FRBSF ECONOMIC LETTER

Changes in Income Inequality across the U.S.

Over the past four decades, overall income inequality has increased in the U.S. One particlarly striking feature of the data is that the income gap has widened most between the top and the middle of the distribution, while it has remained relatively stable between the middle and the bottom. The causal forces behind the increase in inequality have been a topic of much debate among the public, the media, and policymakers (see, for example, Yellen 2006), as well as a rich field of research for economists.

Underlying these inequality trends are considerable differences across regions. Relating these differences to regional characteristics could help identify the sources of national growth in inequality; yet, surprisingly little research has done so. One exception, though now somewhat dated, is Topel (1994), who looked at the nine major regions of the U.S. and explored how the cross-regional variation in the demand for and supply of skilled labor, immigration, female labor force participation, and technical change can explain the regional variation in the growth of income inequality.

In this *Economic Letter*, we follow in that spirit, examining income trends at the county level between 1990 and 2000. Basing our analysis on leading theories of the growing gap between the top and middle of the distribution as well as the stable gap between the middle and the bottom, we explore whether county differences in skill levels, immigration levels, and vulnerability to offshoring—that is, relocating domestic operations overseas—appear to be associated with these trends. Our results do lend tentative support to these theories.

National trends in income inequality

Figure 1 shows the national trends in inequality in the top and bottom halves of the distribution from 1967 to 2005, according to U.S. Census Bureau data on household income. Household income is primarily wages and salaries, but it also includes income from self employment, interest, dividends, rentals, retirement, and certain govern-

Figure 1
Income interpercentile ratios, 1967–2005
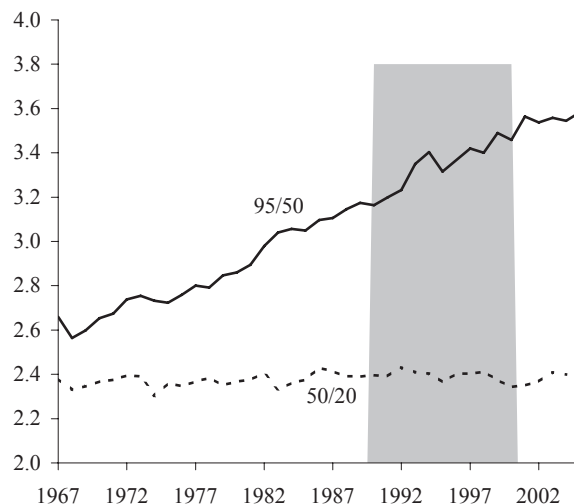
Source: U.S. Census Bureau. Gray bar indicates the decade for which we have county-level data.

ment transfers. Top-half inequality refers to the 95/50 interpercentile ratio (that is, the ratio of the 95th percentile to the 50th percentile of the income distribution) and bottom-half inequality refers to the 50/20 interpercentile ratio. We chose these ratios (as opposed to, say, 90/10 and 50/10) since these data are available at the county level, which is our unit of analysis. As the figure illustrates, while bottom-half inequality has remained relatively stable over the last 40 years, top-half inequality has followed a fairly steady upward trend. Specifically, in 1967, the 95th percentile of household income was 2.6 times higher than the 50th percentile, and by 2005, it was 3.6 times higher.

Potential factors in the evolution of recent inequality trends

Economists have pointed to three particularly important drivers of the recent trends in income inequality: offshoring and immigration, both of which are related to globalization trends, and technological advances that favor skilled workers (often referred to as "skill-biased technological change" or SBTC). Offshoring could help explain the stagnation of wages at the middle of the in-

come distribution, while immigration could push down wages at the bottom. SBTC could help account for the surge in income at the top of the distribution.

Offshoring refers to the shift in the production of goods and services from the U.S. to other countries. Recently, the sector most affected by offshoring has been manufacturing. Since the manufacturing sector traditionally has been a major employer of middle-income workers, the growth in offshoring may explain the reduced demand for such workers in U.S. labor markets and the consequent depressing effect on their wages. Thus, offshoring may account for the widening of the 95/50 gap and the narrowing of the 50/20 gap, all else equal.

Though immigration is integrally linked to globalization trends, in that it represents global mobility of labor rather than of capital and final goods, it is nevertheless distinct from offshoring because it disproportionately brings low-skill workers into the U.S. instead of moving jobs abroad. As immigration increases the relative supply of low-skill workers, the income of individuals at the 20th percentile declines, and the 50/20 ratio increases, all else equal. Thus, immigration has been viewed by some as contributing to the growth in overall income inequality and as being a countervailing force offsetting factors that are working to compress the bottom half of the income distribution (such as SBTC and globalization). The immigration hypothesis offers no clear prediction regarding top-half inequality.

Autor, Katz, and Kearney (2006) propose the SBTC hypothesis to explain the trend in both the 95/50 and 50/20 ratios. This hypothesis starts with the premise that information technology (IT) goods are particularly useful for doing the sorts of routine tasks that were traditionally performed by middle-income (medium-skill) occupations, such as bookkeeping or assembly-line work. At the same time, IT tends to complement the productivity of abstract-task (high-skill) workers, such as financial advisors. Thus, the decline in the price of IT goods has led employers to use IT capital instead of medium-skill workers, while it has increased demand for high-skill workers; it has had relatively little effect, however, on the demand for low-skill workers, such as truck drivers or janitors. The shift in relative skill demands, in turn, causes increased polarization of wages; that is, all things equal, it tends to widen the 95/50 gap and narrow the 50/20 gap.

Some suggestive evidence

We explore the potential of each of these three factors to explain the differential trends in top-half and bottom-half income inequality using data for the roughly 3,000 counties in the contiguous U.S. We focus on household income percentiles for 1989 and 1999 from the U.S. Census Bureau (based on the 1990 and 2000 Decennial Censuses; data for others years were not available). The geographic variation in inequality growth can be crucial to separately identifying the factors associated with the growth in top-half inequality and the relative stagnation in bottom-half inequality. We find that the growth of inequality varied widely among these counties. For the top half of the income distribution, the percentage change in income inequality between 1989 and 1999 ranged from –50% to 79%, with a mean of 2.7%; for the bottom half, changes ranged from –37% to 44%, with a mean of –3.0%.

We conducted a simple, multivariate regression analysis to assess the contribution of each factor to the change between 1989 and 1999 in the top and bottom halves. For offshoring, we look at the association between inequality growth and manufacturing's share of county employment in the initial year (1989), which may indicate a county's initial "vulnerability" to offshoring. For immigration, we use a county's initial (1989) noncitizens' share of the 18-and-over population as an indicator of its "openness" or "susceptibility" to subsequent immigration, both legal and illegal, since previous research has shown that immigrants tend to settle in areas with high proportions of legal (and overall) immigrants. (Using the foreign-born population share gives nearly identical results.) For SBTC, the effect on widening the gap in the top half while narrowing it in the bottom half should be more pronounced in counties where high-skill labor is relatively more important. It has been shown that a reasonably good predictor of a local area's SBTC is its initial (1989) education level, taken as the share of the county's population with college education (see Doms and Lewis 2005).

Figure 2 displays our estimates for each factor. The numbers are coefficients, which represent the contribution (in percentage points) to the 1989–1999 growth rate of the 95/50 (or the 50/20) ratio associated with a 1 percentage point increase in a factor. Beginning with the SBTC explanation, we find that a county with a 1 percentage point higher college share than average (specifically, 16% instead of 15%) in 1989 would be expected to have seen

Figure 2
Cross-county correlations of 1990-2000 inequality growth and 1990 characteristics
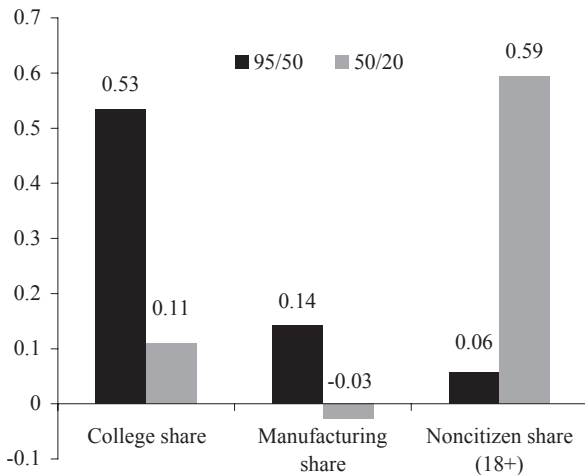
a 0.53 percentage point higher increase in its 95/50 ratio over the subsequent decade (that is, instead of the average increase of 2.7%, top-half inequality would grow by 3.2%). For the bottom half of the distribution, the average county's ratio experienced a decline of −3.0% from 1989–1999, so the 0.11 coefficient can be interpreted as saying that, compared to the average county, a county with a 1 percentage point higher college share in 1989 would be expected to have experienced a 0.11 percentage point slower decline in the 50/20 ratio over the subsequent decade (that is, a decline of −2.89% instead of −3.0%).

Our results then show that, consistent with the SBTC hypothesis, education share has a large positive and statistically significant association with top-half inequality. However, the coefficient on the 50/20 ratio contradicts the SBTC prediction, as it also is positive and significant, even though much smaller. The reason could be that, while the college share of the population is a good proxy for the type of computerization that complements high-skill labor, it may not be a good proxy for the type of computerization that substitutes for medium-skill workers.

Turning to the role of offshoring, our results are consistent with the hypothesis that offshoring pushed down the wages of middle-income workers (who tend to be disproportionately employed in manufacturing). We find that the initial manufacturing share is positively associated with the

change in the 95/50 ratio and negatively associated with the change in the 50/20 ratio (both are statistically significant).

For immigration, we find that the 1989 noncitizen share has a positive association with bottom–half inequality changes over the subsequent decade; the association for upper half inequality is not statistically significant. These results are consistent with the immigration hypothesis, which predicts that the income of those at the lower end of the income distribution will be pushed down, increasing bottom–half inequality while offering no predictions for top–half inequality.

Conclusion

This analysis of the 1990s suggests that offshoring, immigration, and SBTC all likely played important roles in the divergent trends of top–half and bottom–half income inequality in the U.S. over the past four decades. However, the statistical associations we have uncovered are not necessarily causal, and there are other possible factors we did not explore, such as the increase in the female labor force participation rate and the increase in capital income, including dividends, capital gains, and interest income, relative to labor income. Nonetheless, this preliminary analysis suggests that further research exploring the geographic patterns in the evolution of top–half and bottom–half inequality could be fruitful in identifying the separate contributions of each of these factors.

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