

Bridging the Divide:

A look at convergence within the United States

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1 Introduction

The United States is an extremely diverse country economically. Even with a strong government at the federal level, two states can be in two very different places economically. In recent years, we have seen some states boom while other states struggle. Considering the fact that there are 51 mini-economies (including the District of Columbia), do we observe any convergence among the states? Do states with higher initial Gross State Product (GSP)¹ grow slower than states with a lower starting GSP?

This paper is primarily based on the work done by Baumol (1986). Using data from 1870 to 1979, Baumol found a negative relationship between initial GDP per Work Hour and the growth rate for 16 countries. He also found that different types of countries tend to converge within their group. For example, he notes that 16 industrialized countries group together in their convergence, and the members of the USSR are grouped together. Baumol's findings are important because they help to explain the amount of economic growth we see in different countries. Applying the techniques that Baumol used, I attempt to measure how initial GSP affects growth of GSP between 1960 and 1997. I find that there is a certain level of convergence found in the American data.

2 Data

Labor productivity is calculated using data from both the Bureau of Economic Analysis and the Bureau of Labor Statistics. Following Paul W. Bauer and Yoonsoo Lee's (1996) outline for calculating labor productivity per state, I collected GSP data from the Bureau of Economic Analysis and employee data from the Bureau of Labor Statistics. As Bauer and Lee point out, the BLS does not provide work hours for each individual state. Therefore, they, and subsequently I, substituted the number of non-farm workers in each state in a given year. These two numbers would be identical if each worker worked a full 40 hour work week. Because that is not always true, the number of employees is a good, but not perfect, substitute for the number of hours worked.

After collecting the data, I used Excel to calculate GSP per Worker. I used the following formula for my calculations:

$$\text{GSP per Worker} = \ln \left(\frac{\text{GSP}}{\text{workers}} \times 1000 \right) \quad (1)$$

Where *GSP* is the GSP in a given state in a given year in millions of current US dollars and *workers* is the number of people working in a given state in a given year in thousands.

Figure 1 plots each state's GSP per Worker between 1963 and 1998. For the most part, the states tend to move together, and there isn't a lot of convergence immediately visible.

¹In 2006, the Bureau of Economic Analysis changed their terminology from "GSP" to "GDP per state". I will be using GSP for conciseness, as there is no difference in calculation.

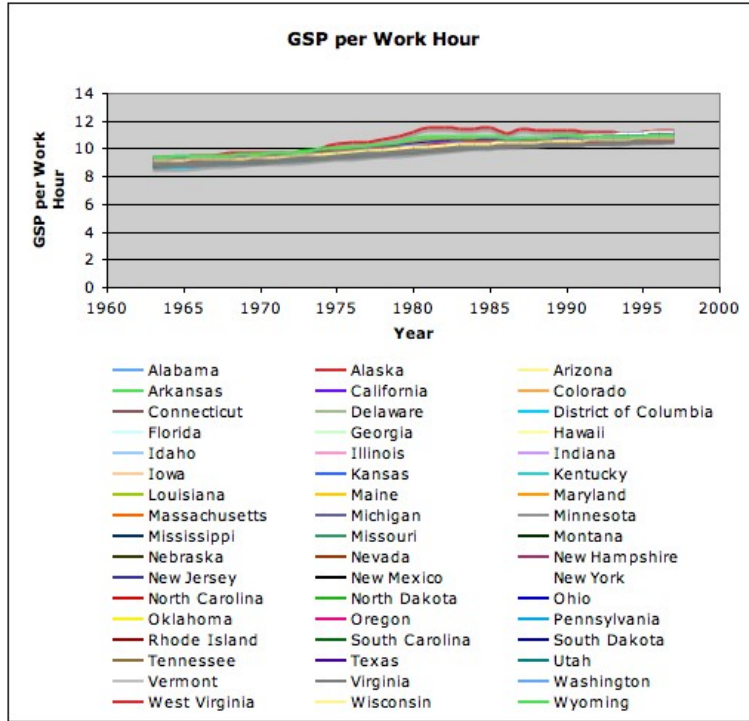


Figure 1: GSP per Worker for each of the 50 states and Washington DC between 1963 and 1998.

The final calculation that needed to be done with the data was the average GSP per Worker growth rate. To do this, I used the following equation:

$$GrowthRate_{1962 \rightarrow 1998} = \ln \left(\frac{\frac{GSP_{1997}}{workers_{1997}}}{\frac{GSP_{1963}}{workers_{1963}}} \right) \quad (2)$$

Equation (2) is used to find the average growth in GSP per worker for each state over the 36 year time frame.

3 Model

The model that I used for this analysis is very similar to the model that Baumol (1986) used in his paper. The model that I will be running takes the following form:

$$GrowthRate_{1962 \rightarrow 1998} = \beta_0 + \beta_1 \ln(GSP \text{ per Worker}_{1963}) + u \quad (3)$$

Baumol got a negative coefficient on initial GDP per Work Hour, and I expect to see a negative coefficient on initial GSP per Worker. The reasoning is simple: the theory of convergence suggests that countries with a higher starting GDP will grow at a slower rate than countries with a lower starting GDP. If that holds for states within the same Union, then the same logic can be applied here.

A negative coefficient will tell us that poorer states do, indeed, grow faster than richer states. If we get a positive coefficient, then we can conclude that richer states grow faster than poor states.

4 Results

After running my regression, I get the following results:

$$GrowthRate_{1962 \rightarrow 1998} = 7.24 - 0.60 \ln(\text{GSP per Worker}_{1963}) \tag{4}$$

Both the intercept and the coefficient for the starting GSP per Worker are statistically significant at the 1% level (see the appendix for the full set of regression output). The R^2 for the regression was 0.29. We can conclude from these results that there is a certain level of convergence taking place. The low R^2 number shows that there is a considerable amount of the growth rate that isn't explained, but 30% is explained by the initial GSP. This relationship between initial GSP and growth rate is illustrated in Figure 2.

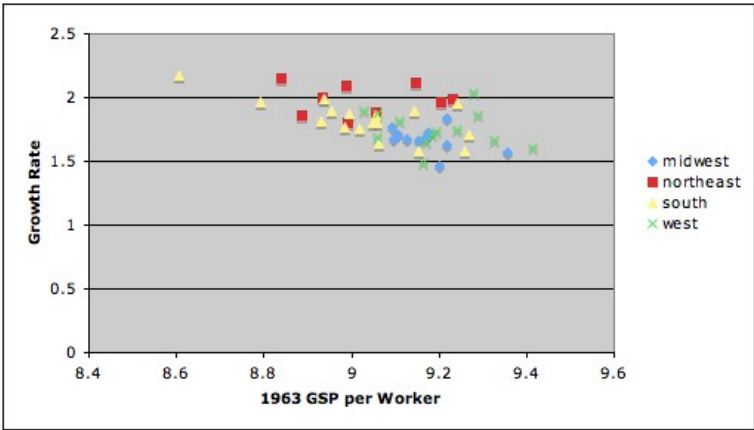


Figure 2: GSP per Worker growth rate plotted against the initial 1963 GSP per Worker for each region

Figure 2 plots each state's initial GSP per Worker against the growth rate. There is a slight, but noticeable, downward slope to the data. This graphically illustrates the negative relationship found in the regression equation above.

Each of the four US Census regions (Northeast, Midwest, South and West) are color-coded to show how each area of the country behaves. Baumol found that different types of countries behaved differently. He termed these different groups "convergence clubs." In the US data, no such convergence clubs are found. All four regions behave in roughly the same way.

The South region illustrates the classical convergence the most, as it is the most spread out and the most downward sloping. If anything, this most likely shows how diverse the South is. The region

includes poorer states from the “Deep South” and richer states like Florida, Texas and Virginia. Midwestern states, on the other hand, all tend to have a higher starting GSP per Worker and a lower growth rate.

It is also notable to compare labor productivity levels among the leaders and laggards for each year. In 1963, we find that the laggard, Washington DC, had a GSP to Workers ratio that was 91% of that of Wyoming, the leader. By 1997, Montana’s (the laggard) GSP to Workers ratio was 94% that of the leader, Alaska. Between 1963 and 1997, there is a slight upward trend in this leader-to-laggard ratio with a slight dip in the early 1980’s. Figure 3 shows this relationship as well as the difference between the leader’s productivity and the laggard’s productivity.

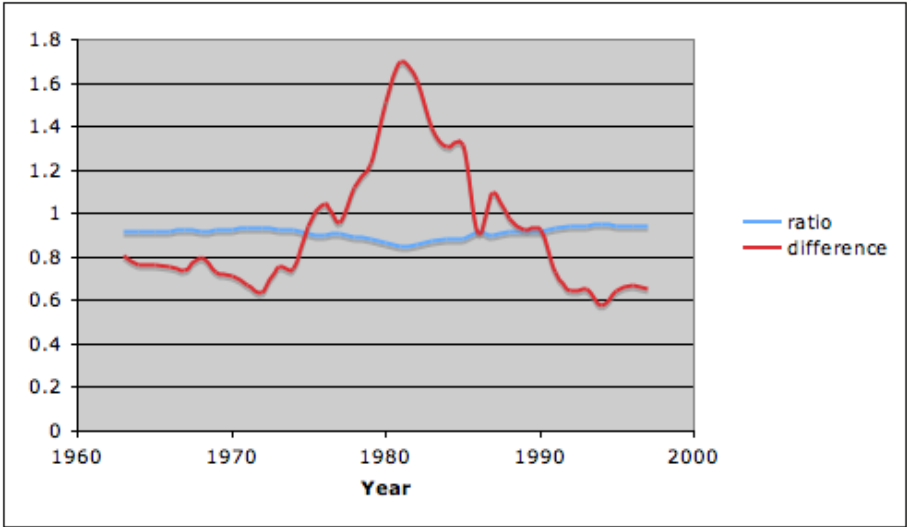


Figure 3: Difference in productivity and the ratio of productivity between the leader and the laggard for each year.

5 Conclusion

Like Baumol found with various countries, I found that there is a certain level of convergence among the fifty States. The convergence found here was not as strong as Baumol found, but it is still present. One of the biggest problems that I encountered was the lack of a good, comprehensive data set. I believe that the evidence for convergence would be much stronger if data were available for a longer amount of time. If the data started after the Civil War instead of the early 1960’s, I think that there would be much more convergence found. By the 1960’s, the South had made up much of the economic divide with the North that was so prevalent for so long. Some of that gap was still there, and that is shown in the above results, but much – if not most – of the convergence most likely happened prior to

the start of the data set.

This paper shows that the idea behind convergence does not solely apply to international discussions. Convergence can be used to describe why certain areas within a country grow faster than others. The founders of this country envisioned states having a great deal of autonomy from the federal government. This allows the states to have a lot of freedom to enact their own economic policies. These varying economic policies have set the stage for convergence to happen. The results presented in this paper show the convergence that did happen between states between 1963 and 1997. From these result, we can better understand why certain states out perform other states, and where states' economies may be headed in the future.

Appendix

	Coefficient	Standard Error	p-value
Intercept	7.25	1.20	2.3×10^{-7}
GSP per Worker in 1963	-0.60	-4.50	4.06×10^{-5}

$R^2 = 0.29$

Table 1: Regression Output

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