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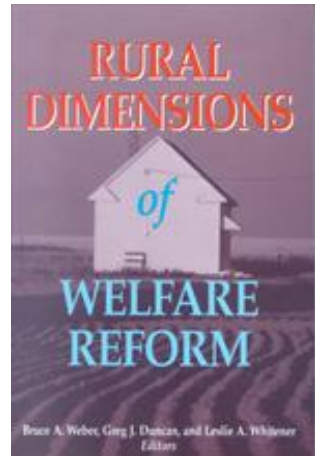
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Welfare participation exhibits significant seasonality in agricultural counties and most rural counties in California. The number of welfare recipients in these counties increases dramatically from summer to winter. Labor market factors drive this seasonality. Welfare rolls contract and expand with seasonal employment and unemployment, leading to a pattern in which a significant fraction of the caseload population works in the summer and receives welfare in the winter.

Different employment sectors drive seasonality in welfare participation among counties. Agricultural employment is primarily responsible for welfare seasonality in agricultural and mixed counties (counties with moderate agricultural employment and a small rural population). In rural counties, the most important sectors vary from one county to another, but they are primarily agriculture, manufacturing, trade, service, and construction and mining. Reductions in the

welfare caseload between winter and summer provide a significant fraction of the workforce in these seasonal sectors in many agricultural and rural counties.

The new Temporary Assistance for Needy Families (TANF) legislation and the California WORKs programs emphasize work and time limits for welfare recipients. Although California's time limits do not necessarily remove an entire family from aid, they do substantially reduce the degree to which welfare can provide income for seasonal workers beyond the time-limit period. What will happen to these seasonal workers under the new legislation? One possibility is that they will move elsewhere to find year-round work, forcing seasonal industries to either find their labor elsewhere or bid up the price of their labor. Other possibilities involve the enactment of government policies to protect these workers. Welfare time limits could be modified in those areas with significant seasonal unemployment, or unemployment insurance could be extended to seasonal workers.

Considering the great importance of seasonal workers to industries in agricultural and rural California counties, California policymakers must take into account the plight of seasonal workers combining welfare with work under the new welfare legislation and act accordingly. National policymakers should also be concerned with this distinct population because California's caseload composes about one-fifth of the national caseload. Although our findings on the prevalence and importance of seasonal welfare populations are based on California data, we expect that seasonal workers who combine welfare with work also exist in agricultural and rural areas outside California because seasonal jobs are often characteristic of these areas (Tickamyer 1992).

PAST RESEARCH

Our work is at the intersection of two different bodies of research. One is how movements on and off welfare are affected by labor markets; the second is how the dynamics of welfare are affected by the different kinds of economies found in rural, agricultural, and urban areas.

Interaction of Welfare and Labor Market Dynamics

Welfare is inextricably linked with labor market conditions. A primary path onto or off welfare is a change in a household's attachment to the labor force, a change in income, or a change in the need for income. Families typically enter welfare when the head of the household loses his or her job, when the family breaks up and loses its primary wage earner, or when the demand for income increases because of the addition of a child. Families usually leave welfare when the head of the household gets a job, when marriage (or some other domestic arrangement) brings an earner into the household or makes it possible for the formerly single parent to get a job, or when children leave home. Attachment to the labor force and income, in turn, obviously depend on the local demand for labor, but most of the welfare literature has neglected the role of local labor markets because of the difficulty in linking information about local labor conditions to welfare entrances and exits. Hoynes (1996) noted that studies using survey data focus more on conditions affecting labor supply, such as welfare recipients' education or states' welfare benefit levels, than on demand-side factors such as the unemployment rate, the wage level, or the number of job openings.

Studies that include labor market variables typically use only state-level economic conditions, such as the unemployment rate, in part because confidentiality restrictions limit the information about the location of welfare recipients on most surveys. These studies often find that labor market conditions have little or no impact on individual entrances and exits from welfare. State-level economic conditions, however, are probably too highly aggregated to capture an individual's employment opportunities. The few studies that use labor market conditions at the county or county-group level find mixed results. These studies (Fitzgerald 1995; Harris 1993; Sanders 1992) mainly rely on variation in economic conditions across areas to identify labor market effects because of the limited timespan covered by most surveys. As a result, estimates of labor market effects are biased if area characteristics associated with labor market conditions are excluded from the model, such as lower-skilled workers living in areas with poorer labor markets.

Using a relatively new, rich individual-level administrative data set, Hoynes (1996) addressed many flaws of the earlier studies, finding

that local economic conditions have a significant effect on welfare exits. With six years of monthly data (1987–1992) on approximately 100,000 welfare cases in California, Hoynes modeled the probability that a person will leave welfare in a given month. She found that higher unemployment rates, lower employment growth, lower employment-to-population ratios, and lower wage growth have a significant, negative impact on the probability that a person will leave welfare, which leads to longer welfare spells (lengths of time on welfare). Hoynes also found that African Americans, residents of urban areas, and two-parent households are more responsive to changes in labor market conditions, whereas teen parents and refugee groups are less responsive.

Hoynes's results provide strong support for the notion that employment conditions affect welfare participation decisions for individuals and households. Additional support is provided by related studies on aggregate welfare caseload trends. In two recent papers using state panel data to model caseload dynamics, economic growth was identified as the major contributor to caseload decline from 1993 to 1996 (Council of Economic Advisers 1997; Ziliak et al. 1997). Blank's caseload model (1997), which also used annual state-level panel data but was more fully specified than most other models, suggested that the state unemployment rate has a significant, positive effect on both the one-parent caseload (formerly called AFDC-Basic) and two-parent caseload (formerly called AFDC-Unemployed Parent).

Rather than focusing only on the aggregate caseload, a few studies model two flows that compose changes in the caseload level: new case openings and case closings (Albert 1988; Bluestone and Sumrall 1977; Brady and Wiseman 1998; Congressional Budget Office 1993, Appendix B). Considering the components separately is important because their determinants are likely to differ and thus have different policy implications.

The most comprehensive model of both case openings and closings is by Brady and Wiseman for California with monthly data from 1972–1996. In the Brady and Wiseman model, the economic variables appear to have a much larger influence on two-parent cases than on one-parent cases. For one-parent cases, the only economic effect that is statistically significant is the negative impact of female potential earnings on entries to welfare. Among two-parent cases, the unemployment

rate has a significant, positive effect on entries and significant, negative effect on exits. The other significant effects for two-parent cases are the negative effect of both employment growth and minimum wage on entries to welfare, as well as the unexpected negative effect of female potential earnings on exits.

These aggregate caseload studies provide strong evidence for the importance of economic variables for welfare dynamics, but they typically involve such large geographic areas (entire states) and aggregate data (monthly or annual caseloads) that the nuances of local labor markets, especially the differences among urban, agricultural, and rural labor markets, are obscured.

Differences in Welfare and Employment Dynamics by Type of Area

Past work has shown that a larger fraction of the population in nonmetropolitan areas receives welfare than in metropolitan areas (see, for example, Fuguitt, Brown, and Beale 1989), perhaps because of greater poverty in rural areas. A higher level of welfare reciprocity has also been documented over the past two decades among women of child-bearing age in California's agricultural areas and rural far northern and mountainous areas than in its more urban areas (MaCurdy, Mancuso, and O'Brien-Strain 2000). These nonmetropolitan areas also have higher levels of poverty (Lichter, Johnston, and McLaughlin 1994), which accounts for the higher level of welfare reciprocity, but the number of welfare recipients per poor household is actually lower in these agricultural and rural areas than in metropolitan areas. The Rural Policy Research Institute (1999) also finds a lower rate of reliance on public assistance among U.S. households living below 125% of the poverty level in nonmetropolitan areas than in urban areas and the suburbs.

Another difference among areas is the average length of time spent receiving welfare. Event-history analyses show that welfare recipients in urban areas have, on average, longer welfare spells than recipients in nonurban areas (O'Neill, Bassi, and Wolf 1987; Rank and Hirschl 1988; Fitzgerald 1995; Porterfield 1998; Jensen, Keng, and Garasky, in this volume, p. 177). In these studies, the authors suggest that the difference is due to greater stigma attached to welfare receipt in rural areas than in urban areas, given that anonymity is less in rural areas.

Urban/rural variations in employment conditions are an obvious source of these differences in welfare receipt. Rural areas have a higher level of underemployment (Findeis and Jensen 1998). The underemployed include low-income workers (“working poor”), involuntary part-time workers, and unemployed individuals who want to work. The higher percentage of working poor in rural areas is largely due to the limited work opportunities in these areas. According to Tickamyer (1992), jobs in rural areas tend to pay low wages, and many jobs are part-time or seasonal (e.g., agriculture and construction). She found that poverty is lower in rural areas with diversified labor markets than in rural areas with narrow, resource-based labor markets such as agriculture and mining. Linking welfare to employment, Porterfield (1998) found that rural families are more likely than families in urban counties to go on welfare because of a decrease in earnings but are less likely to exit welfare because of an increase in earnings.

A few studies focused specifically on welfare and employment dynamics in areas in California. Taylor, Martin, and Fix (1997) examined California’s agricultural areas, arguing that farm employment increases welfare use. With 1990 Census data, regression equations for farm employment, poverty, immigration, income, and welfare use in rural towns were simultaneously estimated. The authors concluded that, largely through its demand for cheap immigrant labor, farm employment increases poverty levels in agricultural areas, leading to increased welfare demand. Hoffmann and Fortmann (1995) examined welfare and employment interactions in California’s 31 “forest counties.”¹ Using Granger causality tests on monthly data for 11 years, they found that employment helps drive the two-parent welfare caseload in about half of the forest counties.

In MaCurdy, Mancuso, and O’Brien-Strain’s (2000) study of California’s welfare caseload trends, the counties classified by the authors as resource-based (counties in their farm belt and northern and mountain regions) have both higher and more cyclical welfare caseloads (except for child-only caseloads) and unemployment. By comparing time trends of caseload, demographic, and economic data, the authors suggest that the primary factors that drive welfare caseloads in California (economic conditions, birth rates, and immigration) vary by region. According to the study, in the resource-based regions, economic condi-

tions explain a great deal of the two-parent welfare caseload trends, and nonmarital birth rates explain much of the one-parent caseload trends.

Taken together, these studies demonstrate the greater prevalence of welfare receipt in nonmetropolitan areas, the importance of labor market factors for welfare receipt in general, and the effect of resource-based employment on welfare use in nonmetropolitan areas. What they do not provide is a detailed picture of the seasonal link between welfare receipt and resource-based employment across different kinds of counties.

OUR STUDY

We use data on California counties to study welfare dynamics in urban, mixed, agricultural, and rural areas. California counties are worth studying because they are so big and so diverse and because they compose a significant fraction of the total welfare population in the United States. The combined population of the 15 California counties we classify as agricultural is larger than the population in each of 21 states. In addition, the value of agricultural production in California is somewhat larger than that of the four agricultural states of Iowa, Kansas, Missouri, and Nebraska combined. The combined population of the 17 counties classified as rural is approximately the same or larger than the population in seven other states.² The total welfare population in California is about one-fifth of the nation's total, and it averaged over 2.3 million people each month in 1997. The number of persons on welfare in California agricultural counties alone during each month of 1997 averaged over 325,000.

By using monthly welfare and industry employment data for California spanning 10 years, our study provides much greater detail (relative to past studies) on the impact of local labor markets on welfare participation over time. With our fourfold typology of California counties, we are able to show how counties with different kinds of economies have different welfare patterns.

We first develop our typology of four kinds of California counties. We then describe aggregate welfare and employment dynamics in each

type of county. These results strongly suggest that rural and agricultural counties have significant cyclical dynamics that distinguish them from urban counties. Finally, we summarize regression and event-history models that demonstrate the strong link between employment cycles and welfare cycles. We end with a discussion of the policy implications of these results.

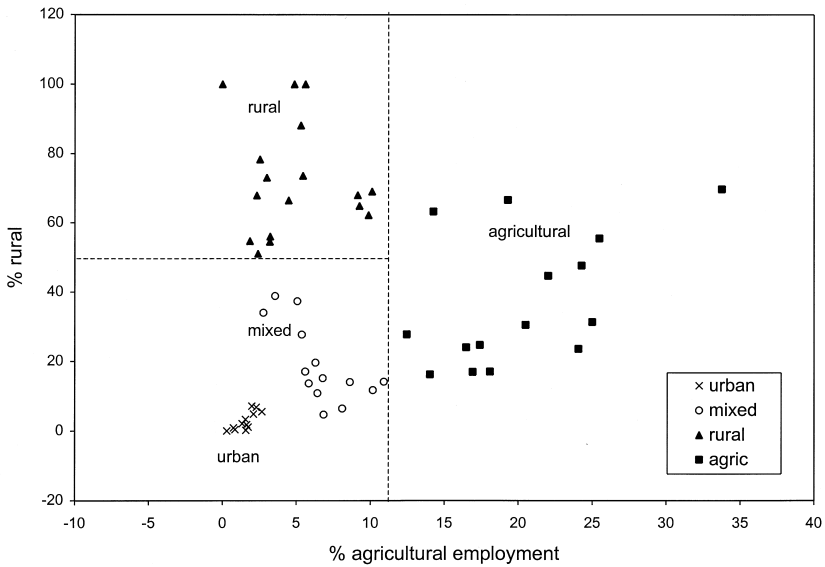
Classification of Counties

The heart of our enterprise is an analytically powerful way to classify places. There are many ways to do this, but we focus on economic and geographic characteristics because there are good reasons to believe they are especially important for the dynamics of welfare. Economic characteristics matter because they determine the types and number of jobs that are available. The role of geography is less clear, and there is a long-standing debate about what makes rural areas different from urban ones. Nevertheless, there is ample empirical evidence that welfare receipt and welfare dynamics differ between rural and urban areas. For welfare recipients, the major geographic factors affecting them are probably the limited choices of jobs in nonurban areas and the dependence on labor markets that are subject to greater seasonal fluctuations than those in urban areas.

To develop a meaningful typology combining economic and geographic factors, we collected data on the economic, geographic, and demographic characteristics of counties, such as percentage of rural population, population density, unemployment rates, and percentage of farm and agricultural services employment. We then used factor analysis and other data reduction techniques to recognize groups of counties with similar characteristics.

Based on this analysis, we found that a useful classification scheme follows from the clusters produced when we place each of California's 58 counties on a plot of percentage rural by percentage farm and agricultural services employment.³ Four clusters of counties appear when this is done (Figure 5.1). The 15 counties with more than 11.5 percent agricultural employment (to the right of the vertical dashed line on Figure 5.1) are considered agricultural. Their geographic distribution can be seen in Figure 5.2. They are, not surprisingly, predominantly in California's agricultural Central Valley.

Figure 5.1 California County Typology

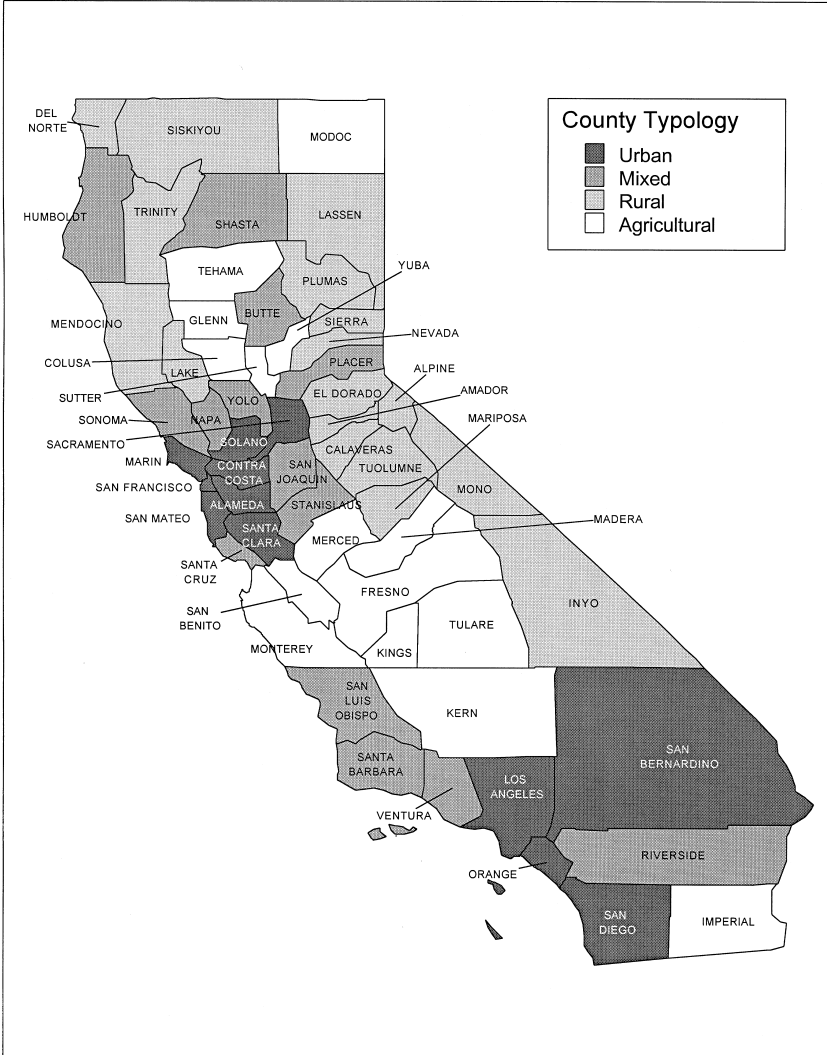


Counties with less than 11.5 percent agricultural employment fit into three categories, depending on their level of urbanization. Those counties with more than 50 percent rural population (above the horizontal dashed line on Figure 5.1) and less than 11.5 percent agricultural workers are labeled rural. These 17 rural counties fall along the northwestern, northern, and eastern edges of the state.

The remaining counties are less than 50 percent rural and have low levels of farm and agricultural workers. They fall into two groups. Twelve counties in the lower left-hand corner of Figure 5.1 are all highly urbanized, with negligible farming employment. These urban counties include four southern counties that compose the metropolitan Los Angeles and San Diego regions and seven counties that constitute the San Francisco Bay area. Sacramento County in the Central Valley is also heavily urbanized because the state capital is located there.

The residual category, "mixed," consists of the remaining 14 counties. Most of these counties have between 5 percent and 11.5 percent agricultural employment and less than 20 percent rural population. They are primarily located around the major urban areas, although a

Figure 5.2 California County Map



few stand alone and are centered on moderately sized cities with populations between 27,000 and 85,000.

The 12 urban counties compose approximately 73 percent of the population and 71 percent of the welfare caseload in California. The 14 mixed counties make up approximately 16.5 percent of population and 14.7 percent of welfare cases. The 17 rural counties contain 2 percent of the population and 1.8 percent of the welfare caseload. The 15 agricultural counties contain 8.8 percent of the population and a disproportionately large share of the welfare population, 12.8 percent of the caseload.

Our typology is not the only way to classify California counties. The U.S. Department of Agriculture has developed two widely used county typologies: Beale codes and Economic Research Service (ERS) economic function types. Beale codes classify counties along a rural-urban continuum. Economic function types of the ERS classify counties according to their major industry. Our typology combines the geographic approach of the Beale codes with the economic approach of the ERS function types. To a very large extent, our classification system accords with the alternative classifications; the typologies agree where we would expect them to agree. The greatest differences between our typology and the alternative ones are that ours is much less likely to classify counties as metropolitan, and it has a less stringent requirement for calling a county “agricultural” than the ERS requirement for “farming” counties.

WELFARE AND EMPLOYMENT DYNAMICS BY COUNTY TYPE

In this section, we show that systematic differences in welfare and employment dynamics exist across county types. Using the typology developed in the previous section, we find that both the level and annual variability of welfare use are higher in agricultural and rural counties than in urban counties. The greater variability in welfare participation among the nonurban counties is due largely to significant seasonality in those counties’ welfare caseloads. We show that welfare use increases

during the winter months and decreases during the summer months in the agricultural and rural counties.

After establishing that distinct welfare patterns exist across county types, we find that differences in employment patterns across county types largely drive the variation in welfare patterns. More specifically, higher rates of unemployment in the agricultural and rural counties help explain the higher welfare use in these counties compared with urban counties. The substantial seasonality in welfare participation among agricultural counties is largely explained by seasonality in employment in the agriculture and manufacturing sectors. In rural counties, the seasonality in welfare use is explained not only by employment in the agriculture and manufacturing sectors, but also by employment in the trade, service, and construction and mining sectors.

Welfare Dynamics by County Type

To examine differences in welfare dynamics by county type, we rely on county caseload data collected by the State of California's Department of Social Services.⁴ These monthly data span a 12-year period from July 1985 to August 1997. Because our focus is on the average county within a county type, our statistics at the county-type level (such as welfare participation by county type) are simple averages among counties within each county type, rather than weighted averages that take into account the different population of each county.⁵

Over the 12-year period of our data set, both the level and annual variability of welfare participation are higher in agricultural and rural counties than in urban counties.⁶ Summary statistics of these data are shown in Table 5.1.⁷ Among the four types of counties, agricultural counties have the highest percent of the population on aid (10.3%) and the most annual variation (0.39%) in the percent receiving aid. Urban counties have the lowest percent of the population receiving aid (5.7%) and the lowest yearly variation (0.08%). Mixed and rural counties fall in between on both measures.

The greater variability in welfare participation among the nonurban counties is due largely to significant seasonality in those counties' welfare caseloads. These counties experience more welfare participation in the winter months than in the summer months.⁸ This seasonality is most apparent when considering the dynamics of entry to welfare (the

Table 5.1 Level and Variability of Welfare Participation and Unemployment by County Type

County type	Level		Variability	
	On aid (%)	Unemployment rate (%)	S.D. of % on aid ^a	S.D. of unemp. rate ^a
Agricultural	10.3	14.0	0.39	2.8
Rural	7.1	9.6	0.33	2.5
Mixed	6.6	8.1	0.17	1.1
Urban	5.7	5.5	0.08	0.5

NOTE: The measures of variability are based on the standard deviation of monthly figures within a year. They are calculated as the average across all years of the standard deviation within a year.

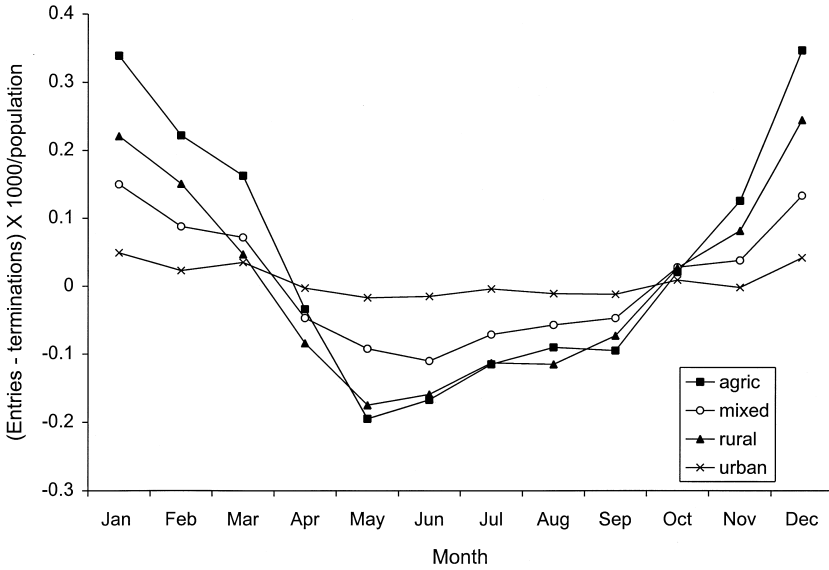
^a S.D. = standard deviation.

number of cases entering in a given month) and terminations (the number of cases leaving in a given month). We examine these dynamics for both subprograms of California's welfare program: the unemployed parent program (U) for families with two parents, and the family group program (FG) for families with an absent parent, usually a father.⁹ There is seasonality for both types of cases, but it is more pronounced among the U cases.

Figure 5.3 plots the average of the net number of new cases (entries minus terminations) divided by population (in thousands) for U cases by calendar month and county type. Thus, the vertical axis is the net number of new cases per 1,000 population. Figure 5.3 clearly shows the much greater seasonal variability in nonurban counties relative to urban counties. The net effect of this variability is a drop in the caseload in nonurban counties over the summer and an increase during the winter. The line for urban counties is almost flat (ranging from zero to 0.05), while the line for agricultural counties ranges from -0.20 to 0.35. Rural counties are almost as variable as the agricultural counties, and mixed counties are, as we might expect, in between urban counties and agricultural/rural counties.

The same plots for FG cases (absent parent) are shown in Figure 5.4. With only one parent available to work, there has always been much less workforce participation in the FG cases than the U cases, so

Figure 5.3 Net New Cases by County Type and Calendar Month (“U” cases)

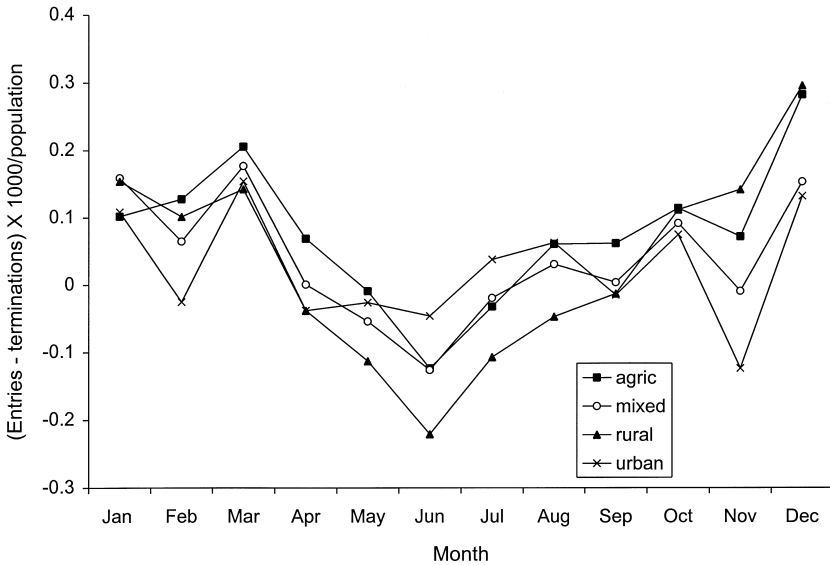


we would expect them to be much less sensitive to employment conditions. Figure 5.4 depicts the monthly changes in the net number of new cases (entries minus terminations) divided by population for agricultural and urban counties. As we would expect, the variation in these series is less than in the U cases, but the pattern is similar. Although there is substantial variability for urban counties, it does not seem to be seasonal, whereas the variability for agricultural counties is clearly seasonal. Seasonality also exists for both mixed and rural counties, but it is greater for rural counties.

Unemployment Dynamics by County Type

Can the differences in welfare dynamics by county type be explained by differences in employment dynamics? We use monthly labor force data by county from 1985–1997 to begin to answer this question; these data are from the State of California’s Employment Development Department (2000). Both the level and annual variability

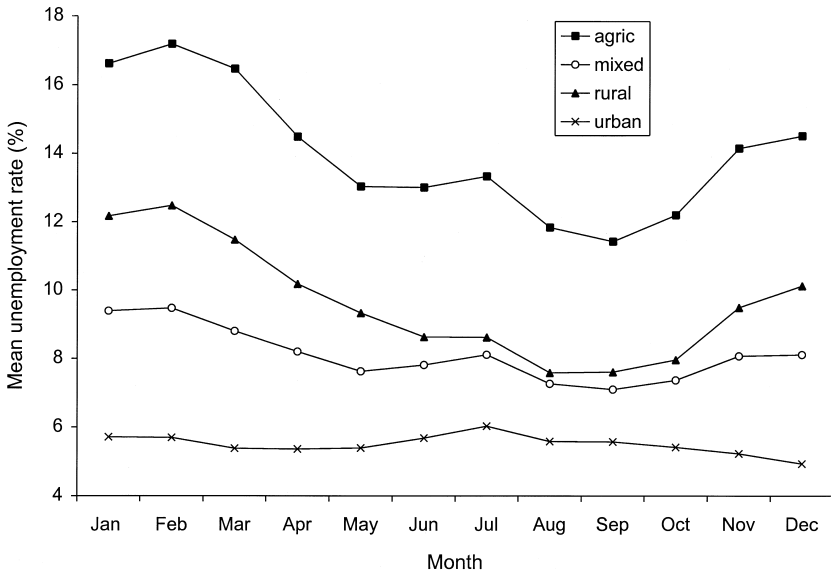
Figure 5.4 Net New Cases by County Type and Calendar Month (“FG” Cases)



ty of the unemployment rate are higher in agricultural and rural counties than in urban counties over the time period of our data.

Table 5.1 includes summary statistics of the unemployment data as well as the welfare participation data. The statistics for both the level and variability of unemployment and welfare participation are lowest for urban counties, highest for agricultural counties, and fall in between for rural and mixed counties. This comparison of the unemployment and welfare patterns by county type reveals a strong, positive relationship between the levels of unemployment and welfare participation. The relationship is in the expected direction, given that an increase in unemployment is likely to increase the welfare caseload, and a decrease is likely to lower the welfare caseload. There is also a strong, positive relationship between annual variability of both unemployment and those on aid. In counties where more people cycle on and off unemployment, more people also cycle on and off welfare.

Employment figures also help explain the seasonality of welfare dynamics in rural and agricultural counties. As shown in Figure 5.5,

Figure 5.5 Unemployment Rate by County Type and Calendar Month

for nonurban counties, unemployment is higher in the winter months and lower in the summer months, corresponding to the seasonal pattern of welfare participation shown earlier. To quantify the amount of seasonal change in unemployment by county type, we subtract the unemployment rate at its lowest point in the year from its highest point in the year. Change in unemployment is highest for agricultural counties, a 5.8 percentage point change, from 17.2 percent unemployment in February to 11.4 percent unemployment in September. The change in unemployment for rural and mixed counties is 4.9 and 2.4 percentage points, respectively.

Employment Dynamics by Industry across County Types

To investigate further the relationship between yearly employment and welfare variability by county type, we turn to monthly employment data for 1985–1997 for eight mutually exclusive and exhaustive economic sectors: agriculture, manufacturing, trade, services, government,

construction and mining, transportation and public utilities, and finance, insurance and real estate. It is important to move from aggregate employment to industry employment so policymakers know which employment sectors drive welfare dynamics and can tailor policies accordingly. For example, if employment in the sector serving tourists is highly seasonal and a large share of total employment, policymakers can work with employers in the tourism industry to devise policies providing employment to these workers in the off season. The industry data are collected by the State of California's Employment Development Department.¹⁰ These monthly, county-level data are for industries classified by the Standard Industrial Classification (SIC) code.

For employment within a specific industry to help explain welfare seasonality, the employment also must exhibit seasonality. In addition, because people are more likely to exit welfare when they are employed, the seasonal pattern for employment must be the reverse of the pattern for welfare participation. Therefore, employment must be higher in the summer months and lower in the winter months. To assess whether an industry's employment helps explain welfare seasonality, we plot each industry's average employment (as a percentage of the civilian labor force) for the 12-year time period by calendar month.

Table 5.2 summarizes the extent to which each employment sector can help explain seasonal welfare participation in each county type. For each sector and county type, the table includes the difference in the percent employed between the summer month with the most employment and the winter month with the least employment.¹¹ Table 5.2 also shows the potential impact of an employment sector on welfare variability by indicating "little," "some," or "a lot."

Two of the eight employment sectors—the transportation and public utilities sector and the finance, insurance and real estate sector—show negligible, if any, seasonality across the four county types, even when broken down separately by county. Employment in these two sectors (as a percentage of total employment) remains essentially constant over the course of the year.

Service-sector employment also appears flat when averaged over each county type, but further examination reveals significant seasonality for two counties, Trinity and Mariposa. The service sector includes employment in hotels, amusements, and recreation services, and both

Table 5.2 Difference in Employment between Summer Month with Highest Employment and Winter Month with Lowest Employment, by Employment Sector and County Type (%)

County type	Farming	Manufacturing	Trade	Construction & mining	Service	Transportation & public utilities	Finance, insurance & real estate	Government
Urban	0.2	0.4	-1.0	0.4	0.8	-0.1	0.0	-1.1
Mixed	2.3	1.0	-0.7	0.6	-0.4	0.3	-0.1	-1.8
Agricultural	Some	Some						
	7.7	1.1	-0.9	-0.3	-0.5	0.3	-0.1	-2.3
Rural	A lot	Some						
	1.2	1.0	1.3	1.1	-0.8	0.3	-0.1	-2.0
	Some	Some	Some	Some	Little			

NOTE: The potential impact of an employment sector on welfare variability is indicated by “little,” “some,” or “a lot.” Except for the “Government” column, cells with no word below the value are sectors with little seasonal variability (less than 1%).

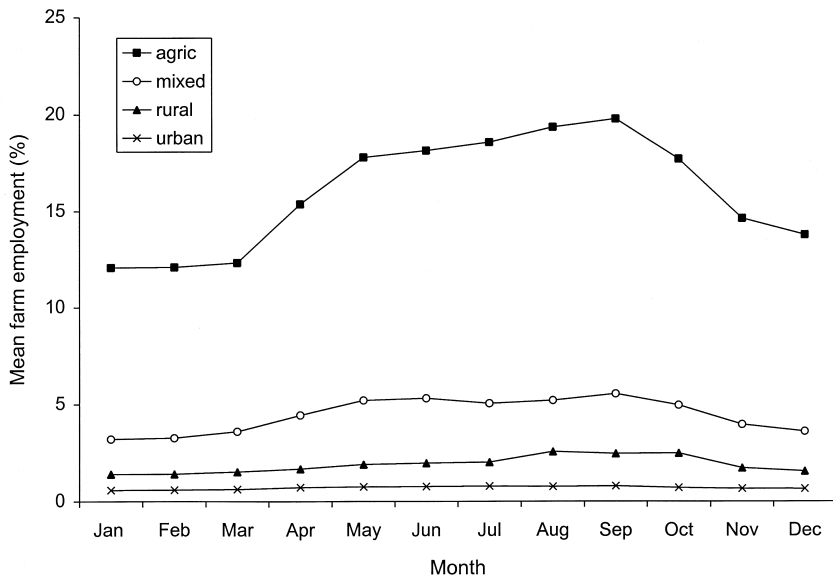
Mariposa (where Yosemite Park is located) and Trinity (with the Trinity Alps, Lake, and River) have substantial summer tourism.

Employment dynamics in a fourth sector, government, exhibit substantial seasonality; however, the seasonal pattern is in the wrong direction. Employment in the government sector, like welfare participation, is higher in the winter months and lower in the summer months. The large drop in government employment among all four county types during July and August is primarily due to the loss of employment for public school teachers in those months. This sector does not affect welfare dynamics.

Employment in the remaining four sectors can help explain the seasonal welfare participation in nonurban counties, as summarized in Table 5.2. For each sector, employment is higher in the summer months than the winter months for at least one nonurban county type.

Consider farming and agricultural employment displayed by county type in Figure 5.6. The substantial seasonality in farm employment

Figure 5.6 Agriculture Employment by County Type and Calendar Month



can go a long way toward explaining some of the variability in welfare caseloads for agricultural counties. To quantify the amount of annual turnover in agricultural employment by county type, we calculate the difference in agricultural employment between its lowest and highest points in the year. The change in agricultural employment is highest for agricultural counties: a 7.7 percentage point change, from 12.1 percent of total employment in January to 19.8 percent in September. The annual turnover for mixed, rural, and urban counties is 2.3, 1.2, and 0.2 percentage points, respectively. These changes in agricultural employment from summer to winter for agricultural and mixed counties are the highest among the eight employment sectors.

The second employment sector that may contribute to the variability in welfare participation in agricultural and rural counties is manufacturing, which includes the manufacture of both durable and non-durable goods. There is an increase in manufacturing employment during the summer months for each county type. The annual turnover in manufacturing employment is approximately 1 percentage point for agricultural, mixed and rural counties, and a much smaller amount for urban counties.

Along with manufacturing, employment in two other sectors, trade and construction and mining, can help explain welfare participation seasonality in rural counties. Employment in both these sectors is higher in summer months than in winter months. Construction and mining employment increases by 1.1 percentage points in rural counties in the summer and by 0.6 percentage points in mixed counties. It has a negligible increase in urban counties and negligible decrease in agricultural counties.

Trade employment decreases in the summer for all counties except rural counties. For those counties, trade employment increases by 1.3 percentage points in the summer months. Trade employment includes both wholesale and retail trade. Because retail trade employment includes employment in eating and drinking places, food stores, and general merchandise, we expect it to be responsive to seasonal tourism.

A closer look at rural counties indicates that they have different dynamics. For example, one county, Mono, accounts for all the variation in the construction and mining sectors for rural counties because of significant seasonal mining activity. Two counties, Mariposa and Trinity, have seasonal service sectors owing to summer tourism. Five rural

counties drive the farming figures, and three drive the manufacturing figures. Thus, within the rural counties, we can distinguish six types. Farming and trade counties (Del Norte and Lake), farming and manufacturing (Lassen, Mendocino, and Siskiyou), service (Mariposa and Trinity), construction, mining, and trade (Mono), nonfarm mixed (Amador, Calaveras, Plumas, and Tuolumne), and three counties with no seasonality (El Dorado, Inyo, and Nevada).

In summary, the seasonality of welfare use in agricultural counties can apparently be largely explained by seasonality of agricultural and manufacturing employment. During the summer months, agricultural employment increases 7.7 percentage points and manufacturing employment increases by about 1.1 percentage points, for a total increase in employment of almost 9 percentage points in the summer. In rural counties, the welfare seasonality can be attributed to employment in the agricultural, manufacturing, trade, and construction and mining sectors. Employment in each of these sectors increases during the summer months by between 1 and 1.3 percentage points, for a total increase in employment of about 5 percentage points in the summer. The service sector also matters in two rural counties.

LINKING EMPLOYMENT DYNAMICS TO WELFARE DYNAMICS

The data presented in the last section suggest a strong link between employment and welfare dynamics, but they do not provide the kinds of proof that multivariate statistical methods can provide. In a separate paper (Brady et al. 2000), we have developed a complete statistical model of welfare entries and terminations for both FG and U cases using aggregate California county data and a statistical model of terminations for FG and U recipients using individual-level data for California counties. These models reach the same conclusions, and they provide us with substantial assurances that there are strong links between employment and welfare. We will briefly describe both statistical models and their main findings, and then we will present some of the implications of the aggregate-level estimations.

Our aggregate and individual-level specifications linking welfare

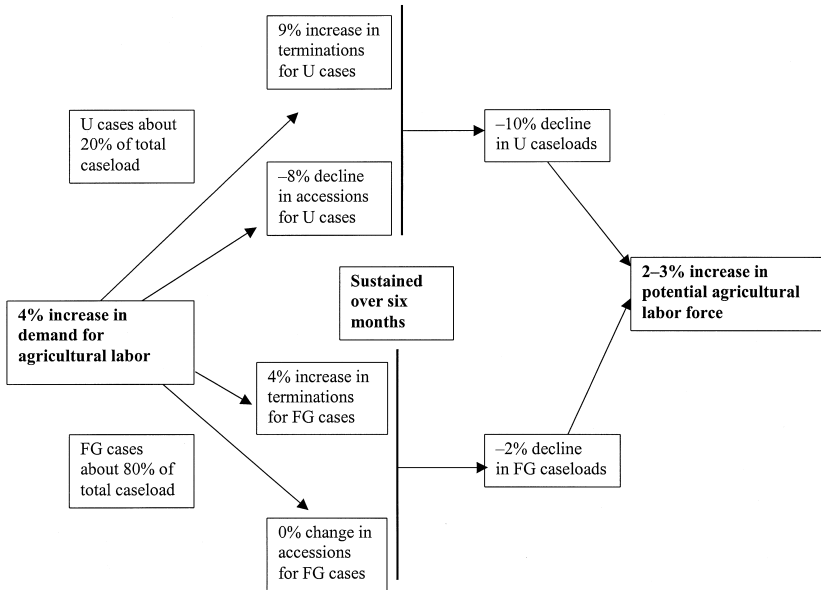
use to employment patterns were guided by a theoretical model of welfare entrances and exits. Our model considers entrances and exits from welfare to be the result of a stochastic process within the relevant at-risk population in which different subpopulations have different chances of entering or exiting welfare. These chances depend on employment conditions, benefit levels, and other factors that affect the use of welfare.

Based on the theoretical model, we developed a time-series, cross-sectional, aggregate-level model for explaining welfare entries and exits, a model that included lagged dependent variables, current and lagged values of independent variables (such as employment in various sectors and birth rates), fixed effects for each county and time period, and corrections for heteroscedasticity and auto-correlation. This model showed that a substantial amount of the variation in entries and exits could be explained by the ups and downs of employment. As expected, employment had a greater effect on welfare participation for U cases than FG cases. Regarding specific employment sectors, agriculture employment had a large, significant effect on both entries and exits for U cases and on exits for FG cases in agricultural counties. In rural counties, retail employment helped explain variation in welfare exits for both FG and U cases and variation in entries for U cases. Employment in other sectors also helped explained both entries and exits for U cases in rural counties.

With the individual-level data—a 1 percent sample of welfare recipients in all California counties—we estimated a discrete time hazard model for terminations. In our model, the exit rate is a linear function of the explanatory variables of age, county employment variables, spell duration effects, and calendar month and county fixed effects. Our individual-level results largely mirror the aggregate-level results. We also find that the average welfare recipient in either a rural or agricultural county has both more and shorter welfare spells than the average welfare recipient in an urban county. A person in an agricultural or rural county is, therefore, more likely than a person in an urban county to go on welfare in a given year; however, once on welfare, he or she is more likely to exit welfare before an urban welfare recipient who began welfare at the same time.

Rather than report all of the details of these estimations, we will simply present some of their implications. Figure 5.7 considers the im-

Figure 5.7 Effect of an Increase in Demand for Agricultural Labor on Welfare Caseload and the Potential Agricultural Labor Force



impact on the U and FG caseload of a 4 percent change in the agricultural employment rate and the resulting impact on the labor available for the agricultural labor force. The data in this figure are calculated from the models described above, and the information we have about the variation in agricultural employment and the distribution of FG and U cases in California.

The figure begins at the left-hand side by assuming a change in the demand for agricultural employment of 4 percent. In fact, the change from peak to trough is 8 percent, but this amounts to an average increase of about 4 percent over six months. This change affects both the U and FG caseload, but the 20 percent of the caseload that is U cases is affected the most. Terminations of U cases increase by 9 percent with a 4 percent change in agricultural employment. Entries to welfare also decline by 8 percent. Over the course of six months, this leads to a decline in U caseloads of about 10 percent. The 80 percent of the caseload that is FG is affected less by an increased demand for agricultural

labor, but terminations for FG cases still increase by 4 percent; entries, however, do not seem to be affected. The net result is that FG caseloads decline by about 2 percent.

With the decline in the U and FG caseloads, the potential agricultural labor force expands by including those who are no longer on welfare, and this increase is about 2 percent to 3 percent of the agricultural labor force. At the margin, this increase in the labor force can have a highly significant impact on the price of agricultural labor because it goes a long way toward covering the increased demand from seasonal factors. Although this analysis is simply mechanical because it does not take into account the possibility that those leaving welfare might enter nonagricultural employment, it does provide a sense of how welfare has provided a seasonal labor force for the agricultural sector.

POLICY IMPLICATIONS

Over one-seventh of the California welfare caseload is in agricultural or rural counties. The number of welfare recipients in these counties increases dramatically from the summer to the winter. The total caseload affected by seasonal factors doubles if mixed counties are included with agricultural and rural counties.

The seasonality in welfare receipt is driven by labor market factors. In agricultural and mixed counties, farming employment is primarily responsible for seasonality. In agricultural counties, the changing demand for agricultural labor from winter to summer leads to a reduction in the welfare caseload that could supply 2 to 3 percent of the total agricultural workforce. In rural counties, the most important sectors vary from one county to another, but they are primarily agriculture, manufacturing, trade, service, and construction and mining. Reductions in the welfare caseload between the winter and the summer provide a significant fraction of the workforce in these sectors in some rural counties.

The new TANF legislation and the California WORKs program emphasize work and time limits for welfare recipients. Although California's time limits do not necessarily remove an entire family from aid, they do substantially reduce the degree to which welfare can pro-

vide income for seasonal workers beyond the time-limit period. What will happen to these seasonal workers under the new legislation?

One answer is that the seasonal workers will stay where they are and simply find other ways to combine summer employment with winter unemployment. This will almost certainly mean that many will have annual incomes below the poverty level. Another answer is that these people might get new jobs with less seasonality or move elsewhere. This will probably happen for some workers, but workers often have difficulty moving from either one job to another or one location to another (Council of Economic Advisers 1990). Furthermore, if a large number of seasonal workers do move to other areas, then seasonal industries must either find their workforce elsewhere or bid up the price of their labor.

Another answer is that welfare time limits might be modified in those areas with significant seasonal or persistent unemployment. This would allow seasonal workers to combine welfare with work and to have enough income to lift them out of poverty. This approach, however, means that the government will be subsidizing the workforce for seasonal employers and that it will be providing incentives for workers to remain in areas with high unemployment rates. It will also extend people's involvement in a stigmatizing social welfare program.

Still another answer might be to extend unemployment insurance (UI), or some variant of it, to seasonal workers. Currently, UI is seldom available to these workers either because their work is not covered originally or because they cannot stay employed long enough to qualify for UI benefits. An unemployment insurance scheme would be less stigmatizing than welfare, and it would involve employers in providing part of the subsidy for its seasonal workers through the traditional experience rating method of funding UI. Unfortunately, it seems likely that many seasonal employers would balk at helping to fund such a program.

Notes

1. According to the authors, forest counties are those that in 1980 had a forest coverage of more than 50 percent or those in which 3 percent or more of the 1980 county wages came from forest sector industries and in which timber was cut commercially.
2. The counties classified as mixed have a combined population that is greater than the population in each of 40 states. Meanwhile the combined population of the counties classified as urban is about one-third larger than any other state.
3. Percent rural figures are from the Bureau of the Census (1992), *Census of Population and Housing, 1990*. They indicate the percent of the population who lives in rural areas, defined as all areas except places of 2,500 or more population incorporated as cities, villages, and towns. Percent farm and agricultural services employment figures are for 1993, from the U.S. Bureau of Economic Analysis.
4. The data used for this and other welfare analysis at the aggregate level is the California Department of Social Services series, *Public Welfare in California*. This data series provides monthly information by county on total aid payments, number of children and people receiving aid, and number of cases, exits, and entries.
5. Two counties, Sutter and Yuba, have been combined in our data set because some industry data were unavailable for each county separately until 1994. In addition, we have excluded from our data set the two counties with the smallest populations, Alpine and Sierra. They have been omitted because a large portion of the variability in their welfare and employment rates is driven by idiosyncratic factors that are averaged out over very small populations.
6. Welfare participation, or percentage on aid, is calculated as the total number of people on aid divided by the population.
7. The variability numbers, which are based on the standard deviation of monthly figures within a year, measure the amount of variation in the percentage of the population on aid within a year. They are calculated as the average across all years of the standard deviation for welfare participation within a year.
8. We define summer months as May through October and winter months as November through April.
9. FG cases comprised, on average, more than four-fifths of the welfare caseload in each county type over the time period of our data set. The proportion of the welfare caseload comprised of UP cases ranged from about one-seventh in urban counties (13.8%) to one-fifth in agricultural counties (19.6%). Compared with other states, California has a disproportionate share of its caseload comprised of two-parent families; only 7 percent of the national caseload consisted of these families in 1996. More than half of all two-parent cases (54%) were in California in 1996 (U.S. House of Representatives 1998). Within both the FG and U welfare subprograms, some cases are child-only cases, cases in which adults (usually parents) are excluded from the household size calculation used to determine welfare benefits. In our analysis these cases are not distinguished from cases with aided

- parents, because we believe adults associated with both types of cases face similar economic incentives.
10. The data were largely obtained from the Employment Development Department's web site at <www.calmis.ca.gov/htmlfile/subject/indtable.htm>. Some data missing from the web site were obtained from the State of California's "Annual Planning Information" publications. When data were unavailable on the web site and in the publications, quarterly ES-202 data were used.
 11. For each county type, employment is averaged across counties of that type for each month, and then the difference is taken between the highest summer and the lowest winter month.

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