
Explaining Variations in State Hunger Rates

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A large and rapidly expanding body of research has examined causes of household-level food insecurity and hunger. A definitive explanation has not emerged that links State prevalence rates of hunger to State-level characteristics such as poverty, employment, and per capita income. In this article, we examined the effect of State-level economic and demographic characteristics on State prevalence rates of food insecurity and hunger. Using food-security data from the U.S. Department of Agriculture and Census data on all 50 States and the District of Columbia, we first estimated, by using ordinary least squares regression, the associations of food insecurity and hunger with a small number of carefully chosen State-level factors. Based on these associations, we then examined the extent to which these factors explained the high rate of hunger in Oregon and, as a contrast, the lower-than-expected rate of hunger in West Virginia. Findings of our study suggest that to reduce hunger rates, policymakers should consider ways to mitigate income shocks associated with high mobility and unemployment and reduce the share of income spent on rent by low-income families.

The U.S. Department of Agriculture (USDA) monitors annually the food security of U.S. households. This monitoring includes calculating the share of households that are food insecure—meaning that they had difficulty at times during the year having enough to eat—and the share of households in which people were hungry at times during the year because of their food insecurity. The USDA reports these statistics for the Nation and for each State (Nord, Jemison, & Bickel, 1999; Nord, Andrews, & Carlson, 2002).

The USDA's Food and Nutrition Service (FNS) uses these statistics to assess the level of need for its food assistance programs and to measure their performance. Advocates for programs that serve low-income families have used these statistics to call for a variety of policy initiatives. The Food Research and Action Center (FRAC), a prominent national organization seeking to end hunger, recently urged Congress to authorize additional funding for the Summer Nutrition and

School Lunch Programs (Food Research and Action Center, 2003b). America's Second Harvest, the Nation's largest hunger-relief organization, has also relied on the USDA's hunger estimates in supporting efforts to alleviate hunger (America's Second Harvest, 2002).

State government agencies and the media have used the USDA's State-level statistics to draw attention to the problem of hunger. In Idaho and Tennessee, newspaper editorial boards have taken the opportunity to use hunger estimates to suggest policy (*Idaho Statesman*, 2002; Cooper, 2002). The State-level estimates have received considerable attention in the Pacific Northwest, particularly in Oregon, where posted rates have been at or near the top of the USDA's hunger rankings (Graves, 2002; Harrison, 2002; Cook, 2002). In spring 2003, Oregon Governor Ted Kulongoski convened a hunger summit and discussed possible solutions with human service providers, business executives, and academic experts and

has since made the eradication of hunger a top priority of his administration. Subsequently, the Governor announced a strategic plan—principally focused on job creation—to reduce the State’s hunger rate. However, with no precise information about how job growth or unemployment relates to hunger, the Governor was unable to predict the degree to which his approach would affect the State’s hunger rate, if at all (Kulongoski, 2003).

The high hunger rates of Oregon and its Northwest neighbors (Washington and Idaho) have surprised policymakers and the Federal officials who oversee USDA’s Current Population Survey Food Security Supplement (CPS-FSS) (Nord et al., 1999). A definitive explanation linking State prevalence rates of hunger to State-level characteristics such as poverty, employment, and per capita income has not emerged. Because the underlying reasons have—to this point—gone unexplained, policy responses have been hampered and some observers have challenged methods used in the survey and deemed the USDA’s findings inaccurate or misleading (Charles, 2003).

In this article, we examined the effects of State-level economic and demographic characteristics on State prevalence rates of food insecurity and hunger. Using food-security data and Census data of all 50 States and the District of Columbia, we first estimated the associations of food insecurity and hunger with a small number of carefully chosen State-level factors. Based on these associations, we then examined the extent to which these factors explained the high rate of hunger in Oregon and, as a contrast, the lower-than-expected rate of hunger in West Virginia.

Background

In 1990, Congress enacted the National Nutrition Monitoring and Related Research Act (U.S. Department of Agriculture [USDA], 2002a). Under the national plan mandated by this Act, the USDA and the U.S. Department of Health and Human Services (HHS) formed the Food Security Measurement Project. Several Federal agencies, as well as academic and private researchers, worked as a team to develop standardized measures of household food security that could be used nationally as well as in State and local surveys.

The team working on the Food Security Measurement Project used, as its starting point, the definitions of food security, food insecurity, and hunger established by the American Institute of Nutrition (Anderson, 1990). Whereas food security means assured access by all people at all times to enough food for active, healthy lives, food insecurity means limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways (Anderson, 1990).¹ Hunger refers to the uneasy or painful sensation caused by lack of food. As measured and described by the project, hunger refers specifically to hunger that results from food insecurity (USDA, 2003b).

Based on these definitions and earlier research, the members of the project developed a series of questions about behaviors and experiences known to characterize households that are having

difficulty obtaining enough food. These questions (i.e., the U.S. Food Security Survey Module) are included in an annual nationally representative survey as a supplement to the monthly Current Population Survey (CPS) of the U.S. Census Bureau. Based on the number of food-insecure conditions they report, surveyed households are identified as food secure, food insecure without hunger, or food insecure with hunger.

A large and rapidly expanding body of research has examined causes of food insecurity and food insufficiency (a related measure based on a single question used in earlier surveys). To date, however, almost all of this research has examined these associations at the household level. The annual reports of food security by the USDA reveal that households headed by single parents, especially women, and Black and Hispanic households were more likely than others to be food insecure (Nord et al., 2002). Poor households have rates of food insecurity far above the national average, and food insecurity is more prevalent in the South and West than in the Northeast and Midwest (Nord et al., 2002).

Using data from the Survey of Income and Program Participation (SIPP by the Census Bureau), Gundersen and Gruber (2001) used a variety of indicators to compare food-insufficient households with food-sufficient ones. They found that “income shocks” were a major factor leading to food insufficiency (especially for households that lacked savings) and that rates of food insufficiency were lower among homeowners, households headed by senior citizens, and married couples without children than among other households. The authors also speculated that moves by a household might reduce the amount of resources available to buy food, but they found no statistically significant differences

¹Current methods of measuring food insecurity may not fully take into account whether food was acquired in socially acceptable ways. In particular, reliance on Federal and community food assistance programs by a household is not directly considered in assessing the food-security status of the household.

between food-insufficient and food-sufficient households in this regard. Gunderson and Gruber (2001) concluded that, compared with their counterparts, food-insufficient households faced more unemployment, losses to the receipt of food stamps, and other income shocks and were less able to withstand these shocks by using savings. Thus, these researchers suggested that food insufficiency should be addressed with policies that mitigate income shocks commonly experienced by low-income families.

Other studies have also examined causes of household-level hunger. Similar findings have emerged. Rose, Gundersen, & Oliveira (1998) found that high school graduates, homeowners, and seniors were less likely than others to be food insufficient. Their findings showed that Whites, compared with other racial groups, had the lowest rates of food insufficiency. Not surprisingly, Rose and colleagues also concluded that the less money a household had, the more likely it was to be food insufficient.

In a more recent study, Nord (2003) found hunger to be associated strongly with low income, as expected, and also found that, even with analytic controls for income, hunger was associated strongly with unemployment, part-time employment for economic reasons (i.e., because more work could not be found), not working because of a disability, recent household moves, and low education. Hunger rates were found to be lower for homeowners and for households with the elderly—especially households with retired elderly—compared with their respective counterparts.

All of these analyses were based on household-level associations. To date, little research attention has been given to State-level food insecurity and hunger and the extent to which these

household-level factors account for the differences in prevalence rates of food insecurity and hunger across States. In an analysis of rates of State hunger estimated by a FRAC-sponsored survey, Ryu and Slottje (1999) concluded that high school graduates were less likely to be hungry than were those who did not receive a high school diploma. Nord et al. (1999) reviewed USDA-measured rates and demonstrated a strong association between State poverty and prevalence rates of food insecurity. However, the authors also acknowledged that the association was not perfect and pointed in particular to Washington and Oregon as exceptions to the general pattern. They concluded: “. . . reasons for these unexpected high rates of food insecurity in the Pacific Northwest are not known, and further research is needed on this subject” (p. 8).

Data and Empirical Model

We were interested in explaining State-level variations in two related prevalence rates: food insecurity and food insecurity with hunger, the more severe condition. State-level prevalence rates of food insecurity and hunger for our analysis were taken from work by Nord et al. (2002)—the most recent statistics on food security that are published by the USDA. These statistics are particularly well suited for analysis of the associations of State-level characteristics with State hunger rates, because they span 1999 to 2001—a period that overlaps the collection of data through the 2000 Decennial Census and the Census Supplemental Survey. State-level statistics based on these Census data are highly precise.

The USDA's statistics on food insecurity and hunger are based on data collected in the CPS-FSS of April

1999, September 2000, and December 2001. The CPS-FSS is a nationally representative survey of about 50,000 households that is conducted annually by the U.S. Census Bureau for the USDA. Representative of both the U.S. civilian noninstitutionalized population and each State, the CPS-FSS is conducted as a supplement to the monthly CPS, a labor force survey conducted by the Census Bureau for the Bureau of Labor Statistics. Households are classified as food secure, food insecure without hunger, or food insecure with hunger,² a classification that is based on the number of food-insecure conditions they report in response to the 18 questions in the food-security module.

For most monitoring and analytic purposes, the CPS sample size in most States is too small to produce annual food insecurity or hunger rates with sufficient reliability. Consequently, the USDA routinely reports State-level food insecurity and hunger rates as 3-year averages. We used the 3-year averages for 1999 to 2001 (Nord et al., 2002) as our main analytic variables.

Our method to assess the associations of State-level food insecurity and hunger rates with State economic and demographic characteristics was a straightforward application of ordinary least squares (OLS) regression analysis. We hypothesized that a number of State-level characteristics independently affect State-level food-insecurity and hunger rates. The relationship between the State hunger rate Y and the explanatory variables X is generally assumed to take this form:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni} + \varepsilon_i$$

²A complete description of the CPS sample design is available at <http://www.bls.census.gov/cps/tp/tp63.htm>.

OLS provides estimates of the values of the β terms, which quantify the relationship between each of the explanatory variables and hunger or food insecurity. We analyzed the associations between food insecurity and explanatory variables in a separate model.

We selected the explanatory variables (X_{1i} , X_{2i} , etc.) based on our review of the literature and discussions with experts on food insecurity and hunger. The limited degrees of freedom in this cross-sectional analysis called for a parsimonious model. The literature and program experts identified associations between five individual characteristics (change of residence, unemployment status, poverty status, age, and race) and food insecurity and hunger. We additionally included a measure of housing cost because a number of observers had identified a correlation between high housing costs and food insecurity. Housing is a major item in the budget of most low-income households and, if too high, can “crowd out” resources available for food (Gundersen & Gruber, 2001; Rose et al., 1998; Food Research and Action Center, 2003a).

Hypothesized Relationships

In this section, we discuss the hypothesized relationship between change of residence, unemployment status, poverty status, age, and race and rates of food insecurity and hunger. We describe these variables as well as report the means and standard deviations (table 1).

- **Percentage of households in 2000 that moved within the last year.** The Census Supplemental Survey reports the share of households in a State that indicate whether they changed dwellings between 1999 and 2000.

Table 1. Descriptive statistics for the 50 States

Variables ¹	Mean	Standard deviation
	Percent ²	Percentage points
Share of population experiencing food insecurity with hunger	3.1	0.9
Share of population experiencing food insecurity	10.2	2.2
Share of population in a different house	16.4	2.7
Peak unemployment rates during 1999-2001	5.0	1.1
Share of population living in poverty	12.1	3.3
Share of renters paying more than 50 percent of income on gross rent	16.4	1.8
Share of population non-Hispanic White	74.9	16.1
Share of population under age 18	25.5	1.9

¹Percentages for all variables are for 2000 unless noted otherwise.

²These figures report the simple average of 50 individual State observations with each State's observation given equal weight. That is, California's observation is given the same weight as North Dakota's. Consequently, the figure does not represent a U.S. average, which would vary the States' weighting by their size.

Households can move for a number of reasons—some positive (e.g., house upgrade or relocation to a new job) and some problematic (e.g., evictions or household dissolutions such as divorces or separations). Household-level research has suggested that, overall, households that have moved recently, compared with households that have not moved recently, were more likely to be food insecure. We hypothesized that this measure is a proxy for income shocks, which Gundersen and Gruber (2001) demonstrated had a positive relationship with hunger. The variable's mean across States was 16.4 percent, and the standard deviation was 2.7 percentage points.

- **Average of 1999, 2000, and 2001 peak unemployment rates.** We constructed this variable as the average of the peak State unemployment rates in each of three years: 1999, 2000, and 2001. The 3 years coincide with the period of measurement for the dependent variables. We selected the peak rate in each year, rather than the average, to capture the worst economic conditions reported in the States. Peak unemployment rate is likely to be a better measure of the share of the labor force that experienced job loss and a related income shock at some time during the year. This measure is, therefore, temporally consistent with the measures of food insecurity and hunger, which reflect the most

problematic food-access conditions of the year. (Households were classified as food insecure or food insecure with hunger if they experienced these conditions at any time during the year.) Based on the work of Gundersen and Gruber (2001) and others (Rose et al., 1998), we hypothesized that high peak unemployment would be associated with high food insecurity and hunger rates. We used the applicable variable from the Local Area Unemployment Statistics series of the Bureau of Labor Statistics. Its mean was 5.0 percent; the standard deviation, 1.1 percentage points.

- **State poverty rate.** Other studies have indicated that a household's income level is a determinant of food insufficiency (Gundersen & Gruber, 2001; Rose et al., 1998; Gundersen & Oliveira, 2001; Nord, 2003). Moreover, the most recent USDA report showed that 12.9 percent of households with incomes below the Federal poverty level experienced hunger, compared with a national average of only 3.3 percent (Nord et al., 2002). Therefore, we anticipated that States with higher poverty rates would also register higher hunger rates. State poverty rates, measured for calendar year 1999 through the 2000 Decennial Census, averaged 12.1 percent; the standard deviation, 3.3 percentage points.
- **Share of renters spending more than 50 percent of income on gross rent.** Just as limited income can put a household at risk for hunger, high expenses can do the same. Past studies have reported that renters were more likely than homeowners to be food insecure (Gundersen & Gruber, 2001; Rose et al., 1998; Gundersen & Oliveira, 2001; Nord, 2003). Therefore, we

used the share of renter-households in the State that spent more than 50 percent of their incomes on gross rent as an explanatory variable.³ We anticipated that within the group of renting households, those with high rents relative to their incomes would be particularly prone to hunger. We used the variable from the 2000 Decennial Census. The mean for the variable was 16.4 percent; its standard deviation was 1.8 percentage points.

- **Population share of non-Hispanic Whites.** Previous research has offered mixed findings about the effect of race and ethnicity on hunger or food insufficiency (Gundersen & Gruber, 2001; Rose et al., 1998; Gundersen & Oliveira, 2001; Nord, 2003). We included the variable that measured the share of a State's population that was non-Hispanic White, but we had no *a priori* assumption about its effect on hunger rates. This variable averaged 74.9 percent; its standard deviation was 16.1 percentage points.
- **Population share under age 18.** Researchers have indicated that larger households, and particularly large households with children, have higher hunger rates (Rose et al., 1998). We anticipated that as a State's share of the population under age 18 rose, so would its hunger rate. The mean for this variable was 25.5 percent; its standard deviation was 1.9 percentage points.

Finally, we explored the extent to which the regression model could account for the high rate of hunger in Oregon. Based on the regression

³Gross rent consists of direct rental costs plus essential utilities.

coefficients and the values of each State's independent variables, we calculated the rates of hunger predicted by the regression model for each State. We also calculated the contribution of each factor to Oregon's higher-than-average hunger rates. As a counterexample, we examined the contribution of each factor to the hunger rate in West Virginia, which was near the national average despite a relatively high State poverty rate.

Results

Because of the limited number of observations (51) and the estimation error associated with prevalence rates of State-level hunger, the model predicted State hunger rates quite well. Overall, the six independent variables explained 64 percent (unadjusted R²) of the variation in State hunger rates—a high rate for this type of model—and 74 percent (unadjusted R²) of the variation of State rates of food insecurity (table 2). Moreover, the measured relationships between most of the independent variables and State rates of hunger and food insecurity were statistically significant and sufficiently strong to be of substantive importance. Also, both in-sample and out-of-sample predictions ranked Oregon with the second highest hunger rate.

Examination of the estimated relationships between each of the independent variables and State hunger and insecurity rates revealed that the “different house,” or mobility variable, had the most robust and consistent relationship with State hunger and food insecurity rates. The hunger model suggests that each percentage-point increase in the share of a State's households that reported changing dwellings between 1999 and 2000 was associated with a 0.13-percentage-point increase in the State's hunger

Table 2. Estimated relationships between selected State characteristics and rates of hunger and food insecurity

	Food insecurity with hunger		Food insecurity (with or without hunger)	
	Regression coefficient	Standard error	Regression coefficient	Standard error
Share of population in a different house	0.132	(0.034)*	0.280	(0.073)*
Peak unemployment rates during 1999-2001	0.314	(0.100)*	0.187	(0.215)
Share of population living in poverty	0.034	(0.031)	0.360	(0.067)*
Share of renters paying more than 50 percent of income on gross rent	0.130	(0.055)*	0.276	(0.118)*
Share of population non-Hispanic White	0.011	(0.006)	0.014	(0.013)
Share of population under age 18	0.112	(0.047)*	0.434	(0.101)*
Constant	-0.069	(0.018)*	-0.164	(0.040)*
R ²	0.638		0.736	
Adjusted R ²	0.588		0.700	

Note: The data are based on ordinary least squares analysis.

*p < .05.

A 1-percentage-point increase in peak unemployment rates was associated with an increase of 0.31 percentage points in a State's hunger rate.

rate. The magnitude of the coefficient was roughly twice as large in the estimate of food insecurity (but the level of food insecurity was also much higher, so the proportional association was similar or somewhat smaller). We interpret the coefficient of the “different house” variable as primarily measuring the associations of food insecurity and hunger with economic shocks and family disruptions.

Effects of peak unemployment rates also were quite strong. A 1-percentage-point increase in peak unemployment rates was associated with an increase of 0.31 percentage points in a State's hunger rate. This relationship is consistent with earlier research findings that job loss and income shocks are associated with a higher

likelihood of food insufficiency (Gundersen & Gruber, 2001; Nord, 2003). We also found unemployment to put upward pressure on food insecurity rates; this association, however, was weaker than the one for hunger and was not statistically significant.

As expected, high poverty rates also put upward pressure on hunger and food insecurity rates. This association for hunger, however, was not statistically significant. The relatively high correlation between State-level poverty and unemployment measures accounted for the weakness of the estimated relationship between poverty and hunger on the one hand and between peak unemployment and food insecurity on the other. Because States with high poverty rates tended also to

have high peak unemployment rates, the models had difficulty disentangling the independent effects of poverty and unemployment. In the case of the hunger model, the stronger association with the unemployment variable left little residual association with the poverty rate. However, when we removed the unemployment variable from the model (analysis not shown), the poverty variable became statistically significant. In the case of the food-insecurity model, poverty had the strong relationship with food insecurity; removing it from the model resulted in a statistically significant association with unemployment.

The additional analyses with poverty rates and peak unemployment rates, omitted in turn, also confirmed that the peak unemployment variable was more strongly associated with hunger rates than with food insecurity rates while the poverty variable was more strongly associated with food-insecurity rates (data not shown). These findings suggest that economic shocks at the household level, for which peak unemployment is a proxy at the State level, are associated with the more severe hunger condition. In States with high poverty rates, by contrast, low-income households and their communities are more likely to have adjusted to sustained low levels of income. Persistently poor households are likely to have developed ways to avoid hunger by relying on family, friends, and local institutions and by altering their consumption patterns. Community institutions in States with consistently high poverty rates will have had time to adjust and better reach families in need.

High housing costs were strongly associated with hunger and food-insecurity rates. Our model estimated that a 1.0-percentage-point increase in the share of a State's renters who paid more than 50 percent of income for

gross rent was related to a 0.13-percentage-point increase in the State's hunger rate. For example, the 8.9-percentage-point difference between New York (the Nation's highest) and South Dakota (the Nation's lowest) and the housing-burden measure is expected to result in a 1.1-percentage-point difference in hunger rates between the two States (data not shown).

We had no expectations about the effects of the non-Hispanic White variable on rates of hunger and food insecurity. The variable showed a positive but weak and statistically insignificant relationship with the dependent variables. The lack of a conclusive relationship is consistent with previous, generally mixed, findings reported by researchers (Rose et al., 1998).

As the share of a State's population under age 18 increased, so did both hunger and food insecurity. A 1-percentage-point increase in the State's population share under age 18 was significantly associated with a 0.11-percentage-point increase in hunger and a 0.43-percentage-point increase in food insecurity. We were concerned that this variable could be confounding the effects of a larger share of children with a smaller share of elderly in the State. However, including the elderly population share in the model (analysis not shown) resulted in no substantial change in the coefficient on the share of the State's population under age 18.⁴ The measured associations of hunger and food insecurity with the elderly population share remained, even when all households with elderly were excluded from the sample used in the analysis for calculating rates of food insecurity and hunger. We thus concluded that the association was

⁴To obtain the detailed data for each State, please contact the first author.

spurious, resulting from other characteristics of States with large elderly population shares.

We also examined the extent to which the regression models accounted for hunger rates in Oregon and West Virginia (table 3). Oregon registered one of the highest hunger rates (5.8 percent) in the Nation; yet, it had a poverty rate slightly below the national average (11.6 vs. 12.1). West Virginia, on the other hand, had a hunger rate near the national average (3.3 percent); yet, it had the fifth highest poverty rate of all States (17.9 percent). We estimated—based on the model's regression coefficients and the States' values on each independent variable—how Oregon's and West Virginia's hunger rates would change if the State's levels were equal to the mean for all 50 States.⁵

For example, Oregon's share of renters paying more than 50 percent of their income in rent is 2.9 percentage points higher than the U.S. average (19.3 vs. 16.4 percent, table 3 and table 1, respectively). If Oregon's rate fell to the 50-State mean, we estimated that the State's hunger rate would fall by 0.4 percentage points (table 3). Oregon's high levels of peak unemployment rate and residential mobility, as measured by the share of the population in a different house, explained even more of the gap between Oregon's hunger rate and those of other States. For each of these two variables, if Oregon's rate fell to the 50-State mean, the model predicted that the State's hunger rate would decline by 0.6 percentage points.

In West Virginia, high peak unemployment pushed the hunger rate up. Bringing peak unemployment down to

⁵These values are not national averages because they are unweighted; they are means for the 50 States.

Table 3. Estimated effect of key characteristics on hunger rates in Oregon and West Virginia

	Oregon		West Virginia	
	Rate	Estimated effect ¹	Rate	Estimated effect ¹
	<i>Percent</i>	<i>Percentage point</i>	<i>Percent</i>	<i>Percentage point</i>
Share of population in a different house	21.1	-0.6	12.9	0.5
Peak unemployment rates during 1999-2001	7.0	-0.6	6.9	-0.6
Share of population living in poverty	11.6	0.0	17.9	-0.2
Share of renters paying more than 50 percent of income on gross rent	19.3	-0.4	17.7	-0.2
Share of population non-Hispanic White	83.5	-0.1	94.5	-0.2
Share of population under age 18	24.7	0.1	22.2	0.4
Total State hunger rate	5.8	-1.6	3.3	-0.3

¹The effect refers to the estimated change in hunger rate if the rate equaled the mean hunger rate of the 50 States. For example, Oregon's share of the population in a different house in 2000 was 18 percentage points higher than the 50-State mean (21.1 vs 3.1). If Oregon's mean were the same as that of the 50 States, Oregon's hunger rate would fall by 6 percentage points.

the 50-State mean (5 percent) would lower the hunger rate by 0.6 percentage points. West Virginia's high poverty rate (17.9 percent) was estimated to push up the hunger rate only 0.2 percentage points. As we observed, with peak unemployment in the model, the effect of the poverty rate was small. Furthermore, West Virginia's share (17.7 percent) of renters paying more than 50 percent of their income for gross rent was nearer the 50-State mean (16.4 percent) than was Oregon's (19 percent), putting a smaller upward pressure on the hunger rate. The most important difference between the two States, however, was that the factors pushing the hunger rate up were largely offset by West Virginia's much lower rate of residential mobility, well below the U.S. mean, and the considerably

smaller-than-average share of children in the population. Taken together, these factors resulted in a hunger rate in West Virginia that was similar to the mean for the 50 States.

Policy Implications and Conclusions

Prior research provided considerable insight about factors affecting household-level hunger, food insecurity, and food insufficiency but little information about the extent to which these factors explained differences in State prevalence rates.

The lack of an intuitively satisfying explanation for high estimated hunger rates in the Pacific Northwest left

policymakers unsure about how to address the problem of hunger and led critics to question the validity of the USDA survey and its measurement techniques. The ability to associate State hunger rates to key social and economic conditions at the State level, as demonstrated in this study, sheds light on State rankings and, by doing so, both lends credibility to the State hunger statistics and provides policymakers with some guidance about policy responses. Nevertheless, this relatively simple cross-sectional analysis points only to associations between hunger and food insecurity and the hypothesized explanatory variables. Our work falls short of establishing definitive causal relationships.

The findings suggest that highly transient populations put upward pressure on the hunger rates in their States. High mobility serves as a proxy for a variety of lifetime disruptions—divorce, separation, eviction, and other shocks to family income—that put people and families at risk of hunger and food insecurity. This risk may be exacerbated by the diminished social cohesion that characterizes highly mobile populations.

Paradoxically, good regional economic conditions often lead to high levels of mobility. States with booming economies attract an influx of job seekers. States with a high percentage of seasonal jobs may experience substantial internal migration during the year. States with strong economies may experience rapid growth in housing prices, resulting in both high housing costs for residents and relatively large portions of the population shifting into new or less expensive areas. People living through these types of economic conditions may be at a higher risk of hunger; because, they are more likely than others to be living in new neighborhoods, distant from family

and friends and disconnected from the local infrastructure of social support. Religious institutions and government programs may not effectively reach people who have lived in the area for only short periods.

In trying to lower hunger rates in highly mobile States in the West and South, policymakers may want to focus their efforts on vulnerable, mobile populations—newcomers, seasonal workers, and displaced renters, for example. In doing so, policymakers in these States can assume a role in overcoming, or partially offsetting, the lack of social cohesion in their communities. If some Western and Southern States lack natural support networks (e.g., family and long-time neighbors) found in the Northeast or Midwest, citizens and policymakers can attempt to substitute for the lack of cohesion through nonprofit or public efforts.

For example, a highly developed network of food banks may prove more important in Oregon than in States in other regions with more stable populations. Also, a state-of-the-art information and referral system, as envisioned by United Way's 211 coalition, can provide much-needed direction to those who relocate and need to know what resources are available to them. Policymakers can also reform the State unemployment insurance programs to better reach seasonal workers, focus food stamp outreach efforts on newcomers, and devise effective support programs for displaced renters.

The association between unemployment and hunger suggests that an economic development policy could serve a dual purpose as an anti-hunger strategy. Many governors have indicated that they want an integrated approach to economic development—one that stimulates job growth and

trains workers. Plans on both fronts are necessary to help State economies and their hungry citizens. Economic development efforts that lower poverty rates, reduce seasonal fluctuations in unemployment rates, and provide jobs in rural areas experiencing high unemployment may be particularly effective in fighting hunger.

Another policy direction to emerge relates to increasing the supply of affordable housing. Findings of this study indicate a substantial reduction in the hunger rate for moderate decreases in the share of renters who pay more than 50 percent of their income on gross rent. States with the largest share of such renters, such as Oregon, have room to improve and the potential to address concerns of both housing and hunger advocates. Competing proposals have been offered to increase the supply of affordable housing: construction of more affordable housing projects and vouchers for existing units, on the one hand, and relaxation of land-use controls to lower the price of land, on the other hand. If further research demonstrates that these approaches do, in fact, increase the supply of low- and moderate-cost housing, then both may reduce the prevalence of hunger, whatever the other strengths and weaknesses of these approaches might be.

In each State that has a high prevalence of hunger, a different combination of factors may be responsible. The results of this study can help policymakers and the concerned public in each of these States understand more fully the factors that particularly affect their State. We hope that this improved understanding will lead to increasingly effective policies, programs, and community institutions to reduce hunger and food insecurity.

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