



Local labor market impacts of energy boom-bust-boom in Western Canada

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ABSTRACT

The impacts of energy price boom and bust are analyzed through the differential growth in employment and earnings between local labor markets with and without energy resources in Western Canada. The estimated differentials attributed to the boom-induced labor demand shocks show significant direct and indirect impacts on the earnings and employment within the energy extraction and other non-energy local sectors respectively. The local job multipliers indicate that job creation within the energy extraction sector leads to modest job creation within the non-energy local sectors during boom periods. For every ten energy extraction jobs created during a boom period, approximately three construction jobs, two retail jobs, and four and a half service jobs are created.

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1. Introduction

Drastic movements in the prices of energy-related goods can generate labor demand shocks to the local labor markets which have these resources readily available for extraction. As the prices of oil, natural gas, or coal increase, positive labor demand shocks may occur within the resource-rich geographical areas, expanding employment opportunities and earnings for the local energy extraction industry. The expansion may also spillover into other local sectors outside of energy, such as construction or services, creating new jobs within those sectors. This described boom period can be followed by a subsequent bust with its negative shock to labor demand, again particularly felt in those local labor markets with resources, lowering employment and earnings not only for those workers in the energy extraction sector but perhaps in other industries as well.

Determining the labor market impacts of each of these types of periods is important in order to understand just how good a boom or how bad a bust can be on a local economy. This measurement is problematic, however, due to the lack of the counter-factual: what would have happen to a resource-rich area had the boom or bust not occurred? This research addresses this issue by measuring the differential impacts experienced by local Western Canadian labor markets which have significant energy resources compared

with similar local markets without such resources, during a period from 1971 to 2006 when two booms and a bust occurred.

While there has been great interest in identifying the local effects of these types of shocks, this remains an understudied area with only a handful of published studies, like that of [Blanchard and Katz \(1992\)](#) and [Black et al. \(2005\)](#). Following the methods used in their work, this study identifies the effects of oil and natural gas shocks on employment and earnings outcomes across the industries which were directly and indirectly impacted. In addition, this study estimates how much of the job creation within the directed impacted industry spills over into further job creation in the indirectly impacted industries, if there are in fact any significant spillovers.

The evidence presented within this study shows that the direct impacts upon the energy extraction industry are large: total employment and earnings are found to have risen dramatically during the 1971–1981 and 1996–2006 boom periods, while no significant changes in its labor outcomes are shown for the 1981–1991 bust. The indirect spillover effects of these booms and bust to non-energy industries are shown to be smaller but significant during each of these shocks. Once the local job multipliers are calculated, it becomes clear that jobs created in the energy extraction sector during the boom periods do indeed spillover into further job creation in the construction, retail trade, and service industries.

In the literature, there are no previous studies that have applied these quasi-experimental techniques using the particular resources of oil and natural gas, nor to the region of Western Canada.

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This is somewhat surprising given the greater reliance of this economy on energy resource production, as well as the relative global importance of the energy resources produced in this region. This is also the first study that was able to generalize the localized impacts of energy price shocks by analyzing over more than one historical boom event within the same region. This paper aims to contribute to the literature by using this unique experiment in its valuable setting in order to better understand the labor market consequences of shocks to the resource sector.

The structure of this paper is as follows. Section 2 provides a brief review of the relevant literature and contains the background on the recent historical price trends in oil and natural gas. Section 3 displays where the resources are contained within Western Canada and discusses the methodology of the study and the data sources. Section 4 presents all of the results of this study, including the differential earnings and employment effects, the differential population effects, and the local job multiplier evidence. Section 5 concludes the paper. The disclaimer, acknowledgments, references, and appendix tables then follow.

2. Background

2.1. Labor demand shocks

The measurement of the effects of local labor demand shocks is an important and elusive area of research. These labor demand shocks can take many forms, but they are often difficult to isolate. Consider first some of the non-energy-related examples. One such example is the impact of a policy such as an enterprise or empowerment zone that is used to stimulate an economically-depressed local economy by offering a favorable tax or subsidy environment to businesses within the area. Some of this research finds that these policies have a positive effect upon employment. O'Keefe (2004) shows evidence that enterprise zones in California have positively stimulated employment in the short-term, growing by about 3% more per year over six years. She uses propensity score matching methods for her measurement and focuses on census-tract and establishment-level data. In another study, Busso and Kline (2007) use rejected applicants to the program as a comparison group and find a 4% increase in local employment for zone recipients.

However, there are also studies that find no employment effect of these policies. A pair of studies, Kolko and Neumark (2010) and Neumark and Kolko (2010), provide examinations of enterprise zones (again in California) using establishment-level data and methods which greatly scrutinize the geographical boundaries of such zones. Their findings suggest that the policy is ineffective at achieving any new job development, but may be more favorable for zones with less of a focus on manufacturing. And Hanson (2009), controlling for endogeneity bias which many other studies ignore, also finds that there is no significant employment effect of these policies.

A second example of a non-energy-related labor demand shock is the introduction of a large plant to a local labor market. Greenstone and Moretti (2004) measure this type of impact by comparing the outcomes of a community that receives a bid to build a large plant relative to the communities that lost the bid. They find a 1.5% increase in the earnings trend within the new plant's industry for the community that ends up winning the bid.

2.2. Energy-specific shocks

More relevant to the current topic are the several papers which focus on labor demand shocks related to spikes in energy prices. These studies use the turbulent movements in the prices of

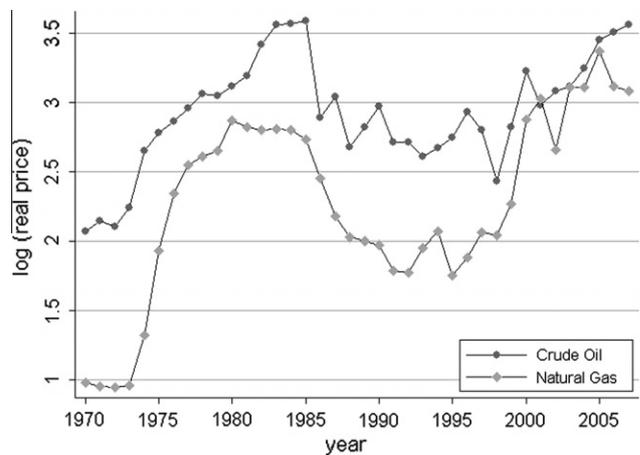


Fig. 1. Log real price trends in crude oil and natural gas, 1970–2007. *Notes:* Author's calculations of 1970–2007 public-use Canadian Association of Petroleum Producers data. The log real price of crude oil is based on the average wellhead price in dollars per cubic meter. The log real price for natural gas is based on the average wellhead/plant gate price in dollars per thousand cubic meters.

energy-related goods, such as crude oil and natural gas, that have occurred over the past forty years. These price changes reflect significant historical events which lead to direct shocks to the world supply and demand of these goods. Fig. 1 displays the logged real price trends of crude oil and natural gas over the 1970–2007 period based on data collected from the Canadian Association of Petroleum Producers. This time period contains one full boom and bust cycle in crude oil and natural gas over the 1970s and 1980s, as well as the boom period of the late 1990s through the mid-2000s.

Throughout the 1950s and 1960s, energy prices were rather constant. During the 1970s, however, world energy prices were significantly impacted by two price shocks. These first arrived in 1973–1974 and again in 1979–1980, reflecting the strategies of the Organization of Petroleum Exporting Countries (OPEC) and overall instability within the Middle East region. Overcapacity in oil production coupled with a sharp drop in demand led to declines in nominal oil prices during the 1980s. Natural gas prices follow a similar boom and bust cycle over this period but reflect even more volatility.¹ The late 1990s and 2000s brought about a second major boom in oil prices due to significantly increased world demand especially driven by developing countries. This boom continued through the end of 2007. Similar to the previous boom and bust, natural gas prices have followed suit with even more volatility. Oil and natural gas prices were fairly correlated during this period of analysis (along with coal) so these can be thought of as reflecting a more general energy price trend.

Blanchard and Katz (1992), building upon the methodology of Topel (1986), used state-variation to examine how regional labor markets respond to various types of labor demand shocks. This study is among the first to combine the topics of local labor markets and natural resources, as one of the particular regional designations they analyze are the “oil and mineral states”. These states are Alaska, Colorado, Louisiana, Montana, New Mexico, North Dakota, Oklahoma, Texas, West Virginia, and Wyoming. The classification of this region is based on oil, gas, and other minerals comprising 2% or more of their total earnings. This group of states seems to clearly respond in total employment to the energy boom of the 1970s and, to a lesser extent, the energy bust of the 1980s.

¹ Helliwell et al. (1989) provide a detailed historical examination of these trends in crude oil and natural gas prices over this particular period through the 1970s and 1980s within a North American context.

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