Labor Force Participation and Human Capital Attainment in States: A Survey of the United States 2010-2019

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Abstract

I analyze the relationship between the monthly labor force participation rate (LFPR) and human capital attainment in each state from 2010-2019, later aggregating the data for nationwide insight. Using monthly, per-state labor series from FRED and education data from the US Census Bureau, I conduct an OLS and two-way fixed-effect regression to identify correlations between and within states over time. I find that there is a statistically significant correlation between the share of the population obtaining at least a bachelor's degree and the labor force participation rate among all states from 2008 to 2019. Most notably, however, is the lack of a clear relationship between increases in education rates and LFPR within each state when accounting for all other time-invariant factors, including economic mobility, fiscal policies, and geography.

1 Introduction

One of the main statistics of study in the field of development economics is the labor force participation rate. Although moderately subjected to cyclical influences, LFPR encompasses the amount of labor resources available in an economy for the production of goods and services, which is generally the product of longer-term structural characteristics of an economy. These include the strength of institutions[1] and labor incentives, including Social Security and employer-provided pensions[2]. In his Nobel Prize winning work, Acemoglu refined his definition of institutions to 'inclusive institutions' that broadly distribute intellectual, innovative, and political power to the people. In this report, I aim to clarify the relationship between LFPR and enrollment in Universities, which play a major role as inclusive institutions in distributing human capital. With a better understanding of this correlation, I hope to equip myself for future study in development economics with the mission of improving access to inclusive institutions around the world.

[1] Daron Acemoglu and James A. Robinson, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* (New York: Crown Business, 2012), 45.

[2] Monthly Labor Review, September 2016, Steven Hipple

2 Data and Methods

This analysis uses a state-level panel dataset covering all 50 U.S. states and Washington, D.C., from January 2010 to December 2019 (N = 510 state-year observations). The dependent variable is the annualized average Labor Force Participation Rate (LFPR) for each state. The monthly LFPR data were sourced from the Federal Reserve Economic Data (FRED) "CIVPART" series and annualized to match the frequency of the explanatory variable, while leveraging as many data points as possible for statistical robustness.

The key independent variable is the bachelor's_share, defined as the portion of the US population 25 years of age and above while holding at least a bachelor's degree. This data was sourced from the U.S. Census Bureau's American Community Survey (ACS) 1-year estimates.

To examine the relationship between these variables, I first deploy an Ordinary Least Squares (OLS) model:

$$\text{LFPR}_{it} = \beta_0 + \beta_1(\text{bachelors\_share})_{it} + \epsilon_{it}$$

In this model, i indexes the state and t indexes the year. This model, however, certainly suffers from omitted variable bias, as it fails to account for unobserved, time-invariant differences between states including working culture and overall economic prosperity (invariant in this range). There are likely other time-variant factors that are omitted, and are outside the scope of this project, including age demographics, and business development.

I therefore select a Two-Way Fixed Effects (TWFE) model, which aims to address such issues by ignoring state and year fixed effects. This is calculated by subtracting the average LFPR rates from each entry, leaving only the variation caused by changes in education to be modeled.

$$\text{LFPR}_{it} = \beta_1(\text{bachelors\_share})_{it} + \alpha_i + \gamma_t + \epsilon_{it}$$

Here, α_i (alpha) represents the fixed effects of the state, which absorb all of the time-invariant characteristics from each state i. The term γ_t (gamma) represents the fixed effects of the year, which captures any variation at the national-level common to all states in year t. This TWFE model isolates the effect of bachelor's share by only using within-state variation (i.e., how a state's LFPR changes when its own education share changes), providing a more credible estimate of the relationship.

3 Results

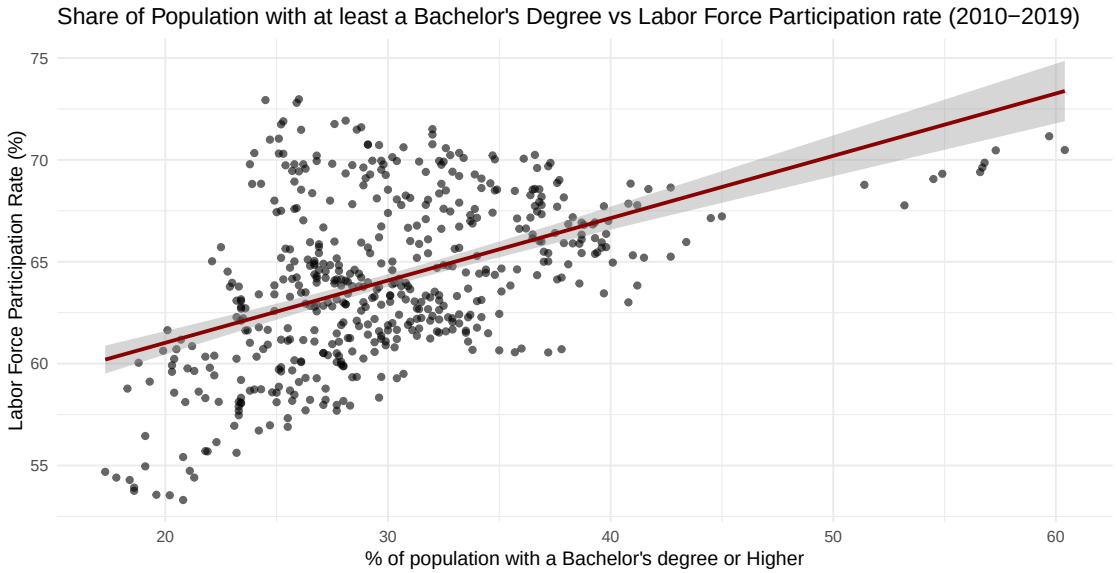

Figure 1: Education and LFPR by state-year. Each point is a state-year; line shows fitted values.

Regression evidence

Table 1: Effect of Education Share on Labor Force Participation Rate

	(1) OLS (Pooled)	(2) Two-way Fixed Effects
Variables		
bachelors_share	0.306***	-0.085*
	(0.024)	(0.050)
(Intercept)	54.909***	
	(0.752)	
Fixed Effects		
State Fixed Effects	No	Yes
Year Fixed Effects	No	Yes
Model Statistics		
Observations	510	510
R^2	0.236	0.975
R^2 (Within)	–	0.006

Note: Standard errors in parentheses.
* p¡0.1, ** p¡0.05, *** p¡0.01

The regression results in Table 1 highlight the prominent difference between the two models. The pooled OLS model in Column (1) finds a positive and statistically significant coefficient (0.306, $p<0.01$). This result, which can be seen in Figure 1, suggests that a 1 unit increase in a state's bachelor's share is associated with a 0.306% increase in LFPR. However, the TWFE model in Column (2), which is expected to be more accurate, tells a very different story. After controlling for all time-invariant state characteristics (α_i) and national-level trends (γ_t), the relationship disappears. The coefficient becomes small and negative (-0.085) and is only weakly significant ($p<0.1$).This reversal implies that the positive OLS result was likely influenced by variables that were omitted in this report. This implies that unobserved factors that are stable over time in a given state, including economic strength and structure are likely correlated with both higher education shares and higher labor force participation. The OLS model naively attributed this correlation to education.

4 Discussion

The key finding of this analysis is that the simple, positive correlation between higher education and labor force participation appears to be limited, driven by unobserved, time-invariant differences between states rather than a causal effect within them.

This report does not aspire to contribute to or critique existing literature in the space. With that said, I hope this report may serve as a resource for aspiring economic researchers as it did myself. The formatting and structure of this report was motivated by professional publications in the space, and employed tools that will only become more valuable in the progression of one's academic career.

References

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