to the professional services, FIRE, wholesale and retail trade, and manufacturing industries (which are dominant in the “automated away,” and “classic blue collar” clusters) is accompanied by an income increase of 15–20 percent—some progress, though significantly less than the 90 percent difference observed between more highly compensated management and professional services occupations in different industries.

THE MOST POWERFUL INFLUENCES ON THE LABOR MARKET

Nine drivers associated with growing income dispersion were selected for this study

Economists and others who have studied growing income dispersion in the United States have suggested the importance and estimated the impact of various drivers potentially responsible for the trend. These are usually examined individually or in twos and threes, and often only in relation to a portion of the overall workforce. For our study, we sought to gather and examine the most frequently cited drivers of growing income dispersion, in order to verify the relevance of each to the overall trend, and understand their relative impact on overall income dispersion.

We reviewed the economic literature and interviewed thought leaders in the field to build a comprehensive list of drivers for further assessment. Ultimately we investigated nine drivers of income dispersion. The first three drivers influence the demand for labor, and comprise skill-biased technological change (SBTC), trade, foreign direct investment and offshoring (TFO), and organizational complexity. The next three influence the supply of labor, and comprise female labor force participation, the aging of the workforce, and immigration. The final three drivers: education, performance pay (including the so-called “superstar” phenomenon, an extreme form of performance pay), and deunionization, are all institutional arrangements in the labor market. These arrangements, made by society with individuals, in the case of education, or between individual institutions and their employees, have a direct effect on individuals' income and employment outcomes and an indirect effect on supply and demand dynamics in the labor market. These nine drivers were the most prominent found in our research and selected for detailed analysis.

We assembled comprehensive case studies¹⁵ for each driver. A brief summary of each driver and its overall impact is presented below, followed by an analysis of their impact on the “Patchwork Labor Market” clusters.

Skill-biased technological change (SBTC). Skill-biased technological change is frequently cited as a key determinant of income dispersion. From the body of literature emerges opposing viewpoints regarding the role of SBTC on wage dispersion. One side believes that advances in technology lead to increased demand for skilled workers. Workers who specialize in non-routine cognitive tasks benefit in particular, while many middle-income jobs with routine tasks are displaced as a result of increasing computerization.¹⁶ The pay premiums for highly skilled workers consequently contribute to widening income dispersion. On the other hand, authors who view the rise in wage dispersion, especially in the 1980s, as an “episodic” event triggered by institutional policies, such as minimum wage,¹⁷ do not believe there exists a substantive case for SBTC's contribution to income dispersion.

¹⁵ These case studies will be separately published.

¹⁶ Autor, David, Katz, Lawrence, and Kearney, Melissa, “The Polarization of the US Labor Market,” NBER working paper, 2006.

¹⁷ Card, David and DiNardo, John E., “Skill-biased technological change and rising wage inequality: Some problems and puzzles,” *Journal of Labor Economics*, October 2002, 733–83.

Over recent decades, technology changed the labor demand and supply equilibrium across the labor market. It is now widely accepted that the adoption of new technology and related process innovations in the workplace are skill-biased, i.e., they favor some employees, namely those with the cognitive, technical, or collaborative skills that allow their work to complement or be leveraged by those innovations, over others with transactional or repetitive manual skills that can be easily substituted or replaced. Our analyses indicate that SBTC affected the domestic workforce in both positive and negative ways, depending on the segment of the labor market in which they fell.

We broadly divided the US labor force into three classes of workers. The first, highly trained and adaptable workers, profited from increasing demand for non-routine analytical and interactive tasks driven by SBTC. Rising need for these employees and emerging talent shortages allowed them to win wage premiums. Examples from this group include “white-collar workers” directly linked to new technologies, such as IT workers, scientists, or engineers. They have seen their wages increase at much higher rates than average workers between 1997 and 2005. Though the average gain during this period was just 2.6 percent annually, scientists, for example, saw their wages increase by almost 4 percent a year (Exhibit 23). The second group includes routine manual or cognitive workers who face automation of their jobs. In their case, the advent of SBTC has depressed their share of employment and wages. The last group, workers in non-routine manual tasks that cannot be easily automated, has been largely unaffected by the technology trend (Exhibit 24). The workers in this group (e.g., police, maids) are still experiencing demand growth, while their traditionally modest wages have barely grown (Exhibit 25).

Exhibit 23

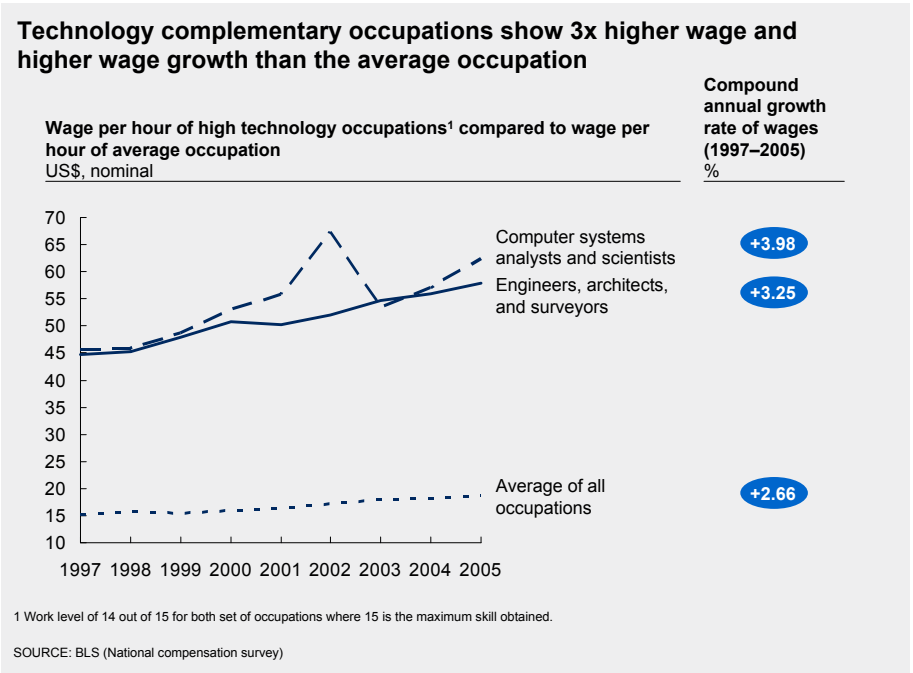


Exhibit 24

There has been an increasing demand for tasks that require human skills complemented by technology

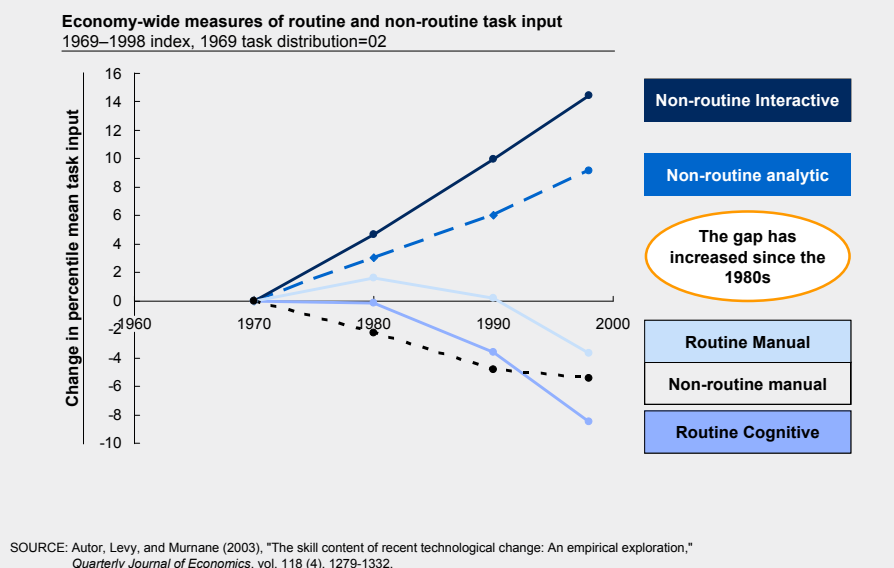
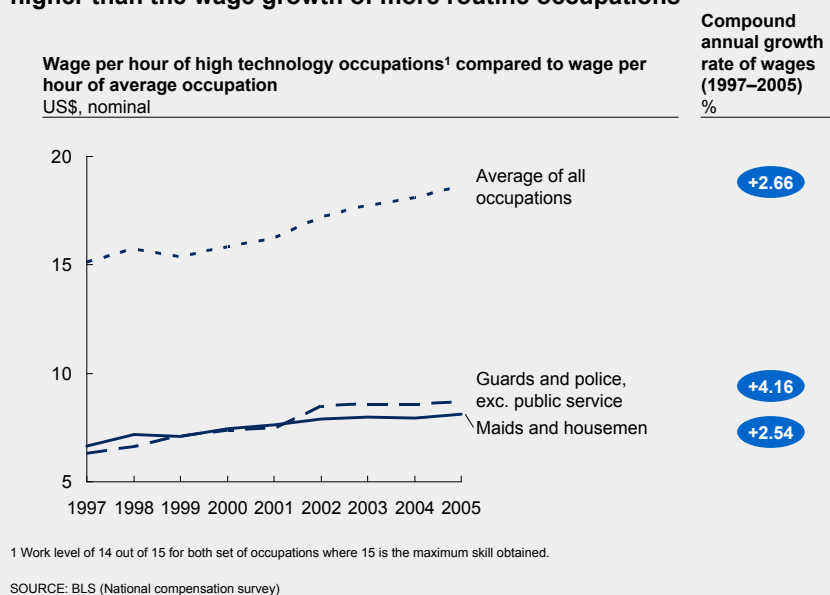


Exhibit 25

Non-routine manual occupations kept pace with average wage growth, higher than the wage growth of more routine occupations



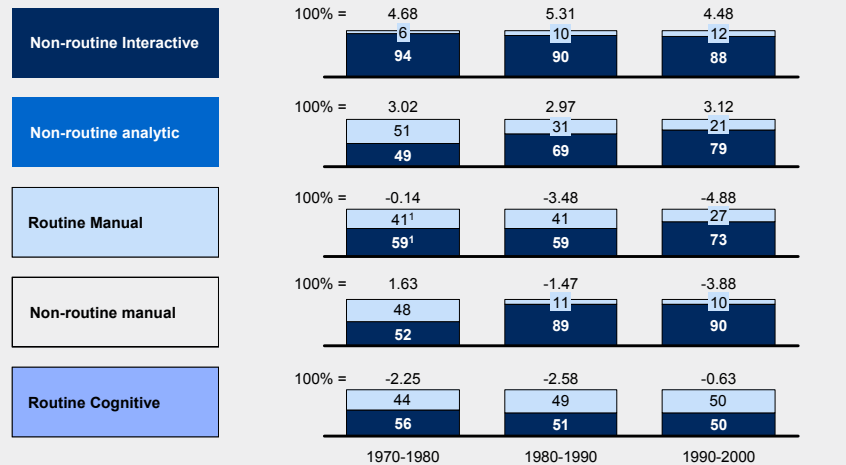
SBTC shapes the labor market by changing the occupational mix. Technology affects the demand for occupations in two key ways: some occupations are created or expanded due to the growing emphasis on technology while others shrink or are eliminated altogether, as jobs are automated.

SBTC also widens income dispersion between occupations involving different types of task within a given industry (Exhibit 26). Notice that most of the task shifts occurred within, rather than across, industries in the past three decades. On one hand, SBTC is creating more opportunities for non-routine analytic tasks within industries. Increasingly sophisticated technology demands more advanced skills to manage complex work environments, for which workers with the necessary skill sets receive wage premiums. On the other hand, technology automates away some tasks, thereby depressing the share of employment and wages for workers who used to perform them, in particular those in routine manual and cognitive positions.

Exhibit 26

Major part of task shifts in US occurred within industries

Decomposition of task shifts into between vs. within industry shifts
1970–2000, percentage share of change in mean annual task percentile¹



¹ Split between 140 consistent Census Industry Code (CIC) industries (59 in manufacturing, 81 in nonmanufacturing).
² Share in sum of absolute shifts, positive between industry shift of 0.33 vs. negative within industry shift of 0.47

SOURCE: Autor, Levy, and Murnane (2003), "The skill content of recent technological change: An empirical exploration," *Quarterly Journal of Economics*, vol. 118 (4), 1279-1332.

Last but not least, SBTC influences income dispersion within certain industry/occupation pairs where, with additional training and new skills, workers may qualify for tasks requiring those additional skills (Exhibit 27). An example of this would be auto mechanics. With more and more complicated electronics in newer cars, auto mechanics needed to gain additional skills to be able to repair and maintain them. Some traditionally trained mechanics have been leaving the auto repair trade, but those able to stay and gain new skills have been rewarded with above average hourly wages. The wage per hour for a level 8 auto mechanic, who can fix modern onboard computers or new "green" cars, nominally increased almost 7 percent a year between 1997 and 2005. A "traditional" level 4 mechanic, on the other hand, experienced flat nominal wages during the same period, which means they lost money in real terms (Exhibit 28).

Exhibit 27

In the US, technology increases wage bifurcation between and within occupations depending on the task composition of jobs

	Occupation (example)	Work level ¹ 15 = max and 1 = min	Employment change	Wage growth nominal, 1997–2005
Average	Average of all occupations	No work level	+	2.66%
A Non-routine manual tasks	Maids and housemen	Level 01 – lowest in the occ.	N/A	2.54%
	Guards and police, exc. public service	Level 01 – lowest in the occ.	N/A	4.16%
B Routine cognitive/manual tasks	Production worker	Level 05 – highest in the occ. But med work level overall	-	1.48%
	Automobile mechanic	Level 04 – mid work level	-	0.07%
C Non-routine interactive/analytic	Auto mechanic expert	Level 14 (out 15)	N/A	6.93%
	Engineers, architects, and surveyors	Level 14 – Highest in the occ. Level 05 – Mid work level	+	3.98% 3.55%
	Computer systems analysts and scientists	Level 08 – highest in the occ.	+	3.25%

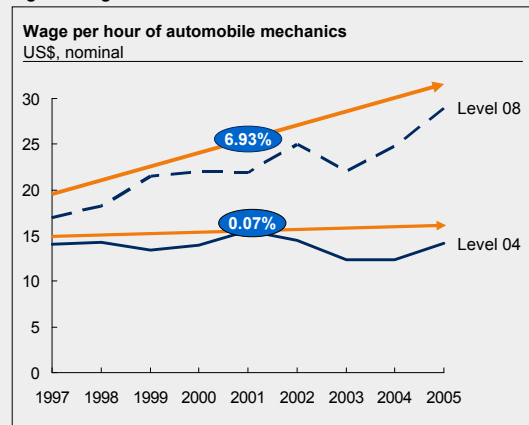
¹ The National Compensation Survey (NCS) produces earnings data by levels of work within an occupation. The duties and responsibilities of a job are evaluated using four factors (such as knowledge and complexity of the work) to determine a work level. Levels vary by occupation, ranging from 1 to 15. For example, level 1 may represent an entry level, while level 15 may represent master-level skills.

SOURCE: BLS (NCS); McKinsey Global Institute team analysis

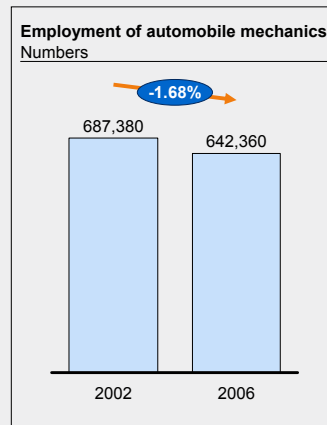
Exhibit 28

Job with routine and manual tasks have stagnant wage growth within an occupation

Wages of automation susceptible lower skilled mechanics remained stagnant while higher skilled mechanics enjoyed significant growth...



...despite the reduction in number of automobile mechanics



SOURCE: BLS (NCS) for wage data; OES for employment data

Trade, Foreign Direct Investment-FDI, Offshoring (TFO). This driver captures the changes generally referred to as “globalization.” Its effect on the labor force and incomes is widely debated in the literature. Opinions range from those who believe globalization, in particular trade, is undermining the welfare of the middle class to those who question whether trade has an impact wages at all.¹⁸ There is general agreement that if it does indeed affect wages, globalization generally has a positive impact on managers while it has a negative impact on production workers.

TFO was a major factor altering the economic structure of the US labor force from 1994 to 2005. Cross-border trade of goods and services and employment due to foreign direct investment (FDI), both in the United States and made by US companies abroad, were important influences on domestic labor supply and demand dynamics. The effects of services offshoring,¹⁹ despite the public attention often focused on it, were minimal over this period.

The United States was the world's largest importer and exporter in the early 1990s, and is the largest importer and second largest exporter in 2005. Although the position of the United States relative to other countries has remained largely unchanged, the nature of the United States' trade balance relative to the rest of the world has changed substantially since the early 1990s. In real terms, the US trade deficit ballooned from \$31 billion to \$658 billion from 1991 to 2006 (Exhibit 29). The balance in manufactured goods (not including agricultural or other goods) accounts for much of the deficit, rising from \$79 billion to \$509 billion²⁰ from 1992 to 2006. Meanwhile, the United States trade surplus in services increased from \$78 billion to \$88 billion (Exhibit 30).

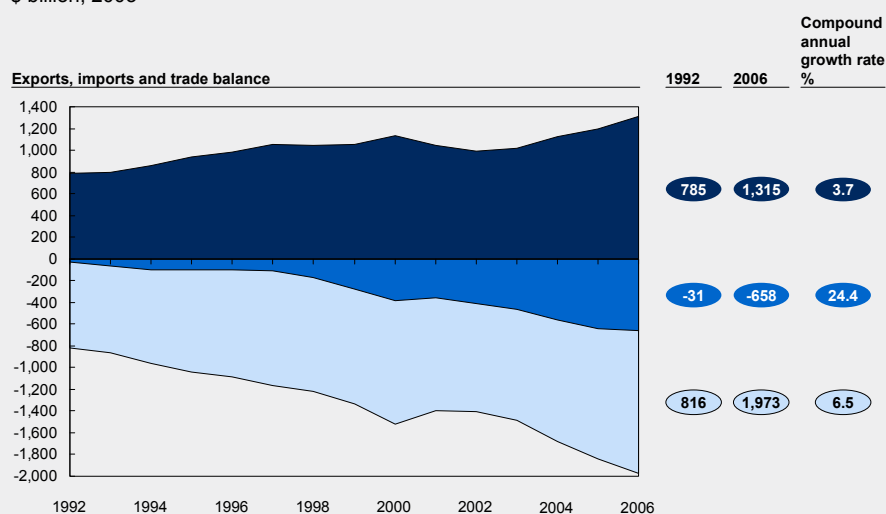
18 Paul Krugman, “For Richer,” *New York Times Magazine*, October 20, 2002, p. 62.; Lawrence, Robert, *Blue Collar Blues: Is Trade to Blame for Rising US Income Inequality?* Policy Analyses in International Economics Series, vol. 85. Washington, D.C.: Institute for International Economics, 2008.

19 Regev, Tali and Wilson, Daniel, “Changes in income inequality across the U.S.” FRBSF *Economic Letter*, September 2007.

20 In 2003 Dollars

Exhibit 29

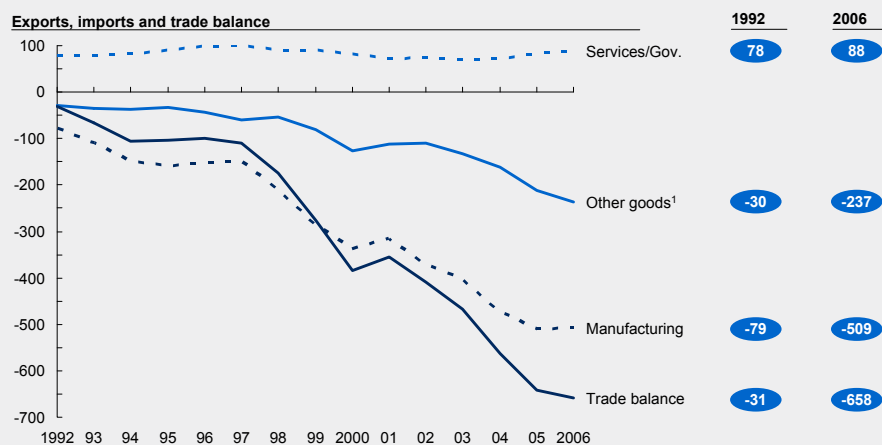
The US trade balance has worsened over time, as the growth rate in imports has outpaced exports
\$ billion, 2003



SOURCE: TradeStats Express; Office of Trade and Industry Information; International Trade Association; Department of Commerce; BEA; McKinsey Global Institute analysis

Exhibit 30

The growing imbalance is largely driven by the manufacturing sector, which accounted for 95 percent of the deficit on average from 1992 to 2006
Real 2003 \$, billion



¹ Other goods includes agriculture products, mining, and petroleum.

SOURCE: TradeStats Express; Office of Trade and Industry Information; International Trade Association; Department of Commerce, "Operations of U.S. Multinational Companies," BEA; McKinsey Global Institute analysis

For the United States, the overall direct employment effect of cross-border trade was negative because of the ballooning trade deficit. This deficit can be translated to an implied net job deficit of approximately 3.8 million jobs (2.7 percent of employment) in 2005, up from 200,000 jobs (0.2 percent of employment) in 1992.²¹ Manufacturing and agriculture combined "lost" employment of roughly 4.1 million jobs or 25 percent of industry employment; up from about 1.6 million jobs (9 percent of industry employment) in 1992. All major manufacturing industries have lost jobs, especially the textiles and apparel, metals, electronic, and auto industries (Exhibit 31). Services, on the other hand, generated 300,000 jobs (0.2 percent of services employment) in 2005, although this was down from the 1.4 million jobs generated in 1992, representing 1.4 percent of services employment.

²¹ See general economic theorems like Stolper Samuelson, 1941.

Exhibit 31

The trade deficit drove embedded employment in the United States downward for all industries

Embedded employment, 1992 and 2005

	1992 Thousand	Share of 1992 employment %	2005 Thousand	Share of 2005 employment %	Difference, 1992-2005 %
① Consumables and textiles manufacturing	-795.3	-14.8	-1,508.90	-36.7	-21.9
② Machinery, electronic, and auto manufacturing	-591.3	-8.7	-1,628.30	-27.5	-18.8
③ Chemicals and metals manufacturing	-233.6	-5.2	-851.1	-19.9	-14.7
④ Professional services and management	146.1	2.1	-35.3	-0.4	-2.5
⑤ Recreation, hospitality, and transportation	416.7	3.3	152.1	0.9	-2.4
⑥ Wholesale and retail trade	579.3	3.2	217.4	-0.2	-2.2
⑦ FIRE	155.5	0	85.9	0	-0
⑧ IT, admin, and private services, nec	47	0.3	-95	-0.5	-0.9
⑨ Construction	7.6	0.2	-8.1	-0.1	-0.3
⑩ Government ¹	28.5	0.1	-30	-0.1	-0.3
⑪ Education ²	-2.2	-0.1	-4.7	-0.2	-0.1
⑫ Health care ²	1	0	-0.2	0	-0
Total	-240.2	-0.2	-3,706	-2.7	-2.5

1 Inclusive of government-employed education and health care professionals.

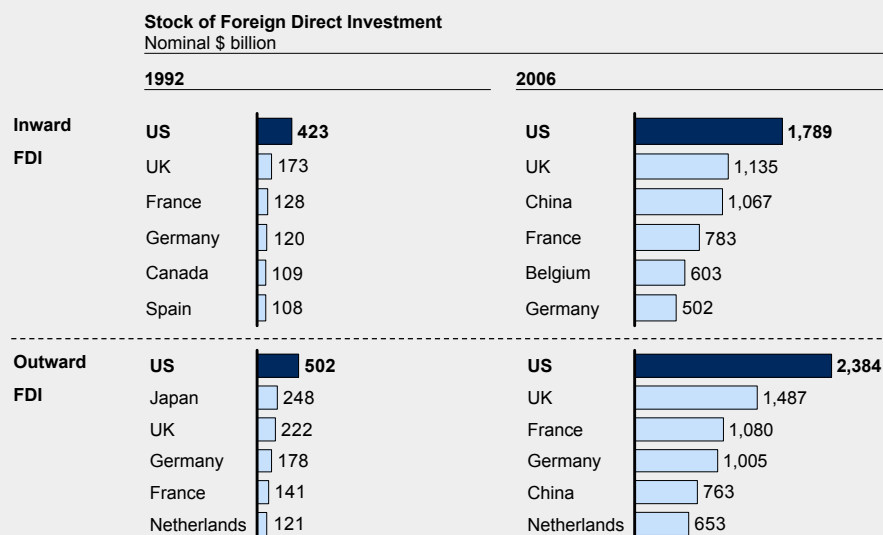
2 Employment numbers do not include education or health care professionals employed by the government.

SOURCE: Annual and Benchmark Input-Output Tables; BEA; McKinsey Global Institute analysis

As with cross-border trade, the United States was the world's most important destination for and source of FDI throughout the time period (Exhibit 32). The annual total of new FDI into the United States in dollar terms exceeded new investment in any other country for almost every year between 1992 and 2006. Furthermore, US companies were more active abroad than those of any other nation: new FDI by US firms in other countries was higher than for any other nation in both 1992 and 2006. Overall, the net of investment flows into the United States less investment out of the United States has not changed substantially from 1992 to 2006. Both inward and outward foreign direct investment employment growth exceeded US domestic employment growth. Domestic employment by majority-owned foreign affiliates grew by a 1.8 percent a year from 1991 to 2005, reaching 5.1 million people or 4.3 percent of employment (Exhibit 33). The service sector was almost solely responsible for this growth. At the opposite end of the spectrum, majority US-owned enterprises employed 9.0 million people abroad in 2005, a 3 percent annual growth from 1994. About 70 percent of this growth came from the service sector.

Exhibit 32

United States maintained world's largest stock of inward and outward FDI

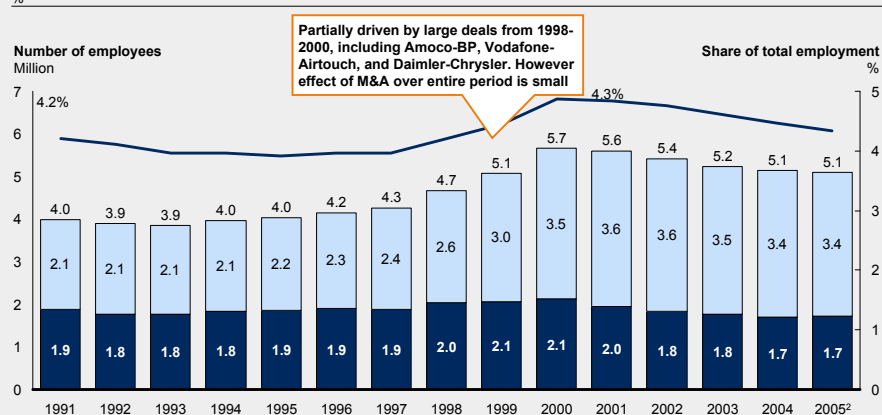


SOURCE: United Nations Conference on Trade and Development

Exhibit 33

The share of US employment by foreign majority-owned companies grew slightly due to an increase in nonmanufacturing employment

Share of US employees in US majority-owned affiliates of foreign companies¹, 1991–2005
%



¹ Operations of nonbank US affiliates that are more than 50 percent owned by foreign direct investors; accounted for 92 percent of employment of nonbank foreign affiliate employment in 2005. Employment by industry is determined in the industry in which US sales were made.
² 2005 numbers are preliminary.

SOURCE: Survey of Current Business; BEA; "US affiliates of foreign companies, August 2007"; NIPA tables

The existing stock of domestic employment by foreign affiliates was disproportionately concentrated in high-value-added manufacturing industries in 1994. However, much of the growth from 1994 to 2005 came from service industries, particularly IT; transportation; FIRE; and professional services. US multinational company (MNC) employment abroad grew for both services and manufacturing. Services employment grew at 2.5 times the rate of domestic service employment growth and represented the equivalent of 4.5 percent of US employment in 2005. Much of this employment growth was in administrative support occupations within the FIRE and IT industries.

Offshoring has been shown by numerous academic studies, including prior work by the McKinsey Global Institute,²² to have had a small impact on the US labor market during this period. Whatever effect it has on the US labor market is captured in the cross-border trade and FDI analyses.

TFO had a mixed impact on incomes, increasing the salaries of managers and decreasing the wages of production workers. Varying levels of cross-border trade of goods and services, foreign direct investment and offshoring in different industries have changed the industry mix and occupation mix. TFO is especially influential in increasing dispersion between the incomes for different occupations within a given industry; for instance, as jobs with more routine elements shift abroad, the income dispersion increases between managers and production workers.

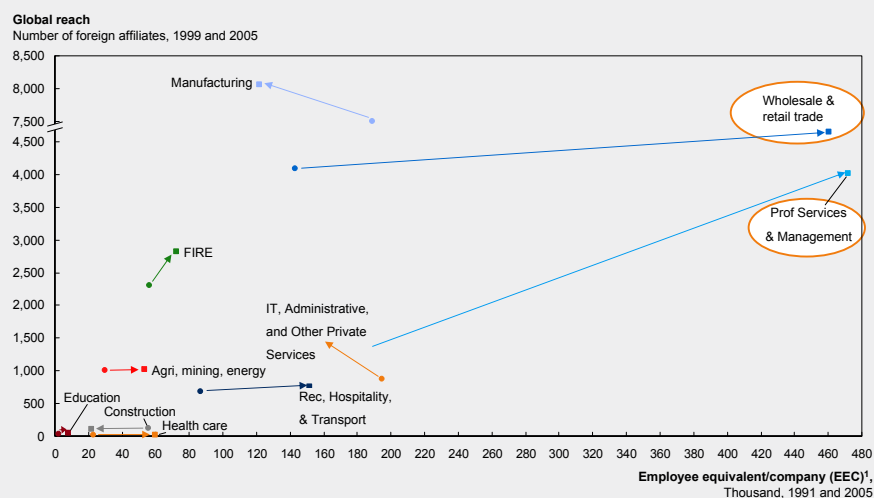
Organizational complexity. Over the period of this study, firms have continuously expanded in scale, global reach and in the complexity of their relationships with multiple suppliers, distribution channels, and other external partners²³ (Exhibit 34). In their more complex new environments, managers need not only continue to demonstrate the core skills required for leadership, but also have an additional suite of soft skills to handle the increased complexity, such as the abilities to cooperate and to take initiatives beyond the confines of a job (Exhibit 35).

²² "The emerging global labor market," McKinsey Global Institute, April 2007. Available at: www.mckinsey.com/mgi/publications/emerginggloballabormarket/index.asp

²³ As an example, some 61 percent of the 471 Fortune 1000 companies surveyed by McKinsey's Organization practice have adopted hybrid organizations (organizations in which there is more than one reporting line into the executive level in at least part of the organization, including matrix-type structures), which are notoriously more complex to manage compared to "pure" organizational archetypes. Hybrid organizations are most prominent in banking and consumer goods, where more than 80 percent of companies have some kind of multiple reporting relationship.

Exhibit 34

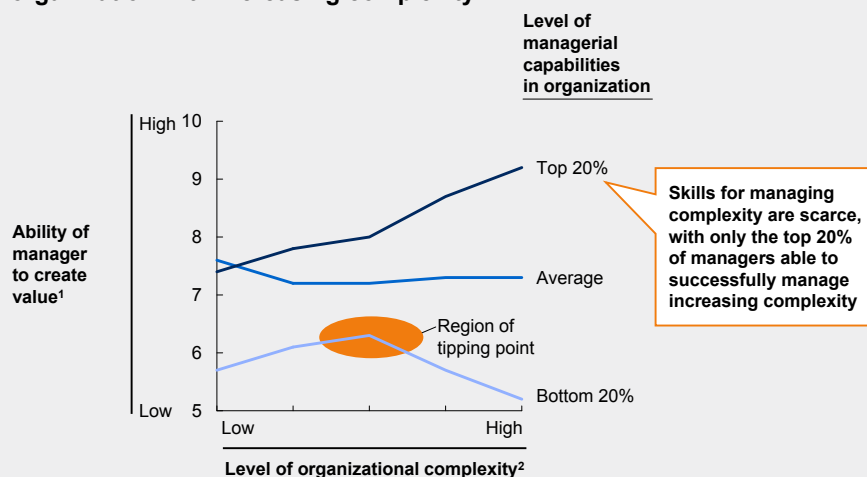
Complexity has increased most in wholesale and retail trade and in professional services & management



SOURCE: BEA International Economics Accounts; Census of US Businesses; McKinsey Global Institute analysis

Exhibit 35

Only the highest performing managers are able to create value in an organization with increasing complexity



1 Assessed by respondents on scale of 1 to 10, n=7,827.

2 Based on number of products, countries, and customers.

SOURCE: Suzanne Heywood, Jessica Spungin, and David Turnbull, "Cracking the complexity code," *McKinsey Quarterly*, No. 2, 2007; McKinsey Global Institute analysis

This growing "organizational complexity" has been described by several authors²⁴ as being a contributing factor to the fast growth in managers' compensation²⁵ for both top and middle management. Leading these global companies is much more complex and difficult than managing smaller or local businesses. Managers who are able to handle the increasing organizational complexity are in higher demand (Exhibit 36). The supply of adequate management talent has been limited, suggesting a compensation premium for managers with these skills.

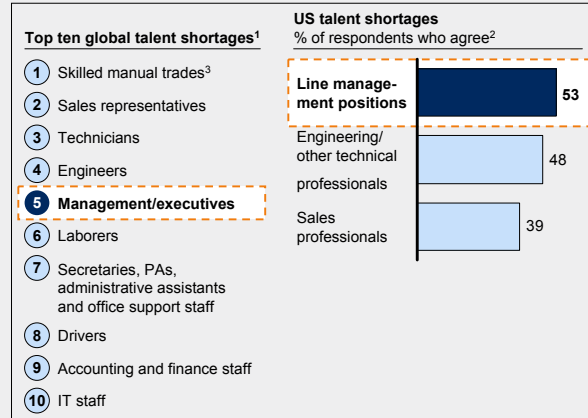
24 Schmidt, Christoph and Zimmerman, Klaus, "Work characteristics, firm size and wages," Working paper number 264, Princeton University, September 1989.

25 As discussed earlier, incomes of managers grew by 3.2 percent per year, which is almost twice as much as the growth of the average employee (1.7 percent).

Exhibit 36

There is a shortage of management talent, especially at the level of middle managers

There is a shortage of middle managers ...



...which is mainly caused by organizations themselves

% of respondents²

"Organization struggles to identify, hire, and develop midlevel managers"

Agree 51

¹ There were 12,585 respondents across 32 countries; conducted by Manpower.

² Survey of 750 business and 55 senior HR executives, conducted by Bersin & Associates.

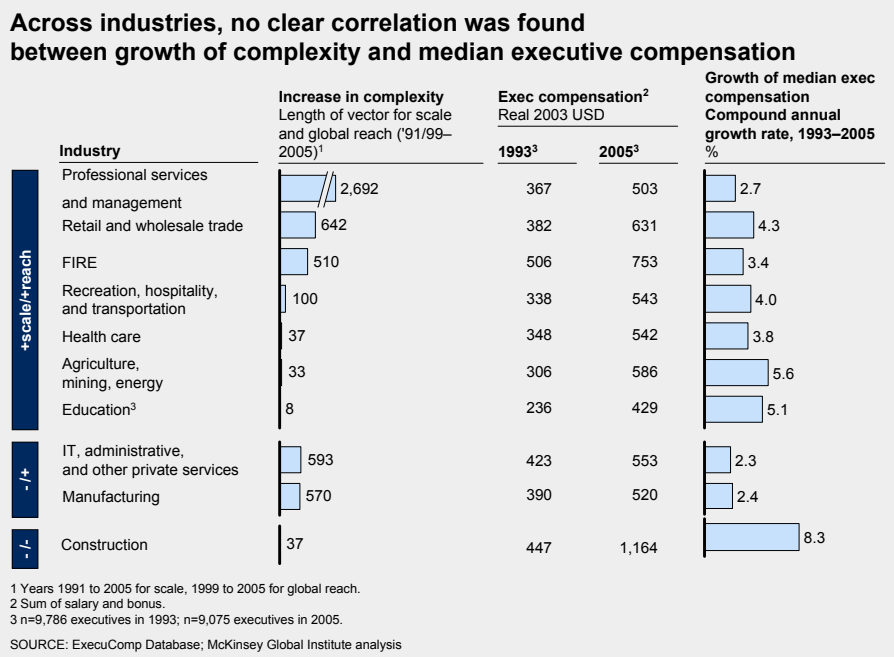
³ In this survey, skilled manual trades refers to a broad range of job titles that require workers to possess specialized skills, traditionally learned as an apprentice. Examples of skilled trades jobs include electricians, bricklayers, carpenters, cabinetmakers, masons, plumbers, welders.

SOURCE: Manpower; Bersin & Associates

The top executives are not the only employees affected by an increase in organizational complexity. Given that larger organizations have more reporting layers and foreign subsidiaries, they tend also to have additional managers. Thus the growth of organizational complexity increased the number of middle managers (managers from below the top executive level down to the project manager level). Complex organizations require an enhanced kind of middle manager. Whereas an archetypal middle manager often worked as an information synthesizer, writing reports or managing selected day-to-day operations, now middle managers must also handle increasing amounts of firm-wide communication, interact with more and more international divisions, and manage multiple reporting relationships in the case of hybrid organizations.

There is a positive correlation between the scale of the company and median executive compensation within all industries in the United States, confirming that executives of larger scale companies earn more than those in smaller scale firms. However, there is no clear correlation between the rate of growth in scale and global reach and the rate of growth in executive compensation. For instance, professional services, the industry that has experienced the highest growth in both scale and global reach over the past 10 to 15 years, shows the smallest growth in executive compensation with 2.7 percent a year between 1993 and 2005. During the same period, in construction, where complexity has decreased in both dimensions, their executive compensation has grown at the highest rate of 8.3 percent a year (Exhibit 37). This implies that other factors, such as convergence within occupation categories, across industries or individual company policy, seem to play a more important role than industry in the growth of executive compensation.

Exhibit 37



Organizational complexity has altered the occupation mix (e.g., by increasing middle manager occupations), as well as occupation specific incomes, both across industries as well as within the same industry.

Immigration. In the United States, the share of the foreign-born population (both legal and undocumented foreign nationals and naturalized foreign-born citizens) grew from 8.8 percent to 12.2 percent between 1994 and 2004, a 38.6 percent rise. The impact of immigrants on wages and unemployment of native born workers and prior immigrants is controversial among economists. Some scholars,²⁶ argue that immigrants do not have a negative impact on wages for one or more of the following reasons: 1) immigrants do not compete for the same jobs, 2) they do essential jobs, plugging a gap in the labor market that domestic workers cannot fill, 3) immigrant workers may create more jobs or 4) they may stimulate the economy through their own consumption. Other economists counter this view by demonstrating immigration's impact on particular segments of the US domestic labor market. In particular, they point to immigration's potential to depress wages among lower-skilled and less-educated workers.²⁷

To assess the effect of immigrants on the overall income distribution, we distinguish between the demographic and the labor market effects of immigration. The demographic effect of immigration takes into account the increasing share of immigrant households in the population. Both legal and undocumented immigrants earn less on average than native workers. Thus, a rising share of immigrant households can depress the overall income distribution without directly affecting the incomes of native-born workers. On the other hand, the labor market effect of immigration posits that an increasing supply of "cheap" labor exerts downward pressure on the wages of native-born workers, independent of the demographic effect.

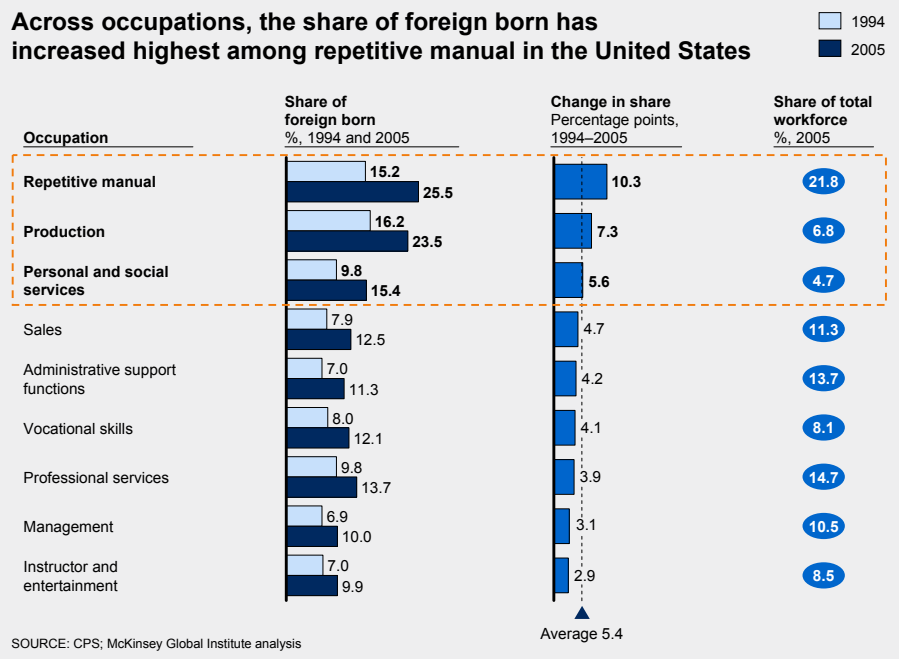
The demographic impact of immigration in the United States is negligible. On the other hand, we find that, while the labor market effect does not affect all segments of the job market equally, it does affect some labor market segments substantially. We will examine the labor market effect by occupation and industry.

26 Card, David, "The impact of the Mariel Boatlift on the Miami labor market," *Industrial and Labor Relations Review*, Vol. 43, No. 2., January 1990, pp. 245–57; Haskins, Ron, "Immigration: Wages, education, and mobility." The Brookings Institution, 2007.

27 Borjas, George J., "The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market." *The Quarterly Journal of Economics*, November 2003.

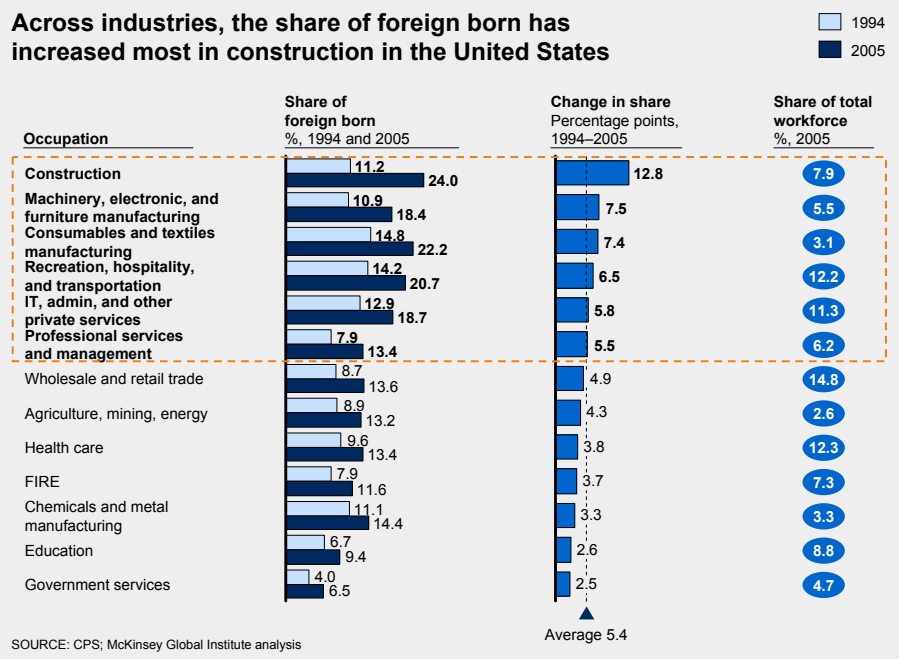
A review of the difference in immigrant shares across occupations indicates that the impact of immigration varies widely. Among US occupations, immigrant share increased the most in repetitive manual occupations. In fact, in 2005 every fourth worker in this occupation was foreign born. The 10.3 percentage point increase in immigrant share in repetitive manual over the 1994 to 2005 period was followed by the 7.3 percentage point increase in immigrant share in production and 5.6 percentage point increase in personal and social services. These movements were all above the 5.4 percentage point average growth in immigrant share across occupations (Exhibit 38).

Exhibit 38



Looking across industries in the United States, the share of immigrants increased the most in construction (12.8 percentage points). As a result, 24 percent of workers in this industry were foreign born in 2005. The second largest increase was documented in manufacturing. At approximately 7.5 percentage points, it lags well behind the increase in construction. Recreation, hospitality, and transportation also recorded a significant increase in the share of foreign born workers (6.5 percentage points) (Exhibit 39).

Exhibit 39

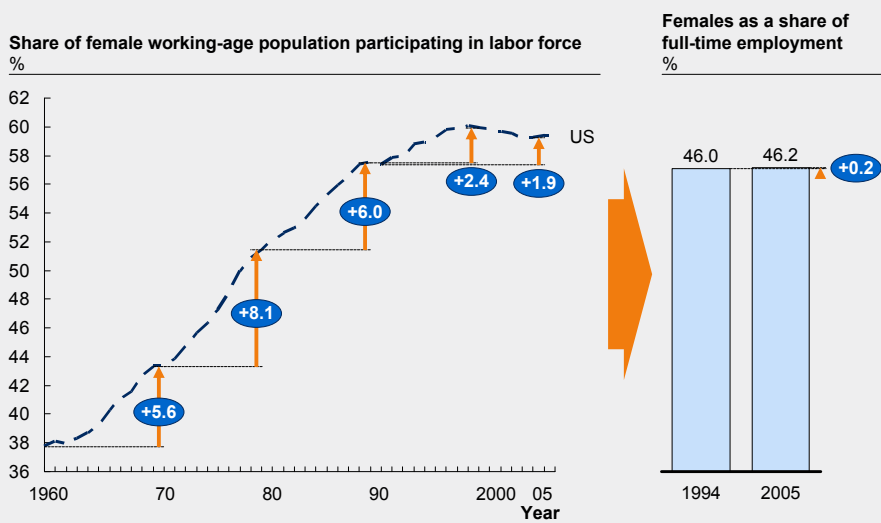


Overall, the labor market effects of immigration can be disaggregated into two main outcomes. Firstly, immigration affects specific occupations across industries. This consequence is most pronounced in the repetitive manual occupation, where the influx of immigrants is large enough to affect existing low-wage jobs in this occupation across the industries where it appears. Furthermore, immigration affects specific occupation/industry pairings. One example is personal and social services in the consumables and textiles manufacturing industry, which experienced a 17.6 percentage point increase in the share of foreign-born workers over the period studied. The lower-wage and less-skilled nature of such occupation/industry pairings means they are available to incoming migratory workers, most of whom are less educated and skilled than the average US laborer.

Female labor force participation. The latter part of the twentieth century saw a dramatic shift in gender ratios in US employment, as more and more women entered the formal work force. This change was at its height in the 1970s, when in the course of only ten years the share of women employed outside the home increased 8.1 percentage points, from 43.4 percent in 1970 to 51.5 percent in 1980. Gains in the female participation rate slowed but continued to grow afterwards. Between 1994 and 2005, the gain was 0.5 percentage points. If we look at only full-time labor, female gains are even more modest: from 1994 to 2005, the female share of full-time labor increased only two-tenths of a percent, from 46 percent to 46.2 percent (Exhibit 40).

Exhibit 40

Increases in female labor force participation flattened during the 1990s

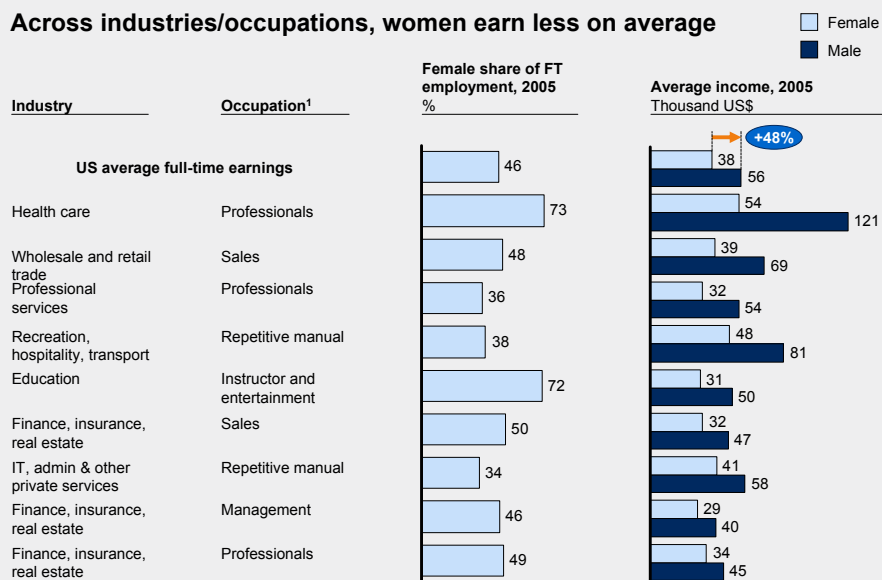


SOURCE: BLS; CPS microdata; McKinsey Global Institute analysis

Men make more money than women within a given industry and occupation. The overall average full-time income for men is \$55,758, 48 percent higher than the female average of \$37,556 (Exhibit 41). While this likely reflects differences between the genders in number of hours worked, years in the labor force, and so forth, from a purely arithmetical standpoint we would expect that an increasing share of females at a lower average income, regardless of the reason, would in turn reduce the overall average income. This is particularly obvious in industries with a preponderance of female workers (e.g., wholesale and retail trade and education) and in female-dominated occupations (e.g., administrative support).

Exhibit 41

Across industries/occupations, women earn less on average



1 Industry/occupation pairs with insufficient sample to calculate average incomes omitted.

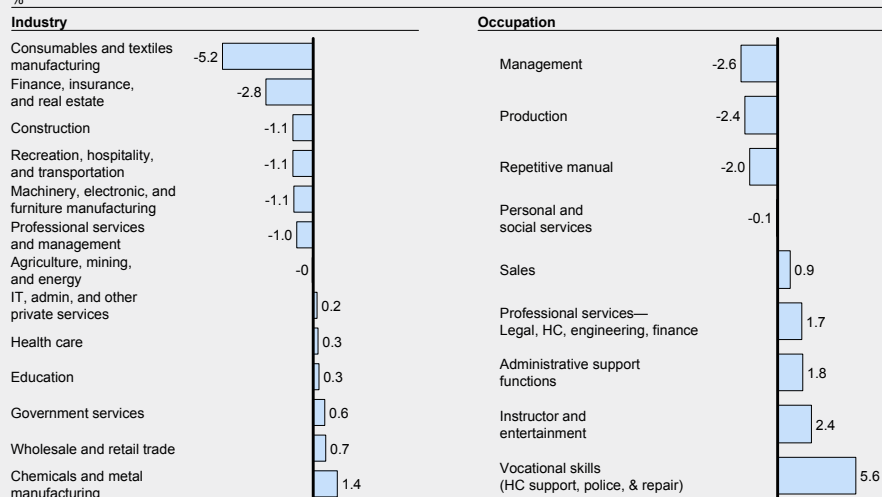
SOURCE: CPS microdata (McKinsey Global Institute and DataFerrett); McKinsey Global Institute analysis

An overall view of the changes in female participation by industry or occupation shows that some sectors have been more affected by female participation than others. While the overall change in share of females in full-time employment was only 0.2 percent between 1994 and 2005, at an industry level these changes in share vary from a 5.2 percent decline in consumables and textiles manufacturing up to a 1.4 percent increase in chemicals and metals manufacturing. Similarly at an occupation level, changes in the share of females range from a 2.6 percent decline in management up to a 5.6 percent increase in vocational skills, such as health care support (Exhibit 42). Although the additional specificity of industries and occupations increases the magnitude of the change in female participation, these changes are still quite small; most industries and occupations have experienced a less than 5 percent increase or decrease in the overall share of females (Exhibit 43). Nor do these changes seem to follow any particular pattern based on the historical concentration of females.

Exhibit 42

Some industries and occupations have experienced greater changes in female participation

Change in female share of full-time employment, 1994–2005 %

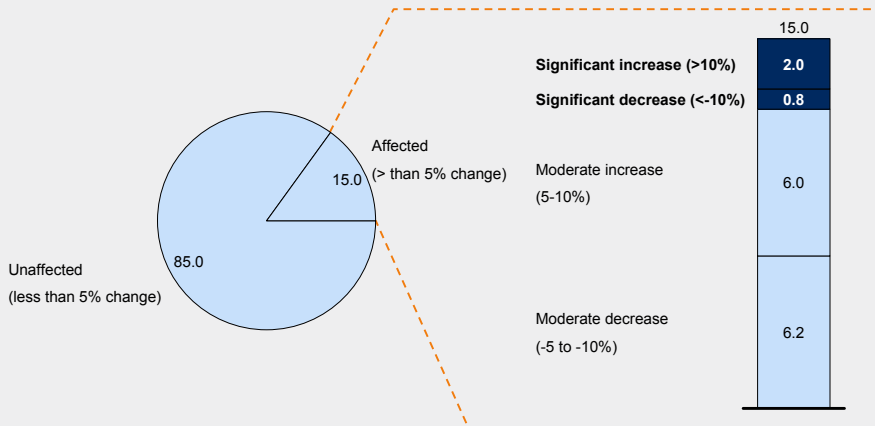


SOURCE: CPS microdata; McKinsey Global Institute analysis

Exhibit 43

The majority of jobs in the United States are not affected by significant changes in female participation

Share of US employment in industries/occupations by change in female share
%



SOURCE: CPS microdata; McKinsey Global Institute analysis

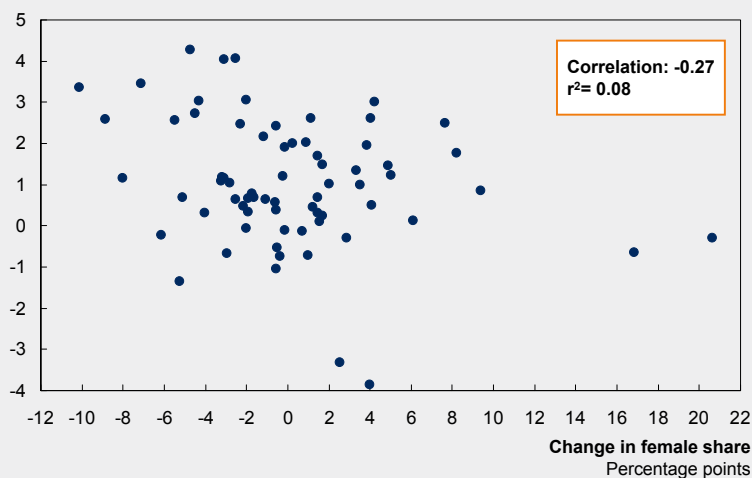
We conclude that female labor participation has had minimal, if any, impact on changes in average incomes within the 11 years of our study. Theoretically it could act to increase income dispersion between occupations within a given industry or within a given occupation across industries. While there is a slight negative correlation (minus 0.27) between an increase in the share of female workers and income growth, the coefficient of determination²⁸ is extremely small, 0.08 (Exhibit 44). Due to these inconclusive results, we assume that changes in female labor force participation since 1994 have had at most a marginal impact on labor supply and demand dynamics in the United States.

Exhibit 44

There is a extremely modest relationship between female participation and income growth

1994–2005 Changes

Overall income CAGR

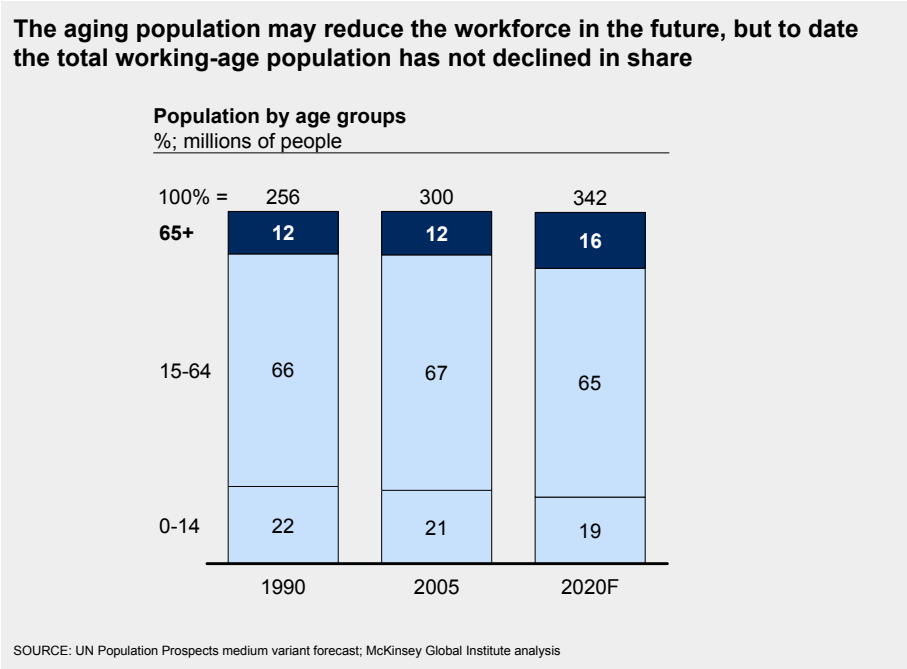


SOURCE: CPS microdata; McKinsey Global Institute analysis

28 The square of the correlation coefficient, also called R^2 .

Aging in the workforce. There are two potential labor market effects that an aging population could have²⁹: first, a sudden reduction in labor force caused by large-scale retirement could increase competition among firms for experienced workers, driving up wages; conversely, immediately before a large-scale retirement, one would anticipate a glut of experienced labor that would reduce competition among firms for experienced workers and so drive down wages. Overall, there is no statistically significant relationship between the share of older workers in the workforce and income growth or employment growth (Exhibit 45). Given the noted skill bias in the industries and occupations that have aged the most, it is likely that the effect of aging is simply dwarfed by larger changes based on other trends affecting workers in these industries, such as SBTC, organizational complexity, and others. Analysis of the share of the population over age 65 indicates that the former hypothesis, that a large scale retirement has recently served to increase wages, is highly unlikely. Between 1990 and 2005 the share of the population over age 65 remained virtually unchanged, increasing one-tenth of 1 percent from 12.2 percent to 12.3 percent (Exhibit 46).

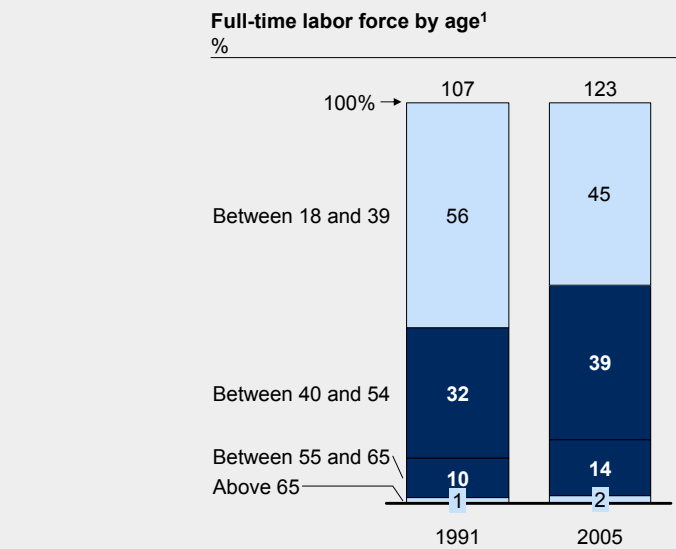
Exhibit 45



29 For the sake of this paper, we deal only with the labor market effects directly attributable to the age of the worker. Other characteristics of the older population, such as increased educational attainment, female participation, performance pay, and so forth, are dealt with separately by characteristic rather than by generation. For a detailed analysis of income dispersion from a generational perspective, please see *Talkin' 'Bout My Generation: The Economic Impact of Aging US Baby Boomers*, McKinsey Global Institute, June 2008.

Exhibit 46

The labor force is older now than in 1991



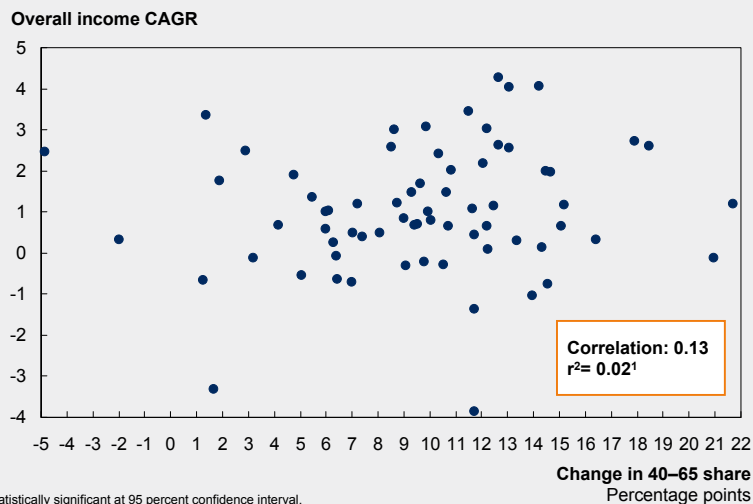
SOURCE: CPS (DataFerrett); McKinsey Global Institute analysis

Limiting our focus to the labor force, we can see that between 1991 and 2005, the labor force in the United States has aged, and in 2005 a majority of the labor force was over age 40 (Exhibit 47).

Exhibit 47

There is no statistically significant relationship between change in share of older workers and income growth

1994–2005 Changes



1 Not statistically significant at 95 percent confidence interval.

SOURCE: CPS microdata; McKinsey Global Institute analysis

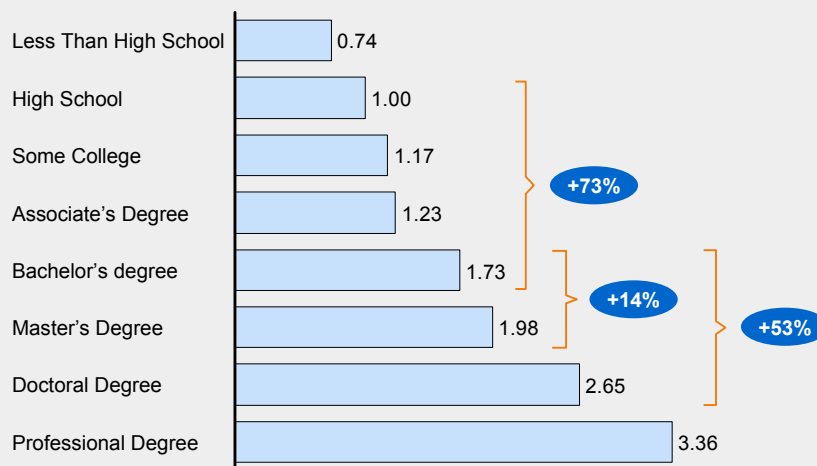
Aging in the workforce has had minimal, if any, impact on changes in average incomes within the 11 years of our study. Aging increases income dispersion in occupations where more senior employees command income premiums for their expertise or senior rank.

Educational attainment. It has long been recognized that education is an important factor in determining income and thus contributing to income dispersion (Exhibit 48).

Exhibit 48

Higher education pays off in the long run in superior labor market outcomes

Lifetime earnings ratio compared to a high school graduate
Multiples



SOURCE: "Education Pays: The Benefits of Higher Education for Individuals and Society", Baum and Payea (2004); The College Board

Our findings are similar to authors Claudia Goldin³⁰ and Larry Katz and Lemieux³¹ who demonstrated that formal education plays a key role in enabling people to profit from SBTC. The lack of such education results in people being left behind in lower earning occupations. In this study however, we strived to address the issue of whether education further increased the income gap between higher and lower income brackets in the United States between 1994 and 2005. Many academic researchers have pinpointed a link between income dispersion and a significant increase in returns to higher education in recent years.³² Other have also pointed out that while education is a necessary condition for success, it is hardly ever a sufficient one.³³ While this study is limited to the individual impact of educational attainment of income one cannot overlook the overall economical and societal impact of education. The US once the leader in post graduate education today is way behind educational leaders like Finland or Korea costing the US economy hundreds of billions in GDP every year.³⁴ Eric Hanushek echoes this point in his latest book on the US education system.³⁵ He points out that there is a major gap between white and minority students in the US but that American student achieve far less than their foreign counterparts and their performance has been flat for years regardless of race and income.

While US achievement has not been advanced in a significant fashion we find that overall levels of educational attainment have risen across the United States and remained a strong predictor of income from 1994 to 2005. Compared to demographic characteristics, such as gender, marital status, or citizenship, education has a far larger

30 Goldin, Claudia and Katz, Lawrence. *The Race between Education and Technology*, Cambridge: Belknap Press, 2008.

31 Lemieux, Thomas, "Increasing residual wage inequality," *The American Economic Review*, 2007; Lemieux, Thomas, "The changing nature of wage inequality," *Journal of Population Economic*, 2008.

32 Lemieux, Thomas, "Postsecondary Education and Increasing Wage Inequality," *American Economic Review*, v.26, 2006, p.195–99.

33 Paul Krugman, "The Great Wealth Transfer," *Rolling Stone*, November 30, 2006.

34 <http://www.mckinsey.com/client/service/socialsector/achievementgap.asp>

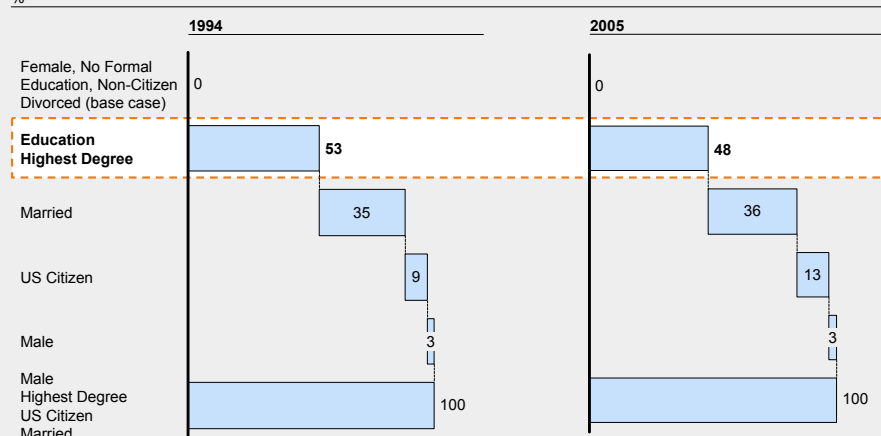
35 Hanushek, Eric A. and Lindseth, Alfred A. *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools* (Princeton University Press, 2009)

influence on a person's income, accounting for about half of the upward mobility in the income deciles. This effect remained stable over the 11 years observed in this study (Exhibit 49). While all Americans are more educated in 2005 than in 1991 (Exhibit 50), educational attainment has grown somewhat faster in the upper deciles. In addition, income premiums for college graduates and postgraduates have increased from 1991 to 2005. This is especially true for postgraduates who increased their total compensation by 43 percent between 1991 and 2005 while their total number increased by only 34 percent (Exhibit 52).

Exhibit 49

While education is a key predictor for reaching higher income deciles, the impact of education has not increased between 1991 and 2005

Impact of demographic characteristics on income decile¹
%



¹ Analysis is based on deciles to smooth out large income differences and outliers.

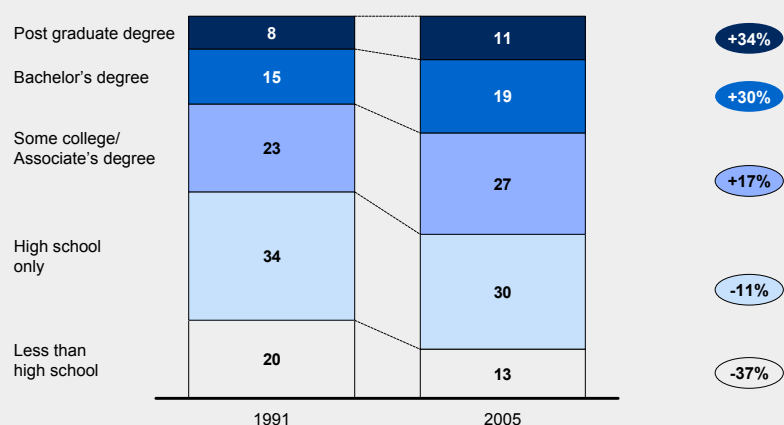
The demographics based regression explains between 35% and 40% of the variance

SOURCE: CPS; McKinsey Global Institute analysis

Exhibit 50

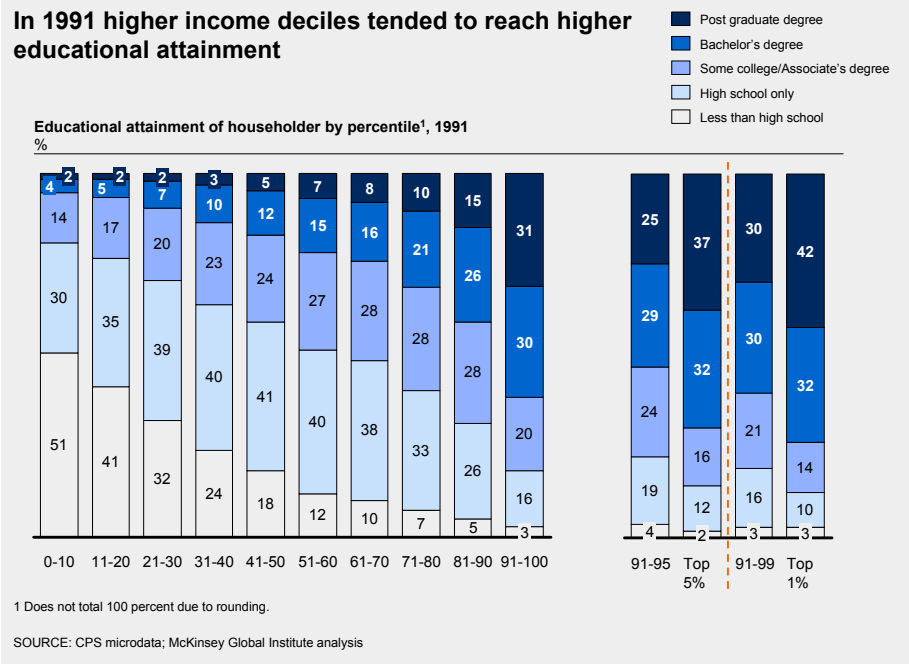
Between 1991 and 2005 educational attainment increased in the US as a whole

Educational attainment of householder 1991–2005
%



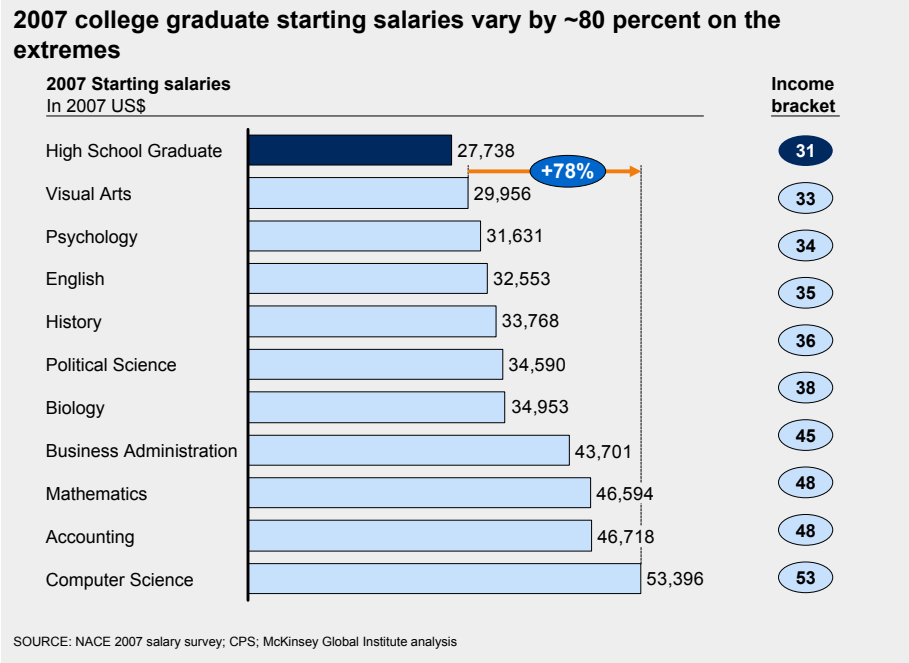
SOURCE: Current population survey (CPS) microdata; McKinsey Global Institute analysis

Exhibit 52



Increasing educational attainment was a driver of income growth rates among the highest-labor income earners. Reaching the top 5 percent and especially the top 1 percent of the income distribution increasingly requires schooling beyond a bachelor's degree, as evidenced by a decrease in the share of college graduates and an increase in postgraduates in those brackets (Exhibit 53).

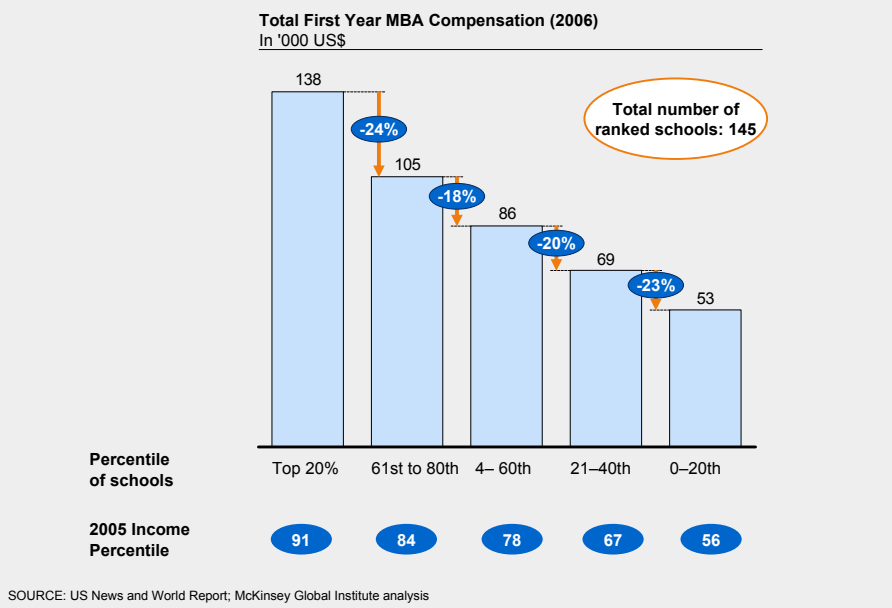
Exhibit 53



However, our findings also support the fact that the premiums for education increasingly depend on additional factors beyond just the level of attainment, such as field of study or a college ranking. The best evidence for the impact of these factors is the strong increase in the income standard deviation among people with the same level of educational attainment. The standard deviation went up by 26 percent for bachelor's degree holders and 35 percent for postgraduates. Some of the factors that contribute to the income gap tend to be more a result of choice, such as the field of study (Exhibit 53), while others depend more on a person's financial situation, determining, for example, the college to attend (Exhibit 54).

Exhibit 54

Graduate school rankings affect the level of income of their graduates



Educational attainment affected all salaries with a particularly positive impact on salaries among certain higher income groups. Higher levels of educational attainment enables other drivers to exert a positive influence on compensation, for instance, SBTC. Through these effects, education increases income dispersion between occupations for a given industry, and within a given occupation across industries or even within an industry/occupation pairing.

Performance pay. Managers' compensation is increasingly tied to performance.³⁶ The motives for this arrangement are diverse. Primarily, companies try to link managers' behavior to company objectives. The incidence of performance pay across the labor market has remained relatively steady at a low level in the United States,³⁷ declining from 22.7 percent in 1990 to 22.5 percent in 2000. However, this hides the importance of performance pay in certain occupations and industries. Employees at the top (i.e., above \$60,000–75,000 per year) and the bottom (i.e., below \$20,000–40,000 per year) of the income distribution report the highest incidence of commissions.³⁸ Across occupations, managers have the highest incidence of performance pay (55 percent in 2005), followed by sales occupations, where 48 percent of employees received some kind of performance pay in 2000 (mostly commission). The latter saw the greatest decline in performance pay arrangements, from 55 percent in 1990 to 48 percent in 2000. Professional and technical occupations, which began with one of the lowest incidences of performance pay arrangements, have seen the greatest increase, 5.1 percentage points, and now 21 percent of workers in these occupations receive performance pay (Exhibit 55). In the United States, the incidence of performance pay arrangements increased only in some service industries, among which FIRE saw the biggest increase, from 27 percent of employees in the industry receiving performance pay in 1990 to 42 percent in 2000, the highest share of performance pay in any industry at that time. Transport, communication, and public utilities saw the second strongest increase in performance pay arrangements, from 25 percent in 1990 to 32 percent in 2000. The strongest decline in jobs with performance pay was in entertainment and recreation services, down from 29 percent in 1990 to 22 percent in 2000 (Exhibit 56).

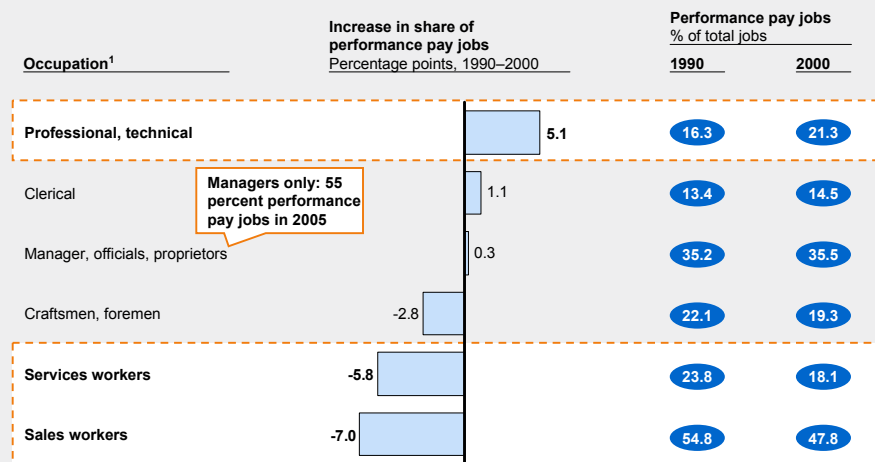
³⁶ Lemieux, Thomas, MacLeod, Bentley and Parent, Daniel "Performance Pay and Wage Inequality," Discussion paper No. 2850, June 2007.

³⁷ Analysis on national longitudinal survey database (BLS); 1990: n=8,897; 2000: n=2,431 (base: all respondents who responded with either "yes" or "no")

³⁸ "Pay and performance in America: 2005 compensation and benefits," Hudson Highland Group.

Exhibit 55

Across all US occupations, performance pay has increased most among professional/technical occupations

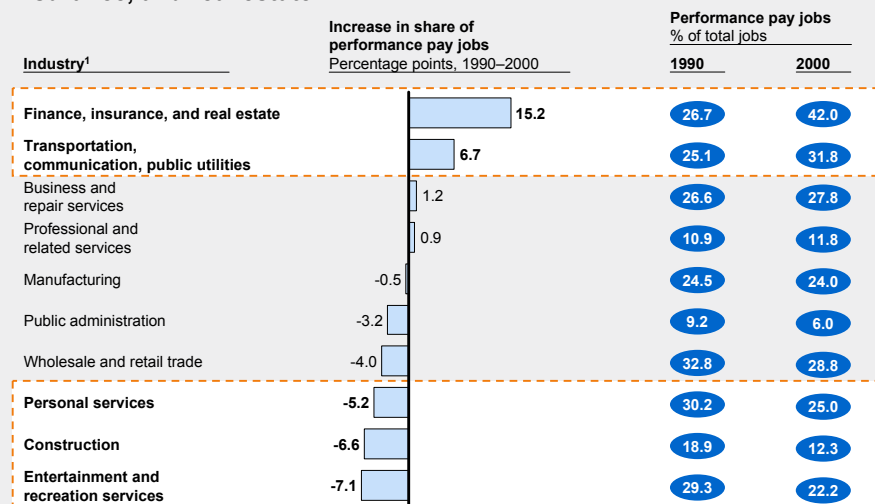


¹ 1990: n=8,897; 2000: n=2,431 (base: all respondents who responded with either "yes" or "no"); only occupations with more than 50 observations.

SOURCE: NLSY database; McKinsey Global Institute analysis

Exhibit 56

Among industries, performance pay has increased most in Finance, insurance, and real estate



¹ 1990: n=8,897; 2000: n=2,431 (base: all respondents who responded with either "yes" or "no"); only industries with more than 50 observations.

SOURCE: NLSY database; McKinsey Global Institute analysis

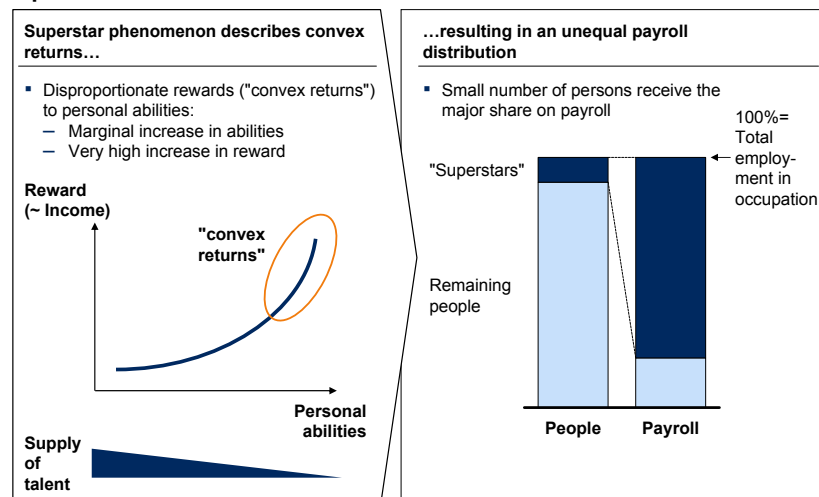
Performance pay could affect overall income dispersion in three ways. It could increase income dispersion across occupations within a given industry, for example if top managers had it but middle managers and frontline workers did not; it could increase dispersion within a given occupation across industries, if only some people in that occupation had a performance pay deal; or it could increase dispersion within an industry/occupation pairing, depending on performance pay's availability and the employee's relative performance.

The superstar phenomenon. First introduced by Rosen in 1981, the superstar phenomenon mainly describes the skyrocketing incomes of top artists, sports stars, and CEOs.³⁹ In these cases a few people generate a disproportionate share of rewards, because the marginal return to their talent is convex (Exhibit 57). By definition, the superstar phenomenon has a very strong effect on the incomes of very, very few people. The well-publicized superstar phenomenon among top managers accounts for the part of the increase in their wages, often delivered as performance-based income components, which cannot be explained by the complexity or performance of the firm. Additional factors, such as the reputation of top managers, the prestige of the company, and other intangibles all contribute to such premium pay.

The superstar phenomenon is the extreme example of performance pay. However, there are not enough superstars in any industry or occupation, with the exception of top executives, to change the average income in either significantly within the 11 years of our study. Given its characteristics of being an “extreme” of performance pay, the “superstar phenomenon” affects income in the same three ways.

Exhibit 57

The superstar phenomenon explains disproportionate incomes at the top end



SOURCE: Sherwin Rosen, "The Economics of Superstars," *The American Scholar*, vol. 52 (4), 1983; based on original AER (1981) article, vol. 71 (5); Robert J. Gordon and Ian Dew-Becker, "Unresolved issues in the rise of American inequality," presentation to the Brookings Institute, September 2007; McKinsey Global Institute analysis

39 Rosen, Sherwin "The economics of superstars," *The American Scholar*, Volume 52, Number 4, Autumn 1981.

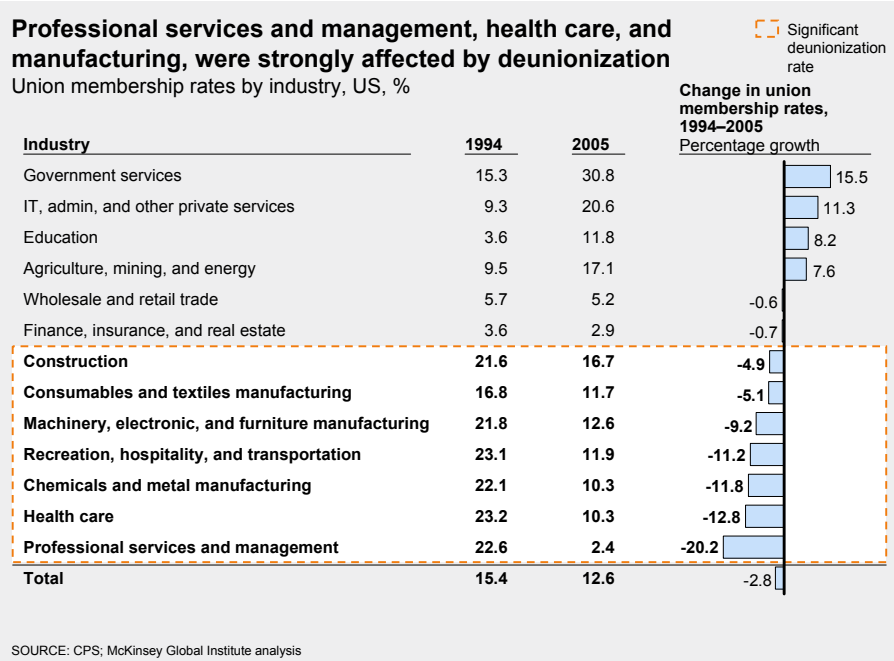
Deunionization. Since they were first established, unions have been both lauded and criticized for influencing wages. Their perceived effects remain controversial in economic literature: while some researchers argue that unions raise real income through giving unionized workers a stronger bargaining position,⁴⁰ others suggest that their focus on negotiating wage premiums for current members comes at the expense of future overall employment.⁴¹

In the United States union membership rates reached a peak in the 1950s and declined steadily thereafter. The most significant deunionization⁴² occurred during the 1970s and 1980s but they were still substantial declines in the United States during the period of this study. By 2006, only 12 percent of workers were members of unions, and 13 percent were covered by union agreements.⁴³

Overall, union participations rates declined by 2.8 percentage points from 1994 to 2005. Closer examination of the evidence shows that this decline had profoundly different effects by industry and by occupation.

On the industry side, deunionization may have affected wages and/or employment more strongly in some industries than others. The most significant decline in union membership of 20.2 percentage points took place in professional services and management. This was followed by health care, which experienced a 12.8 percentage point decline. Nearly all manufacturing areas declined at a notably fast pace, between 11.8 and 5.1 percentage points, between 1994 and 2005. They were followed by recreation, hospitality, and transportation (11.2 percentage points) and construction (4.9 percentage points) (Exhibit 58).

Exhibit 58



On the other end of the spectrum, union membership and, in theory, wage and benefit bargaining power for workers, grew significantly in four industries: in government

40 Lewis, Gregg, *Union Relative Wage Effects: A Survey*, University of Chicago Press, 1986.

41 Freeman, Richard B and Medoff, James L. *What Do Unions Do?* New York: Basic Books, 1984.

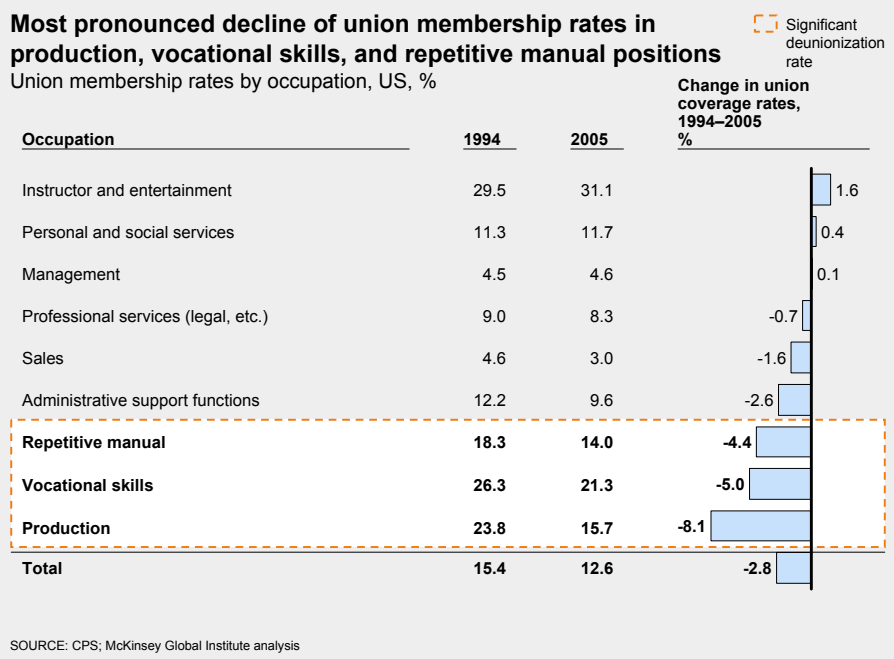
42 Deunionization refers to the declining relevance of unions for the wage bargaining process. As an indicator of the deunionization process, this study focuses on the number of union members respectively of union covered employees.

43 Union members are officially members of the unions who fulfill certain duties, such as paying membership dues. In certain firms, additional nonunion member workers are also covered by union agreements.

services, it increased by 15.5 percentage points; followed by IT, admin, and other private services (11.3 percentage points); education (8.2 percentage points); and agriculture, mining, and energy (7.6 percentage points).

In occupational categories, production experienced the highest rate of deunionization (minus 8.1 percentage points in coverage), followed by vocational skills (minus 5.0 percentage points) and repetitive manual (minus 4.4 percentage points). Only one occupation increased its union coverage by more than half a percentage point: instructor and entertainment increased by 1.6 percentage points (Exhibit 59).

Exhibit 59



As this data would lead one to expect, deunionization had a pronounced impact on certain occupations across industries. Vocational and production workers, no matter the industry, have experienced lower bargaining power in line with diminishing union presence. The effect of deunionization on specific occupation and industry pairings is also notable. A vocational health care worker, for instance, would have been adversely affected by diminishing union membership in this particular industry/occupation combination.

Blue-collar wages, which benefited most from union coverage, have been especially hard hit. Between 1989 and 2005, union coverage rates among blue-collar workers dropped by 10.7 percentage points. In line with this development, the positive influence of unions on wages, (that is, the resulting wage premium), dropped from 6.7 percent in 1989 to 4.3 percent in 2005.⁴⁴ By comparison, white-collar occupations have experienced a decline in union coverage of only 1.4 percentage points and their union premiums have fallen by only 0.2 percentage points.

Thus deunionization has two direct effects that change the labor market: first, the isolated effect of deunionization on a single occupation regardless of industry and, second, the isolated effect of deunionization on an occupation/industry pairing. Other potential effects on, for example, industry and occupation mix are more characteristic of demand-side drivers, such as trade and SBTC, rather than institutional drivers.

44 Mishel, Lawrence, Bernstein, Jared, and Shierholz, Heidi. *The State of Working America*, Economic Policy Institute. 2006/2007. Union wage premium is defined as the relative difference between the wage of similarly skilled union and non-union employees.

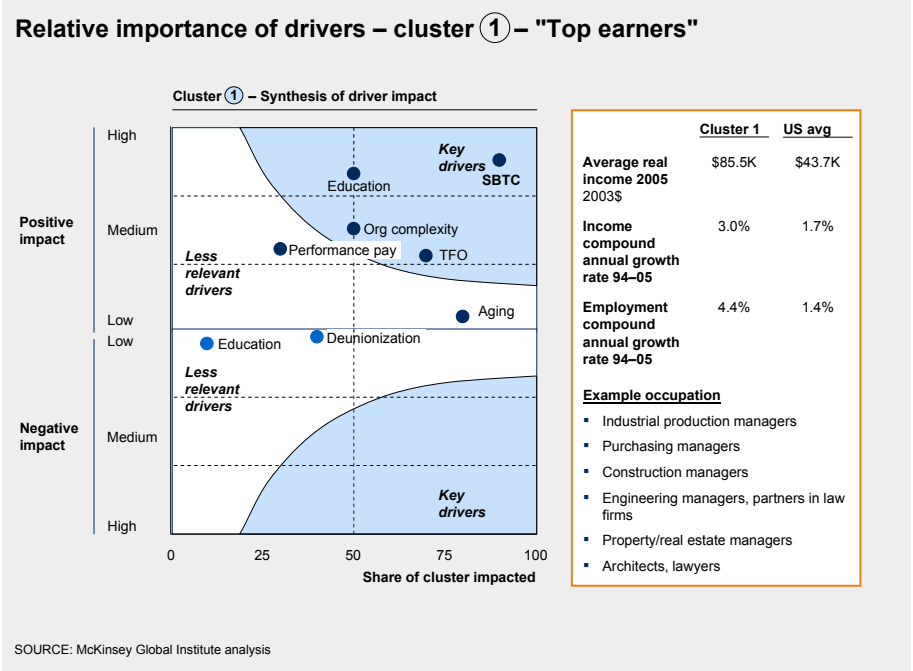
THE IMPACT OF DRIVERS ON THE PATCHWORK LABOR MARKET

To assess the impact of the drivers on each of the eight clusters of jobs further analyzed or, more precisely, industry/occupation pairings described in detail earlier, we used both qualitative and quantitative approaches. We represented the breadth and depth of the impact of each driver on each cluster in an “impact matrix.” Each matrix shows the share of industry/occupation pairings in the cluster’s population affected by each driver along the x-axis and each driver’s degree of impact on income growth for the share affected along the y-axis. To identify the x-axis values, we used quantitative data from the CPS of the US Census Bureau or data from sources specified in the cluster-by-cluster discussion below in cases where no CPS data was available or CPS data was deemed unreliable.⁴⁵ Our assessments of the degree of impact of each driver on the share affected – high, medium, or low – represent a qualitative judgment based on the detailed and quantitative case studies developed and described in the section above.

Below we set out our findings on the impact of the drivers in each cluster.

Top earners (see Exhibit 11). Income growth in this cluster was driven upwards mainly by three demand drivers—SBTC, TFO, and organizational complexity—and one institutional driver, rising education levels. Performance pay, and aging also played smaller positive roles (Exhibit 60).

Exhibit 60



Of the four main drivers SBTC and TFO were the most potent: they had positive effects on the incomes of 90 percent and 70 percent of people in this cluster, respectively, depending on the industry/occupation pairings in which people worked. The extent of these two drivers’ impact is not surprising given the increasing demand for highly skilled professionals across all industries and greater opportunities for trade. Organizational complexity also played a role in income growth, as 50 percent of the people in this cluster worked in industry/occupation pairings that are found in companies with high global reach, including finance, professional services, retail, and electronic and auto manufacturers. Companies of greater organizational complexity and global reach require more highly skilled managers and professionals.

45 See technical notes for detailed description of methodology.

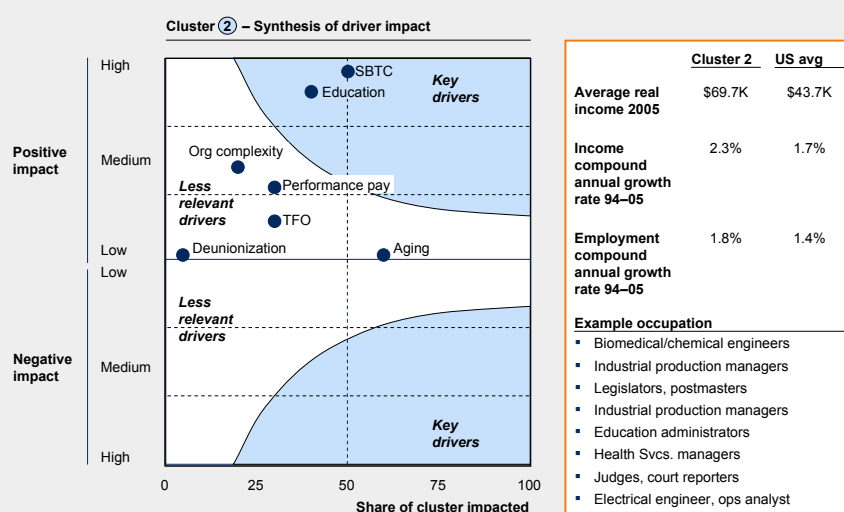
Not surprisingly, education also appeared as a strong attribute of income growth in this cluster. About half the group had higher educational levels in 2005 relative to 1994. Educational attainment is regarded as highly relevant to top-level managerial or professional success. Interestingly, 10 percent of the cluster had lower education levels in 2005 relative to 1994, suggesting that some industries draw on more formally educated talent while others might need a skill set requiring less formal education. However, managers in the construction industry were the only top level managers who saw their overall education decline. The wide definition of "managers" might play a role in our findings on this point since an analysis of income dispersion for each industry/occupation pairing shows that the highest dispersions within an industry/occupation pair are in this cluster.

Performance pay also played a significant role in the overall high income growth of this cluster: some 30 percent of its employees received increased performance pay. Within performance pay, the "superstar" phenomenon played relatively minor roles in this cluster. It may be home to highly paid artists, sports stars, supermodels, and name-brand executives who can command huge premiums on their wages for their unique capabilities and/or reputations, but we found that only 5 percent of the cluster is likely to enjoy this benefit. In contrast, roughly 80 percent of this cluster has more workers aged 46-64 in 2005 relative to 1994. Generally speaking, older workers in this cluster are better paid because of their experience and seniority, and 80 percent is an important share, but we found that, nevertheless, changes in age structure had only a minor impact on this cluster.

White-collar workers (see Exhibit 12). As we saw above, "white-collar workers" and the "top earners" have similar occupations, largely as managers and professionals: differences in their incomes result mainly from the different industries in which they are employed. Given the similarity between the first and second cluster profiles, it is not surprising six out of the seven drivers act on both in the same way, although with different intensity. Among "white-collar workers," SBTC and education were the most important drivers of income growth, as were, to a lesser extent, organizational complexity, TFO, performance pay, aging workforce, and deunionization (Exhibit 61). Together these drivers pushed this cluster's growth in income and employment share to above average levels.

Exhibit 61

Relative importance of drivers – cluster ② – "White-collar workers"



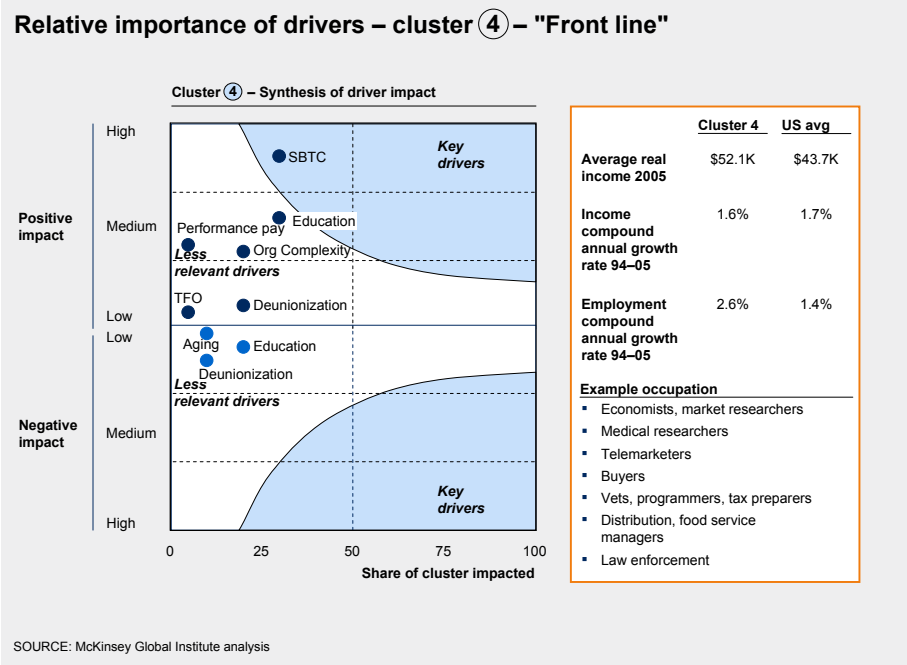
SOURCE: McKinsey Global Institute analysis

Half the group was positively affected by SBTC and 40 percent of the industry/occupations pairings have higher educational attainment. Education has the same importance across this cluster of high-skill managers and professional services employees, regardless of industry.

The impact of TFO on this cluster was lower than on “top earners”: it affected 30 percent of white collar workers, but not too deeply. This reflects the high share of nontradable industries (health care, government, and education) in this cluster, as well as industries that saw their trade balances decline (machinery, electronics, and auto manufacturing). Nonetheless, the impact was still positive, since highly educated and skilled professionals generally gain from more trade. Similarly, organizational complexity and performance pay impinged on this group less than the “top earners,” with a positive effect on 20 percent and 30 percent, respectively. Performance pay has a medium impact on this group, because the number of jobs offering some form of performance pay increased. While in most other industries performance pay is limited to top-level management, in FIRE performance pay is found among many lower levels of workers. The period of this study coincided with the real estate boom, so the FIRE sales pairing, exemplified by real estate agents and mortgage brokers, is particularly well represented here. During the boom years, these professionals received significant variable pay according to the sales they closed.

Front line (see Exhibit 13). In this cluster only one driver, SBTC, played a key positive role. Organizational complexity, performance pay, and TFO, had a moderately positive impact, while the effect of educational attainment, and deunionization, were positive for some and negative for others. An aging workforce had a negative impact on the income growth of this cluster (Exhibit 62).

Exhibit 62



As in the first two clusters, SBTC plays an important role, with 30 percent of “front line” experiencing a positive impact on income growth thanks to a high level of investment in new technology in their industries and occupations. In this cluster, modern technology professionals are well represented in the occupations of IT professionals or health care / medical technicians.

Organizational complexity affected the income growth of 20 percent of this cluster, including management in recreation, hospitality and transportation and professional services employees from a number of industries where the formation of larger organizations has resulted in higher salaries. In addition, performance pay had a

marginally positive impact in this cluster, with 5 percent more affected by this driver in 2005 than in 1994.

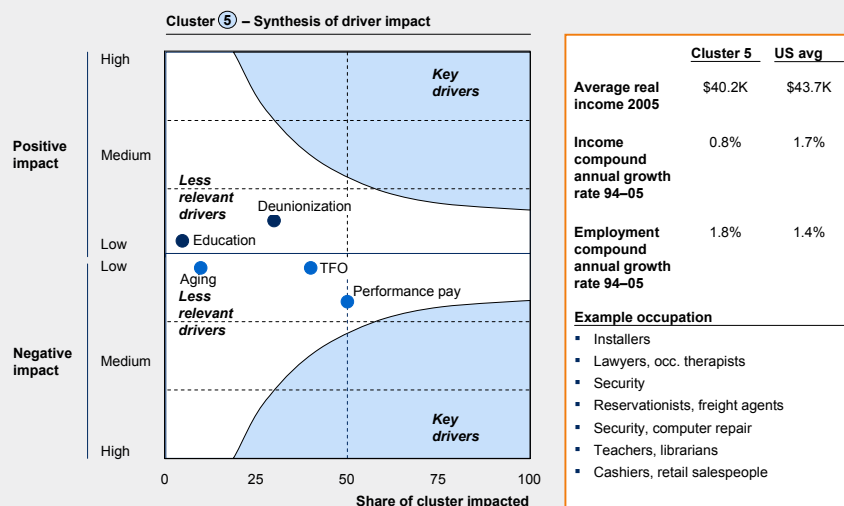
Education worked both ways in this cluster. Almost 30 percent of employees in the cluster had higher educational attainment in 2005 than was the case in 1994, especially health care researchers and managers. However, 20 percent of the cluster had lower levels of educational attainment such as instructors in the professional services industry. This is likely the consequence of occupational requirements: in the past, higher degrees were needed for positions now staffed with less formally educated employees, who might have higher vocational skills.

The remaining drivers barely affected the cluster. It experienced both unionization in for example, workers with vocational skills in the government services industry (e.g., law enforcement) and deunionization in for example in health care, resulting in a net 10 percent increase in union membership in the industry/occupation pairings of the cluster. This had a negligible effect on incomes for those involved. Similarly, about 10 percent of this cluster was relatively older in 2005, but the higher share of experienced workers had little impact on incomes in the cluster as a whole. TFO and the superstar phenomenon played an even smaller role, with each having a positive impact of 5 percent on the cluster.

Speeding treadmill (see Exhibit 14). The "speeding treadmill" cluster experienced no significant income growth. Education and deunionization had a modestly positive impact on a minority of this group, while almost half of the group was affected negatively by TFO and shrinking performance pay and a minority of employees in this group was marginally affected by an aging population (Exhibit 63).

Exhibit 63

Relative importance of drivers – cluster ⑤ – "Speeding treadmill"



SOURCE: McKinsey Global Institute analysis

An increase in unionization in this cluster created the most positive impact, with almost one-third of the group experiencing higher levels of unionization with the associated income benefits. This effect was mainly observed in the wholesale and retail trade sales and vocational skills industry/occupation pairings. Unionization had a low impact on the income of the group as a whole, however, since union premiums on income in these industry/occupations clusters are declining. Educational attainment proved a very small positive factor for this cluster with overall levels of education up for some of its workers and down for others, resulting in a net positive impact of about 5 percent. Its positive effect was limited to administrative support functions that are now earning a small premium for higher formal education. The restricted value of the education driver within the "speeding treadmill" cluster was likely due in part to requirements for higher skill levels

among professional services employees – “speeding treadmill” workers who gained higher skills may have moved to jobs in higher-earning industry/occupation clusters.

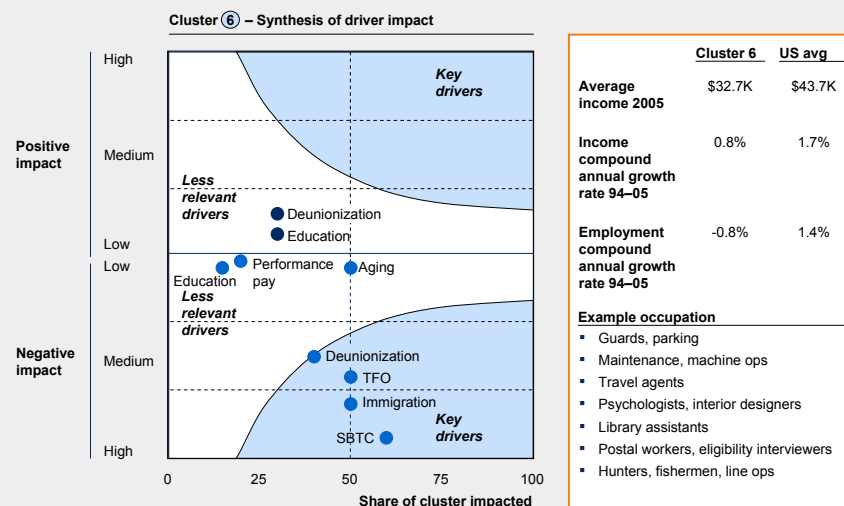
Half the cluster was negatively affected by decreased performance pay because the number of sales jobs offering performance pay, for example in the form of commission based performance bonuses for sales people, has reduced. Fewer vocational jobs with performance premiums also contributed to lower earnings.

While international trade was not much of a factor in this cluster, TFO trends negatively affected 40 percent of the group, by way of reduced inward foreign direct investments and reduced shares of foreign affiliate employment. As with other clusters, an aging workforce was a minor driver of income change, in this case a slightly negative one, in this group, with 10 percent of the cluster being older on average.

Automated away (see Exhibit 15). Education and unionization had slightly positive effects on income in this cluster, but otherwise the main drivers of income change served to depress wages. Deunionization, SBTC, immigration, and TFO had strongly negative effects on incomes in the relevant industry/occupation pairings. An aging workforce and performance pay were also negative drivers, but to a lesser extent (Exhibit 64).

Exhibit 64

Relative importance of drivers – cluster ⑥ – “Automated away”



SOURCE: McKinsey Global Institute analysis

Enhanced education was a positive driver in this cluster, with 30 percent, mostly in administrative support, experiencing pay premiums for higher formal education. Incomes of another 15 percent across the cluster were, however, negatively affected by having lower educational attainment in 2005 than in 1994.

In this cluster, unionization and deunionization play a key role. About 30 percent of the industry/occupation pairings had higher unionization, but an even larger share. Forty percent, was negatively affected by deunionization. The impact of increased unionization was only slightly positive since it mostly occurred in occupations where unions have limited impact on wage setting. Deunionization, on the other hand, played a larger negative role since it occurred mostly in the manufacturing sector where collective bargaining agreements have traditionally secured higher compensation.

SBTC, through large-scale automation of repetitive manual jobs in manufacturing, is having a significant negative impact on this cluster. Overall, it depressed incomes for 60 percent of the group. Immigration and TFO are also important negative drivers: half the employees in the cluster have seen substantially more foreign nationals work in their

industry/occupations at lower wages. Another 50 percent were negatively affected by TFO, resulting from the large trade gap in manufacturing that opened up between 1994 and 2005. This trade gap widened from 10 percent to 28 percent over the period, affecting manufacturing workers and also FIRE administrative support staff, such as credit card call center workers.

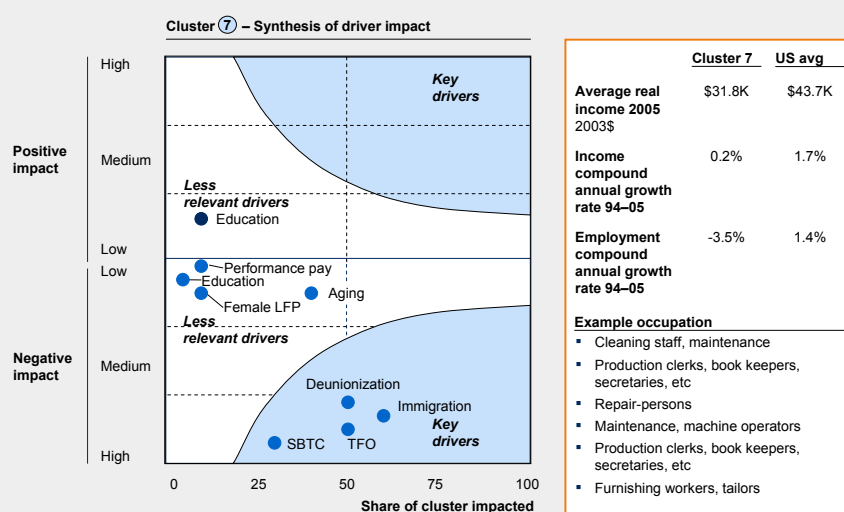
An aging workforce only had only modest negative effect on income. Although a large segment of the group, 50 percent, are now in industry/occupation pairings with a more experienced workforce, age and experience play a smaller role in deciding pay in the industries and occupations of this cluster.

Finally, performance pay plays a small overall role in this group. Few workers are affected, mainly those working in repetitive manual jobs, where variable pay generally comes from tips. These form a small part of overall pay.

Classic blue collar (see Exhibit 16). There are more factors depressing incomes in this cluster than promoting income growth. Immigration, TFO, deunionization and SBTC were key negative drivers. Aging, performance pay, female labor force participation, and education also played negative roles, albeit slight. Education was the only positive driver in the cluster (Exhibit 65).

Exhibit 65

Relative importance of drivers – cluster ⑦ – "Classic blue collar"



SOURCE: McKinsey Global Institute analysis

Approximately 10 percent of this cluster had higher educational levels in 2005 relative to 1994. Similar to some slightly higher-income groups, there are industry and occupation pairings within the cluster where average educational attainment is now lower than in 1994. The most likely explanation for this drop in about 5 percent of pairings in this cluster is that college educated workers migrated out of these occupations leaving those who could not move on due to a lack of education. This effect is seen mostly in administrative support functions that pay a premium for higher formal education. Even in these functions, however, the impact is low.

Immigration played a meaningful role in this cluster: 60 percent of the industry/occupation pairing saw an increase in foreign-born nationals. Our findings suggest that the rising share of foreign-born workers depressed average wages, particularly in maintenance, repair, and cleaning occupations.

TFO affected 50 percent of employees in the cluster, a high figure because of the preponderance of manufacturing jobs in this group and the increased manufacturing

trade gap. The impact of TFO is strongest in textile and consumables manufacturing. Compounding this impact, 30 percent in the cluster were also affected by SBTC. Several types of job were automated, and a large number of production workers were replaced by equipment, whose operation required fewer workers with greater skills.

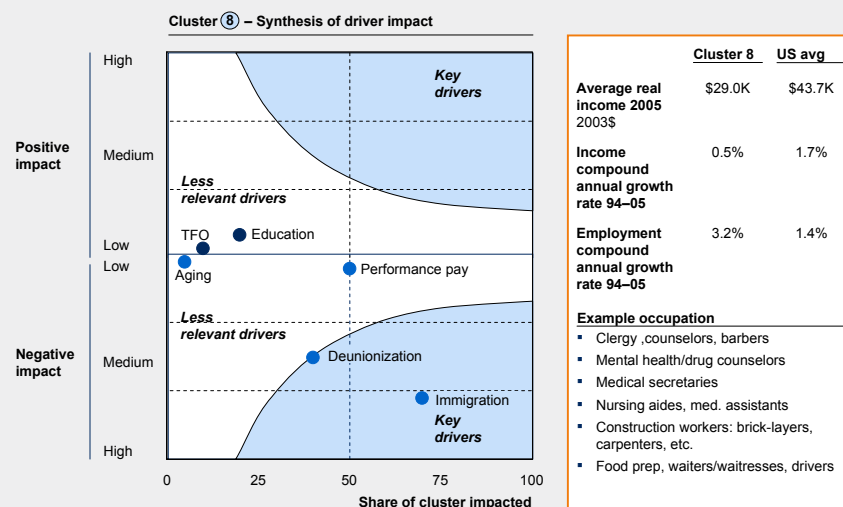
As with other clusters, the level of unionization was mixed. A very modest rise (less than 10 percent) in unionization in some areas was offset by a large drop in others. More than half the workers in this cluster experienced negative effects from the general decline in union membership in low-wage/low-skill manufacturing jobs. The likely net effect was lower bargaining power and so lower wages overall.

Aging was a negative driver in this cluster. Female labor force participation has barely affected the cluster, with about 10 percent of the workforce feeling the impact of a larger share of lower-paid women workers entering the labor force and competing for jobs. The negative effect of these two drivers is low overall, however, since experience and wage levels were relatively low to begin with. Finally, a small group (10 percent), mostly in crafts, saw their wages decline because of falling or disappearing performance pay.

Semi-skilled servicers (see Exhibit 17). In this cluster immigration and deunionization are the key drivers depressing wages. While half of the factors driving income changes that we examined did not affect this group, those that did mostly had a negative influence on employment and income growth. Trade and education positively affected a small share of this cluster (Exhibit 66).

Exhibit 66

Relative importance of drivers – cluster ⑧ – "Semi-skilled servicers"



SOURCE: McKinsey Global Institute analysis

As in the previous cluster, immigration and deunionization played important roles in depressing incomes in a cluster very much defined by repetitive manual and administrative support occupations. Because the industries represented in the cluster are largely nontradable, however, any potentially negative effects of TFO and SBTC were limited.

Immigration had the largest negative impact, affecting 70 percent of people in this cluster, particularly repetitive manual workers in construction and recreation, hospitality and transportation who account for almost 60 percent of the workers in these clusters. The relatively low skill and education requirements of these occupations allow for easy substitution and downward pressure on wage. Deunionization appears slightly less important but still considerable in its depressing effect on incomes in this cluster. Most industry/occupation pairings in this cluster (except the IT industry) have seen a drop in the percentage of unionized workers: roughly 40 percent of the cluster has shifted to deunionized status during the period of the study.

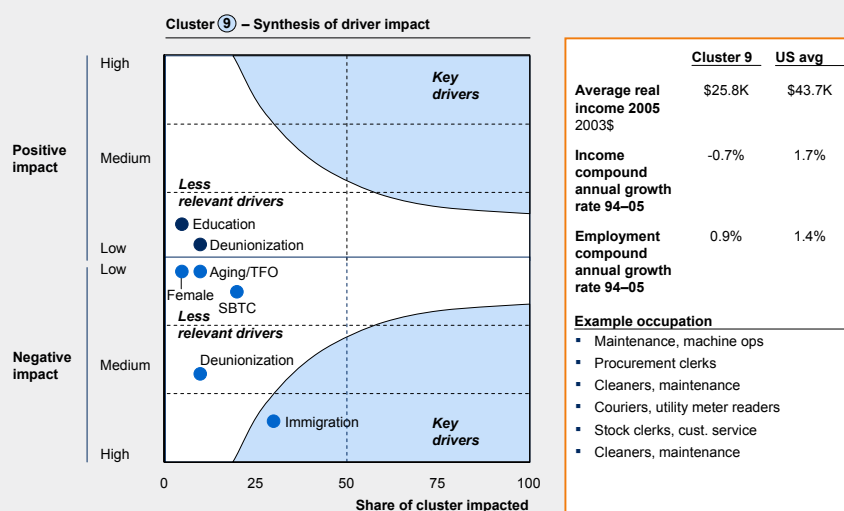
Performance pay had a very modest effect on incomes among the "semi-skilled servicers," although nearly half (50 percent) of the individuals in the cluster can claim to receive it in some form. Its effects, however, are largely limited to waitstaff within the recreation, hospitality and transportation/repetitive manual group. An aging workforce had an even slighter effect here, with only 5 percent of the cluster comprising older and more experienced workers than in 1994.

TFO was a positive driver for this group mainly due to increased foreign direct investment: it gave a slight boost in pay to the 10 percent of the cluster who are repetitive manual labor workers in the transportation industries. The only other positive driver for this group was education, which had a modest effect on 20 percent of employees.

Low earners (see Exhibit 18). The only key driver at play in this cluster was immigration, although deunionization, SBTC, aging, female labor force participation and TFO each had modest negative effects on incomes here (Exhibit 67).

Exhibit 67

Relative importance of drivers – cluster ⑨ – "Low earners"



SOURCE: McKinsey Global Institute analysis

More foreign nationals were working in this cluster in 2005 than any other, and the impact of immigration here had increased by 30 percent since 1994. As in the previous clusters, an increase in the impact of immigration translates into more competition among workers, which in turn depresses wages. In this cluster, where most of the jobs are low-skill, low-education roles, such as cleaners and maintenance workers, wages were low to begin with. TFO and SBTC negatively affected 10 and 20 percent of employees in this sector, respectively, targetting primarily low-skill IT workers.

Unionization again played a mixed role and had a modest overall impact: 10 percent were negatively affected by deunionization, while wages for 10 percent appear to be positively affected by increased unionization. Similarly, demographic changes played a small role. About 10 percent of this population was affected by greater shares of older more experienced workers in the sector. However, their impact on wages was mitigated by a below-average age in this cluster overall. Female labor force participation also negatively affected 5 percent of the cluster because lower paid female workers represent larger shares in the industry/occupation pairings that are in this cluster.

Education is a modest positive driver for this group. However, a mere 5 percent of the entire cluster enjoyed this effect, with most of the benefit again concentrated among administrative support staff.

THE EFFECT OF THE INTERACTION OF DRIVERS ON THE US LABOR MARKET

Mapping the drivers against all clusters allows for a comprehensive assessment of the first-order effects they had on each of the labor market occupational clusters analyzed (Exhibit 68). Of course, there are limitations to this approach, as it cannot capture well any second-order and general equilibrium effects, such as the extra purchasing power that consumers may have gained from international trade creating more jobs in the retail industry. We recognize these limitations, but believe that the insights gained in assessing first-order effects in a common framework will be of significant value to policy makers in business and government, and researchers seeking to extend our understanding of income dispersion and labor market trends. In this final section, we synthesize implications and an agenda for further research

Exhibit 68

Cluster	Demand drivers			Supply drivers			Institutional drivers			De-unioni- zation % workforce
	SBTC	TFO	Org complexity	Immigration	Female partic.	Aging	Education	Perform. Pay		
1 "Top earner"	↑	↑	↑	-	-	↑	↑	↑	↓	7.8
2 "White-collar workers"	↑	↑	↑	-	-	↑	↑	↑	↑	14.0
3 "Artists and farmers"	Data limitations do not allow for a full analysis									1.1
4 "Front line"	↑	↑	↑	-	-	↓	↑/↓	↑	↑/↓	6.7
5 "Speeding treadmill"	-	↓	-	-	-	↓	↑	↓	↑	17.4
6 "Automated away"	↓	↓	-	↓	-	↓	↑/↓	↓	↓/↑	13.2
7 "Classic blue collar"	↓	↓	-	↓	↓	↓	↑/↓	↓	↓	4.5
8 "Semi-skilled worker"	-	↑	-	↓	-	↓	↑	↓	↓	19.9
9 "Low earner"	↓	↓	-	↓	↓	↓	↑	-	↓/↑	9.0

SOURCE: CPS; BLS; McKinsey Global Institute analysis

SBTC, TFO and organizational complexity are the main drivers of growing income dispersion

Our results are in line with those of several authors who acknowledge that a combination of factors working together is more likely to be influencing income dispersion than any single, dominant factor.⁴⁶ This is not surprising given that several of the drivers are multi-layered and interconnected, reflecting the systemic nature of the changes taking place in the economy.

Runaway income growth for "top earners" has been fuelled overwhelmingly by advances in technology combined with the expansion of increasingly complex corporations and supply chains. More opportunities for international trade also modestly supported income growth at the top⁴⁷ where jobs and whole professions have evolved to maximize returns from them.

While advancing technology contributed to the potential earnings of those with the right education, it has also "automated away" many middle income opportunities for people

46 Autor, Katz, Kearney "Trends in U.S. Wage Inequality: Revising the Revisionists," June, 2007.; Regev, Wilson, 2007.

47 Performance related pay and the "superstar" phenomenon, which in some markets allows a few individuals who are marginally more talented or prominent than their peers to command far greater compensation, also drove up incomes in the highest earning clusters but to much a lesser extent than mastery of new technologies, new opportunities for trade and increasing organizational complexity.

with industry-specific vocational training. Global firms have moved many operations overseas, lowering demand for production jobs in the United States and decreasing rates of pay for those jobs that remain (although this has been offset in part by rising US exports and inbound foreign direct investment).

Above and beyond this, greater opportunities for trade and increasing organizational complexity were critical ingredients of rapid income growth in some industries and occupations. Managers that profit from organizational complexity are more likely to work in a global corporation benefiting from or even depending on trade. Our findings show that every occupational cluster that benefitted from organizational complexity also benefitted from international trade due to increased imports and exports as well as the global reach of their corporations.

Taken together, SBTC, trade, and organization complexity are ultimately shaping demand in the labor market. Their combined effects are creating a structural change and not a cyclical one, as many believe. Income dispersion will not automatically return to earlier levels at the bottom of an economic cycle, as our findings on the impact of the recent economic downturn show. As discussed above, while the financial industry and professional services industry have indeed experienced a significant number of layoffs and displacement, these workers are likely to have the appropriate skill to find new employment fairly rapidly in similar occupations. Manufacturing/production workers, on the other hand, have seen the recession exacerbate an existing downward trend in demand for their skills. These displaced workers will have much more difficulty becoming productively reengaged.

Education is the key enabler to meet rising demand for skills

In the face of these demand trends, educational attainment and achievement is an essential enabler of entry to higher-income employment. It expands the supply of workers qualified for attractive jobs in sectors that are growing in the shift from manufacturing to services. To profit from the positive income effects of the demand side drivers above, generally, a worker needs a higher level of formal education. To illustrate, a purchasing manager in a US manufacturing multinational might be tasked with buying the best value inputs from anywhere in the world to supply factories in Asia. To do that job well, she would need advanced skills in a host of information technologies, the ability to coordinate the activities of colleagues and business partners in a global network, and very likely have a formal education in foreign languages—a scarce skill set. Such highly educated, highly skilled workers are in increasing demand from employers. Scarcity of supply means their skills can translate into significant income premiums. Moreover, the work of Eric Hanushek demonstrates that educational achievement, meaning mastery of cognitive skills - broadly speaking the mental abilities people use to think, study and learn - is an even more important determinant of income growth than levels of educational attainment, such as high school graduation.⁴⁸

These findings are in line with Larry Katz and Claudia Goldin's pathbreaking work in *The Race Between Education and Technology*,⁴⁹ which shows that rapid skill biased technological change combined with relatively stagnant US educational attainment were the key determinants of change in the US labor force and income structure since the 1970 and 80s, although immigration, trade and other issues also play a role. The former chair of the Council of Economic Advisors Edward Lazear makes the point that while globalization, trade, and automation did cost some people their jobs, only those who do not keep up their skills have been negatively affected, so globalization per se can only be partially responsible for lower wages.⁵⁰

48 McKinsey's Social Sector Office adapted Hanushek's methodology to estimate the enormous loss of potential income ("a permanent national recession") caused by gaps in US educational achievement in *The Economic Cost of the Achievement Gap in America's Schools* (2009).

49 Goldin, Claudia and Katz, Lawrence, *The Race between Education and Technology*, Cambridge: Belknap Press, 2008.

50 Gross, Daniel. "Income Inequality, Writ Larger" *The New York Times*, June 10, 2007.

Of other institutional drivers, deunionization and performance pay are contributors to growing income dispersion

In addition to the demand drivers shaping the US labor market and labor incomes, and the educational outcomes determining workforce skills, some institutional arrangements affecting labor markets influence changes in compensation and income dispersion. Of the institutional arrangements we looked at, deunionization had the biggest impact in this period, as unions lost share in the fastest growing industries (outside the public sector). Even in those areas where deunionization was not a direct driver of lower incomes, unions often have less influence on wage setting than formerly. Interestingly, many of the same occupation-industry clusters that were negatively affected by deunionization were also negatively affected by the reduction of performance pay. While performance pay increased in the “high earner,” “white-collar workers,” and “front line” clusters, it stagnated or fell among the “speeding treadmill,” “automated away,” “classic blue collar,” and semi-skilled services clusters, contributing to a further dispersion of income between the highest and middle income earners.

Immigration is the main supply side driver shaping the increase in income dispersion

Of the demographic drivers we evaluated, only immigration proved to be influential in shaping the supply side of the labor market, and primarily in four occupational clusters: “classic blue collar,” “automated away,” “semi-skilled services,” and “low earners.” In all four of these occupational clusters, the share of foreign-born workers rose sharply, expanding the supply of low-skill labor, and placing downward pressure on wages for what were already low-paid jobs. In the fast-expanding cluster of lower paid, lower skill service jobs, pay has been particularly depressed by increasing competition from immigrants.⁵¹ This does not mean that immigration might not have been a positive benefit to the economy overall, as we are not measuring the contributions of newly arrived residents to aggregate demand, innovation, new business creation, and other potential benefits. It does mean that lower skilled workers were disproportionately in competition with new arrivals.⁵²

The other supply-side drivers we examined in-depth were far less influential. The impact of women entering the formal workforce in larger numbers was negligible during this period, and the gradual aging of the workforce caused at most minimal downward pressure on compensation in a few clusters.

IMPLICATIONS AND OUTSTANDING ISSUES

A superficial reading of this analysis might suggest that policymakers keen to reduce income dispersion and boost middle class incomes should look to restrict global organizations, advances in technology, trade, immigration or declining union power, either in isolation or together. Such an approach would be self-defeating, given the overwhelming evidence, documented in previous work by the McKinsey Global Institute among others, that these factors have also been critical in driving sustained economic growth. Moreover, trade, global organization and technology advances are closely interlinked in their impact on growth, as the pressure of global competition accelerates the diffusion of both technical and managerial innovations that increase productivity and incomes in both the United States and other countries.⁵³

51 Increasing female participation in the workforce and its overall aging were two other potential drivers of growing income gaps examined. Neither proved influential.

52 Anecdotal evidence in the current recession suggests that recent immigrant labor is highly flexible, with sharply reduced arrivals and rising departures in the face of poor job prospects in the US. So, the impact of immigration on incomes in poorly compensated occupations may be less during downturns than during periods of strong demand.

53 Lewis, William, *The Power of Productivity: Wealth, Poverty, and the Threat to Global Stability*, University of Chicago: October 2005. For further discussion on labor productivity, please see previous work by the McKinsey Global Institute, including *Domestic services: The hidden key to growth*, December 2005; *U.S. Productivity Growth, 1995-2000*, October 2001; and *U.S. productivity after the dot-com bust*, December 2005

However, taking no action may also be untenable. The most recent employment data shows that the factors driving income dispersion are still at work during the current economic downturn. There is no strong reason to believe that these trends in income divergence will not accelerate again when economic growth resumes.

Upgrading worker skills, productivity, and rewards

Our findings show that the US labor market has been too slow to respond to the fundamental, ongoing changes in the US economy. As the structure of the US economy shifts from manufacturing to services, the productivity of human rather than physical capital has become the key to overall productivity improvement and growth. Increasingly complex US organizations are using technological advances and unrestricted access to markets to exploit business opportunities unimaginable only five to ten years ago. Whole new sectors have emerged and will continue to do so. To compete globally, these businesses need a highly skilled, productive and motivated workforce. Only a minority of the US labor force possesses those skills in abundance today, and mediating labor market institutions are not optimized to give workers in these growing service sectors incentives to improve productivity, quality, and value.

A symptom of how far the labor market has been left behind is that 71 percent of US workers are now in jobs for which there is either lower demand from employers, or a rising supply of eligible workers with modest skills, or both. The 27 percent of workers in the three clusters "automated away," "classic blue collar," and "low earners," where labor demand, income levels and income growth are all falling, are largely working for employers in shrinking sectors, or for uncompetitive employers. They are prevented by a redundant skill set from moving up into the kind of higher growth service sectors where there are attractive opportunities. There are critical unanswered questions for these occupational-industry clusters. Should vocational training aim to provide workers with skills targeted at "jobs of the future" or be less industry-specific and more flexible? Given the generally higher effectiveness of on-the-job training, what is the role of private employers in broad workforce development? How should new models of training (subsidized on-the-job, online, community college refresher) be delivered and financed? What mix of national or regional/local approaches make most sense? Are there segments of workers in the "automated away" cluster for whom this transition is simply impossible? What societal choices should we make in such cases?

The 44 percent of workers in the front-line, "speeding treadmill" and "semi-skilled servicers" clusters are in services jobs for which demand is growing but levels of pay are low and rising slowly. Unlike the previous group, they work in higher growth sectors, but their skill sets may be too limited to allow them to move up into more attractive jobs, and they lack the institutional sway to capture the upside of their contributions to productivity gains through either bargaining or performance pay.

While there are no silver bullets, our research implies that the greatest benefits to the incomes of workers in these two groups would come from upgrading the skills, productivity, and rewards of service sector workers in the most rapidly expanding occupation-industry clusters. Such an upgrade would certainly include dramatically accelerated turnarounds in the worst performing schools, and an alignment of educational standards to the requirements of higher-wage work. In fact, the retooling of the education system required to transition to a high-wage service economy may be as dramatic as that which took place in the transition from farming to manufacturing. It may also require operations redesign across sectors like health care and retail with numerous low paid employees, equipping those workers with productivity enhancing technology, and motivating productivity increases linked to rewards. The shift to a service economy means that the value of differential performance among front-line individuals or teams is higher than ever but not necessarily reflected in their incomes.

The answers to other questions are less certain, but important to pose. What might be the role of an immigration policy that took into account labor market outcomes more explicitly? What are the relative roles of collective bargaining, collaborative problem solving, and individual- or team-based performance pay in determining the organization of work for higher productivity and the setting of pay commensurate with contributions? What growth rate of productivity would be required to bring the “semi-skilled servicers” cluster into solid middle class earnings, and can these service sector gains be achieved?

Finally, how could we bring together these multiple drivers into coherent labor market and human capital strategies? For example, one of the fastest growing businesses is the remote data center industry to store and give instantaneous access to the terabytes of data created by the rising complexity of information-based business process and consumer information services. Given that remote data are responsible for a growing share of business costs, there are significant economic pressures to manage them from lower cost locations outside the US. The economics of data center offshoring can be matched or bettered, however, by an integrated strategy of locating data centers in relatively low cost US locations, in towns with access to an educated workforce from local community college-based technical programs, and applying “lean” techniques to maximize the productivity of those data centers, reinforced by team-based performance pay for front-line workers whose small innovations, reductions of error rates, and culture of continuous improvement generate significant savings. In microcosm, such an integrated approach harnesses the demand drivers of globalization, technical change and rising complexity to appropriate investments in education and skills, and labor market institutions that allow middle- and lower-income front-line workers to reap the benefits of their contributions to productivity improvements. Can the United States replicate such strategies on a national scale, working across business, government, and the social sector?

The United States in the past 20 years has experienced impressive overall growth in productivity, based on the rapid spread of managerial and technological innovations that has been fueled by global competition. At the same time, income dispersion has grown in the modern economy in large part because too few Americans have the skills they need to seize opportunities that these changes presented, and because our labor market institutions are not fully aligned to deliver higher wages on the basis of higher productivity in a services-dominated economy. Now is the time, therefore, to rebuild America’s human capital and labor market institutions so that ever more Americans can earn a better living by filling the high skill, high-value add roles that high-growth industries will continue to create, or by creating and capturing more value in front-line service and vocational roles. Focusing the efforts of business, government, and non-profit institutions on achieving these changes while maintaining our competitive economic dynamism is a challenge for our time.

Technical Notes

PART I: General technical notes

- Assumptions
- Household size adjustment
- Selection of timeframe

PART II: Segmentation and Clustering

- Household segmentation
- Clusters
- Occupational Skills

PART III: Drivers

- BLS-based coding matrix
- Driver-by-driver methodology

PART I: GENERAL TECHNICAL NOTES

ASSUMPTIONS

Deflator

Unless otherwise noted, all figures are in 2003 US dollars, deflated using the Consumer Price Index Research Series published by the BLS. The CPI-RS differs from other CPI series in that the basket of goods has been normalized to include more recent updates to the calculation methodology and is thus a better proxy for inflation over time. It is important to note, however, that the CPI is not chain-weighted, and therefore may somewhat overstate inflation over time. This series was selected due to its consistency over time. The base year of 2003 was chosen because it was the most recent year for which there were data available from all the surveys used (SCF and CPS).

Definitions

Household income: unless otherwise specified, “household income” refers to pretax “money income” for cohabiting individuals as defined by CPS, which differs from the definition of “personal income” used in the National Income Product Accounts. It is composed of cash and equivalents received by individuals. Money income consists of income in cash and its equivalents that is received by individuals.

- Money income includes earnings (wages, salaries, and self-employment income); interest income; dividend income; rents, royalties, estate, and trust income; nongovernment retirement pensions and annuities; nongovernment survivor pensions and annuities; nongovernment disability pensions and annuities; Social Security; unemployment compensation; worker's compensation; veterans' payments other than pensions; government retirement pensions and annuities; government survivor pensions and annuities; government disability pensions and annuities; public assistance; supplemental security income; veterans' pensions; government educational assistance; nongovernment educational assistance; child support; alimony; regular contributions from persons not living in the household; and money income not elsewhere classified. CPS data are survey based and do not have a “household income” option, that is, it will be up to the respondent to decide to which individual to attribute shared income. For example, interest earned on a shared account may be counted as income for either of the account holders, or divided

between the two, and so forth. This is not a problem on the household level but should be taken into consideration when evaluating individual income.

- Money income excludes capital gains, employer contributions for employee pension and insurance funds; lump-sum payments except those received as part of earnings; certain in-kind personal current transfer receipts— as Medicaid, Medicare, and food stamps—and imputed income.

Posttax income: CPS money income plus employer contributions to Social Security and Medicare (estimated) less the share of income paid in taxes, based on estimated effective federal and applicable state tax rates. Progressiveness of federal tax rates was simplified into four categories of effective tax rates, and exemptions were not estimated. Progressiveness of state tax rates was disregarded, and flat rates were applied according to state. Data provided by the CPS on taxes paid was considered unreliable since overall tax payments in the CPS do not match officially published IRS numbers on taxes paid.

Transfers: Social Security benefits; welfare and other public assistance; unemployment compensation; disability benefits; education assistance benefits; survivor's income; supplemental security; veteran pay; worker's compensation; private transfers. Note that unlike in Germany, income from pensions is not included in transfers.

Workforce: unless otherwise specified, persons age 16 to 75 either currently employed or actively seeking work. Does not include students.

Highest income earner: individual in the household who received the highest labor income.

Medians versus averages

Unless otherwise noted, average rather than median incomes are used to describe household incomes across income brackets.

Negative and zero incomes: in the lowest income group, some households report negative and/or zero incomes. Particularly within labor income, a negative pretax income is theoretically impossible. Even if all negative incomes are converted to zeroes, a problem may persist: within cohorts at the bottom end of the income distribution, more than 50 percent of respondents may have a negative or zero income, particularly within a specific income category. For instance, in the median, income in the (unadjusted) bottom 10 percent of the income distribution in 2005 was \$7,328. However, since less than 50 percent of households in that group receive any given component of income, the median earnings income is zero, the median Social Security income is zero, and so forth. Using averages enables comparison of the subcomponents of income even within groups that have very low incomes.

Intertemporal comparisons: Due to revisions in industry and occupation codes, industry and occupation data within the CPS must be converted to be comparable over the entire time period (see explanation below). Due to this conversion, employment by industry/occupation must be weighted by the appropriate 1990-to-2000 conversion factor; averages can be much more easily and accurately weighted than medians.

Minimum counts

For cross-tabulations of CPS data, we set a minimum of 200 observations to minimize standard errors. Descriptive statistics in cross-tabulations with fewer than 200 observations are omitted.

Top coding in CPS

Within CPS, as with all government surveys, data for which there are very few observations are suppressed in order to preserve confidentiality for the respondents. Because of this,

very high incomes in CPS are “top-coded,” that is, incomes above a certain threshold are simply counted as one observation at the threshold. For instance, the unadjusted household income threshold in 2005 was \$1.12 million (nominal); a household with an income of \$1.5 million would thus be counted as a household with an income of \$1.12 million. Thus, average incomes for the very top of the income distribution as reported by CPS are lower than in reality. However, the focus of this analysis is not the extreme high-end of the income distribution, but rather the majority of US households. For more in-depth data on the top end of the income distribution, please see the Congressional Budget Office publication “Historical Effective Federal Tax Rates: 1979-2005.”

HOUSEHOLD SIZE ADJUSTMENT

Increasing household size naturally has a direct effect on household income—in 2005, the median income of households with two members was 108 percent higher than households with only one member. Median incomes typically peak for households with four members, and decline above that level. This is natural, as the needs of a household grow with each additional member, but—due to economies of scale in consumption—not in a proportional way. Needs for housing space, electricity, and so forth, will not be three times as high for a household with three members as for a single person. Thus simply adjusting for household size by taking a per capita income will be misleading—a household of three people living on \$90,000 per year will be much more comfortable than three individuals living separately on \$30,000 per year due to economies of scale. Thus when ranking households within an income distribution, it is important to incorporate some sort of size-of-household adjustment to group households with similar spending power.

There are a variety of equivalence-adjusted scales, but typically all involve dividing the household income by an adjusted number of members. Thus any given household will fall differently within an equivalence-adjusted income distribution and an unadjusted distribution. Households with more than the average number of people will be lower in an adjusted distribution than they would have been in an unadjusted distribution, while the opposite is true for households with below-average number of members.

Unless otherwise noted, all household income percentiles are equivalence-adjusted using the Luxembourg Income Study Scale, which divides the income of the household by the square root of the number of people in the household.

SELECTION OF TIMEFRAME

It is important to note in discussions of differential income-growth rates that very different conclusions can be reached depending on the years used to calculate the different rates of growth. Take, for example, unadjusted average income data from the Congressional Budget Office. If we look at average annual income growth by quintile for 20 years beginning in 1981, the range of income growth is quite large: 0.8 percent for the lowest 20 percent, but 2.4 percent for the top 20 percent, or three times faster. By tweaking the time period somewhat and looking at income growth for 15 years beginning in 1988, the distribution is much less dispersed, ranging from 0.9 percent for the lowest 20 percent up to 1.3 percent for the top 20 percent. Similarly, the increase in income bifurcation varies significantly depending on which time period used. For example, the average income in the top quintile was 119 percent greater than the average income in the next quintile in both 2001 and 2003. Bifurcation grew significantly in the 1980s, however, so in the 1981–2001 period the difference grew a dramatic 42 percent, from 77 percent. In the 1988–2003 period, by contrast, the difference grew only 7 percent, from 112 percent.

This demonstrates how two comparisons that are not significantly different in length and time period can produce significantly different results.

This phenomenon makes it particularly important to be thoughtful in selecting base years for calculations of growth rates and comparisons over time, while still contributing meaningfully to the debate about rising income inequality in the recent past. An

examination of the Gini coefficient, a widely used measure of income inequality tracked by the census, shows that in fact the most acute increases occurred in the 1990s, and growth in this index of inequality has actually slowed significantly in recent years. Another interesting phenomenon of the late 1990s and early 2000s is that the index has become more “spikey,” in that inequality has experienced a series of more rapid increases followed by sharp contractions than in years past, when inequality was growing but in a much less pronounced way.

Given the distinct patterns of rising income inequality in the 1990s and 2000s, we determined that whatever larger economic, social or policy trends that caused these increases would be most manifest in this period. Furthermore, more detailed data were available from the Current Population Survey beginning in 1991. As income inequality barely changed between 1990 and 1991, and the growth rates calculated based on 1990 were virtually identical to those based on 1991, we opted to use 1991 as our base year in the interest of additional data granularity.

PART II: SEGMENTATION AND CLUSTERING

HOUSEHOLD SEGMENTATION

Having adjusted CPS household income statistics for household size, we segmented households into deciles according to their adjusted income levels. The household deciles were then divided into the following four groups where we observed natural break points: the top group, consisting of the top decile by adjusted household income; the upper middle group, comprising the seventh to ninth deciles; the lower middle group, comprising the fourth to sixth deciles; and the bottom group, made up of the lowest three deciles. Other household demographic data were also examined, including household size, number of children, female labor participation, marital status, age, education, occupation, and industry. These data also formed fairly distinctive patterns within the household income boundaries of the four groups above.

CLUSTERS

Clusters of jobs that experienced similar rates of change in employment demand and pay and ended up at similar levels of compensation in 2005 were identified by applying a statistical algorithm to US labor market data from 1994 to 2005. Nine such clusters show up, namely, “Top earners,” “White-collar workers,” “Artists and farmers,” “Front line,” “Speeding treadmill,” “Automated away,” “Classic blue collar,” “Semi-skilled servicers,” and “Low earners.”

OCCUPATIONAL SKILLS

Occupational skills are categorized into the following three groups. Tacit skills are required for occupations that cannot function without person-to-person interactions (physical or virtual). These occupations involve judgment and insight applied to complex communications or problem solving. Examples include managers, salespeople, and customer service representatives. Transactional skills are required for occupations that involve simple communication and interactions that do not require the use of judgment and insight. These occupations can involve complex individual problem solving. Examples include budget analysts, computer scientists, and bank tellers. Transformational occupation skills are required for occupations that are directly involved in the extraction and conversion of raw materials into finished goods (e.g., direct manufacturing labor). Examples include machinists, tire builders, and bakers.

PART III: DRIVERS

The drivers’ analysis was done with a three-step process using quantitative analysis based on data from the Current Population Survey (CPS) of the US Census Bureau and a qualitative assessment of impact. The quantitative analysis was supplemented with data from other sources (specified in the driver-by-driver section below) in cases where

no CPS data was available or CPS data was deemed unreliable. In some cases literature review replaced or supplemented available data.

BLS-BASED CODING MATRIX

For each driver a detailed Bureau of Labor Statistics (BLS) occupation and industry pairing was evaluated. A matrix of 572 individual cells were created (although some of them had zero cases) and then later aggregated to a matrix with 172 cells (even after aggregation some cells had zero cases) in the following categories:

Industry classification

1. Agriculture, Mining, and Energy
2. Consumables and Textile Manufacturing
3. Chemicals and Metal Manufacturing
4. Machinery, Electronic, and Furniture Manufacturing
5. Trade
6. Finance, Insurance, and Real Estate (FIRE)
7. Recreation, Hospitality, and Transportation (RHT)
8. Education
9. Health care
10. Construction
11. IT, Administrative, and Other Private Services
12. Government Services
13. Professional Services and Management

Occupations classification

1. Management
2. Professional Services (Legal, Health care, Engineering, Finance)
3. Administrative Support Functions
4. Education and Entertainment
5. Sales
6. Vocational skills (Health care support, Police, and Repair)
7. Personal and Social Services
8. Production
9. Repetitive Manual

The driver impact was assessed in a three-step process. The level of analysis for steps 1 and 2 are the cells described above; for step 3, the level of analysis was the entire cluster.

Step 1:

Cell level Quantitative assessment

Step 2:

Cell level Qualitative assessment of direction (if applicable; see details in each driver section)

Step 3:

Cluster level Qualitative assessment of overall impact

The results of steps 1 and 2 are a code for each cell:

- (-1)** if there was a negative impact (i.e., wages were lowered or employment was negatively affected)
- (0)** if the cell was not impacted at all or below the predetermined threshold
- (1)** if the effect was positive (i.e., wages were increased or employment was positively affected)

After each cell outcome was determined, the impact was added up for all cells in each cluster.

Conceptual example:

Cluster A is made up of three industry/occupation groups :

- (1) Finance Managers (Industry Group 6, Occupation Group 1): 50% of cluster
- (2) Health Care Managers (Industry Group 6, Occupation Group 1): 30% of cluster
- (3) Government Managers (Industry Group 12, Occupation Group 1): 20% of cluster

Unionization increased above the threshold ONLY in group 3. The determination for Cluster A would be that 20% of the cluster was positively impacted by unionization.

Step 3 was then a second qualitative assessment. This time the determination was made at the cluster level rather than at the cell level to establish if the impact of a particular driver on a cluster was high, medium, or low. This was a completely qualitative assessment based on literature review, previous MGI and McKinsey work, and outside experts. In the example above, the determination could have been, for instance, that the impact of unionization on the cluster was low because

(A) Only 20% were impacted at all

(B) Unions play only a small role in wage setting among government managers

All three steps were then translated into an x/y grid. The x-axis represents steps 1 and 2 (how many people were impacted and in which direction). The y-axis represents step 3 (the level of impact on the entire cluster).

DRIVER-BY-DRIVER METHODOLOGY

TFO (Trade, Foreign Direct Investment, Off-shoring). Trade, Foreign Direct Investment (FDI), and Off-shoring were treated as a single driver since their effects are interrelated. CPS has no matching variables for these drivers; consequently a broad industry and occupation analysis was done based on existing literature, such as Stolper-Samuelson's widely accepted work on translating FDI and trade deficits into US worker equivalents. The US trade balance was analyzed by industry and occupation, and

increases and decreases in each industry's trade balance between 1994 and 2005 was translated into US worker equivalents. In cases with an impact of more than 2.5 percent in each direction the cell was considered affected. For each case with a trade deficit that translated into a loss of 2.5 percent (the US average) in US employment, the industry and occupation was considered negatively impacted. For FDI the net balance of incoming and outgoing FDI (the US average) was used in the same fashion. A 3 percent change in either direction was considered an impact. The final step was then a qualitative assessment of how the trade affected different occupations. For example, globalization in the form of trade generally affects managers positively while it affects manufacturing workers negatively.

Skill-Biased Technological Change (SBTC). SBTC investments are not directly covered in the CPS. Instead the team investigated investments in technology based on a per worker bases, flagging cells where the investment was more than \$4,320 (the US 2003 average). The team then made a qualitative assessment of whether the impact was positive or negative. Management positions were generally considered positively impacted, for example, while manufacturing positions were considered negatively impacted (due to automation). While we acknowledge the often direct link between education and SBTC, establishing a direct link through the CPS was unfortunately not possible.

Organizational Complexity. Organizational Complexity impacted management cells only. A cell was considered positively impacted by organizational complexity if scale or reach of the corporations in this area increased. Increases in the scale of firms was measured through the EEC (Equivalent Employment by Company) index, and increases in the global reach was approximated by measuring increases in the numbers of foreign subsidiaries. These variables are not part of the CPS and, consequently, outside data was used.

Performance Pay. Performance pay comes in different forms, ranging from annual bonuses to other types of variable pay such as commissions for salespeople. For the purpose of this study an increase in annual bonuses for managers of more than 5 percentage points was considered a positive effect of performance pay in all management cells. In nonmanagement occupations an increase of least 5 percentage points in jobs that offer any type of variable pay was considered a positive effect. In both cases a 5 percentage point decrease was considered a negative effect. The data quality of the CPS dataset was considered poor since definitions are not always clear. A commissioned salesperson, for example, often has a guaranteed minimum pay if they fail to "make commission," that is, sell enough goods to qualify for commissions. Unlike a management bonus, a salesperson's base pay is often not paid once they qualify for commission in any given pay period, making the distinction in a survey complicated. These and other examples led the team to decide to treat this variable more broadly in a qualitative measure. For example, in some cells the data might have not shown a decrease in performance pay but the majority of similar positions showed that decrease. In these cases a qualitative decision was reached to adjust neighboring cells. If performance pay reaches very high levels, the literature sometimes refers to these workers as "superstars".

Superstar phenomenon. "Superstars" are people such as highly paid CEOs, sports stars, famous actors, and top chefs. By definition this group is very small and income effects are therefore not easily picked up by a survey like the CPS since overall participation (measured in the number of completes) is too low. All effects from sports or movie stars are therefore not part of this analysis. The superstar phenomenon was exclusively analyzed by assessing the growth of CEO salaries using any management cell as an approximation. The results were then adjusted qualitatively. Only management cells were considered, and any above-average increase in compensation was considered a positive impact for this cell. The assessment was then qualitatively adjusted, since a very broad definition of the superstar phenomenon was used.

(De-)unionization. Unionization impact on income hails from the union's power to negotiate on behalf of its entire membership to reach collective bargaining agreements. Lower unionization is therefore considered a negative impact while higher unionization is considered a positive impact. These assessment needs to be supplemented with a qualitative assessment of the union's power and influence on wage setting. The impact of unionization was measured in a three-part test for each cell. The first two were quantitative measures. Positive or negative impact was only assessed in cells that showed above-average unionization in the base year (1994: 14.9 percent) and the target year (2005:12.1 percent). A cell was then considered negatively impacted if unionization went down by more than 5 percent and positively impacted if unionization was up more than 5 percent. The 5 percent cutoff was determined by the median of all absolute effects of unionization for each cell. For example, minus 2 percent, 5 percent, and minus 7 percent unionization growth would have been translated into three effects of 2 percent, 5 percent, and 7 percent, determining the median to be 5 percent. The final step was a qualitative assessment if the impact on unionization numbers will actually impact wage setting. Increased unionization among government workers, for example, would have been assessed a low effect since salaries for many government positions are highly regulated and increased union membership will have little impact on the overall levels of these wages.

Education. CPS records the education level of each respondent. For the purpose of this study college education was selected as the key variable. Overall, Americans were more educated in 2005 than in 1994, and on average there was a 10 percent increase in people with college educations across all industries and occupations. Cells were considered positively affected if college education increased at least twice the average rate or declined by 10 percent. In all cells where the majority of workers were already college educated in 1994 (mostly management and professionals cells), the rate of postgraduate degrees was measured using the same cutoffs.

Migration. A three-part test was performed to determine if cells were affected by migration. Any industry and occupation cluster with average salaries above the US average income (\$45,123) or below average share of immigrants (15.6 percent) was considered not impacted at all. All cells that were left were considered potentially impacted since an above-average increase in immigrants who demand lower wages than their American counterparts could negatively impact a cell. The final determination was therefore made based on the average (5.6 percent) increase of immigrants in all cells. Any cell with an increase of more than 5.6 percent was considered negatively impacted; cells with a decrease of 5.6 percent or more were considered positively impacted.

Female Labor Force Participation (FLP). FLP is similar to immigration. Increasing numbers of lower-paid female workers potentially impact wages. An increase of 10 percent in FLP was considered a negative impact and a decrease of 10 percent a positive impact for each cell. Many cells were excluded from this analysis since overall FLP in the cell was too low to make a final determination of the impact.

Aging. Aging can have a positive or negative impact on the labor force, requiring a two-part test. To determine whether a cell was impacted at all, a quantitative CPS-based measure was chosen. Any cell with an increase of 10 percent or more of workers aged 40–65 was considered impacted. A determination was then made if the impact was positive or negative by investigating the average income of different age groups. This second determination was necessary since an aging workforce can either mean more experienced workers earning higher wages or more experienced workers creating a supply shock and lowering wages.

Bibliography

Autor, David, Katz, Lawrence, and Kearney, Melissa, "The Polarization of the US Labor Market," NBER working paper, 2006.

Autor, David, Katz, Lawrence, and Kearney, Melissa, "Trends in U.S. wage inequality: Revising the revisionists," June 2007.

Borjas, George, J., "The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market." *The Quarterly Journal of Economics*, November 2003.

Card, David, "The impact of the Mariel Boatlift on the Miami labor market," *Industrial and Labor Relations Review*, Vol. 43, No. 2., January 1990, pp. 245-57.

Card, David and DiNardo, John E., "Skill-biased technological change and rising wage inequality: Some problems and puzzles," *Journal of Labor Economics*, October 2002, p. 733-83.

Domestic services: The hidden key to growth, McKinsey Global Institute, December 2005

The economic impact of the achievement gap in America's schools, McKinsey & Company Social Sector Office, 2009.

The emerging global labor market, McKinsey Global Institute, April 2007.

Freeman, Richard B. and Medoff, James L., *What Do Unions Do?* New York: Basic Books, 1984.

Goldin, Claudia and Katz, Lawrence, *The Race between Education and Technology*, Cambridge: Belknap Press, 2008.

Goldin, Claudia and Katz, Lawrence, "Long-Run Changes in the U.S. Wage Structure: Narrowing, Widening, Polarizing," Harvard University and NBER working paper, 2007.

Gross, Daniel. "Income Inequality, Writ Larger" *The New York Times*, June 10, 2007.

Haskins, Ron, "Immigration: Wages, education, and mobility." The Brookings Institution, 2007.

Hanushek, Eric A. and Lindseth, Alfred A. *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools* (Princeton University Press, 2009)

Krugman, Paul, "For Richer," *New York Times Magazine*, October 20, 2002, p. 62.

Krugman, Paul, "The Great Wealth Transfer," *Rolling Stone*, November 30, 2006.

Lawrence, Robert: *Blue Collar Blues: Is Trade to Blame for Rising US Income Inequality?* Policy Analyses in International Economics Series, vol. 85. Washington, D.C.: Institute for International Economics, 2008.

Lemieux, Thomas, "The changing nature of wage inequality," *Journal of Population Economics*, 2008.

Lemieux, Thomas, "Increasing residual wage inequality," *The American Economic Review*, 2007.

Lemieux, Thomas, "Postsecondary education and increasing wage inequality," *American Economic Review*, 2006, volume 26, 2006, p. 195–99.

Lemieux, Thomas, MacLeod, Bentley and Parent, Daniel, "Performance Pay and Wage Inequality," NBER working paper, number 2850, June 2007.

Lewis, William, *The Power of Productivity: Wealth, Poverty, and the Threat to Global Stability*, University of Chicago: October 2005.

Lewis, Gregg, *Union Relative Wage Effects: A Survey*, Chicago: University of Chicago Press, 1986.

Mishel, Lawrence, Bernstein, Jared, and Shierholz, Heidi. *The State of Working America*, Economic Policy Institute, 2006/2007

"Pay and performance in America: 2005 compensation and benefits report," Hudson Highland Group, 2005.

Regev, Tali and Wilson, Daniel, "Changes in income inequality across the U.S." *FRBSF Economic Letter*, September 2007.

Rosen, Sherwin, "The economics of superstars," *The American Scholar*, Volume 52, Number 4, Autumn 1981.

Schmidt, Christoph and Zimmerman, Klaus, "Work characteristics, firm size and wages," Working paper, number 264, Princeton University, September 1989.

Talkin' 'Bout My Generation: The Economic Impact of Aging US Baby Boomers, McKinsey Global Institute, June 2008.

U.S. productivity after the dot-com bust, McKinsey Global Institute, December 2005

U.S. productivity growth, 1995-2000, McKinsey Global Institute, October 2001

