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The Importance of Non-labor Income: An Analysis of Socioeconomic Performance in Western Counties by Type of Non-labor Income

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Abstract. Non-labor income (NLI) is one of the largest and fastest growing sources of income, constituting more than one-third of personal income in the U.S. West. Given the unprecedented growth in NLI and its diverse make-up, which includes investment income, Social Security, Medicare and Medicaid, and welfare, it is worth asking what effect the different types of NLI have on local economies and social well-being. We classify NLI into payments associated with investments, aging, and economic hardship, and then we use an empirical approach to evaluate the relationships between these NLI types and socioeconomic performance in western counties. We find that the NLI types accruing in the West are concentrated in rural counties and are associated with predictable, and in many cases undesirable, socioeconomic characteristics. Policies and demographic trends that affect the disbursement of NLI (e.g., aging baby boomers and reforms to retirement, income maintenance, and medical benefits) will have widespread effects, particularly in the rural West.

1. Introduction

Non-labor income (NLI), also known as non-earnings income, is one of the largest and fastest growing sources of personal income in the U.S. economy, constituting more than one-third of all personal income and more than half of net growth in real personal income in the last decade (U.S. Department of Commerce, 2012). In many counties, particularly in rural areas, NLI is the single largest contributor to personal income.

The growth in NLI, which has risen steeply throughout the 1990s and 2000s, has commonly been attributed to the growth of the stock market and changes in the nation's aging population, particularly baby-boomers and retirees, since much of NLI comes from money earned from investments, Medicare benefits, Social Security, and retirement payments associated with an older population. However, the types of non-labor income are diverse. For example, roughly one-quarter of NLI is associated with financial hardship, for example Medicaid and unemployment insurance compensation (U.S. Department of Commerce, 2012).

Given the unprecedented growth in NLI and its diverse make-up, it is worthwhile to ask what effect different types of non-labor income have on local economies and social well-being. Research has yet to yield a clear answer to this question, in part due to the lack of analysis focused on the wide variety of sources included in NLI.

The importance of evaluating the sources of NLI separately is illustrated by looking at two counties with comparable levels of total NLI: Lincoln County, Montana, and Teton County, Wyoming. Both have more than half of total personal income in the form of NLI, yet they are very different from each other. Lincoln County's economy has been dominated historically by a declining mining and logging industry and currently has high unemployment and low per

capita income, whereas Teton County's economy is dominated by a growing tourism and recreation sector spurred by wealthy "amenity migrants" and second home buyers and has low unemployment and high per capita income. In Lincoln County, NLI income is driven by an aging population and higher levels of economic hardship, likely related to the loss of mining and timber jobs and the out-migration of the younger, working population, while in Teton County, high NLI is an indication of economic growth that is led by investments, likely driven by the stock market and the in-migration of wealthy people. Although overall levels of NLI are similar, the types of NLI accruing within these counties are certainly related to different causes and different outcomes for their local economies. An approach that does not distinguish between the components of NLI would miss important distinctions between these two communities.

This example illustrates the importance of the research described in this paper, in which we investigate the relationships between non-labor income components and key measures of local socioeconomic well-being, such as income, education, and poverty rates. We also use the health care sector as a case study to test whether there is a relationship between non-labor income components and a major sector of the economy. Health care is a logical choice since it has become an increasingly important sector of the economy, particularly for rural areas, and because medical spending, in the form of Medicare and Medicaid, is a large and growing portion of NLI.

This paper also describes a new method of categorizing types of NLI. As defined by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce, NLI consists of two subcategories: Dividends, Interest, and Rent (DIR) and Transfer Receipts (TR). DIR includes personal dividend income, personal interest income, and rental income of persons with capital consumption adjustment. These income sources are sometimes referred to as "investment income" or "property income". TR are defined as payments to persons for which no current services are performed, consisting of payments to individuals and to nonprofit institutions by federal, state, and local governments and by businesses. Rather than use these two broad categories, in order to evaluate the relationships between the components of NLI and socioeconomic performance we reclassify NLI data into the following categories that relate more logically to socioeconomic drivers and outcomes:

1) DIR (e.g., investment income)
2) Age-Related Payments (e.g., retirement, Social Security, Medicare)
3) Hardship-Related Payments (e.g., Medicaid, income maintenance benefits)
4) Education Payments
5) Other NLI (e.g., workers' compensation, veterans benefits)

Our analysis uses a statistical approach to evaluate the relationships between the first three of the reclassified components of NLI, socioeconomic performance metrics, and the health care sector during the period 1990 to 2011 in all counties of the states within the conterminous U.S. West: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. We focus on the West since it has experienced even faster growth in NLI in the past two decades (1990-2011) than the rest of the country. Sixty percent of net growth in personal income occurred in the form of non-labor income in the West, compared to 54 percent in the non-West. By 2011, NLI exceeded labor earnings in 16 percent of western counties, as opposed to 9 percent of non-western counties (U.S. Department of Commerce, 2012).

Our empirical approach is significant because we make a concerted effort to control for the heterogeneity in both the components of NLI and among counties, which together could lead to different experiences with NLI. Other studies have either investigated the role of overall NLI (e.g., Petigara, Patriquin, and White, 2012; Nelson and Beyers, 1998), focused only on DIR (Nelson, 2005; Nelson, Lee, and Nelson, 2009), or did not apply statistically rigorous approaches that control for the heterogeneity among NLI-dependent communities. The reclassification of NLI components and the relationships evaluated in this study constitute a novel addition to the current research concerning the influence of NLI.

2. Relevant literature and conceptual framing

There have been several published studies concerning the social and economic effects of NLI. For example, Petrigara, Patriquin, and White (2012) examined how Canadian communities with high cumulative NLI differed from resource-dependent communities. They found that, relative to resource-dependent communities, NLI-dependent communities had lower labor-force participation rates, higher unemployment rates, higher poverty rates, higher

levels of economic diversity, and a higher percentage of elderly. Their study did not attempt to differentiate between the components of NLI.

With only one exception, studies that have differentiated between components of NLI have focused on DIR. Nelson and Beyers (1998) found a positive relationship between DIR, net migration, and employment in the non-metropolitan West. Nelson (1999) also focused on the non-metropolitan West and found a positive relationship between DIR, population growth, and small business growth (measured as growth in income from self-employment). Nelson (1999) observed that high levels of DIR tend to perpetuate even more DIR in the future, referring to growth in these areas as "self-reinforcing." Vias (1999) also found a positive relationship between DIR and employment growth in the non-metropolitan Rocky Mountain West in the 1970-1980 and 1980-1990 time periods, but found no relationship in 1990-1995. Vias suggests the result may be related to fluctuations in employment during these periods which were not accounted for in the analyses. Overall, research has generally found that DIR is associated with growth in employment, but less is known about other socioeconomic measures.

Only one study that we are aware of has investigated the effect of transfer receipts (Vias, 1999). Vias (1999) found a negative relationship between TR and employment growth in the non-metropolitan Rocky Mountain West. The study did not attempt to differentiate between the components of TR.

Other NLI-related studies have investigated the effect that retirees and baby-boomer migrants, with their associated retirement and investment income, have had on local economies (Cromartie, 2009; Graves and Waldman, 1991). These studies did not directly investigate the effects of NLI, but rather the demographic shifts commonly associated with changes in retirement- and investment-related NLI. Stockdale and MacLeod (2013) examined baby-boomer in-migration in rural Scotland and found that many migrants were in the process of transitioning out of the labor force and were likely to start a small home business when they moved to a new area. Stockdale and MacLeod suggest this trend could lead to a boost in local employment created by the "entrepreneurial infusion" in areas targeted by pre-retirees. In the U.S., Nelson, Oberg, and Nelson (2010) found that each retiree moving into a community generated 0.34-0.58 additional jobs, mainly in construction, health services, personal services, and household services. Another paper found that not only do baby-boomers stimulate growth in low-wage service-sector jobs, but they also stimulate in-migration by the people who work in those jobs (Nelson, Lee, and Nelson, 2009).

Taken together, the existing literature suggests that the source of NLI affects socioeconomic relationships. Several studies demonstrate positive relationships between socioeconomic performance, DIR, and the populations (retirees and baby-boomers) associated with DIR and age-related sources of NLI. Additionally, Vias' (1999) findings indicate that TR may have the opposite relationship with socioeconomic well-being. Our research approach is informed by these studies and by the lack of empirical evidence of the relationships between the individual components of NLI and socioeconomic performance. No studies to date have evaluated the relationships between the components of NLI and socioeconomic performance using a consistent quantitative methodology. In order to do so, we reclassify NLI data into categories that relate more logically to socioeconomic drivers and outcomes: DIR, Age-Related Payments, Hardship-Related Payments, Education Payments, and Other NLI.

Empirical evaluations of basic performance metrics are necessary to assess the presence or absence of relationships between NLI components and socioeconomic performance before analysts can begin to consider questions about causation. For this reason, our analysis is framed around a set of testable hypotheses about the relationships between NLI components and socioeconomic performance metrics, which have been suggested but not yet established by the economic development literature for the U.S. West. Our hypotheses are that we expect:

1) DIR to be related to higher levels of household income, educational attainment, net migration, average wages, and the share of the population of retirement age. We also expect DIR to be related to lower poverty and unemployment rates.

2) Age-Related Payments (ARP) to be associated with a higher share of population of retirement age and lower household income and educational attainment, and not associated (either positively or negatively) with poverty rate, unemployment rate, net migration, and average wages.

3) Hardship-Related Payments (HRP) to have the opposite effect as DIR. We expect HRP to be associated with higher poverty and

unemployment rates and with lower levels of household income, educational attainment, net migration, average wages, and the share of the population of retirement age.

4) DIR, ARP, and HRP to be positively related to the percentage of jobs in the health care sector. We expect the magnitude of this relationship to be largest for ARP due to high demand for health care services by older populations.

5) DIR to be related to higher average wages in the health care sector, which is consistent with our hypothesis that DIR will be related to higher average wages overall. We expect ARP and HRP to be related to lower wages in the health care sector, which is also consistent with our hypotheses that APR and HRP will be related to lower average wages overall.

The data and methods described in the following section address these hypotheses empirically for the western U.S. We do not investigate the effects of NLI categorized as Education Payments or Other NLI, which comprised only 6 percent of NLI in the West in 2011 (U.S. Department of Commerce, 2012). The sample, timeframe, and statistical approach allow us to evaluate the unique relationships between NLI components and local economies.

3. Data and methods

The study used county-level data for the time period 1990-2011 for all counties in the West, excluding Broomfield County, Colorado, which was incorporated in 2001 and therefore does not have the full time series available. In total, we analyzed data for 413 counties in the conterminous U.S. West.

3.1. Components of non-labor income (explanatory variables)

The most detailed data on NLI in the U.S. are available from the Bureau of Economic Analysis' Regional Economic Information System (REIS), which reports income by place of residence (U.S. Department of Commerce, 2012). REIS reports DIR and TR (in Table CA05N), which when summed constitute all NLI. REIS also reports seven major components of TR, many of which are further subdivided to provide more detail (in Table CA35). We used these data to create the following five categories that sum to total NLI:

1) Dividends, Interest, and Rent (DIR): This category generally represents earnings from investments and is used as reported in Table CA05N (Line code 46).
2) Age-Related Payments (ARP): We used measures that are most likely to be associated with an older segment of the population. These consist of Social Security benefits, railroad retirement and disability payments, and Medicare benefits from Table CA35 (Line codes 40, 50, and 111).
3) Hardship-Related Payments (HRP): This category consists of public assistance medical care benefits (Medicaid and other medical care benefits), income maintenance benefits (supplemental security income, family assistance, TANF, SNAP, and other income maintenance benefits), and unemployment insurance compensation from Table CA35 (Line codes 112, 120, and 170).
4) Education Payments: Only education and training assistance from Table CA35 were assigned to this category (Line code 280). This is primarily education subsidies and loan assistance programs.
5) Other NLI: This last category includes all other forms of NLI: workers' compensation, other government retirement and disability insurance benefits, military medical insurance benefits, veterans benefits, other transfer receipts of individuals from governments, and current transfer receipts of nonprofit institutions. (Line codes 90, 100, 115, 230, 290, and 300).

These five categories were created using annual data for each year from 1990-2011. The percent of total personal income in DIR, ARP, and HRP for 2011 are shown in Figures 1, 2, and 3. Because DIR, ARP, and HRP comprise 94 percent of non-labor income, we focus our analysis on these components.

3.2. Socioeconomic measures (dependent variables)

We used seven variables to represent overall county socioeconomic well-being and two variables to represent the health care sector (Table 1). When possible, we collected data for each year from 1990-2011. The variable with the most restrictive range of data availability was "persons with college degree as percent of adult population", which was only available for four years: 1990, 2000, the average of 2006-

2010, and the average of 2007-2011. A total of six data sources, four from the U.S. Census Bureau and two from the U.S. Bureau of Labor Statistics, were used for the dependent variables. The U.S. Census Bureau data were compiled from the Small Area Income and Poverty Estimates, the Population Estimates, the American Community Survey, and the Decennial Census. The Bureau of Labor Statistics data were from the Local Area Unemployment Statistics and Quarterly Census of Employment and Wages Programs. We used the consumer price index to adjust all dollar amounts to 2012 dollars prior to making other calculations.

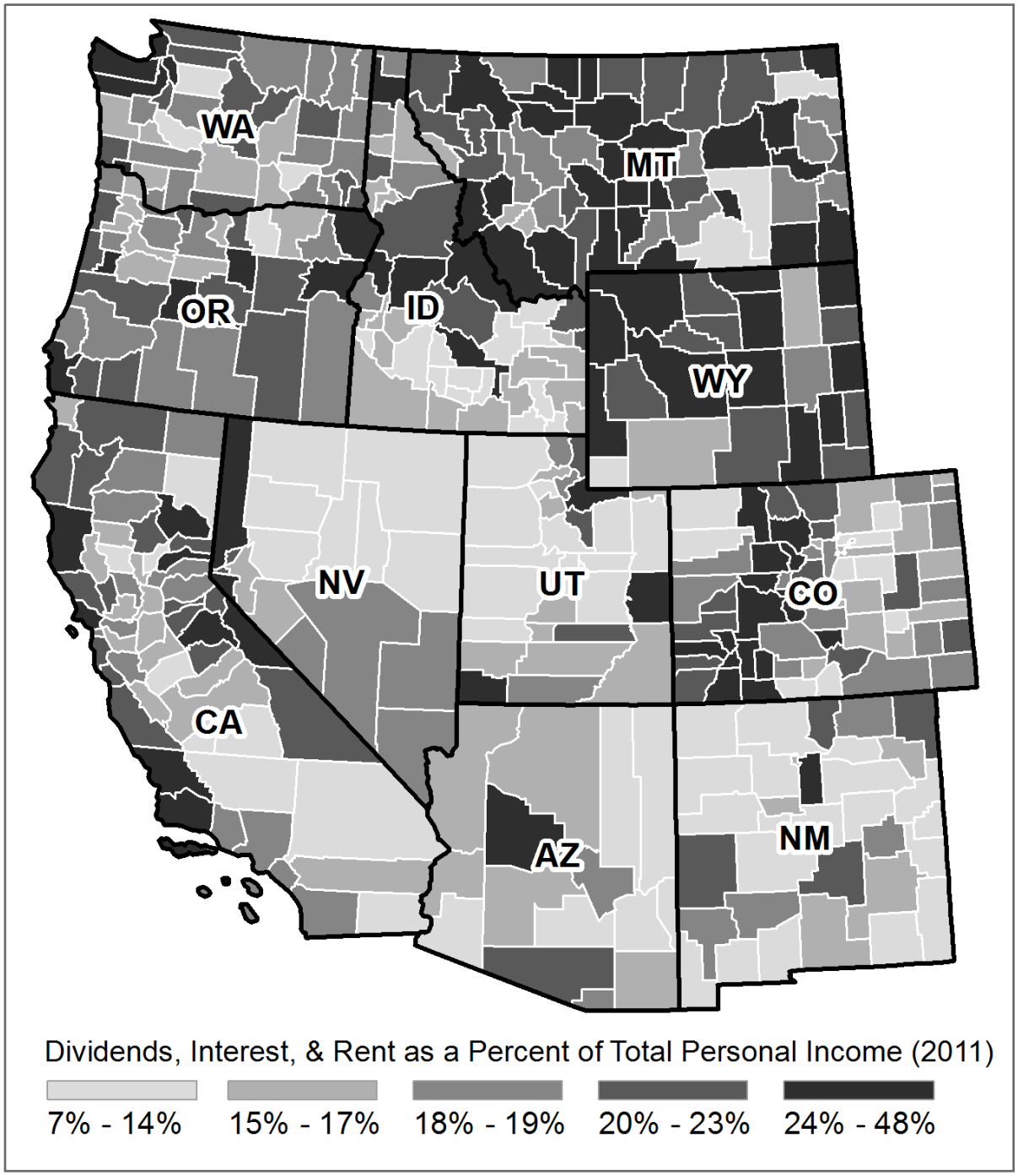

Figure 1. Non-labor income categorized as "Dividends, Interest, and Rent" as a percent of total personal income in 2011 for counties in the West.

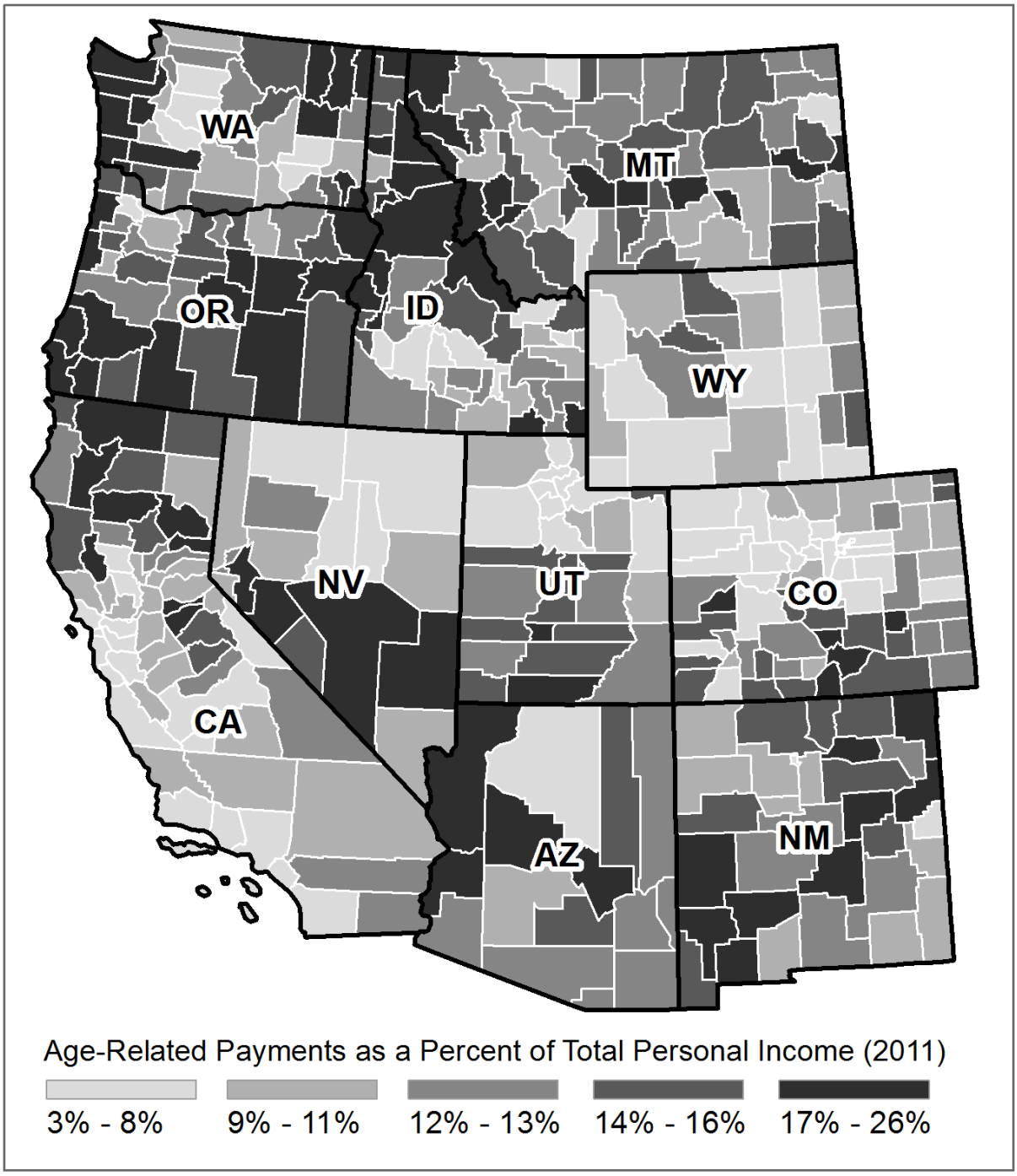

Figure 2. Non-labor income categorized as "Age-Related Payments" as a percent of total personal income in 2011 for counties in the West.

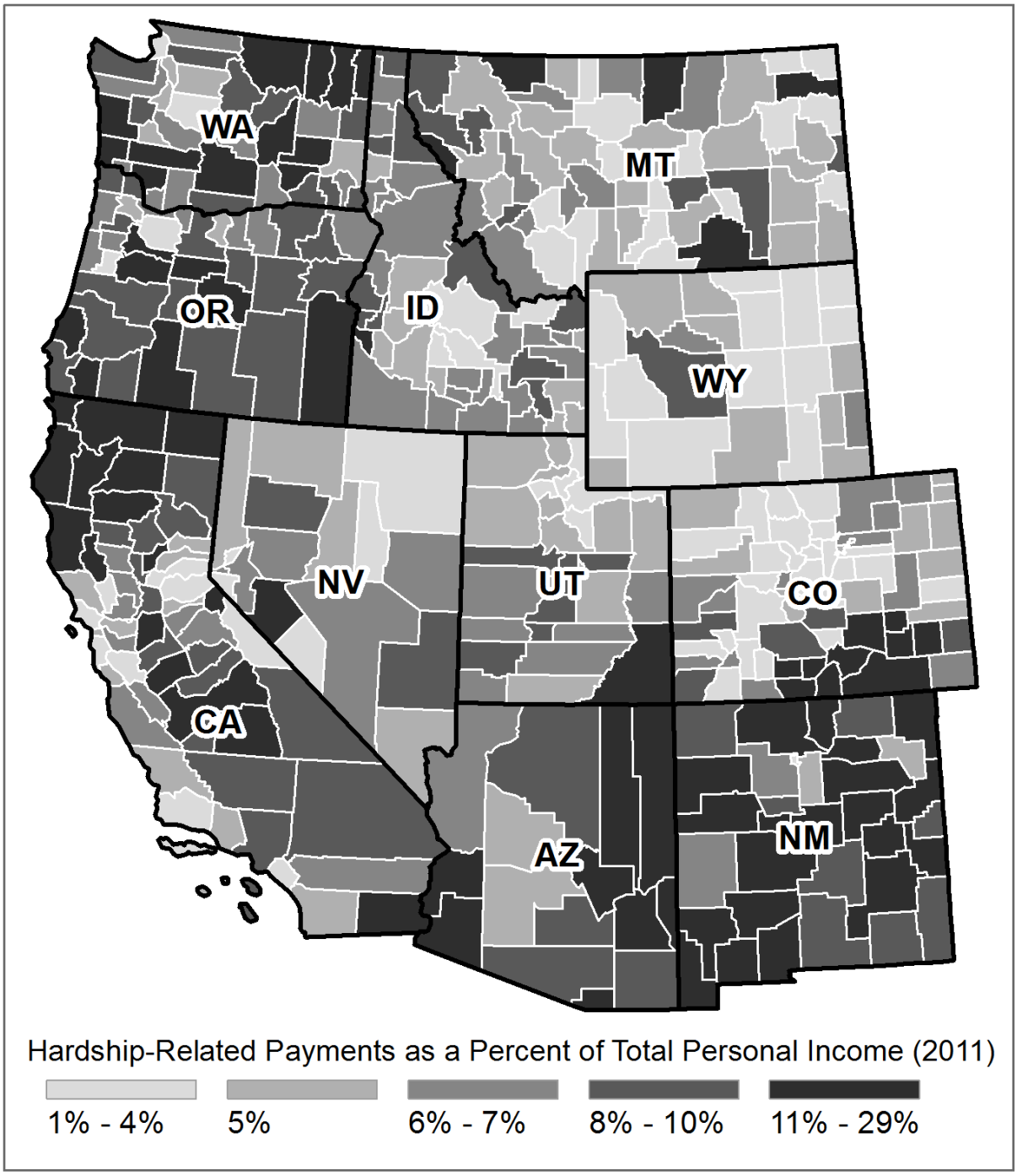

Figure 3. Non-labor income categorized as "Hardship-Related Payments" as a percent of total personal income in 2011 for counties in the West.

Average earnings per job for all industries (NAICS 10), average earnings per job for health care (NAICS 62), and percent of employment in health care (NAICS 62) were calculated using data reported for private industries from Quarterly Census of Employment and Wages (QCEW) (U.S. Department of Labor, 2013). Average annual unemployment rates were obtained from Local Area Unemployment Statistics (U.S. Department of Labor, 2013a). College education was obtained from the Decennial Census of Population and Housing (U.S. Department of Commerce 1990; U.S. Department of Commerce

2000) and from the American Community Survey (ACS) (U.S. Department of Commerce, 2012a). The ACS data result from a five-year survey, and are representative of average characteristics during the survey period. The five-year ACS estimates tend to report higher accuracy for rural areas, making them ideal for cross-geography comparisons. College education was used as a measure of the quality of human resources and the potential for economic development, since many high-wage occupations such as engineering, architecture, and finance require college-educated workers. Median household income, poverty rates, population more than 65 years old, and net migration rates were obtained from the U.S. Census Bureau's Population Division (U.S. Department of Commerce, 2012b) and Small Area Income and Poverty Estimates Program (U.S. Department of Commerce, 2012c). The adjustment to 2012 dollars used the Consumer Price Index for all urban consumers (CPI-U) (U.S. Department of Labor, 2013b).

Table 1. Variables and descriptive statistics.

Variable	*Mean*	*Std. Dev.*	*Type*	*Source*
Dividends, Interest, and Rent as % of total personal income	21%	6%	E	REIS*
Age-Related Payments as % of total personal income	11%	4%	E	REIS*
Hardship-Related Payments as % of total personal income	5%	3%	E	REIS*
Median household income in 2012 $s, (1993, 1995, 1997-2011)	$48,466	$12,046	D	SAIPE^
Persons with college degree as % of adult population (1990, 2000, 2006, 2007)	20.7%	9.3%	D	US CB***
Poverty rate (1993, 1995, 1997-2011)	14.6%	5.4%	D	SAIPE^
Unemployment rate	6.7%	3.4%	D	LAUS^^
Migrants per 1,000 persons (2000-2011)	1.9	15.3	D	US CB^^^
Average earnings per job in 2012 $s	$24,900	$9,360	D	QCEW**
Persons aged 65 and older as % of population	10%	5%	D	US CB^^^
Health care sector employment as % of total employment	6.9%	6.9%	D	QCEW**
Health care sector earnings per job in 2012 $s	$21,388	$18,750	D	QCEW**
Total personal income in 2012 $s	$5,956,720	$24,100,000	C	QCEW**
Indicator for farming-dependent counties (> 15% of employment in farming)	0.07	0.25	C	QCEW**
Indicator for counties with oil and gas royalties (> 0% employment in oil and gas AND > 50% of oil and gas basins occur on private land)	0.04	0	C	QCEW** GIS

Notes: Variable types are as follows: E = explanatory, D = dependent, C = confounding.
Unless otherwise noted, data were compiled for each year from 1990-2011.
* U.S. Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System
** U.S. Department of Labor. 2012. Bureau of Labor Statistics, Quarterly Census of Employment and Wages
***U.S. Department of Commerce. 2012. Census Bureau, Decennial Census and American Community Survey (ACS). ACS data calculated using annual surveys conducted during a 5-year period and representative of average characteristics during that period.
^ U.S. Department of Commerce. 2012. Census Bureau, Small Area Income and Poverty Estimates Program
^^ U.S. Department of Labor. 2013. Bureau of Labor Statistics, Local Area Unemployment Statistics
^^^ U.S. Department of Commerce. 2012. Census Bureau, Population Division

3.3. Confounding variables

Three variables were identified as possibly confounding associations between the NLI explanatory variables and the socioeconomic dependent variables (Table 1). We included total personal income, obtained from the Bureau of Economic Analysis' Regional Economic Information System (REIS) Table CA05N (Line code 10), to control for the size of the economy (U.S. Department of Commerce, 2012). We also included an indicator equal to one in counties with greater than 15 percent of jobs in farming. Rental income from leasing farm land can be a large source of DIR in farm communities, which exhibit unique socioeconomic characteristics. Including this

variable allowed us to quantify the effect of DIR after accounting for the effect of farming. Total employment (NAICS 10) and farm employment (NAICS 111) were obtained from data reported for private industries from QCEW (U.S. Department of Labor, 2013). We also included an indicator variable used as a proxy measure for potential income from oil and gas royalties, since socioeconomic performance may be different for communities where oil and gas royalties comprise a large part of DIR. The oil and gas royalties indicator was equal to one for counties where more than zero percent employment occurred in oil and gas extraction (QCEW, NAICS 211) and where more than 50 percent of oil and gas basins, identified using GIS, occurred on private land.

In addition, we included indicator variables for each unique year and county. The year variables were used to control for macroeconomic trends that vary over time but have the same effect on all counties. The county variable was used as a measure of each county's average socioeconomic conditions across the study period. These variables were included to improve our ability to detect the true association between the components of NLI and the socioeconomic dependent variables.

3.4. Statistical analyses

Statistical analyses were performed using Stata IC version 13.1 using user-written modules xtserial, xtcsd, and xtpcse. To test all hypotheses, we estimated a county-level linear fixed effects model, regressing the socioeconomic dependent variable of interest on the proportion of total personal income from DIR, ARPs, and HRPs. The models allow us to estimate the relationships between NLI sources and socioeconomic variables, but these relationships cannot be interpreted as socioeconomic effects caused by changes in NLI sources. The general model follows:

$$\begin{aligned} &Socioeconomic\ Variable_{iy} \\ &= \beta_0 + \beta_1 DIR_{iy} + \beta_2 ARP_{iy} + \beta_3 HRP_{iy} \\ &+ \beta_4 \ln(totalpersonalincome)_{iy} \\ &+ \beta_5 FarmDependent_{iy} + \beta_6 Royalty_{iy} + \alpha_i \\ &+ \gamma_y + u_{iy} \end{aligned} \quad (1)$$

where i ranges from 1 to 413 to index the counties and y ranges from 1 to 21 to index the years 1990 to 2011. The variable α_i shifts the intercept for county i, and the variable γ_y shifts the intercept for year y. The structure of the error term, u_{iy}, is described in further detail below.

The fixed effects specification reflects our understanding that there are omitted, time-invariant differences between counties, and that these differences are likely correlated with the dependent variables. These differences, which would not be modeled sufficiently in a random effects specification, include natural amenities and baseline socioeconomic conditions. An extensive body of literature supports our decision to control for the role of natural amenities, which have been found to be associated with differences in wages, unemployment, and migration (e.g., Roback, 1982; Deller, 2009; Chi and Marcouiller, 2012; and Gunderson and Ng, 2005). Results for the Hausman specification test (1978) for each dependent variable used in the analysis are summarized in Table 2. For all variables, we reject the null hypothesis that random effects would sufficiently capture the time-invariant inter-county variability.

County-level longitudinal socioeconomic data tend to be highly correlated within the county over time (e.g., the current year's poverty rate is highly correlated with the previous year's poverty rate), and also across nearby counties (e.g., poverty tends to cluster in some areas). We tested for correlation within a county over time using Wooldridge's test for serial correlation in panel data (Wooldridge, 2010). We tested for contemporaneous correlation across counties using Pesaran's cross-sectional dependence test (Pesaran, 2004). The results for each dependent variable used in the analysis are summarized in Table 2.

For all models, we rejected the null hypothesis of no first-order autocorrelation. We rejected the null of no cross-sectional dependence for all models except the percent of the population more than 65 years old and the percent of the population with a college degree. Ignoring these relationships in the error terms would lead to biased, inconsistent parameter estimates, likely inflating our estimates of how differences in NLI proportions affect socioeconomic conditions. To account for correlation in the data between years and across counties, we estimated the linear fixed effects model using a Prais-Winsten transformed regression estimator (Prais, 1954). In this specification the error terms, u_{iy}, have first-order autocorrelation and satisfy the following condition:

$$u_{iy} = \rho_i u_{i,y-1} + \varepsilon_i \quad (2)$$

where ρ_i is a county-specific autoregression parameter and ε_i are distributed as $N(0,\sigma_i^2)$ with panel-

specific standard deviations. The covariance matrix for u allows for heteroskedasticity across panels and autocorrelation within the panels. The models for the percent of the population more than 65 years old and percent of residents with college degrees, which we found are not contemporaneously correlated across counties, are identical except for ρ being constant across all counties.

Table 2. Results from tests for fixed effects specification, serial correlation, and cross-sectional dependence for socioeconomic and health care sector models.

Dependent variable	*Hausman test of fixed effects specification Test statistic (p-value)*	*Wooldridge test for serial correlation Test statistic (p-value)*	*Pesaran's test for cross-sectional dependence Test statistic (p-value)*
Ln(Median Household Income)	730.87 (0.00)	267.6 (0.00)	-2.24 (0.03)
Percent with College Degree	231.75 (0.00)	84.8 (0.00)	0.17 (0.87)
Poverty Rate	940.43 (0.00)	247.3 (0.00)	8.73 (0.00)
Unemployment Rate	194.76 (0.00)	1,447.4 (0.00)	15.57 (0.00)
Migrants per 1,000 persons	181.77 (0.00)	17.9 (0.00)	2.58 (0.01)
Ln(Average Annual Wages)	115.05 (0.00)	3.8 (0.05)	304.83 (0.00)
Percent over 65 Years	1491.08 (0.00)	20,596.3 (0.00)	-0.80 (0.42)
Ln(Avg. Annual Wages in Health Care)	19.12 (0.00)	87.7 (0.00)	271.32 (0.00)
Percent of Jobs in Health Care	21.71 (0.00)	83.1 (0.00)	71.98 (0.00)

4. Results

When ranked by the percent of total personal income from NLI sources in 2011, the top 50 western counties are either rural or micropolitan statistical areas with exception of Yavapai County, AZ, which is classified by the Census Bureau as a metropolitan statistical area and has relatively high levels of NLI from ARP. The tendency for high NLI to occur disproportionately in rural areas can be seen in maps (Figures 1, 2, and 3) and is most marked for DIR and ARP. When the top 50 counties are ranked by the percent of total personal income from ARP, only three counties are metropolitan. When ranked by DIR only six counties are metropolitan, and when ranked by HRP only nine counties are metropolitan.

In western counties in 2011, NLI ranged from 16 to 63 percent of total personal income and was more than 40 percent of total personal income in half of the counties. The three counties with highest NLI (as a percent of total personal income) were San Juan County, WA, Meagher County, MT, and Huerfano County, CO. DIR ranged from 7 to 48 percent of total personal income, and was more than 18 percent in half of the counties. The counties with the highest percent DIR were Teton County, WY; San Juan County, WA, and Hinsdale County, CO. ARP ranged from 3 to 26 percent, and was more than 12 percent in half of the counties. The counties with the highest percent ARP were Wheeler County, OR, Lewis County, ID, and Mohave County, AZ. HRP ranged from 0.01 to 28 percent, and was more than 6 percent in half of the counties. The counties with the highest HRP were Apache County, AZ, Navajo County, AZ, and Mora County, NM.

As described in Table 3, the majority of our a priori hypotheses were supported. In the following paragraphs we describe the nature of the relationships between types of NLI and socioeconomic measures and provide examples of the magnitude of these relationships.

4.1. Dividends, interest, and rent

As hypothesized, DIR was found to be positively related to the percent of adults with a college degree (95% confidence interval [CI] from 0.46 to 0.64%), the percent of the population of retirement age (65 years and older) (95% CI 1.18 to 1.58%), average annual wages in health care (95% CI 0.03 to 0.46%), and the percent of jobs in health care (95% CI 0.001 to 0.05%). Also, as hypothesized, DIR was found to be negatively related to the poverty rate (95% CI -0.7 to -0.13%). Inconsistent with our a priori hypotheses, median household income (95% CI -0.24 to -0.04%) and average annual wages (95% CI -0.48 to -0.25%), both log-transformed prior to performing the regressions, were found to be negatively related

to DIR. Whereas we had hypothesized that DIR would be associated with lower unemployment rates and net migration, confidence intervals on the coefficient estimates (95% CI -0.20 to 0.26% and -1.62 to 1.92% respectively) suggest that they are not associated with either an increase or decrease in DIR (Table 3).

The magnitude of relationships between DIR and socioeconomic variables can be illustrated using the poverty rate, education rate, median household income, and average annual wages. We estimate with 95 percent confidence that an increase in the proportion of income from DIR of 6 percentage points, which is equal to one standard deviation from the mean, is associated with a drop in poverty rate of between 0.6 and 4.2 percentage points. For reference, contrast a hypothetical county characterized by the average poverty rate within our sample (14.6% of individuals) and the average proportion of income from DIR within our sample (17.4% of total personal income) to a second hypothetical county that is identical in every way except that the proportion of personal income from DIR is 6 percentage points higher (23.4% of total personal income). Based on the inference statistics, the second county is expected to have a poverty rate between 10.4 and 14.0 percent (as opposed to the 14.6% poverty rate of the first county). We also estimate with 95 percent confidence that an increase in the proportion of income from DIR of 6 percentage points, or one standard deviation from the mean, is associated with a 2.8 to 3.8 percentage point increase in the college attainment rate, which has an average value within our sample of 20.7 percent of adults.

Because median household income and average annual wages were log-transformed, the relationships between DIR and these variables are expressed in terms of percent change. On average, an increase in the proportion of income from DIR of 6 percentage points (one standard deviation from the mean) is associated with a -0.2 to -1.4 percent change in median household income. If a hypothetical county with the average median household income within our sample ($48,466) experienced an increase of 6 percentage points in the proportion of income from DIR, the associated decrease in median household income is expected to be between $116 and $698. Similarly, we estimate with 95 percent confidence that an increase in the proportion of income from DIR of 6 percentage points is associated with a 1.5 to 2.9 percent decrease in average annual wages. Using the average annual wages within our sample ($24,900), an increase in the proportion of income from DIR of 6 percentage points is associated with a decrease in average annual wages of $374 to $717.

Table 3. 95% confidence intervals for changes in socioeconomic responses associated with a 1% increase in the percent of total personal income from the three types of non-labor income.

	Dividends, Interest, & Rent	Age-Related Payments	Hardship-Related Payments
Ln(Median Household Income)	-0.24 to -0.04%	**-2.24 to -1.88%**	**-3.3 to -2.63%**
Percent with College Degree	**0.46 to 0.64%**	**-1.44 to -0.90%**	**-0.40 to -0.12%**
Poverty Rate	**-0.70 to -0.13%**	1.16 to 2.16%	**9.67 to 13.22%**
Unemployment Rate	-0.20 to 0.26%	0.16 to 1.25%	**4.12 to 5.99%**
Migrants per 1,000 Persons	-1.62 to 1.92	**-0.37 to 5.01%**	**-7.83 to -2.89%**
Ln(Average Annual Wages)	-0.48 to -0.25%	-1.56 to -1.16%	**-1.25 to -0.74%**
Percent over 65 Years	**1.18 to 1.58%**	**6.22 to 8.52%**	**-1.70 to -1.08%**
Ln(Avg. Annual Wages in Health Care)	**0.03 to 0.46%**	**-0.98 to -0.08%**	-0.11 to 0.61%
Percent of Jobs in Health Care	**0.001 to 0.05%**	**0.29 to 0.45%**	**0.15 to 0.28%**

Note: Intervals that do not overlap zero and support the *a-priori* hypotheses are shown in bold.

4.2. Age-related payments

Most of our hypotheses regarding the relationships between ARP and the socioeconomic dependent variables were supported. As hypothesized, ARP was found to be positively related to both the percent of the population greater than 65 years of age (95% CI 6.22 to 8.52%) and the percent of jobs in health care (95% CI 0.29 to 0.45%). Also supported were our hypotheses that ARP would be negatively related to median household income, log-transformed (95% CI -2.24 to -1.88%), the percent of adults with a college degree (95% CI -1.44 to -0.90%), and log-transformed average wages in health care (95% CI -0.98 to -0.08%). We had expected to find no

relationship with poverty rate, unemployment rate, and average wages. Instead, we found that ARP was positively related to both poverty rate (95% CI 1.16 to 2.16%) and unemployment rate (95% CI 0.16 to 1.25%) and negatively related to log-transformed average annual wages (95% CI -1.56 to -1.16%).

The magnitude of the relationship between ARP and the percent of the population of retirement age (65 years and older) is much larger than for other types of NLI. On average, an increase in the proportion of income from ARP of 4 percentage points (one standard deviation from the mean) is associated with an increase in the proportion of retirement age individuals of 24.9 to 34.1 percentage points. It should be noted that the upper end of this interval is outside the range of data within our sample, in which the maximum proportion of the population that is 65 years and older is 32 percent. This suggests that the true relationship between ARP and the retirement age population is most likely non-linear.

The decline in average annual wages and educational attainment, and the increase in the proportion of jobs in health care, associated with increasing ARP, are larger in magnitude than these relationships for either DIR or HRP. For example, an increase in the proportion of income from ARP of 4 percentage points (one standard deviation from the mean) is associated with a 3.6 to 5.7 percentage point decrease in the college attainment rate. An increase in the proportion of income from ARP of 4 percentage points is also associated with a decrease in average annual wages of $1,733 to $2,331, when using the average annual wages within our sample ($24,900) as a starting point, a necessary reference since this relationship is expressed in percent change. Also, when compared to other types of NLI, the extent to which the proportion of jobs in health care increases with increasing ARP is largest. An increase in the proportion of income from ARP of 4 percentage points is associated with a 1.2 to 1.8 percentage point increase in the proportion of jobs in health care, which has an average value within our sample of 6.9 percent.

4.3. Hardship-related payments

All but one of our a priori hypotheses regarding the relationships between HRP and the socioeconomic dependent variables were supported. As hypothesized, HRP was found to be positively related to poverty rate (95% CI 9.67 to 13.22%), unemployment rate (95% CI 4.12 to 5.99%), and the percent of jobs in health care (95% CI 0.15 to 0.28%). Also as hypothesized, HRP was found to be negatively related to log-transformed median house income (95% CI -3.3 to -2.63%), percent of adults with a college degree (95% CI -0.40 to -0.12%), net migration rate (95% CI -7.83 to -2.89%), log-transformed average annual wages (95% CI -1.25 to -0.74%), and percent of the population greater than 65 years of age (95% CI -1.70 to -1.08%). However, whereas we had hypothesized that HRP would be negatively associated with log-transformed average wages in health care, the confidence intervals on the coefficient estimate (95% CI -0.11 to 0.61%) suggests no association with either an increase or decrease in HRP (Table 3).

For many variables, including poverty rate, unemployment rate, median household income, and net migration rate, the relationships with HRP are larger in magnitude than for other types of NLI. Overall, the largest observed effects are with poverty and unemployment rates. We estimate with 95 percent confidence that an increase in the proportion of income from HRP of 3 percentage points (one standard deviation from the mean) is associated with an increase in poverty rate of between 29.0 and 39.7 percentage points. For reference, the maximum poverty rate within our sample is 43.9 percent of individuals. We also estimate that, on average, an increase in the proportion of income from HRP of 3 percentage points is associated with an increase in the unemployment rate between 12.4 and 18.0 percentage points. Similar to DIR and ARP, HRP is associated with a slight increase in health care jobs; an increase in the proportion of income from HRP of 3 percentage points is associated with a 0.5 to 0.8 increase in the proportion of jobs in health care. Lastly, HRP is the only type of NLI to show a significant relationship with net migration rate, represented as net migrants per 1,000 people. On average, an increase in the proportion of income from HRP of 3 percentage points is associated with 8.7 to 23.5 outmigrants per thousand residents. The average county in our sample has a population of 142,678; a loss of 9 to 24 people per thousand translates to between 1,284 and 3,424 people leaving per year.

5. Discussion of results

We find that NLI components (dividends, interest, and rent; age-related payments; and hardship-related payments) have large and statistically significant relationships with many county-level measures of socioeconomic performance in the West. The majority of our hypotheses regarding these relationships are supported, indicating that the types of NLI

accruing in western counties are associated with predictable socioeconomic characteristics – in some cases desirable and in other cases undesirable.

5.1. Dividends, interest, and rent

In agreement with previous research (Nelson, 1999; Vias, 1999; Nelson and Beyers, 1998), we find that DIR is associated with some favorable socioeconomic measures, including higher education attainment and lower poverty. However, on average, household income and average wages decrease with increasing DIR, and no relationship with unemployment rate is evident. These results are consistent with research that has found that, relative to those who depend on labor earnings, those who receive relatively higher levels of NLI are more likely to live in communities with lower average wages (Gunderson et al., 2012; Reichert and Rudzitis, 1994). Whereas some western counties with the highest percent of personal income from DIR are affluent and experiencing high levels of in-migration (e.g., Teton County, WY; San Juan County, WA; and Summit County, CO), the majority are isolated from markets, with older populations and out-migration resulting in a declining workforce (e.g., Hinsdale County, CO; Carter County, MT; and Meagher County, MT). Relatively low income levels and wages are common among isolated counties of the West that are losing population (Rasker et al., 2009).

Previous research has found largely positive economic performance associated with DIR. However, because we find that very different types of counties can share the characteristic of having high DIR, we believe that the causes of high DIR in western communities likely vary depending on whether the population is growing or shrinking, and the role DIR plays in contributing to growth in other sectors of the economy will also vary with population change. This is a topic that merits future research.

5.2. Age-related payments

For ARP, all the investigated associations with socioeconomic performance appear to be disadvantageous. On average, median household income, educational attainment, and average wages decline and poverty and unemployment rates increase with increasing ARP. The extent of these negative relationships is consistent with studies such as Lambert et al. (2007), which found lower rates of job growth in communities with a high proportion of residents over age 65, and Day and Barlett (2000), which found that health care wages are lower in communities with numerous retirees. Most research finding lower socioeconomic performance associated with retirees attributes the effect to poorer, older retired populations that are aging in place (Serow, 2003) and out-migration of the working population (DeVanzo, 1978; Schlottmann and Herzog, 1981; Rabe, 2012). However, other literature focused on the West argues that an influx of retirees can stimulate economic growth (Nelson, Oberg, and Nelson, 2010; Nelson, Lee, and Nelson, 2009). The apparent disagreement between these conclusions is likely related to whether retirees are moving in because the county is a retirement destination, or whether working-age people are moving out, leaving behind retirees as the only major driving force of the economy (Serow, 2003).

In the majority of western counties with high ARP, population aging is due to out-migration of working-age people. The majority of counties with high ARP are experiencing either population decline or slower growth than the national average (Department of Commerce 2000, Department of Commerce 2012a), and of the top 50 counties ranked by the percent of total personal income from ARP, 70 percent experienced population decline between 2000 and 2012. Examples are Wheeler County, OR, Huerfano County, CO and Wibaux County, MT, in which roughly one-quarter of personal income comes from ARP. Each of these counties experienced a loss of one-sixth of their population from 2000 to 2012, resulting in an 8 to 10 year increase in the median age. Although they are in the minority, some counties with high ARP are experiencing population growth caused by in-migration of retirees. Included in this list are metropolitan and micropolitan counties (e.g., Mohave County, AZ; Nye County, NV; and Crook County, OR) and rural counties (e.g., Piute County, UT; Sanders County, MT; and Pend Oreille County, WA). Studies of the effects of in-migration by retirees suggest a rosier picture for these types of counties, one where retirees stimulate economic growth in several sectors (Nelson, Oberg, and Nelson, 2010; Nelson, Lee, and Nelson, 2009). The counties we have listed as examples appear to have lower income levels and higher poverty than average for either the West or the nation, but further quantitative research is needed to adequately test whether the relationships between ARP and socioeconomic performance differ between counties experiencing net in-migration versus net out-migration.

5.3. Hardship-related payments

The relationships between HRP and socioeconomic well-being are consistently undesirable, similar to ARP, but with larger magnitude. Not surprisingly, the most dramatic relationships are with poverty and unemployment rates, a finding consistent with previous research (Lacombe, et al., 2012). A one percentage point increase in HRP is associated with increases in poverty and unemployment of approximately eleven and five percentage points, respectively.

Decreases in net migration are also associated with higher HRP, which is the only type of NLI to show a significant relationship with net migration rate. These results are consistent with other research that has found economic hardship in places with net out-migration (Cebula and Alexander, 2006). Out-migration can be symptomatic of, and further exacerbate, poor economic conditions locally (Gunderson and Sorenson, 2010). However, mobility can be beneficial for the individual who can find improved work opportunities elsewhere, and for the regional economy as available jobs are filled.

High HRP is also unique in that it is not predominantly a rural phenomenon. In fact, high HRP appears to be distributed evenly among rural and non-rural (micropolitan or metropolitan) counties. For example, across the West, 54 percent of counties are classified by the Census Bureau as either micro- or metropolitan. Similarly, among the top 50 counties with the highest share of personal income from HRP, 54 percent are either micro- or metropolitan.

5.4. Non-labor income and the health care sector

While previous studies have investigated the ties between NLI and socioeconomic performance, this study was the first to investigate the connections between NLI and an individual sector of the economy. Using the health care sector as a case study, we found that the types of NLI do indeed have different relationships with this particular economic sector.

The relationship between DIR and the health care sector is, on average, positive. The share of jobs and the average wages in health care tend to increase slightly with increasing DIR. For communities characterized by high DIR and growth, this may reflect greater wealth or a higher tendency of DIR recipients to use health care services. For the communities characterized by high DIR and population decline, this may reflect the higher demand for health care services by older populations, which are typical of these types of communities.

The relationships between ARP and the health care sector are mixed. As ARP increases, wages in health care decrease and the share of jobs in health care increases. An increase in ARP of ten percentage points is associated with roughly a four percentage point increase in the share of jobs in health care. This relationship is expected due to high demand for health care services by older populations, which are most strongly associated with ARP.

HRP and average wages in health care appear unrelated. However, average wages across all sectors are lower when HRP increases. Taken together, this suggests that while average wages tend to be depressed in communities with high HRP, average wages in health care are not affected disproportionately. The health care sector also tends to be larger in communities with higher HRP and is likely important for communities experiencing the greatest economic hardship.

5.5 Limitations

As with all observational studies, causality is not implied. People accumulate different types of non-labor income and spend that income in different ways. Socioeconomic characteristics likely both cause and result from patterns in non-labor income. Before causality can be explored, it is necessary to clarify the socioeconomic characteristics that exist in counties accumulating different types of non-labor income. That is the goal of this study.

We go a step further than previous research by dissecting the effects associated with types of NLI and by exploring the relationships between types of NLI and one particular sector of the economy, health care. More research is needed to investigate the effect of types of NLI on other major economic sectors such as construction, professional services, and retail. We also believe that it would be worthwhile to investigate whether the relationships with NLI components differ for counties with population growth versus decline. High NLI can result from both population gain (e.g., in-migration of retirees) and loss (e.g., out-migration of workers and aging-in-place seniors), to which patterns in socioeconomic performance are closely tied.

Lastly, the Bureau of Economic Analysis data used in this study did not contain the level of detail required to investigate components of DIR. If a suitable data source could be found, it would be worthwhile to measure the characteristics of com-

munities related to dividends versus types of interest versus rent.

6. Conclusions

The implications of this research are important for nearly all western counties and for the U.S. in general. Dramatic growth in non-labor income is nearly ubiquitous, and policies and demographic trends that affect the disbursement of non-labor income, such as changing migration patterns and the aging baby boomer generation, will have widespread effects. Our results demonstrate that non-labor income sources are large and diverse, and they have significant relationships to socioeconomic conditions, particularly in rural counties.

The classification system presented in this paper differentiates between components of non-labor income and can help explain how federal policies to reform DIR and transfer payments could affect some local economies more than others. For example, policies that affect Social Security and Medicare benefits will disproportionately impact counties with an aging population, which tend to be economically stressed and have relatively low average wages, median household income, and educational attainment.

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