

Technology and Growth in the United States

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Figure 1 shows the paths of nominal GDP Y and real GDP y both expressed in per capita terms. They cross in the base year 2005. Clearly, in spite of the ups and downs, there has been a lot of progress. There has also been some inflation: that is why the nominal line is steeper than the real line.

The next graph, Figure 2, shows the log of real GDP per person, along with the trend line (found from the regression of $\ln y_t = \alpha + \beta Year_t + \epsilon_t$). The slope of the trend line is the average growth rate of the economy. Here it is $\beta = .0206$ or 2.06% per year – with a t value of 60 (which is huge) showing that the relationship is extremely close.

Next, we show in Figure 3, the progress of the employment rate (employed people/civilian population) and productivity (output/hour, not A). Both are index numbers centered on 100 in the year 2005. We see that there is no evidence that high productivity reduces employment by this measure.

It is interesting to see how population and employment changed over time. We see that in Figure 4. Both have increased.

It is normal to look at the unemployment rate (unemployed people/labor force) to gauge the health of the economy. That is shown in Figure 5.

Real compensation and labor costs (both in the business sector) show continuous increases. See Figure 6. As in many of these graphs, the levels are meaningless. Only the change is meaningful: and costs have been rising faster than wages. We do know, however, that $ULC = Wage + Fringes$ so that wages are always less than costs.

The next figure, Figure 7, is very interesting. It shows the decomposition of output per person into three components:

$$y = \frac{Y}{N} = \left(\frac{Y}{H}\right) \left(\frac{H}{L}\right) \left(\frac{L}{N}\right) \quad (1)$$

where $H = \text{Hours}$, $L = \text{Workers}$, and $N = \text{Population}$. Notice that you can simply cancel lots of intermediate terms to show that the right side equals the left side. The first ratio is productivity, the second is hours per worker, and the third is the ratio of workers per population.¹

Finally, I show in Figure 8 that there is little relationship between the trade deficit (or current account deficit) and unemployment.

¹To be a “worker” is the same thing as being “employed”: Column B of Table B-36 of the *Economic Report of the President*.

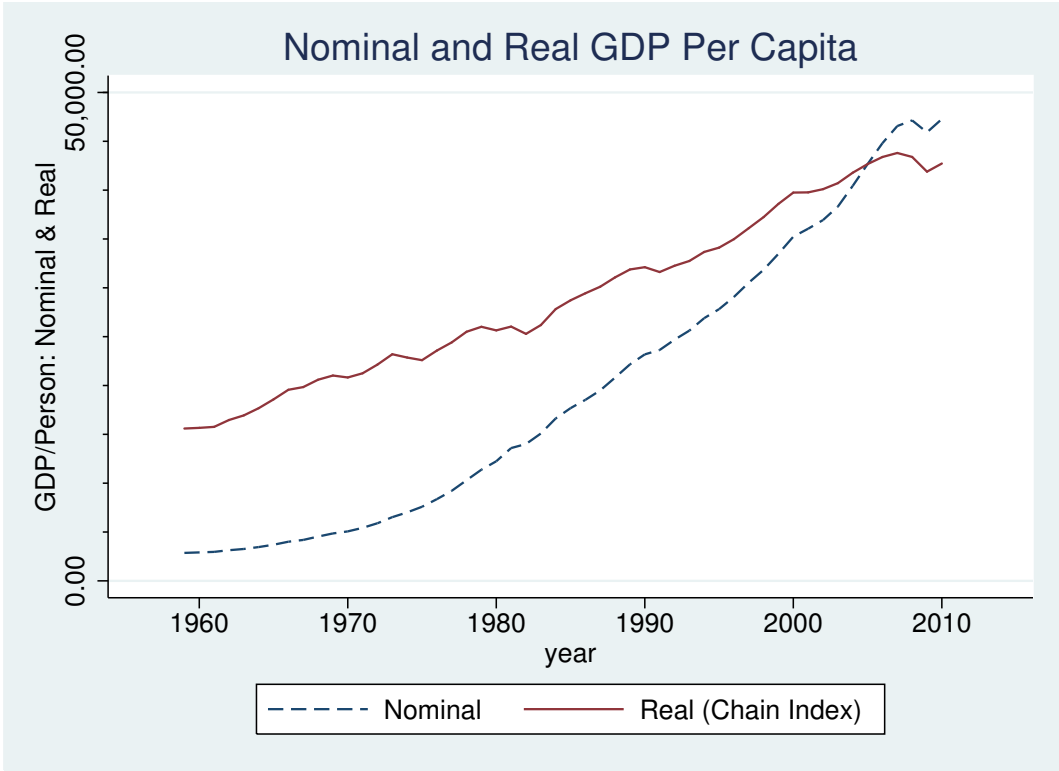


Figure 1: Y and y in the United States

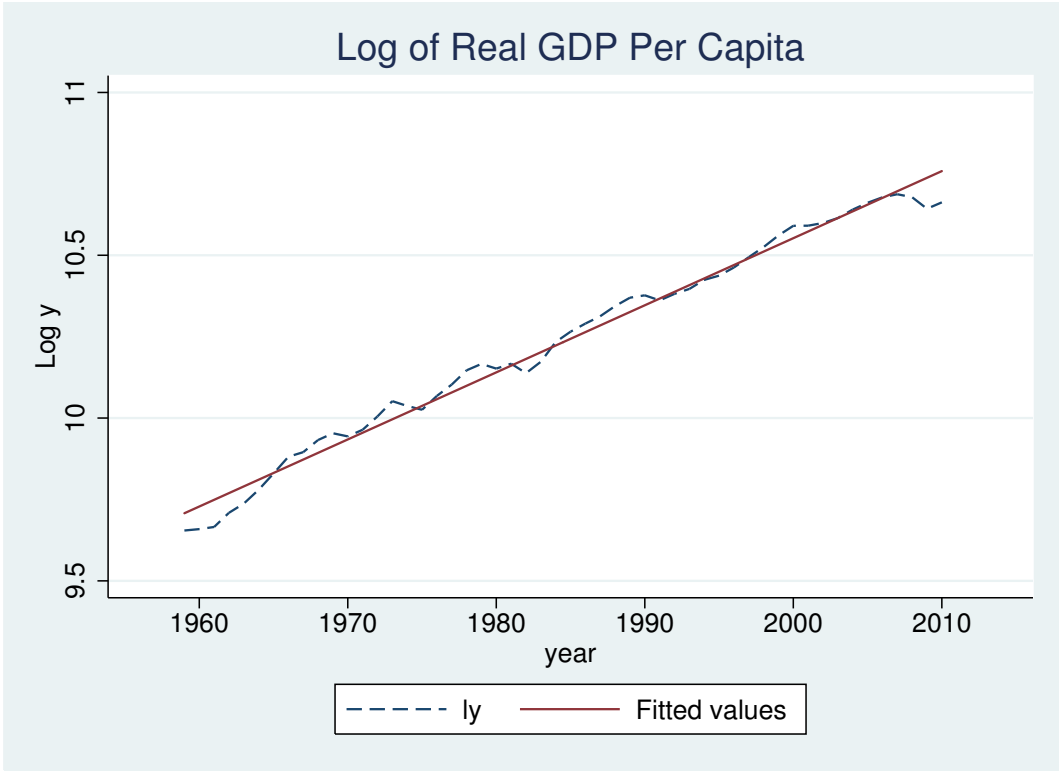


Figure 2: Log of Real GDP and Trend Line

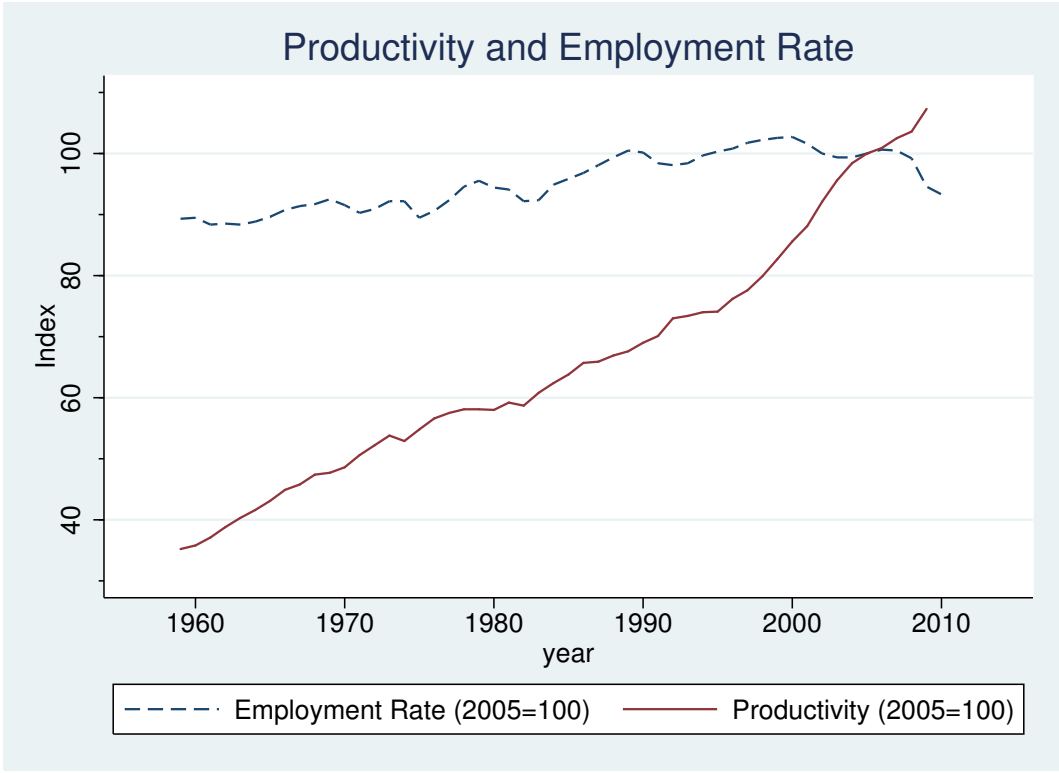


Figure 3: Productivity and Employment over Time

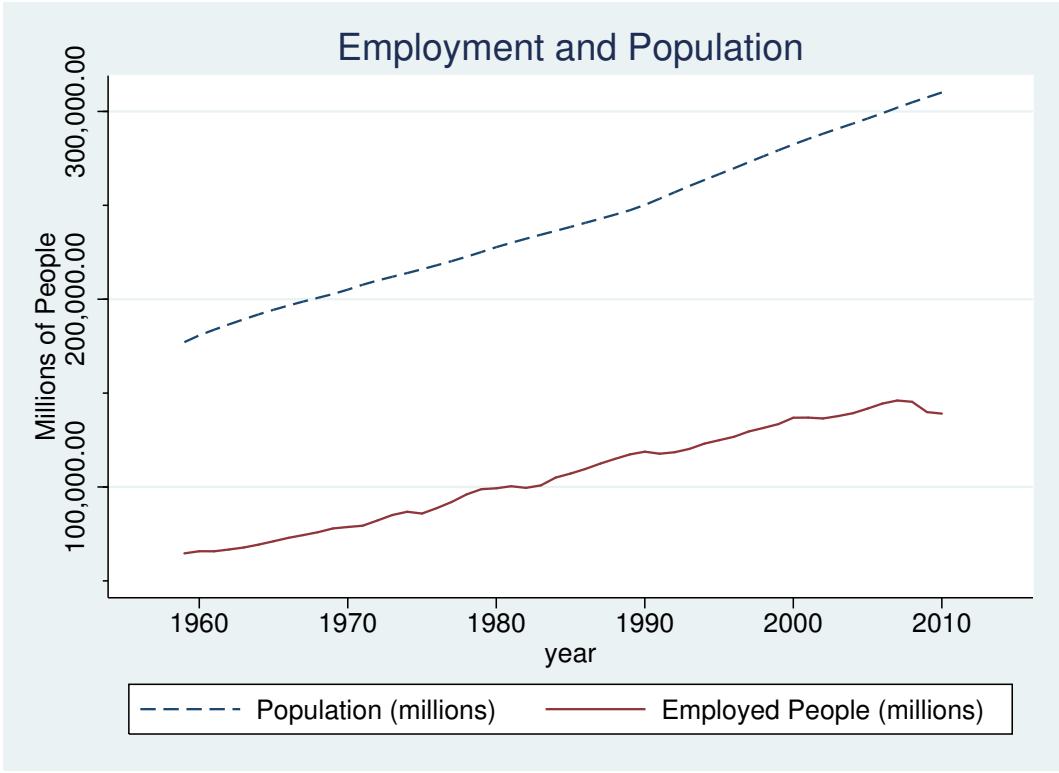


Figure 4: Population and Employment over Time

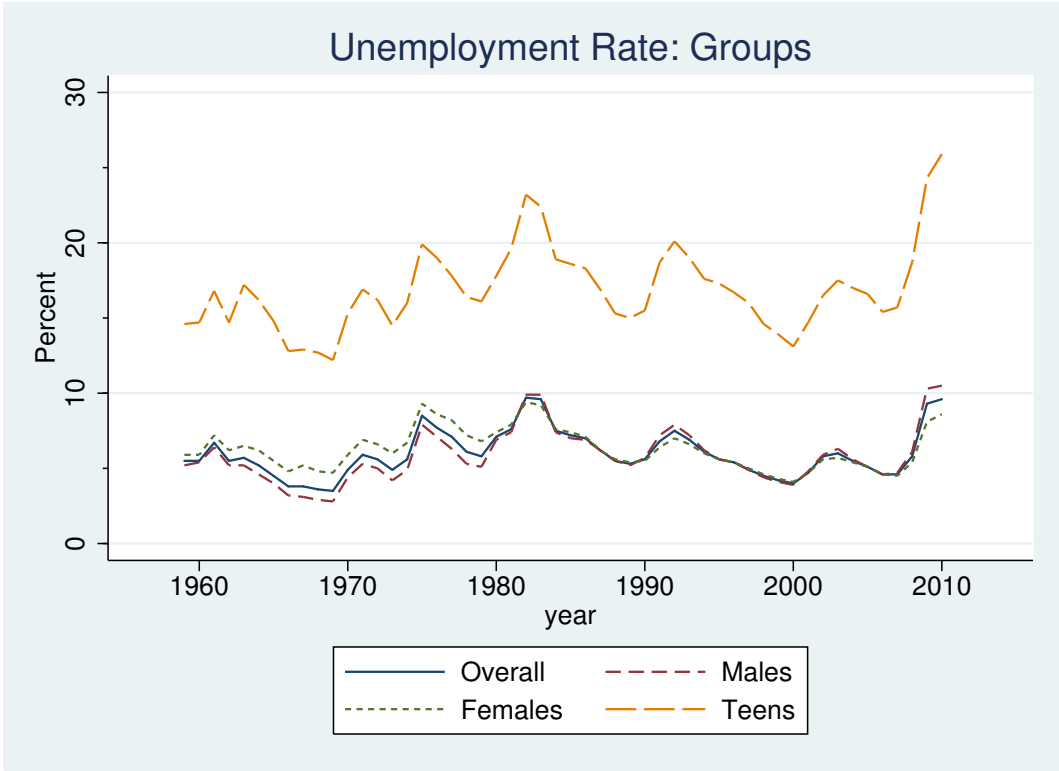


Figure 5: Unemployment Rates by Different Groups

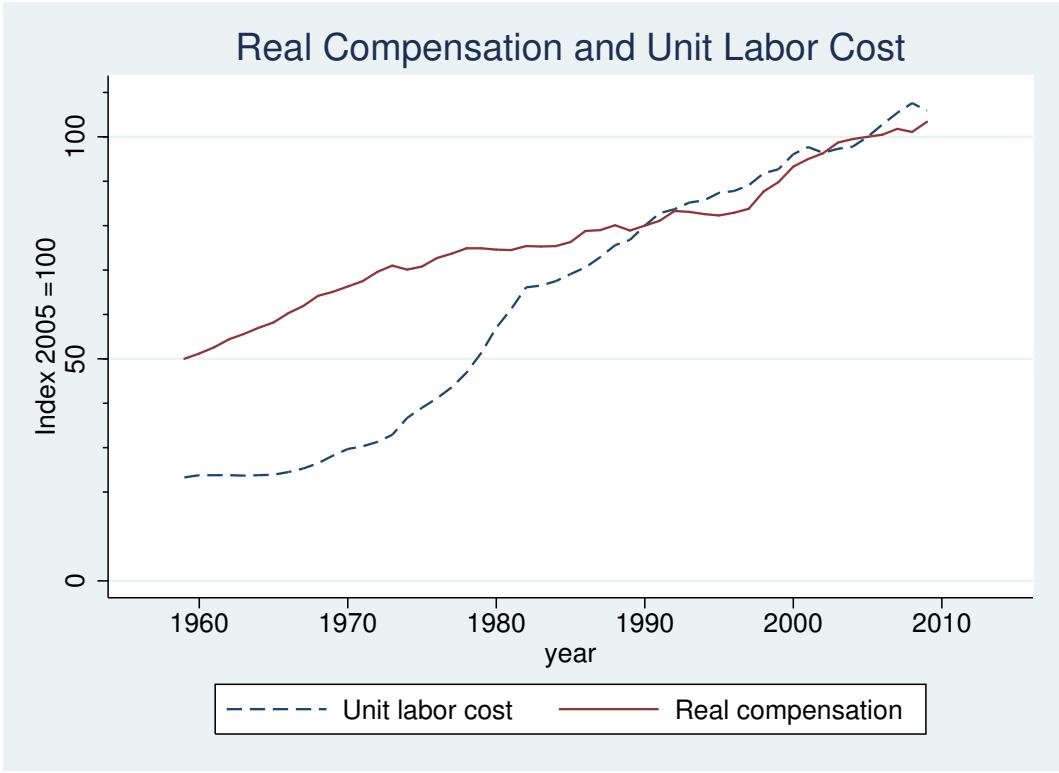


Figure 6: Real Wages and Costs

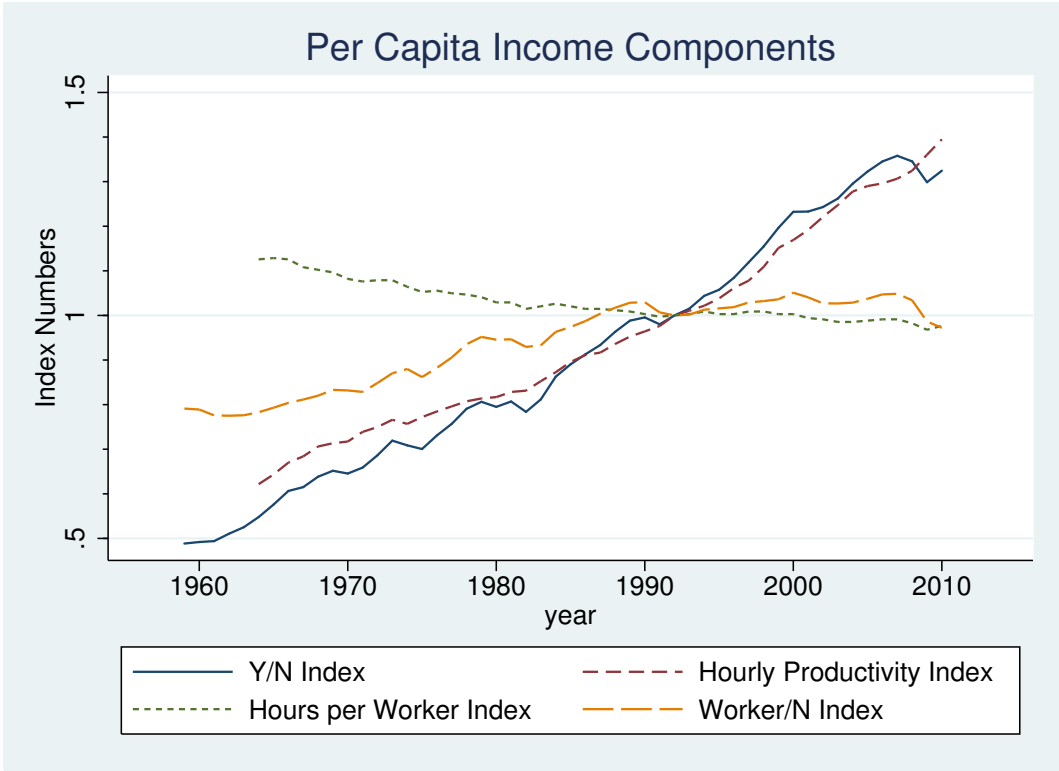


Figure 7: Decomposition of y



Figure 8: Unemployment and Trade