

THE IMPACT OF LOCAL LABOR MARKET CONDITIONS ON MIGRATION: EVIDENCE FROM THE BAKKEN OIL BOOM

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Overview

A central question in labor economics has been the extent to which local economic conditions impact labor migration. This question is of particular importance given that migration is a fundamental outcome of local economic growth and decline, as well as a primary mechanism of regional labor market adjustment. Surprisingly, the existing literature provides relatively few causal estimates of this relationship. In this paper, I exploit exogenous variation in local labor market conditions to estimate the impact of economic growth on net migration. The boom in oil production in the Bakken formation covering parts of Montana, North Dakota, and South Dakota created an unexpected labor demand shock that increased earnings, particularly for oil counties. Using the value of county oil reserves as an instrument for earnings, I estimate a causal relationship between local economic conditions and migration. I find a semi-elasticity of net migration with respect to county earnings of 0.2. My estimates suggest that the oil boom led to a 2.6 percentage point increase in the net migration rate for oil counties in North Dakota, consistent with theoretical models of local labor markets and migration.

Methods

In this paper, I provide new estimates of the effect of local labor market conditions, as measured by earnings, on permanent migration. I exploit exogenous variation in earnings growth over time across counties in Montana, North Dakota, and South Dakota (henceforth known as “the three-state region”) due to a boom in oil production in the Bakken formation of the Williston Basin. From 2000 through 2010, oil production in these states more than quintupled from nearly 50 to 250 million barrels of oil per year. This increase is part of a larger boom in oil and natural gas production in the United States that was made possible by a combination of rising oil prices and advancements in extraction technologies, including horizontal drilling and hydraulic fracturing, colloquially known as fracking. As extractive industries increasingly rely on technological advancements and boom and bust cycles become a common feature of the industry, it is important to understand the impacts of these cycles on local labor markets and labor migration.

A fundamental empirical challenge is that at the local labor-market level, earnings, employment, and migration are jointly determined. To address this, I develop an instrumental variable (IV) estimation strategy that isolates the shocks to labor demand from factors that also directly affect labor supply and migration. I implement this strategy using a county-level panel dataset of administrative earnings and migration data from the Internal Revenue Service (IRS) for 1993 through 2010. To estimate the causal relationship between earnings and net migration, I use the value of county oil reserves as an instrument for earnings. I construct the instrument using oil reserves data and West Texas Intermediate (WTI) crude oil prices from the United States Department of Energy’s Energy Information Administration (EIA). This methodology allows me to exploit natural variation in oil reserves across counties and time series variation in oil prices. In particular, the oil-rich counties in the three-state region experienced an exogenous shock to labor demand and earnings. Much of the oil activity and, by extension, economic activity takes place around the Bakken formation, where there are large amounts of proven reserves.

Results

My instrumental variables estimates suggest a substantial, statistically significant, positive relationship between county-level earnings growth and net migration. I estimate a semi-elasticity of net migration with respect to earnings for North Dakota, which accounted for nearly 70 percent of the oil production in the three-state region since 2000. I find a semi-elasticity of 0.2. This estimate implies that if earnings increase by 10 percent, the net migration rate increases by 2 percentage points. Expanding the analysis to the three-state region, I find a semi-elasticity of migration with respect to county earnings of 0.4. This estimate suggests that if earnings increase by 10 percent, the net migration rate increases by 4 percentage points. Compared to the mean net migration rate of -0.8 percent (i.e. net out-migration), these estimates suggest a large impact of earnings growth on net migration. Although somewhat speculative, the net migration semi-elasticities suggest that the premium to earnings to compensate for the costs of moving to North Dakota is 64 percent.

Conclusions

In this paper, I exploit exogenous variation in local labor market conditions to estimate the impact of economic growth on net migration. The boom in oil production in the Bakken formation covering parts of Montana, North Dakota, and South Dakota created an unexpected labor demand shock that increased earnings, particularly for oil counties. Overall, my estimates suggest a statistically significant, positive impact of earnings growth on net migration rates.

My research contributes to the literature in three ways. First, the use of a natural experiment is a novel approach that provides new causal evidence of the impact of economic booms on county-level internal migration within the United States. Despite an extensive body of research examining migration, we know little about the impact of natural resource booms on migration in impacted localities. Second, my large elasticity estimates are consistent the Blanchard and Katz (1992) finding that migration is an important mechanism of labor market adjustment in the presence of a shock to local economic conditions. The local labor markets literature explains that a positive demand shock, such as an oil boom, should increase wages, employment, and in-migration. Finally, this paper contributes to the growing literature examining impact of natural resources on labor market outcomes (Acemoglu et al., 2013; Aldy, 2014; Allcott and Keniston, 2014; Black et al., 2002; Black et al., 2005; Vachon, 2014).

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