

# Local Labor Markets and Natural Resources: A Synthesis of the Literature

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## Abstract

The relationship between local labor markets and natural resources begins with a greater demand for resources leading to a greater demand for labor. The magnitude of this outward shift in labor demand can be measured through changes in employment and earnings, which are outcomes specific to the labor market, or more generally, through changes in the population and income. These labor market changes may not only happen for those working in the extraction sector, but also for those working in other local industries. In addition, natural resources may alter the distributional outcomes of inequality and poverty, which determine the equity of these effects, as well as alter educational attainment, if people are choosing between schooling and work. In this synthesis of the literature, we organize the existing studies according to their natural resource measurement and the types of outcomes that they estimate. The goals of this study are to act as a guide to the current understanding of the local labor market effects of natural resources and to stimulate further research in order to provide a foundation to generalize these results through the use of meta-analysis in the future.

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## Key Messages

- The literature on the economic consequences of natural resources has proliferated, largely because of the widespread development of unconventional oil and gas resources, combined with a general shift towards studying sub-national variation in resources.
- Distinguishing our review from others, we organize the existing papers by a natural resource typology that we introduce and by five different types of outcomes.
- While the literature largely began with natural resources defined by dependence or endowment, many of the newer studies now use extraction or endowment and extraction.
- All studies included have found positive employment effects during a boom, and all but two studies also found evidence of population growth due to natural resources.
- Many studies find positive income effects in aggregate, per capita, or per household, while fewer studies look specifically at wages or earnings but also find increases.
- Several studies have also documented the spillover effects, finding that each oil and gas sector job creates around one to two jobs in other sectors of the local economy.
- The majority of studies in developed and developing countries show a decline in the poverty rate, but mixed evidence regarding the impact of resources on inequality.
- By increasing the returns to low-skilled labor, an energy boom is likely to increase high school dropout rates, according to the handful of studies relating to education.
- Greater uncertainty surrounds the long-term effects of extraction and whether busts are generally worse for the local economy than the booms are good.
- Our synthesis of the literature hopes to inspire further research and future meta-analyses in each of these studied areas of local labor markets and natural resources. The most promising outcomes for this seem to be the growth in employment and income.

# 1 Executive Summary

Natural resources can affect a locality in many ways. One of the primary ways is through the demand for labor, which can employ more individuals who want to work, attract people from elsewhere, and raise earnings and income. This, in turn, affects people and firms across the local economy, even if they have no direct connection to the natural resource sector, through spillover effects. The demand for labor can also alter the distribution of earnings or the poverty rate, as well as influence decisions about staying in school or what types of education to pursue.

This review describes and synthesizes the recent literature on these local labor market effects of natural resources. The literature on the economic consequences of natural resources has proliferated, largely because of the widespread development of unconventional oil and gas resources in the U.S., Canada, and Australia in the last decade, combined with a general shift by researchers towards studying sub-national variation in resources. Several reviews or review-like papers have emerged, although none have focused exclusively on local labor market effects. Focused on the national level, van der Ploeg (2011) reviews the cross-country literature and provides an overview of the causal channels linking resource abundance to various economic outcomes. And, Fleming and Measham (2013) also develop a conceptual framework for linkages between resources and socio-economic outcomes and, in doing so, review many studies.

In the most recent set, Fleming et al. (2015) review the literature on the effects of unconventional fossil fuel development in particular, looking at effects on employment and income, population and housing values, and human and social capital. More narrowly focusing on shale gas development, Mason et al. (2015) quantify the economic costs and benefits of development and also review much of the literature on unconventional fossil fuel development. Aragon et al. (2015) consider non-renewable resources in general and review the cross-country and within-country literature, looking at an array of socio-economic, environmental, and public finance outcomes. Lastly, van der Ploeg and Poelhekke (2016) offer the

latest literature review on this topic.

Distinguishing the current review from related literature reviews, we synthesize the literature by first introducing a classification based on the aspect of natural resources that each paper examines, by: dependence, such as the share of earnings accounted for by mining; endowments, such as oil reserves; or extraction, such as the number of wells drilled. The literature largely begins with natural resources defined by dependence, which first focused on testing the so-called “resource-curse hypothesis” and then used resource dependence interacted with changes in resource prices to measure the effects of changing labor demand. Resources were then typically defined by endowment, often comparing high and low-endowment localities across periods, with differing incentives to extract the resource. Many of the newer studies instead use extraction, or some combination of endowment and extraction, as the definition in their work, relying on the presence or scale of extraction of the resource.

After introducing the resource typology, we review the evidence in the literature on local labor markets and natural resources by considering the studied effects on aggregate labor outcomes, starting with employment and population, and then looking at earnings and income, purposefully separating the measurement in terms of “bodies” first and then “dollars”. In terms of employment and population, all studies found positive employment effects during a boom, but a lower number of studies also show positive population growth. In terms of earnings and income, many studies find positive income effects, while fewer studies look at earnings. However, those that do look at earnings also find increases.

Following the aggregate labor outcomes, we turn to estimates involving other related outcomes, namely spillovers (from natural resource-based industries to other industries), the distribution of income (inequality and poverty), and education (high school graduation rates). The spillover effects have been documented by several studies, attributing an additional one to two jobs in other sectors of the local economy for each oil and gas sector job created. While it remains unclear what the true impacts of resources on inequality are from the mixed existing evidence, the majority of studies in both developed and developing

countries show a decline in the poverty rate due to an energy boom. An energy boom is also likely to increase high school dropout rates, according to the handful of studies relating to education, as the relative returns to a low skill level are increased.

In conclusion, our synthesis of the literature hopes to inspire further research and future meta-analyses in each of these studied areas of local labor markets and natural resources. If the literature continues to progress at close to its current pace or faster, proper meta-analyses should be able to soon follow for most of the areas outlined. The many studies on aggregate employment and income may provide the material for a proper meta-analysis of the literature to quantify the consensus in the literature. Our resource-measure typology should also aid such an effort by providing a foundation for identifying comparable studies.

Greater uncertainty surrounds the long-term effects of extraction and whether busts are generally worse for the local economy than the booms are good or what happens when the economically attractive resources have been largely exhausted, providing an opportunity for convincing research in this area, especially given the many studies that have documented the economic gains brought about by the expansion of extraction. We also note that estimates of the human capital effects of resources are scarce and inconclusive among our effects categories, even though such effects potentially shale the long-run local effect of natural resources. As such, the various links between natural resources and human capital accumulation are also an area ripe for research.