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Electricity prices and industrial competitiveness: A case study of final assembly automobile manufacturing in the United States and Canada

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ABSTRACT

This paper studies the real and perceived impacts of electricity pricing on competitiveness in the United States and Canada. Financial analysis is combined with interviews to explore whether and how the cost of electricity affects competitiveness in one of North America's most important sectors: automobile manufacturing. The cost of electricity in top automobile manufacturing jurisdictions in Canada and the US is captured over a six year period starting in 2010. At between approximately US $2.00 and $11.00 per vehicle, the paper finds that the per vehicle gap between electricity costs in the most expensive automobile making jurisdiction in North America (Ontario) and all others is quite small. How, then, to explain the preoccupation of industry actors with electricity costs in Ontario? Several reasons are suggested including media coverage, the relatively narrow inventory of issues under local management control and mechanics of the pricing system itself. The paper explains how the pricing system causes manufacturers to make decisions that depart from core mandates (making things) and generates the unintended effect of heightened scrutiny, a combination of factors that has the effect of aggravating tension around electricity pricing and damaging perceived competitiveness.

1. Introduction

In 2016, for the 52nd consecutive year, Canadian assembly plants made more vehicles than Canadians purchased. However, the gap between vehicle production in Canada and sales in Canada has been narrowing, a trend that developed in the early 2000s. It was around that time that production in Mexico, the low cost option in North America (Alvarez-Medina and Carrillo, 2014; Klier and Rubenstein, 2013; Rutherford and Holmes, 2014), started to grow. That combination: the concurrent ascendance of Mexico and stagnant Canadian production, intensified scrutiny of costs among Canadian operations. Those pressures are evident in various manners and described by Mordue and Sweeney (2017) as production wages that have languished below the rate of inflation and the fact that every vehicle assembler in Canada has sought and obtained government incentives, not just for new investments, but as a means by which to offset the costs of model changes that occur at five – seven year intervals. The pressures are also evident in persistent discussion about the effect of electricity on competitiveness.

By 2015, the Ontario Chamber of Commerce (OCC) was warning that one in 20 operations in Ontario were expected to close over the next five years due to increasing electricity prices (Taber, 2015) and that 40% of businesses had delayed or cancelled investment decisions because of it (McKitrick and Adams, 2015). The OCC's President, Allan O'Dette warned: "If real and meaningful action is not taken to mitigate these increases, businesses will leave the province, jobs will be lost, and our economy will suffer" (Ontario Chamber of Commerce, 2015). Fueled by years of steadily increasing media coverage (Fig. 1), by 2016, the cost of electricity had become Ontario's number one issue (Morrow and Cardoso, 2017). In so far as the province's auto sector was concerned, a 2014 report stated: "It was not many years ago that electricity costs were touted as a benefit of doing business in Canada. More recently, however, a combination of factors – not the least of which is revised policy goals – have converged to make Ontario rates higher than competing jurisdictions" (Canadian Automotive Partnership Council, 2014, p. 19). Three years later, the sector continued to register its concern, the President of the Canadian Vehicle Manufacturers' Association, for example, criticized the province's failure to "address a climate of investment uncertainty related to what has been our number one request to the Province of Ontario – the urgent need to address out of control Class A industrial electricity rates" (Canadian Vehicle Manufacturers' Association, 2017). An observer could reasonably conclude that electricity costs had reached dangerous levels; that the province's competitive calculus had evaporated.

This paper considers the issue by way of a case study analysis of the automobile assembly industry in the United States and Canada. It is grounded on conditions in the province of Ontario. Vehicle

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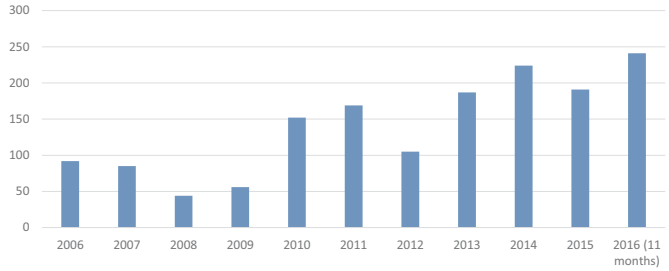

Fig. 1. Electricity cost teference in top Ontario print media.
Source: – Top 10 paid circulation newspapers are Globe and Mail, Toronto Star, National Post, Toronto Sun, Hamilton Spectator, Waterloo Record, Ottawa Citizen, London Free Press, Windsor Star, Ottawa Sun. From 2015 Daily Newspaper Circulation Spreadsheet (Newspaperscanada.ca)(Newspapers Canada, 2015)

manufacturing represents an appropriate focus because its nature is such that comparable data can be constructed: the size of operations tend to be similar, levels of capitalization and automation between factories vary only moderately, and the processes for which electricity is used in final assembly factories are generally the same. As a result, benchmarks can be set and per unit costs can be compared. The ability to assign a per unit electricity cost to the final output, a vehicle, provides a tangible and relatable basis from which to frame broader discussions about electricity pricing and industrial competitiveness. Accordingly, this paper seeks answers to two important questions: 1) what are the gaps in electricity prices across jurisdictions, and 2) How are the gaps interpreted and represented by industrial stakeholders. By answering these questions, a clearer sense will be provided of how energy policy influences decisions in the industrial sector.

The purpose of this paper is not to update previous work recounting how Ontario arrived at its present state with respect to electricity costs. Instead, it considers the impact of electricity prices on present day competitiveness. It complements previous work documenting historical trends (Goulding, 2013; Hampton and Reno, 2003; Stokes, 2013; Rosenbloom and Meadowcroft, 2014). It also builds from work on energy policy levers in Ontario that affect delivery and price (Choi et al., 2011; Jiang et al., 2016; Kosal et al., 2015; Mendonca et al., 2009; Sen, 2017). However, it goes beyond describing the mechanics and financial effect of those policy tools. Most notable in that regard, it captures how those tools are implemented in manufacturing settings.

The paper starts with a brief review of relevant literature, including work describing current and historical electricity policy in Ontario as well research on the effect of the cost of electricity on competitiveness. After that, the methodology is explained, a combination of financial analysis and interviews. From there, a discussion of the findings ensues. The first part captures interjurisdictional cost gaps, describing how costs have evolved in North America's top auto producing locations. Jurisdiction-by-jurisdiction electricity rates are calculated along with per vehicle cost comparisons. After that, an assessment is offered of why and how the cost of electricity has come to assume such profile. It includes an explanation of local management's preoccupation. Finally, a description is provided of the effect of one of Ontario's primary industrial electricity pricing policies and the unintended effects that policy has engendered. The paper concludes with a discussion of policy implications.

2. Literature review

It has been established that Ontario has highly volatile electricity prices, especially when compared to competing jurisdictions including the Pennsylvania-New Jersey-Maryland Interconnection, or PJM (Zareipour et al., 2007, 2011). As explained by Hampton and Reno (2003), Rosenbloom and Meadowcroft (2014) and Stokes (2013) such volatility is the result of significant and longstanding political intervention.

The specific interest of this paper, however, is whether and how these actions are affecting competitiveness in the here and now. As Winfield and Dolter (2014) suggest, the preponderance of that work has emanated from economic modelling exercises. For example, Kwon et al. (2016) deploy such tools to demonstrate the relationship between electricity prices and industrial output in South Korea, recommending that policy makers there exercise caution as they move to increase electricity prices to the OECD average. Moreno et al. (2014) employ similar tools to judge the effect of energy costs, including electricity, on manufacturing competitiveness in Spain.

The last time work directly related to the cost of electricity and its effect on automobile manufacturing was conducted was 1989 when Price and Ross (1989) studied electricity pricing in the North American and European auto industries. They suggested that electricity costs were commonly overlooked because they accounted for a relatively small portion of the total cost of production. This work builds from that by updating the data and presenting it in a very transparent manner: cost per vehicle in a common currency. The cost of electricity is also placed into context through a multi-stage process.

Certainly, much has happened since Price and Ross conducted their work. In Ontario, for example, a series of climate and pollution mitigation-related measures have been implemented as a result of the Green Energy Act of 2009 (Pirnia et al., 2011; Yatchew and Baziliauskas, 2011). McKitrick and Adams (2015) insists that the effect of the Act has been a significant increase in costs and a corresponding impairment of competitiveness. However, others have taken a different view, applying economic modelling methodologies to suggest the financial effects of the introduction of such changes has been less than the rhetoric would indicate (Dewees, 2012; Weis and Partington, 2011). Despite this, the emergence of renewables has become a flashpoint for consumer sensitivity surrounding price and political intervention (Rivard and Yatchew, 2016; Stokes, 2013), conditions also witnessed in Germany (Frondel et al., 2014) and Spain (Alonso et al., 2016). Even so, Winfield (2013) explains that proponents of renewable energy can demonstrate that, by assigning economic value to the subsidies that conventional technologies receive and the externalities they avoid, the overall cost impact of renewable energy initiatives relative to conventional alternatives is marginal.

Bassi et al. (2009) and Oberndorfer et al. (2010) suggest that the effect of any cost increases that do occur can be diminished by passing added charges onto customers. Both acknowledge, however, that doing so is not feasible in every industry. In fact, because the products built in Canada's final assembly auto plants compete with those assembled in other jurisdictions – with different electricity pricing mechanisms – automakers would be unable to manage the effect of rising prices through such a strategy. This is supported by Rivers (2010) who notes that the combination of Canada's openness to trade and its energy intensive economy renders it more vulnerable to an erosion of international competitiveness, particularly if similar action is not taken by other countries.

Two aspects of the pricing mechanism in Ontario are pertinent: the Global Adjustment (GA) and a demand response program called the Industrial Conservation Initiative (ICI). By way of definition, a demand response program encourages “changes in electrical usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time or to incentivize payments designed to induce lower electricity use at times of high wholesale prices or when the system is jeopardized” (Federal Energy Regulatory Commission, 2009 p. 22). In Ontario, the GA is levied on a per kilowatt-hour basis, its purpose being to support the development of generating capacity and conservation programs in Ontario. It typically accounts for more than half of the total cost of electricity for large Class A consumers like auto assembly plants. The ICI, however, allows Class A consumers to reduce GA charges by incenting them to reduce their use of electricity during peak periods. ICI participants are assessed GA charges commensurate with their share of the total use of electricity during the