

# California's Rising Income Inequality: Causes and Concerns

*Deborah Reed,  
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# Foreword

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In July 1996, PPIC released its first research publication, *The Distribution of Income in California*. One finding reported in that study—that income inequality was increasing in California—was subsequently and widely cited as a troubling trend for the state. The authors found not only that income inequality has risen sharply over the past two decades but also that the disparity has grown faster in California than in the rest of the nation. To many observers, this portrait of California seemed at odds with the state’s long tradition of well-paying jobs and upward mobility for natives, migrants, and immigrants alike. The lead author of the initial study, Deborah Reed, took on the challenge of explaining the forces that have led to this increasing income disparity, and the result is the present volume, *California’s Rising Income Inequality: Causes and Concerns*.

The potential explanations for income disparity in California are many of the same ones that have been suggested and studied by analysts of national trends in income inequality: technological change, global

competition, immigration, changing household composition, higher returns to education, and structural changes in the post-industrial economy. However, California presents a particularly troubling case because, according to Reed's 1996 study, the increase in disparity in the state results from a more substantial decline in income for those at the mid-to-lowest levels of the distribution. After examining a number of possible explanations, Reed identifies *rising returns to skill* and *immigration* as the two leading causes of the widening gap in California. On the skill dimension, more years of education and more years of work experience translate into higher income, and over time the returns to both education and experience have increased. With regard to the second factor, immigrants now constitute 36 percent of the male workforce in California, and although they are present in every income group, immigrants are disproportionately represented at the lower end of the income distribution.

Thus, the author concludes that California is not only adding low-wage workers to its population through immigration but it has also seen the value of schooling, training, and experience grow each year, and both factors have contributed significantly to the state's increasing income inequality. For some, indeed for many, these are not likely to be surprising findings. What is surprising, however, is that after including changes in industrial structure, the author is able to explain just over half of the overall growth in income inequality in California. In other words, difficult-to-measure aspects of the workforce, such as individual skills and abilities, and of the work place, such as job risks and responsibilities, evidently play an important role as well.

What does this growing disparity mean for California's future? This is perhaps the most difficult question of all to answer. Reed identifies a

set of policies that would help address the issue of rising returns to skill through education and training. But, in a larger context, she observes that “economic growth has not resulted in wage gains in the middle and lower end of the male wage distribution, where wages have fallen during economic expansions as well as economic contractions.” For some, this growing societal bifurcation is simply the price of economic competitiveness in a global economy. For others, such tendencies represent a serious degradation of the California Dream.

This report presents a profile of income disparity in a way that is readily accessible to analyst and advocate alike. It is the type of study that Roger Heyns, one of the founders of PPIC, had in mind when he first conceived of the Institute in 1993: “To provide the State of California . . . particularly its elected representatives in the legislature and executive branch, with objective analyses of the major economic, social, and political issues facing the state.” Although there is still much to be learned about the meaning and consequences of the state’s current trends in income disparity, this report provides the information necessary to start that learning process.

David W. Lyon  
President and CEO  
Public Policy Institute of California

# Summary

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In 1996, the Public Policy Institute published its first research report, *The Distribution of Income in California*, by Deborah Reed, Melissa Glenn Haber, and Laura Mameesh. At that time, California was just emerging from the worst recession it had experienced since the end of the Great Depression. In most areas of the state, the economic picture was brightening and belief in the California Dream was beginning to revive. However, the report offered some troubling insights into how the benefits of returning prosperity might be shared: The study showed that in the last two decades, income inequality has risen sharply in California, greatly outdistancing the rise in the nation since the late 1980s. The rise in both California and the nation resulted from income growth at the top of the distribution and absolute declines in income at the bottom. Income inequality grew faster in California not because of faster growth at the top. In fact, income growth throughout the distribution has been slower in the state. Instead, the greater increase in inequality in the state resulted from a more substantial drop in income at the mid-to-lowest levels of the distribution.

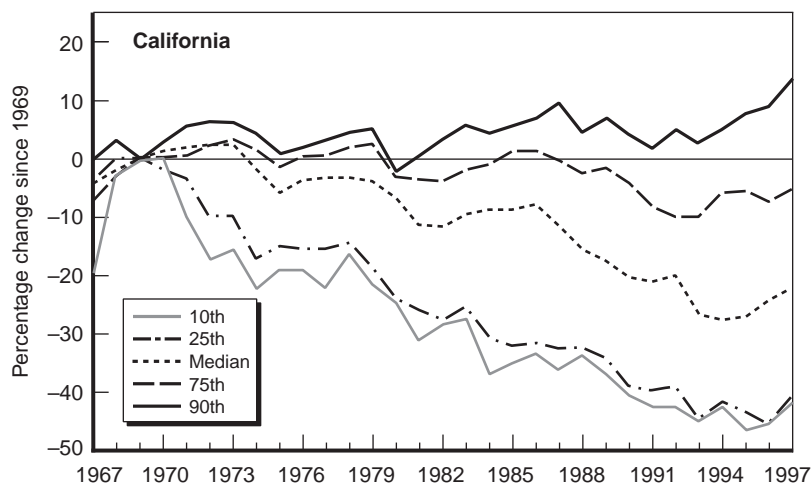
Predictably, inequality increased during business cycle recessions, with those at the bottom hardest hit. The difference between California and the nation—and one of the most troubling findings of the study—is that in the nation at large, incomes of people at the lower levels rebounded more during upswings than they did in California. The poor seemed to be on a more slippery income slope in California—even before the recent recession hit.

The results of the study gained wide attention in the media and at the state capitol. Clearly, all boats have not risen and fallen equally with the California economic tide. In the interest of equity and economic growth in the state, it is critical to understand what has caused the growing income inequality in the state and what this means for public policy. This monograph reports the results of a study undertaken for that purpose. This summary provides an overview of the study, its results, and the policy issues.

## **Trends, Questions, and Approach**

The first report traced the state trends in income inequality, absolutely and relative to trends in the nation as a whole, from 1967 to 1994. Because the state was still in recession in 1994, the possibility remained that recovery might reduce income inequality substantially if the wages of the poor grew. Focusing on male wages, this new study has extended the analysis to 1997 and has found that income inequality in California was slightly higher after the recession than before, and that it remained substantially higher than in the rest of the nation.

As Figure S.1 shows, between 1969 and 1997, real wages for male workers grew only at the very top (90th percentile) of the income distribution, and that growth was not dramatic—13 percent over the



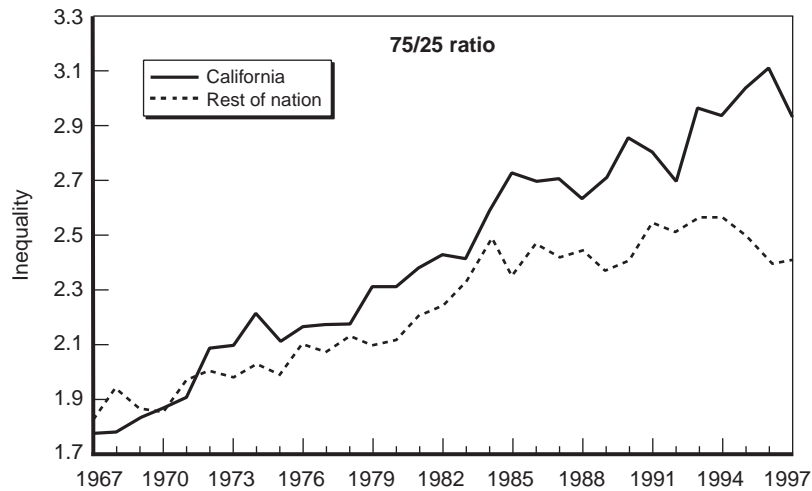
SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure S.1—Percentage Change in Real Weekly Wages for Male Workers, by Income Percentile, 1967–1997**

entire period. Even for the 75th percentile, there was no real growth trend and wages had not returned to their 1969 levels by 1997, with the state well out of the recession. At the median and below, male wages declined dramatically and steadily. The 10th and 25th percentiles fell by about 40 percent. In other words, while the rich got a little richer, the poor got a whole lot poorer. To be more precise, male workers who were at the bottom of the distribution in 1997 had even lower wages than the male workers at the bottom in 1969. Because the survey data include different samples of male wage earners in each year, the figure does not show that the “poor got poorer” in the sense that the *same people* who were poor in 1969 were even poorer in 1997.

How do these earnings trends translate into income inequality? The study measured inequality by calculating male earnings near the top of the income distribution relative to earnings of workers near the bottom. Figure S.2 shows the trend in inequality for the 75/25 ratio—the ratio of wages for men at the 75th income percentile (upper-middle income) and at the 25th percentile (lower-middle income). In 1967, men at the 75th percentile were earning about 1.8 times the wages of men in the 25th percentile; by 1997, the 75/25 ratio had risen to 2.9.



SOURCE: Author's calculations from the March file of the CPS.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure S.2— Ratio of Male Weekly Wages at the 75th Percentile Relative to the 25th Percentile, 1967–1997**



Because this increase in inequality has persisted and has been relatively unresponsive to economic upturns, the state cannot expect economic growth to reverse the trend. Policymakers must understand the underlying causes to address the concerns that income inequality raises about the well-being of the poor, equal economic opportunity, and the potential social consequences of intransigent inequality. To that end, the study posed two questions: Why has income inequality risen so sharply in California? Why has it been higher in the state than in the rest of the nation since the mid-1980s?

The study focused on male weekly wages because labor income, earned by working, is the main source of household income. Trends in labor income provide a better indicator of changes in the economy than household income does: Household income reflects not only economic changes but also societal changes, such as in marriage behavior, family size, and female labor force participation. The study focused on the earnings of males because trends in male wages are indicative of labor market realities generally, without the complicating effects of rising labor force participation, as in the case of female wage trends.

Using weekly wages as the earnings measure focuses on earnings variation determined in the labor market. Variation across people in *annual* labor earnings includes variation in participation, e.g., weeks of work during the year. Using trends in the distribution of *weekly* wages removes variation resulting from weeks of work. The labor earnings trends reported in this study are for civilian males ages 18 to 54 years who are not students, who are not self-employed, who report some earnings, and who worked at least 13 weeks of the year. The measure of earnings is pre-tax monetary compensation.

Using data from the Current Population Survey (CPS) and the decennial Census of Population and Housing, the study investigated several potential explanations for the rising inequality in male earnings: workforce diversity—that is, diversity resulting from immigration and from changes in native labor force education, age, race, and ethnicity; economic diversity, in terms of industrial structure; and labor market realities, in terms of rising returns to skill.

Trends in the distribution of income are sensitive to business cycles. To study long-run trends, the study focused on changes between business cycle peaks in 1969 and 1989. The study also looked at changes over the full period available in the CPS: 1967 to 1997.

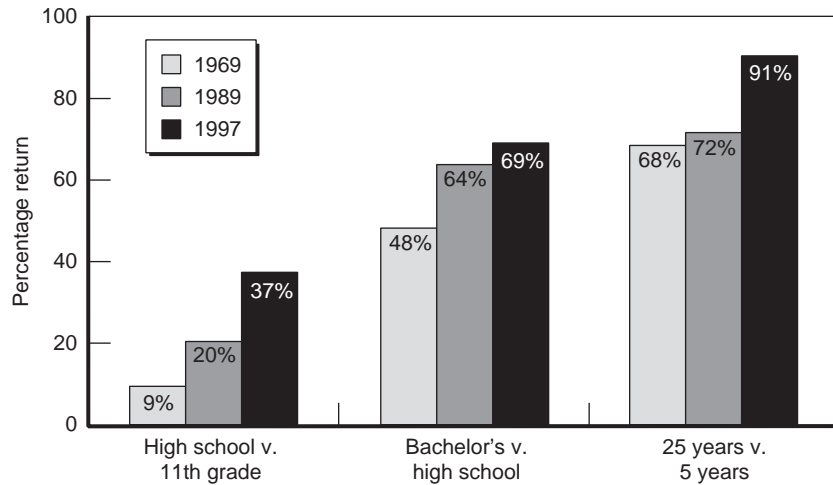
## **The Causes of California's Rising Income Inequality**

Of all the possible causes the study considered, two accounted for most of the rise in California and most of the difference in income inequality between the state and the nation: returns to skill and immigration.

### ***Effects of Rising Returns to Skill in California***

The study found that in California (as in the rest of the nation), rising returns to skill accounted for a great deal of increasing income inequality. Returns to skill measure the differential in earnings between more- and less-skilled workers. In the study, skill was defined in terms of years of schooling and years of work experience.

Figure S.3 shows the returns to skill and how they have changed over time for native California workers. The return to having a high school diploma versus having 11 or 12 years of schooling but no diploma increased from only 9 percent in 1969 to 20 percent in 1989 and to over



SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

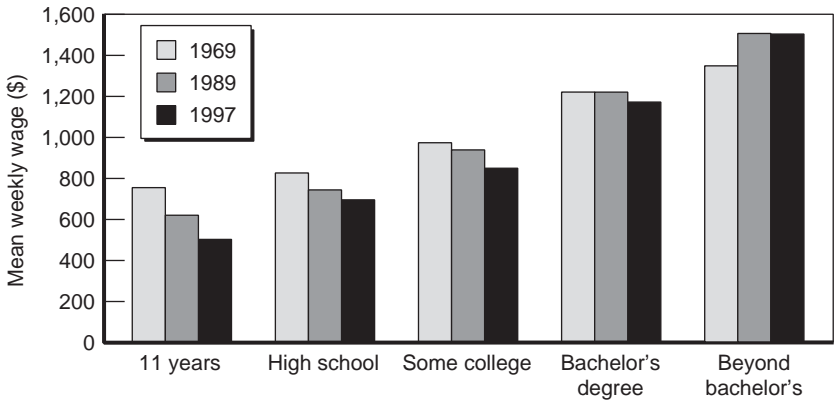
**Figure S.3—Returns to Skill for Native Male Workers in California, 1969, 1989, and 1997**

35 percent in 1997. In 1969, a native with a bachelor's degree earned almost 50 percent more than a similar worker who had only a high school diploma. By 1989, the return to a bachelor's degree for natives increased to over 60 percent and in 1997 it was just under 70 percent. For native workers, the returns to experience have also grown over the last 30 years. In 1969, a native worker with 25 years of experience earned 68 percent more than a native worker with five years of experience, in 1989, he earned 72 percent more, and by 1997, 91 percent more.

The change in returns to education, like the increase in income inequality, results more from falling wages for men at the bottom of the

distribution—in this case, the education distribution—than from increases for men at the top. As Figure S.4 indicates, mean weekly wages for native males with 15 years of labor market experience, 11 years of education, and no high school diploma fell almost 20 percent, from \$750 to \$620 between the labor market peaks in 1969 and 1989 (statistics reported in real, 1997 dollars). Mean wages for similar native males with a high school diploma fell almost 10 percent, from \$820 to \$740. Mean wages for similar native males with a college degree stayed fairly stable at about \$1,220.

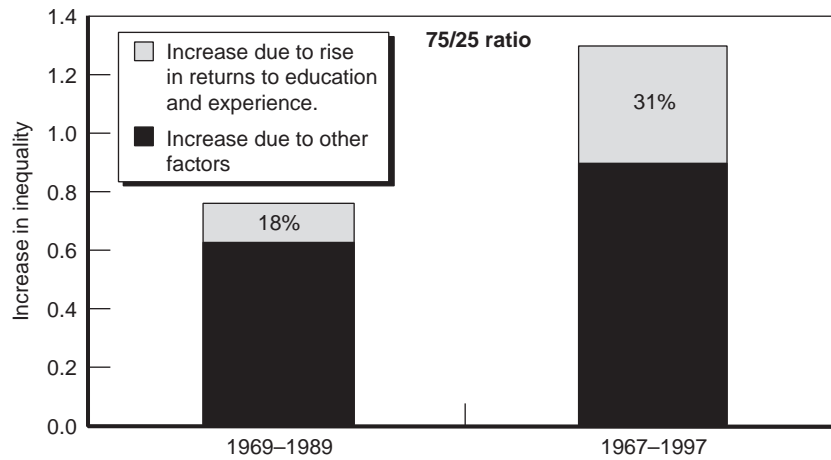
Figure S.5 shows how much the changes in returns to skill affected income inequality over two periods of time, 1969–1989 and 1967–1997. For each period, the total height of the bar represents the actual increase



SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

NOTES: Statistics are adjusted to 1997 dollars. Weekly earnings are predicted from the regression equation based on 15 years of work experience. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure S.4—Mean Real Wages for Native Male Workers in California with Less Than a Bachelor's Degree, 1969, 1989, and 1997**



SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and from the decennial Census for 1969 and 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1968 sample is based on combined data from the 1967 and 1968 surveys.

**Figure S.5—Effect of Rising Returns to Skill on Increased Male Wage Inequality in California, 1967–1997**

in the 75/25 ratio (recall that this is the wage differential between those at the 75th and those at the 25th percentile). The black part of each bar represents how much the ratio would have increased if returns to education and experience had not changed. Between 1969 and 1989, the 75/25 ratio increased by almost 0.8 points, from 1.8 to 2.6 (that is, by 1989, a man in the 75th percentile earned over two-and-a-half times more than a man at the 25th percentile). If the returns to education and experience had not changed, the ratio would have increased by 0.6 points. The rise in returns to education and experience thus explains the remaining 0.2 units of growth or roughly 18 percent of the overall increase in male wage inequality in this period. The second bar shows

that, between 1967 and 1997, the actual 75/25 ratio increased by 1.3 points. If the returns to skill had not changed, it would have risen by only 0.9 points. Thus, the change in returns to skill accounts for the other 0.4 points or 31 percent of the increase in male wage inequality in that period.

What explains the rising returns to skill? Research at the national level has suggested several likely contributors. Technological change has increased the demand for skilled workers who are trained to use technological innovations and has reduced the demand for less-skilled workers who may be replaced by technology. Rising rates of international trade have increased the demand for skilled workers who produce the goods we export (such as financial services) and have reduced the demand for less-skilled workers who produce the goods we import (such as textiles). Immigration has increased the relative supply of less-skilled workers and may have reduced their wages. In the past, unionization rates were higher for people with lower schooling levels. Thus, declining unionization rates may have reduced their wages.

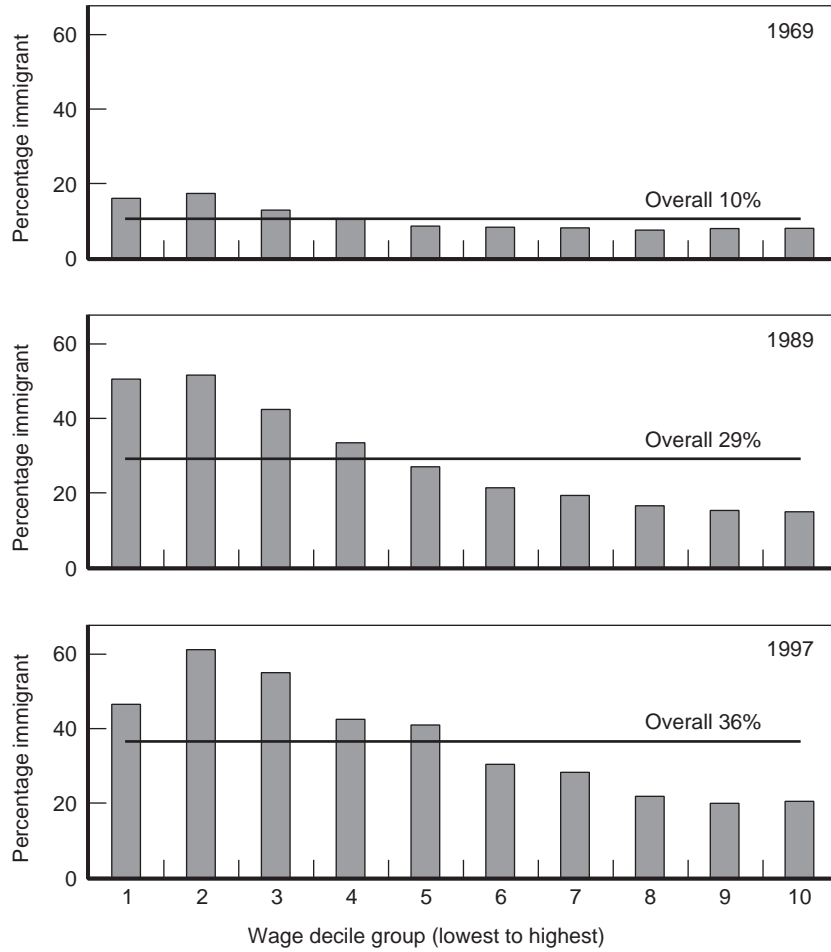
Despite numerous studies, national research has failed to find a single “smoking gun” to explain the rise in returns to skill. There is no general consensus among economists on the relative magnitude of the many explanatory factors. In light of the failure of national research to find an acceptable answer and the more limited data available at the state level, this study did not attempt to find a California-specific answer to this question.

### ***Effects of Immigration on Rising Income Inequality in California***

Immigration contributed to rising income inequality in the state because the proportion of immigrants in the state's male workforce has grown substantially—mainly at the bottom and lower-middle of the income distribution. For 1969, 1989, and 1997, Figure S.6 shows the proportion of immigrants in the male workforce for each of 10 wage groups of equal size (from lowest to highest wages).

In 1969, immigrants accounted for 10 percent of the male workforce (as shown by the horizontal line in the top panel), but much more than 10 percent of workers in the first two wage groups, the bottom 20 percent. Between 1969 and 1989, immigrants' degree of overrepresentation in the bottom increased: In 1989, immigrants accounted for 29 percent of the workforce; the proportion of immigrants in the bottom three categories tripled; and their share in the top three categories barely doubled (middle panel). Between 1989 and 1997, the proportion of immigrants grew from 29 to 36 percent and their share in the bottom category declined slightly, signifying a drop in their overrepresentation at the very bottom of the wage scale. Nevertheless, immigrants' overall share and degree of overrepresentation in the bottom categories was lower in 1969 than in 1989 and 1997, suggesting that immigration has contributed to the rise in income inequality in California. But by how much?

Figure S.7 suggests the possible range of immigration's effects on the rise for 1969–1989 and for 1967–1997 in terms of the 75/25 earnings ratio. For each period, the study calculated the actual rise in income inequality and what the rise would have been in the absence of immigration under each of three scenarios. The scenarios reflect

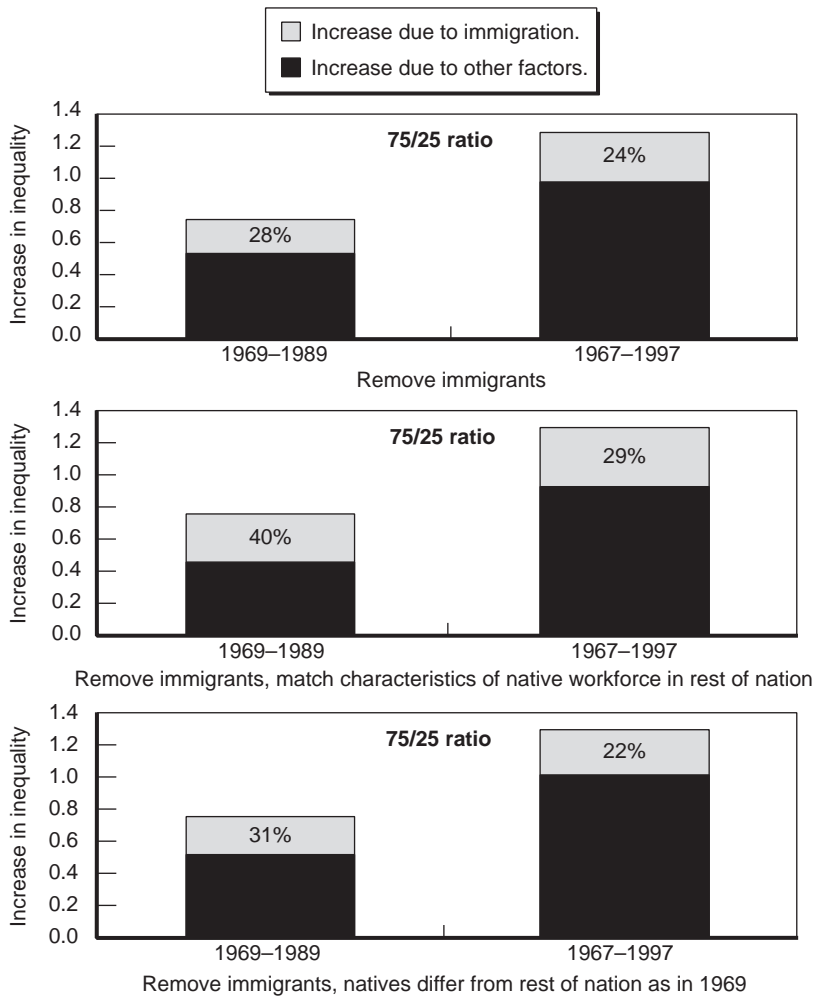


SOURCES: Author's calculations from the March file of the CPS for 1997 and the decennial Census for 1969 and 1989.

NOTES: Statistics are reported by decile group of male weekly wage in ascending order. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure S.6—Representation of Immigrants in the Distribution of Male Wages in California, 1969, 1989, and 1997**





SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1967 sample is based on combined data from the 1967 and 1968 surveys.

**Figure S.7—Effect of Immigration on Increased Male Wage Inequality, 1967-1997**

different assumptions about the ways immigration has affected the workforce in California. None of the scenarios accurately describe the California economy in the absence of immigration. However, they are useful for providing rough estimates of immigration's effects on rising income inequality.

The first scenario (Figure S.7, top panel) assumes that, in the absence of immigration, the native male workforce would have the same characteristics as the existing native male workforce in the state. For each period, the total height of the bar indicates how much the 75/25 ratio actually grew and the gray part shows how much of the growth is explained by immigration. The figure shows that between 1969 and 1989, immigration explains 28 percent of the increase and between 1967 and 1997, 24 percent.

The second scenario (middle panel) assumes that the native workforce in California would have had the same characteristics as the native workforce in the rest of the nation. Under this assumption, immigration explains 40 percent of the rise in the state between 1969 and 1989 and 29 percent of the rise between 1967 and 1997.

The third scenario (bottom panel) assumes that the native workforce in California would differ from the native workforce in the rest of the nation only in ways that it already differed in 1969. In that case, immigration accounts for 31 percent of the rise in the 75/25 ratio between 1969 and 1989 and 22 percent of the rise between 1967 and 1997.

### ***Summing Up Causes of California's Rise in Male Wage Inequality***

Table S.1 shows how much of California's overall rising income inequality can be explained by the factors examined in the study. Together, rising returns to skill and immigration account for almost half of the rise in both periods.

For the other possible explanations of the rise in income inequality, the study found only slight effects. Characteristics of the native male workforce have changed over the last three decades. For example, education levels have risen. The industrial structure of California has also changed; for example, there has been a large drop in the percentage of male workers in durable goods manufacturing. However, these factors explain relatively little of the rise in inequality over the two periods.

**Table S.1**  
**What Percentage of the Rise Can We Explain?**

	1969–1989	1967–1997
Returns to skill and immigration	40	44
Changes in native education, age, race	3	6
Changes in industrial structure	5	4
Race/ethnicity effect	-2	0
Total	46	54

SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

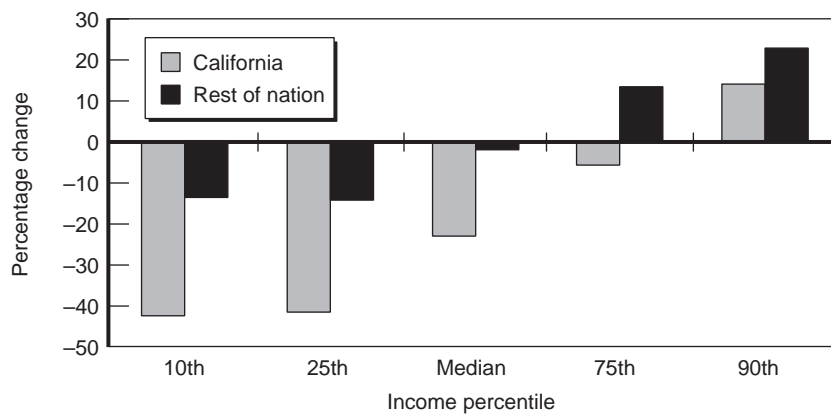
NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from 1996 and 1997. The 1967 sample is based on combined data from 1967 and 1968.

Taking into account all of the factors examined, the analysis explained about half of the rise in the 75/25 ratio for male wages. What explains the rest? The answer lies in factors that were not in the wage model developed in this study and could not be observed in the data. These factors include characteristics of workers, for example, abilities, basic skills, and special training; and characteristics of jobs, including risks and responsibilities. In light of the rise in returns to education and experience, it seems likely that rising returns to unobserved measures of skill such as ability and basic skills have contributed to growing male wage inequality.

### **Why Is Income Inequality Higher in California Than in the Rest of the Nation?**

As Figure S.2 shows, beginning in the mid-1980s, male wage inequality in California began to rise much faster than in the rest of the United States. Figure S.8 suggests why: The divergence of trends between 1969 and 1997 results because California's poor lost more ground. In the nation, male earnings at the 25th percentile dropped by about 15 percent but plummeted over 40 percent in California. At the 75th percentile, during the same period, male earnings in the rest of the country increased about 12 percent but decreased about 5 percent in California.

The study found that virtually all of the difference in income inequality between the state and the rest of the nation in 1989 was due to immigration. Immigration accounted for about 45 percent of the difference in 1997. Put another way, male wage inequality among natives in California was similar to that of the rest of the nation in 1989 but higher than that of the rest of the nation in 1997. Higher returns to



SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed.

**Figure S.8—Percentage Change in Male Wages, 1969–1997**

skill explained about one-third of the higher native wage inequality in 1997.

## Policy Considerations

This study has gone a long way toward explaining California's growing income inequality. It makes clear that the state's poor have been losing income ground steadily, in good economic seasons and bad, since the late 1960s. The earnings of California's male workers at the median and below have failed to rebound in business cycle growth over the last three decades. Thus, it seems unlikely that the state can grow itself out of this situation—even with a period of sustained, strong economic growth. Given the trends and the causes the study has identified, it seems reasonable to anticipate continuing high income inequality in the state's future.

That likelihood raises concern about the well-being of low-income people, about equal opportunity, and about potential social consequences. The absolute well-being of the poor becomes a major issue when real male earnings in the 10th and 25th percentiles have dropped by 40 percent over three decades. What are the living conditions for households when those earnings represent the main source of household income? As incomes at the median and below continue to slide, should we be more concerned about “equal opportunity”? If the earnings of the lower half are dropping inexorably as the earnings of the top rise, what will that do to the social fabric?

To address these concerns and questions, the study suggests several policy directions related to the major causes of income inequality that can be identified: rising returns to skill and immigration. These policy directions all involve education and training:

- Improve the opportunity to finish high school and enter college;
- Improve training for people who do not go on to college; and
- Promote the economic progress of immigrants through education and training.

Given the rising importance of education, one way of narrowing the income gap is through programs that improve people’s chances of getting a high school diploma and going on to college. The effect of such programs would not only increase wages below the median, it would also create a society with more equal opportunity.

Another way of responding to the rising returns to skill would be to improve K–12 education and other training received by people who do not go on to college. As the study showed, the rising returns to skill increased inequality not because the wages of a college graduate rose so

much as because the wages of a worker with high school or less education fell so far. Since that drop may be at least partially explained by a decrease in the quality of education these workers bring to the workplace, improving K–12 education and other training might well increase wages for those below the median.

Both of these policy directions might also address the effects of immigration on income inequality. The study's results have no direct implications for immigration policy: That is a national policy and one that must consider the social and economic costs and benefits of immigration. In the state, immigration has disproportionately increased the number of low and lower-middle wage earners in the workforce and, thus, income inequality. The low economic status of immigrants is unlikely to have harsh social consequences as long as new waves of immigrants progress economically as previous waves have progressed. However, recent immigrants tend to have lower levels of education relative to natives than past immigrants. Because the returns to schooling have increased, it is now even more important to ensure that second and third generations of immigrants have access to high-quality schooling and the opportunity to reach higher education levels.

Finally, from a policy perspective, it is essential that national and state leaders consider how policies focused on promoting growth and economic efficiency may affect income inequality. In California, economic growth has not resulted in wage gains in the middle and lower end of the male wage distribution, where wages have fallen during economic expansions as well as economic contractions. Moreover, policies intended to promote growth through technological change and international trade have contributed to the growth in income inequality experienced in California.

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# 1. Introduction

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Income inequality—a measure of how equally income is divided among members of society—has increased dramatically in California over the last two decades. Income inequality in the state matched that of the nation from the late 1960s until the late 1980s. Since that time, income inequality has grown faster in California than in the nation. The rise in income inequality in California results not only from growth at the top of the income distribution but also from decline at the bottom. Inequality growth in California has exceeded that of the nation in recent years not because of the greater income gains of the rich, but because of the more severe income losses of the poor. These trends were documented in our first study, Reed, Glenn Haber, and Mameesh (1996).

Californians care about the trends in income inequality because we care about the declining well-being of low- and lower-middle-income people. We care about providing a fair society where the opportunity for

economic success is available to all. We also care about the possible social consequences of income inequality.

This study examines several explanations for California's rising income inequality. The primary question of the study is, Why has income inequality grown in California since the late 1960s? The study also addresses an additional, related question: Why has income inequality been higher in California than in the rest of the nation in recent years?

Examining the forces behind the income inequality trends is essential for understanding their relevance and suggesting areas of concern for public policy. California has a diverse population with diverse needs and desires for income. When rising income inequality results from growing diversity, our concern may not be with income inequality per se but rather with ensuring that all members of society have the opportunity to achieve economic success. When rising income inequality results from a growing gap between the wages of educated and experienced workers and the wages of those with low skills, we should seek to improve access to quality education, training, and skills. When rising income inequality occurs with real losses for lower-income people, we need to consider whether their economic condition has deteriorated beyond an acceptable minimum level.

The study focuses on explaining rising inequality of labor earnings— income earned by working. Labor earnings are the largest source of household income. On average, California households received 89 percent of income from labor earnings in 1967 and 85 percent in 1997. Compared to household income, trends in labor earnings more directly measure changes in the economy, particularly in the labor market,



because trends in household income reflect changes in family size and household structure.<sup>1</sup>

The study examines the causes of rising wage inequality among working males. Wage trends for males provide a good indication of the labor market conditions faced by both males and females without the complicating effects of rising labor force participation found in the female wage trends.

The study investigates several potential explanations for rising male wage inequality in California including immigration, changes in the education and age of the workforce, and changes in industrial structure. It also examines the role of rising “returns to skill”—the increasing wage differentials between highly skilled workers and those less-skilled.

The main analysis investigates two periods. The 1969–1989 period covers the two business cycle peaks closest to the beginning and end of the income trends measured in this report. Using business cycle peaks reduces the role of short-run fluctuations and focuses attention on longer-run trends. Another advantage of studying this period is the availability of the decennial Census data with large sample sizes for California. The study also investigates the full period spanned by the March file of the Current Population Survey (CPS), 1967–1997. Because the CPS survey has a small sample size for California, only about 5,000 households per year, the analysis is based on combined surveys. Data from 1967 and 1968 are combined to represent the late 1960s and data from 1996 and 1997 are combined to represent the late 1990s.<sup>2</sup>

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<sup>1</sup>For an analysis of trends in household income, see Reed and Cancian (1999).

<sup>2</sup>See Appendix A for a description of the income data used in this report.

The study proceeds as follows. Chapter 2 updates the trends found in our earlier study using three types of income: household income, male weekly wages, and female weekly wages. The trends presented in Chapter 2 are based on income data from the March Current Population Survey. Income data from the decennial Census show the same trends, but the magnitudes are somewhat different. Income data from the two sources should not be combined.<sup>3</sup>

Chapter 3 reports measures of returns to skill and their effect on growing male wage inequality. Chapter 4 investigates the location of immigrants in the distribution of wages and measures the role of immigration in explaining growing male wage inequality. Chapter 5 examines additional explanations for growing male wage inequality: changes in native workforce characteristics such as education and age and changes in industrial structure. Chapter 6 turns to the question of higher inequality in California relative to the rest of the nation, investigating the same basic explanations: returns to skill, immigration, workforce characteristics, and industrial structure. The study concludes with a discussion of the implications of our results for understanding income inequality in California and areas of concern for public policy.

Readers interested in the technical details of the study are directed to the appendices. Appendix A describes the income data used in this study and Appendix B provides a technical description of the methodology for each chapter.

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<sup>3</sup>For example, in 1969, the 90/10 ratio for male wages was just over 3.6 using the CPS data and almost 4.0 using the Census data. In 1997, using only the CPS data, the 90/10 ratio was 7.1. The percentage growth in the 90/10 ratio between 1969 and 1997 was 196 using the CPS data. If we were to calculate the percentage growth using the Census data for 1969, we would underestimate the growth at 180 percent. To avoid this type of error, the study analyzes each data source separately. The 90/10 ratio is a measure of income inequality described in Chapter 2.

## 2. Trends in the Distribution of Income

---

Reed, Glenn Haber, and Mameesh (1996) documented a substantial rise in income inequality in California over the last two decades. That study traced the rise that occurred between 1967 and 1994 and that led to the two questions of this study: Why has income inequality risen so rapidly in California and why has it been higher in the state than in the nation in recent years? Before turning to those questions, this chapter documents this growth, updating the earlier work with three new years of data on household income, male labor earnings, and female labor earnings.<sup>1</sup>

As in the first report, our interest is in long-run trends in the distribution of income as opposed to short-run business cycle deviations. Thus, we focus on years with business cycle peaks to reduce the complicating effects of recessions and recoveries. The first report

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<sup>1</sup>Readers interested in a fuller discussion of alternative types of income, measurement issues, and trends are referred to Reed, Glenn Haber, and Mameesh (1996).

compared trends in California with trends in the nation as a whole (i.e., including California) to provide a sense of the relative magnitude of income inequality growth in California. Because this study examines *why* California has higher income inequality than the rest of the nation, the comparison is between the state and the rest of the nation—excluding California.

## **Trends in the Distribution of Household Income**

Of the income measures, household income is perhaps the best measure of economic well-being because it includes income from all sources for all members of the household.<sup>2</sup> Table 2.1 shows the trends in real adjusted household income at the median and at four percentiles for specific times between 1969 and 1997. As the table indicates, household income at the median and below experienced a decline and did not fully recover as California emerged from the last recession. Only household income above the median experienced gains.

The income figures for the 25th percentile indicate how the lower-middle class fared over that period. The 25th percentile is the level of income at which 25 percent of people live in households with lower income and 75 percent of people live in households with higher income. A household with two adults and two children at the 25th percentile had an annual income of \$28,200 during the business cycle peak in 1969. That income had fallen to \$27,900 by the business cycle peak in 1989.

---

<sup>2</sup>A household with more members requires more income to maintain the same level of economic well-being as a smaller household. We adjust household income by the number and age of members to correct for resource needs. We divide household income by the poverty line relevant for the household to create an income-to-needs ratio. The base level of the poverty threshold does not affect the trends in household income and income inequality because these trends are scale-free (e.g., dividing every household's income by \$15,000 or by \$5,000 will not change these trends).

**Table 2.1**  
**Trends in Real Adjusted Household Income in California**

	Income Percentile				
	10th	25th	Median	75th	90th
1969, peak	16,700	28,200	43,600	65,300	87,800
1979, peak	17,300	30,200	50,700	79,300	108,800
1989, peak	15,000	27,900	51,100	83,100	121,500
Early 1990s, trough	11,300	22,100	43,800	78,600	117,400
1997	13,000	25,300	48,600	84,500	130,600

SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. Income level reported is for a household with two adults and two children. Income at the 25th and 50th percentiles reached the lowest level of recent years in 1993. At the 10th percentile, the low point occurred in 1994. At the 75th and 90th percentiles, the low point occurred in 1992.

It fell even lower during the depth of the recession in 1993, to \$22,100. Despite California's emergence from the recession, in 1997 incomes for lower-middle-class households remained below pre-recession levels at \$25,300.

The data in Table 2.1 should not be interpreted as showing how the incomes of the same households have changed over time. The survey data used in this report include a different sample of households in each year. The table shows that incomes at the 25th percentile fell about \$2,900 between 1969 and 1997. The table does not show that income for the *same households* who were at the 25th percentile in 1969 fell \$2,900 by 1997. The numbers show that incomes for the lower-middle class declined in the sense that households at the 25th percentile in 1997 had lower incomes than households at the 25th percentile in 1969. The distinction is particularly important in California where there is a high degree of mobility into and out of the state.

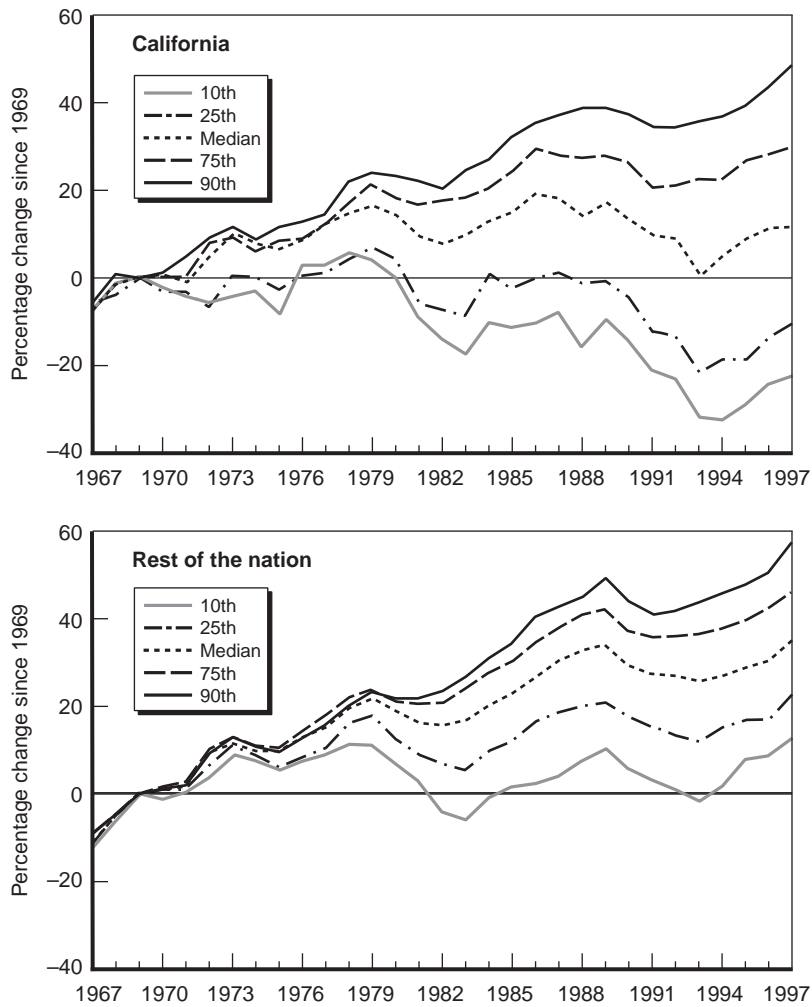
The 10th percentile represents the bottom of the income distribution—the income level at which only 10 percent of people live in households with lower income. A household of four at the 10th percentile had an income of \$16,700 in 1969. By the business cycle peak in 1989, income in that percentile fell substantially, to \$15,000. As of 1997, income remained below pre-recession levels at \$13,000.

For the median household (50th percentile), income grew between the business cycle peaks in 1969 and 1989, from \$43,600 to \$51,100. By 1997, the median household had not recovered to pre-recession levels, with income of \$48,600.

For the upper-middle and top of the distribution, the last three decades have brought income growth with full recovery from the recent recession. In 1969, a household of four at the 75th percentile had an income of \$65,300, growing to \$83,100 in 1989 and to \$84,500 by 1997. At the 90th percentile, household income was \$87,800 in 1969, grew to \$121,500 by 1989, and grew to \$130,600 by 1997.

The income data in Table 2.1 show the widening of the distribution of household income. In 1969, a household of four at the 10th percentile had an income of \$16,700 whereas a household of four at the 90th percentile had an income of \$87,800. By 1989, income had fallen for the bottom and lower-middle of the distribution and had grown for the top and upper-middle of the distribution. By 1997, income at the 10th percentile was \$13,000 and at the 90th percentile it was \$130,600.

To compare the income trends for the bottom and lower-middle of the distribution with those for the top and upper-middle of the distribution, Figure 2.1 displays the percentage change in income since 1969. For example, for households at the 10th percentile, income has shown a downward trend since the early 1980s. In 1997, income at the



SOURCE: Author's calculations from the March file of the CPS.  
 NOTES: Statistics are adjusted to 1997 dollars. In 1988, income in California may not be comparable to other years because of changes in the CPS.

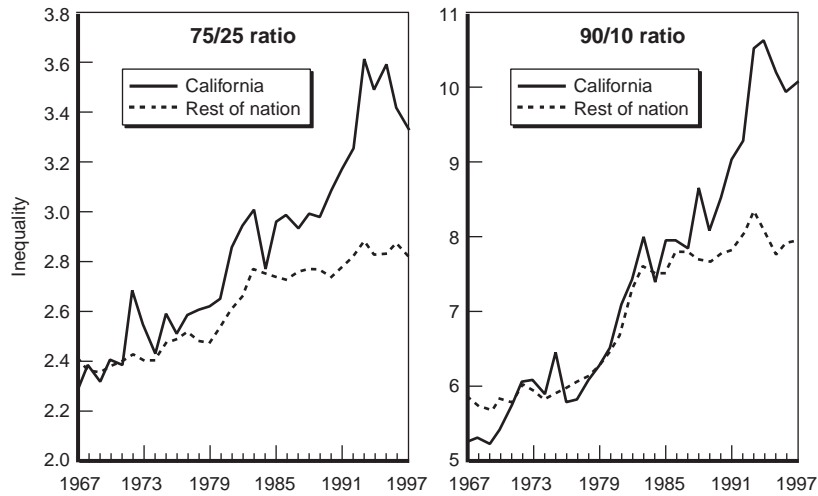
**Figure 2.1—Percentage Change in Real Adjusted Household Income, by Income Percentile, 1967–1997**

10th percentile was 22 percent below 1969 levels. At the median, income grew during the 1970s, showed no growth in the 1980s, and had nearly recovered from the 1990s recession by 1997. In 1997, income at the median was 11 percent above 1969 levels. The 75th and 90th percentiles showed growth in the 1970s and 1980s. Income growth slowed during the recent recession, but it has fully recovered. In 1997, income was 29 percent higher for the 75th percentile and 49 percent higher for the 90th percentile.

The distribution of household income in the rest of the nation also widened considerably over the last three decades. Compared to California, the rest of the nation experienced more growth throughout the distribution (Figure 2.1, bottom panel). Income at the 10th and 25th percentiles in the rest of the nation grew during the 1970s, showed no growth over the 1980s, and fully recovered from the recession of the early 1990s. By 1997, income at the 10th percentile was 13 percent higher than in 1969, and at the 25th percentile it was 22 percent higher. The median, 75th, and 90th percentiles in the rest of the nation grew in the 1970s and the 1980s and fully recovered from the recent recession. Between 1969 and 1997, income grew 35 percent for the median, 46 percent for the 75th percentile, and 57 percent for the 90th percentile.

The distribution of household income in California has widened as incomes for the poor and lower-middle class have declined and incomes of the rich and upper-middle class have grown. Figure 2.2 charts the increase in income inequality as measured by a comparison of the incomes near the top of the distribution to those near the bottom. The measure for the middle class is the 75/25 ratio, that is, the ratio of income at the 75th percentile to income at the 25th percentile. The





SOURCE: Author's calculations from the March file of the CPS.  
 NOTES: In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure 2.2—Summary Measures of Inequality in Real Adjusted Household Income, 1967–1997**

90/10 ratio measures the inequality between the extremes of the income distribution.

In 1969, the upper-middle class in California had 2.3 times the income of the lower-middle class (the 75/25 ratio, see Figure 2.2). By the business cycle peak in 1989, the 75/25 ratio had increased to almost 3.0. In 1997, the ratio was 3.3, substantially above pre-recession levels.

In the rest of the nation, the increase in the 75/25 ratio was not as great as in California, growing from 2.4 to 2.8 between 1969 and 1997. In the late 1960s, the 75/25 ratio was essentially the same in the state as in the rest of the nation. By 1979, the ratio was about 6 percent higher in the state. In 1989, the 75/25 ratio was 8 percent higher and in 1997 it was 19 percent higher in the state.

The 90/10 ratio shows the same pattern of greater growth in California compared to the rest of the nation. In 1969, households at the 90th percentile in California had 5.3 times the income of households at the 10th percentile. By the business cycle peak in 1989, the 90/10 ratio had grown to 8.7. By 1997, the 90/10 ratio had grown to 10.1. In the rest of the nation, the 90/10 ratio was higher than in the state in the late 1960s. From 1974 through 1987, the ratio was similar to that of the state. By 1997, the 90/10 ratio was 7.9 in the rest of the nation compared to 10.1 in the state.

## **Trends in the Distribution of Male Earnings**

Labor income, earned by working, is the main source of household income. It includes earnings from wages, salary, and self-employment. Trends in labor income provide a better indicator of changes in the economy than household income does. Household income reflects not only economic changes but also societal changes, such as in marriage behavior, family size, and female labor force participation.

For people who receive income from self-employment, reported earnings often include income from previous capital investments, such as the purchasing of a business. Such income is not part of labor income. Therefore, the sample used to investigate the trends in labor earnings excludes any workers who are self-employed or who report substantial earnings from self-employment. The labor earnings trends reported here are for civilians ages 18 to 54 years who are not students, who report some earnings, and who worked at least 13 weeks of the year.<sup>3</sup> The measure of earnings is pre-tax monetary compensation.

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<sup>3</sup>The main trends discussed here are not sensitive to these sample exclusions. See Reed, Glenn Haber, and Mameesh (1996).

This study uses weekly wages as the earnings measure, for several reasons. The focus here is on earnings variation determined in the labor market. Variation across people in *annual* labor earnings includes variation in participation, e.g., weeks of work during the year. Using trends in the distribution of *weekly* wages removes variation resulting from weeks of work. Weekly wage is defined as annual earnings divided by weeks of work during the year. One alternative to weekly wages is hourly wages. However, that was not an option for this study because information on hours of work is not available in the early years of the data surveys used.

For men in the lower-middle of the weekly wage distribution, earnings have fallen substantially since 1969 (see Table 2.2). Weekly earnings at the 25th percentile were \$526 in 1969 and fell to \$345 by the business cycle peak in 1989. At the trough of the recession in 1993, men at the 25th percentile earned only \$291 per week. By 1997, weekly

**Table 2.2**  
**Trends in Real Weekly Wages for Male Workers in California**

	Wage Percentile				
	10th	25th	Median	75th	90th
1969, peak	332	526	720	957	1,210
1979, peak	260	425	690	977	1,274
1989, peak	208	345	594	940	1,296
Early 1990s, trough	178	291	519	859	1,229
1997	192	308	554	904	1,373

SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. Income at the 10th percentile reached the lowest level of recent years in 1995. At the 25th and 75th percentiles, the low point occurred in 1993. At the median, the low point occurred in 1994 and at the 90th percentile the low point occurred in 1991.

earnings had grown somewhat but remained below pre-recession levels, at \$308.

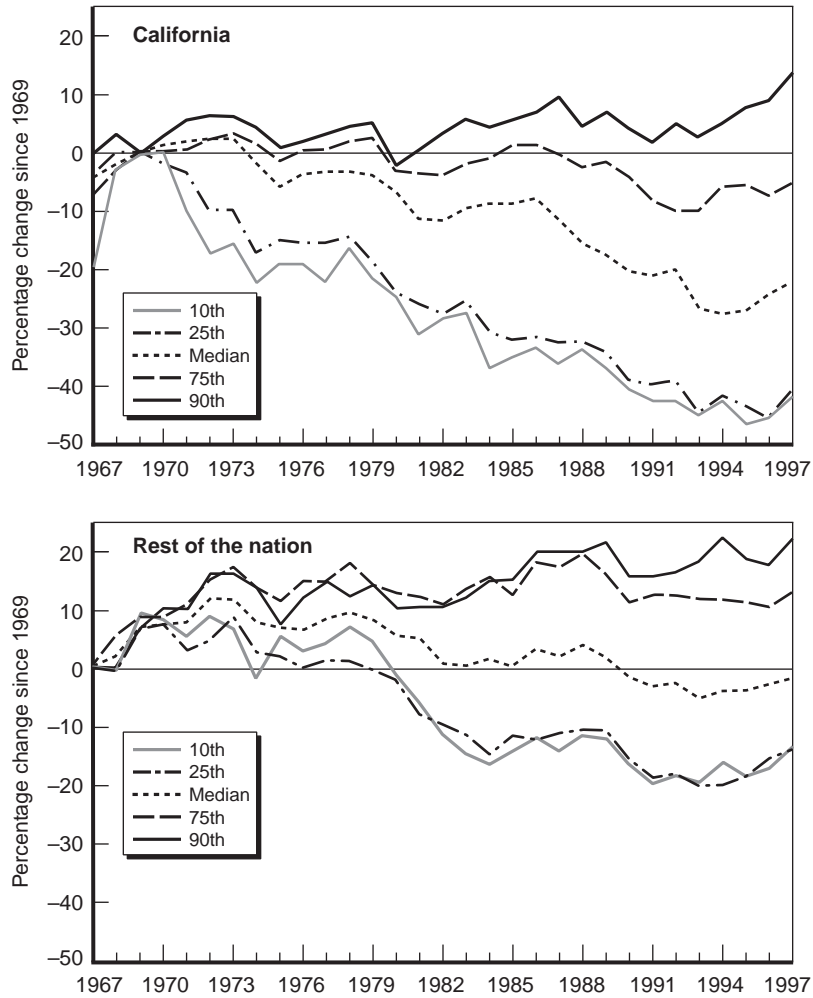
At the 10th percentile, male weekly wages showed a similar downward trend, falling from \$332 in 1969 to \$208 in 1989. By 1997, male earnings at the 10th percentile were still lower than pre-recession levels, at \$192.

Even the median of male weekly wages has declined over the last 30 years. In 1969, the median was \$720. The median fell to \$594 in 1989 and had not recovered from the recent recession by 1997, when it was \$554. The upper-middle of the distribution showed no growth through 1989 and had not recovered from the recent recession as of 1997.

The only growth in male weekly wages occurred near the top of the distribution. Male wages at the 90th percentile grew by a small amount between 1969 and 1989, from \$1,210 to \$1,296, and recovered fully from the recent recession, reaching \$1,373 in 1997.

Figure 2.3 shows the comparative trends at different percentiles in terms of the percentage change since 1969. Weekly wages at the 10th and 25th percentiles have experienced substantial declines of similar magnitude throughout the last three decades. Between 1969 and 1997, weekly wages declined by about 40 percent.

At the median, male weekly wages have declined since the mid-1970s. In 1997, median wages were 23 percent below 1969 levels. At the 75th percentile, there was no real growth during the 1970s and 1980s and there has not been a full recovery from the recent recession. In 1997, weekly wages at the 75th percentile were 6 percent below 1969 levels. At the 90th percentile, there has been a slow growth trend over the whole period with 1997 wages 13 percent higher than 1969 levels.



SOURCE: Author's calculations from the March file of the CPS.

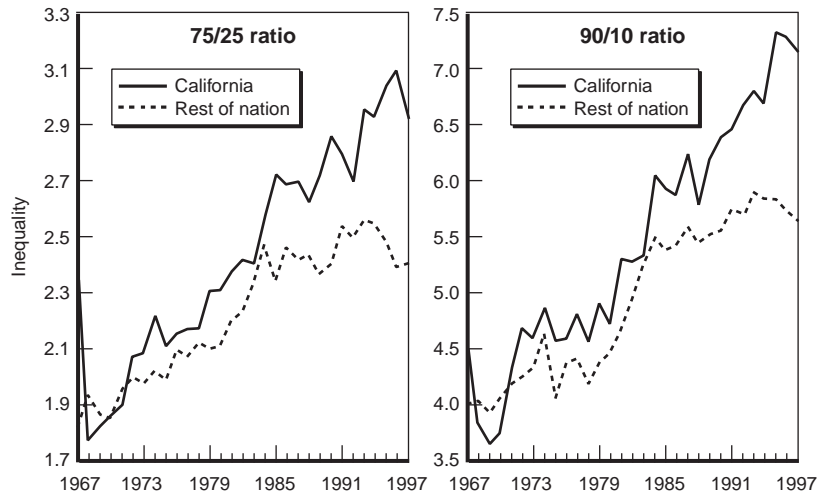
NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure 2.3—Percentage Change in Real Weekly Wages for Male Workers, by Income Percentile, 1967–1997**

Compared to wages in California, male weekly wages in the rest of the nation had more growth at the top and less decline at the bottom. Between 1969 and 1997, the 10th and 25th percentiles fell by less than 15 percent in the rest of the nation, compared to 40 percent in California. The median in the rest of the nation has fallen since the early 1970s, but by 1997 the median in the nation nearly matched its 1969 level, compared to a 23 percent fall in California. In the rest of the nation, both the 75th and the 90th percentiles grew during the 1970s and 1980s and have recovered from the recent recession. Overall, between 1969 and 1997, the 75th percentile grew 13 percent and the 90th percentile grew 22 percent.

The trends for male weekly wages are similar to the trends for household income (compare Figures 2.2 and 2.3). The distributions of male weekly wages and household income have widened in California and in the rest of the nation. The rest of the nation has experienced more growth (less decline) throughout the distribution than has the state. Compared to household income, male weekly wages show substantially less growth (and more decline) in California and in the nation. One reason for this is that growth in female earnings has contributed to growth in household income over the last three decades.

Figure 2.4 traces the growth in income inequality for male weekly wages in terms of the 75/25 and 90/10 ratios. In 1967, males at the upper-middle of the distribution in California earned 1.8 times the weekly wages of males at the lower-middle (the 75/25 ratio, Figure 2.4). The 75/25 ratio shows a growth trend over the entire period. Although there has been some recovery from the recent recession, the 75/25 ratio in 1997 was 2.9, substantially above the pre-recession level of 2.7 in 1989.



SOURCE: Author's calculations from the March file of the CPS.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure 2.4—Summary Measures of Inequality in Male Weekly Wages, 1967–1997**

In the rest of the nation, the 75/25 ratio has also grown, but growth has been slower than in California since the mid-1980s. In 1969, the 75/25 ratio in the rest of the nation nearly matched that of the state, but by 1979 the ratio was 10 percent higher in the state, and by 1989 it was 15 percent higher. In 1997, the 75/25 ratio was 22 percent higher in the state—2.9 compared to 2.4 in the rest of the nation.

The 90/10 ratio shows a similar pattern of faster rise in the state with substantially higher levels of inequality since the mid-1980s. Between 1969 and 1997, the 90/10 ratio for male weekly wages in California increased from 3.6 to 7.1. Over the same period, the rise in the rest of the nation was from 3.9 to 5.7.

## Trends in the Distribution of Female Earnings

Earnings trends over the last 30 years are different for male and female workers. Trends for females reflect growing labor force participation. As women have become more attached to the labor market and more invested in careers, their weekly wages have grown. Thus, the study measures earnings growth and distribution trends separately for male and female workers to capture important differences in these trends.<sup>4</sup>

Weekly wages among female workers have shown more growth (and smaller declines) throughout the distribution than household income or male wages (see Table 2.3). For the lower-middle of the distribution, weekly wages have remained roughly stable with a small growth from \$239 to \$257 during the 1970s and a small decline to \$241 during the

**Table 2.3**  
**Trends in Real Weekly Wages for Female Workers in California**

	Wage Percentile				
	10th	25th	Median	75th	90th
1969, peak	120	239	384	514	658
1979, peak	157	257	403	552	773
1989, peak	145	241	410	651	940
Early 1990s, trough	124	224	413	636	878
1997	138	231	423	673	1,000

SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian females ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. Income at the 10th percentile and median reached the lowest level of recent years in 1993. At the 25th percentile, the low point occurred in 1994. At the 75th percentile the low point occurred in 1992, and at the 90th percentile the low point occurred in 1991.

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<sup>4</sup>We measure female earnings the same way as male earnings. We use weekly wages calculated as annual earnings divided by weeks of work.



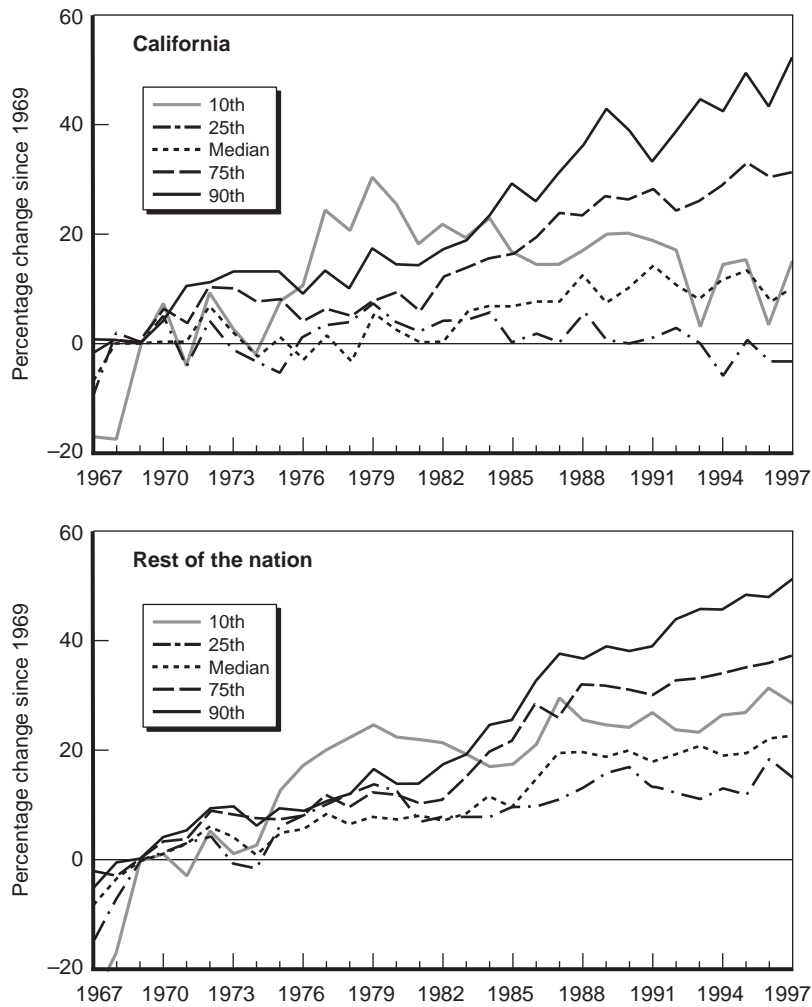
1980s. In 1997, female wages at the 25th percentile were close to pre-recession levels at \$231. At the 10th percentile, female weekly wages grew from \$120 in 1969 to \$145 in 1989. By 1997, the 10th percentile had nearly recovered from the recession with wages of \$138.

At the median and above, there was growth with full recovery from the recession. Weekly wages at the median rose from \$384 in 1969 to \$410 in 1989 to \$423 in 1997. At the 75th percentile, weekly wages were \$514 in 1969 and rose to \$673 in 1997. At the 90th percentile, wages rose from \$658 in 1969 to \$1,000 in 1997.

As with household income and male earnings, percentage growth was the greatest near the top of the female wage distribution (see Figure 2.5). The 75th and 90th percentiles show a growth trend over the whole period. By 1997, wages at the 75th percentile had increased 31 percent above 1969 levels and at the 90th percentile wages had increased 52 percent. The median showed slower growth, 10 percent, between 1969 and 1997 and the 25th percentile showed no growth trend.

One difference for female earnings was the strong growth of the 10th percentile in the 1970s. Between 1969 and 1979, the 10th percentile grew over 30 percent, exceeding the percentage growth in even the 90th percentile. However, since 1979, female wages at the 10th percentile have shown a downward trend. By 1997, wages were only 15 percent higher than 1969 levels.

Trends for the rest of the nation are similar to those for California but show more overall growth near the bottom and at the median. The 10th percentile showed strong growth during the 1970s and by 1997 had grown 28 percent in the rest of the nation compared to 15 percent in California. The median grew 23 percent compared to 10 percent in California. Overall growth near the top of the distribution nearly



SOURCE: Author's calculations from the March file of the CPS.

NOTES: Statistics are adjusted to 1997 dollars. The sample includes civilian females ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

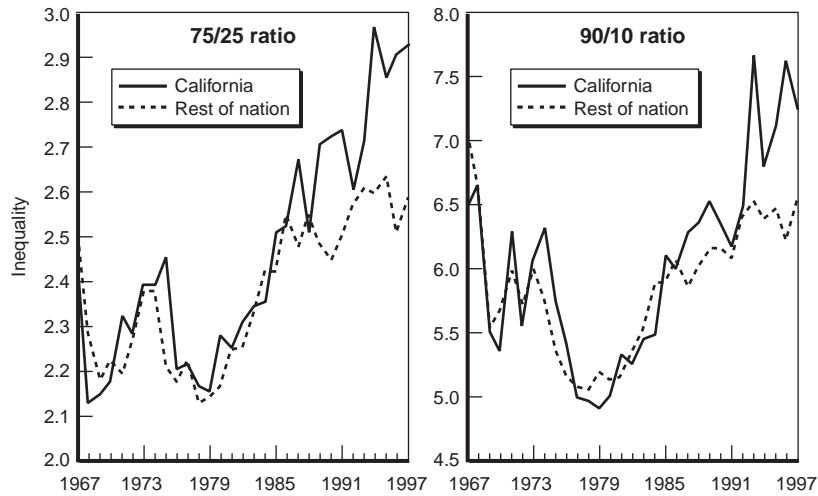
**Figure 2.5—Percentage Change in Real Weekly Wages for Female Workers, by Income Percentile, 1967–1997**

matched that of the state at 37 percent for the 75th percentile and 51 percent for the 90th percentile.

Trends in the distribution of female earnings are substantially different from trends for male earnings. The bottom of the distribution of female weekly wages has not experienced substantial decline and the top has seen strong growth. Rising rates of female labor force participation are a major force behind these trends. Using weekly wages among workers removes variation from weeks worked, but rising trends in hours of work will result in weekly wage growth. Moreover, adjusting for weeks worked does not account for changes resulting from the increased consistency of work. A woman who has been active in the labor force consistently for several years will tend to have higher wages than a woman who entered the labor force recently, even if the women work the same number of weeks this year. The rising proportion of women who work consistently also causes growth in weekly wages.

In terms of income inequality, the 75/25 ratio for female weekly wages has increased in California since the early 1980s (see Figure 2.6). In 1969 and in 1979, women at the 75th percentile in California earned about 2.1 times the wages of women at the 25th percentile. The ratio increased to 2.7 in 1989 and to 2.9 in 1997. The 75/25 ratio for the state was similar to the ratio in the rest of the nation until the late 1980s, when it began to rise faster in the state. In 1997, the 75/25 ratio in the rest of the nation was 2.6.

The 90/10 ratio showed a downward trend in California during the 1970s and has shown an upward trend since the early 1980s. The ratio was 5.5 in 1969 and fell to 4.9 in 1979 before rising to 6.5 in 1989 and 7.2 in 1997. The 90/10 ratio in the rest of the nation matched that of



SOURCE: Author's calculations from the March file of the CPS.  
 NOTES: The sample includes civilian females ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. In 1988, income in California may not be comparable to other years because of changes in the CPS.

**Figure 2.6—Summary Measures of Inequality in Female Weekly Wages, 1967–1997**

California until the late 1980s. In 1997, the ratio was 6.5 in the rest of the nation, about 11 percent below the ratio in the state.

### Summary of Trends in the Distribution of Income

Inequality of household income and male earnings has grown in California over the last three decades. As the state economy recovered from the recent recession, there was a slight fall in income inequality, but inequality remained higher in 1997 than before the recession in 1989. The rise in inequality in California can be explained by declining incomes near the bottom and lower-middle of the distribution and growing incomes near the top and upper-middle of the distribution.

In the late 1960s, income inequality in the rest of the nation was similar to that of California. Over the last three decades, inequality has grown in the rest of the nation but has grown faster in California. Since the late 1980s, inequality of household income and male earnings has been substantially higher in the state than in the rest of the nation. The rise in inequality in California has not been greater because California's rich have gotten richer faster than the rich in the rest of the nation but because the poor have gotten poorer. Throughout the distributions of household income and male earnings, California has experienced less growth (more decline) than the rest of the nation.

Unlike the distributions of household income and male wages, female wages have grown throughout the distribution. Female wage inequality did not begin to rise until the early 1980s. Similar to household income and male wages, female wages have grown more slowly in California and inequality in recent years has been higher than in the rest of the nation.

This chapter has presented the trends in income inequality in household income, male weekly earnings, and female weekly earnings for California and has compared them with the trends for the rest of the nation. As noted at the beginning of the chapter, household income may be the best measure of economic well-being because it includes income from all sources for all members of the household. The rise in household income inequality is explained by changes in male earnings and societal changes, such as falling marriage rates, choices about family size, rising female labor force participation, and the rising correlation of spousal

earnings. These social changes are important in understanding household income inequality. Readers interested in investigating social changes and household income inequality are referred to Reed and Cancian (1999).

The remainder of this report explains the growth in income inequality for male weekly earnings. By studying male earnings, we also learn about the trends in household income. Male earnings were the largest single source of household income. In 1967, male earnings were 71 percent of household income on average for households with prime-age heads (ages 18–64). In 1997, male earnings were 54 percent on average. Female earnings made up the bulk of the rest of household income, accounting for 18 percent on average in 1967 and 30 percent in 1998. The labor market conditions that we observe for males are likely to reflect labor market conditions for females without the confounding effects of participation changes that occurred for females.

### 3. Rising Returns to Skill and Male Wage Inequality

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At the national level, rising returns to skill have been identified as a major component of growing male wage inequality.<sup>1</sup> The term “returns to skill” refers to the effect that skill has on wages. Rising returns to skill means that skill has become an increasingly important determinant of wages, with the wages of highly skilled workers rising relative to the wages of less-skilled workers. This chapter investigates the returns to skill, in particular, education and work experience, the two measures of skill in the datasets used for the study.<sup>2</sup> The results show that the returns to education and experience have increased in California and that the increase in returns to education and experience

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<sup>1</sup>See Levy and Murnane (1992) for a review of this literature.

<sup>2</sup>The data do not have information on actual work experience. We use a measure of potential work experience, i.e., approximate years since schooling was completed (age minus years of schooling minus 6).

explain up to one-third of the overall rise in male wage inequality in the state.<sup>3</sup>

## **Rising Returns to Education and Work Experience in California**

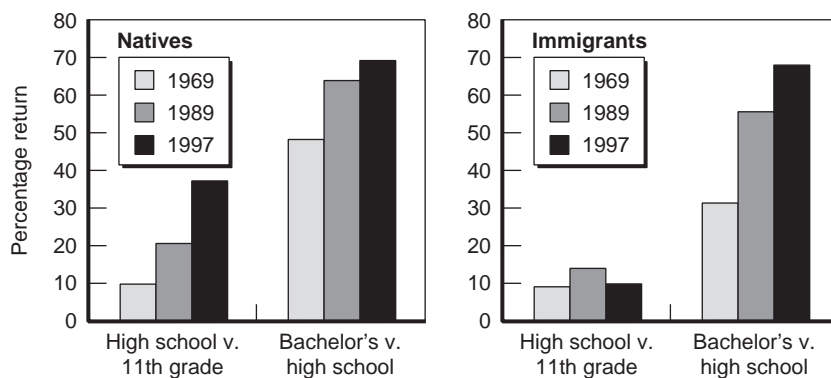
Returns to education have increased dramatically in California. Figure 3.1 shows the increase separately for natives and immigrants (these terms denote, throughout the text, people born in the United States and people born in foreign lands, respectively). In 1969, a native with a bachelor's degree earned almost 50 percent more than a similar worker who had only a high school diploma. By 1989, the return to a bachelor's degree for natives increased to over 60 percent and in 1997 it was just under 70 percent. Similarly, the return to having a high school diploma versus having 11 or 12 years of schooling but no diploma increased from only 9 percent in 1969 to over 20 percent in 1989 and to over 35 percent in 1997.

For immigrants in California, the returns to a college degree versus a high school diploma increased from 30 percent in 1969 to 55 percent in 1989 and to over 65 percent in 1997. The returns to a high school diploma increased between 1969 and 1989 but not as dramatically as for natives, rising from 9 percent to 14 percent but then falling back to 9 percent in 1997. The lower returns to a high school diploma for immigrants could reflect a lower quality of education in their country of origin. It may also reflect lower returns to education in the types of jobs

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<sup>3</sup>The estimates in this chapter are based on the human capital model of wage determination in which wages are a function of education, experience, race, and ethnicity. The model is estimated separately for immigrants, including indicators for years spent in the United States.





SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

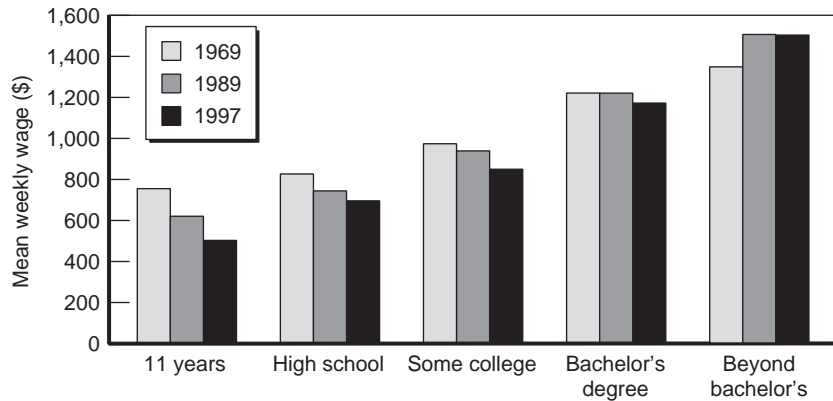
NOTES: Reported statistics are the percentage difference in wages for specified levels of education. Estimation controls for education, experience, race, and ethnicity. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1969 data do not have information on degrees. We convert years of schooling to degrees (e.g., "high school" refers to workers who have completed exactly 12 years of schooling).

**Figure 3.1—Returns to Educational Attainment in California for Native and Immigrant Male Workers, 1969, 1989, and 1997**

immigrants with a high school diploma or less are likely to obtain in California.

The returns to education can rise even when wages at all education levels grow, if the percentage of wage growth for highly educated workers exceeds that for less-educated workers. Mean weekly wages for native males with 15 years of labor market experience and no high school diploma fell almost 20 percent, from \$750 to \$620, between the labor market peaks in 1969 and 1989 (see Figure 3.2).<sup>4</sup> Mean wages for

<sup>4</sup>The wage model predicts the natural logarithm of weekly wages. We convert to dollar terms by adding half the variance of the error term and taking the exponent.



SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

NOTES: Statistics are adjusted to 1997 dollars. Weekly earnings are predicted from the regression equation based on 15 years of work experience. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. Data for 1997 from the CPS may not be directly comparable to data from the decennial Census. The 1969 data do not have information on degrees. We convert years of schooling to degrees (e.g., "high school" refers to workers who have completed exactly 12 years of schooling).

**Figure 3.2—Estimated Weekly Wage in California for Native Male Workers with 15 Years of Experience, by Education Level, 1969, 1989, and 1997**

similar native males with a high school diploma fell about 10 percent, from \$820 to \$740. Mean wages for similar native males with a college degree stayed fairly stable at about \$1,220.<sup>5</sup> Unlike inequality, measurement of the change in wages over the last few decades depends on the consumer price index used to adjust wages for inflation. Estimates of the price index vary substantially. The estimates in Figure

<sup>5</sup>We do not calculate percentage changes to 1997 because the CPS data used for 1997 may not be comparable to the Census data used for 1969 and 1989. We cannot calculate trends in the CPS data because surveys in the early years do not contain the information on immigrant status that must be identified to estimate trends for natives.

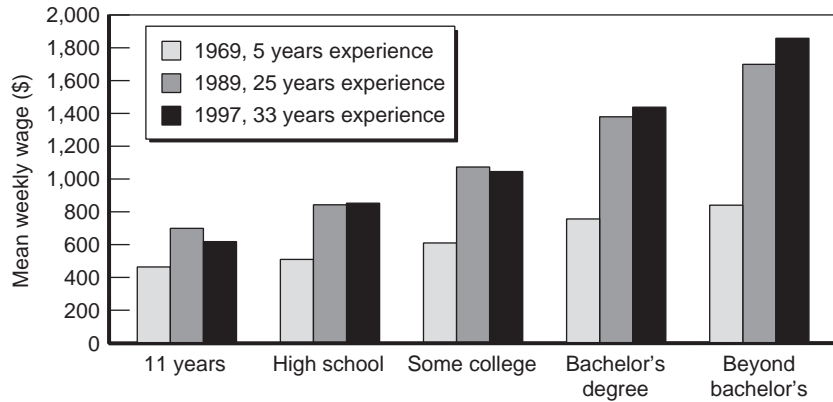
3.2 use the most conservative price index of the Bureau of Labor Statistics.<sup>6</sup>

The information from the human capital model furthers our understanding of the distributional trends presented in the previous chapter (Figure 2.3). One explanation of the downward trend in male wages in California is that the share of less-skilled and lower-paid workers has increased in the state. For example, since international immigration tends to bring low-wage workers to the state, we would expect to observe downward wage trends even if the wages of natives remained stable. However, the wage equation estimates (Figure 3.2) show that the mean wages for native workers with less than a college degree have fallen and there has not been substantial growth in mean wages for natives with a college degree.

The samples for different years include different people, but the wage equation estimates permit calculation of the progress of mean wages across years, allowing labor market experience to increase with time. The mean of weekly wages for a native male with 11 years of schooling and five years of labor market experience in 1969 was \$470 (Figure 3.3). In 1989, a man with these same characteristics would have 25 years of labor market experience and mean wages of \$700. Mean wages for a male with a high school diploma and five years of experience in 1969 were \$510. In 1989, with 25 years of experience, high school males were earnings \$840 on average. For native males with college degrees whose experience increased from five to 25 years between 1969 and 1989, mean weekly wages grew from \$760 to \$1,380.

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<sup>6</sup>We use the CPI-U-X1. See Appendix A for a discussion of the calculation of this index.



SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

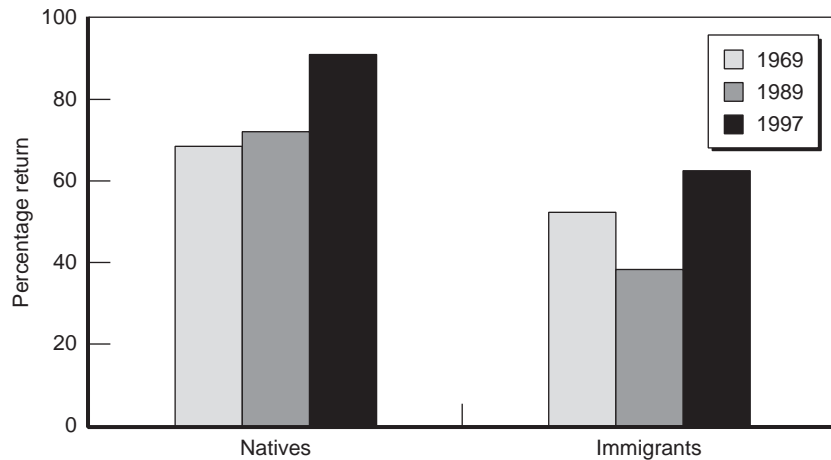
NOTES: Statistics are adjusted to 1997 dollars. Weekly earnings are predicted from the regression equation based on increasing years of work experience. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. Data for 1997 from the CPS may not be directly comparable to data from the decennial Census. The 1969 data do not have information on degrees. We convert years of schooling to degrees (e.g., "high school" refers to workers who have completed exactly 12 years of schooling).

**Figure 3.3—Estimated Weekly Wage in California for Native Male Workers with Increasing Years of Experience, by Education Level, 1969, 1989, and 1997**

The estimates for changes in mean wages as experience increases suggest that between the business cycle peaks, there has been real wage growth even for native males with low levels of schooling. However, the data are not conclusive on this point, since high levels of domestic migration may have changed the population. For example, if successful high school graduates moved into the state and unsuccessful high school graduates left the state, the mean wage of high school graduates in California in 1989 overestimates the mean for those who were here in 1969.

For natives, the returns to experience have also grown over the last 30 years (see Figure 3.4). In 1969, a native worker with 25 years of experience earned 68 percent more than a native worker with five years of experience. In 1989, the return to 25 versus five years of experience was 72 percent and by 1997 this return had increased again to 91 percent.

For immigrant workers, the estimated returns to experience declined between 1969 and 1989. In 1969, an immigrant worker with 25 years of experience earned 52 percent more than an immigrant worker with five years of experience. In 1989, the return to 25 versus five years of experience was 38 percent and by 1997 this return had increased again to 62 percent.



SOURCES: Author's calculations from the March file of the CPS for 1997 and from the decennial Census for 1969 and 1989.

NOTES: Reported statistics are the percentage difference in wages for workers with 25 versus five years of experience. Estimation controls for education, experience, race, and ethnicity. The sample includes civilian males ages 18 to 54, who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure 3.4—Returns to Experience in California for Native and Immigrant Male Workers, 1969, 1989, and 1997**

years of experience. In 1989, the return was 38 percent. This decline in returns to experience may reflect the larger share of relatively recent immigrants in California in 1989. Recent immigrants may not receive high returns to overall labor force experience because relatively few years of their experience have been in the United States. By 1997, the returns to 25 years of experience versus five years had increased to over 62 percent for immigrants.

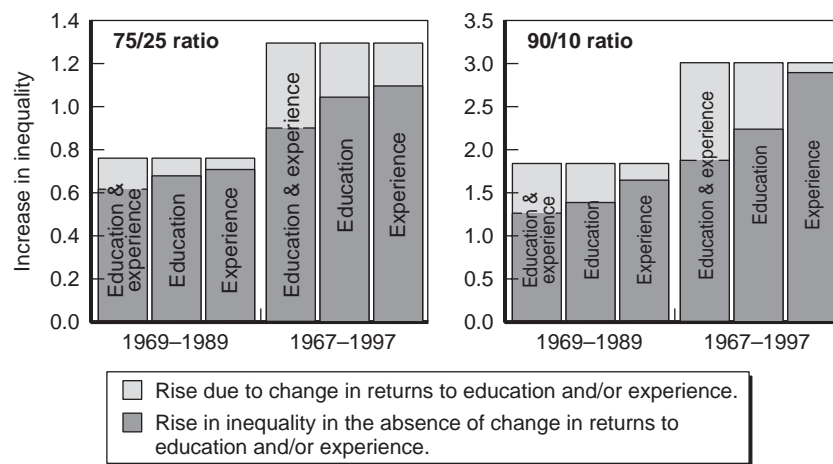
### **The Effect of Rising Returns on Male Wage Inequality**

Rising returns to education and experience reflect an increased wage differential between workers with high levels of education and experience and workers with low levels. All else equal, the increased wage differential will lead to higher wage inequality. This section presents estimates of the effect of rising returns to education and experience on male wage inequality. The estimates are made by posing the counterfactual question, What would the change in inequality have been if there had been no change in the returns to education and experience? The results show that rising returns to education and experience explain between 18 and 38 percent of the growth in male wage inequality in California, depending on the years analyzed and the measure of inequality.

Between 1969 and 1989, the 75/25 ratio grew from 1.8 to 2.6. The total growth was about 0.8 units (see Figure 3.5, total height of first set of bars). If the returns to education and experience had not changed, the growth would have been about 0.6 units (Figure 3.5, dark portion of first bar). The rise in returns to education and experience therefore explains the remaining 0.2 units of growth (Figure 3.5, light portion of first bar)

or roughly 18 percent of the total growth. The returns to education alone explain roughly 11 percent and the returns to experience explain about 6 percent (Figure 3.5, second and third bars).<sup>7</sup>

Between 1989 and 1997, the returns to education and experience increased further. Therefore, when we look at the entire period from 1967 to 1997, we find an even larger effect of rising returns than for the



SOURCES: Author's calculations from the March file of the CPS for 1967-1997 and the decennial Census for 1969-1989.

NOTES: The full height of the bar represents the actual change in male wage inequality. The dark portion of the bar is the change that would have occurred if there had been no change in returns to education and/or experience, all else equal. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample combines data from the 1996 and 1997 surveys. The 1967 sample combines data from the 1967 and 1968 surveys.

**Figure 3.5—Rising Male Wage Inequality in California:  
The Role of Rising Returns to Skill, 1967-1997**

<sup>7</sup>The effect of rising returns to education and experience when calculated separately will not sum when calculated jointly because of an interaction effect.

1969 to 1989 period. However, because the survey data for 1967 do not include information on immigrant status, the results for 1967 to 1997 should be considered approximate.<sup>8</sup>

Between 1967 and 1997, the 75/25 ratio grew 1.3 units—from 1.8 to 3.1. If the returns to education and experience had not changed, the growth would have been 0.9 units. Thirty-one percent of the total growth (the remaining 0.4 units) is explained by rising returns to education and experience. Rising returns to education alone explain about 20 percent of the growth. Rising returns to experience alone explain about 15 percent.

Results for the 90/10 ratio show an even greater effect of rising returns to education and experience. Rising returns explain about 32 percent of the increase in the ratio over the 1969–1989 period and about 38 percent of the increase over the 1967–1996 period. Rising returns to education were somewhat more important than rising returns to experience.

As in California, rising returns to education and experience in the rest of the nation explain almost one-third of the overall growth in male wage inequality (not shown). For the rest of the nation, we find that almost 30 percent of the growth in the 75/25 and 90/10 ratios between 1967 and 1997 can be explained by rising returns to education and experience. Results for 1969–1989 are of similar magnitude.<sup>9</sup>

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<sup>8</sup>We estimate a single model for the 1967 data sample with no controls for immigration. The implicit assumption in that model is that the returns to education and experience were the same for immigrants and natives in 1967.

<sup>9</sup>Our results are consistent with the national results of Juhn, Murphy, and Pierce (1993).



## What Explains Rising Returns to Skill?

Rising returns to skill explain up to one-third of the growth in male wage inequality in California and the rest of the nation. Why have the returns to skill increased?

Research at the national level has suggested several factors that are likely contributors to the rising returns to education and experience. Technological change has increased the demand for skilled workers who are trained to use technological innovations and has reduced the demand for less-skilled workers who may be replaced by technology. Rising rates of international trade have increased the demand for skilled workers who produce the goods we export (such as financial services) and have reduced the demand for less-skilled workers who produce the goods we import (such as textiles). Immigration has increased the relative supply of less-skilled workers and may have reduced their wages. In the past, unionization rates were higher for people with lower schooling levels. Declining unionization rates may have reduced the wages of low-skilled workers.<sup>10</sup>

Despite numerous studies, national research has failed to find a single “smoking gun” explanation for the rise in returns to skill. There is no general consensus among economists on the relative magnitude of the many explanatory factors. In light of the failure of national research to find an acceptable answer and the more limited data available at the state level, this study does not attempt to find a California-specific answer to this question.

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<sup>10</sup>Declining unionization rates may be the result of the decline in demand for low-skilled workers rather than a primary cause of falling wages.

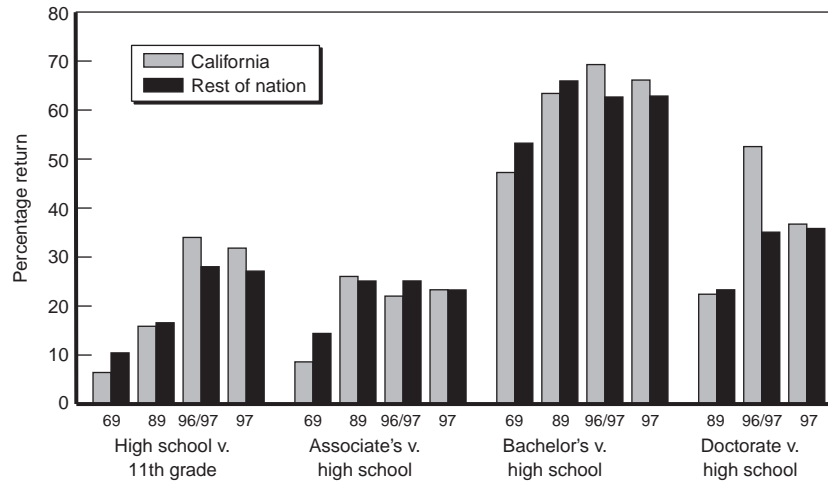
In addition, the explanation for rising returns to skill is likely to be national and not regional. Economic theory suggests that the returns to education will be roughly equivalent across the nation. Firms have incentives to locate production in places where wages are relatively low for the skill level of labor they need. As firms move production to low-wage regions, the demand for labor and wages will increase in those regions. Workers have incentives to move to places where wages are relatively high for the skill level they have. The increase in the relative supply of labor in high-wage regions will reduce wages there. In the long run, the movement of production and workers will tend to equate wages at each skill level across regions.

Observed differences in the returns to skill across regions are likely to be temporary. They may also be signals of problems with the data (e.g., regional differences in unobserved characteristics of workers or jobs). The results in this study are consistent with economic theory. We do not find substantial differences in returns to education between California and the rest of the nation during the business cycle peak in 1989 (Figure 3.6). In 1969, California had slightly lower returns to education than the rest of the nation.<sup>11</sup>

In 1996/97, returns to schooling were higher in California than in the rest of the nation. Since the 1996/97 calculations combine data from 1996 and 1997, this may be a short-term effect, possibly due to incomplete recovery from the recent recession. Data from 1997 alone suggest that the returns to schooling in California have become fairly

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<sup>11</sup>The percentage returns for California in Figure 3.6 are slightly different from those in Figure 3.1. The analysis for Figure 3.6 used all the information available on education for each survey year. The analysis in Figure 3.1 converted the education information to be roughly consistent across years. Figure 3.6 should not be used to measure trends in California across years.



SOURCE: Author's calculations from the March file of the CPS for 1996 and 1997 and the decennial Census for 1969 and 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1969 data do not have information on degrees. We convert years of schooling to degrees (e.g., "high school" refers to workers who have completed exactly 12 years of schooling). There is no information on doctorates in 1969.

**Figure 3.6—Returns to Education for Native Male Workers, California and the Rest of the Nation, 1969–1997**

similar to returns in the rest of the nation, except for the differential between workers with a high school diploma and those with less schooling. For overall inequality, this differential is not of great importance because workers with less than a high school diploma made up only about 7 percent of the native male workforce in California in 1997.<sup>12</sup>

<sup>12</sup>In 1997, the returns to a master's degree were higher in California than in the nation but the returns to a professional degree were lower than in the nation. Only about 8 percent of the native male working population in California had degrees beyond a bachelor's in 1997.

## Summary

Rising returns to education and experience explain about one-third of the rise in the 75/25 and 90/10 ratios for male wage inequality in California between 1967 and 1997. Results for the period 1969 to 1989 show slightly smaller returns but they are still substantial—explaining almost 20 percent of the growth in the 75/25 ratio and about 30 percent of the growth in the 90/10 ratio. In the rest of the nation, rising returns to skill explain almost one-third of the increase in male wage inequality over both periods for both the 75/25 and 90/10 ratios.

## 4. Immigration and Rising Male Wage Inequality

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Over the three decades covered in this study, the share of immigrants in the male workforce in California grew substantially from about 10 percent in 1969 to over 36 percent in 1997. This chapter describes the role of immigration in explaining the rise in male wage inequality in the state.

The results show that immigration can explain up to 40 percent of the rise in male wage inequality in California. Estimates of the immigration effect vary substantially depending on the time period and the measure of inequality (the 75/25 versus the 90/10 ratio). The estimates are based on the effect of immigration on the composition of the California population. They do not take into account any effect of immigration on the wages received by natives. Relaxing the assumption that immigrants do not affect the wages of natives could lead to a slightly higher immigration effect.

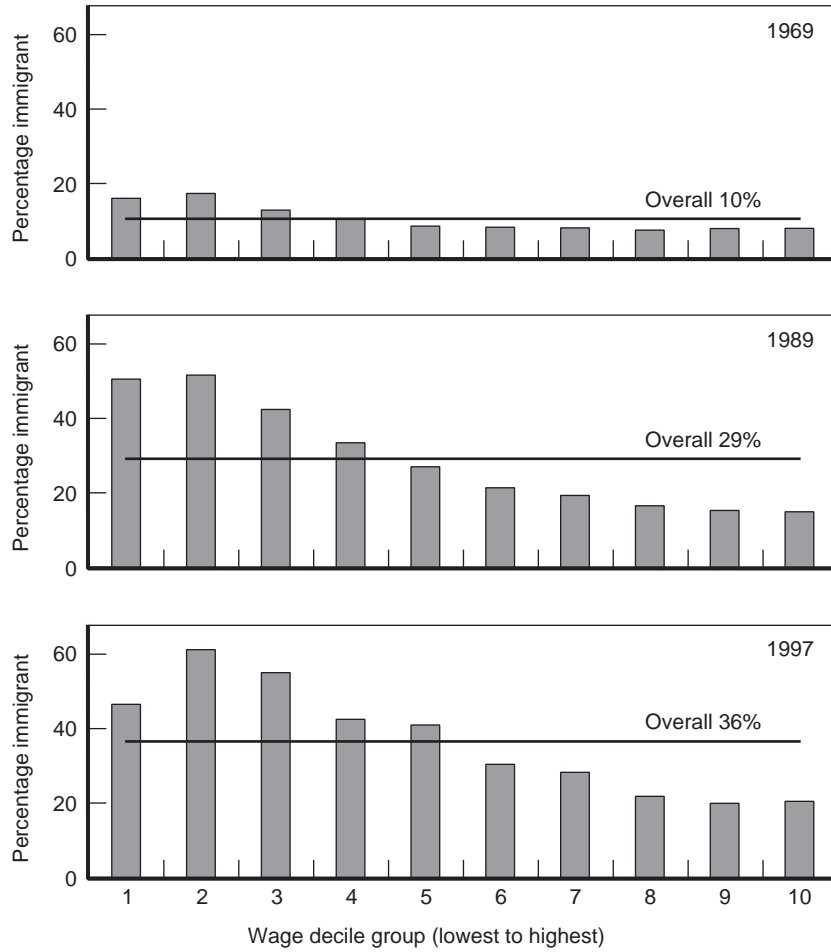
## **Immigrants in the Distribution of Male Wages**

The effect of immigration on wage inequality depends on the share of immigrants in the working population and the location of immigrants in the distribution of wages. The more substantial the immigrant share, the larger the potential effect of immigration on wage inequality. If immigrants tend to be located in the bottom of the wage distribution, wage inequality would be lower in the absence of immigration. If immigrants were spread evenly throughout the distribution, they would have no effect on wage inequality.

In 1969, the overall share of immigrants in the male working population was 10 percent (Figure 4.1, top panel). If immigrants were equally represented throughout the distribution, the share of immigrants in each decile group would be 10 percent (decile groups divide the workforce into 10 groups of equal size from lowest to highest wages). However, immigrants were overly represented in the bottom three groups—the lowest 30 percent of the male wage distribution. Immigrant representation in the lowest wage group was 16 percent. Immigrants were only 8 percent of the highest wage group.

By 1989, the immigrant share had increased to 29 percent and the degree of overrepresentation in the lower wage groups had increased. In 1989, the share of immigrants in the bottom group was 50 percent. The highest wage group was only 15 percent immigrant.

By 1997, the overall immigrant share had increased again to 36 percent, but the degree of overrepresentation in the lowest wage group had declined relative to 1989. Between 1989 and 1997, the share of immigrants in the bottom group actually declined from 50 to 46 percent. Immigrant representation in the lowest income group was only 1.2 times their overall representation. That is, immigrant concentration at the very



SOURCES: Author's calculations from the March file of the CPS for 1997 and the decennial Census for 1969 and 1989.

NOTES: Statistics are reported by decile group of male weekly wage in ascending order. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure 4.1—Immigrants in the Distribution of Male Wages in California, 1969, 1989, and 1997**

bottom was even less than in 1969: 1.2 versus 1.5 times the overall share. However, immigrant concentration in the lower half of the distribution was greater in 1997 than in 1969: 1.3 versus 1.2 times their overall share. The share of immigrants in the top group was 20 percent or slightly more than half their overall share in 1997, compared to three-fourths of their overall share in 1969.

Several factors contribute to the shift of immigrants away from the bottom group between 1989 and 1997. All else equal, recent immigrants tend to have lower wages than those who have been here longer. In 1989, about 24 percent of all immigrants had arrived in the five years before the survey. This compares with about 13 percent in 1997.<sup>1</sup> Male immigrants in the workforce also had higher levels of education in 1997. The share of immigrants with a high school diploma or more education was about 50 percent in 1989 and about 57 percent in 1997. Changes in the native workforce also may have contributed to the shift. Johnson (1996) shows that native workers with lower-middle incomes were leaving the state between 1990 and 1995. This would tend to increase the immigrant share in those groups. Finally, the growing economy in 1997 may have encouraged entry-level natives with low wages to enter the labor market. This would lead to new native workers who were concentrated in the bottom of the distribution of male wages.<sup>2</sup>

Because immigrants tend to be more concentrated in the bottom of the distribution, their presence has increased inequality in California.

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<sup>1</sup>The 24 percent calculation for 1989 actually covers five years and four months. The 13 percent calculation for 1997 covers five years and two months for those interviewed in March 1997 and six years and two months for those interviewed in March 1998.

<sup>2</sup>An alternative explanation for the difference between 1989 and 1997 is that the 1997 CPS data are not representative of immigrants in California.



Growth in the share and low-wage concentration of immigrants suggests that immigration has contributed to the rise in male wage inequality in the state.

### **Estimates of the Effect of Immigration: Three Scenarios**

To determine the effect of international immigration on male earnings inequality in California, this section outlines three scenarios showing what the California workforce would have looked like if there had been no international immigration. The three scenarios are based on different assumptions about the composition of the native workforce in California in the absence of immigration. The analysis in this section is based on the assumption that immigration does not affect the wages of natives. This assumption is further discussed in the next section. Readers interested in the methodology for implementing these scenarios are referred to Appendix B.

The first scenario assumes that the native workforce would be exactly the same as the existing native workforce in California. That is, the characteristics of the native workforce under this scenario can be learned by simply removing immigrants from the data sample.

Between 1969 and 1989, the 75/25 ratio grew by 0.8 units. Under the first scenario, in the absence of immigration, the ratio would have grown by just over 0.5 units. Over the longer period, 1967 to 1997, the 75/25 ratio grew by 1.3 units. Under the first scenario, the growth would have been less than 1 unit.<sup>3</sup> Using the first scenario, immigration

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<sup>3</sup>The data surveys do not contain information on immigrant status in 1967. For that year, we calculate the level of inequality under the scenarios by assuming that at each point in the distribution, immigration would have the same percentage effect as in 1969. For example, in the 1969 data, the 10th percentile was 5 percent higher under the first

explains about 28 percent of the growth between 1969 and 1989 and about 24 percent of the growth between 1967 and 1997.

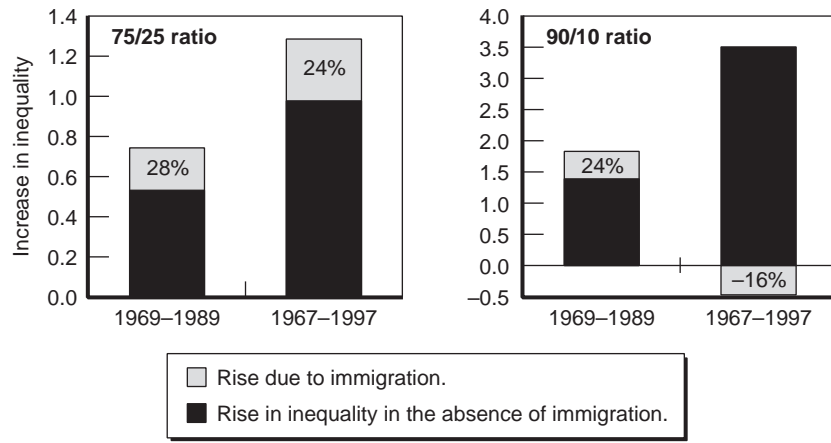
Using the 90/10 ratio as the measure of inequality leads to similar results for the 1969–1989 period. Immigration explains about 24 percent of the growth in inequality. However, for the period 1967–1997, immigration does not explain any of the inequality growth. Between 1967 and 1997, the 90/10 ratio grew by 3.0 units. Under the first scenario, the ratio would have grown by 3.5 units. That is, immigration reduced the growth in the 90/10 ratio by about 16 percent. The equalizing effect can be explained by the location of immigrants in the distribution of male wages. In 1997, immigrants were less concentrated in the lowest 10 percent of the distribution than in the late 1960s (see Figure 4.2). Removing immigrants in 1997 actually increases the 90/10 ratio from 7.0 to 7.2 rather than reducing it.

This first scenario is extreme in that it assumes that immigration has had no effect on the characteristics of the native workforce in California. However, the native children of immigrants are part of the native workforce in this scenario. In addition, immigrants have increasingly taken the jobs for low-educated workers in California, which may have caused natives with low education to seek jobs in the rest of the nation. A criticism of the first scenario is that it removes immigrants from California but does not replace them with low-wage natives.

To address these criticisms, the second scenario assumes that in the absence of international immigration, the California native workforce would have the same distribution of education and age as the native

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scenario compared to the actual value. We approximate the 10th percentile under the first scenario in 1967 by increasing the actual 10th percentile by 5 percent. The estimates for the 1967 to 1997 period are close approximations to the actual values.



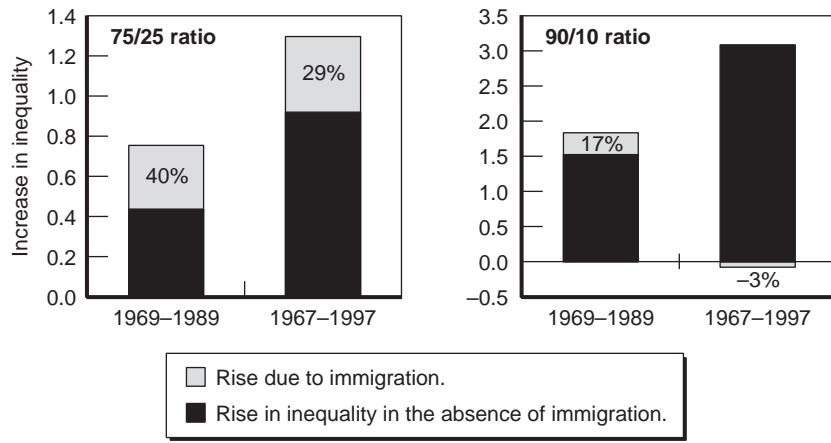
SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

NOTES: Calculations are based on removing immigrants from the data sample (first scenario). The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1967 sample is based on combined data from the 1967 and 1968 surveys.

**Figure 4.2—Immigration and Growth in Male Wage Inequality in California, First Scenario, 1967–1997**

workforce in the rest of the nation. This scenario is at the opposite extreme of the first scenario: It assumes that all of the uniqueness of the California native workforce is due to immigration.

Under the second scenario, immigration explains 40 percent of the growth in the 75/25 ratio between 1969 and 1989, and 29 percent of the growth between 1967 and 1997 (see Figure 4.3). Using the 90/10 ratio as the measure of inequality, immigration explains 17 percent of the growth between 1969 and 1989 but none of the growth between 1967 and 1997.



SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

NOTES: Calculations are based on removing immigrants from the data sample and matching the distribution of education and age for natives in California to the distribution for natives in the rest of the nation (second scenario). The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1967 sample is based on combined data from the 1967 and 1968 surveys.

**Figure 4.3—Immigration and Growth in Male Wage Inequality in California, Second Scenario, 1967–1997**

The third scenario recognizes that the California native workforce was already different from the rest of the nation 30 years ago when immigration rates were much lower and male wage inequality was similar to that of the other states. The third scenario assumes that the native workforce in California would be different from the native workforce in the rest of the nation only in ways already exhibited in 1969. The distribution of education and age for the California native workforce is attained by starting with the 1969 native workforce in the state and using

the same percentage changes in the distribution of education and age as occurred in the rest of the nation.<sup>4</sup>

The third scenario lies between the extremes of the first and second scenarios. It does not assume that all or none of California's uniqueness is due to immigration, but rather it assumes that the unique changes in the native workforce in the state are due to immigration. The third scenario assumes that in the absence of immigration, *changes* in the native workforce in the state would have mirrored those in the rest of the nation.

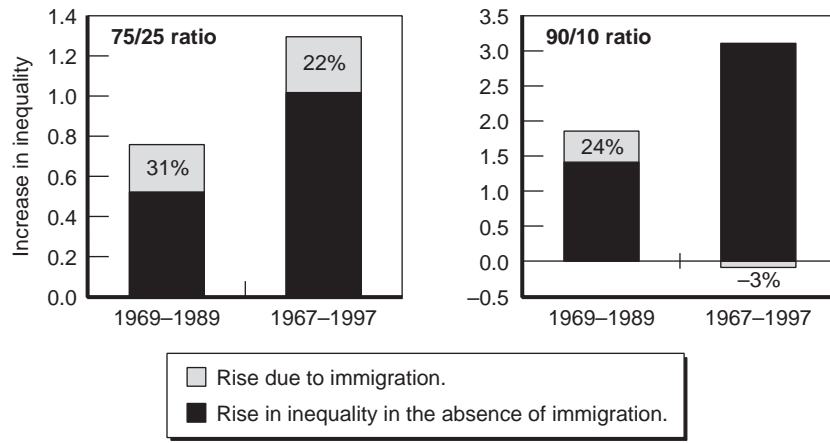
Under the third scenario, immigration explains 31 percent of the growth in the 75/25 ratio between 1969 and 1989, and 22 percent of the growth between 1967 and 1997 (see Figure 4.4). Using the 90/10 ratio as the measure of inequality, immigration explains 24 percent of the growth between 1969 and 1989 but none of the growth between 1967 and 1997.

Clearly the three scenarios used in our calculations do not describe all the realistic possibilities of what the California workforce might have looked like had it not been for immigration, nor do they provide the upper or lower limits of the effect of immigration on inequality in California. Other plausible scenarios do exist. However, these three represent the two obvious extremes as well as a more moderate scenario.

The scenario approach is appealing because of its simplicity. A full model of the effect of immigration on the workforce in California would need to consider such general equilibrium questions as whether agriculture would still be an important industry and whether agricultural

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<sup>4</sup>We group male workers by education and age. We begin with the number of people in each group in California in 1969 and we change the size of each group by the same percentage as occurred in the rest of the nation since 1969.



SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

NOTES: Calculations are based on removing immigrants from the data sample and basing native education and age on differences with the rest of the nation in 1969. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1967 sample is based on combined data from the 1967 and 1968 surveys.

**Figure 4.4—Immigration and Growth in Male Wage Inequality in California, Third Scenario, 1967–1997**

production would use the current amount and type of labor were it not for immigration. Such a model would require a great number of untested assumptions with complicated effects on the outcome that would strain the credibility of the results. Although not complete, the scenario approach provides straightforward approximations of the total effect.

Another alternative to using the above scenarios would be to determine the characteristics of the native workforce in the state by estimating a model of domestic migration into and out of California. Estimates from the migration model could be used to calculate predicted

net migration in the absence of international immigration. Like the scenario approach, this method would also fail to consider the general equilibrium of the California economy.

One difficulty with modeling domestic migration as a function of immigration is the coincidence in timing during the late 1980s of a great influx of international immigrants to California with a high outflow of domestic migrants from California and the beginning of economic stagnation and eventual recession in California. The migration model would be quite sensitive to the ability to control for economic conditions that influence domestic migration. The model would also need to account for lags (e.g., immigration today affects domestic migration today and in future years) as well as any differential effect across types of workers (e.g., immigration of less-skilled workers could increase the demand for more skilled workers needed to manage them).

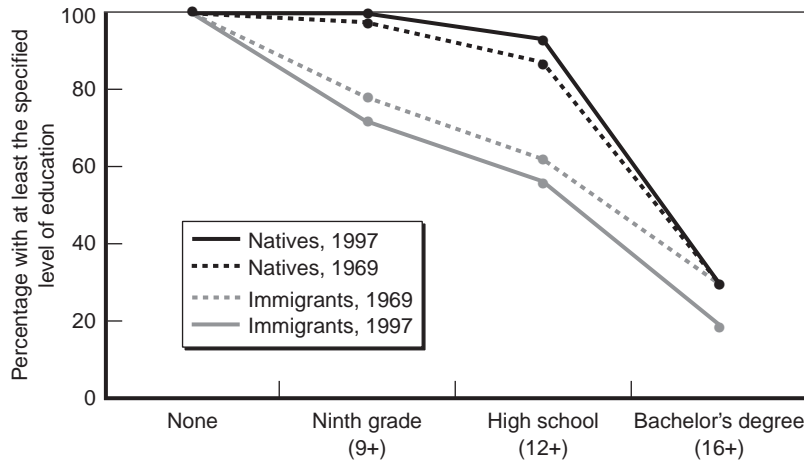
Despite several studies of the effect of international immigration on native migration, there is no consensus in the literature. Frey et al. (1996) find that immigration tends to reduce net native migration. Using the same data, Card (1996) finds that cities with the greatest growth in international immigration tend to have more growth in the number of native workers. Given the lack of consensus among experts on how to model the effect of immigration on domestic migration, the scenario approach is highly appealing for studying the effect of immigration on inequality in California.

## **Education and the Effect of Immigration on Male Wages**

The presence of immigrants in the California economy has led to rising male wage inequality because the share of immigrants has increased

and because they have become more concentrated in the bottom and lower-middle of the distribution of male wages. One important cause of this shift in the location of immigrants in the distribution has been the shift in their relative education.

The gap between immigrant and native educational attainment has increased—in part because native education has improved and in part because immigrant education has worsened. In 1997, roughly 93 percent of natives and 57 percent of immigrants in California had a high school diploma (see Figure 4.5). For 1969, the data survey reports the number of years completed but not whether a degree was awarded. The 1969 estimates are likely to exaggerate total completion rates but are still



SOURCES: Author's calculations from the March file of the CPS for 1997 and the decennial Census for 1969.

NOTES: The figure reports the percentage of men who have at least the indicated level of education. The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure 4.5—Distribution of Education Among Male Workers in California, by Immigrant Status, 1969 and 1997**



valid for comparing immigrants and natives. In 1969, about 87 percent of natives and 62 percent of immigrants had completed 12 years of schooling.

Differentials in schooling levels help explain why inequality would be lower in the absence of immigration. When we remove immigrants from the data under the first scenario, we find that the 75/25 ratio falls by 0.28 units in 1989. If immigrants had the same educational attainment as natives, the immigration effect would be only 0.14 units. Education differentials explain almost half of the immigration effect in 1989 and about one-fourth of the immigration effect in 1997. For the 90/10 ratio, education differentials explain about one-fourth of the effect of immigration in 1989. In 1997, the presence of immigrants does not increase the 90/10 ratio.

## **Does Immigration Affect the Wages of Natives?**

The calculations thus far have used the assumption that immigration affects only the characteristics of the native workforce but not the wages of natives. This section reviews the literature on the effect of immigration on native wages and discusses the results of this study in light of the existing research.

Economic theory predicts that immigration will affect native wages. As shown in Figure 4.5, about 40 percent of California's working male immigrants have less than a high school diploma. As these workers enter the labor market, they might be expected to bid down the wages of similar natives and perhaps bid up the wages of workers required to manage them.<sup>5</sup> For example, an increase in the supply of production

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<sup>5</sup>The supply effect could be moderated by an increased demand for workers as immigrants increase overall consumption.

workers could reduce the wages of production workers but raise the wages of production managers. If immigration increases the wages of highly educated natives relative to the wages of less-educated natives, immigration will increase inequality by raising the returns to education for natives. This effect is in addition to the effect on the native workforce as measured in the previous sections of this chapter.

Economic theory also predicts that in the long run, the effect of immigration on native wages will be diffused from places with high immigration rates to places with little or no immigration, because of the movement of production and workers. Within the United States production will tend to move to regions where wages are low and workers will tend to move to regions where wages are high. The movement of firms and workers in response to wages will occur until the wages of similar types of workers are equalized across regions of the nation. In the long run, regions with high immigration, such as California, are not expected to have higher returns to education than regions with low immigration or the nation as a whole.

The empirical literature is consistent with the implication of economic theory: Immigration does not have large region-specific effects on native wages. Most of the studies compare the returns to education for natives in locations with few immigrants to the returns to education of similar natives in locations with many immigrants. In a recent survey of this extensive literature, a study by the National Research Council (NRC) concludes that the estimates of the effect of the number of immigrants on the native wage “cluster around zero” (1997, p. 221).<sup>6</sup>

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<sup>6</sup>For other surveys of this literature, see Borjas (1994), Friedberg and Hunt (1995), and Greenwood and McDowell (1993).

The results of this study are basically consistent with the NRC conclusion that the wages of natives in locations with high immigration are not substantially different from those of natives in other regions. The returns to education for natives were similar in California and the rest of nation in 1989 (see Figure 3.6). In 1997, the returns to education in California were similar to those in the rest of the nation except for the higher differential in the state between workers with a high school diploma and workers with less education. In 1997, workers with less than a high school diploma in California may have had relatively lower wages because of competition with immigrants.

Economic theory, empirical research, and the results of this study suggest that immigration has not had a substantially different effect on the wages of natives in California than it has in the rest of the nation. If there are wage effects of immigration on natives, these effects seem to be dispersed throughout the nation. Borjas et al. (1997) show that in theory, the magnitude of the increase in the relative labor supply of workers with less than a high school diploma was substantial enough to explain about a 5 percent fall in their wages.

The results from Borjas et al. (1997) and from this study suggest that if immigration has changed the wages of natives, the largest effect has been a decline in the wages of natives with less than a high school diploma. Only about 7 percent of native male workers in California had less than a high school diploma in 1997. These estimates suggest that the effect of immigration on the wages of natives is small relative to the growth in male wage inequality. For example, under the first scenario, immigration explains 28 percent of the growth between 1969 and 1989 and 24 percent of the growth between 1967 and 1997 (see Figure 4.2). Including the estimated effect of immigration on native wages, the effect

of immigration increases only slightly to 29 percent of the growth between 1969 and 1989 and 26 percent of the growth between 1967 and 1997.<sup>7</sup>

## Summary

The presence of immigrants increases inequality in California because immigrants are overrepresented in the bottom and lower-middle of the income distribution. Over the last three decades, the overall share of immigrants among male workers in California has increased dramatically from 10 percent in 1969 to 36 percent in 1997. Their overrepresentation in the bottom and lower-middle of the wage distribution has also increased. Their rising share and shifting location in the distribution explain why immigration has contributed to rising inequality in California.

Under three scenarios for the composition of the California male worker population in the absence of immigration, we have found that the rise in the male wage inequality would have been lower in the absence of immigration. The magnitude of the immigration effect depends on the time period studied, the measure of inequality, and the scenario used.

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<sup>7</sup>The estimates of native wages in the absence of immigration are constructed by first simulating native wages under the assumption that the returns to education for natives in California would match the returns for natives in the nation as a whole. Then the wages of workers with less than a high school diploma are increased by a factor of 1.053. Results for the 90/10 ratio and for the second and third scenario vary. The native wage effect is most important under the third scenario for the period 1969–1989—the inclusion of the native wage effect leads to an increase in the estimate from 31 percent (Figure 4.4) to 38 percent for the 75/25 ratio and from –3 percent (Figure 4.4) to 6 percent for the 90/10 ratio. These calculations show that the national immigration effect estimated by Borjas et al. (1997) and the differential returns to schooling in California compared to the nation are not substantial contributors to the growth in wage inequality in California. However, the calculation does not fully account for all possible effects of immigration on native wages but rather accounts only for the effect of immigration on the returns to education for natives.

We find that immigration explains between 17 and 40 percent of the rise in male wage inequality. The one exception is growth in the 90/10 ratio between 1967 and 1997, which cannot be explained by the presence of immigrants.

The Census Bureau data used in this report do not accurately reflect the population of immigrants, especially undocumented immigrants, who are undercounted in official statistics. If the data were to include a representative sample of immigrants, the growth in male wage inequality in California would almost certainly be even greater than measured. The share of the wage inequality growth explained by immigration would also be greater than measured.

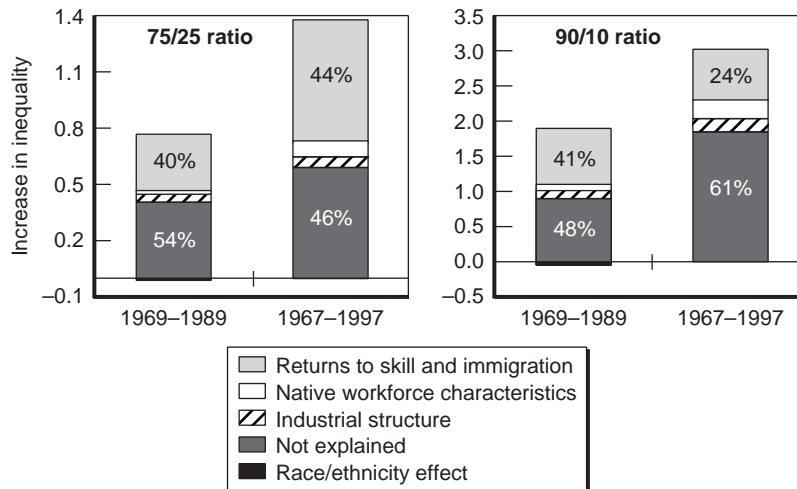
## 5. Native Workforce Characteristics and Industrial Structure

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The preceding chapters have shown that immigration and rising returns to skill explain a substantial portion of the increase in male wage inequality in California. This chapter considers a variety of additional explanatory factors: changes in the effect of race and ethnicity on wages, changes in characteristics of the native workforce, and changes in industrial structure. The estimates show that these additional factors have relatively small effects.

### **Combined Estimates for All Factors**

Between 1969 and 1989, the 75/25 ratio grew from just over 1.8 to just under 2.6—a change of almost 0.8 units (height of first bar, Figure 5.1). If the returns to education and experience had not changed and if immigrants are removed from the workforce, the increase in the 75/25 ratio would have been 0.45 units (height of first bar less the top gray



SOURCES: Author's calculations from the March file of the CPS for 1967 and 1997 and the decennial Census for 1969 and 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys. The 1967 sample is based on combined data from the 1967 and 1968 surveys.

**Figure 5.1—Growth in Male Wage Inequality, Combined Effects of All Factors, 1967–1997**

portion).<sup>1</sup> That is, immigration and rising returns to schooling combined explain 40 percent of the rise in the 25/75 ratio between 1969 and 1989. For 1967 to 1997, the combined effect explains 44 percent of the growth.<sup>2</sup> Estimates for the 90/10 ratio are of roughly the same magnitude for 1969–1989, explaining just less than half the growth in inequality. For 1967 to 1997, immigration and rising returns to skill

<sup>1</sup>The calculations for the effect of immigration in this chapter are based on removing immigrants from the data sample as in the first scenario presented in Chapter 4.

<sup>2</sup>Estimates for the 1967–1997 period are approximate. The survey used for 1967 does not have information on immigrant status. We calculate effects using the decennial Census for 1969 and the CPS for 1997.

explain only 24 percent of the growth in the 90/10 ratio. All of the explained growth in the 90/10 for this period comes from rising returns to skill—immigration does not explain the growth (see Chapter 4).

The effect of immigration and rising returns when taken together is less than the sum of the effect of each separately (as presented in the preceding chapters). The difference is explained by an interaction effect. Reducing the returns to schooling to the relatively low rates found in the late 1960s has a stronger effect when immigrants are included in the analysis because the diversity of education is much higher in their presence. The more substantial the diversity of educational attainment, the more important is the rate of return to education. Similarly, removing immigrants has a stronger effect when the rates of return to schooling are high, as in 1997. That is, the more substantial the rate of return to schooling, the more important the diversity of education caused by the presence of immigrants.

After accounting for the effect of rising returns to skill and removing immigrants, just over half of the rise in the 75/25 ratio between 1969 and 1989 remains unexplained. Over this period, the importance of race and ethnicity in determining wages among natives declined. In 1969, the wages for Hispanic male workers were about 10 percent below the wages of similar U.S. natives who were white (estimates control for education and experience). In 1989, Hispanics earned about 9 percent less than whites. Asians earned 10 percent less than whites in 1969 and only 3 percent less in 1989. Blacks earned 24 percent less than whites in 1969 and 20 percent less in 1989. The declining effect of race and ethnicity tends to equalize the distribution of wages. Changes in the effect of race and ethnicity, therefore, do not help explain rising wage inequality. In the absence of these changes, the growth in the 75/25



ratio would have been about 2 percent less between 1969 and 1989. Results for 1967 to 1997 and for the 90/10 ratio are similar—changes in the effect of race and ethnicity on native wages do not explain the growth in male wage inequality (see Figure 5.1, small negative effect at bottom).

After accounting for the declining importance of race and ethnicity, the rising returns to skill, and removing immigrants, more than half of the rise in the 75/25 ratio between 1969 and 1989 is still unexplained. The characteristics of native workers in California changed over this period. For example, educational attainment increased (see Figure 4.5). Changes in the distribution of native characteristics explain only 3 percent of the growth in the 75/25 ratio between 1969 and 1989 and only 6 percent between 1967 and 1997. Similarly, native characteristics play only a small role in the growth of the 90/10 ratio, explaining 5 percent and 9 percent for the two periods, respectively.

The industrial structure of California has changed over the last three decades. For example, the share of native male workers in durable goods manufacturing fell from about 22 percent in 1969 to about 12 percent in 1997. After accounting for immigration, returns, and workforce characteristics, changes in industrial structure explain only an additional 5 percent of the growth in the 75/25 ratio in the 1969–1989 period and 4 percent in the 1967–1997 period. Changes in industrial structure explain only 6 to 8 percent of the growth in the 90/10 ratio for both periods.<sup>3</sup>

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<sup>3</sup>The estimates of the effect of industrial structure reported in this text are based on very specific assumptions about the role of industrial structure. See Appendix B for further details. Alternative estimation strategies also lead to the conclusion that changes in industrial structure do not explain a substantial portion of the increase in male wage inequality. For a broader discussion of the role of industrial structure, see Reed and Dardia (1999).

Taking into account all the factors measured in our data and examined in our study, we cannot explain 54 percent of the growth in the 75/25 ratio between 1969 and 1989 (46 percent between 1967 and 1997) and 48 percent of the growth in the 90/10 ratio (61 percent between 1967 and 1997). The total effect of the additional factors considered in this section has been quite small. Rising returns to skill and immigration together account for the bulk of the explained growth.

The additional factors considered in this chapter also play a relatively minor role in explaining the growth in male wage inequality in the rest of the nation. After accounting for immigration and rising returns to skill, changes in characteristics of the native workforce explain 9 percent or less of the growth in male wage inequality. Changes in industrial structure explain 6 percent or less of the growth. Growth in the 90/10 ratio between 1967 and 1997 is the one exception: Changes in native characteristics explain 18 percent of the growth and changes in industrial structure explain 13 percent of the growth.

## **Summary**

In investigating the rise in male wage inequality in California and the rest of the nation over the last three decades, we have found no substantial contribution from factors other than immigration and returns to skill. In particular, changes in the effect of race and ethnicity for natives, changes in the characteristics of the native workforce, and changes in industrial structure do not explain a substantial portion of the rise in male wage inequality.

Taken together, all the factors that we consider explain about half of the growth in male wage inequality in the state. The data surveys and the models that we have used cannot explain the remaining half of the

growth, which is due to rising “unexplained variance” in the wage model. Unexplained variance includes characteristics of workers and jobs that are not included in the model and the effect of those characteristics on wages. In light of the importance of rising returns to education and experience, it seems reasonable to speculate that rising returns to unobserved skills such as motivation, strength, and ability have contributed to the increase in unexplained variance.<sup>4</sup> There may also be increasing diversity of unobserved human capital (e.g., quality of education) and job requirements.

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<sup>4</sup>See Juhn, Murphy, and Pierce (1993).

## **6. Why Is Male Wage Inequality Higher in California Than in the Rest of the Nation?**

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In the late 1960s, male wage inequality in California was similar to that in the rest of the nation. Since the mid-1980s, California has had substantially higher inequality. This chapter explores the causes of higher male wage inequality in the state relative to the rest of the nation in recent years. Several potential explanations are explored, including the greater share of immigrants in the state, higher returns to schooling, the distribution of native characteristics, and industrial structure. The analysis shows that immigration is the most important explanation, particularly for the late 1980s. By the late 1990s, the role of immigration has lessened and other factors, particularly higher returns to skill among natives, have become important.

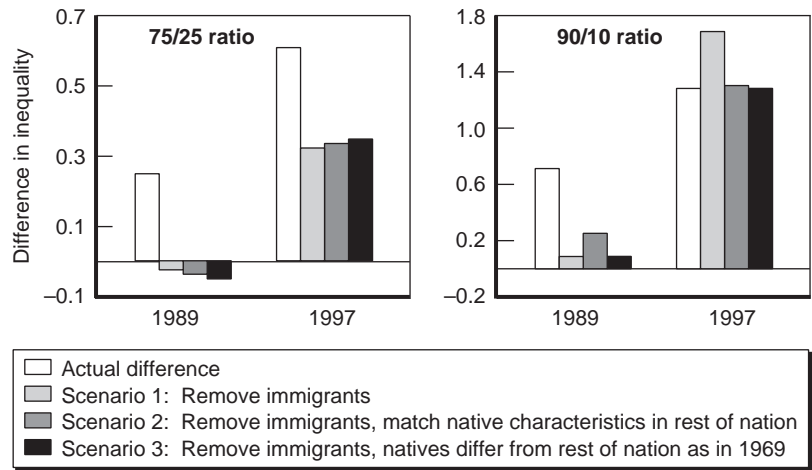
## **Immigration and Higher Male Wage Inequality in California**

California not only has a much higher share of immigrants, but, relative to the rest of the nation, immigrants in the state are also more likely to have low wages. In 1989, immigrants were 29 percent of the male workforce in California and only 8 percent in the rest of the nation. In 1997, immigrants were 36 percent in California and 12 percent elsewhere. In California, 67 percent of immigrants were in the lower half of the wage distribution in 1997 (70 percent in 1989). The degree of overrepresentation in the lower half of the distribution was smaller in the rest of the nation at 64 percent in 1997 (59 percent in 1989).

Would male wage inequality be higher in California relative to the rest of the nation in the absence of immigration? To answer that question, the analysis in this section applies the three scenarios for the California workforce that were developed in Chapter 4.

In 1989, the 75/25 ratio was just under 2.6 in California—almost 0.3 units higher than in the rest of the nation (see Figure 6.1, first bar). Removing immigrants from the data under the first scenario substantially reduces the 75/25 ratio in California to just below 2.3 and only slightly reduces the ratio in the rest of the nation. Under the first scenario, the 75/25 ratio would have been lower in California than in the rest of the nation (Figure 6.1, light grey bar). The 90/10 ratio in 1989 would have been just above the rest of the nation. That is, under the first scenario, immigration explains virtually all of the higher male wage inequality in California in 1989.

Results for 1997 are more mixed. In that year, the 75/25 ratio in the state was 3.1 and in the rest of the nation it was 2.5. Removing



SOURCES: Author's calculations from the March file of the CPS for 1997 and the decennial Census for 1989.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure 6.1—Effect of Immigration on Higher Male Wage Inequality in California, 1989 and 1997**

immigrants from the data reduces the differential from 0.6 units to 0.3 units. That is, in 1997, the 75/25 ratio among natives in California was 0.3 units higher than among natives in the rest of the nation. Under the first scenario, immigration explains almost half of the higher 75/25 ratio in the state.

Removing immigrants *increases* the 90/10 ratio in the state in 1997 from 7.0 to 7.2. This occurs because in 1997, immigrants in California were more concentrated in the lower-middle of the male wage distribution than in the bottom 10 percent (see Figure 4.1). Removing

immigrants in the rest of the nation reduces the 90/10 ratio from 5.7 to 5.5. Therefore, under the first scenario, the gap between the state and the nation actually increases from 1.3 to 1.7. That is, in 1997, the 90/10 ratio among natives in California was 1.7 units higher than among natives in the rest of the nation. Immigration does not explain the higher 90/10 ratio in the state in 1997.

Under the second scenario, in the absence of immigration the native workforce in California would have the same distribution of age and education as the native workforce in the rest of the nation. Under the third scenario, the native workforce in California differs in age and education from the rest of the nation, as it differed in 1969. Results for the second and third scenario are similar to those for the first scenario. Immigration explains virtually all the higher male wage inequality in California in 1989, about half of the higher 75/25 ratio in 1997, but none of the higher 90/10 ratio in 1997.

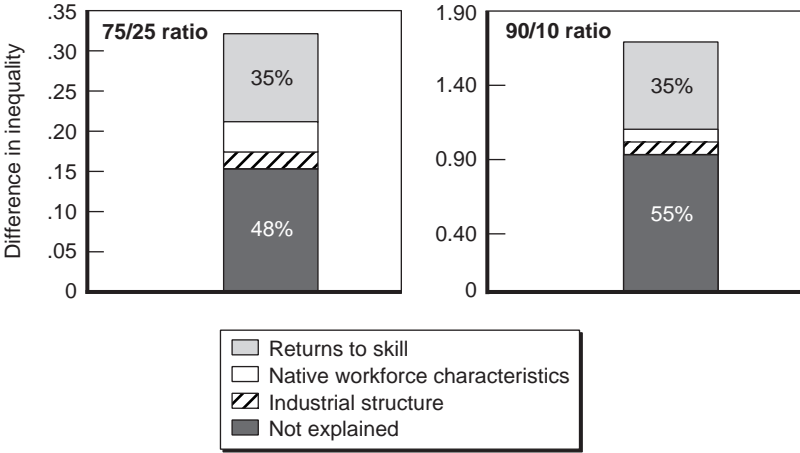
The Census Bureau data used in this report do not accurately reflect the population of immigrants, especially undocumented immigrants who are undercounted in official statistics. If the data were to include a representative sample of immigrants, the differential between male wage inequality in California and the rest of the nation would almost certainly be even greater than measured. The share of California's higher inequality explained by immigration would also be greater than measured.

### **Causes of Higher Inequality Among Natives in California in 1997**

As shown in the previous section, male wage inequality among natives in California nearly matched that of the rest of the nation in

1989 (first scenario). In 1997, California had substantially greater male wage inequality among natives. This section explores the greater inequality among natives in the state in 1997.

When immigrants are removed, the 75/25 ratio in California was 2.7 compared to 2.4 in the rest of the nation—a difference of just over 0.3 units (see Figure 6.2). If returns to education and experience in California matched that of the rest of the nation, the differential would have been about 0.2 units. That is, higher returns to skill in the state explain about 35 percent of the greater 75/25 ratio for natives. Higher returns to skill also explain about 35 percent of the greater 90/10 ratio.



SOURCES: Author's calculations from the March file of the CPS.

NOTES: The sample includes civilian males ages 18 to 54 who worked at least 13 weeks during the year and who were not self-employed. The 1997 sample is based on combined data from the 1996 and 1997 surveys.

**Figure 6.2—Explanations for Higher Male Wage Inequality Among Natives in California Relative to the Rest of the Nation, 1997**



Other differences between California and the rest of the nation play a relatively small role in explaining greater native male wage inequality in the state. Differences in the effect of race and ethnicity on wages do not explain greater inequality in California. Differences in the distribution of native workforce characteristics can explain only 11 percent of the greater 75/25 ratio and 5 percent of the greater 90/10 ratio. Differences in industrial structure explain 5 to 7 percent of the greater inequality in California.<sup>1</sup>

## Summary

In 1989, male wage inequality in California was greater than in the rest of the nation because of immigration. In 1997, immigration explained about half of the greater 75/25 ratio but did not explain the greater 90/10 ratio. That is, in 1997, male wage inequality among natives was greater in California than in the rest of the nation. Higher returns to skill in California explain about one-third of the higher native male wage inequality. Differences in native workforce characteristics and industrial structure play a relatively small role.

About half of the greater male wage inequality among natives in California in 1997 cannot be explained by the factors that we consider. The unexplained difference in inequality is due to differences in characteristics of workers and jobs that are not included in the survey data and in the model and differences in the effect of those characteristics

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<sup>1</sup>The estimates of the effect of industrial structure reported in this text are based on very specific assumptions about the role of industrial structure. See Appendix B for further details. Alternative estimation strategies also lead to the conclusion that differences in industrial structure between California and the rest of the nation do not explain a substantial portion of the higher male wage inequality in the state. For a broader discussion of the role of industrial structure, see Reed and Dardia (1999).

on wages. In light of the importance of higher returns to education and experience in California, it seems reasonable to speculate that higher returns to unobserved skills, such as motivation, strength, and ability, have contributed to the greater native male wage inequality in the state. There may also be greater diversity of unobserved human capital (e.g., quality of education) and job requirements.

## 7. Summary, Social Concerns, and Policy Directions

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This study sought to answer two questions: What explains the rise in male wage inequality in California? and Why has male wage inequality been higher in California than in the rest of the nation in recent years? In answer to the first question, the wage differential between educated workers and less-educated workers has grown, as has the wage differential between experienced and less-experienced workers. Immigration has increased the share of the workforce with low wages. Changes in characteristics of the native workforce, such as education and age, and changes in industrial structure have played relatively minor roles.

In answer to the second question, immigration explains virtually all of the higher inequality in the state in the late 1980s. However, as California has grown out of the recent recession, higher returns to education and experience in the state have also contributed to greater wage inequality relative to the rest of the nation. Differences between California and the rest of the nation in such native workforce

characteristics as age, education, and race/ethnicity and differences in industrial structure explain relatively small portions of the greater inequality in the state.

## **Social Concerns**

In light of more than two decades of rising income inequality and the identified causes of the inequality growth, we anticipate that inequality will remain high in California relative to 30 years ago. The high returns to skill and large share of low-wage immigrants reflect trends that are not likely to reverse in the near future. These results shape the way that we think about income inequality in California and suggest areas of concern for public policy.

The reasons that Californians care about trends in income inequality can be organized around three concepts: the well-being of the poor, equal opportunity, and social consequences. From the perspective of “absolute well-being” of the poor, there is concern about meeting the resource needs of families in the bottom and lower-middle of the distribution whose earnings and incomes have fallen. However, many people have argued that the well-being of the poor may be better measured relative to the well-being of the non-poor. For example, the minimum standard of living that society is willing to accept may be higher in richer societies.<sup>1</sup> Moreover, recent Nobel laureate Amartya Sen argues that the absolute well-being of the poor in terms of their ability to “participate in the standard activities of the community” depends on their relative well-being in terms of resources (Sen, 1983).

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<sup>1</sup>This argument is fundamental in the growing literature on measuring poverty using relative measures. See Foster (1998) and Ruggles (1990).

The relative well-being of the poor also raises issues of equal opportunity. There is concern that as the distribution of income has widened, differences in economic opportunities have become more consequential and equal opportunity may be harder to attain. As inequality increases, the rich are able to buy more opportunities relative to the poor. For example, the children of the rich may be increasingly provided better education, better health care, and safer communities. As Sen also argues, participating in the community tends to require more resources for the poor in wealthier societies. When inequality increases without income growth for the poor, the poor may be less capable of succeeding in society. Empirical evidence suggests that intergenerational mobility is higher in societies with lower income inequality, but this relationship has not been thoroughly studied.<sup>2</sup>

In sum, reduced relative resources, lower capabilities of the poor, and unequal opportunity are potential social consequences of rising income inequality. Are there additional social consequences of rising income inequality? One obvious social consequence is simply living in a society with more income inequality. Many Americans would prefer to live in a society with lower levels of income inequality.<sup>3</sup> As many people have argued, other social consequences may be political instability, low economic growth, and crime. However, the empirical evidence in

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<sup>2</sup>See Bjorklund and Jantti (1997) and Erikson and Goldthorpe (1991).

<sup>3</sup>For a discussion of survey results on inequality, see McClosky and Zaller (1984). Social psychologists have also studied preferences for equality versus efficiency in the context of changing degrees of meritocracy (see Mitchell, Tetlock, Mellers, and Ordóñez, 1993).

support of these claims tends to be mixed and the relationships have not been adequately established.<sup>4</sup>

## **Policy Directions**

To address these concerns and questions, the results suggest several policy directions related to the major causes of income inequality that have been identified: rising returns to skill and immigration. These policy directions all involve education and training:

- Improve the opportunity to finish high school and enter college;
- Improve training for people who do not go on to college; and
- Promote the economic progress of immigrants through education and training.

Rising returns to skill have widened the distribution of wages. The returns to skill can rise without a real decline in the earnings of workers with low skills. However, in California, the average wages of native male workers with a less than a bachelor's degree have fallen since 1969 (Figure 3.2). Now, more than in past decades, it is important that people have the opportunity to develop and improve their skills. Providing equal access to high-quality education from the early years through college should be a key concern for the state. Increasing education, training and general skills will improve the absolute well-

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<sup>4</sup>Posner (1997) presents evidence that political stability is related to mean income but not the distribution of income. Park (1996) argues that the empirical evidence suggests that inequality promotes socioeconomic instability. Researchers have produced theories and evidence suggesting that income inequality both promotes and hinders economic growth (see Grossman, 1996, and Tanzi and Chu, 1998). Harer and Steffensmeier (1992) present evidence that violent crime increases with income inequality, whereas Allen (1996) claims that the evidence suggests that income inequality reduces property crime.

being of workers whose productivity and wages rise. Workers with low skills will also see their wages rise as the relative supply of low-skilled workers falls. By promoting the opportunity for people to improve their economic condition, the state can reduce the negative consequences of the increasing disparity in well-being.

Immigration has disproportionately increased the number of low and lower-middle earners in the workforce. The absolute well-being of most immigrants is probably generally higher than it would have been had they not immigrated to California. The relative well-being of immigrants is unlikely to have harsh social consequences as long as their economic position improves over their lifetime and the position of their descendants also improves. Economic integration of immigrants eases the divisiveness of income inequality between immigrants and natives. The economic progress of immigrants throughout U.S. history is encouraging. However, recent immigrants tend to have lower levels of education relative to natives than past immigrants. Because the returns to education have increased, it is now more important than ever to ensure that the second and third generations of immigrants have access to high-quality education and training.

The study results have no direct implications for immigration policy. Immigration policy should be based on the social and economic benefits of immigration versus the costs. The increase in inequality resulting from immigration is merely one economic effect. Studies of the overall economic effect suggest that immigration benefits the economy.<sup>5</sup>

Finally, the main underlying factors that explain rising returns to skill—technological change and international trade—have been

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<sup>5</sup>For a discussion of the economic effect of immigration, see the National Research Council (1997).

encouraged by public policy because they are expected to promote growth and improve economic efficiency. What we have learned over the past three decades is that these policies have winners and losers.



## Appendix A

### Notes on Data

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Income data for this study come from two national household surveys collected by the U.S. Bureau of the Census: the March Current Population Survey (public-use files, survey years 1968–1998) and the decennial Census of Population and Housing (1970, 1980, and 1990). Each survey includes information on household and personal characteristics for the current year and income for the prior year. To limit confusion, we refer to information from each survey as information for the prior year (i.e., the year in which income was received).

The Current Population Survey and the Census report pre-tax, money income, which includes wages, salary, farm income, self-employment income, social security, railroad retirement, supplemental social security, public assistance, welfare, interest, dividends, income from estates and trusts, net rental income, veteran's payments, unemployment and workmen's compensation, private and government pensions, alimony, child support, regular contributions from persons not

living in the same household, and other periodic income. Capital gains are not included.

## **March Current Population Survey**

The March file of the Current Population Survey is an annual survey of civilian households that provides detailed demographic information, including income received, for about 5,000 households in California and 50,000 households in the nation.<sup>1</sup> The advantage of the Current Population Survey is that it is available annually. Using these data, we have information on households, people, and incomes from as recently as 1997.

Over the period covered by the study, several changes were made in the design of the Current Population Survey. (See Reed, Glenn Haber, and Mameesh (1996) for a discussion of these changes and their effect on inequality measures and for a description of the representativeness of the March Current Population Survey for California.) For the 1994 and 1995 surveys, the results in the text rely on corrected weights constructed by Jeffrey Passel of the Urban Institute. Census Bureau weights lead to similar results.

## **Current Population Survey, Outgoing Rotation Group**

In each month, the Census Bureau collects information on employment and wages for about one-fourth of the adult sample in the

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<sup>1</sup>This file also includes Armed Forces personnel living with civilians. Our measures of household income include these households. Samples of workers do not include military personnel. About 3,000–4,000 male workers and 2,000–3,000 female workers are in the California sample. The national samples have about ten times as many workers as the California samples.

Current Population Survey. This monthly sample, known as the Outgoing Rotation Group, can be merged over an entire year to create a dataset roughly three times as large as the March Current Population Survey (which is the entire sample for a single month). The larger sample size makes the Merged Outgoing Rotation Group (MORG) data a valuable alternative to the March file. We have replicated several of the results for male weekly wage inequality using the MORG data from 1979–1996. We found no substantial changes in our conclusions when we use the MORG data.

We have chosen to rely on the March file instead of the MORG data for three reasons. First, the household income measures require income and household information not found in the MORG data. Second, the March file is available beginning with income year 1967, whereas the MORG data are available beginning in 1979. Third, the measure of male weekly wages in the March file is constructed from annual earnings divided by weeks of work. The MORG file measures earnings in the week before the survey. The March measure is arguably a better measure of wage inequality because it smooths over week-to-week variation. The March measure is also the same as that used in the decennial Census. By combining March files over two years, we have a sample size roughly two-thirds the size of the 12-month MORG file.

## **Census of Population and Housing**

We employ the Public Use Microdata Sample of the Census to investigate the distribution of male wages in 1969 and 1989. One advantage of using the Census is that its larger sample size leads to more precise statistical estimates. In addition, the Census is designed to sample the entire population and therefore is representative of each state

(with the important exception of undercount problems). The main limitation of the Census is that the most recent collection was in 1990 with income for 1989. (See Reed, Glenn Haber, and Mameesh (1996) for a further discussion of the Census data and a comparison with the Current Population Survey data for California.)

### **Top-Codes**

Both the Current Population Survey and the decennial Census restrict responses to income questions to a certain range. Responses outside of the range are “top-coded” by being reported at the range cutoff points. For instance, from 1967 to 1975, sampled households with incomes above \$50,000 were reported as incomes at \$50,000 in the Current Population Survey. The range for reporting incomes is different for different sources of income and has changed over time.

Increasing the magnitude of the top-code can increase measured income inequality even when the true underlying distribution of income does not change. To limit biases in our measures of inequality that result from changing top-codes, we standardized the percentage top-coded across each year for each type of income for both surveys. Similarly, we re-coded the same percentage in California and in the rest of the nation. (See Reed, Glenn Haber, and Mameesh (1996) for a further discussion of the effect of top-coding on measurements of income inequality in the Current Population Survey and the Census.)

### **Consumer Price Index**

All income statistics reported in this study have been adjusted to 1997 dollars based on the consumer price index computed by the Bureau of Labor Statistics (BLS). The consumer price index for California is

calculated by the California Department of Finance based on the population-weighted mean of consumer price indices for San Francisco and Los Angeles (and San Diego before 1986).

The consumer price index used in this report is based on all urban consumers (CPI-U-X1). The CPI-U-X1 is a more conservative measure of inflation than the CPI-U. The CPI-U-X1 series is not available for California before 1983. To construct a CPI-U-X1 series for California before 1983, we assume that the ratio of the CPI-U to the CPI-U-X1 in the national statistics is the same for the California statistics. Using this assumption and the national CPI-U series, the national CPI-U-X1 series, and the California CPI-U series, we computed an estimate of the CPI-U-X1 for California before 1983. Table A.1 reports the inflation adjustments used in this study.

**Table A.1**  
**Inflation Adjustments for California and**  
**the United States, 1967–1997**

Year	California	United States
1967	4.48	4.42
1968	4.31	4.26
1969	4.14	4.07
1970	3.98	3.89
1971	3.84	3.72
1972	3.72	3.61
1973	3.51	3.40
1974	3.22	3.09
1975	2.94	2.86
1976	2.77	2.70
1977	2.59	2.54
1978	2.41	2.38
1979	2.21	2.17
1980	1.95	1.95
1981	1.77	1.78
1982	1.67	1.68
1983	1.62	1.61
1984	1.55	1.54
1985	1.48	1.49
1986	1.43	1.46
1987	1.38	1.41
1988	1.32	1.36
1989	1.25	1.29
1990	1.19	1.23
1991	1.14	1.18
1992	1.10	1.14
1993	1.07	1.11
1994	1.06	1.08
1995	1.04	1.05
1996	1.02	1.02
1997	1.00	1.00

SOURCE: Author's calculations  
from statistics provided by the  
California Department of Finance.

## **Appendix B**

### **Notes on Methodology**

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The conceptual methodology is discussed in the text. This appendix provides additional statistical detail where necessary. After a brief discussion relevant to all estimates in this study, the first section discusses the wage equation methodology, the second section describes the estimation strategy for measuring the effect of industrial structure, and the third section discusses the methodology for simulating inequality under the three immigration scenarios.

In this study, the term “native” is used to describe any person born in the United States. We do not distinguish between natives born in California and natives born elsewhere in the nation. The term “immigrant” is used to describe any person not born in the United States. People born in Puerto Rico, Guam, and other U.S. territories are classified as immigrant. People born abroad of U.S. parents are also

classified as “immigrant.”<sup>1</sup> Using a more restrictive definition of immigrant does not have a substantial effect on the results. Less than half a percent of the male workforce in California was born in Puerto Rico or other U.S. territory and just over 1 percent was born abroad to U.S. parents. In 1997, the 75/25 ratio in California was 3.06. Removing immigrants brings the ratio to 2.67 using the expanded definition and to 2.71 using the restrictive definition.

Estimates of the effect of a factor on income inequality are based on accounting exercises. For example, we measure the effect of a change in the distribution of education holding all else equal. Accounting exercises give us a sense of the relative magnitude of single effects. They do not incorporate economic interactions, such as changes in the distribution of education altering the returns to education.

In this appendix, we describe the decomposition of the change in the distribution of male wages between 1969 and 1989. The decompositions of the change between other years and the difference between California and the nation in recent years are analogous.

### **Wage Equation Decompositions (Chapters 3, 5, and 6)**

The natural logarithm of weekly wages is assumed to be a linear additive function of educational attainment (piecewise linear within four categories: less than high school, high school, some college, and college or more), a quartic in potential experience, three race dummies (Asian, black, and other), and ethnicity (Hispanic). The wage equation is estimated by OLS separately for natives and immigrants, separately for

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<sup>1</sup>We use the question “When did you come to the United States permanently?” to distinguish immigrants from natives.



California and for the rest of the nation, and separately for each year. The regressions for the rest of the nation include regional effects for nine regions.

The natural logarithm of weekly wages (ln-wage) for individual  $i$  in 1989 ( $w_{i89}$ ) can be written

$$w_{i89} = X_{i89}\beta_{89} + F_{89}^{-1}(\theta_{i89} | X_{i89}) \quad (1)$$

where  $X_{i89}$  is the vector of regressors listed above measured in 1989.  $\beta_{89}$  is the vector of the effect of each regressor on weekly wages. We refer to  $\beta_{89}$  as the price effect of  $X_{89}$ . The percentile of individual  $i$  in the distribution of regression residuals is  $\theta_{i89}$ . The nonparametric function  $F_{89}^{-1}$  converts percentiles to residual terms using the 1989 distribution of residuals (i.e.,  $F$  is the cumulative distribution function of wage equation residuals). We simulate the distribution of residuals using the mean residual in 0.1 percentiles for  $F_{89}$  (i.e., we approximate the distribution of the residual term using 1,000 points). We refer to the simulated distribution as  $w_{i89}^s$ .

To measure the effect of changes in returns to education and experience on the rise in income inequality (Chapter 3), we calculate the level of inequality that would have occurred in the absence of a change in the returns to education and experience. Equation (2) describes the ln-wage for individual  $i$  under this scenario.

$$w_{i89}^{CF} = X1_{i89}\beta1_{69} + X2_{i89}\beta2_{89} + F_{89}^{-1}(\theta_{i89} | X_{i89}) \quad (2)$$

where  $X1$  is the vector of education and experience regressors ( $\beta1$  is the corresponding price effects), and  $X2$  is the vector of race and ethnicity regressors ( $\beta2$  is the corresponding price effects). The difference between inequality in the absence of a change in returns to education and

experience (inequality in the distribution of  $w_{i89}^{CF}$ ) and actual inequality (inequality in the distribution of  $w_{i89}$ ) is the portion of growth in inequality explained by changes in the returns to education and experience. Equation (3) describes the percentage of the rise in inequality between 1969 and 1989 resulting from changes in the returns to education and experience.

$$\frac{\{I(w_{89}^S) - I(w_{89}^{CF})\}}{\{I(w_{89}) - I(w_{69})\}} * 100 \quad (3)$$

where  $I$  represents functions that convert the vector of ln-wages to indices of inequality.

The calculations in Chapters 5 and 6 use the same basic method with a slight modification. In place of the individual's actual percentile in the distribution of regression residuals for 1989, we use a randomly generated percentile ( $\theta_i$  in place of  $\theta_{i89}$ ). We generate the random percentile to be independent of  $\beta_{89}X_{i89}$  and  $\beta_{69}X_{i89}$ . We use the same procedure for assigning random percentiles in 1969.<sup>2</sup>

The calculation of the effect of changes in returns to education and experience is analogous to that described above except that we replace  $\theta_{i89}$  with  $\theta_i$  in Eqs. (1) and (2). We calculate the effect of changes in the price effects of race and ethnicity ( $\beta_2$ ) by comparing the growth in inequality explained by changes in all price effects (all  $\beta$ ) to the growth in inequality explained by returns to education ( $\beta_1$ ). That is, the percentage of the growth in inequality explained by changes in  $\beta_2$  is

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<sup>2</sup>In practice, generating an independent random percentile is difficult. For each person, we generate a random variable from a univariate distribution. We regress this random variable on a cubic of  $\beta_{89}X_{i89}$  and  $\beta_{69}X_{i89}$ . We use the residual from that regression to assign percentiles.

equal to the percentage of inequality explained by changes in all  $\beta$  minus the percentage explained by changes in  $\beta_1$  (using Eq. (3)).

Equation (4) describes the distribution of ln-wages if price effects  $\beta$  and workforce characteristics  $X$  had not changed.

$$w_{i89}^{CF} = X_{i69}\beta_{69} + F_{89}^{-1}(\theta_i) \quad (4)$$

We calculate the percentage of growth in inequality explained by changes in prices and characteristics using Eq. (3). The difference between this percentage and that explained by changes in prices alone is the percentage resulting from changes in characteristics.

The modification to independent residual percentiles is required to calculate the effect of changes in workforce characteristics  $X$  on wage inequality. The distribution in Eq. (4) is determined by using the micro-data from 1969 for  $X_{i69}$  with the estimates of  $\beta_{69}$  and  $F_{89}$ . The alternative to using  $F_{89}^{-1}(\theta_i)$  in this case would be using  $F_{89}^{-1}(\theta_{i69} | X_{i69})$ . That is, since we are using the 1969 micro-data, we could use the residual percentile calculated for each individual from the 1969 wage regression. However, the residual terms would then exhibit the same relationship with the regressors as found in 1969.<sup>3</sup> In this case, Eq. (4) would describe the ln-wage distribution if there had been no change in the relationship between  $X$  and  $\theta$  in addition to no change in price effects  $\beta$  and no change in workforce characteristics  $X$ . By using

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<sup>3</sup>The OLS regression model assumes that there is no correlation between the regressors and the residual term. This assumption holds by construction for the estimates in a single year. However, there is no imposed constraint on the correlation between  $X_{i69}$  and  $F_{89}^{-1}(\theta_{i69} | X_{i69})$ . In practice, the correlation is not zero. Furthermore, nonlinear relationships between the regressors and the residual term will affect inequality when measured by the 75/25 and 90/10 ratios.

the independent residual percentiles, changes in the relationship between  $X$  and  $\theta$  are assigned to the residual category (“unexplained changes”).

The methodology used in this paper is different from the usual decomposition of the variance of ln-wage (VLN). In the standard inequality decomposition, the workforce is divided into  $n$  groups defined by their characteristics. The VLN of male weekly wages in 1989 can be expressed as

$$VLN(y_{i89}) = \sum_{g=1}^n s_{g89} (\bar{w}_{g89} - \bar{w}_{89})^2 + \sum_{g=1}^n s_{g89} VLN(y_{i \in g89}) \quad (5)$$

where  $s_g$  is the share of the workforce in group  $g$ ,  $y$  is weekly wages, and  $w$  is the natural logarithm of weekly wages. The first term is the weighted sum of squared deviations of group means from the overall mean. This term is referred to as inequality “between” groups. The second term is the weighted sum of inequality in each group. This term is referred to as inequality “within” groups.

The most important advantage of the wage equation methodology used in this study is that it allows us to simulate the entire distribution of wages and thereby construct any measure of inequality, whereas Eq. (5) is limited to the VLN. Another advantage of the wage equation methodology used in this study is that by assuming that the regressor effects are linear and additive, we can estimate the effect of changes in a single price effect, leaving the distributions of regressors and other price effects unchanged. The VLN decomposition approach requires that all regressors be interacted. When regressors are interacted, the price effects measure the combined effects of several regressors. A final advantage of the wage equation approach is that the parametric assumptions simplify the model from hundreds of groups to 15 price effects.

The wage equation approach measures only the inequality between groups, i.e., only the effect of changes in workforce characteristics on wage differentials between groups defined by X. In theory, changes in characteristics X could affect within-group inequality. For example, if within the group of more-educated men there tends to be higher wage variance compared to the wage variance within the group of less-educated men, then increasing education levels will increase within-group inequality. In the wage equation approach, this within-group increase that is due to changes in X is assigned to the residual category. In practice, within-group wage inequality does not vary substantially across groups defined by X in the United States. That is, the relationship between observable workforce characteristics and the variance of the residual is weak.<sup>4</sup> In the data for this report, regressing the square of the estimated residual on X leads to R-squared values of less than 0.0002 with no statistically significant coefficients. In other words, ignoring the effect of changes in X on within-group inequality does not have a substantial effect on the results presented in this study.

The wage equation methodology used in this report is similar to that of Juhn, Murphy, and Pierce (1993). Their approach also ignores the effect of changes in the distribution of X on within-group inequality. We make three modifications to their method. First, they do not create independent residual percentiles. For the estimates in this study, failing to adjust for the relationship between X and  $\theta$  can lead to severe overestimation of the effect of changes in X on inequality growth using the 75/25 ratio.

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<sup>4</sup>When the variance of the residual depends on the regressors, OLS estimates of the price effects are unbiased but standard error estimates are incorrect. This is known as “heteroskedasticity.”

They also did not attempt to separate the effect of changes in single price effects (e.g., returns to education). Jones (1983) shows that for decomposing the mean of wages, the calculation of a single price effect is sensitive to the arbitrary intercept term. For example, with categorical education variables, the effect of changes in the returns to education on the mean of male weekly wages will be different if the returns are measured relative to a high school diploma or relative to a college degree. This problem does not occur in decomposing scale-free inequality measures, because the arbitrary intercept term is additive and does not affect inequality.

Finally, we use clear, intuitive counterfactuals to evaluate the role of changes in prices and characteristics. The effect of changes in returns to education is evaluated by asking the question, What would inequality be in the absence of a change in returns to education? The estimates of partial effects sum to the observed actual growth because the estimates are based on sequential counterfactuals. For example, the effect of changes in regressors is determined by comparing the effect of changes in prices and regressors to the effect of changes in prices alone. The order of the sequence does affect the magnitude of the results but does not change the main conclusions reached in this study. The results in this study are based on a different sequence than that of Juhn, Murphy, and Pierce (1993). Choice of sequence is subjective. In this study, rising returns to skill were investigated first because of their greater importance in explaining growth in inequality in California.

## Estimating the Effect of Industrial Structure (Chapters 5 and 6)

Our estimate of the effect of changes in industrial structure includes only changes not explained by changing returns to education and experience, changes in the effect of race and ethnicity, or changes in characteristics of the workforce. In essence, we are asking, Can changes in industrial structure explain the remaining growth in inequality after accounting for changes in workforce characteristics and prices?

To estimate the effect of changes in industrial structure after accounting for the effect of changes in characteristics ( $X$ ) and changes in prices ( $\beta$ ), we estimate the effect of industrial structure on the distribution of residuals. We reweight the micro-data in 1989 to represent the industrial makeup observed in 1969.<sup>5</sup> For each industry  $j$ , we calculate the number of workers in 1989 by summing the Census Bureau weights

$$n_{j89} = \sum_{i \in j} \omega_{i89} \quad (6)$$

where  $\omega_i$  is the Census Bureau weight for individual  $i$ . We use an analogous calculation for 1969. We calculate a new 1989 weight for each individual in industry  $j$  by multiplying the individual Census Bureau weight by the ratio of the total workforce in industry  $j$  in 1969 to the total in  $j$  in 1989.

$$\omega_{ij89}^{CF} = (n_{j69} / n_{j89}) \omega_{ij89} \quad (7)$$

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<sup>5</sup>For 1969 and 1989, when we have Census data, we use 47 industries. For 1967 and 1997, when we have only the Current Population Survey data, we use 14 industries. See Reed and Dardia (1999) for further discussion.

Under these new weights, the total number of workers in each industry will be the same as in 1969. Using these new weights, we can construct the counterfactual distribution of the residual in 1989,  $F_{89}^{CF}$ , if the distribution of industries had not changed since 1969, all else equal.

Using the counterfactual distribution of residuals, we construct the counterfactual distribution of ln-wages:

$$w_{i89}^{CF} = X_{i69}\beta_{69} + (F_{89}^{CF})^{-1}(\theta_i) \quad (8)$$

We compare this counterfactual distribution to the distribution described by Eq. (4) to determine the effect of changes in industrial structure.

Estimates of the effect of industrial structure reported in this study allow for only a limited role. Changes in industrial structure could also have contributed to the rising returns to education and experience. For example, growth in high-tech industries might have increased the demand for college-educated workers relative to workers with less education and thus contributed to the rising relative wages of college-educated workers. Changes in industrial structure may also have contributed to changes in the characteristics of the workforce. Growth in high-tech industries, for example, may have encouraged Californians to receive more education and may have encouraged interstate migration of college graduates into California.

In our analysis, any industrial change that brings about a change in characteristics  $X$  or prices  $\beta$  will be assigned directly to those factors as described in the previous section. We chose this method of attribution to focus attention on education—a California policy. Our estimates reflect the total effect of changes in returns to education and experience wherever they may come from.



For alternative measures of the effect of industrial change on growing wage inequality in California, see Reed and Dardia (1999). In our companion study, we find that even in a less-restrictive context, industrial change does not explain a substantial portion of the rise in male wage inequality. Our results are consistent with research at the national level that also finds only a small role for changes in industrial structure.

### **Assessing Inequality Under the Counterfactual Scenarios for Immigration (Chapters 4 and 6)**

The main analysis on the effect of immigration relies on the assumption that immigration changes the composition of the workforce but does not affect the wages of natives. The assumption is relaxed only at the end of Chapter 4. We pose three scenarios for the composition of the workforce in California in the absence of immigration. In this section, we describe the methodology for simulating the level of male wage inequality under the three scenarios.

Under the first scenario, we simply remove immigrants from the data sample and calculate inequality among natives. Under the second scenario, we match the distribution of education and age among natives in California to the distribution for natives in the rest of the nation. Under the third scenario, we use the 1969 California native workforce as a base and adjust workforce characteristics to match the changes experienced for natives in the rest of the nation.

The wage equation approach described above could be used to simulate the level of male wage inequality under the second scenario. The counterfactual distribution of ln-wages can be found by replacing the X matrix for California in Eq. (1) with the X matrix for the rest of

the nation. However, the wage equation approach cannot be used for the third scenario, because the counterfactual X matrix does not exist.

We simulate inequality under the third scenario using a method adapted from Ryscavage, Green, and Welniak (1992). After immigrants are removed, the data are divided into 29 groups using five education categories (less than high school diploma, high school diploma, some college, college bachelor's, or beyond bachelor's) and six age categories (less than 25, 25–29, 30–34, 35–39, 40–44, or 45 and over). For the less than age 25 group, the highest two education categories are combined. For each group  $g$  we construct the following ratio:

$$\frac{CA_{g69} * \{US_{g89} / US_{g69}\}}{CA_{g89}} \quad (9)$$

where  $CA_{g69}$  is total number of workers (the sum of individual weights) in group  $g$  in the state in 1969 and the other terms are analogous. In the 1989 sample of natives, we multiply the Census Bureau weight for each individual by the ratio for his group. Using this ratio to adjust weights, the counterfactual workforce in California in 1989 exhibits the same percentage change since 1969 as observed in the rest of the nation for every education-age group. We then calculate the level of inequality in the sample using the adjusted weights.

For consistency, we simulate inequality under the second scenario using an analogous workforce ratio method to adjust the California native workforce to match the characteristics of the national native workforce. When we use the wage equation method for the second scenario, the results are not substantially different from those reported in the text. We also use the workforce ratio method to simulate inequality if the education distribution of the immigrant workforce were to match

the education distribution of the native workforce within age groups (in Chapter 4, “Education and the Effect of Immigration on Male Wages”).

Near the end of Chapter 4, we relax the assumption that immigration does not affect the wages of natives. We measure the effect of immigration on native wages under the assumption that in the absence of immigration, natives in California would have the same returns to education as natives in the nation as a whole. We simulate this counterfactual distribution of native wages using Eq. (2). We then apply the Borjas et al. (1997) national estimate that immigration has caused a 5 percent decline in the wages of natives with less than a high school diploma (i.e., we divide the simulated wages of natives with less than a high school diploma by 0.95). Using the resulting distribution of native wages, we evaluate inequality under the three scenarios for the effect of immigration on the composition of the population.

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