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Employment effects of US minimum wage policy

A strong argument against raising the minimum wage, often voiced in US policy debates, is that a higher minimum wage will have adverse effects on job opportunities. Considerable effort has been devoted to providing quantitative estimates of the employment effects of the minimum wage with quite mixed results. We review this literature before turning to estimates of the impact of state level differences in the level of the minimum wage on youth employment in local labor markets in the Great Lakes Region of the US. We find that a higher minimum wage level is associated with higher earnings, lower employment, and reduced worker turnover for those in the 14 to 18 age group. For workers aged 19 to 21 and 22 to 24, we find less consistent evidence of important minimum wage effects on earnings and employment.

Keywords: minimum wage, youth employment, worker and job turnover.

I. Introduction

Efforts to measure the labor market effects of cross-state differences in the minimum wage have yielded a range of estimates. Case studies using difference-in-difference methods often find positive employment effects following changes in the minimum wage on one side of a state border. Panel data studies seem to confirm the old consensus that a 10% higher minimum wage would result in 1% to 3% fewer jobs for affected workers. But these estimated negative employment effects often disappear when controls for spatial heterogeneity are included.

This paper reexamines the effect of the minimum wage on labor market outcomes by focusing on local labor markets for youth. We concentrate on the five states in the Great Lakes region and use separate time effects for each Bureau of Economic Analysis (BEA) Economic Area (EA) in that region to control for spatial heterogeneity. We find evidence that the level of the state minimum wage is negatively correlated with teenage employment levels, with low elasticity estimates in the.1 to.3 range, but positively correlated with the employment of young workers between the ages of 22 and 24. We also examine dynamic aspects of youth labor markets and find that accessions, separations and turnover rates are lower in local labor markets with higher minimum wages for all youth. While we find there is no minimum wage effect on net job growth for teens in our sample, there is a positive effect for older youth in these markets.

The rest of the paper proceeds as follows. Section II briefly reviews the literature, with a focus on identifying the methodology and different conclusions about minimum wage effects on employment. Section III describes the data and how we construct our sample. Section IV presents the empirical model. Section V provides the main results. Section VI concludes.

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II. Background

What are the effects of higher minimum wage levels on labor market outcomes? This is a question that has attracted the attention of many

economists. Previous studies, both theoretical and empirical, have generally reached a variety of conclusions about the effects on the employment level. The large empirical literature, mainly looking at teenage workers or those employed in restaurants or other establishments likely to be affected by the minimum wage, can be divided into four clusters, ordered chronologically.

First, by the early 1980s, most studies of the effects of time series variation in the national minimum wage reported results suggesting that higher minimum wages decreased employment opportunities for low wage workers. Brown's influential survey (1982) identified a consensus finding that the minimum wage elasticity of teenage employment ranged from -0.1 to -0.3 in time series studies using Current Population Survey data with varying sample periods and specifications.

Second, starting in the 1990s, the results of the "new minimum wage research"[1], which tended to study cross-state differences, raised questions about the effects on low-wage employment of a higher minimum wage (Neumark and Wascher, 2007). Case studies of cross border differences following an increase in a state's minimum wage level (Card and Krueger 1994 and 1995) often find a positive and statistically significant effect of the minimum wage on employment in low-wage labor markets. This effect can be explained, in part, by assuming that employers of low-wage workers have market power and act as monopsonistic buyers of labor.

Third, panel studies, employing national-level longitudinal data on individuals or time-series data for a cross-section of geographic areas, often find a negative correlation between employment and the minimum wage.[2] A good example of such panel models is that specified in Neumark and Wascher (1992) and written in equation (1). Here E_{it} represents employment in state i at time t, MW_{it} is the minimum wage in state i at time t and X_{it} includes control variables. The equation also includes year dummies τ_t to control for state-invariant time effects and state dummies ϕ_i to capture state-specific, time-invariant unobserved characteristics:

$$E_{it} = \beta_0 + \beta_1 MW_{it} + X_{it}\beta_2 + \phi_{\mathrm{i}} + \tau_{\mathrm{t}} + \varepsilon_{it}, \qquad (1)$$

Neumark and Wascher (2008) conclude that panel studies focusing on cross-state variation with time and state fixed effects suggest renewed support for the "consensus" employment elasticity estimate of -0.1 to -0.3.

Several recent papers of the employment effects of cross-state variation in minimum wage levels reinforce the conclusion of this third cluster of studies. Thompson (2009), using Quarterly Workforce Indicators data for 1996-2000, evaluates how state differences in minimum wages affect teenage employment at the county level. By referring to quintiles of teen average quarterly earnings, he identifies high-impact counties (where the minimum wage is most likely to affect teenage markets) and low-impact counties (where prevailing wages exceed the minimum). Using difference-in-difference estimations, he demonstrates that the employment elasticity in the high-impact counties ranged between -0.26 and -0.37. In addition, using the same DID model with an alternative dependent variable (hiring), he shows that the teen share of new hires (THS) declined markedly following a minimum wage increase.

Sabia (2009) points out that industry studies narrowly based on sub-sectors of the retail sector, such as the fast-food restaurants in many case studies, may not capture the minimum wage effects across the entire retail sector. Using monthly data from the 1979-2004 CPS, Sabia supplements

[1] The new minimum wage research began in November 1991, when there were an innovative set of studies on the effects of the minimum wage presented and discussed in "New Minimum Wage Research Conference". And a special issue of the Industrial and Labor Relations Review (ILRR) was published in the early 1990s. (Neumark and Wascher, 2007)

[2] Generally speaking, nationwide individual-level data, such as the Current Population Survey (CPS), can provide the worker-level demographic information to estimate the employment effect by age, gender or race; time-series and cross-section data (the geographic data) can incorporate both state and time variation in minimum wages. For example, Quarterly Census of Employment and Wages (QCEW) and Quarterly Workforce Indicators (QWI) can provide a full census of quarterly count of employment and wages, available at the county, MSA, and state levels by industry.

the model in equation (1) by including a fixed effect for each month to capture unmeasured seasonal employment patterns. He finds that the employment elasticity in retail trade is -0.1, while the adverse employment effects are much larger, with estimated elasticities of -0.34 to -0.38, for teenagers in retail sectors.

Taking into consideration that a change in the minimum wage in a state affects employment not only in its own state but also in neighboring states through spatial dependence and spatial spillovers, Kalenkoski and Lacombe (2011) use annual average state level panel data from the BLS for 1990-2004 and employ a Spatial Autoregressive (SAR) model to estimate the teen employment elasticity relative to the real effective minimum wage at -0.21.

Sabia et al. (2012) use 2004 and 2006 CPS data to examine the effects of a minimum wage increase in New York State on the employment rates of 16-to-19-year-old workers without high school diplomas. They employ a difference-in-difference method, which is similar in spirit to the case studies by Card and Krueger (1994 and 1995), with a control group of similar workers in nearby states that did not experience a rise in the minimum wage over the same period. They find that a median employment elasticity of the minimum wage is around -0.7, which is larger than the previous consensus of -0.1 to -0.3.

The fourth cluster of minimum wage studies again questions the existence of a consensus on negative employment effects from minimum wages once controls for spatial heterogeneity are included in panel regressions. Dube, Lester, and Reich (2010) generalize the case study method by estimating the employment effects of state variation in the minimum wage in a panel of contiguous border county-pairs in the United States over the years from 1990 to 2006. They find that the fixed-effects specification in the canonical model presented in equation (1) cannot account for trends in employment prior to the increase in the minimum wage and that spatial heterogeneity may have a time-varying component. To control for this they add a separate pair-specific time effect τ_{pt} for each cross border county pair in their sample to their regressions. Unlike much of the literature from panel studies after the 1990s, they find that an estimated negative employment effect associated with a higher state minimum wage in estimates of models like equation (1) disappears when the pair-specific time effect is included in their regressions.

Taking a different approach to controlling for spatial heterogeneity, Allegretto, Dube, and Reich (2011) estimate the effects on teen earnings and employment with CPS panel data for the period 1990-2009. Each observation in their sample is at individual level i, in state s and time t. They add a Census division-specific time effect τ_{dt} to sweep out the variation across the nine Census divisions and a state-specific linear trend $\psi_s t$ to capture long-run growth differences across states and conclude that the estimated employment elasticity with these controls in the model is indistinguishable from zero.

Finally, Addison, Blackburn, and Cotti (2009) examine minimum wage effects on employment in low-wage subsectors of the retail trade industry. Their approach to controlling for spatial heterogeneity is to include a county-specific time trend in the error term to sweep out a county-specific linear trend, and then use de-trended data to estimate models similar to equation (1). They find evidence of modest (but robust) positive employment effects in many sectors, and explain this by monopsony and efficiency wages.

Neumark et al. (2013) provide a detailed critique of these approaches to controlling for spatial heterogeneity. They argue that the strategy of limiting identification of the minimum wage effect to within-area or relative-to-area-trend variation leads to neglect of valid information. Still, this cluster of minimum wage studies raises an important question about the evidence for minimum wage effects in local labor markets. We compare results using the panel data approach with estimates that incorporate controls for spatial heterogeneity to add additional information on this issue.

The literature has focused considerable attention on the impact of the minimum wage on the level of employment. Far less attention has been paid to the impact on labor market flows. Thompson (2009), as noted above, provides evidence that the teen share of new hires is significantly lower in counties where the minimum wage affects the local wage structure. Dube, Lester, and Reich (2011) estimate that the number of hires, the

number of separations and the turnover rates for teens and restaurant workers are significantly lower in counties with higher minimum wage levels, even controlling for spatial heterogeneity. This finding is similar to that of Portugal and Cardoso (2006) in their analysis of the mid-1980s change in the minimum wage in Portugal. They conclude that a higher minimum wage reduces the teen share of accessions in continuing and new firms, and sharply reduces the share of teenagers in job separations from continuing firms. We also examine the effect of the minimum wage on such labor market flows as well as net job growth, again comparing results from a typical panel model with those from a model incorporating controls for spatial heterogeneity.

III. Data

We use data from the Quarterly Workforce Indicators (QWI) from the Longitudinal Employer-Household Dynamics (LEHD) program at the U.S. Census Bureau.[3] The QWI are built on wage records in the Unemployment Insurance (UI) system and information from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW, formerly known as ES-202[4]). The QWI data provide employment levels, employment flows (accessions, separations and turnover rates), job creation and destruction, and average earnings for demographic subgroups (age and gender) by different levels of geography: state, county, metro, and workforce investment area, as well as by detailed industry. We measure the minimum wage at the state level as the higher of the federal or state minimum and include the total population each year at the county level[5] in the QWI panel dataset for all counties in the five states of the Great Lakes, or East North Central region, from 2003 through 2007.

The QWI system can apply the job concepts to both full-quarter and point-in-time (not lasting the full quarter) levels. Take employment, for example. Employment for a full quarter assumes that the individual has been continuously employed throughout the quarter with the same employer, i.e., he has valid UI wage records in the current quarter, the preceding quarter, and the subsequent quarter. Employment at a point in time can be divided into two types in the QWI – at the beginning of the quarter and at the end of the quarter. When the individual has valid UI wage records for the current and the preceding (subsequent) quarter she is defined as employed at the beginning (end) of the quarter (Abowd et al., 2005). In our paper, we use the end-of-quarter employment count as the measurement of point--in-time employment.

Following a similar definition, the QWI also provides information about earnings, accessions, separations, job creation, job destruction, and net job flows, at the full-quarter and point-in-time levels, respectively. To accurately estimate the minimum wage effects on teenage workers, we prefer to employ the concept of point-in-time jobs and job changes. Thompson (2009) finds that transitory jobs account for nearly half of all teen employment, compared to just over one-fourth of non-teen employment; and he defines transitory employment as the difference between total employment and stable employment (full-quarter employment). The point-in-time data are also more comparable to other federal statistics that measure labor market situations as of a given day or week each month.

In the QWI system, accessions are divided into two subcategories – new hires and recalls. If there are no valid wage records for this job within the last four quarters, then an accession into a job during the current quarter is called a new hire; otherwise, it is a recall. Separations are the number of workers

[3] The QWI variables, including employment, job creation, job loss, net job flows, accessions, separations, and average monthly earnings for both full-quarter and point-in-time jobs can be accessed at the county level in each state separately, which are published by the LEHD Program at the U.S. Census Bureau, http://lehd.did.census.gov/led/. For our study, the full public-use QWI data were accessed through the Cornell Institute for Social and Economic Research, using the VirtualRDC @ Cornell, http://www2.vrdc.cornell.edu/news/data/qwi-public-use-data/.

[4] The ES-202 program, also known as the Covered Employment and Wages (CEW) program, includes the employer reports based on information from each state's Department of Employment Security.

[5] Intercensal Estimates of the Resident Population for Counties, United States Census Bureau, http://www.census.gov/popest/data/intercensal/county/CO-EST00INT-01.html.

who left the employer during the current quarter. We define the point-in-time turnover rate as the ratio of the average of point-in-time accessions and separations over the end-of-quarter employment: Turnover = ((*EAkt* = *ESkt*)/2)*Ekt*.[6]

In the QWI system, dynamic job flows – job creation and destruction – are defined at the employer (establishment) level rather than at an individual level. Jobs are created (destroyed) at the establishment if end-of-quarter employment is greater (less) than beginning-of-quarter employment. We calculate the net job flow rate for point-in-time jobs at the county level as the ratio of net point-in-time job changes across the establishments within the county divided by the end-of-quarter (full-quarter) employment.

The QWI data allow us to examine the separate effects of the minimum wage on local labor market outcomes at the county level for workers in three age categories: 14-18, 19-21, and 22-24. Workers in these age groups are most likely to be affected by minimum wage legislation. In 2007 about a fifth of hourly wage earners earning the minimum wage were 16 to 19 years old and nearly half were under 25.[7] And younger workers are also more likely to be constrained in their choice of residence and so limited to employment opportunities within a geographic area (Ihlanfeldt 1990 and Stoll 1999).

The Bureau of Economic Analysis (BEA) defines eight multi-state regions in the U.S.[8] We limit our analysis to local labor markets in a single BEA region as a first level control for spatial heterogeneity, focusing on the five state Great Lakes region, also known as the East North Central Region in Census data. QWI data for all five states[9] in the Great Lakes region are available for the sample period. Some other regions have incomplete region-wide data, due to the lack of state participation in the QWI program. The states in the Great Lakes region share similar geographic characteristics, common business cycles, and comparable levels of economic development (Crone 1998/1999). And there is sufficient time series and cross state variation in the minimum wage within the Great Lakes region (see Table 1). But this is not true for some other regions. For example, the minimum wages in most states of the Southeast region and in all states of the southwest region are exactly the same as the federal minimum wage, $5.15, from 2001 to 2006. And even the states neighboring to the Great Lakes region, except for Minnesota, have virtually no changes in the minimum wage from 2001 to 2006.[10]

We control for spatial heterogeneity within the Great Lakes region by allowing for separate time effects for BEA Economic Areas (EAs). BEA Economic Areas consist of one or more economic "nodes" – metropolitan or micropolitan statistical areas – and the surrounding counties that are economically related to these nodes.[11] There are 32 Economic Areas centered in the Great Lakes region. Nine of these Economic Areas are defined to include counties in two or more neighboring states; 39.4% of the 437 counties in the Great Lakes region are in Economic Areas that overlap state boundaries within the region. So we can take advantage of potential differences in the minimum wage within these Economic Areas as well as time variation within each Economic Area to help identify minimum wage effects in local labor markets.

State minimum wages from 2003 to 2007 in the Great Lakes region are reported in Table 1. This is a time period during which the national labor market approached full employment after the 2001 recession and stayed there until the onset of the recession of 2008-2009. The federal minimum of $5.15 per hour prevailed in all five states in 2003 but legislation adopting higher state minimum wages was enacted in four of the five states at several points during the sample period.

[6] An arbitrary aggregate k = county × age group.

[7] U.S Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/cps/minwage2007.pdf.

[8] The eight regions are New England region, Mideast region, Great Lakes region, Plains region, Southeast region, Southwest region, Rocky Mountain region, and Far West region, http://www.bea.gov/regional/docs/regions.cfm.

[9] According to the definition by BEA, the Great Lakes region includes five states: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

[10] The minimum wage for states – North Dakota, South Dakota, Nebraska, Kansas, Iowa, Missouri, Kentucky, and West Virginia – is constant at $5.15 from 2001 to 2006. The minimum wage in Minnesota rose from $5.15 to $6.15 in 2006.

[11] Bureau of Economic Analysis, U.S. Department of Commerce. www.bea.gov/regional/docs/econlist.cfm.

Table 1. State Minimum Wages in the Great Lakes Region

State	2003	2004	2005	2006	2007Q1Q2	2007Q3Q4
Illinois[a]	$5.15	$5.50	$6.50	$6.50	$6.50	$6.50
Indiana[b]	$5.15	$5.15	$5.15	$5.15	$5.15	$5.85
Michigan[b]	$5.15	$5.15	$5.15	$5.15	$6.95	$6.95
Ohio[c]	$5.15	$5.15	$5.15	$5.15	$6.85	$6.85
Wisconsin	$5.15	$5.15	$5.15	$5.70	$6.50	$6.50

Note: [a] – Rates applicable to employers of four or more
[b] – Rates applicable to employers of two or more
[c] – Ohio sets a lower rate for employers with gross annual sales under $150,000 to $500,000 ($3.35 January 1,1991-January1, 2005) and for employers with gross annual sales under$150,000($2.50 January 1,1991- January1, 2005), so we assign $5.15 to minimum wage of Ohio from 2001 to 2006.

Resource: Changes in Basic Minimum Wages in Non-farm Employment under State Law: Selected Years 1968 to 2010, U.S. Department of Labor, Office of State Standards Programs Wage and Hour Division web site Minimum Wage and Overtime Pay Standards Applicable to Nonsupervisory NONFARM Private Sector Employment under State and Federal Laws.

The minimum wage in Indiana increased only in the last two quarters of 2007 when the federal minimum wage was increased to $5.85 per hour. Thus, differences in federal and state legislation define different minimum wage regimes over time within each state and across states within the region at various intervals in the sample period.

IV. Empirical Model

Using county-level quarterly data, we examine the effect of the level of the minimum wage prevailing in each state from 2003 to 2007 (the minimum wage is the higher of the federal or state minimum wage level) on labor outcomes for youth in three age groups – teenagers between the ages of 14 and 18, youth between the ages of 19 and 21, and older youth between the ages of 22 and 24 in the Great Lakes region.

We start with what Dube et al. (2010) refer to as the "canonical model" for panel studies of spatial differences in the minimum wage, which is written as equation (2) below:

$$\begin{aligned} \ln(Y_{ist}) &= \beta_0 + \beta_1 \ln\left(MW_{st}\right) + \\ &+ \beta_2 \ln(EMP_{ist}^{TOT}) + \\ &+ \beta_3 \ln(POP_{ist}^{TOT}) + \phi_i + \tau_t + \varepsilon_{ist}, \end{aligned} \tag{2}$$

where i, s, and t respectively indicate county, state, and quarterly time for all observations. The dependent variables in our paper can be divided into three sets, all of which are measured for three age groups at the point-in-time level: first, the static level of employment and earnings – the natural log of total employment and average monthly earnings; second, employment flows – the natural log of accessions and separations as well as turnover rates, and third, the dynamic job changes – the net job flows rate.

All independent variables have been transformed into natural log form. Ln(MW_{st}) refers to the natural log of the minimum wage, which is the same for all counties within each state in each quarter. To control for aggregate labor market conditions and relative size of the local labor market, two control variables are added – the natural log of total employment of persons between the ages of 14 and 99 years old at the county level [$\ln(EMP_{ist}^{TOT})$] and the natural log of total population at the county level[$\ln(POP_{ist}^{TOT})$]. The model also includes county fixed effects ϕ_i and time effects τ_t common to all of the counties in the sample.

To further address unmeasured spatial heterogeneity in the traditional panel data model, we modify this model by adding the specific time effects, $EA * \tau_t$, for each multi-county Economic Area within the region. Our main focus then

is comparing the estimates of β_1 in regressions in equation (2) with those obtained from the expanded model in equation (3).

$$\ln(Y_{ist}) = \beta_0 + \beta_1 \ln(MW_{st}) + \\ +\beta_2 \ln(EMP_{ist}^{TOT}) + \beta_3 \ln(POP_{ist}^{TOT}) + \\ \phi_i + EA * \tau_t + \varepsilon_{ist}, \quad (3)$$

V. Results

Our main findings about the effects of the minimum wage on the level of employment and earnings for youth in the three age groups are presented in Table 2. Panel A shows the results from the traditional panel data model (Equation (2)) and panel B reports estimates of the model with EA-specific time effects (Equation (3)). Because state minimum wages are the same for all counties within one state, the error term ε_{it} in equation (2) and (3) often does not satisfy the basic assumption $\varepsilon_{it} \sim (0, \sigma_\varepsilon^2)$ in the panel dataset, but instead the idiosyncratic error terms are probably correlated within each state. Therefore, we use clustered standard errors for the estimated coefficients, which allow for an arbitrary pattern of correlation in the error terms across different counties within the same state. All the robust standard errors in brackets in are clustered at the state level for all regressions.

In Column 1 of Table 2, we find that the minimum wage is negatively correlated with the teenage (14-18 years old) employment level. By adding EA-specific time effects, our model shows a bigger negative teenage employment effect with the elasticity of -0.21, compared with that of -0.10 based on the traditional panel model. Thus, our estimation of the teenage employment elasticity falls into the range between -0.1 and -0.3 in the consensus of national CPS studies but in contrast to Dube et al. (2010) and Allegretto et al. (2011), who find that the employment elasticity is indistinguishable from zero, after controlling for spatial heterogeneity.

Column 3 in Table 2 presents the effects of the minimum wage on employment for 19-to-21-year-old young workers. Based on the model with EA-specific time effect, we find that a higher minimum wage is associated with a significantly lower level of employment for 19-21 year old workers. Again the estimated minimum wage elasticity for this group is strengthened considerably in the regression controlling for Economic Area specific time effects. In contrast with the results for those aged 14-18 and 19-21, the results in column 5 reveal a positive correlation between the minimum wage and the employment of 22-24-year-old workers. This result is statistically significant with a positive elasticity of.095 in Panel B. The results in that panel suggest that the minimum wage has the biggest effect on the youngest workers, slightly smaller but still negative effects on employment for 19-21-year-olds, and a positive relationship with employment for the 22-24-year-olds. The minimum wage is positively related to the average monthly earnings of workers in all three age categories, with statistically significant results in Panel B, where we are controlling for spatial heterogeneity.

Table 3 reports the estimates of minimum wage effects on dynamic job changes for all youth in the Great Lakes region, using the panel data model with Economic Area specific time effects. We find that both accessions and separations for all youth are substantially lower in counties with a higher minimum wage level. The negative effect of the minimum wage on accessions and separations is also seen in lower turnover rates in jurisdictions with higher minimum wage levels. This is consistent with the evidence found by Dube et al. (2011) and Portugal and Cardoso (2006) and suggests that, by raising the wage and making jobs more valuable to their holders, the minimum wage lowers quit rates and spurs greater worker effort leading to fewer dismissals (Shapiro and Stiglitz 1984). With a given level of employment and a lower separation rate, we would also expect a lower hiring rate since there would be fewer vacancies to fill. Another possible reason for a negative turnover rate elasticity is that a higher minimum wage shifts the employment distribution away from high-turnover, low-wage firms to low-turnover, high-wage ones (Dube, 2011).

Finally, Column 4 presents the estimated coefficients for the minimum wage in regressions with the net job growth rate as the dependent variable. County job growth rates aggregated across establishments for workers aged 14-18 and

Table 2. Minimum Wage Effects on Employment and Monthly Earning in the Great Lakes Region, All Youth, 2003–2007

Age Group	14–18		19-21		22-24	
	(1) ln(Employment)	(2) ln(Earnings)	(3) ln(Employment)	(4) ln(Earnings)	(5) ln(Employment)	(6) ln(Earnings)
Panel A Panel Model						
ln(Minimum Wage)	-0.102*	0.176**	-0.044**	0.086**	0.001	0.012
	(0.040)	(0.038)	(0.012)	(0.022)	(0.016)	(0.016)
ln(Total Employment)	1.008***	0.128*	1.246***	0.107	1.266***	0.111
	(0.123)	(0.046)	(0.117)	(0.070)	(0.071)	(0.069)
ln(Population)	0.328***	-0.271*	0.083	-0.343***	0.027	-0.326*
	(0.053)	(0.109)	(0.207)	(0.053)	(0.066)	(0.131)
Observations	8,740	8,740	8,740	8,740	8,740	8,740
R-squared	0.681	0.626	0.717	0.479	0.684	0.411
Panel B Panel Model with EA × Time FE						
ln(Minimum Wage)	-0.210***	0.199**	-0.126**	0.218***	0.095***	0.104***
	(0.043)	(0.066)	(0.041)	(0.015)	(0.015)	(0.016)
ln(Total Employment)	0.949***	0.105*	1.219***	0.085	1.233***	0.090
	(0.088)	(0.049)	(0.116)	(0.073)	(0.065)	(0.068)
ln(Population)	0.110	-0.256	0.119	-0.268**	0.021	-0.199*
	(0.061)	(0.152)	(0.194)	(0.074)	0.071()	(0.090)
Observations	8,740	8,740	8,740	8,740	8.740	8,740
R-squared	0.724	0.722	0.752	0.567	0.717	0.506

Notes: All the dependent variables and independent variables are taken in the natural log. Panel A presents results from the traditional panel data model including county fixed effects and time fixed effects. Panel B presents results from the panel data model with BEA-Economic Areas (EA)-specific time effects. Column (1) and (2) present the minimum wage effects on static employment and monthly earnings for teenage worker between the ages of 14 and 18; column (3) and (4) are for the youth aged between 19 and 21; and Column (5) and (6) are for the youth aged between 22 and 24. Average monthly earnings are in nominal dollars. Robust standard errors in parentheses are clustered at the state level for all regressions. *Statistically Significant at the.10 level; ** at the.05 level; *** for the.01 level.

Table 3. Minimum Wage Effects on Job Flows in the Great Lakes Region, All Youth, 2003–2007, Using Panel Model with EA Specific-Time Effects

	(1) ln(Accessions)	(2) ln(Separations)	(3) ln(Turnover rates)	(4) Net Job Flows Rate
Panel A Age 14–18				
ln(Minimum Wage)	-0.507***	-0.558***	-0.301***	-0.018
	(0.090)	(0.093)	(0.038)	(0.055)
Observations	8,736	8,734	8,730	8,740
R-squared	0.791	0.786	0.754	0.694
Panel B Age 19–21				
ln(Minimum Wage)	-0.316***	-0.391**	-0.222***	0.034
	(0.066)	(0.120)	(0.043)	(0.045)
Observations	8,738	8,740	8,738	8,740
R-squared	0.770	0.752	0.695	0.714
Panel C Age 22–24				
ln(Minimum Wage)	-0.261**	-0.262***	-0.363***	0.084***
	(0.059)	(0.047)	(0.039)	(0.015)
Observations	8,737	8,735	8,732	8,740
R-squared	0.640	0.559	0.533	0.422

Notes: All the dependent variables and independent variables are taken in the natural log, except for the dependent variable–net job flows rate. All the regression results are based on the panel data model with BEA-Economic Areas (EA)-specific time effects. Panel A presents the minimum wage effects on job flows for teenage worker between the ages of 14 and 18; Panel B are for the youth aged between 19 and 21; and Panel C are for the youth aged between 22 and 24. There are some missing values for accessions, separations and turnover rates for each group of the youth. Average monthly earnings are in nominal dollars. Robust standard errors in parentheses are clustered at the state level for all regressions. *Statistically significant at the.10 level; ** at the.05 level; *** for the.01 level.

19-21 are not significantly affected by the level of the minimum wage. On the other hand, counties with a higher minimum wage exhibit faster job growth for workers age 22-24 in our sample. This reinforces our conclusion that higher minimum wages improve labor market outcomes for this group of workers in our sample perhaps because of substitution toward older, more experienced workers in areas with higher minimum wages.

VI. Conclusions

As revealed by the wide ranging results reported in the myriad empirical studies of minimum wage results, the impacts of this policy initiative are complex and vary considerably by time, place, and worker group. We find that state level differences in the minimum wage are associated with higher wages, lower employment levels and lower turnover rates for workers aged 14-18 and 19-21 in the five-state Great Lakes region during the period from 2003 to 2007 when the national labor market could well be described as at full employment. In contrast with several recent studies, our estimates of these effects are strengthened when we control for unmeasured spatial heterogeneity by including separate time effects for multi-county Economic Areas in the regressions. The elasticity of employment for these two age groups with respect to the minimum wage falls into the range of -.1 to -.3 – a range that is often found in studies that confirm negative employment effects.

However, when we focus on workers in the age group 22-24 we find that higher minimum wage levels are associated with higher employment levels and faster net job growth as well as higher

wages and reduced turnover. Again, the results are stronger in both the size of the estimated coefficients and the level of statistical significance in the regressions using our control for unmeasured spatial heterogeneity. While positive employment effects are often attributed to monopsony in labor markets, our differing results by age category suggest the possibility of labor-labor substitution, with higher minimum wage levels shifting employment away from the youngest workers toward older, more experienced and, perhaps, reliable workers.

The normative analysis of minimum wage legislation has often pointed to offsetting wage and employment effects from this policy intervention. Like a few studies in the literature, our results also suggest an additional positive impact of minimum wage policy through a statistically significant decrease in labor turnover and, presumably, the associated costs of recruiting, hiring, and training workers to fill vacancies.

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Wpływ polityki płacy minimalnej na zatrudnienie w Stanach Zjednoczonych

W debatach politycznych w USA często powraca argument o rzekomo negatywnym wpływie podwyższenia płacy minimalnej na perspektywy zatrudnienia. Wiele wysiłku włożono w zgromadzenie ilościowych danych szacunkowych dotyczących tego zagadnienia. Uzyskane wyniki należy uznać za niejednoznaczne. Autorzy artykułu analizują dostępną literaturę przedmiotu, a następnie przechodzą do oceny wpływu różnic wysokości płacy minimalnej na poziomie stanowym na zatrudnienie młodzieży na rynkach pracy w regionie Wielkich Jezior. Zaobserwowano związek wyższego poziomu płacy minimalnej z wyższymi zarobkami, niższym zatrudnieniem i spadkiem rotacji pracowników w grupie wiekowej od 14 do 18 lat. W wypadku pracowników w wieku od 19 do 21 lat i od 22 do 24 lat trudniej zaobserwować wyraźny wpływ płacy minimalnej na poziom wynagrodzeń i zatrudnienia.

Słowa kluczowe: płaca minimalna, zatrudnienie młodzieży, rotacja pracowników i stanowisk.