Stanford University • July 2012

SIEPR policy brief

Stanford Institute for Economic Policy Research

on the web: http://siepr.stanford.edu

The Allocation of Talent and U.S. Economic Growth

by Pete Klenow

Abstract: In 1960, 94 percent of doctors were white men, as were 96 percent of lawyers and 86 percent of managers. By 2008, these numbers had fallen to 63, 61, and 57 percent respectively. Skilled occupations have become more equally distributed across race and gender, as have earnings within occupations. The result is arguably better allocation of talent and human capital investment, potentially accounting for 15 to 20 percent of U.S. economic growth over the last fifty years.

Acknowledgements: Based on joint work with Chang-Tai Hsieh, Erik Hurst and Chad Jones. Our research paper can be found here: *http://klenow.com/HHJK.pdf.*

Fifty years ago, there were stark differences in the occupations of white men versus women and blacks. For example, in 1960, 96 percent of lawyers, 99 percent of engineers, 94 percent of doctors, and 86 percent of executives and managers were white men.[1] Roughly 20 percent of all white men in 1960 worked in the high skilled occupations of lawyers, doctors, engineers, scientists, architects, mathematicians and executives/managers. In contrast, 2-6 percent of white women, black men, and black women worked in these occupations in 1960. Instead, 58 percent of working white women in 1960 worked as nurses, teachers, sales clerks, secretaries, and food preparers. And 54 percent of working black men worked as freight handlers, drivers, machine operators, farm laborers and janitors. And 51% of working black women worked in household services, personal services, and food preparation/services.

continued on inside...

1 All data is from the 1960, 1970, 1980, 1990, and 2000 Decennial Censuses or the 2006-2008 American Community Surveys (ACS) conducted by the U.S. Census Bureau.

About The Author

Pete Klenow received his Ph.D. from Stanford University, where he is currently Landau Professor of Economics and the Gordon and Betty Moore Fellow at SIEPR. He is also a Research Associate of the National Bureau of Economic Research, for whom he organizes conferences on Economic Growth. He is a consultant to the Federal Reserve Banks of San Francisco and Minneapolis. He is currently an Associate Editor for the *Quarterly Journal of Economics* and *Econometrica*, and previously served on the Board of Editors of the *American Economic Review*. He has an ongoing Intergovernmental Personnel Assignment with the U.S. Bureau of Labor Statistics. Klenow specializes in macroeconomics, with emphasis on prices, productivity and economic growth.

By 2008, only 63 percent of doctors and 61 percent of lawyers were white men. Similarly, by 2008, the share of women and blacks in the high-skilled occupations listed above increased to 19 percent and 15 percent, respectively. In 2008, the share of working white men in these occupations grew as well, but less dramatically to 25 percent. Table 1 summarizes these changing occupational shares.

Over the same time frame, wage gaps within occupations narrowed.[2] Whereas working white women earned 58% less on average than white men *in the same occupations* in 1960, by 2008 they earned 26% less. Black men earned 38% less than white men in the typical occupation in 1960, but had closed the gap to 15% by 2008. For black women the gap fell from 88% in 1960 to 31% in 2008. Figure 1 plots the path of these wage gaps, which control for individual hours worked, experience and education.

How have these shifting occupation and wage gaps by race and gender affected average labor market outcomes? The answer depends on what forces are driving them. One possibility is that investments in human capital have risen for women and blacks relative to white men. Another possibility – not mutually exclusive – is that discrimination against women and blacks in the labor market has diminished. In both cases, these shifts could have contributed to growth in average incomes. Workers with more skill are more productive. Declining discrimination can produce gains by allocating jobs more on merit and less on race and gender.

Consider the world that Supreme Court Justice Sandra Day O'Connor faced when she graduated from Stanford Law School in 1952. Despite being ranked third in her class, the only private sector job she could get immediately after graduating was as a legal secretary (Biskupic, 2006). Such barriers might explain why white men dominated the legal profession at that time. And the fact that private law firms are now more open to hiring talented female lawyers might explain why the share of women in the legal profession has increased dramatically over the last fifty years. Similarly, the Civil Rights movement of the 1960s is surely important in explaining the change in the occupational distribution of blacks over the last fifty years.[3]

Discrimination and differential human capital investments can

Table 1
Occupation Shares in 1960 and 2008

	1960	2008
% OF WHITE MEN IN OCCUPATION:		
Doctors	93.7%	62.9%
Lawyers	95.8%	61.1%
Managers	85.9%	57.2%
% OF GROUP WORKING IN HIGH-SKILL OCCUPATIONS:		
White Men	19.7%	24.9%
White Women	6.2%	21.2%
Black Men	2.7%	14.8%
Black Women	1.7%	15.7%

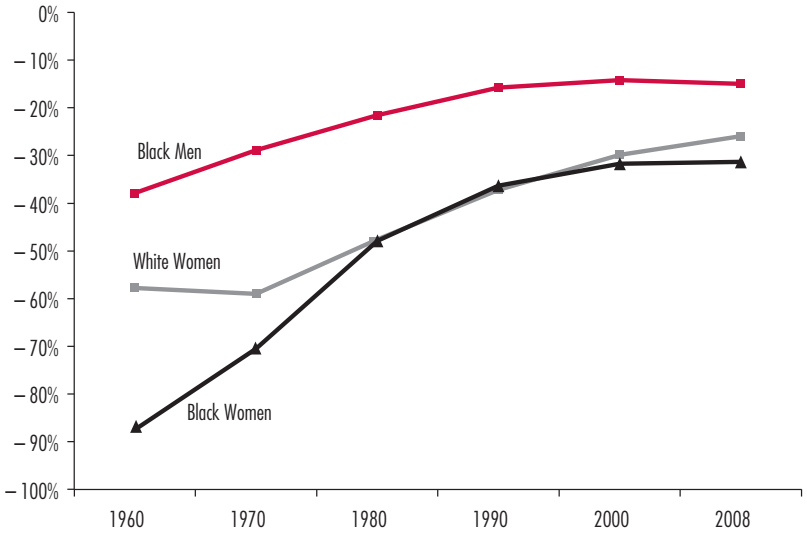
Notes: Group shares are conditional on working. High-skill occupations are lawyers, doctors, engineers, scientists, architects, mathematicians and executives/managers. Source: 1960 U.S. Census and 2006-2008 American Community Surveys.

2 Here we are using roughly 70 occupational sub-headings from the 1990 Census occupational classification system. Example occupations include ``Executives, Administrators, and Managers", ``Engineers", ``Natural Scientists", and ``Lawyers and Judges".

3 See Donohue and Heckman (1991) for an assessment of the effect of federal civil rights policy on the economic welfare of blacks. Still, Charles and Guryan (2008) show that relative black wages are lower in states where the marginal white person is more prejudiced against blacks today.

occur before the labor market. First, the prospect of facing discrimination in the 1960 labor market could well have discouraged women and blacks from getting human capital in the first place.[4] Second, in 1960 some groups were restricted from elite higher education institutions, black public schools were underfunded relative to white public schools, and prenatal and early life health care and nutrition differed by race.[5] These injustices have diminished. But even so, their legacy can continue to affect the current generation of workers through their parents' investments in their prenatal and early childhood medical care, nutrition, and education. Third, women may invest less in education and market skills because they plan to work fewer years or part-time to take care of their children. As women are having fewer children, having them later, and working more with children, women's incentives to invest in high-skilled careers have risen (Goldin, 1990).

Figure 1
Wage Gaps vs. White Men



Source: 1960-2000 U.S. Censuses, 2000-2008 American Community Survey.

A Simple Model for Quantification

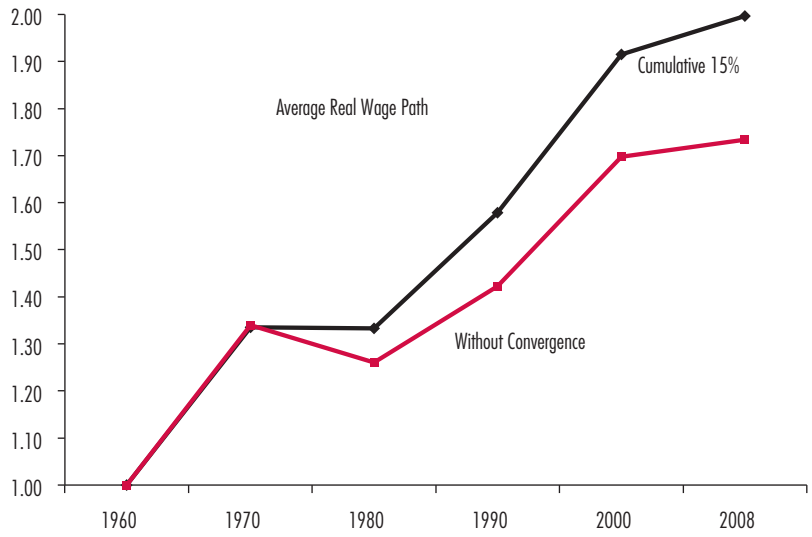
To get a sense of how much these labor force changes might have contributed to growth in average income per worker, we specify a stark and simple model:

- Each person possesses general ability (common to all occupations) and ability specific to each occupation (and independent across occupations).
- All groups (men, women, blacks, whites) have the same distribution of abilities.
- Each young person knows how much discrimination they would face in any occupation, and the resulting wage they would get in each occupation.
- When young, people choose an occupation and decide how much to augment their natural ability by investing in human capital specific to their chosen occupation.
- Occupations differ in their skill requirements and hence average wage levels.
- The bigger the barriers to entering an occupation, the higher the wages in that occupation for a given amount of human capital.

4 Subtler forces can act much like discrimination. Expectations and norms about gender roles by teachers, for example, could affect how much boys vs. girls build up math and science skills. See Fernandez, Fogli and Olivetti (2004), Fernandez (2007), and Fogli and Veldkamp (2011) for more examples and evidence.

5 Karabel (2005) documents how Harvard, Princeton, and Yale systematically discriminated against blacks, women, and Jews in admissions until the late 1960s. Card and Krueger (1992) show that public schools for blacks in the U.S. South in the 1950s were underfunded relative to schools for white children. See Chay, Guryan and Mazumder (2009) for evidence on the importance of improved access to health care for blacks.

Figure 2
Growth from Convergence by Gender, Race



Source: Calculations in Hsieh, Hurst, Jones and Klenow (2012).

- Technological progress is occurring in ways that favor some occupations over others.

We put numbers in our model to match the occupation and wage data in the U.S. Census for white men, white women, black men, and black women.

Our setup does not allow us to distinguish between barriers to accumulating human capital and labor market barriers. We proceed by considering two polar cases. At one extreme, we assume barriers occur only in acquiring human capital. At the other extreme, we assume only labor market barriers.

An important ingredient to our calculation is how much individuals differ in their occupation-specific ability. This comparative advantage is not to be confused with absolute advantage. Ken Arrow might be talented at all occupations relative to the average person. But if he is equally talented at all occupations (again, relative to the average person), then it does not matter which occupation he chooses. In contrast, suppose Arrow has a strong comparative advantage as an economist. Then it matters a lot whether he faces discrimination in going to college, getting a PhD in economics, and working as a research economist. The more comparative advantage exists, the more the economy has to gain from allocating the right people to the right occupations — regardless of their gender or race.

To estimate how much comparative advantage exists, we look at wage dispersion within occupations for a given gender-race. Importantly, we make adjustments for how much of this dispersion might reflect general ability rather than occupation-specific ability, based on education and test scores.

Other important ingredients include the technology for acquiring human capital and the way in which different occupations are combined to produce goods and services in the economy. If human capital accumulation is a major activity, then barriers to human capital accumulation are more costly. If it is hard to substitute nurses for doctors or paralegals for lawyers, then discrimination against women entering the medical and legal professions will do more damage.

Productivity Gains

Armed with our calibrated model, we ask: How much of overall growth in income per worker between 1960 and 2008 in the U.S. can be explained by women and African Americans investing more in human capital and working more in high-skill occupations?

Our answer is 15% to 20%, depending on the exact modeling choices and the exact source of the barriers (in the labor market vs. in human capital acquisition). Figure 2 illustrates this by showing that about 15% of the cumulative doubling of real wages from 1960 to 2008 may be credited to the wage and occupational convergence by gender and race.

Two-thirds of these gains are associated with white women,

continued on flap...

as they are more numerous than blacks in the labor force. Gains for blacks were concentrated in the South. White men arguably lost around 5% of their earnings, as a result, because they moved into lower skilled occupations than they otherwise would have. But their losses were swamped by the income gains reaped by women and blacks.

References

Biskupic, Joan, Sandra Day O'Connor: *How the First Woman on the Supreme Court Became Its Most Influential Justice,* New York, NY: HarperCollins, 2006.

Card, David and Alan B. Krueger, "School Quality and Black-White Relative Earnings: A Direct Assessment," *The Quarterly Journal of Economics,* February 1992, 107 (1), 151–200.

Charles, Kerwin Kofi and Jonathan Guryan, "Prejudice and Wages: An Empirical Assessment of Becker's The Economics of Discrimination," *Journal of Political Economy,* October 2008, 116 (5), 773–809.

Chay, Kenneth Y., Jonathan Guryan, and Bhashkar Mazumder, "Birth Cohort and the Black-White Achievement Gap: The Roles of Access and Health Soon After Birth," NBER Working Papers 15078, National Bureau of Economic Research, Inc June 2009.

Donohue, John J. and James Heckman, "Continuous versus Episodic Change: The Impact of Civil Rights Policy on the Economic Status of Blacks," *Journal of Economic Literature,* December 1991, 29 (4), 1603–43.

Fernandez, Raquel, "Culture as Learning: The Evolution of Female Labor Force Participation over a Century," NBER Working Papers 13373, National Bureau of Economic Research, Inc September 2007.

Alessandra Fogli, and Claudia Olivetti, "Preference Formation and the Rise of Women's Labor Force Participation: Evidence from WWII," NBER Working Papers 10589, National Bureau of Economic Research, Inc June 2004.

Fogli, Alessandra and Laura Veldkamp, "Nature or Nurture? Learning and the Geography of Female Labor Force Participation," *Econometrica,* July 2011, 79 (4), 1103–1138.

Goldin, Claudia, *Understanding the Gender Gap: An Economic History of American Women,*New York, NY: Oxford University Press, 1990.

Karabel, Jerome, *The Chosen: the Secret History of Admission and Exclusion at Harvard, Yale, and Princeton,* New York, NY: Houghton Mifflin Harcourt, 2005.

SIEPR *policy brief*

Stanford University
366 Galvez Street
Stanford, CA 94305
MC 6015

A publication of the
Stanford Institute for
Economic Policy Research

Non-Profit Org.
U.S. Postage
PAID
Palo Alto, CA
Permit No. 28

SIEPR

About SIEPR

The Stanford Institute for Economic Policy Research (SIEPR) conducts research on important economic policy issues facing the United States and other countries. SIEPR's goal is to inform policymakers and to influence their decisions with long-term policy solutions.

Policy Briefs

SIEPR policy briefs are meant to inform and summarize important research by SIEPR faculty. Selecting a different economic topic each month, SIEPR will bring you up-to-date information and analysis on the issues involved.

SIEPR policy briefs reflect the views of the author. SIEPR is a non-partisan institute and does not take a stand on any issue.

For Additional Copies

Please see SIEPR website at *http://SIEPR.stanford.edu*.