The Changing Geography of American Inequality: From IT Bust to Big Government Boom

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UTIP Working Paper No. 40
October 23, 2006

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Abstract:

In this note we report on the changing geographical dispersion of incomes in the United States following the information technology bust of 2001. We find that the IT bust produced a sharp deflation of incomes in counties most closely associated with that boom, while from 2001 to 2004 the largest gainers were in counties strongly affected by federal government and military spending, and by the ongoing housing boom. The winners especially included the federal capital at Washington DC, and its immediate surroundings.

Introduction

The American income distribution is always changing. Innovation, entrepreneurship, and fraud transform paupers into princes; corporate collapses and outsourcing turn well-paid workers into the unemployed; public policies create new classes of winners and losers. These processes affect individuals, but they also explain income differences across communities and over time. In this note, we explore changes in relative incomes between U.S. counties during the information technology boom and bust and in the first years of the Bush administration.

Data and Measurement

Our source data are per capita income and total population for each county in the United States, provided through Local Area Personal Income Statistics in the Regional Economics Accounts of the Bureau of Economic Analysis, U.S. Department of Commerce (Bureau of Economic Analysis 2006).[1]

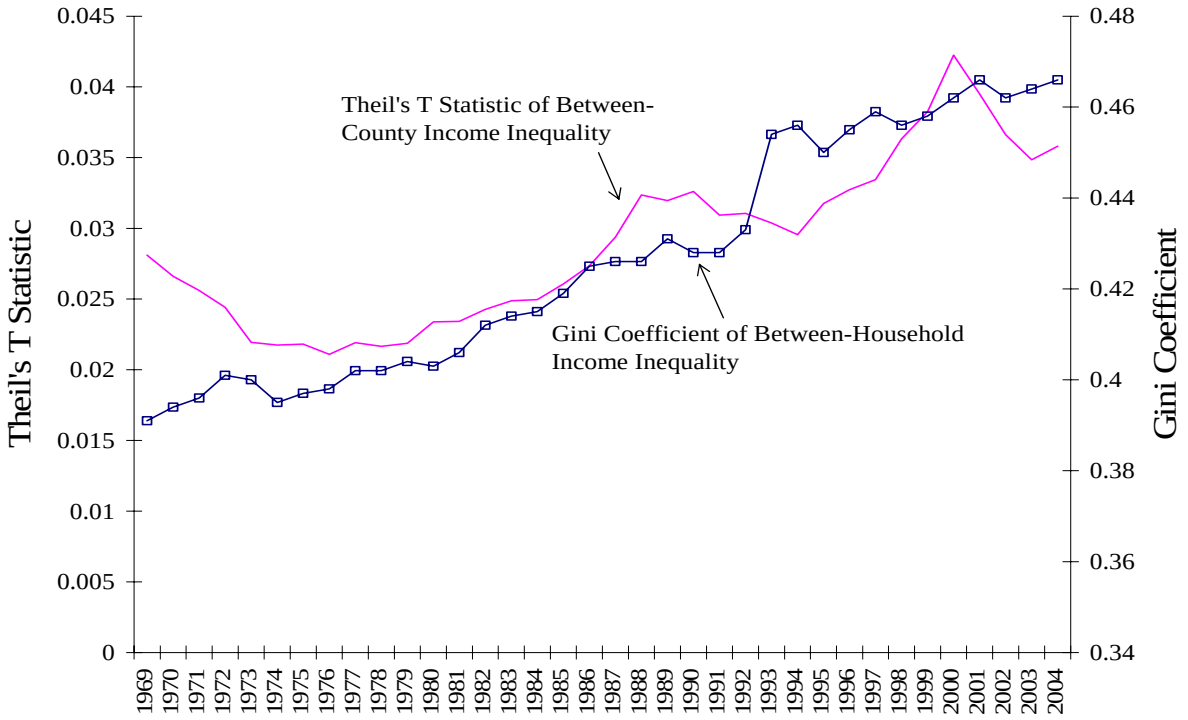
Our dispersion metric is the between-groups component of Theil's T Statistic, measured across county incomes and using county population weights. The formula is:

$$T'_{Counties} = \sum_{i=1}^{m} \frac{p_i}{P} * \frac{y_i}{\mu} * \ln(\frac{y_i}{\mu})$$

where p_i is the population of a county indexed by i, P is the total population of the United States, y_i is the average income for county i, and μ is the average income for the United States. This measure can be computed for each year from 1969 through 2004. The "Theil element" measuring the contribution of each county to overall inequality is simply the term within the summation sign.

This measure ignores all variation among individuals within counties. However, as Figure 1 shows, the overall movement of the series tracks the standard survey-based measure of income inequality quite well; the correlation between this measure and the standard Gini coefficient of household income inequality (computed from the Current Population Survey) from 1969 to 2004 is .89. Moreover, the between-counties measure is free of certain distortions known to affect the Gini measure, notably the jump in 1994. The latter appears to have been largely if not entirely an artifact of changes in method (revisions to top-coding) rather than changes in the actual income distribution.

Figure 1. Between-County and Between-Individual U.S. Income Inequality 1969 – 2004



Source: Authors' computations based on BEA Regional Economic Accounts (2006) and CPS Estimates (U.S. Census Bureau 2005)

The particular virtue of Theil's T Statistic in this context is that it allows us to isolate the effect of each county separately on the whole distribution. Household surveys, including the CPS, are not dense enough to cover 3,000 counties in a consistent and comprehensive fashion. With Theil's T Statistic of between-county income inequality, the exercise is simple; since the county average is based on tax returns millions of underlying individuals are effectively covered.

A county's Theil element in any given year may be positive or negative. If the county's average income is greater than the national average, the element will be positive, otherwise zero (if income equals the average), or negative (if income falls below the average). Population weights also matter. Counties with small populations will have smaller Theil elements – in absolute terms – *ceteris paribus*. By construction, the sum of the positive elements must be greater than the sum of the negative elements, so that the aggregated statistic is always positive.

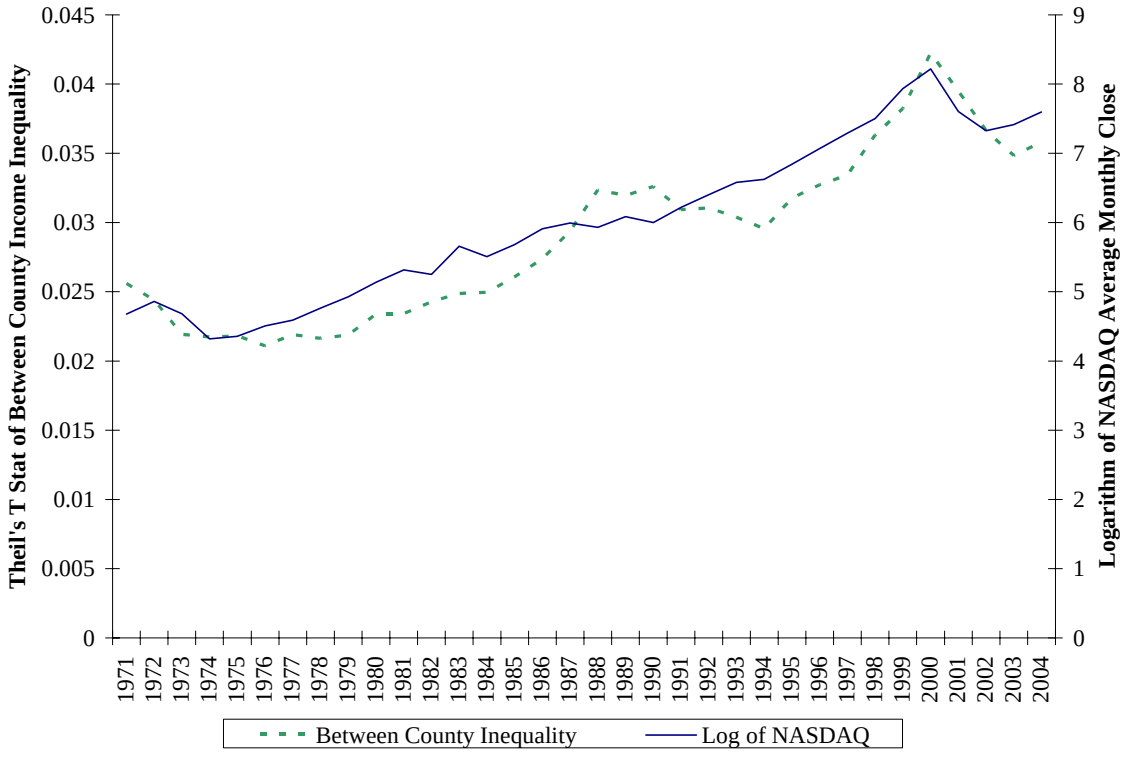
The value of the aggregated inequality measure for a given year is largely uninterpretable, and so are the elements attributed to individual counties when taken in isolation. However, looking at changes over time in these numbers yields clear insight into broad shifts in inequality. As Figure 1 indicates, in the late 1960s and early 1970s cross-county inequality declined, before stabilizing through the early 1980s. The mid 1980s saw a rise in inequality, which was mitigated in the late 1980s and early 1990s. The period from 1994 to 2000 marks the period of largest inequality growth, a 48% increase in the between-county measure. From 2001 to 2003, on the other hand, between-county income inequality sharply declined.

Winners and Losers During the IT Boom and Bust

Rising income inequality and the information technology bubble were two hallmark phenomena of the United States 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. Some celebrated the bull market as evidence that the "new economy" would drive American prosperity into the future. Others lamented the spectacular rises in executive compensation and of inequality more generally. On both sides, few noted that the two phenomena were, in fact, identical. An analysis of the between-county T statistic can help elucidate the relationship between the technology boom (and bust) and the inequality rise (and lull).

Figure 2 shows the natural logarithm of the NASDAQ Composite, average monthly closings, 1971-2004, as compared to the between-counties income inequality index. The correlation is .955 and one is put in mind of Thoreau's remark that some circumstantial evidence is quite strong, "as when you find a trout in the milk."

Figure 2. NASDAQ Composite and Between-County Income Inequality, 1971-2004



As high-tech firms' stock prices shot upwards, their employees (especially the handful of 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 Silicon Valley, Seattle, North Carolina's Research Triangle, Austin, and Boston's Route 128 Corridor.

Table 1 lists the 10 counties with the largest positive and negative Theil element changes from 1994 to 2000. The counties with large gains are leaders in hardware and software manufacturing and development. Big gains occur around areas of the country known to have a hi-tech emphasis (e.g. Silicon Valley, Seattle, and Boston), while losses occur in rust belt counties and counties heavily reliant on tourism (e.g. Flint, Michigan and Honolulu). Several smaller counties in areas of the country also known to have a technological emphasis (e.g. Raleigh, North Carolina, Austin, and Boulder, Colorado) have Theil element gains that rank in the top 50.

Table 1

Counties with the largest positive changes in Theil Elements 1994 - 2000

County, State	Theil Element Change 1994 - 2000
New York, New York	0.00517211
Santa Clara, California	0.00468738
San Mateo, California	0.00208153
King, Washington	0.00169613
San Francisco, California	0.00148821
Harris, Texas	0.00147724
Middlesex, Massachusetts	0.00131529
Fairfield, Connecticut	0.00099520
Alameda, California	0.00088503
Westchester, New York	0.00086216

Counties with the largest negative changes in Theil Elements 1994 – 2000

County, State	Theil Element Change 1994 - 2000
Los Angeles, California	-0.00089362
Queens, New York	-0.00070519
Honolulu, Hawaii	-0.00065515
Broward, Florida	-0.00056938
Cuyahoga, Ohio	-0.00036473
Kings, New York	-0.00034178
Miami-Dade, Florida	-0.00032742
San Bernardino, California	-0.00031665
Genesee, Michigan	-0.00031147
Clark, Nevada	-0.00030658

A crude way to distinguish counties with economies driven by technology is to identify where hi-tech firms are located. One list of such firms is the CNET Tech Index. In 2003, this index was composed of 84 Internet, computer manufacturing, and other information technology companies including Microsoft, IBM, and Amazon; subsequent mergers have reduced the ranks. All but four of the CNET firms are headquartered in the United States. Half of the 84 companies are (or were) headquartered in counties among the top-10 largest positive contributors to changing between-county inequality from 1994 to 2000. Twenty-six are headquartered in Santa Clara County; of the top ten counties, eight had at least one leading hi-tech firm. On the other hand, the 10 counties that saw their Theil elements erode the most from 1994 to 2000 contained headquarters for only two CNET Tech Index firms.

What happened in 2001, when the Internet bubble burst? If technology really is a central part of the story, the counties where Theil elements were growing most rapidly from 1994 – 2000 should have declined significantly from 2000 to 2001. Table 2 lists the 10 counties with the largest decreases in their Theil elements and the 10 counties with the largest increases in their Theil elements from 2000 - 2001.

Table 2

Counties with the largest negative changes in Theil Elements 2000 - 2001	
County, State	**Theil Element Change 2000 - 2001**
Santa Clara, California	-0.00168036
San Mateo, California	-0.00066027
Dallas, Texas	-0.00042349
DuPage, Illinois	-0.00033057
King, Washington	-0.00021691
Collin, Texas	-0.00018728
Contra Costa, California	-0.00018602
Kings, New York	-0.00016389
Alameda, California	-0.00015011
Oakland, Michigan	-0.00012203

Counties with the largest positive changes in Theil Elements 2000 – 2001	
County, State	**Theil Element Change 2000 - 2001**
New York, New York	0.00048097
Los Angeles, California	0.00039629
Harris, Texas	0.00038605
Fairfax, Virginia	0.00019027
Allegheny, Pennsylvania	0.00018010
Orange, California	0.00017505
Palm Beach, Florida	0.00015951
Montgomery, Maryland	0.00013561
Cook, Illinois	0.00013094
San Diego, California	0.00009651

This evidence, though less overwhelming, still supports the central thesis. Santa Clara, the most tech-driven county in the country, is the biggest loser. Three other Silicon Valley counties are in the top-10 list, along with King County Washington, home of Microsoft. The list of the fifty counties that saw the biggest Theil element declines includes counties surrounding tech centers like Boston, Denver, Austin, and Boise, Idaho. The counties on the right side of Table 2 are most alike in that they are part of some of the largest metropolitan areas in the country (New York, Los Angeles, Chicago, Houston). These economies are not tied as directly to the tech sector as the counties on the left side of Table 2; it is interesting that New York, New York saw gains in the boom and then again in the bust.

The number of hi-tech firms headquartered in the counties with large changes in their Theil elements from 2000 to 2001 follows the expected pattern. 37 of the CNET Tech Index companies are headquartered in counties that were among the counties that saw the ten most significant declines in their Theil elements, and 46 of the 80 CNET companies are headquartered in the top 50 decliners. The 10 counties that saw their Theil element gain the most from 2000 to 2001 host headquarters for 11 CNET Tech Index firms, while 17 of the 80 CNET companies are headquartered in the 50 counties that had the largest increases in their Theil Elements from 2000 to 2001. However, most of those companies are headquartered in New York, Los Angeles, San Diego, or Chicago, which have large and heterogeneous economies.

Winners and Losers in the Bush Administration through 2004

In the wake of the of the IT bust, aggregate between-county income inequality declined, while income inequality measured between individuals remained roughly constant. But this does not mean there were no shifts in the pattern of relative incomes. Table 3 lists the 10 counties with the largest decreases and the ten with the largest increases in their Theil elements from 2000 to 2004. As with Table 2, the left side of Table 3 has a distinctly technological flavor. Eight of these ten counties host at least one firm listed on the CNET Tech Index, and 51 of the 80 index firms are located in the 50 counties with the largest negative Theil element changes over this period. Thus the IT slide continued through the first term of the second Bush.

Table 3

Counties with the largest negative changes in Theil Elements 2000 – 2004	
County, State	**Theil Element Change 2000 - 2004**
Santa Clara, California	-0.00309744
New York, New York	-0.00201477
San Mateo, California	-0.00137477
San Francisco, California	-0.00071193
Bergen, New Jersey	-0.00056755
DuPage, Illinois	-0.00056338
Collin, Texas	-0.00047336
Cook, Illinois	-0.00045971
Fairfield, Connecticut	-0.00044868
Palm Beach, Florida	-0.00043658

Counties with the largest positive changes in Theil Elements 2000 – 2004	
County, State	**Theil Element Change 2000 - 2004**
Los Angeles, California	0.00081922
San Diego, California	0.00055202
District of Columbia,	0.00044164
Fairfax, Virginia	0.00043147
Philadelphia, Pennsylvania	0.00038494
Orange, California	0.00030240
Montgomery, Maryland	0.00027241
Suffolk, Massachusetts	0.00025924
Davidson, Tennessee	0.00022409
Baltimore, Maryland	0.00020814

The right side of Table 3, shows the counties with the most significant relative income growth over the 2000 to 2004 period. What, if anything, links them together?

First, we must mention a couple of caveats. The inclusion of Los Angeles County is a bit of an anomaly. In 2000, for reasons unknown to us, average income in Los Angeles was two percentage points below the national average, whereas in every other year from 1999 to 2004 the county was within one-half of one percent of the national average. Also Philadelphia's gains during this period actually reduced between-county inequality, as average income in Philadelphia grew from 83% of the national average in 2000 to 90% in 2004. In other words, the increase in the Theil element in this case came from it becoming *less negative,* not increasingly positive.

In the other eight counties, average incomes were higher than the national average in 2000 and rose through 2004. Of these counties, four contain or are near to the nation's capital (DC, Fairfax, Montgomery, Baltimore). Two contain state capitals (Davidson, Suffolk). San Diego County is home to several Navy installations, and Orange County is the poster-child for the ongoing—but perhaps soon-to-burst--housing bubble.

The economic effect of the Bush years on the Baltimore-Washington region is not limited to the four counties in the top ten. Among the top 35 gainers, there are five more in the immediate vicinity of the federal capital: Anne Arundel, Maryland (16), Prince George's, Maryland (21), Baltimore (Independent City) Maryland (27), Arlington Virginia (29), and Alexandria (Independent City) Virginia (34). Conversely, none of the top-50 element declines from 2000 to 2004 come from counties near the District of Columbia.

Outside of the government and military sectors, it is not possible for us yet to characterize fully the pattern of gains in the Bush years. It is worth noting that the largest gains are almost an order of magnitude smaller than they were in the 1994-2000 period. Except for the effects of the growth of military and other government spending, part of the reason there is no clear pattern may be simply that none exists; the continuing housing growth that has been—up until now--the defining feature of private activity under Bush is fairly widespread.

Conclusions

Rising income inequality from 1994 to 2000 period was largely an artifact of the information technology bubble. As such, it should be judged in the context of the bubble itself. We believe that measures to slow and disperse the bubble as it developed would have been wise, and that the bust ultimately inflicted large, arbitrary and unnecessary losses on many who were not prepared to shoulder them. Nevertheless, we share the view of Robert Shapiro, former Under Secretary for Economic Affairs in the Department of Commerce,

> "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 the side benefit of demonstrating that full employment can be achieved without inflation, something much of the economics profession had not believed possible before that time.

Is the pattern from 2000 to 2004 so benign? The concentration of increasing income around Washington D.C. appears to reflect the vast growth in spending by the federal government in the Bush years, as well as its consequences for housing prices and credit expansion in and around the capital. Much of this spending is related to the growth of military and intelligence activities; though federal civilian spending also grew rapidly in 2003-2004, and there was undoubtedly also substantial growth in spending by private sector lobbies. 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 the Bush years so far have engendered 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 can perhaps best be described as ironic.

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[1] To be precise, “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).