
THE IMPACT OF UNIONS ON SOUTH CENTRAL STATE ECONOMIES: A STEADY STATE ANALYSIS

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INTRODUCTION

What do unions do?ⁱ Given their effect on measures of economic health, unions are capable of having an unfavorable impact on state economies. The degree of their negative influence can be witnessed through state's steady state measures of growth. Steady state measures provide an opportunity for state policy makers to compare their state's condition with others, and to determine the effect that a policy change would have within their state. This information provides an analytical tool for states considering laws regarding labor and industry.

Using a model applied by Pantuosco et al. [20] for the US states, we use annual data for a panel of the 48 contiguous states to estimate a series of three pairs of simultaneous equations. With a focus on the states within the West South Central and East South Central regions of the US, the equations were solved to estimate the steady state rates of six economic measures: gross state product growth (GSP), productivity growth, unemployment rates, wage inflation, population growth and employment growth. a series of simultaneous equations. The differences in state growth rates stems from state specific differences in input measures, such as union density percentages.

Union density percentages have been in the state of flux throughout the time period of 1977 to 1996. This twenty-year period encompasses two full business cycles. The time period was chosen with the soft landing of 1996 as the end period. This ending time frame permits us to compare the influence of unionization changes on the steady state. The states of the East South Central and West South Central have experienced on average a 32 percent decrease in their percent of union density. Seven of the states displayed decreases of between thirty and forty percent. While, Oklahoma, one of the two states in the survey not covered by right to work laws, displayed a mere ten percent declineⁱⁱ. Alabama, Kentucky and Oklahoma exhibit union density percentages above 10 percent. Clearly, the right to work status influences union density percentages. But, how much do these levels of union density impact a state's economic barometers?

THEORY AND EVIDENCE

The first pair of simultaneous equations addresses the joint determination of unemployment rates and wage inflation.

$$UR = b_0 + b_1 * LAGUR + b_2 * UNION + b_3 * LAGGSP + b_4 * WAGINF + e \quad [1]$$

$$WAGINF = a_0 + a_1 * UNION + a_2 * UR + a_3 * STATE + e \quad [2]$$

UR is the annual unemployment rate; WAGINF is annual change in the average weekly salaries of covered employees; UNION is the annual average percentage of

employed workers who are union members; LAGUR is the lagged annual unemployment rate; LAGGSP is the lagged annual GSP growth rate; and, STATE dummy variables were included for the eight states in the South Central regions. All regressions are run for the period from 1977 to 1994.

One factor shown to impact state unemployment rates is the union density of the employed. Summers [23] attributed the rise in the natural rate of unemployment to the level of union density within a state. Even though unionization rates decreased over his sample period, Summers determined that aggregate unemployment rates fell by less in the state's that carried higher unionization rates. Lindbeck and Snower [15], and Layard et al. [14] have also estimated a positive relationship between union membership and unemployment rates.

GSP growth has been found to have an inverse relationship with unemployment rates [18], [24], [3] and [19]. Wage inflation was added to the unemployment rate equation as a feedback term. The lagged unemployment rate simply captures past errors, and provides an estimate for the level of persistence in the dependant variable.

One of the promises of union organizers is their ability to bargain for higher wages and higher wage increases than their non-union, or unorganized, counterparts. With this in mind there has been a multitude of studies estimating the impact that unions have on wages. The more militant the union the greater wage bargaining power [5]. Even though unions represent a small percentage of the employed, spillover effects of their wage impact can reverberate through the state's economy. Freeman and Medoff [8] and other researchers [4] [6] [22] provide evidence to support the claim of the AFL CIO that unions do indeed raise wages. Linneman et al. [16] found union rents to increase over their sample period.

The coefficient of the unemployment variable in the wage inflation equation captures the Phillips relation [21]. Hyclak and Johnes [12], who estimate a similar equation to the one above, verify the Phillips relationship for US states. State dummy variables are included to capture fixed effects of the equation.

The second pair of equations in our model focuses on the joint determination of GSP growth and productivity growth.

$$\begin{aligned} \text{PROD} &= b_0 + b_1 * \text{LAGPROD} + b_2 * \text{UNION} + b_3 * \text{GSP} + b_4 * \text{LAGUR} + b_5 * \text{WAGINF} + e \quad [3] \\ \text{GSP} &= a_0 + a_1 * \text{LAGGSP} + a_2 * \text{UNION} + a_3 * \text{PROD} + a_4 * \text{LAGUR} + a_5 * \text{POP} + a_6 * \text{STATE} + e \quad [4] \end{aligned}$$

GSP is the growth rate of the GSP; PROD is the productivity growth rate; and POP is the growth rate of the population. Annual data was used in the construction of each variable.

The relationship between unions and productivity is controversial, and to date there is no consensus. Freeman and Medoff [8] theorize that the "collective voice" of unions enhances the productivity of the firm. Some researchers question this result claiming that even if unions appear more productive, the productivity increases may stem from a wage effect, shock effect, or even biased surveys [1] and [10]. There are even those who estimate that unions have a negative effect on productivity [9] and [17]. All of the studies are mired with econometric issues and industrial distortions that cloud their conclusions.

Studies find that unions impact GSP indirectly. Unions have been associated with lower capital investment [9], lower employment in the manufacturing sector [11], and reductions in labor demand [16]. All of these findings lead to lower GSP.

Population growth is expected to increase GSP growth. And, as previously noted, the relationship between unemployment rates and GSP growth is expected to be negative [18].

The third pair of simultaneous equations examines the joint determination of population growth and employment growth.

$$\text{POP} = a_0 + a_1 * \text{LAGPOP} + a_2 * \text{UNION} + a_3 * \text{EMP} + a_4 * \text{LAGGSP} + a_5 * \text{STATE} + e \quad [5]$$

$$\text{EMP} = b_0 + b_1 * \text{lag EMP} + b_2 * \text{UNION} + b_3 * \text{POP} + b_4 * \text{LAGGSP} + b_5 * \text{LAGUR} + e \quad [6]$$

POP and EMP are the annual growth rates of population and employment, respectively.

Over the past twenty years the exodus from the highly unionized states to the Southern "Right to Work" states has raised issues of concern and opportunity for state governments. Holmes [11] finds that labor is mobile from Closed Shop to Right to Work states. In other words, the jobs attract the workers. If indeed unions are responsible for lower GSP, less jobs, and higher unemployment rates, union density can be a factor in the migrant's motive for moving. Kahley [13] claims that economic conditions, such as employment growth and GSP growth, are important determinants in the worker's decision to migrate. With these studies in mind, population growth is expected to be lower in states rich in union density.

Eberts and Stone [7] claim that unions decrease labor demand and thus employment growth. Researchers who disaggregate unions into private and public sectors could challenge this finding. There is evidence to suggest that public sector unions add employment [2]. Since private unions dominate overall union membership, it is expected that the negative effect of private unions will outweigh any positive effect of public unions.

The pairs of equations were pre-selected because of their theoretical and empirical interdependency (endogeneity).ⁱⁱⁱ Thus, we contend the rates of unemployment and wage inflation are determined simultaneously in the labor market. The rates of productivity growth and GSP growth also are determined simultaneously, as are the rates of employment growth and population growth. Each of the six equations contains a constant term, a unionization variable, and a feedback component (which is the dependent variable within its pair.) When appropriate we used dependent variables from the other five equations as control variables. In each equation, our focus is on the union variable. The estimates from the model above are derived from a panel of 48 contiguous US states. Each pair of equations is then re-estimated to include state fixed effect measures for the states of the South Central US. The coefficients from the estimation equations provide a well-defined system of simultaneous equations that can be solved for the steady state solution. The fixed effect levels for each state and the exogenous percentage of union density provide a unique solution for each state. To illustrate the impact of fluctuations in union density, the system is solved first by using the end of sample data for all variables in 1994. Then the system is solved again using the out of sample data point of 1996 for union density.

The results from our regression analysis are reported in Table 1. The estimates of the simultaneous equations of the labor market are reported in columns 1 and 2. Union membership has a significant positive effect on the unemployment rate and the rate of wage inflation. As expected, the results indicate the lagged measure of growth in GSP has a negative significant impact on unemployment rates. The

constant terms of unemployment and wage inflation reveal positive trends. Also, the lagged coefficient of 0.737 indicates that unemployment rates are slow to adjust. The coefficient of the unemployment rate in the wage inflation equation can be interpreted as the slope of the Phillips curve.^{iv}

TABLE 1
South Central State Variations
(absolute *t*-statistics)

	(1) <i>UR</i>	(2) <i>WAGINF</i>	(3) <i>PROD</i>	(4) <i>GSP</i>	(5) <i>POP</i>	(6) <i>EMP</i>
Constant	.019** (2.7)	.077*** (8.9)	.020*** (3.6)	-.0009 (0.1)	.003*** (3.4)	.006*** (3.1)
Lagged Dependent	.737*** (7.4)	.	.125** (2.5)	.178*** (3.8)	.685*** (16.8)	.086** (2.2)
<i>UNION</i>	.045*** (3.4)	.184*** (8.3)	-.072*** (3.6)	-.041** (2.4)	-.001** (2.3)	-.020* (2.1)
Feedback Variable	-.116 (1.7)	-.742*** (4.8)	-.366*** (3.2)	.638* (1.8)	.008 (0.1)	.603*** (6.5)
<i>LAGGSP</i>	-.102** (2.6)				.070*** (3.7)	.172*** (6.2)
<i>LAGUR</i>			.071 (1.2)	.196*** (5.5)		
<i>WAGINF</i>			.071* (2.0)			
<i>POP</i>				.803*** (5.3)		
<i>PROD</i>	.029 (0.9)					
<u>States</u>						
<i>AL</i>	.020** (2.7)		.008* (2.1)			.010** (2.2)
<i>KY</i>	.005 (0.6)		-.0008 (0.1)			.005 (1.1)
<i>MS</i>	-.014* (1.8)		.001 (0.2)			.001 (0.3)
<i>TN</i>	-.010 (1.4)		-.009* (1.8)			-.010** (2.3)
<i>AR</i>	.024** (3.0)		.011** (2.4)			.013** (2.7)
<i>LA</i>	.233** (2.9)		.0001 (0.0)			.006 (1.2)
<i>OK</i>	-.019** (2.5)		.004 (0.6)			.002 (0.5)
<i>TX</i>	.754 (1.0)		.006 (1.1)			.006 (1.4)
<i>R-squared</i>	.68	.10	.34	.65	.64	.39

Note: *(**, ***) = significant at the 0.05 (0.01, 0.001) level, two-tailed test.

The third and fourth columns of Table 1 report the results from the simultaneous analysis of production growth and growth in GSP. In both equations, the rate of union membership has a significant negative impact. A decline in union membership within a state results in an increase in productivity growth and an increase in the growth of GSP. The lags of production growth and growth in GSP are positive and significant. The feedback term between the dependent variables indicates that GSP growth and production growth are interrelated. While growth in production is positively linked to GSP growth, GSP growth has a negative feedback on production growth. Growth in production spurs contemporaneous growth in GSP. The effect on productivity growth of the lagged unemployment rate is not significant. Wage inflation has a significant positive link to productivity growth, which is consistent with the "wage effect" theory of employment.

The estimation of the final set of simultaneous equations, presented in columns 5 and 6, show the influence of union membership on states' rates of population and employment growth. Union membership has a negative significant impact on population growth and employment growth. This supports the idea that high union states are losing jobs and population to states with low union membership. Combined with the positive effect of union membership on unemployment rates, this indicates that union membership increases the number of people looking for employment, and decreases employment opportunities. Both equations show a significant positive effect of the lagged dependent term and a significant positive impact on GSP growth.

STEADY STATE PATTERNS OF GROWTH

The estimates from the simultaneous equations provide an interdependent system of state level economic variables. Given the fixed effects associated with each state from Table 1 and the exogenous level of unionization, this system can be solved to yield the steady state growth rates for unemployment, wage inflation, GSP, productivity, employment, and population. To illustrate the influence of changes in unionization the steady state solution for each state within the region is presented in Table 2.

The first six rows of data provide solved state level growth rates given the 1994 rates of unionization. The lower half of the table recalculates the steady state solutions given the rate of unionization in 1996. This analysis permits us to compare the impact of unionization between states and the impact of changes in unionization on the potential growth within a state.

Due to the influence of fixed effects within the model the steady state comparison between states is not a simple matter of determining that the state with the highest or lowest level of unionization must have the highest or lowest level of growth. For example, Alabama has the highest level of unionization. This raises the level of unemployment and reduces GSP for Alabama. However, Tennessee with a slightly lower rate of unionization fares much worse in terms of GSP growth and unemployment rates. The drop in unionization in Alabama between 1994 and 1996 reduces the long-term steady state unemployment rate and raises the potential growth rate for GSP. The impact of declining unionization is shown in Figure 1. In Oklahoma the rate of unionization rose between 1994 and 1996. This negatively effected employment growth and raised unemployment as shown in Figure 2. In general the fixed effects were largest and most significant in Alabama and Arkansas.

These fixed effects capture state specific dynamics that are not included in the model specification.

TABLE 2
Steady State Fixed Effects, 1994 & 1996

Steady State Fixed Effects	AL	KY	MS	TN	AR	LA	OK	TX
Prod Gro	0.478%	0.792%	0.679%	0.981%	0.603%	0.851%	0.424%	0.683%
GSP	4.257%	3.659%	4.392%	2.924%	4.943%	4.056%	4.541%	4.632%
UR	3.761%	4.838%	4.989%	6.354%	2.301%	4.284%	5.516%	3.488%
Wage Inf	9.489%	6.729%	3.747%	4.149%	9.900%	6.179%	3.290%	7.162%
Pop Gro	1.632%	1.555%	1.874%	1.327%	1.987%	1.769%	1.835%	1.925%
empgro	3.405%	2.737%	2.787%	0.715%	4.169%	3.110%	2.825%	3.402%
Union 1994 data	13.900%	11.500%	6.400%	11.900%	7.900%	7.700%	8.800%	7.000%
Steady State Fixed Effects	AL	KY	MS	TN	AR	LA	OK	TX
Prod Gro	0.554%	0.755%	0.697%	1.052%	0.627%	0.839%	0.375%	0.695%
GSP	4.459%	3.562%	4.440%	3.109%	5.007%	4.024%	4.412%	4.664%
UR	3.323%	5.048%	4.883%	5.952%	2.161%	4.354%	5.795%	3.418%
Wage Inf	9.354%	6.793%	3.715%	4.024%	9.857%	6.200%	3.376%	7.140%
Pop Gro	1.757%	1.495%	1.905%	1.443%	2.027%	1.749%	1.755%	1.945%
empgro	3.582%	2.652%	2.829%	0.878%	4.225%	3.082%	2.711%	3.431%
Union 1996 data	11.400%	12.700%	5.800%	9.600%	7.100%	8.100%	10.400%	6.600%

FIGURE 1
Unionization Drop in Alabama

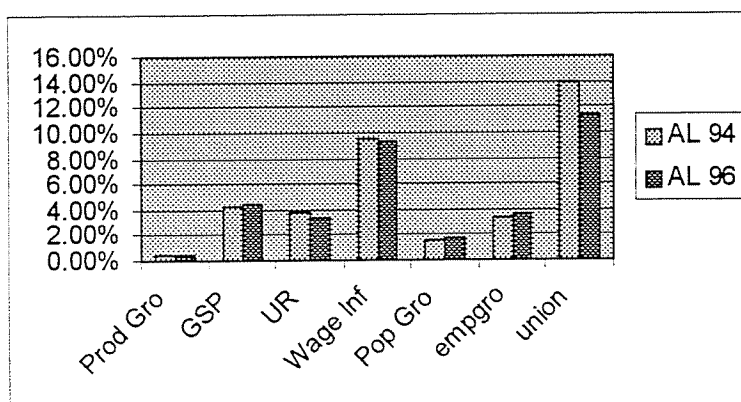
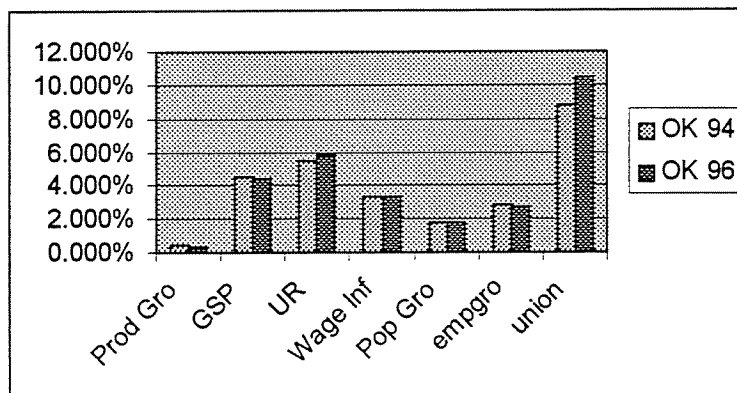


FIGURE 2
Unionization Rise in Oklahoma



CONCLUSION

The steady state solutions suggest that the dynamics are in place for all states in the region to continue growing at a moderate pace. The concern of policy makers in some of the states, in particular Alabama and Arkansas, is how to continue growth without wage inflation and labor shortages. Indeed, the positive impact of decreased union density percentages has been significant throughout the economy, but this trend may not continue at such a vigorous pace. Wage inflation may be on the horizon. Should unionization continue to decline in these states, the opportunity for expanded growth, lower wage inflation, and reduced unemployment is enhanced. The path of unionization, in either direction, presents challenges for state officials with respect to the performance of each of the economic measures of health. The use of the steady state solution is not a substitute for state level analysis of macro-dynamics. Rather it provides a framework to measure the direction and relative strength of the interrelationship of these variables.

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Data Sources

Data on employment and unemployment are taken from the U.S. Department of Labor,

Bureau of Labor Statistics.

Gross state product (GSP) data and population data are from the U.S. Department of Commerce, Bureau of Economic Analysis.

Union membership data are from the United States Statistical Abstracts and diskettes from Hirsch and Macpherson [9].

Wage data are from the U.S. Department of Labor, Employment, and Training Administration.

ENDNOTES

ⁱ This question was the topic of Freeman and Medoff's in their 1984 book entitled *What Do Unions Do?*

ⁱⁱ Kentucky is the other state not covered by right to work laws. Texas passed right to work legislation in 1993.

ⁱⁱⁱ For a panel study of state data, econometric issues of multicollinearity, autocorrelation, and heteroscedasticity can arise. We use rates of change to mitigate heteroscedasticity and autocorrelation. Lagged variables control for autocorrelation and provide a measure of hysteresis. Estimating simultaneous equations controls for multicollinearity and is a preferred method for testing in the presence of heteroscedasticity. The simultaneous-equations technique is equivalent to a three-stage least squares estimation with instrumental variables. These equations are over-identified. Fixed effects are considered for those states within the region.

^{iv} Using a fixed effects model at the regional level produced similar results and is not reported separately.

