

The Evolution of Economic Inequality in the United States, 1969-2007

Evidence from Data on Inter-industrial Earnings and Inter-regional Incomes

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Popular writing on U.S. income inequality emphasizes the outsized gap between chief executive officer compensation and average-worker pay -- a stark ratio that tends to overlook the fact that there are only five hundred Fortune 500 CEOs at any given time.<sup>1</sup> Meanwhile the professional literature is absorbed with assessing the empirical importance of theoretical constructs like the demand for skill and the supply of education (Goldin and Katz, 2008) -- concepts which apply, if at all, to the distribution of *wage rates* rather than of incomes or even earnings, even though the data normally used to assess them invariably relate to income or to earnings (per person) and not even to the closest analogue in the available data, which is pay per job.

Neither approach provides detailed information on patterns of gain and loss, whether by industry or geography. But such information is, we believe, essential to an understanding of the *political economy* of inequality in America. This paper reports on an effort to fill the information gap, by examining measures of inter-industrial pay inequality and of between-area income inequality. Our approach captures major features of the rise in American economic inequality, and it distinguishes clearly and in fine detail the winners and losers in specific periods. These measures thus open up new ways to investigate the determinants of change in the economy, and particularly the influence of changing power relationships and public policies on distribution.

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<sup>1</sup> The movement in this ratio is also an unreliable gauge of social trends. It was 525 to 1 in 2000 before plunging to 281 to 1 in 2002 (United for a Fair Economy 2007). No socialist revolution had occurred; the decline merely reflected the impact of the information technology bust on the earnings of people like Bill Gates.

## **Between-Industry Earnings Inequality in the United States**

The famous Kuznets (1955) inverted-U hypothesis is based on inter-sectoral transitions in the process of economic development: Kuznets postulated that industrialization first increases inequality because factories pay more than farms, but that inequality later declines as the weight of agriculture in the employment mix drops. Thus in Kuznets' simple model there are two sources of inequality: the difference in average wages between farms and factories, and the distribution of the population across these sectors. A reduction of either sector or a diminution of the differential will decrease the inequality measured between sectors.<sup>2</sup>

The modern U.S. economy is more complex, but we can measure between-industry earnings inequality using the same principles. Overall inequality between sectors depends on the differentials between average wages and their comparative size. Further, as the work of Conceição, Galbraith and Bradford (2001) shows, classification schemes that break the economy into a relatively small number of sectors often capture the major dimensions of pay variability. Sectors are a particularly sensitive fault line (the relative fortunes of sectors capture many important economic changes) but a detailed category scheme of any type furnishes an instrument for measuring the changing shape of a distribution. With sector-level data, pay inequalities among individuals *within* particular industries are not captured, and while these inequalities are wide, they tend (partly for institutional reasons, such as the stability of intra-firm pay hierarchies) to vary less than inequalities between sectors.

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<sup>2</sup> Kuznets was not interested in inequalities stemming from non-labor sources of income, such as capital gains, and deliberately excluded them from the analysis to avoid undue complications.

## *Method and Measurement*

The Bureau of Economic Analysis (BEA) publishes annual earnings and employment data for industrial sectors the nation as the whole and for individual states. Earnings are defined as “the sum of Wage and Salary Disbursements, supplements to wages and salaries and proprietors' income” and derive from a virtual census of employers' tax records. (BEA 2008). As such, there is almost complete coverage of the (formal) working population with minimal reporting error.

From 1969 until 2000, data were organized according to the Standard Industrial Classification (SIC) coding system. Beginning in 2001, the BEA dropped the SIC schema in favor of the North American Industry Classification System (NAICS). To ease comparisons between the two taxonomies, the BEA released recoded data for the 1990 to 2000 period using the NAICS categories. Thus, there are two annual datasets with a decade of overlap, one from 1969 to 2000 and the other from 1990 to 2007.

Many of the standard inequality metrics can be used to describe the distribution of pay; we focus on Theil's T in our calculations. Given the wage bills and employment levels for a mutually exclusive and completely exhaustive set of industries, Theil's T is:

$$T'_{Sectors} = \sum_{i=1}^m \frac{P_i}{P} * \frac{y_i}{\mu} * \ln\left(\frac{y_i}{\mu}\right)$$

where  $p_i$  is the number of jobs in sector  $i$ ,  $P$  is the total number of jobs in the United States,  $y_i$  is the average pay in sector  $i$ , and  $\mu$  is the average pay for all jobs. We refer to the terms within the summation sign, one for each category, as “Theil elements.” As with Kuznets' hypothesis, inter-sectoral wage inequality is a function of the relative size of the sectors and of their relative wages.

In addition to measuring inequality between sectors, Theil's T Statistic allows us to identify winners and losers and those sectors most responsible for changing inequality. By examining the Theil elements, we can isolate the contribution of each sector to total inequality between sectors. The Theil element will be positive or negative, depending on whether the sector's average earnings are greater or less than the national average, with the contribution weighted by sector size.<sup>3</sup>

An attractive property of Theil's T is decomposability. Given two or more groups, total inequality is made up of two components, a between-group component ( $T'_g$ ) and a within-groups component ( $T^w_g$ ), each of them always positive, and the latter a weighted sum of the inequalities measured inside each group.

$$T = T'_g + T^w_g$$

As a moment's reflection will confirm, expanding the number of groups transfers inequality from the within-groups component to the between-groups component, so that T becomes a closer approximation of total inequality as the group structure becomes more fine. However, if we are correct in thinking that between-sector movements dominate the evolution of inequality, it should not be necessary to disaggregate too much, before the major movements in the structure of incomes over time become clear. And in practice, Theil's T measured this way is an exceptionally simple, inexpensive, and robust way to calculate and track the movement of economic inequalities through time.

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<sup>3</sup> By construction, the sum of the positive elements must be greater than the sum of the negative elements.

## *The Evolution of Between-Sector Earnings Inequality*

Income inequality in the United States has been rising for several decades. Earnings inequality measured between sectors follows a similar general pattern. Figure 1 displays *earnings* inequality calculated with a SIC basis from 1969 to 2000 and a NAICS basis from 1990 to 2007 (authors' calculations from BEA data) and Census Bureau measures of household *income* inequality over the same period (DeNavas-Walt et al. 2008). The earnings inequality measures are based on a relatively fine disaggregation of sectors-within-states -- that is oil drilling in Texas compared to farming in Utah compared to retail in Rhode Island compared to all the other combinations of states and sectors.

<Insert Figure 1 about here><sup>4</sup>

Earnings inequality rose substantially over the last four decades, but the rate of change varied over this period. From 1969 to 1982, the between state-sector measure of Theil's T increased 61%, but then earnings inequality remained flat until 1994 – a pattern previously identified by Galbraith (1998). A run-up from 1995 to 2007 was only interrupted by a pause from 2000 to 2003. The shift in coding regimes from SIC to NAICS has little effect on the pay inequality metric. Over the eleven data points where both coding schemes are available, the two series move in lock step. The correlation coefficient of the two series across the overlapping years of 1990 to 2000 is .98, and the year-over-year changes have a correlation of .88.

The richness of the BEA data allows us to explore pay inequality through a myriad of lenses – broader or narrower sectors at the state or national level. The Appendix lists the available NAICS-based sectors.

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<sup>4</sup> A change in top-coding values and survey methodology accounts for the break in the Gini series between 1992 and 1993.

Figure 2 displays Lorenz Curves for 4 different group structures in 2007: 51 states (irrespective of sector), 21 broad national sectors, 93 narrow national sectors, and 4389 narrow state sectors.<sup>5</sup>

<Insert Figure 2 about here>

Each of these Lorenz curves has an associated Gini coefficient – 51 States: 0.089; 21 U.S. Sectors: 0.259; 93 U.S Sectors: 0.301; 4389 State Sectors: 0.320. The graphs and Gini coefficients reveal two key facts: 1) In the United States, sector matters more than geography – there is greater variance in pay between industries than between states; and 2) Adding sector detail provides little additional information – the set of 21 broad national sectors captures the bulk of between-state-sector pay differences.

Figure 3 displays the evolution of pay inequality from 1990 to 2007 using the same 4 category structures.

<Insert Figure 3 about here>

The measures move together over time. Yet each between-sector metric is useful in its own way. The 21 sector nation-level measure is easier to visualize, while the measures that use a larger number of sectors identify the narrow groups most responsible for inequality changes.

Figure 4 breaks down the annual measures of pay inequality among the 21 broad national sectors into their constituent Theil Elements. The black line tracks the level of Theil's T, while the stacked portions of the bar graphs show the individual sector components. The legend is organized such that all of the sectors that are above the horizontal axis in 2007 – those with above average earnings – are in the upper box, starting with the sector that contributed “most” to

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<sup>5</sup> We variously treat Washington D.C. as a state- and a county-equivalent depending on the context.

inequality: manufacturing. Likewise the lower box lists all the sectors that contributed to inequality from below in 2007, beginning with the largest contributor to inequality having below average earnings: retail trade.

<Insert Figure 4 here>

Two trends that emerge clearly from Figure 4 are the waning and waxing of the public sector since 1990 and the rising importance of finance and insurance, especially from 1990 until 2001. It is notable that the Clinton years were not banner ones for government and government enterprises; this sector fared markedly better under George W. Bush.

Taken as a whole, the period from 1990 to 2007 was one of rising earnings inequality. As Kuznets taught, the source of this increase could be either (or both) changes in relative wages or changes in sector employment shares. Figure 5 shows the relative average wages and employment levels of the 21 sectors in 1990 and 2007. The sectors are ordered according to relative average income in 2007.

<Insert Figure 5 here>

The largest contributors to inequality from above during this period were professional and technical services and finance and insurance. Finance and insurance saw a slight decline in jobs over this period, but still contributed to rising inequality with strong growth in relative earnings. Professional and technical services, spurred by the IT revolution, gained employment share and experienced a small increase in relative earnings. Administrative and waste services and real estate rental and leasing, which both boasted significant employment gains, added the most to inequality from below. Relative average earnings in real estate actually improved, but not enough to offset the flood of new jobs into what remains a low-paid sector.



### *Winners and Losers during the IT and Beltway Booms*

Our cursory analysis of only 21 national sectors reveals that the contours of pay inequality depend on rising and falling fortunes in specific industries. When we expand the number of sectors subject to analysis, we find that only a handful of subsectors with a small minority of the nation's workforce account for the most significant changes in pay inequality.

Common sense can guide the search for high-leverage sectors. The emergence of personal computing and information technology as major forces in the mid- to late 1990's and the housing boom of the early 2000's were hallmark economic phenomena of the last two decades. From 1996 to 2000, nominal earnings per job in computer and electronic manufacturing rose from \$57,268 to \$83,848. Likewise, from 2001 to 2006, earnings per job for construction of buildings grew robustly from \$53,140 to \$66,112, and the sector added more than 300,000 jobs. Indeed, computer manufacturing and construction were two significant contributors to the increase in earnings inequality during these episodes. However, many other sectors saw comparably wide swings in their fortunes.

Pay increases in sectors listed in Table 1, which contained only 3.8% of all workers in 2001, account for the entire rise in pay inequality during the IT boom.

<Insert Table 1 about here>

These boom sectors experienced a 58% climb in nominal average earnings in this five year period while all other sectors gained 22%. The employment growth rate in the high flyers was roughly half that for the rest of the economy. The separation of the boom sectors from the rest of the economy explains *all* of the increase in between sector inequality from 1991 to 2001. This is evident in Figure 6, which parses Theil's T for between-sector earnings inequality into three

components: inequality among the IT boom sectors, inequality among the sectors in the rest of the economy, and inequality between the high-growth sectors and the rest of the economy writ large from 1991 to 2001.

<Insert Figure 6 about here>

Inequality between the 12 sectors in Table 1 was essentially unchanged from 1991 to 2001.

Inequality between the other 82 national sectors actually declined slightly. But inequality between the haves and have-nots rose significantly, accounting for the 17.2% increase in between-sector earnings inequality during this period.

The growth in between-sector pay inequality since 2003 reflects wage gains in a wider array of sectors that contain a higher percentage of employment, but the pattern is similar. Table 2 shows average wages in fifteen high-growth sectors in 2003 to 2007.

<Insert Table 2 about here>

These sectors accounted for 7.4% of total jobs in 2007. From 2003 to 2007, average earnings in these “Bush boom” sectors increased 32%, while earnings in the rest of the economy averaged 13%, barely keeping pace with inflation. Yet the rate of job growth in the high-flyers was half of that for the other sectors over this period. After experiencing brief stagnation in earnings growth during the IT bust, computer and electronic product manufacturing and securities, commodity contracts, and investing experienced strong rebounds in earnings from 2002 to 2007. However, neither of these sectors regained the employment levels of 2000. To the contrary: computer and electronic product manufacturing shed 29% of its workforce from 2000 to 2007.

Figure 7 shows the contributions of inequality among the Bush boom sectors, inequality among all other sectors, and inequality between the high growth sectors and lower-growth sectors from 2000 to 2007.

<Insert Figure 7 about here>

Unlike the IT boom, during which inequality within the high growth and low growth sectors, was relatively stable, the Bush boom saw rising inequality *among* the sectors in Table 2, *among* the sectors in the rest of the economy, and *between* those sectors that surged ahead and those that stayed behind. Nonetheless, in this period, as before, the disparity between the haves and have-nots explains the majority of the total increase in between-sector earnings inequality.

By coincidence or design, sector performance seems to have a political dimension.

Technologists and financiers were key supporters of President Clinton, and these sectors thrived under his leadership. Under President Bush, workers in extraction industries, the military, and, ironically, government have done quite well, which may well reflect the administration's policies of deregulation and empire building, as well as the commodities boom. The oil business was consistently lucrative during the Bush years.

The lagging sectors are also informative. Declining fortunes in the domestic auto industry in recent years mitigate the impact on total inequality of expansion and earnings gains in other sectors. The motor vehicles, bodies and trailers, and parts manufacturing sector, which consistently pays wages well above the national average, lost jobs and saw stagnant earnings from 2002 to 2007; thus inequality *declined* on that account. This is of course not good news, and sounds a caution against regarding any inequality statistic as per se indicative of social welfare.

### *Education as an Inequality Remedy?*

Public rhetoric on inequality focuses strongly on the supply side of the labor market. According to Treasury Secretary Henry Paulson (2006), the correct response to rising inequality is to “focus on helping people of all ages pursue first-rate education and retraining opportunities, so they can acquire the skills needed to advance in a competitive worldwide environment.” This is of course a standard view, with powerful support among professional economists. But our analysis raises immediate questions; by itself the simple inter-sector dynamics indicate that education is not a complete solution.

The reason is obvious: the last fifteen years have seen significantly *slower* job growth in high-earnings-growth sectors than in the economy at large. So even if large numbers of young people “acquire the skills needed to advance” there is no evidence that the economy will provide them with suitable employment. Moreover, investments in education presuppose that we know, in advance, what education should be for. Years of education in different fields are not perfect substitutes for each other, and it does little good to train for jobs that, in the short space of four or five years, may (and do) fall out of fashion. Recent experience clearly indicates that we do not know, in advance, what to train for. Rather, education and training have become a kind of lottery, whose winners and losers are determined, *ex post*, by the behavior of the economy.

Thus, students who studied information technology in the mid 1990’s were lucky; those completing similar degrees in 2000 faced unemployment. Likewise, who predicted that the *public sector* would fare so well, relatively speaking, under President Bush? And how long will the bureaucratic boom of these recent Republican years last?

## **The Changing Geography of American Income Inequality**

As demonstrated above, variation in earnings across 21 sectors far surpasses variation in earnings across the 51 states. But there is substantive variation in the geographic dispersion of earnings and incomes. At the state level, per capita income ranged from \$27,028 in Mississippi to \$57,746 in Washington D.C. in 2006; counties spanned \$9,140 per person in Loup, Nebraska to \$110,292 in New York, New York. In this section we explore these geographical differences.

### *Method and Measurement*

The BEA definition of income includes wages and salaries, but also incorporates rent, interest and dividends, government transfer payments, and other sources.<sup>6</sup> As such, income provides a broader picture of economic well being than earnings. The ideal dataset for studying income inequality would include regular measurements of income for all individuals or households along with geographical and demographic identifiers. Such data exists in the form of income tax returns, but researchers do not have access to individual records.

The BEA produces income and population estimates for each county in the United States annually.<sup>7</sup> These data are provided through Local Area Personal Income Statistics in the

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<sup>6</sup> “Personal Income is the income that is received by all persons from all sources. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income with inventory valuation and capital consumption adjustments, rental income of persons with capital consumption adjustment, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. The personal income of an area is the income that is received by, or on behalf of, all the individuals who live in the area; therefore, the estimates of personal income are presented by the place of residence of the income recipients” (BEA 2008).

<sup>7</sup> Source data for BEA income estimates come from a host of government sources, including: “The state unemployment insurance programs of the Bureau of Labor Statistics, U.S. Department of Labor; the social insurance programs of the Centers for Medicare and Medicaid Services (CMS, formerly the Health Care Financing Administration), U.S. Department of Health and Human Services, and the Social Security Administration; the Federal income tax program of the Internal Revenue Service, U.S. Department of the Treasury; the veterans benefit programs of the U.S. Department of Veterans Affairs; and the military payroll systems of the U.S. Department of Defense” (BEA 2008).

Regional Economics Accounts (BEA 2008). Given this annual series, we calculate Theil's T for between-county income inequality.<sup>8</sup>

Our logic should now be familiar. Changes in between-county income inequality have two components – changes in relative population and changes in relative incomes. Inequality declines when poor counties add income faster than rich counties or middle income counties add population faster than counties at either tail of the distribution. When rich counties get relatively richer, poor counties get relatively poorer, or middle income counties lose population share, inequality rises.

### *The Evolution of Between-County Income Inequality*

From 1969 to 2006, between-county income inequality in the United States increased, but the path was not smooth. From 1969 to 1976 cross-county inequality declined. A steady rise in inequality occurred until the mid 1980's, and then accelerated through the end of the decade.

1990 to 1994 saw another decline, but another reversal pushed inequality to new heights through 2000. An equally steep decline followed through 2003. Figure 8 plots two series of U.S. income inequality, the Census Bureau between-household measure and our own between-county measure.

<Insert Figure 8 about here>

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<sup>8</sup> “Counties are considered to be the "first-order subdivisions" of each State and statistically equivalent entity, regardless of their local designations (county, parish, borough, etc.). Thus, the following entities are considered to be equivalent to counties for legal and/or statistical purposes: The parishes of Louisiana; the boroughs and census areas of Alaska; the District of Columbia; the independent cities of Maryland, Missouri, Nevada, and Virginia; that part of Yellowstone National Park in Montana; and various entities in the possessions and associated areas” (National Institute of Standards and Technology 2002).

Since the early 1970's, the two series show roughly similar trends, a sharp rise in income inequality during the 1980's and a peak and trough around the IT boom and bust. Between-county inequality shows greater relative variability during this period.

The movements of between-state income inequality and between-county income inequality are closely related. Figure 9 plots the between-state component and sum of the within-state components of county income inequality from 1969 to 2006. The height of the bar represents total between-county inequality, and the white portion represents the between-state component.

<Insert Figure 9 about here>

Despite the close association in the annual movements of the between-state and between-county series, state per-capita incomes converged during the 1969 to 2006 period while county and household incomes grew further apart. The reduction in state income variation occurred as the South became more closely integrated with the nation as a whole over the last 40 years. For example, although still the lowest in the nation, per capita income in Mississippi has grown from 62% of national per capita income in 1969 to 74% of national per capita income in 2006. Alabama, Arkansas, Georgia, South Carolina, North Carolina, and Tennessee made similar gains.

### *The IT-Boom, Bust, and Beyond*

Rising income inequality and the information technology bubble were important features of the United States economy in the 1990s. From January 1994 to February 2000, the tech-heavy NASDAQ Composite index rose from 776.80 to 4,696.69, a 605% increase. Brokers and venture capitalists celebrated the bull market as evidence that the "new economy" would drive American prosperity into the future. Liberals (and not only liberals) lamented the spectacular

risers in executive compensation and of inequality more generally. Few noted that the two phenomena were, in fact, identical. Figure 10 matches the level of between-county income inequality – lagged one year – against the natural logarithm of the NASDAQ Composite. The two series move together seamlessly from 1992 to 2004.

<Insert Figure 10 about here>

As high-tech firms' stock prices shot upwards, their employees (especially top executives) and stockholders reaped the benefits in the form of options realizations and capital gains. If employment and share ownership in the technology sector had been uniformly distributed, this would have had little impact on the between-county measure of inequality. But technological firms are not distributed uniformly; they are concentrated in centers such as San Francisco, California; Seattle, Washington; Raleigh, North Carolina; Austin, Texas; and Boston, Massachusetts. The financiers are concentrated in Manhattan. Income growth in the counties surrounding these areas accounted for the bulk of the inequality increase in the late 1990's, and when the IT bubble burst in 2000, falling relative incomes in these same areas reduced aggregate between-county inequality.

In particular, the same four counties that contributed most to the increase in between-county income inequality from 1994 to 2000 contributed most to the inequality decline from 2000 to 2003 – New York, NY; Santa Clara, CA; San Mateo, CA; and San Francisco, CA.

<Insert Table 3 about here>

The rebound in inequality from 2003 to 2006 was of two pieces. First, many, though not all, of the IT bust counties experienced renewed income growth – New York County most significantly. Second, there was a concentration of increasing income around Washington D.C., in Southern



California, New Orleans, Las Vegas, and Southern Florida, areas central to the housing boom, the expanding government, or both.

Thus rising geographic income inequality from 1994 to 2000 was largely an artifact of the IT bubble. Measures to slow and disperse the bubble as it developed would have been wise; the bust ultimately inflicted large, arbitrary and unnecessary losses on many who were not prepared to shoulder them. Nevertheless, as Robert Shapiro, former Under Secretary for Economic Affairs in the Department of Commerce, writes:

“The American bubble represented an excess of something that in itself has real value for the economy -- information technologies. The bubble began in overinvestment in IT and spread to much of the stock market; but at its core, much of the IT was economically sound and efficient. Further, these dynamics also played a role in the capital spending boom of the 1990s, and much of that capital spending translated into permanently higher productivity. The result is that the American bubble should not do lasting damage to the American economy” (2002).

To this, we note that the full employment achieved in the late 1990s raised living standards very broadly and engendered lasting productivity gains, as well as demonstrating that full employment can be achieved without inflation, something much of the economics profession had not believed possible before that time.

The 2003 to 2006 pattern may be less benign. The region around the national capitol thrived amidst vast growth in spending by the federal government. Much of this spending is related to the growth of military and intelligence activities; though federal civilian spending also grew rapidly as well, and there was undoubtedly also substantial growth in spending by private sector lobbies. The growth in Southern California and other areas was likely related to the construction boom, a phenomenon which was the precursor to the financial crisis.

The ultimate economic consequences should, as with the earlier period, be judged in part by the worth of the activities undertaken. However, it is already clear that this decade has seen no very broad revival of private-sector economic leadership; a main economic beneficiary of government spending was the government itself and those associated with it. Given the broad ideology of the administration, this is, well, ironic.

### **Interpreting Inequality**

Even before the onset of the financial crisis, distributional issues were becoming a bipartisan concern:

“Amid this country's strong economic expansion, many Americans simply aren't feeling the benefits. Many aren't seeing significant increases in their take-home pay. Their increases in wages are being eaten up by high energy prices and rising health-care costs, among others.” – Secretary of the Treasury Henry Paulson; Remarks at Columbia University; August 1, 2006

“I know some of our citizens worry about the fact that our dynamic economy is leaving working people behind. We have an obligation to help ensure that every citizen shares in this country's future. The fact is that income inequality is real; it's been rising for more than 25 years. The reason is clear: We have an economy that increasingly rewards education, and skills because of that education... And the question is whether we respond to the income inequality we see with policies that help lift people up, or tear others down.” – President Bush; State of the Economy Report Address at Federal Hall, New York; Jan. 31, 2007

“Thus, these three principles seem to be broadly accepted in our society: that economic opportunity should be as widely distributed and as equal as possible; that economic outcomes need not be equal but should be linked to the contributions each person makes to the economy; and that people should receive some insurance against the most adverse economic outcomes, especially those arising from events largely outside the person's control.” – Chairman of the Federal Reserve Ben Bernanke, Remarks before the Greater Omaha Chamber of Commerce; February 6, 2007

Perhaps most striking, in an appearance on the Charlie Rose Show on September 20, 2007, former Federal Reserve Chairman Alan Greenspan said flatly, “You cannot have a market capitalist system if there is a significant mood in the population that its rewards are unjustly distributed.” These comments echo the concerns of policy makers and analysts on the political Left, who have long lamented the pernicious consequences of inequality on health, educational attainment, and democratic participation (Neckerman 2004).

We agree that rising inequality *may* reflect higher poverty rates, maldistributed opportunities, and discrimination. When inequality results from higher unemployment and lower working hours at the bottom of the pay scale, the measure of inequality captures a major economic problem. But inequality in earnings and incomes can rise in response to growing employment or innovation, in which case it is necessary to take a different view.

Consider the increasingly close relationship between changes in employment and changes in U.S. between-county income inequality.

<Insert Figure 11 about here>

From 1969 to 1989 the series measuring inequality and jobs-per capita are only loosely linked. Over this period, the levels have a correlation of .47, and year-to-year changes are almost totally uncorrelated. However, since 1990, employment and inequality have moved together. The levels have a correlation of .95 and the year-to-year changes have a correlation of .79. A rising tide may lift all boats, but recent business cycles have been more like waves -- whereby certain sectors and areas ride the peaks before crashing to the shore. This is a sign, surely, not of the social evil of inequality per se, but of the instability of bubble economies, for which we may now pay a fearsome price.

## *Conclusion*

In recent years, economic inequality increased, mainly due to extravagant gains by the already-rich (McCarty, Poole, and Rosenthal 2006). Our analysis shows that this is just as true for average incomes across counties and earnings across industries as it is for individuals. This type of inequality has consequences; it affects the distribution of political power, and increasing incomes at the top of distribution may ratchet up consumption expectations in ways that filter down throughout society and cause behaviors that reduce social welfare (Frank 2007). Still, relative deprivation is not the same as absolute deprivation. Rather, the deeper issue with inequality of this type may be instability: that which rises like a rocket above the plain also, eventually, falls. And the problem with the trick of generating prosperity through inequality is simply that it cannot be continually repeated.

Finally, the onrushing economic downturn will almost certainly lead to larger losses in the absolute earnings, wealth and incomes of the well-off than those the working poor. As such, the slump at hand will almost surely lead to a decrease in measured inequality within the United States, even as it inflicts real pain on American families. *Schadenfreude* aside, this is not good news. Inequality increases may well as a rule be malignant, for one reason or another. But not all trends towards “equity” are benign.

Figure 1. Between State-Sector Earnings Inequality and Household Income Inequality 1969 – 2007

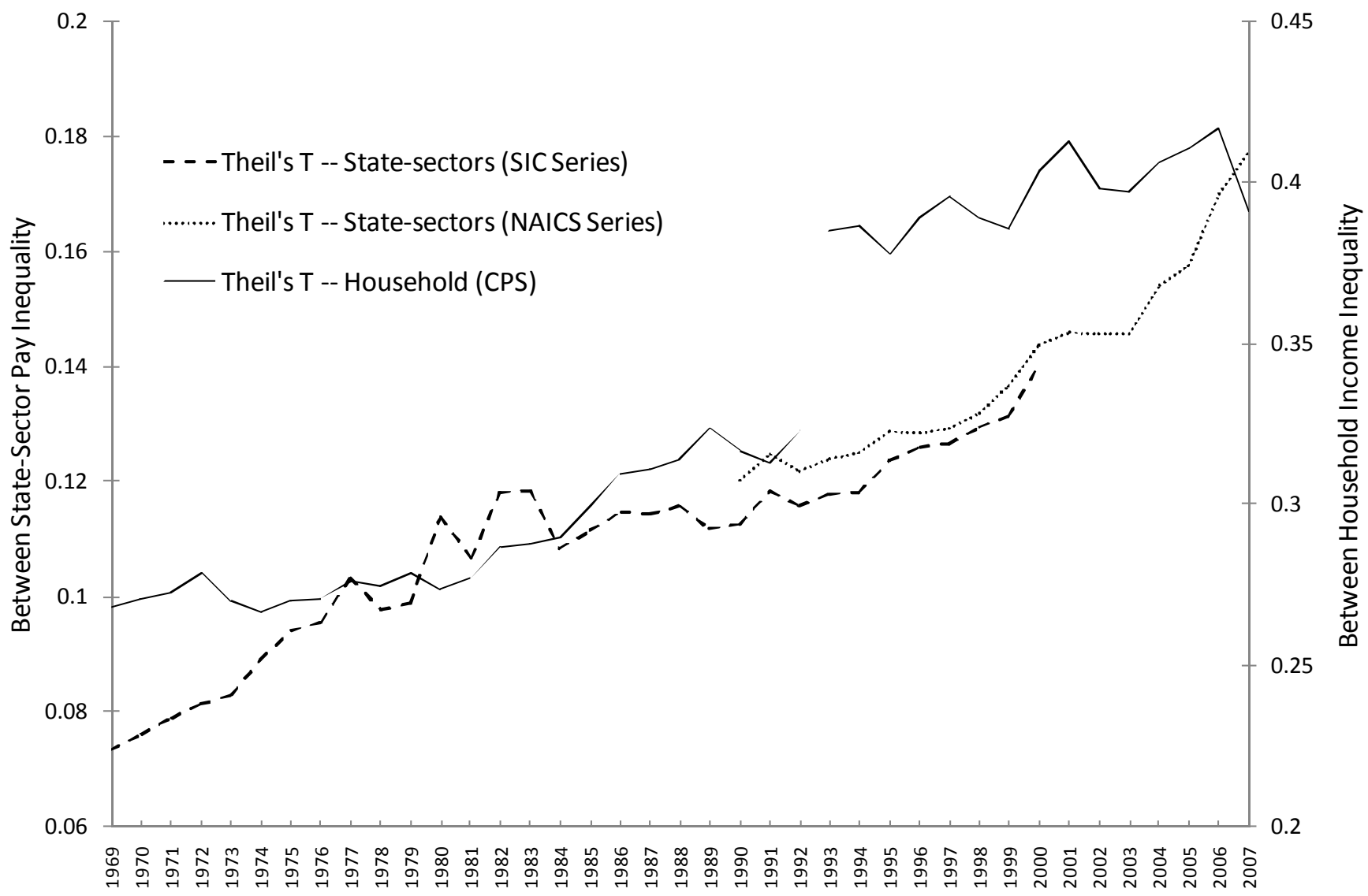


Figure 2. Lorenz Curves for the U.S. Distribution of Pay in 2007 Using Various Group Structures

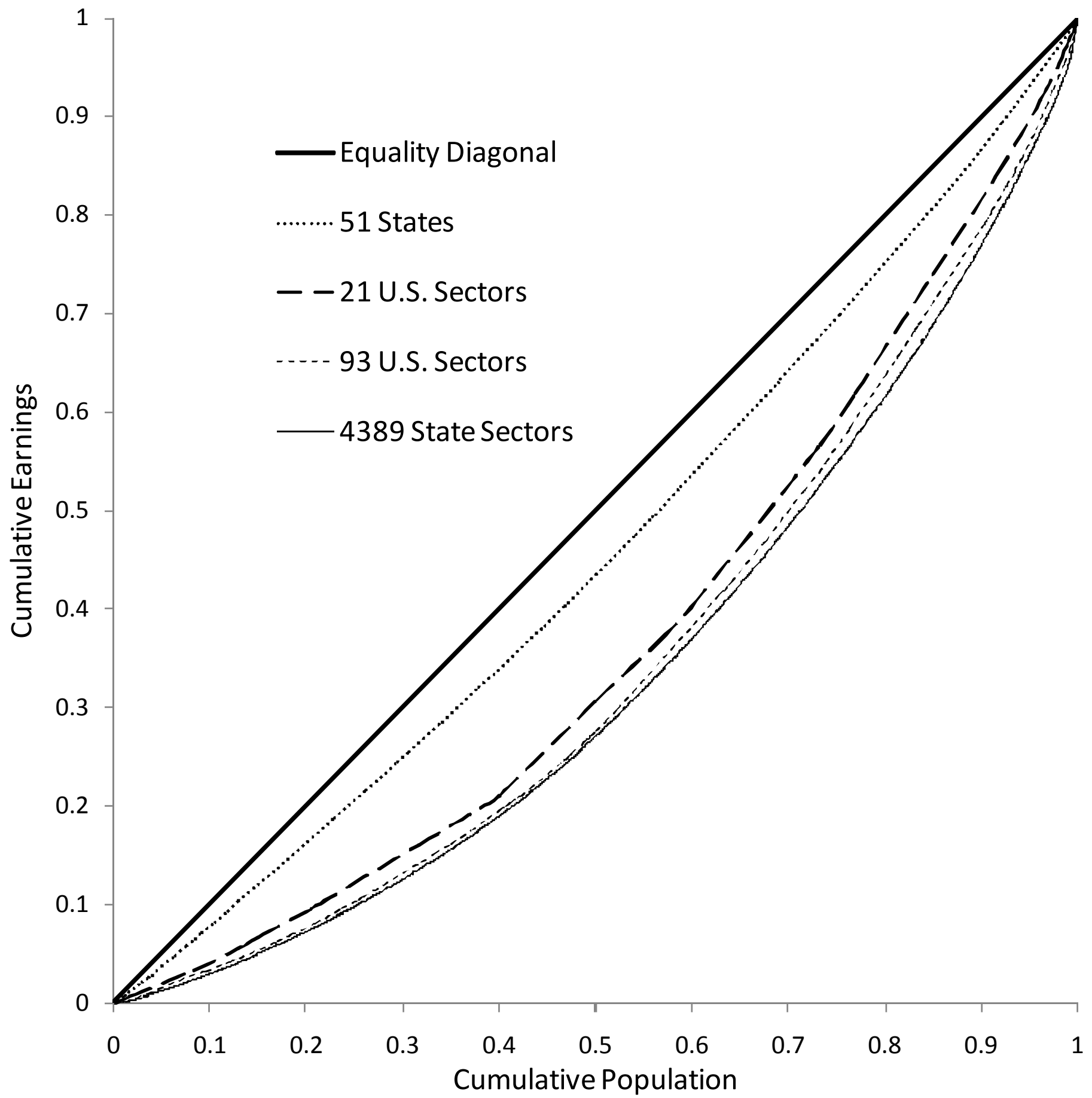


Figure 3. U.S. Pay Inequality 1990 to 2007 Calculated Using Alternative Category Structures

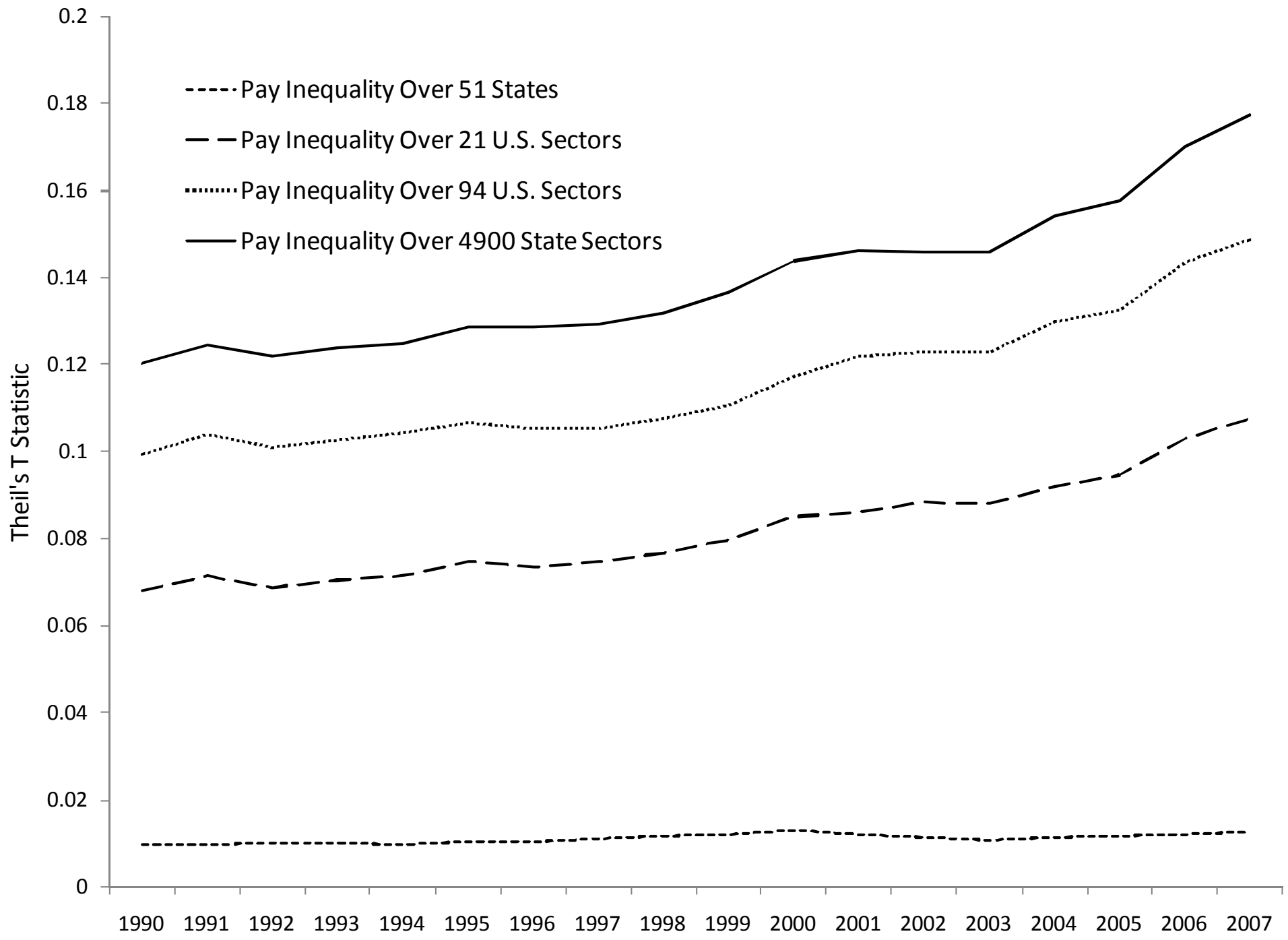
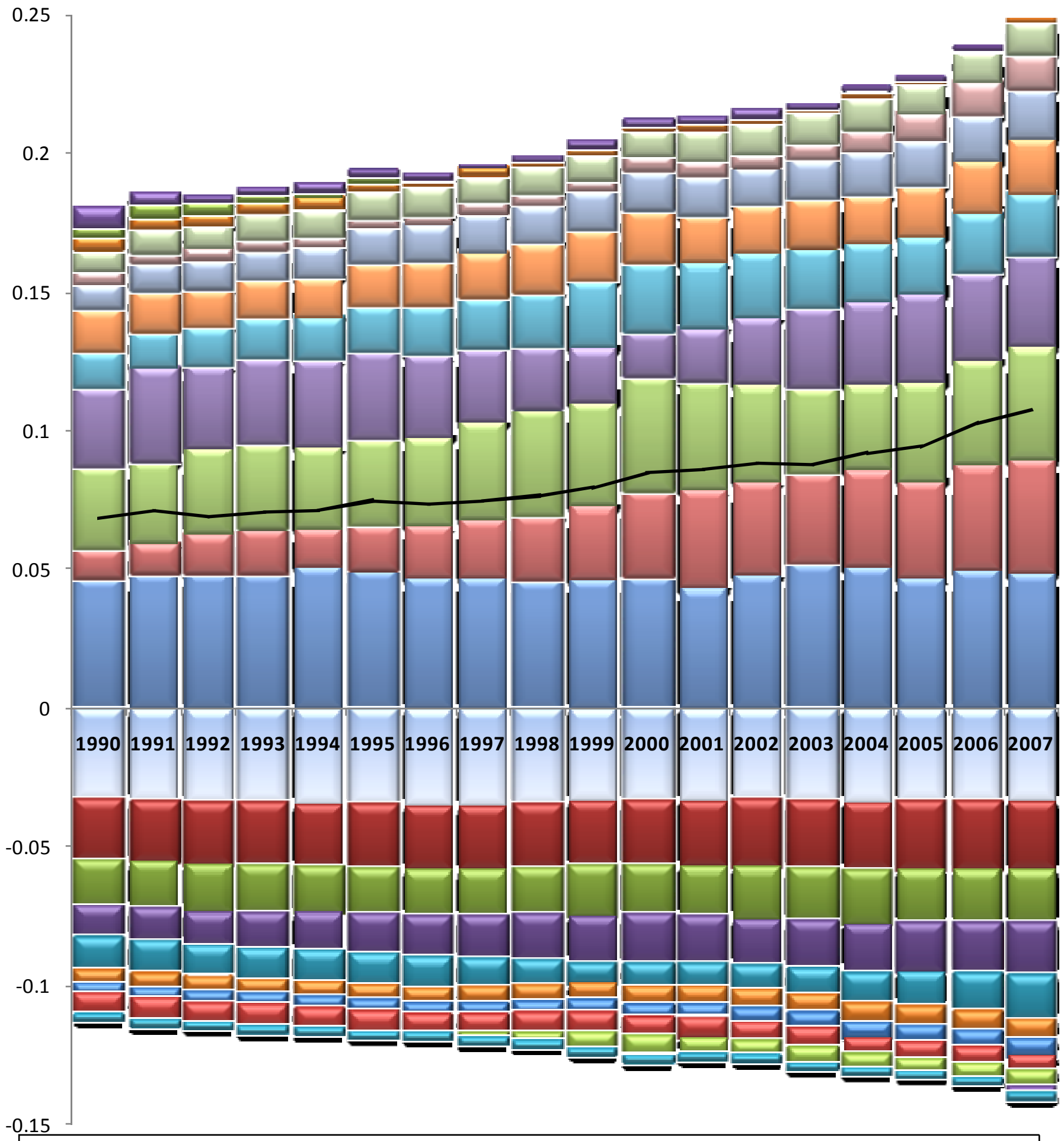


Figure 4. Theil Elements of Between-Sector Pay Inequality in the U.S. 1990 – 2007



- |  |                                       |
|--|---------------------------------------|
| Manufacturing                                    | Finance and insurance                 |
| Professional and technical services              | Government and government enterprises |
| Information                                      | Wholesale trade                       |
| Management of companies and enterprises          | Mining                                |
| Utilities  | Transportation and warehousing        |
| Retail trade                                     | Accommodation and food services       |
| Other services, except public administration     | Administrative and waste services     |
| Real estate and rental and leasing               | Arts, entertainment, and recreation   |
| Educational services                             | Farming                               |
| Health care and social assistance                | Construction                          |
| Forestry, fishing, related activities, and other |                                       |



Figure 5. Relative Earnings and Employment in 21 U.S. Sectors 1990 and 2007

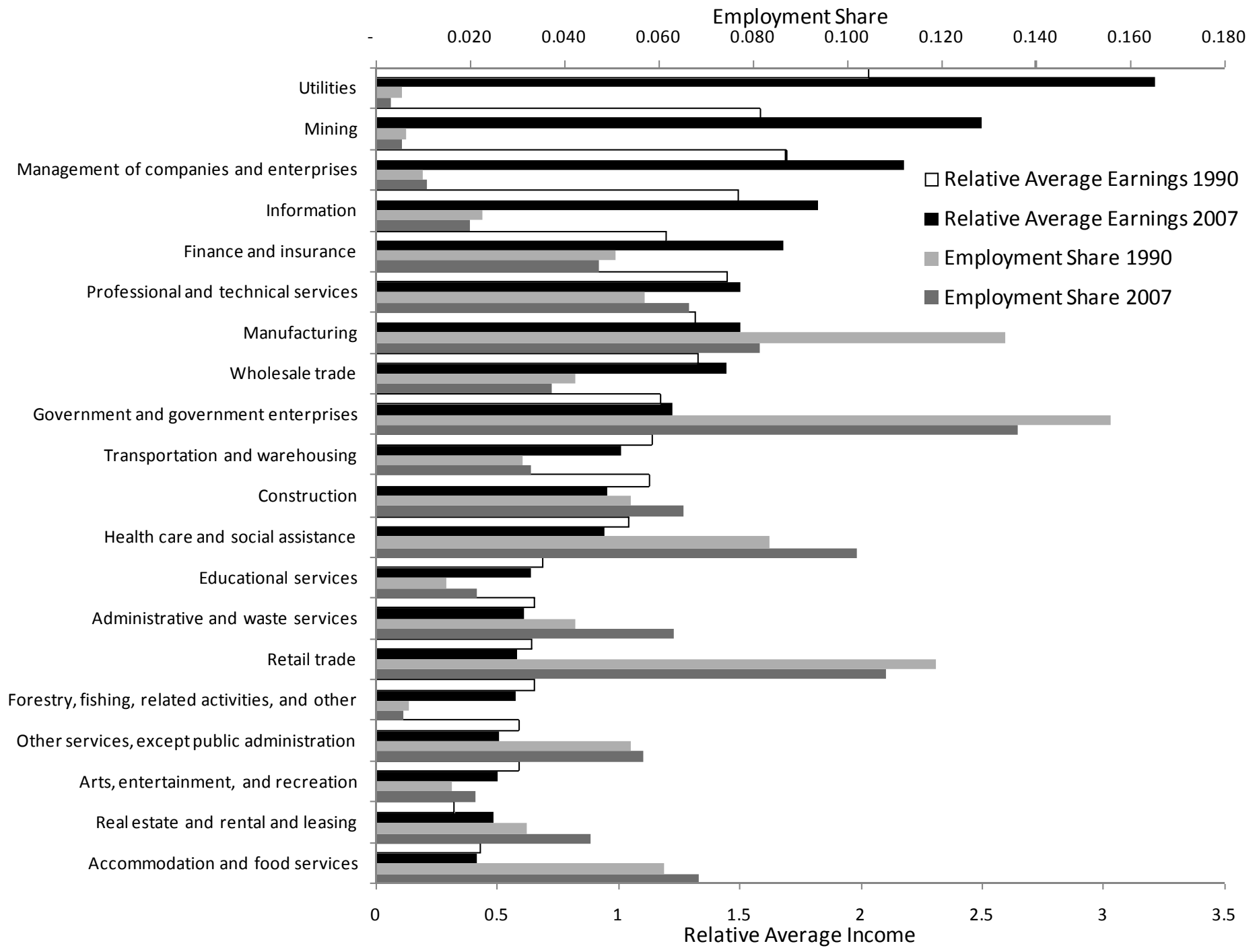


Table 1. Average Pay in 1996 and 2001 in 12 High-Growth Sectors

Sector	Average Wage	
	1996	2001
Computer and electronic product manufacturing	\$ 57,268	\$ 78,198
ISPs, search portals, and data processing	\$ 44,426	\$ 68,175
International organizations; foreign embassies; consulates	\$ 83,632	\$ 107,550
Internet publishing and broadcasting	\$ 54,116	\$ 82,080
Funds, trusts, and other financial vehicles	\$ 50,132	\$ 79,931
Utilities	\$ 82,384	\$ 113,605
Oil and gas extraction	\$ 49,765	\$ 90,958
Broadcasting, except Internet	\$ 91,831	\$ 133,576
Securities, commodity contracts, investments	\$ 46,249	\$ 88,604
Petroleum and coal products manufacturing	\$ 124,821	\$ 200,367
Lessors of nonfinancial intangible assets	\$ 91,556	\$ 192,836
Pipeline transportation	\$ 93,285	\$ 299,978
All other Sectors	\$ 31,276	\$ 38,099

Figure 6. Between-Sector Inequality 1991 – 2001

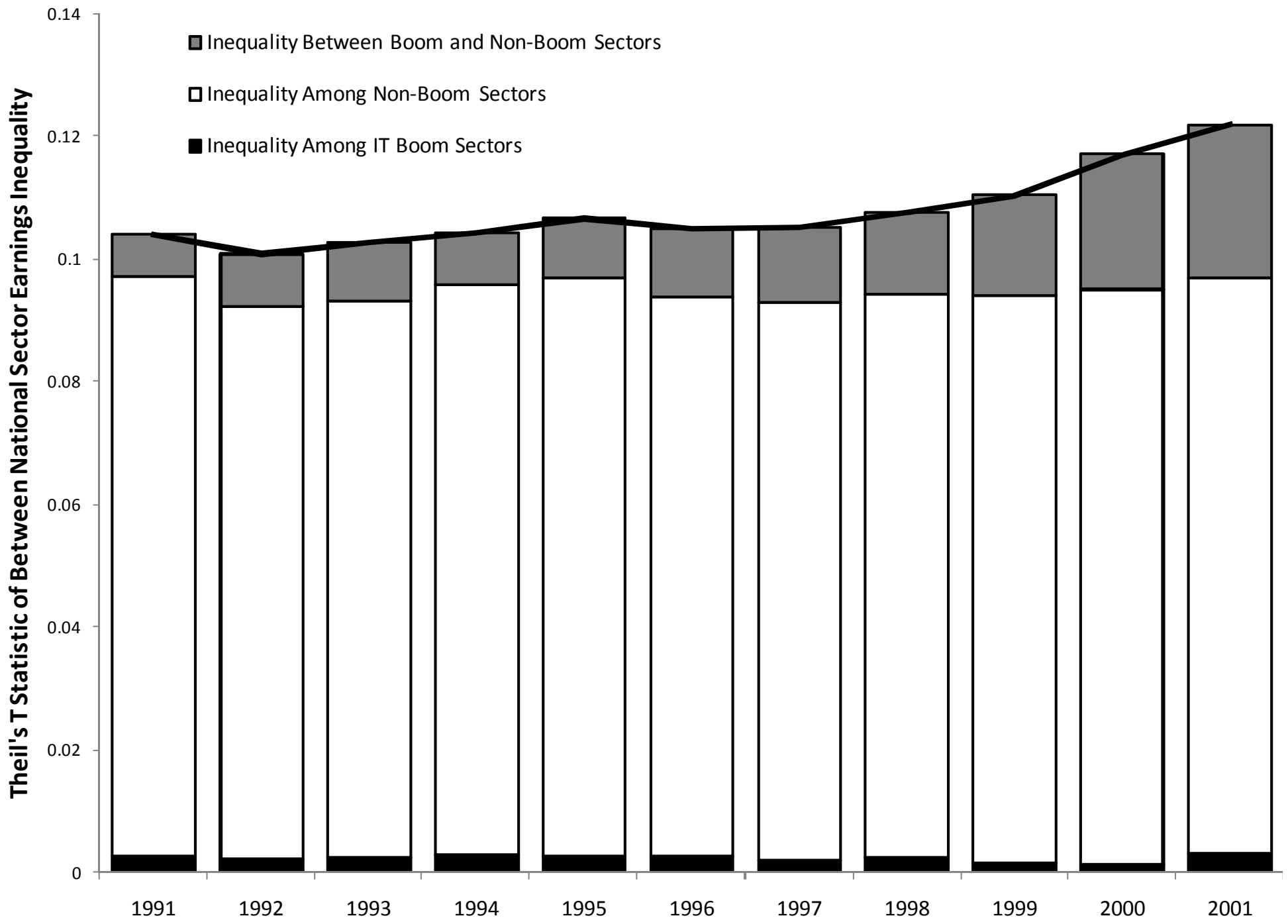


Table 2. Average Pay in 2003 and 2007 in 15 High-Growth Sectors

Sector	Average Wage	
	2003	2007
Military	\$ 53,178	\$ 71,616
Federal, civilian	\$ 79,153	\$ 98,844
Computer and electronic product manufacturing	\$ 88,365	\$ 108,125
Mining (except oil and gas)	\$ 66,671	\$ 89,371
Water transportation	\$ 70,634	\$ 93,452
Management of companies and enterprises	\$ 83,618	\$ 106,587
Support activities for mining	\$ 61,650	\$ 87,241
Chemical manufacturing	\$ 97,062	\$ 124,020
Utilities	\$ 127,487	\$ 157,138
Securities, commodity contracts, investments	\$ 83,053	\$ 113,907
Broadcasting, except Internet	\$ 149,362	\$ 197,862
Other information services <sup>9</sup>	\$ 34,490	\$ 86,726
Oil and gas extraction	\$ 98,979	\$ 167,418
Pipeline transportation	\$ 181,197	\$ 263,350
Petroleum and coal products manufacturing	\$ 185,070	\$ 363,962
All other sectors	\$ 38,989	\$ 43,949

<sup>9</sup> The increase in earnings for the Other information services sector is an artifact of a change to the taxonomy. Internet publishing and broadcasting became part of Other information services in 2007.

Figure 7. Between-Sector Inequality 2000 – 2007

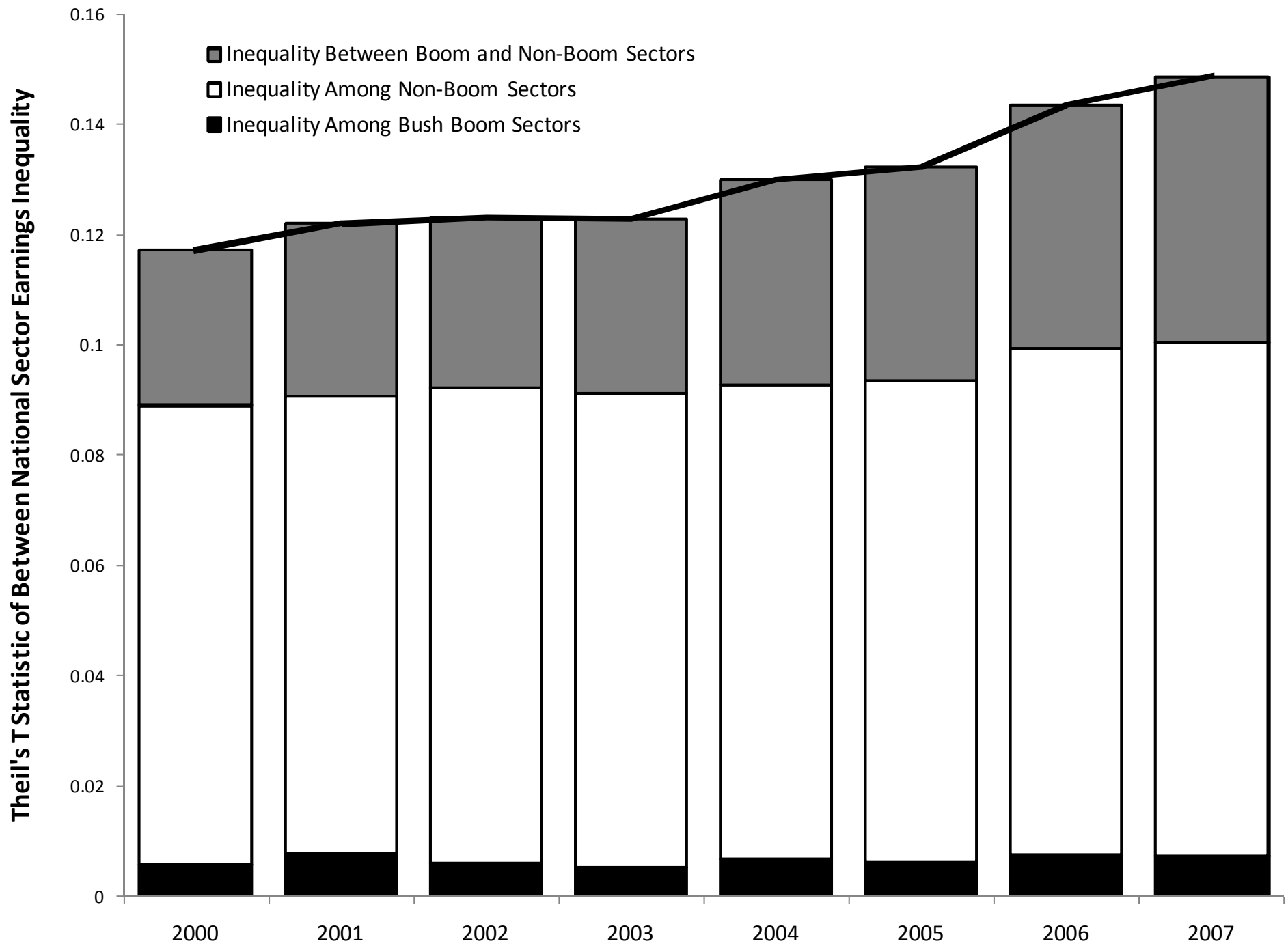


Figure 8. U.S. Income Inequality 1969 – 2006



Figure 9. Components of Theil's T Statistic of Between-County U.S. Income Inequality 1969 – 2006.

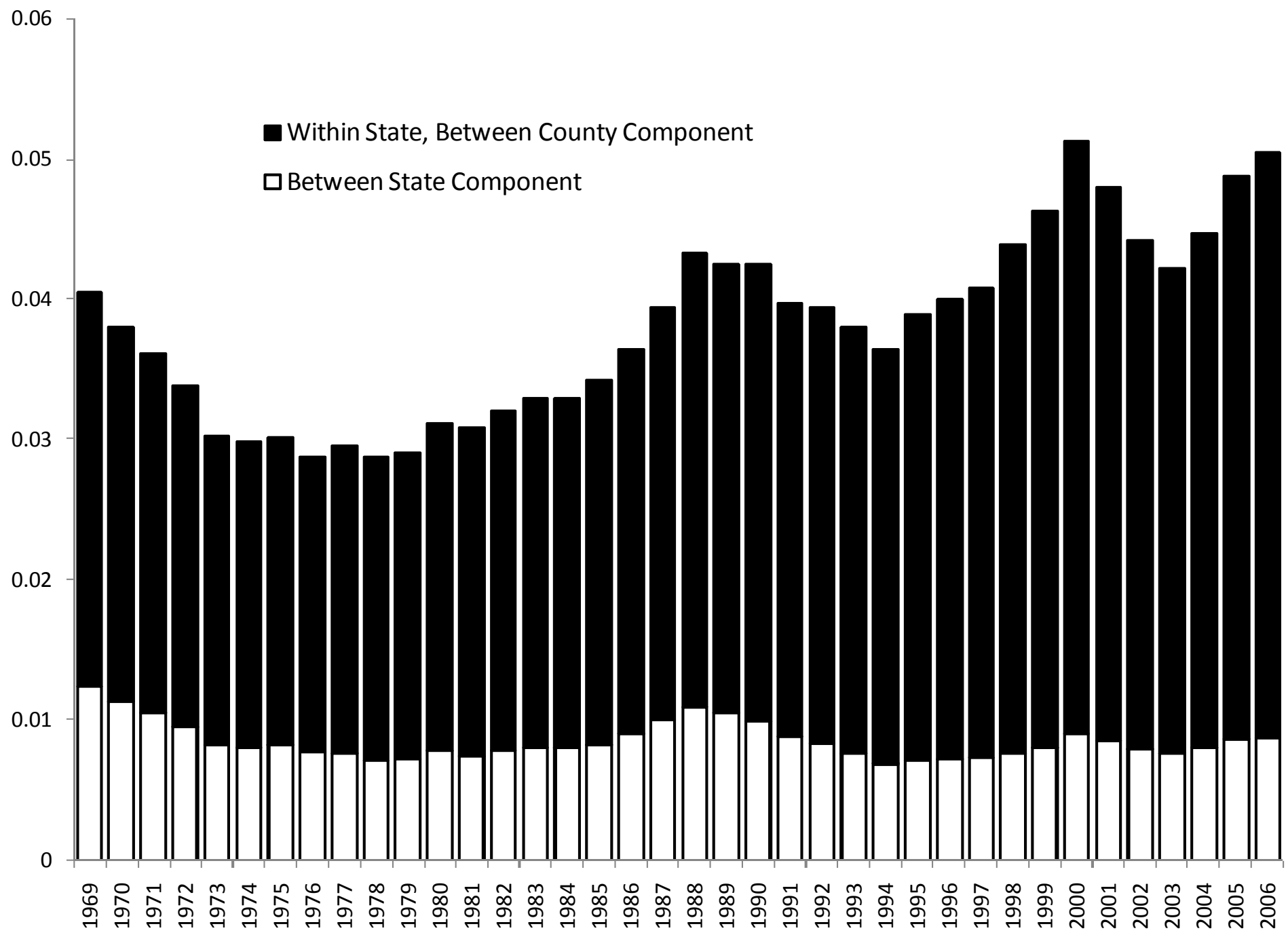


Figure 10. Theil's T Statistic of U.S. Between-County Income Inequality 1969 – 2006 Plotted Against the Natural Logarithm of the NASDAQComposite

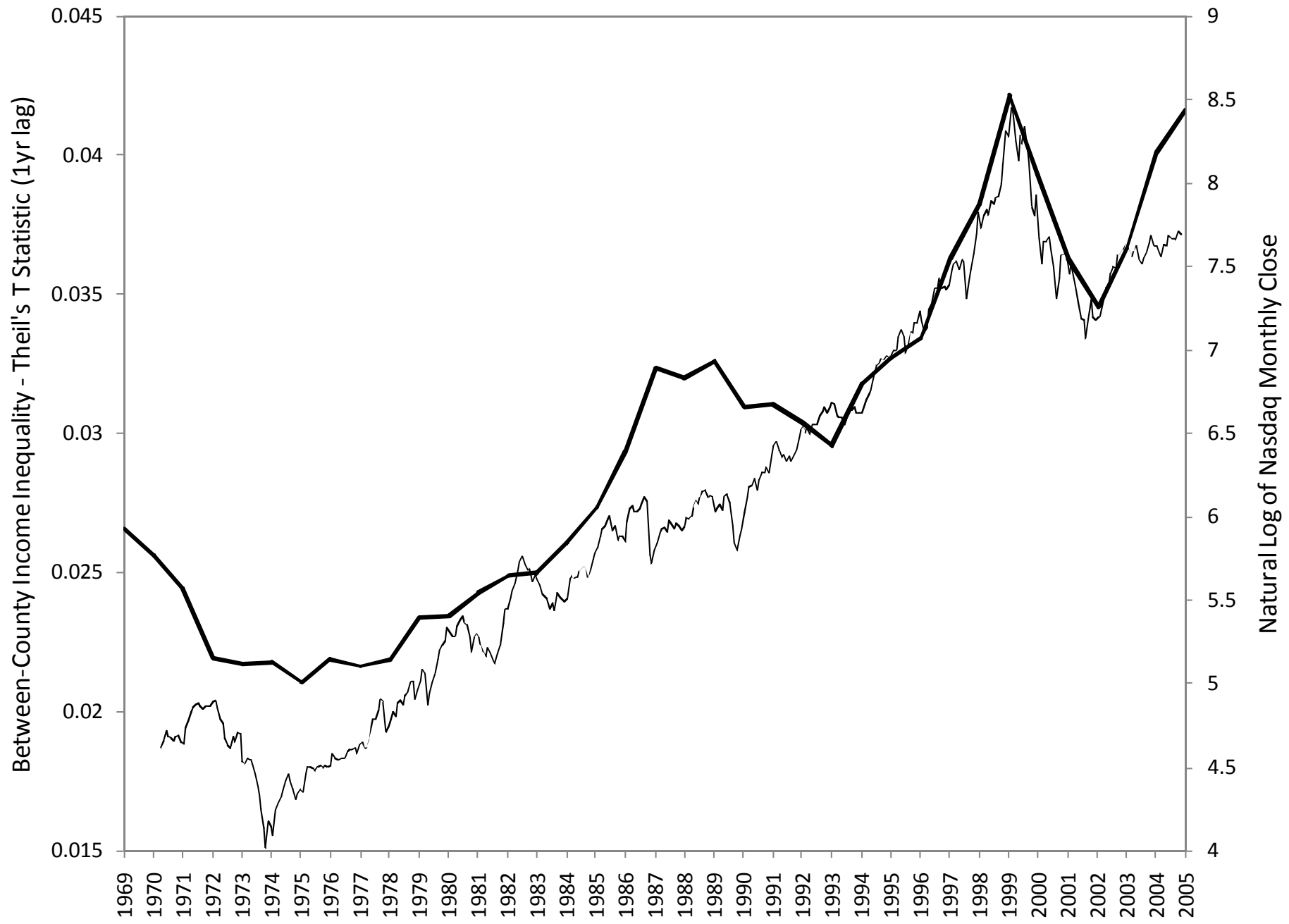
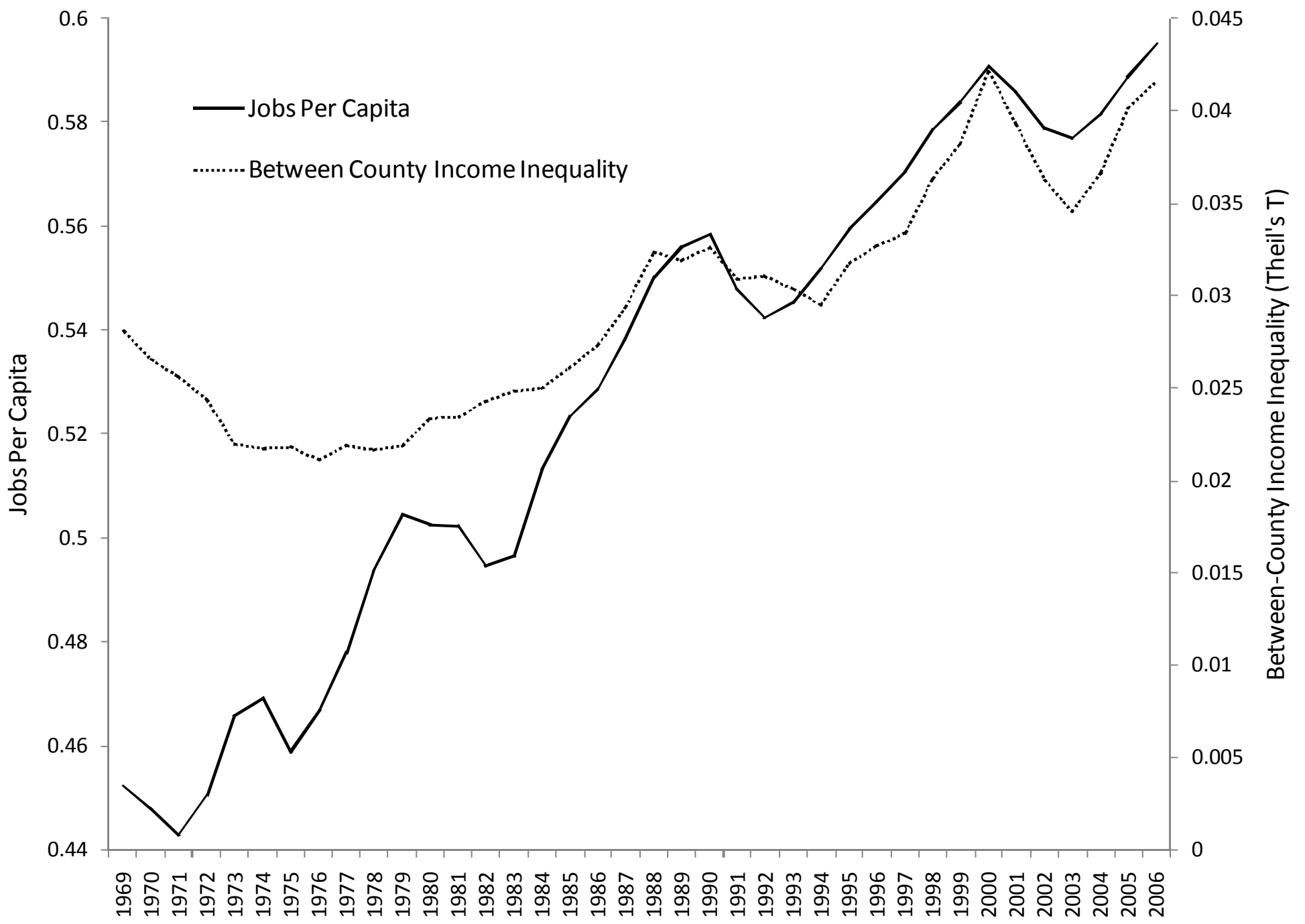




Table 3. County Population and Per Capita Income for Selected Counties 1994, 2000, 2003, 2006

Population	1994	2000	2003	2006
San Francisco, CA	742,316	777,669	759,056	756,376
San Mateo, CA	674,871	708,584	698,132	700,898
Santa Clara, CA	1,561,366	1,686,621	1,678,189	1,720,839
New York, NY	1,503,909	1,540,934	1,577,267	1,612,630
U.S.	263,125,821	282,194,308	290,447,644	298,754,819
Per Capita Income	1994	2000	2003	2006
San Francisco, CA	\$ 33,164	\$ 55,658	\$ 53,864	\$ 69,942
San Mateo, CA	\$ 33,628	\$ 58,893	\$ 52,235	\$ 66,839
Santa Clara, CA	\$ 29,255	\$ 54,183	\$ 46,569	\$ 55,735
New York, NY	\$ 56,905	\$ 85,752	\$ 82,904	\$ 110,292
U.S.	\$ 22,172	\$ 29,845	\$ 31,504	\$ 36,714

Figure 11. U.S. Between-County Income Inequality and Jobs Per Capita 1969 – 2006



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[http://www.faireconomy.org/research/CEO\\_Pay\\_charts.html](http://www.faireconomy.org/research/CEO_Pay_charts.html)

## Appendix: NAICS Sectors

Farming

Forestry, fishing, related activities, and other

Forestry and logging

Fishing, hunting, and trapping

Agriculture and forestry support activities

Other

Mining

Oil and gas extraction

Mining (except oil and gas)

Support activities for mining

Utilities

Construction

Construction of buildings

Heavy and civil engineering construction

Specialty trade contractors

Manufacturing

Wood product manufacturing

Nonmetallic mineral product manufacturing

Primary metal manufacturing

Fabricated metal product manufacturing

Machinery manufacturing

Computer and electronic product manufacturing

Electrical equipment and appliance manufacturing

Motor vehicles, bodies and trailers, and parts manufacturing

Other transportation equipment manufacturing

Furniture and related product manufacturing

Miscellaneous manufacturing

Food manufacturing

Beverage and tobacco product manufacturing

Textile mills

Textile product mills

Apparel manufacturing

Leather and allied product manufacturing

Paper manufacturing

Printing and related support activities

Petroleum and coal products manufacturing

Chemical manufacturing

Plastics and rubber products manufacturing

Wholesale trade

Retail trade

Motor vehicle and parts dealers

Furniture and home furnishings stores

Electronics and appliance stores

Building material and garden supply stores

Food and beverage stores

Health and personal care stores

Gasoline stations

Clothing and clothing accessories stores

Sporting goods, hobby, book and music stores

General merchandise stores

Miscellaneous store retailers

Nonstore retailers

Transportation and warehousing

Air transportation

Rail transportation

Water transportation

Truck transportation

Transit and ground passenger transportation

Pipeline transportation	Administrative and support services
Scenic and sightseeing transportation	Waste management and remediation services
Support activities for transportation	Educational services
Couriers and messengers	Health care and social assistance
Warehousing and storage	Ambulatory health care services
Information	Hospitals
Publishing industries, except Internet	Nursing and residential care facilities
Motion picture and sound recording industries	Social assistance
Broadcasting, except Internet	Arts, entertainment, and recreation
Internet publishing and broadcasting	Performing arts and spectator sports
Telecommunications	Museums, historical sites, zoos, and parks
ISPs, search portals, and data processing	Amusement, gambling, and recreation
Other information services	Accommodation and food services
Finance and insurance	Accommodation
Monetary authorities - central bank	Food services and drinking places
Credit intermediation and related activities	Other services, except public administration
Securities, commodity contracts, investments	Repair and maintenance
Insurance carriers and related activities	Personal and laundry services
Funds, trusts, and other financial vehicles	Membership associations and organizations
Real estate and rental and leasing	Private households
Real estate	Government and government enterprises
Rental and leasing services	Federal, civilian
Lessors of nonfinancial intangible assets	Military
Professional and technical services	State government
Management of companies and enterprises	Local government
Administrative and waste services	