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Economic Distress and Labor Market Participation

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Abstract: Many of the most deeply and persistently distressed regions of the U.S., such as parts of West Virginia, suffer from extremely low levels of labor force participation. These are regions where economic despair seems to have taken hold for generations and which face numerous other impediments to economic prosperity, such as opioid abuse. Better understanding these linkages can lead to policy solutions to help the most disadvantaged places break the cycle of economic despair. Using county-level data, we begin by estimating a series of models that allow us to understand the drivers of local labor force participation. We also consider how these drivers may differ between rural and urban areas. We then analyze how levels of participation in the labor force are related to other measures of economic distress. We find that there is significant variation in the drivers of rural and urban labor force participation; however, much of the variation can be explained by known factors. Yet, our results also suggest that there remains some portion of the lower levels of labor force participation in West Virginia and Appalachia that cannot be explained by other factors. Since it appears that labor force participation is important to explaining higher levels of employment growth in rural areas, for persistently distressed regions, finding ways to increase labor force participation may be a critical step toward increasing economic prosperity.

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Introduction

While the traditional unemployment rate (U3) tends to receive most of the attention in the media and in the academic literature, the measured statistic fails to provide a true representation of labor market conditions in many areas of the U.S., as it does not always properly account for those who have dropped out of the labor force. The labor force participation rate (LFPR) is the percentage of the working-age population who are either working or actively searching for work (Juhn and Potter 2006). The disparity between the unemployment rate and the LFPR is especially stark in some rural and distressed areas. For instance, by mid-2017, the state-level unemployment rate in West Virginia was close to the national level – seemingly indicating that the state has a healthy economy. However, at the same time, West Virginia ranked last among the 50 states in terms of labor force participation (LFP), with a LFPR about 10 percentage points below the national level. The challenge for places like West Virginia is not that men and women who are looking for work cannot find it, but rather that a large percentage of the population is not looking for work in the first place. Ultimately, a low rate of LFP presents a major impediment to economic prosperity over the long term.

Overall, LFP in the U.S. has declined since 2000, when it reached an all-time high of 67 percent nationally. The national LFPR had previously been increasing, generally since the mid-1960s, driven largely by the increasing number of women in the workforce and by a changing age-distribution of the population associated with the Baby Boomers. Figure 1 illustrates how the national LFPR has changed over time. The recent decline has received attention from policymakers and others (for example, see Brainard 2017). At the same time, there is tremendous spatial variation in LFP. The LFPR varies widely across the nation: in 2017, it ranged from a high of around 70 percent of the adult population in North Dakota to a low of 53 percent in West Virginia, and these differences persist over time. The variation is, unsurprisingly, far wider at the county level, which is the level on which we conduct our analysis. There is also evidence of a rural-urban divide, with the LFPR of prime working-aged (25-54 years old) individuals about three and a half percentage points lower in rural areas compared to larger metropolitan areas, thus we consider these differences as well (Brainard 2017). It is likely that low LFP is driven, at least to some extent, by poor human capital outcomes. For instance, those with lower skills have fewer opportunities when faced with the loss of a job. Health issues may also affect the LFPR as a person who suffers from poor health outcomes may be unable to work and is therefore not in the labor force. A lower LFPR may also affect health outcomes. Related to the recent opioid crisis, Betz and Jones (2018) and Goetz and Davlasheridze (2018), find that economic factors such as employment and unemployment can lead to higher levels of opioid overdoses, but that there are also differences between rural and urban areas. Rural areas have also been especially hard hit by the restructuring of the national economy (Goetz et al. Forthcoming) and workers in these areas, especially those without high levels of human capital, face few opportunities if they are unwilling to relocate.

Despite the differences in LFP and how they may impact the economic prospects of local areas, much of the recent research has not explored this issue. While a few older studies (such as Isserman and Rephann 1993) did consider county-level LFP, there have been drastic changes in the economy and workforce, as well as the overall LFPR, since that research was conducted.

To explore the drivers of the spatial variation in the LFPR, we use a panel of county-level data for the years 2000 and 2010. Our model includes a basic set of demographic variables that describe the county in terms of the age and gender distribution since both of these factors have been clearly demonstrated to affect LFP. We also include other variables that include industrial composition, recent economic conditions to capture economic opportunity, education and health, and population mobility, among other factors. Unlike any previous studies, we also account for spillover effects between counties, i.e., a stronger labor market in one county may affect LFP in neighboring counties as economic regions do not end at the county line.

We also examine separately the LFPR of rural and urban areas based on the hypothesis that the determinants of LFP in rural and urban areas may differ. Consistent with the recent work by Weingarden (2017), our data show that there are higher rates of LFP in counties in metropolitan statistical area (MSAs), compared to non-MSA counties (table 1). However, to our knowledge, no previous research has specifically delved into the question of whether the factors that associate with high or low LFP in rural areas differ from those in urban areas. We also expand on the research begun by Isserman and Rephann (1993) and Dorsey (1991) exploring why West Virginia or places in the Appalachian Region of the U.S. may have lower levels of LFP.

Overall, we identify some factors that are important in explaining county-level LFP. For example, industrial composition and the recent unemployment rate both affect the LFPR. Importantly, we find some evidence that the determinants of LFP vary significantly between MSA and non-MSA counties. For urban counties, population and employment growth are associated with higher levels of LFP, but do not appear to affect the LFPR in rural counties. Additionally, higher levels of human capital are more important for rural counties, perhaps due to fewer job opportunities. Finally, it appears that, even after controlling for all of these factors, there are some unexplained differences which result in lower rates of LFP in West Virginia, and more generally in Appalachia.

We also find evidence that the LFPR matters in explaining other measures of economic prosperity, even after controlling for all of the factors that we have identified that help explain the LFPR. For example, places with a higher LFPR are associated with lower levels of poverty. Additionally, for rural counties, higher levels of LFP are associated with higher levels of employment growth. Given the historic distress in the mostly rural counties in Appalachia, and the lower rates of LFP in counties in that region, this suggests that raising the LFPR may be one way for the counties in that region to increase economic prosperity.

Ultimately, this research suggests some factors that may help policymakers better design policies to help local areas overcome one of their most serious economic development challenges and support long-term economic prosperity.

In what follows, we review the relevant previous literature. We then outline the data and model that we use to understand the drivers of LFP. Following that, we discuss the results of our models. Finally, we conclude the article by discussing the implications and value of this analysis.

Previous Literature on U.S. Regional Labor Force Participation

The large majority of the literature relating to LFP focuses on movements nationally over time. As discussed in Juhn and Potter (2006), the national LFPR in the U.S. increased from the 1960s to about 2000, mostly driven by increasing numbers of women in the workforce and by a changing age-distribution of the population associated with the Baby Boomers. However, since 2000, the LFPR has declined, partially due to a permanent withdrawal of some workers from the labor market after periods of lower job growth.

At the same time, there continues to be significant regional variation in the LFPR as well as in economic growth and other measures of economic vitality. As noted in Brainard (2017) and Goetz et al. (2017), metropolitan areas have generally fared better economically in recent years. Additionally, Partridge and Tsvetkova (2018) find that economic factors (such as the structure of the economy) as well as the ability to adapt to changes are most important in explaining the recovery since the Great Recession. If the LFPR is low, then it may decrease the ability for these regions to adapt to the restructuring economy and affect their ability to grow. Thicker urban labor markets provide more job opportunities, while as noted in Fisher (2007), thinner labor markets in rural areas may result in spatial mismatches in terms of jobs and may affect the LFPR.

Our focus is on understanding the regional variation in the LFPR in the U.S. as well as the differences between rural and urban areas and thus we focus on that relevant literature. As such, we do not attempt to provide any review of the broader, national-level literature or international literature on LFP.

Chalmers and Greenwood (1984) represents an early attempt at understanding regional variation in labor markets and the determination process for LFP. The authors estimate a simultaneous regression model explaining the LFPR at the county level for a stratified random sample of around 350 U.S. counties using data between 1960 and 1970 on migration, employment, unemployment, and earnings. They find that LFP is critical to understanding the interaction between migration and changes in employment and earnings and that there are significant differences in growing and declining areas.

Our research most closely mirrors Isserman and Rephann (1993). The authors estimate the LFPR at the U.S. county level, similar to our basic approach. The authors present several reasons why an analysis at the county level is insightful. Primarily, they argue that a county level analysis allows examining a much larger degree of information – information that may be masked in a state-level analysis – since LFP rates vary widely even within states, and that a county-level analysis is closer to capturing actual regional labor markets.

Isserman and Rephann consider a wide array of potential explanatory factors of LFP, including demographic factors such as race, and age distribution; labor market conditions, such as wages, unemployment, and unionization; industrial composition;

urbanization and population density; and reliance on transfer income. Our model follows the empirical structure of Isserman and Rephann to a significant extent, although with some important exceptions, as described below. Isserman and Rephann's specific focus was on identifying a possible "Appalachian Effect" or the impact of a unique culture in Appalachia that lends itself to persistently low levels of LFP. Their study came largely as a direct response to Dorsey (1991), who concludes there is such an effect in his analysis using state-level data from one year (1987). Isserman and Rephann show that using data from only one year can lead to false conclusions about the factors that affect LFP. However, in their own analysis, they use county-level data from only one year (1980) and, in this case, they conclude there is no Appalachian effect. Thus, there remains an open ended question about whether there is an Appalachian effect or if there are cultural factors that may explain ongoing lower levels of the LFPR.

Bradley et al. (2001) provide a deep examination of descriptive statistics related to LFP in Appalachian counties that cover many of the factors discussed above in the context of Isserman and Rephann (1993). Additionally, they argue that studies of developing economies have found that a large underground or informal sector, indicated by a low LFPR, may impeded economic development and economic progress. If this is the case, we would expect places with lower rates of LFP to have lower levels of growth. We will explore that in some extensions of our main analysis.

Several studies consider the differences between rural and urban areas using microdata. Kilkenny and Huffman (2003) use data from the 1996 Survey of Income and Program Participation (SIPP) on households in the Midwest. They find that differences in the LFPR between rural and urban areas appear to be due to demographic differences. Similarly, using microdata from Canada, Phimister et al. (2002), look at regional variation in female LFP, specifically focusing on the differences in rural and urban areas. They also find that most of the differences in the LFPR can be explained by differences in socioeconomic characteristics. However, they also find that when there are changes in these characteristics, the response may be different for rural women. Both studies suggest that pooling metro and non-metro data together may mask the true effects.

A few other studies consider regional variation in unemployment rates, such as Elhorst (2003), which reviews the large literature on regional variation in unemployment rates in Europe and the U.S. However, as noted in the introduction, unemployment is not the same as LFP. Despite this, Elhort makes a compelling case for the value of examining regional variation in unemployment, in addition to the more common macroeconomic approach of seeking to understand timewise variation at the national level. We would argue that Elhorst's argument would easily extend to the value in examining regional variation in LFP. Many of the same factors that are generally incorporated into an unemployment rate model are also appropriate to a LFPR model, such as migration, industrial composition, and measures of human capital.

Other regional studies have looked at LFP in developing countries or in specific countries in Europe and their approach and results do not appear relevant here. Overall, there appears to be a gap in fully understanding the factors that affect local LFP in the U.S. in recent decades.

Data and Empirical Methodology

In assembling our data, we draw upon the previous literature that has considered the factors that affect LFP, particularly, those that look at regional or local levels of LFP. We also draw upon other relevant literature as discussed below. However, we do not attempt to replicate previous work, such as that by Isserman and Rephann (1993), partially because it is not clear what sources of data they used (much of which is not currently available at the county level).

We create a two-period panel of data for 2000 and 2010 at the county level from various sources. Our data include counties from the lower 48 states. In a few cases, counties had to be omitted due to missing data. Our final dataset includes data on 3000 counties. Summary statistics for all of our variables are provided in table 1. We examine more than one time period, as Isserman and Rephann (1993) show that analyzing only one year can lead to false conclusions about the factors that affect LFP. However, due to the non-time varying nature of some of the factors, the structural changes in the economy over time, and the fact that we want to explore the more recent factors related to LFP, we restrict our analysis to just these two periods.

LABOR FORCE PARTICIPATION: First, we construct our measure of county-level LFP, or the county-level LFPR, using data from the Bureau of Labor Statistics (BLS) on the labor force in each county (including both the employed and unemployed populations). We then divide that by the total population that is 15-64 years old using data from the biennial U.S. Census. We use 15-64 years old as the total working age population based on the OECD definition[1], however, when we use other age ranges (such as 15-69), the results are similar. Appendix A contains a table showing the ranking of states by their average county-level LFPR using our data.

ECONOMIC OPPORTUNITY (UR): We also use BLS data to obtain unemployment rate data, which we lag over the previous year and over the previous ten years. If there is recent or persistent unemployment in an area, people may exit the labor market and therefore the LFPR may be lower as a result of this lack of economic opportunity, i.e., the discouraged worker phenomenon.

INDUSTRIAL COMPOSITION (IND): The industrial structure of a county can also affect its LFPR as pointed out by Isserman and Rephann (1993), as different sectors may have lower entry requirements (for example) that may lead to higher participation. We use the local area data from the Bureau of Economic Analysis (BEA) to construct the share of total employment in each county that is in government, agriculture, manufacturing, and mining. Since people can also choose to join the workforce by working for themselves, we also control for self-employment by including the share of non-farm proprietors employment.

POPULATION MOBILITY (POP): Changes in the supply and demand for labor can also affect LFP. Changes in the supply of labor can be proxied by changes in the population over the last 10 years, using data from the U.S. Census. While population changes can be due to various factors, Rappaport (2007) and Faggian, Olfert, and Partridge (2012) show that population change is a good proxy for household migration.

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[1] https://data.oecd.org/emp/labour-force-participation-rate.htm

This is important, because changes in labor supply (at least in the short run) will be due to migration in and out of a county. Additionally, the net change in both supply and demand (the growth or decline of firms) will lead to changes in employment levels, and we control for this by calculating the percentage change in employment over the last five years using data from the BEA.

URBAN v. RURAL STATUS (URBAN): Cities offer more opportunities for employment and, after holding other factors constant, this should increase LFP. There is also evidence that jobs are becoming increasingly centralized. From 2007 to 2015, while job growth slowed nationally, growth was actually negative in rural areas, while urban areas continued to experience a modest increase. Thus, we control for these difference by locating whether each county in within a metropolitan statistical area (MSA) as defined in 2000 and 2010 by the by the Office of Management and Budget (OMB). As Goetz et al. (2017) show, the definition has increasingly included more remote counties. Thus, we also use ArcGIS to measure the distance from the county to the center of the MSA to account from proximity to the urban centers. We also use data from the U.S. Census on land area (in square miles) and population to calculate the population density of each county.

DEMOGRAPHIC CHARACTERISTICS (DEMOG): The demographic characteristics of a region can also affect LFP. As Cajner et al. (2017) show, racial differences have long persisted, with minorities exhibiting lower rates of LFP compared to whites. Gender and age differences also exist. Married women may be constrained due to their husband's employment in certain industries (Chinitz 1961) or due to the fact that their husbands have a longer commute time (Black et al. 2014). Additionally, there is evidence that the LFPR for women with young children without adequate or convenient access to childcare is lower (Compton and Pollack 2014), and the LFP of women with children of any age has historically been lower. Additionally, before age 25, a larger portion of men and women may still be gaining training toward their future employment and their participation in the labor force may be lower. Overall, men from 25 to 54 years of age have historically had the highest LFP rates, although that has been declining as overall the overall LFPR has declined. To control for all of these differences, we use data from the decennial U.S. Census to calculate shares of the population that are African American and other races, with the white/Caucasian share as the base category. We also calculate age shares of women and men separately - under 25 years old and between 25 and 54 years old; with age 55 and over as the omitted category.

HUMAN CAPITAL – EDUCATION (EDUC): The level of education in a region can be a key driver of the LFPR. Overall, higher levels of education lead to higher levels of LFP. Lower skilled workers have fewer options and may be the most disenfranchised in periods of sustained labor market decline. This has been shown to be particularly a problem in recent years in rural areas (Weingarten 2017). Thus, we use data from the U.S. Census 2000 decennial census and the American Community Survey 2010 5-year estimates to calculate the share of the population over 25 years old with a four-year college degree or higher, the share with some college (post high school) and the share with a high school diploma (or its equivalent). The omitted category is those who have not completed high school.

HUMAN CAPITAL – HEALTH (HEALTH): The health of the workforce can also affect the LFPR. People with a long-term disability have withdrawn from the workforce and previous studies (Isserman and Rephmann 1993; Dorsey 1991; among others) find that disability status influences labor supply. Additionally, those with ongoing health issues may have difficulty finding a job and withdraw. At the same time, if health issues lead to premature mortality, this can decrease both the number of people in the labor force and the LFPR. We use data from the Social Security Administration to get the number of people receiving disability benefits per county, and then the share of people receiving disability benefits by dividing by the total county-level population. The overall health of the county is proxied using data provided by the Institute for Health Metrics and Evaluation (IHME) on life expectancy for men and women separately.

CULTURAL EFFECT (CULTURE): As an earlier article by Dorsey (1991) had suggested that there may be an Appalachian effect lowering the LFPR in West Virginia and other states that are within the federally-designated Appalachian Regional Commission (ARC) region,[2] although Isserman and Rephmann (1993) find there is no such effect. To explore this further, we include an indicator variable for the counties that are within the federally-designated ARC region. Part of the reasoning Dorsey (1991) gives for the Appalachian effect is that it is cultural. We attempt to also control for this by using the Social Capital Index, which also has been shown to be associated with female LFP. The index is comprised of individual and community factors associated with social capital (Rupasingha et al. 2006). Since this index is only available in certain years, we

[2] For an overview of the ARC region, see Stephens and Partridge (2011).

use the index for 1997 for predicting LFPR in 2000 and the index for 2009 for predicting LFPR in 2010.

NATURAL AMENITIES (AMENITY): We also include the natural amenity ranking of each county using data from the U.S. Department of Agriculture's Economic Research Service (USDA/ERS). There is some evidence that rural areas with high amenities may benefit from higher levels of economic growth and that even urbanized areas with more amenities may be desirable to both firms and workers, affecting labor supply and, potentially, labor market participation (Rickman and Wang 2017).

REGIONAL SPILLOVER EFFECTS (SPATIAL SPILLOVER): The boundaries of economic activity do not stop at county boundaries and there is significant urban to rural and between county commuting (Partridge et al. 2010). If there are economic opportunities in nearby counties, that should raise the in-county LFPR. Conversely, if the economies of nearby counties are weak, then that may lower opportunities and, in the long run, lead to lower in-county LFPR. To control for these spillovers, we use a five nearest neighbor weight matrix and interact it with the one-year lagged unemployment rate and the percentage change in employment over the previous five years.

OTHER ECONOMIC OUTCOMES: We also gather data on the poverty rate and median income for each county in each year from the U.S. Census as well as data from the BEA on employment growth in the five years after our two observation years, so from 2001 to 2006 and 2011 to 2016. We will use that to consider the impact of LFP on other county economic outcomes.

OTHER FACTORS: While our models attempt to control for the relevant factors that affect the LFPR, there are other factors such as state tax policies, state welfare policies, state unemployment insurance rates that would affect LFP and that tend to change little over time. We control for those using state fixed effects. Additionally, we use year fixed effects for 2000 and 2010 to control for overall market factors (such as recessionary pressures) that could differ between the two years.

EMPIRICAL MODEL: While factors such as wages may also affect the LFPR, they are endogenous to our model. We thus estimate the following reduced form model of LFPR, for each county (i), in the year 2000 or 2010 (t). Where the components are vectors of factors as described above, θ_s is the fixed effect for the state in which each county is located, and γ_t is the year fixed effect.

$$\begin{aligned}LFPR_{it} = \beta_o &+ \beta_1 UR_{it} + \beta_2 IND_{it} + \beta_3 POP_{it} + \beta_4 URBAN_{it} + \beta_5 DEMOG_{it} \\ &+ \beta_6 EDUC_{it} + \beta_7 HEALTH_{it} + \beta_8 CULTURE_{it} + \beta_9 AMENITY_{it} \\ &+ \beta_{10} SPATIAL\ SPILLOVER_{it} + \theta_s + \gamma_t + \varepsilon_{it}\end{aligned}$$

We have attempted to control for the relevant factors that explain the LFPR. However, there is the potential that there are other unobserved factors that we are unable to control for in our model. Thus, we recognize that our results may be more descriptive than causal. Nevertheless, they still provide us with insight about the reasons why some places may have lower levels of LFP that may help inform policymakers.

Results

Primary Results – Determinants of Labor Force Participation

Results of our first set of models of county-level LFP are reported in table 2. We estimate the model for all counties pooled together (Column 1), as well as for Urban Counties (Column 2) and Rural Counties (Column 3) separately. Overall, we identify numerous important relationships among our variables of focus and the LFPR.

INDUSTRIAL COMPOSITION: Beginning with industrial composition, results indicate that a heavier reliance on government employment is associated with significantly lower rates of LFP. This finding could be driven by the likelihood that many government jobs are very stable, and when an economy suffers, what remains tends to be a higher share of government employment. As a very simple illustration, in the county in West Virginia that has the lowest rate of LFP – around 30 percent - one of the biggest employers is a federal prison. The estimated effect of the government employment share does not vary between urban and rural counties.

We also observe that a higher manufacturing or agriculture share (and correspondingly lower employment in service sectors) is associated with higher rates of LFP. Regarding manufacturing, this could be driven by the idea that more manufacturing jobs attract some people to the labor force who would not otherwise work, therefore driving the LFPR up. Importantly, notice that the estimated effect of a one percentage point increase in either the agricultural or manufacturing share is associated with a much larger increase in the LFPR in rural areas compared to urban areas. This may be reflective of the idea that urban economies are more diversified and resilient to economic shocks and, in rural areas, labor market fundamentals are more responsive to changes in the health of these industries.

Regarding the share of the population that is self-employed, we observe a different relationship where greater reliance on self-employment is associated with lower rates of LFP. This could be driven by the idea that, in some cases, men and women become self-employed due to a lack of economic opportunity (Low et al. 2005). In a similar pattern to manufacturing and agricultural employment shares, the estimated relationship with self-employment is larger in rural areas compared to urban areas.

UNEMPLOYMENT, POPULATION MOBILITY, and DENSITY: Results indicate that one of the bigger drivers of LFP is the more recent unemployment rate. Unsurprisingly, a higher unemployment rate may lead to more discouraged workers – those who have given up looking for work and have left the labor force due to a lack of optimism surrounding economic opportunities – and therefore a lower rate of LFP. Our results do not identify lingering effects of unemployment after a 10-year period.

For the full sample, population mobility – defined as the change in the population over the past decade – does not appear to have a statistically identifiable relationship to LFP. However, we find that more population growth is associated with higher rates of LFP in urban areas, perhaps indicating that in-migration is occurring as a result of a strong economy. Conversely, the estimated effect of population growth in rural areas is negative. It may reflect the much lower levels of population change in rural areas (with many experiencing a loss of jobs) or it may be a statistical anomaly given the small magnitude of the estimated coefficients.

Our results do not identify a statistically important relationship between distance to the nearest MSA and LFP. However, there does appear to be a structural difference between rural and urban areas. Results do indicate that higher population density is associated with lower LFP, but the effect is present only in urban areas, possibly due to the tremendous variation in density within urban counties relative to rural counties (see table 1).

DEMOGRAPHICS – RACE, AGE AND GENDER: Consistent with the previous literature, some of the strongest indicators of LFP are basic demographic variables that divide the population into segments based on age and gender. By far the largest movement in LFP is associated with the share of the population that is female, ages 25 to 54. Here our results indicate that, for our entire sample, an increase in the female age 25 to 54 share of one percentage point is associated with an increase in the overall LFPR of around 1.3 percentage points. And the effect is noticeably larger in rural counties compared to urban counties. This makes sense given that there is evidence that female LFP has been a major driver, overall, in changes in the LFPR.

In contrast, larger population shares of males (and correspondingly lower population share of those of either gender who are age 55 or over) are associated with lower rates of LFP, regardless of whether we examine the younger group or the older group. This is also consistent with the results presented in Brainard (2017) about how recent declines in the LFPR are due to the aging of the population and declines in the LFPR of prime working-age men, especially those with lower levels of education.

Our race indicators are also important in explaining the LFPR. A higher African American share (in conjunction with a lower white share) is associated with lower rates of LFP and here the estimated effect is slightly larger in rural areas. The population share that is another race (Hispanic, Asian, etc.) is also associated with a slightly lower rate of LFP, but the effect is only present in rural areas. Again, these results are consistent with previous research by Cajner et al. (2017) which showed these differences have persisted for decades.

HUMAN CAPITAL: Unsurprisingly, results identify a positive relationship between educational attainment and LFP. However, the estimated effect is relatively small. The largest overall estimated effect is related to having a high school diploma. A one-percentage-point increase in the share of the population with a high school diploma (and correspondingly fewer people with less than a high school diploma) is associated with an increase in LFP of about 0.18 percentage points. However, education also appears to be more important to determining the LFPR in rural areas. In rural areas, having a high school diploma or higher (all categories combined) is associated with about a 0.48 percentage point increase compared to a 0.44 percentage point increase in urban areas.

The factor in our model that appears to have the strongest effect relates to disability status. For all counties, we estimate that a one percentage point in the working-age population receiving disability assistance is associated with a decrease in the LFPR rate of more than 1.4 percentage points. And the estimated effect is noticeably larger (in absolute value) in rural counties. Female life expectancy – our proxy for female health overall - is associated with higher LFP, as expected. Oddly, greater male life expectancy is associated with lower rates of LFP in urban counties, and we find no relationship in rural counties.

OTHER FACTORS: Our results indicate that more abundant natural amenities in a county is associated with lower LFP in urban counties, although there is no identified relationship in rural counties. This may be driven by the idea that early retirees (those younger than age 65; recall that we focus only on the LFPR for those age 15 to 64) are attracted to metro areas with more abundant natural amenities, therefore lowering the LFPR. Our social capital index is associated with significantly higher rates of LFP in rural areas. This is likely due to the fact that rural areas with greater levels of social capital are those in which people are more engaged in the community and helping each other. In these types of areas, people may be less likely to slip through the cracks and drop out of the labor force.

After controlling for all of the other factors in our model, our results identify that being located in Appalachia is associated with a significantly lower rate of LFP. The effect is especially pronounced for rural counties, where our estimates indicate that the "Appalachian Effect" is associated with a rate of LFP that is more than 1.5 percentage points lower than in similar counties outside of Appalachia. Referring back to the literature review above, our result matches more closely with Dorsey (1991) and contrasts with Isserman and Rephann (1993), even though the latter study matches our empirical design more closely. We explore this further in our extensions section below.

SPATIAL SPILLOVER EFFECTS: Lastly, our results do indicate that the economic situation in neighboring counties affects the LFPR. Most importantly, we find that a higher unemployment rate in the previous year in neighboring counties is associated with slightly lower rates of LFP in a given county. This is consistent with the impact of the county's own recent unemployment rate and provides evidence that a weak economy in a given county can spill over and negatively affect LFP in neighboring counties. Results do indicate that this effect is more than twice as large (in absolute value) in rural counties, compared to urban counties.

STATE FIXED EFFECTS: Because we are interested in why certain places may have lower rates of LFP, we separately examine our estimated state fixed effects in table 3. The omitted state is Pennsylvania, which has an average LFPR closest to the national, county-level average of 75.23. For most states, the state fixed effect is positive or statistically insignificant. For those with a statistically insignificant effect, it suggests that the LFPR in that state's counties is explained by other factors in our model. A positive and statistically significant effect suggests that the state's LFPR is higher than expected. Only two states have any negative and statistically significant effects: Louisiana and West Virginia. From appendix A, we see that West Virginia has the lowest average county-level LFPR. However, for Louisiana, the state fixed effect is only weakly statistically significant for the urban sample. For West Virginia, the state fixed effect is strongly statistically significant and negative suggesting that there are some other factors (not explained in our model) that lead West Virginia to have such a low LFPR. This is consistent with the findings in Dorsey (1991).

Further Exploration – Differences in the Rural and Urban and Appalachian Effects

To explore further the differences in rates of LFP between rural and urban areas and to investigate the "Appalachian Effect," we use an Oaxaca (or Oaxaca-Blinder) decomposition approach. This is an approach standard in the gender wage gap literature (beginning with Oaxaca 1973; and Blinder 1973) used to see if there are unexplained differences between two groups. Kilkenny and Huffman (2003) applied a similar approach and found that they could explain the differences between the rural and urban individuals in their sample.

We consider two types of differences: between rural and urban counties and between Appalachian and non-Appalachian counties. We estimate the model for each sample first without spatial and time fixed effects since Oaxaca in not compatible with fixed effects, and then by relaxing the assumptions and including the fixed effects. Using both approaches, the results are similar so we focus on the theoretically consistent results without fixed effects. Results are available in appendix B.

Overall, the difference in the LFPR between rural and urban counties is only 0.70 percentage points. Of this, our results suggest 80 percent of the difference (or 0.57 percentage points) can be explained by our model and the unexplained portion is statistically insignificant. However, the difference in the LFPR between ARC and non-ARC counties is sizable – 7.1 percentage points; with a difference of 3.5 percentage points for urban counties and 8.6 percentage points for rural counties. Of this, at least 1.1 percentage points of the variation cannot be explained by our model. This provides further evidence of an "Appalachian Effect" that future research should continue to explore.

Further Exploration – Relationship between LFPR and Other Economic Outcomes

While the focus of our research is on understanding the factors associated with the LFPR, we also want to explore how LFP affects economic outcomes. In table 4, we show the results for our measure of LFP in models predicting the county-level poverty rate and the subsequent five-year employment change for urban and rural counties separately. All models also include the other factors that we included in our results in table 2, thus already controlling for other factors that may affect these outcomes. For poverty, we find, not surprisingly, that higher levels of the LFPR are associated with lower levels of poverty. For employment change, we find that the LFPR only matters for rural counties. In other words, in rural counties, a higher level of LFP is associated with a higher level of employment growth. This is especially important since rural areas are generally facing lower levels of employment growth overall. Thus, for these counties, increasing LFP may be one way to boost their economic prosperity. However, further research is needed to fully explore this.

Conclusion

Low levels of LFP are a major impediment to economic development in many deeply and persistently distressed areas of the U.S. For instance, West Virginia has suffered from the problem of extremely low LFP for decades and has some counties where the rate is far below 50 percent, with one county having an ongoing LFPR in the low-30-percent range. It is difficult to imagine new business developing in a county where such a small share of the adult population is engaged in the labor force. Most of the literature that seeks to understand LFP focuses in movements over time in the national LFPR while relatively few studies have investigated regional variation.

In this study, we have analyzed how a wide array of economic and demographic factors relate to LFP using a panel of county-level data for the years 2000 and 2010. We focus especially on how various factors relate to LFP in rural versus urban counties differently and we innovate over the previous literature by incorporating an analysis of cross-county spillover effects.

Our results identify a number of important findings, many of which are expected based on previous research and economic theory. For instance, numerous factors such as demographics, industrial composition, economic opportunity, human capital in the form of education, health, and disability all matter in explaining the LFPR and they have the expected sign.

Turning away from what has been identified in the previous literature, our results indicate that the determinants of the LFPR often differ in important ways between rural and urban areas. Many of these findings provide important insight into helping researchers understand why some rural areas lag so significantly in terms of LFP. Further, our results provide insight in showing that economic conditions in one county can generate important spillover effects in neighboring counties, and this spillover effect may be noticeably larger in rural counties.

One of our most important findings relates to Appalachia specifically: We find that, after controlling for numerous factors that explain a great deal of the variation in the LFPR, counties in Appalachia and in West Virginia exhibit a significantly lower LFPR compared to similar counties outside of Appalachia. This finding is consistent with some of the earlier research and deserves more attention in future research to understand the specific drivers of this result.

Ultimately, we are able to explain much about county-level LFP, but more needs to be done to identify levers that can be used to promote LFP, especially in rural counties. Given that our research also demonstrates that the LFPR is closely associated with employment growth, especially in rural areas, further work in the area may be a critical step toward increasing rural economic prosperity.

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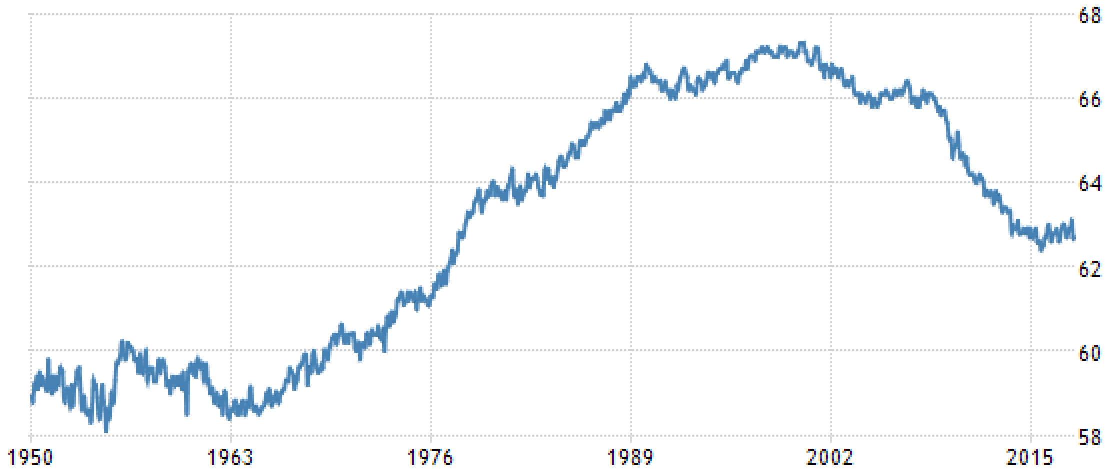

Figure 1. U.S. Labor Force Participation, 1950 to 2017

Source: Tradingeconomics.com and U.S. Bureau of Labor Statistics

Table 1: Summary Statistics

VARIABLES	(1) All Counties	(2) Urban Counties	(3) Rural Counties
Labor Force Participation Rate (ages 15 to 64) (%)	75.174	75.663	74.953
	(9.920)	(6.869)	(11.017)
Industrial Composition			
Share of government employment (%)	16.786	15.434	17.396
	(6.739)	(6.781)	(6.632)
Share of manufacturing employment (%)	12.031	11.269	12.375
	(8.928)	(7.304)	(9.551)
Share of employment in mining (%)	1.261	0.602	1.559
	(3.292)	(1.946)	(3.706)
Share of agriculture employment (%)	6.838	2.873	8.628
	(6.939)	(4.037)	(7.227)
Share of employment by non farm proprieters (%)	20.911	20.376	21.152
	(6.463)	(6.768)	(6.307)
Employment and Population			
Percent change in employment over 5 years	5.991	8.914	4.672
	(10.637)	(11.630)	(9.879)
Unemployment Rate (one year lag) (%)	7.008	6.825	7.091
	(3.643)	(3.478)	(3.712)
Unemployment Rate (ten year lag) (%)	5.543	4.713	5.918
	(2.871)	(2.218)	(3.048)
Percentage change in population over last 10 years (%)	13.283	21.504	9.573
	(18.344)	(19.966)	(16.256)
Urbanization and Density			
Located in an MSA	0.311	-	-
	(0.463)	-	-
Distance in km to the nearest MSA	34.660	20.686	40.967
	(32.477)	(17.231)	(35.624)
Population Density	225.043	636.770	39.199
	(1,671.968)	(2,956.698)	(41.218)
Demographics - Race and Age			
Percentage of population that is African American (%)	8.800	10.359	8.096
	(14.428)	(12.936)	(15.002)
Percentage of population that of another race (%)	6.359	7.322	5.924
	(8.453)	(7.552)	(8.796)
Share of population that is male, ages 25 to 54 (%)	20.038	20.779	19.703
	(2.200)	(1.816)	(2.276)
Share of population that is male, under age 25 (%)	17.116	17.546	16.921
	(2.223)	(2.004)	(2.289)
Share of population that is female, ages 25 to 54	19.930	21.140	19.383
	(1.971)	(1.802)	(1.792)
Share of population that is female, under age 25 (%)	16.198	16.757	15.945
	(2.277)	(1.974)	(2.359)
Education			
Share of population age 25+ with a bachelor's degree or higher (%)	17.622	22.805	15.283
	(8.141)	(9.624)	(6.068)
Share of population age 25+ with some college (%)	27.252	28.388	26.739
	(5.570)	(4.564)	(5.899)
Share of population age 25+ with high school diploma (%)	35.324	32.381	36.652
	(6.676)	(7.218)	(5.959)

Table 1: Summary Statistics (Continued)

	(1)	(2)	(3)
VARIABLES	**All Counties**	**Urban Counties**	**Rural Counties**
Health			
Percent of population age 15 to 64 receiving disability assistance (%)	4.181	3.640	4.426
	(2.056)	(1.655)	(2.170)
Female Life Expectancy	79.233	79.614	79.060
	(1.840)	(1.775)	(1.844)
Male Life Expectancy	74.004	74.706	73.687
	(2.494)	(2.357)	(2.489)
Other Local Factors			
Natural Amenity Rank	3.486	3.583	3.443
	(1.046)	(1.095)	(1.020)
Social Capital Index	-0.014	-0.508	0.208
	(1.371)	(0.949)	(1.470)
Located in the ARC	0.137	0.135	0.138
	(0.344)	(0.341)	(0.345)
Influence of nearby counties			
Spatially lagged five-year employment growth	6.021	7.274	5.455
	(7.321)	(7.980)	(6.930)
Spatially lagged umployment rate (%)	6.992	7.270	6.867
	(3.177)	(3.164)	(3.175)
Other Measures of Economic Prosperity or Distress			
Poverty Rate	15.046	12.76	16.078
	(6.11)	(5.27)	(6.19)
Employment Growth (Next 5 years)	4.267	8.428	2.389
	(9.52)	(11.18)	(7.99)
Number of Observations	6,000	1,866	4,134

Table 2: Regression Results: Labor Force Participation Rate

VARIABLES	(1) All Counties	(2) Urban Counties	(3) Rural Counties
Industrial Composition			
Share of government employment (%)	**-0.32991*** **	**-0.31511*** **	**-0.31887*** **
	(0.01728)	**(0.03396)**	**(0.02041)**
Share of manufacturing employment (%)	**0.11150*** **	**0.05758** **	**0.14391*** **
	(0.01256)	**(0.02306)**	**(0.01539)**
Share of employment in mining (%)	-0.01542	-0.04286	0.00247
	(0.02557)	(0.06089)	(0.02837)
Share of agriculture employment (%)	**0.24626*** **	**0.18094*** **	**0.25327*** **
	(0.02065)	**(0.03768)**	**(0.02304)**
Share of employment by non farm proprieters (%)	**-0.10844*** **	**-0.05510** **	**-0.10750*** **
	(0.01468)	**(0.02161)**	**(0.01886)**
Employment and Population			
Percent change in employment over 5 years	0.00623	-0.00199	0.00583
	(0.00961)	(0.01120)	(0.01306)
Unemployment Rate (one year lag) (%)	**-0.16716*** **	**-0.18349** **	**-0.15523** **
	(0.05507)	**(0.07783)**	**(0.06889)**
Unemployment Rate (ten year lag) (%)	0.06475	0.00277	0.08738*
	(0.04335)	(0.08776)	(0.04916)
Percentage change in population over last 10 years (%)	-0.01047	**0.01478** **	**-0.02108** **
	(0.00651)	**(0.00734)**	**(0.00874)**
Urbanization and Density			
Located in an MSA	0.15348	-	-
	(0.18944)	-	-
Distance in km to the nearest MSA	0.00028	-0.01046	0.00024
	(0.00286)	(0.00637)	(0.00323)
Population Density	**-0.00010*** **	**-0.00016*** **	-0.00269
	(0.00003)	**(0.00005)**	(0.00246)
Demographics - Race and Age			
Percentage of population that is African American (%)	**-0.15414*** **	**-0.13720*** **	**-0.16777*** **
	(0.00862)	**(0.01289)**	**(0.01167)**
Percentage of population that of another race (%)	**-0.05390*** **	-0.03571	**-0.04920*** **
	(0.01667)	(0.03105)	**(0.01836)**
Share of population that is male, ages 25 to 54 (%)	**-0.69816*** **	**-0.59278*** **	**-0.69756*** **
	(0.05742)	**(0.09738)**	**(0.06081)**
Share of population that is male, under age 25 (%)	**-0.46441*** **	**-0.77619*** **	**-0.35705*** **
	(0.11327)	**(0.20012)**	**(0.12996)**
Share of population that is female, ages 25 to 54	**1.29047*** **	**1.12203*** **	**1.37539*** **
	(0.08109)	**(0.12583)**	**(0.10110)**
Share of population that is female, under age 25 (%)	0.05746	**0.35149***	-0.02650
	(0.11283)	**(0.17993)**	(0.13354)
Education			
Share of population age 25+ with a bachelor's degree or higher (%)	**0.14559*** **	**0.15371*** **	**0.18608*** **
	(0.02917)	**(0.04802)**	**(0.03461)**
Share of population age 25+ with some college (%)	**0.13399*** **	**0.09820** **	**0.12169*** **
	(0.02611)	**(0.04784)**	**(0.03124)**
Share of population age 25+ with high school diploma (%)	**0.18142*** **	**0.19026*** **	**0.17378*** **
	(0.02786)	**(0.05095)**	**(0.03239)**

Table 2: Regression Results: Labor Force Participation Rate (Continued)

VARIABLES	(1) All Counties	(2) Urban Counties	(3) Rural Counties
Health			
Percent of population age 15 to 64 receiving disability assistance (%)	**-1.41073*** **	**-1.22562*** **	**-1.39659*** **
	(0.07937)	**(0.14265)**	**(0.08852)**
Female Life Expectancy	**0.46457*** **	**0.67583*** **	**0.42685*** **
	(0.11340)	**(0.16178)**	**(0.14456)**
Male Life Expectancy	-0.05703	**-0.51192*** **	0.07237
	(0.09290)	**(0.14495)**	(0.11123)
Other Local Factors			
Natural Amenity Rank	**-0.25268** **	**-0.45701*** **	-0.23275
	(0.10813)	**(0.14025)**	(0.14278)
Social Capital Index	**1.48477*** **	0.64326	**1.67844*** **
	(0.24933)	(0.43001)	**(0.15467)**
Located in the ARC	**-1.42005*** **	**-1.18451*** **	**-1.59616*** **
	(0.22946)	**(0.30423)**	**(0.32067)**
Influence of nearby counties			
Spatially lagged five-year employment growth	0.00686	**0.03393* **	-0.00217
	(0.01472)	**(0.01939)**	(0.01942)
Spatially lagged umployment rate (%)	**-0.40882*** **	**-0.19390** **	**-0.44748*** **
	(0.06116)	**(0.08746)**	**(0.07690)**
Constant	**37.06881*** **	**56.19326*** **	**27.24740*** **
	(7.57153)	**(10.59301)**	**(9.77810)**
Year Fixed Effects?	Y	Y	Y
State Fixed Effects?	Y	Y	Y
Observations	6,000	1,866	4,134
R-squared	0.78469	0.78291	0.79699
Adjusted R-squared	0.782	0.774	0.793

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: State Fixed Effects

	All Counties	Urban Counties	Rural Counties
AL	4.26958***	2.22403***	5.07693***
	(0.52796)	(0.65556)	(0.80627)
AZ	4.04734***	3.80742**	2.93551*
	(1.13843)	(1.58196)	(1.61475)
AR	2.29739***	0.65927	2.91714***
	(0.53006)	(0.70015)	(0.76372)
CA	4.11090***	3.73780***	3.86074***
	(0.83109)	(1.18790)	(1.35860)
CO	0.87580	1.74149*	0.41582
	(0.84188)	(0.97834)	(1.15423)
CT	1.99025**	2.06492**	5.13078***
	(0.77817)	(0.85706)	(0.94126)
DE	3.49922**	1.93015	5.06097
	(1.57981)	(1.50626)	(3.26520)
FL	2.66506***	2.33056***	2.23623**
	(0.59729)	(0.68323)	(0.94540)
GA	4.53013***	1.93059***	5.85562***
	(0.50125)	(0.65494)	(0.72397)
ID	3.71206***	2.76573**	4.10748***
	(0.81203)	(1.31773)	(1.07321)
IL	2.40159***	3.73422***	2.04875***
	(0.49176)	(0.68477)	(0.72409)
IN	-0.15432	-0.46731	0.24627
	(0.42547)	(0.54471)	(0.65824)
IA	3.70707***	5.30766***	3.43406***
	(0.50939)	(0.89388)	(0.68690)
KS	5.79352***	5.45618***	5.62519***
	(0.63307)	(1.05961)	(0.82276)
KY	0.64289	0.77874	1.00354
	(0.48749)	(0.70576)	(0.69473)
LA	-0.49976	**-1.24582***	-0.18656
	(0.53232)	(0.64258)	(0.78995)
ME	1.01669*	2.37669***	0.36112
	(0.56211)	(0.82496)	(0.79860)
MD	4.34867***	2.90092***	6.55704***
	(0.62569)	(0.74240)	(1.01456)
MA	1.64266*	0.61729	7.51264*
	(0.96623)	(0.68716)	(4.44182)
MI	1.62224***	1.42540**	2.01471***
	(0.51584)	(0.70233)	(0.74839)
MN	5.60699***	5.16891***	5.86731***
	(0.63447)	(0.94796)	(0.78958)
MS	4.84123***	1.11426	6.23702***
	(0.61728)	(1.07212)	(0.82975)
MO	3.36180***	4.17863***	3.32498***
	(0.52437)	(0.71090)	(0.75112)
MT	-0.53974	-0.13965	-0.66955
	(0.78671)	(1.15189)	(0.97175)
NE	6.53960***	4.80504***	6.60363***

Table 3: State Fixed Effects (continued)

	All Counties	Urban Counties	Rural Counties
NV	5.44713***	4.18989**	5.76898***
	(1.39757)	(1.78094)	(1.75070)
NH	2.14776***	2.66358***	2.06200*
	(0.73999)	(0.77790)	(1.18471)
NJ	2.28870***	1.84131***	
	(0.64434)	(0.61610)	
NM	-0.03491	-0.69300	0.15457
	(1.00035)	(2.01038)	(1.27687)
NY	0.75225*	0.85154	0.63759
	(0.42566)	(0.54203)	(0.69784)
NC	4.35553***	2.98002***	5.18864***
	(0.50818)	(0.68375)	(0.76220)
ND	2.91262***	4.95489***	2.56719**
	(0.87039)	(1.20198)	(1.03710)
OH	0.12259	0.41549	0.10965
	(0.41498)	(0.57440)	(0.60528)
OK	0.31687	-0.07226	0.47953
	(0.60432)	(0.93409)	(0.82636)
OR	2.10068***	2.43490**	2.26074**
	(0.72367)	(1.01033)	(1.00446)
RI	4.35719***	4.44759***	
	(0.76113)	(0.79643)	
SC	4.49332***	1.30671	6.76673***
	(0.72625)	(0.81993)	(0.87716)
SD	5.29312***	6.42463***	5.08097***
	(0.77623)	(1.65470)	(0.90967)
TN	3.21247***	1.19029*	4.01161***
	(0.48669)	(0.66959)	(0.68896)
TX	2.65471***	0.84601	3.31781***
	(0.55554)	(0.82916)	(0.80147)
UT	5.96796***	4.41866***	6.95115***
	(0.98519)	(1.40294)	(1.29755)
VT	2.79839***	3.57880**	2.16336**
	(0.73755)	(1.47042)	(0.97573)
VA	3.43692***	2.39336***	4.53857***
	(0.55717)	(0.71343)	(0.86064)
WA	1.52074*	3.35601***	0.48713
	(0.82529)	(1.24068)	(1.13612)
WV	**-2.57351*** **	**-3.30982*** **	**-2.02862*** **
	(0.53330)	(0.72616)	(0.73310)
WI	4.27774***	3.84603***	5.10840***
	(0.44346)	(0.68944)	(0.64269)
WY	4.47262***	3.46374**	4.35404***
	(0.86425)	(1.70312)	(1.04685)

Fixed Effects are relative to the "average" state, in this case Pennsylvania.

Table 4: Labor Force Participation and Measures of Economic Prosperity and Distress

Dependent Variable	Urban Counties	Rural Counties
Poverty Rate (%)	**-0.11820*** **	**-0.11118*** **
	(0.01851)	**(0.00968)**
Employment Growth over the next 5 years (%)	0.05112	**0.05459** **
	(0.09210)	**(0.02637)**
Observations	1,866	4,134

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: All models also include the other control variables used in the analysis in Table 2.

Appendix A: Ranking of States by the Average County LFPR

Ranking	State	Avg LFPR
1	WV	64.26453
2	LA	64.69073
3	MS	65.86986
4	AL	67.20024
5	KY	67.73805
6	AZ	68.01704
7	NM	68.19875
8	SC	68.60382
9	GA	68.75322
10	AR	69.55876
11	FL	69.70104
12	TN	70.56348
13	OK	71.53091
14	NC	71.71426
15	CA	71.89271
16	VA	73.13933
17	NY	73.53695
18	WA	73.75899
19	NV	73.77463
20	TX	73.88781
21	MI	74.511
22	PA	75.03313
23	DE	75.38393
24	OH	75.9095
25	IN	76.40293
26	OR	76.8612
27	MO	76.96209
28	ID	77.14601
29	UT	77.34007
30	ME	77.59544
31	NJ	77.65797
32	CO	77.77319
33	MD	78.29642
34	IL	78.4866
35	MT	79.26511
36	CT	80.17926
37	MA	80.38123
38	RI	80.91784
39	NH	81.41875
40	WY	81.74854
41	VT	81.75824
42	WI	83.36431
43	KS	84.70195
44	SD	85.52796
45	IA	85.81255
46	ND	85.96396
47	MN	86.61325
48	NE	89.35658

Appendix B. Blinder-Oaxaca decomposition of differences in the county-level LFPR

Panel A: Differences between Rural and Urban Counties		
Average County LFPR		
Rural Counties	74.95 ***	(0.17)
Urban Counties	75.66 ***	(0.16)
Difference in Average LFPR between Rural and Urban Counties	-0.71 ***	(0.23)
Explained Portion of the Difference	-0.57 **	(0.26)
Unexplained Portion of the Difference	-0.14	(0.20)
Panel B: Differences between Appalachian and Non-Appalachian Counties		
Average County LFPR		
Non-Appalachian Counties	76.14 ***	(0.14)
Appalachian Counties	69.09 ***	(0.29)
Difference in Average LFPR between Appalachian and Non-Appalachian Counties	7.06 ***	(0.32)
Explained Portion of the Difference	5.92***	(0.31)
Unexplained Portion of the Difference	1.13 ***	(0.21)
Panel C: Differences between Appalachian and Non-Appalachian Counties - Urban Only		
Average County LFPR		
Urban Non-Appalachian Counties	76.14 ***	(0.17)
Urban Appalachian Counties	72.61 ***	(0.35)
Difference in Average LFPR between Urban Appalachian and Non-Appalachian Counties	3.53 ***	(0.39)
Explained Portion of the Difference	2.22 ***	(0.39)
Unexplained Portion of the Difference	1.31 ***	(0.27)
Panel D: Differences between Appalachian and Non-Appalachian Counties - Rural Only		
Average County LFPR		
Rural Non-Appalachian Counties	76.14 ***	(0.18)
Rural Appalachian Counties	67.54 ***	(0.36)
Difference in Average LFPR between Rural Appalachian and Non-Appalachian Counties	8.61 ***	(0.41)
Explained Portion of the Difference	7.42 ***	(0.40)
Unexplained Portion of the Difference	1.19 ***	(0.29)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1