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Can We Decentralize Our Unemployment Policies? Evidence from the United States

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I. INTRODUCTION

We are grateful to Bruno Frey for his stimulating intellectual conversation and superb collegiality throughout the years. That stimulation has been no greater than in the subject area of federalism. In Frey and Eichenberger (1996), for example, the authors stake out a provocative position – that the European Constitution should be modified to allow the evolution of functional, overlapping, and competing jurisdictions – in essence a centrally mandated system of decentralized governmental competition. Indeed, in much of his writing, Bruno Frey has made the case for decentralized federalism – a case with which we have substantial sympathy. Interestingly, however, one area in which the case for decentralization has not been well received has been with respect to macroeconomic policy. We have, elsewhere, raised concerns about centralized macro policy in the context of an analysis of the European Monetary Union (Inman and Rubinfeld 1992, 1994). In this paper we take a different perspective – we ask whether from the U. S. experience unemployment policies can be effectively decentralized.

It is an accepted proposition of public finance that only the most central, national government can successfully manage an economy's macro-economic swings and the resulting unemployment of economic resources. The mobility of factors of production across subregions of a national economy and the high propensity of a region's residents to spend their incomes on 'imported' goods have generally been taken as decisive arguments against the use of subnational policies for managing unemployment[1]. Surprisingly, prior the middle 1990's,

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1. Oates (1972) is the standard reference on this point; see particularly chapter 1 and its Appendix. Oates mentions a third possible difficulty for running subnational fiscal policies, the fact that local debt will generally be held as 'external debt' by nonresidents. Thus when that debt is repaid, repayments flow from the regional economy creating a fiscal drag on the economy at a later date. True as this may be, in today's international financial economy the argument cannot be used to establish a comparative advantage of national over subnational fiscal stabilization policies.

very little empirical evidence had been presented to verify these underlying arguments for the centralization of economic stabilization policies in the U. S., and what evidence there was – notably from Gramlich (1987), Eichengreen (1990), and Blanchard and Katz (1992) – was only mildly supportive of the centralization hypothesis. Events of the past decade, including the ongoing debate about European monetary union, have made it essential that scholars look more closely at the empirical validity of these and other assumptions.

Historically the federalism debate has focused on whether there is a need for regional stabilization policies in the first place. When a particular regional economy receives an economic shock, the response of the private economy and the public sector will attenuate the effects of that shock to some extent. This attenuation can arise because of built-in stabilizers (the tax obligations of the region will tend to decrease, while subsidies will tend to increase), or because of labor adjustments (workers will move to other regions to find employment). If such attentuation were substantial, there would be no need for a regional stabilization policy. However, the evidence, which we examine briefly, suggests that significantly less that half of all such shocks are likely to be reduced.

We begin with unemployment insurance. Here, the literature suggests that the program gets mixed reviews at best. This is due in part to the significant moral hazard problems created by such insurance, and in part to the externalities created by a relatively mobile labor force[2]. What about discretionary fiscal policy? With respect to the ability of state governments to utilize their fiscal budgetary controls to respond to economic shocks, the evidence is mixed as well. Sorensen and Yosha (2000) point to the fact that many states utilize their own 'rainy day' funds (accumulations of budget surpluses) to buffer local economies during downturns. Yet, the presence of balanced-budget rules in most states does significantly restrict the ability of states to respond to shocks[3].

Over the past decade a substantial literature has attempted to evaluate the cumulative effect of all automatic and statutory stabilization problems. Sala-i-Martin and Sachs (1991) are on the high end – they believe that approximately 40% of economic shocks are stabilized, whereas von Hagen (1992) suggests a number closer to 10%. For similar studies applied outside the U. S., see Bayoumi and Masson (1995, Canada), Goodhart and Smith (1993, UK, Canada), Pisani-Ferry, Italianer, and Lescure (1993, France), and Zumer (1996, France). The most recent study, whose coverage included all of the aforementioned

2. For further discussion, see Topel and Welch (1980), Topel (1984), Bronars and Jansen (1987), and Terkla and Doeringer (1991).
3. See, for example, Eichengreen and Bayoumi (1994), Poterba (1994), and Bohn and Inman (1996).

countries, is by Melitz and Zumer (2000). They find that automatic stabilizers reduce the effects of shocks by 20% for the U. S., France, and the UK, and from 10% to 14% in Canada[4].

Whatever the empirical evidence, it is clear that in the United States, political paralysis over the size of the national deficit had effectively removed stimulatory fiscal instruments from the central government policy agenda for a decade; this has only changed in the past several years, as governmental surpluses have become the norm in the U. S. At the same time, in Western Europe, the move towards a European Community and European Currency Union has taken away country-specific monetary policies as a means to stimulate employment, leaving the member states only decentralized fiscal policies as instruments to control their unemployment. Finally, the newer capitalist economies of Eastern Europe, mostly small open economies, must also consider the efficacy of fiscal policies for the control of local unemployment. They can no longer rely on the central state to plan and purchase outputs.

It is not surprising that the experiences of the local and regional economies of the United States has offered a useful laboratory to test the potential efficacy of decentralized fiscal policies for the control of local unemployment. Not only is the United States economy well characterized as an active trading network of distinct subeconomies, each with their own comparative advantages, but the U. S. economy is managed as a true monetary union with limited barriers to trade. If local fiscal policies can have significant effects on local unemployment in this environment, then decentralized fiscal policies must be considered as serious policy instruments for economic stabilization by other federalist systems as well.

This paper provides empirical evidence concerning an assumption that is necessary for the proposition that only central government fiscal policies can effectively manage unemployment within an economic union: that factors of production are highly mobile across regions. We test this assumption by examining the persistence of unemployment within individual U. S. states and the relationship between unemployment in individual state and unemployment within neighboring states. Section II provides a simple model of a local labor market in an open economy; the model allows for less than instantaneous adjustments of labor supplies to exogenous shocks to labor demands. Section III

4. Melitz and Zumer attribute most of the disagreement over the magnitude of the automatic stabilizers to accounting, not econometric differences, arguing that when questions of stabilization at a region are at issue, the right transfers should take into account lower-level governments and firms as well as individuals. Two recent studies, which take this general perspective, Asdrubali, Sorensen, and Yosha (1996) and Obstfeld and Peri (1998), find relatively low stabilization effects. See also Arreaza, Sorensen, and Yosha (1999).

uses the structure of the model to motivate various empirical tests of local labor mobility and the resulting persistence of local unemployment. The evidence suggests significant persistence, rejecting one of the key assumptions behind the argument for limiting stabilization policies to central governments. It also suggests that effects among neighboring states are not sufficiently substantial to provide the basis for a regional rather than a state stabilization policy. Section IV offers a few concluding remarks which attempt to place our work in the broader research agenda for deciding stabilization responsibilities within a federalist public economy.

II. LOCAL LABOR MARKETS AND LOCAL UNEMPLOYMENT

States within the U. S. are small, open economies. Employment, the size of the labor force, and unemployment are economically connected to the wider national product and labor markets. The equilibrium model of state employment specified below allows firms within the state to sell their outputs both locally and nationally; the model also allows for potential workers within the state to seek employment both locally and nationally. Firms are profit-maximizers and hire workers from a state labor market. Workers within the state can seek employment in the state labor market or they can migrate to more attractive alternatives outside the state when the expected net returns from the migration are positive. Equilibrium migration to these more attractive alternatives does not occur instantaneously, however. The lags in the state's adjustment to equilibrium employment, given labor's alternative net wage outside the state, create temporary unemployment within the state.

Equilibrium employment within the state is specified by a six equation model of the state's labor market[5]. Equations (1) and (2) define the production technology for output produced and the marginal costs of production in state s:

$$q_s = f(n_s; k_s, \varepsilon_s) \quad \text{and} \tag{1}$$

$$m_s = m(q_s, w_s; k_s, \varepsilon_s) \tag{2}$$

where q_s is the output of state s sold in the national market, n_s is employment in state s, k_s is the state s's capital stock, which is assumed to be predetermined, ε_s are productivity shocks to the production technology of state s with $\varepsilon_s > 0$

5. The formal details of one version of this general model are provided in the Appendix. Each equation in the text has an exact counterpart in the Appendix.

(< 0) enhancing (reducing) state outputs, and m_s is the marginal cost of producing state output, given wages per worker in state s, w_s.

The demand for state output depends on the relative price of output and upon income spent within the state:

$$q_s = q(p_s, y_s; p_e) \tag{3}$$

where p_s is the price of state output, y_s is income spent within the state, and p_e is the expected national price level. Income spent within the state is the sum of the value of state output plus 'imported' income, μ_s, into the state:

$$y_s = y(p_s, q_s; \mu_s) \tag{4}$$

Imported income reflects the state's balance of trade and will be positive (negative) when nonresidents consume more (less) within the state than state residents consume outside the state[6]. Imported income is assumed to be exogenously determined by the underlying comparative advantage of each state's economy.

Firms within the state are assumed to be profit-maximizers and to use a mark-up above marginal cost pricing rule to set the price of state output:

$$p_s = p(m_s; \beta) \tag{5}$$

where $-\beta$ is the price elasticity of demand for state output. We assume that $\beta > 1$.

The final equation of the model defines the equilibrium wage within the state. In equilibrium, labor is assumed to be elastically supplied at the alternative net wage available to the workers in state s, w_s, defined as:

$$w_s = w(w_{r/s}, u_{r/s}, t_s) \tag{6}$$

where $w_{r/s}$ is the exogenous alternative wage in the regional (or national) labor market exclusive of state s, $u_{r/s}$ is the exogenous rate of unemployment in the regional (or national) labor market exclusive of state s, and t_s is percent of wages lost due to search or relocation from state s. This specification assumes that the number of workers in state s is small compared to the size of the regional or national labor market as a whole.

6. Florida is a state likely to have positive imported income.

The model includes six endogenous variables – q_s, n_s, m_s, w_s, p_s, and y_s – and six equations. The model is solved sequentially. Equations (2), (3), (4), and (5) specify a reduced form demand for state output as a function of state wages, w_s, and the exogenous variables p_e, β, μ_s, k_s, and ε_s:

$$q_s = q(w_s; p_e, \beta, \mu_s, k_s, \varepsilon_s) \tag{3'}$$

Equating state demand specified by equation (3') to the production of state output specified by equation (1) defines the demand for labor by firms in state s, dependent on state wages, w_s, and the exogenous variables p_e, β, μ_s, k_s, and ε_s:

$$\begin{array}{l} n_s = n(w_s;\ p_e,\ \beta,\ \mu_s,\ k_s,\ \varepsilon_s) \\ \quad\ \ (-)\ \ (+)\ (?)\ (+)\ \ (+)\ (+) \end{array} \tag{7}$$

The model predicts that the demand for labor is inversely related to wages in the state and positively related to expected prices in the country as a whole, imported income into the state, predetermined capital stocks within the state, and positive productivity shocks. In this model, the price elasticity of demand for the state's output has ambiguous effects on the demand for state labor.

The equilibrium demand for labor in each state is defined by the labor demanded at the exogenous alternative wage available to workers in that state. Equation (6) defines that alternative wage. Equilibrium labor demands are therefore:

$$\begin{array}{l} n_s{}^* = n(w_{r/s},\ u_{r/s},\ t_s;\ p_e,\ \beta,\ \mu_s,\ k_s,\ \varepsilon_s) \\ \quad\ \ (-)\ \ \ (+)\ \ (+)\ (+)\ \ (?)\ (+)\ \ (+)\ (+) \end{array} \tag{8}$$

The equilibrium level of employment in the state is negatively related to the alternative wage offered in the wider economy, and positively related to the wider unemployment rate, to relocation and search costs for residents, the national price level, imported income, state capital stocks, and favorable productivity shocks. As expected, the effect of β on the equilibrium level of employment is ambiguous.

Unemployment (or labor shortages) in the state occurs because of exogenous shocks to the independent variables defining the demand for labor in the state, $n_s{}^*$, and a subsequent failure of the state's labor supply to adjust instantaneously through migration to the new equilibrium level of demanded employment. We define unemployment as the difference between available labor and demanded labor, specified as:

$$u_s = l_s - n_s^* \tag{9}$$

where u_s is the level of state unemployment ($u_s > 0$) or labor shortage ($u_s < 0$), l_s is the current number of workers seeking work in the state, and n_s^* are the number of job openings in the state. In equilibrium, $l_s = n_s^*$ and unemployment is zero[7]. However, the supply of workers in the state may adjust less than instantaneously to the employment opportunities within, and outside of, the state. If so, then at any point in time:

$$l_s = l_{s,-1} + \lambda(n_s^* - l_{s,-1}) \quad \text{or} \tag{10}$$

$$l_s = ln_s^* + (1 - \lambda)l_{s,-1}$$

as last period's available labor, $l_{s,-1}$, flows out of (for $(n_s^* - l_{s,-1}) < 0$) or into (for $(n_s^* - l_{s,-1}) > 0$) the state. The parameter λ is bounded $0 \leq \lambda \leq 1$, where values of λ nearer 1 imply a faster convergence towards the new equilibrium value of employment.

Substituting this dynamic specification of labor relocation for l_s in equation (9) gives the dynamic path for state unemployment:

$$u_s = (1 - \lambda)l_{s,-1} - (1 - \lambda)n_s^* \quad \text{or} \tag{11}$$

$$u_s = (1 - \lambda)u_{s,-1}$$

As a final step, we need to take into account the fact that the speed of adjustment is likely to be slower (λ smaller) as unemployment outside the state labor market rises relative to state unemployment. In other words, there is less exit as job prospects in neighboring states decline.

To model this effect, we assume that the adjustment parameter λ in equation (11) is given by:

$$\lambda = \lambda_0 - \lambda_1(u_{n,-1} / u_{s,-1}) - \lambda_2(u_{r,-1} / u_{s,-1}) \tag{12}$$

With this specification, (11) becomes:

7. Unemployment here is to be interpreted as unemployment above the natural, or search, rate of unemployment. Positive values of u_s imply unemployment above the natural rate, while negative values of u_s imply unemployment below the natural rate, e.g., excessive overtime.

$$u_s = (1 - \lambda_0)u_{s,-1} + \lambda_1 u_{n,-1} + \lambda_2 u_{r,-1} \tag{13}$$

Finally, it is important to bear in mind that our model emphasizes disequilibrium state unemployment rates. To capture this we need to focus on the difference between nominal state unemployment rates and natural, long-run equilibrium rates of unemployment. Because measured unemployment rates incorporate both of these components, it is important to net out the natural rate of unemployment. This will certainly vary over time as national unemployment rates vary. It may also, however, vary by region and by state as a function of differences in structural economic conditions. Since (13) accounts for national and regional differences, we need simply to allow for state differences by adding a vector of state-specific constant terms to (13):

$$u_s = \alpha_s U_s + (1 - \lambda_0)u_{s,-1} + \lambda_1 u_{n,-1} + \lambda_2 u_{r,-1} \tag{14}$$

where U_s is the natural rate of unemployment in state s.

III. EVIDENCE ON LOCAL LABOR MOBILITY AND THE PERSISTENCE OF STATE UNEMPLOYMENT

In this Section we provide empirical tests of the two conditions that are prerequisites for a state stabilization policy to be appropriate:

(1) State unemployment rates converge, but not at a rapid rate to the equilibrium natural rate of unemployment. This is tested by the estimation of the parameter λ. Values of λ near 1 imply relatively fast convergence of state labor markets to their new equilibrium values. In this case, there would be no role for state fiscal policies in combatting state unemployment, since it would be difficult if not impossible to put a timely statewide fiscal policy into effect[8]. However, values of λ closer to zero imply slow convergence and a potentially important role for state unemployment policies. (If there were no convergence, on the other hand, statewide unemployment rates would be persistent, due to long-term structural factors which would not be remediable by a countercylical fiscal policy.)

(2) Statewide unemployment rates must not be highly dependent on the unemployment rates of neighboring states. If the relationship between unemployment rates was relatively strong, then unemployment policies in state t would

8. Variations in ε could not be managed by the fiscal policies of the state because there wouldn't be sufficient time for policy makers to respond to changes in unemployment rates.

directly affect unemployment in state s. Without a coordinated regional policy, independent state fiscal policies would be suboptimal[9].

Direct estimation of (14) is not possible without the additional of a substantial number of prior restrictions that limit the number of neighboring states that affect each particular state's measured unemployment rate and rate of convergence. As an alternative, we will estimate λ based on equation (11). We will then provide a separate analysis of the relationship between unemployment rates of neighboring states in the Western region of the U.S. using the vector autoregression method (VAR). The results of a similar analysis for the Mideast (13) region appear in the Appendix.

The empirical study uses annual state, regional, and national unemployment data for the twenty-year period 1969–1989. Regional unemployment rates were calculated for each of the U.S. census regions as weighted averages of state unemployment rates.

To begin, we estimated a variant of (11) using maximum-likelihood estimation. The estimated equation includes the regional and national unemployment rates and a series of state fixed effects (state dummies) to allow for differences in natural unemployment rates. The estimated equation is as follows (with t-statistics in parentheses and the constant and fixed effects suppressed):

$$\underset{}{u_s} = \underset{(2.66)}{0.105\, u_n} + \underset{(24.48)}{0.888\, u_r} + \underset{(31.38)}{0.703(1-\lambda)} \tag{15}$$

Adjusted R-Squared = 0.92 Log-likelihood = −941.60

While the fixed effects as a whole were statistically significant, only a few of the individual state dummies were significant. Louisiana, Michigan, Montana, New Mexico, Washington, and West Virginia were significantly above average, while Maryland, Nebraska, New Hampshire, South Dakota, Virginia, and Wisconsin were significantly below average. While there is no overall pattern here, it is interesting to note that a number of the states with persistently high unemployment were highly dependent on a single industry which has faced series structural problems in the last two decades (Louisiana, oil; Michigan, automobiles). Conversely, several of the states with lower than average unemployment

9. An equivalent set of conditions applies if a regional fiscal unemployment policy is to be appropriate: (1) Regional unemployment rates must converge, but not too rapidly over time to the national levels; and (2) Regional unemployment rates must not be highly dependent on unemployment rates in other regions.
10. See Pindyck and Rubinfeld (1998), chapter 13, for details.

rates were farm states that have been provided cushions during downturns by generous federal policies (Nebraska and South Dakota).

Clearly, both regional and national unemployment are significantly related to state unemployment. Yet, the variation in state unemployment conditional on these macro variables is itself quite substantial. (The ratio of the standard error of the regression to the standard deviation of u_s is $0.63/2.25 = 28\%$.) More importantly, autoregression process is itself significant with a first-order autocorrelation coefficient of 0.7, which implies a value of λ of 0.3[11]. The results clearly satisfy the first prerequisite for a state stabilization policy[12, 13].

To focus our analysis of the second criterion for a state stabilization policy, we focused on the Western U.S. census region, consisting of California, Oregon, Washington, and Nevada. (Hawaii and Alaska were omitted since they are not contiguous states.) We estimated a series of vector autoregressions analyzing unemployment rates or all pairs of states in the region. The results are summarized in *Table 1*. Each row of the table lists the states whose unemployment rates were chosen as the dependent variable, and the independent variable in a vector autoregression with four lags, followed by the results of a Granger causality test. The Granger test provides a F-test of the null hypothesis that the independent variable (current and lagged values) has a significant effect on the dependent variable.

11. The results are similar to those found in Blanchard and Katz (1992), who found that relative unemployment rates (state/national) return to their mean in 6 to 10 years, and Gramlich (1987) who estimated a similar first-order autoregressive process using quarterly unemployment data. We obtained essentially the same result with a specification that focused on the ratio of the state unemployment rate to the national rate. The regression was:

$$(u_s/u_n) = \underset{(23.63)}{0.865}(u_{r-1}/u_s) + \underset{(1.36)}{0.018}(u_{s-1}/u_n) + \underset{(31.18)}{0.712}/(1-\lambda)$$

12. Marston (1985) appears to find contradictory results, with estimated ρ's that are insignificantly different from 1. As Gramlich (1987) points out, however, Marston's results are due largely to his choice of city, rather than state unemployment rates. His paper argues implicitly against citywide fiscal policies, a view with which we agree.
13. Focusing on the regional issues, we estimated the equation $u_r = 0.967\ u_n + 0.843(1-\lambda)$, with t-values of 22.56 and 22.80 (Adjusted R-Squared = 0.92 and Log-likelihood = –147.96). None of the individual regional fixed effects was significant. (Those regions with somewhat higher than average unemployment levels were Great Lakes, Far West, and Southeast Central; Plains was somewhat lower than average.) Note also that the ratio of the conditional (residual) standard deviation to the standard deviation of regional unemployment is $0.537/1.880 = 28\%$.
Clark (1998) uses a vector autoregression analysis of regional data in an attempt to sort out industry-specific effects from aggregate regional effects. He finds evidence of 'significant region-specific components in the cyclical variation in the major regions of the U. S. Roughly half of the variance of the cyclical innovation in any region's employment growth rate is particular to that region' (p. 3).

Table 1

Vector Autoregression Results

Dep. Var.	Indep. Var.	Granger F	p-value
Calif.	Nevada	0.376	0.820
Nevada	Calif.	0.456	0.766
Calif.	Oregon	4.963*	0.026
Oregon	Calif.	0.321	0.856
Calif.	Wash.	0.884	0.514
Wash.	Calif.	0.403	0.802

Notes: Based on a VAR model with four lags, TU and a constant term.
* means significant at the 5% level.

With one exception, the results show no significant causal relationship between California and its neighboring states. The surprising exception is the significant effect of Oregon on California. The Granger test, whose null hypothesis is no causality, is rejected in the Oregon-California case, but is not rejected in the California-Oregon case[14].

To pursue the link between California and all its neighboring states, we examined the variance decomposition of the errors in the California unemployment equation. The results are summarized in *Table 2*[15]. The first column reports the contemporaneous correlation of residuals between California and its neighbors[16]. The substantial correlation between California and Washington of 0.76 is noteworthy, since it suggests (despite the Granger causality test) that there is a close link between the two economies. The remaining correlations of 0.55 and 0.42 also suggest some linking.

14. See Cromwell (1992) for a complete VAR analysis of employment levels in an expanded Western region.
15. The variance-decomposition approach necessitates an identifying restriction. By ordering California first in the VAR we have implicitly assumed that contemporaneous shocks in California affect neighboring states, but not vice versa.
16. This was calculated from the estimated covariance matrices.

Table 2

Variance Decomposition

	Effect of a One Standard Deviation Shock in California on:		
State Contemp.	Correlation	California	Other State
Nevada	0.550	85.54	14.46
Oregon	0.419	61.05	38.95
Washington	0.762	84.43	15.57

Note: Based on the 5th period forecast of a one-standard deviation shock using a VAR model with four lags (with u_n as an exogenous variable).

The second and third columns report the results of a variance decomposition analysis of forecast errors associated with the model of unemployment. Thus, the first column focuses on California as the driving variable; it tells us that after a period of 5-years 85.54% of the effects of a shock in California is felt within the state; only 14.46% is felt in Nevada (national unemployment effects are held constant). This number, along with the 61% and the 84% numbers for Oregon and Washington suggest that most of the effect of California shocks are felt within California[17].

To pursue the relationship between unemployment rates in California and its neighbors in more detail we used an impulse response analysis. *Figures 1* through *3* show the effects of a one-standard-deviation shock to California unemployment on Nevada, Washington, and Oregon, respectively. In all three cases, the shocks dampen relatively quickly over the first several years, and eventually move close to equilibrium by the end of the ten-year period shown. In the first *Figure,* both Nevada and California initially overshoot, but eventually return to equilibrium unemployment. The patterns in Oregon and Washington are slightly different; however, in all three cases, the effects of California shocks on their neighbors are not unusually large and the rate of adjustment towards equilibrium is consistent with the adjustment process described earlier in this Section.

17. The results are somewhat sensitive to the lag specification of the model. For example, when a 6-period lag model was used, the process became nonstationary.

Figure 1
Response of California and Nevada
To One Std Dev Shock in California (0.77%)

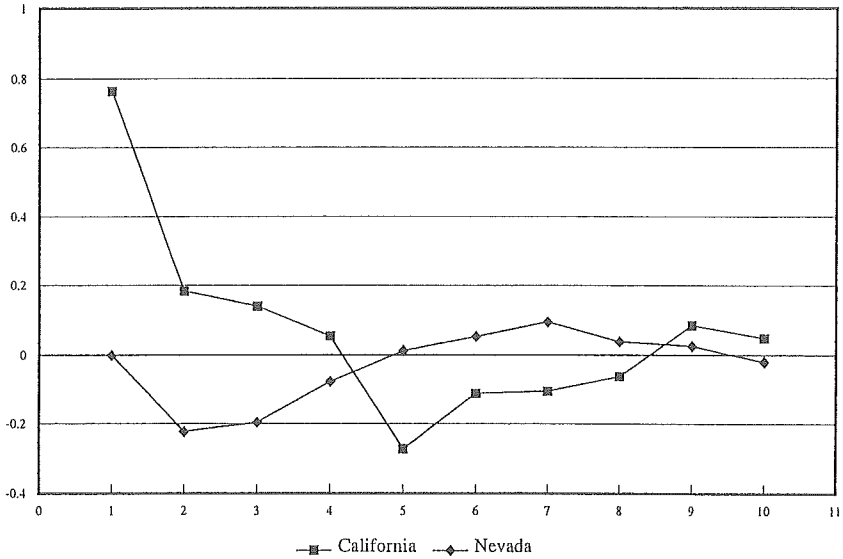


Figure 2
Response of California and Washington
To One Std Dev Shock in California (0.69%)

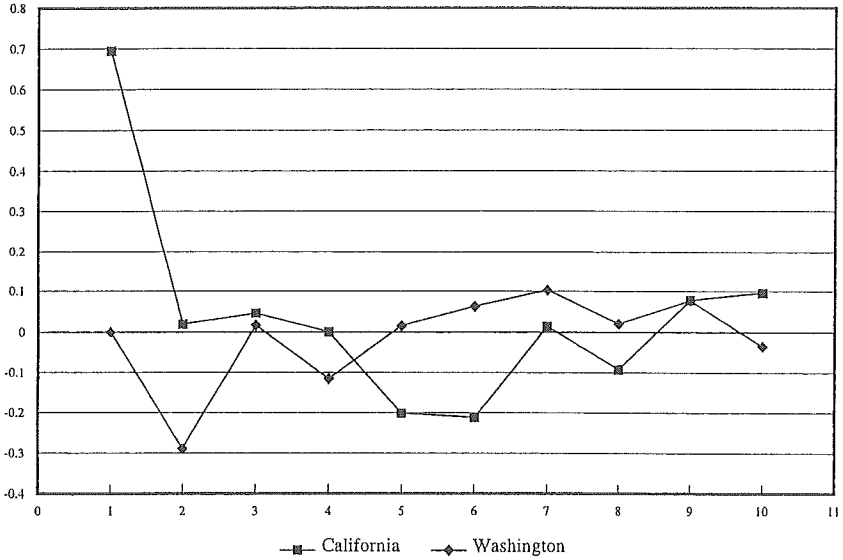
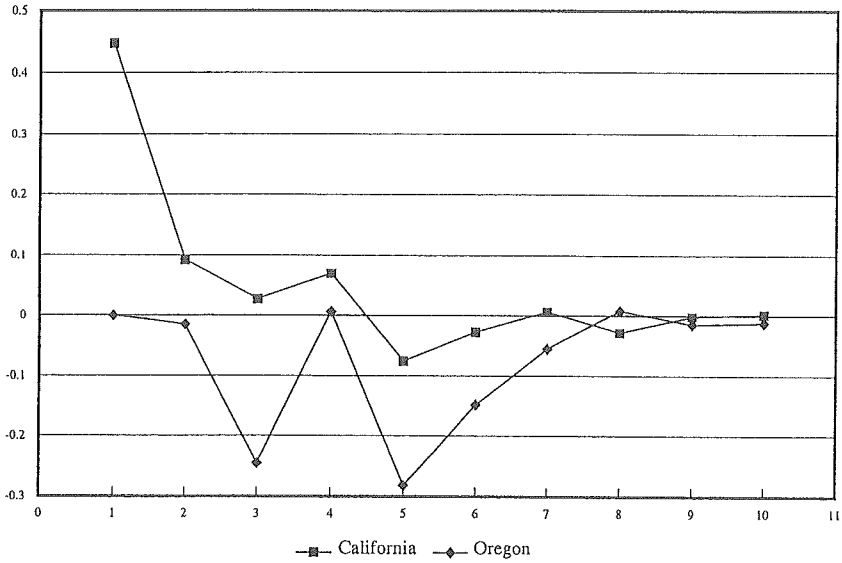


Figure 3

Response of California and Oregon
To One Std Dev Shock in California (0.45%)



To further confirm our results, we reestimated the vector autoregression model jointly for all states in the Western region. The model specification was restricted to one lag in order to conserve degrees of freedom. We found strong evidence that California drives the Western economy, but not vice versa[18].

Overall, the VAR analysis is confirmatory of our view that the California economy does have an effect on the economy of its neighbors. With the possible exception of Washington, however, the reverse effects appear to be relatively small. Our tentative conclusion with respect to the Western region is that the second condition for a California stabilization policy is satisfied.

18. The Granger F's and the associated p-values for each state were: California, F = 2.96 (p = 0.079), Nevada, F = 0.79 (p = 0.527), Oregon, F = 0.22 (p = 0.883), and Washington, F = 0.86 (p = 0.489).

IV. CONCLUSION: QUESTIONS YET UNANSWERED

The empirical results of Section III suggest that at least one of the two pre-conditions for effective, decentralized stabilization policies appears to be met for the local economies within the U.S. federalist system. Local unemployment is not quickly dissipated through adjustments in labor supply in local labor markets. In addition, there is moderate support for the second condition, at least with respect to California and the Western region.

This second condition is also supported by Gramlich (1987), who has presented preliminary evidence on the degree to which high import propensities from state income might mitigate the effectiveness of state government efforts to shift the aggregate demand for state labor. Gramlich finds that states with low income propensities to import ($\approx$ 0.30 to 0.40) may well find it advantageous to use state fiscal policies to stimulate local employment. California, New York, Texas, Illinois, Pennsylvania, Ohio, and Michigan are Gramlich's likely candidates[19].

Of course, concluding that some states *can* effectively manage local unemployment through state fiscal policies does not necessarily mean that states *should* be allowed to do so. Other considerations must be weighed in the balance too. Notably, state fiscal policies to combat state unemployment will not be made in an economic and political vacuum. With open economies, states interact economically. Such interactions create the potential for strategic behavior between states. Between large states such behaviors may be globally non-optimal, however. Employment expansion in one state may come at the price of significant, and inefficient, reductions of employment in other states[20]. Coordination of state fiscal policies at the national level may be required to achieve the collectively efficient allocation. While large states may be able to execute expansionary fiscal policies, strategic inefficiencies may still dictate the centralization of such policies. The importance of such strategic interactions in state fiscal policies remains to be demonstrated.

Finally, even though the economic analysis of state fiscal policies might recommend the decentralization of stabilization policies to state governments, it is important to consider the political incentives for state deficit financing too. Finding that a policy instrument is potentially effective does not mean that the

19. A further project would involve extending Gramlich's analysis by estimating the structural employment model presented here, focusing particularly on the ability of state expenditures, taxes, and deficit policies to influence state employment levels.
20. Gramlich (1987) develops an interaction model between two large states, each playing Cournot-Nash strategies, but he does not explore the possible advantages of cooperative behavior between the states.

political process will use that instrument efficiently. There are good reasons to suspect that states might overuse expansionary fiscal policies, particularly when residents are mobile in the long-run. If current residents can borrow to finance current period public goods expenditures – e.g., under the guise of expansionary fiscal policy – then exit before that debt falls due, they will receive a wealth transfer from future residents who do repay the debt. The capitalization of such debt obligations into land prices may deter such transfers, but there are good economic reasons, and some tentative empirical evidence, which suggests that local debt capitalization is weak at best[21]. Understanding how state governments now decide their tax, spending, and deficit policies will shed important light on how this new policy instrument–deficit financing–might be used.

APPENDIX

I. Equilibrium Employment in the Local Labor Market

A. Technology and Costs

Identical firms in each state (s = 1 . . . S) are assumed to produce an output sold in a national market using a constant returns to scale production technology:

$$q_s - k_s = \alpha(n_s - k_s) + \varepsilon_s \tag{A1}$$

where q_s is value-added output in the state, k_s is the predetermined capital stock in the state, n_s is employment in the state, and ε_s represents serially uncorrelated productivity shocks to the state's technology. We assume $E(\varepsilon_s) = 0$. All variables are measured in per capita units and specified as logarithmic values.

Based upon the constant returns technology of (A1), firm marginal costs are specified (in logs) as:

21. If mobile residents are renters and do not own land, then capitalization offers no constraint on their incentives to borrow. Further, new residents must discover the amount of debt obligations to be repaid. To the extent such discovery is costly then, as with all private information revealed through market prices, there will be an incentives for new residents to free-ride. The outcome will be inadequate discovery, and incomplete debt capitalization. Inman (1982) presents some tentative evidence against the hypothesis of full local debt capitalization in his study of local pension funding.

$$m_s = w_s + ((1-\alpha)/\alpha)\,(q_s - k_s) - \ln\alpha - (\varepsilon_s/\alpha) \tag{A2}$$

where m_s is the marginal cost of a unit of state output and w_s is the wage paid to workers in the state.

B. Pricing of Output/Demand for Labor

Firms are assumed to be price-setters, facing a downward sloping demand curve for state output. The pricing decision will determine the quantity of state output sold and, given the state production function and wages, the demand for state labor.

The demand for state output is specified (in logs) as:

$$q_s = -\beta(p_s - p_e) + y_s \tag{B2}$$

where β is the price elasticity of demand for state output ($\beta > 1$ is assumed), p_s is the price of state output, p_e is the expected national price level, and y_s is national income spent on the state's products. The income elasticity of demand is assumed to be unity. National income spent within the state is specified as income earned within the state ($p_s + q_s$) plus income 'imported' ($\mu_s > 0$) or 'exported' from the state ($\mu_s < 0$):

$$y_s = p_s + q_s + \mu_s \tag{B3}$$

Firms are assumed to use a profit-maximizing mark-up rule for setting prices:

$$p_s = -\ln\varphi + m_s \tag{B4}$$

where $\varphi = (1 - (1/\beta))$. Substituting (A2) into (B4) gives the following specification for the pricing decision:

$$p_s = w_s - \ln(\alpha\varphi) + ((1-\alpha)/\alpha)\,(q_s - k_s) - (\varepsilon_s/\alpha) \tag{B5}$$

Substituting the income definition (B3) for y_s into the demand curve (B2) and then, using the specification of price from (B5) yields, upon simplification, the following reduced form specification for the demand for state output:

$$q_s = k_s + (\alpha/(1-\alpha))\ln(\alpha\varphi) - (\alpha/(1-\alpha))\,w_s \tag{B6}$$

$$+ (\beta\alpha/(\beta-1)\,(1-\alpha))\mathrm{p_e} + (\alpha/(\beta-1)\,(1-\alpha))\,\mu_s$$

$$+ (1/(1-\alpha))\,\varepsilon_s$$

The demand for labor follows from this demand for state output. Substituting (B6) into the production function, (A1), gives the following specification for the demand for state labor:

$$n_s = k_s + (1/(1-\alpha))\ln(\alpha\varphi) - (1/(1-\alpha))\,w_s \tag{B7}$$

$$+ (\beta/(\beta-1)\,(1-\alpha))\,p_e + (1/(\beta-1)\,(1-\alpha))\,\mu_s + (1/(1-\alpha))\,\varepsilon_s$$

The demand for labor in state s is inversely related to state wages (w_s) and positively related to the level of capital stock within the state (k_s), expected national prices (p_e), 'imported' income into the state (μ_s), and positive productivity shocks ($\varepsilon_s > 0$).

C. Setting Wages/Supply of Labor

Labor to the state's firms is assumed to be elastically supplied at the expected alternative real wage in the regional labor market specified (in logs) as:

$$(w_s - p_e) = (w_{r/s} - p_e) - u_{r/s} - t_s \tag{C1}$$

where $(w_s - p_e)$ is the alternative real wage for workers in state s, $(w_{r/s} - p_e)$ is the real wage earned by workers in the region but outside the state s, $u_{r/s}$ is the unemployment rate in the region exclusive of state s, and t_s are the relocation/search costs (as a percent of the alternative real wage) for residents of state s seeking employment in the regional labor market. We assume that state s is economically small relative to its economic region; thus $w_{r/s}$ and $u_{r/s}$ are exogenous. To attract workers to employment, firms in state s must pay a nominal wage:

$$w_s \geq p_e + (w_{r/s} - p_e) - u_{r/s} - t_s = w_{r/s} - u_{r/s} - t_s \tag{C2}$$

We assume firms are profit maximizing, so $w_s = w_{r/s} - u_{r/s} - t_s$.

D. Equilibrium Employment

Equilibrium employment $n_s{}^*$ is defined from the demand for labor schedule, (B7), and the elastic supply of labor at the wage w_s specified in (C2). Substituting (C2) into (B7) defines the equilibrium level of employment in state s:

$$n_s^* = k_s + (1/(1-\alpha))\ln(\alpha\varphi) - (1/(1-\alpha))(w_{r/s} - u_{r/s} - t_s) \qquad \text{(D1)}$$

$$+ (\beta/(\beta-1)(1-\alpha))p_e + (1/(\beta-1)(1-\alpha))\mu_s + (1/(1-\alpha))\varepsilon_s$$

Equilibrium employment in the state is negatively related to the nominal wages paid in the wider economic region ($w_{r/s}$) and is positively related to the level of unemployment in the wider region ($u_{r/s}$) and to the costs of relocation and labor market search for state residents (t_s). Equilibrium employment also rises with the level of capital stock within the state (k_s), with expected national prices (p_e), with 'imported' income into the state (μ_s), and with positive productivity shocks ($\varepsilon_s > 0$).

II. The Effects of Neighboring States – The Mideast Region

A. Granger Causality Tests

Table 3 shows that the primary direction of causality is from New York to other states. Unemployment rates in New York are significantly causally related to unemployment rates in Delaware (significant at the 6% level), Maryland (significant at the 5% level), Pennsylvania (significant at the 10% level), and Ohio (significant at the 1% level).

There is, however, some evidence of reverse causation as well, especially between Delaware and New York and Ohio and New York (both are significant at the 5% level). Links relating to Maryland, New Jersey, and Pennsylvania, while not statistically significant, are also strong.

Table 3

Vector Autoregression Results

Dep. Var.	Indep. Var.	Granger F	p-value
New York	Delaware	6.35*	0.013
Delaware	New York	3.54	0.060
New York	Maryland	1.75	0.232
Maryland	New York	3.88*	0.049

New York	New Jersey	1.46	0.300
New Jersey	New York	1.80	0.222
New York	Pennsylvania	2.76	0.103
Pennsylvania	New York	5.59	0.019
New York	Ohio	4.07*	0.043
Ohio	New York	17.03*	0.001

Note: Based on a VAR model with four lags, TU and a constant term.
* means significant at the 5% level.

B. Variance Decomposition

The variance decomposition (shown in *Table 4*) points to the importance of the link between New York and its neighboring states, especially New Jersey, Pennsylvania, and Ohio. The contrary result for Delaware necessitates further study.

Table 4

Variance Decomposition

	Effect of a One Standard Deviation Shock in New York on:	
State	New York	Other State
Delaware	26.01	73.99
Maryland	82.43	17.57
New Jersey	91.62	8.38
Pennsylvania	99.02	0.98
Ohio	97.69	2.31

Note: Based on the 5th period forecast of a one-standard deviation shock using a VAR model with four lags (with TU as an exogenous variable).

Finally, an analysis of the effects of a one-standard deviation shock in New York on New York, Delaware, Maryland, New Jersey, Pennsylvania, and Ohio shows that the adjustment process appears to work reasonable well in the latter three

states, whereas in the Delaware and Maryland cases the process has yet to converge after ten years.

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