European Economic Review 111 (2019) 35–52

Contents lists available at ScienceDirect

European Economic Review

journal homepage: www.elsevier.com/locate/euroecorev

Mergers in nonrenewable resource oligopolies and environmental policies☆

Hassan Benchekroun[a,*], Michèle Breton[b], Amrita Ray Chaudhuri[c]

[a] Department of Economics, McGill University and CIREQ, 855 Sherbrooke West, Montreal, QC H3A-2T7, Canada
[b] Department of Decision Sciences, HEC Montréal and GERAD, 3000, Chemin de la Côte-Sainte-Catherine, Montreal, QC H3T 2A, Canada
[c] Department of Economics, The University of Winnipeg and CentER & TILEC, 515 Portage Avenue, Winnipeg, MB R3B 2E9, Canada

ARTICLE INFO

Article history:
Received 2 April 2018
Accepted 31 August 2018
Available online 25 September 2018

Keywords:
Mergers
Horizontal Mergers
Cartels
Nonrenewable Resources
Natural Resources
Environmental Policy
Competition Policy
Antitrust

ABSTRACT

We examine the profitability of horizontal mergers within nonrenewable resource industries, which account for a large proportion of merger activities worldwide. Each firm owns a private stock of the resource and uses open-loop strategies when choosing its extraction path. We analytically show that even a small merger (merger of 2 firms) is always profitable when the resource stock owned by each firm is small enough. In the case where pollution is generated by the industry's activity, we show that an environmental policy that increases the firms' production cost or reduces their selling price can deter a merger. This speeds up the industry's extraction and thereby causes emissions to occur earlier than under a laissez-faire scenario.

© 2018 Elsevier B.V. All rights reserved.

1. Introduction

This paper examines the incentive to merge in nonrenewable resource industries. This sector constitutes a large proportion of GDP in many economies,[1] and also has a long history of mergers and acquisitions (M&A) activity, starting with Standard Oil's acquisitions in the early 1900's. The volume of M&A has been consistently higher in the exhaustible resource sector relative to many others. Moreover, this sector has experienced a spate of mega-mergers, starting in the late 1990s, including the mergers of BP and Amoco (1998, $63 billion); Exxon and Mobil (1999, $74.2 billion); Total Fina and Elf Aquitaine (1999, $54.2 billion); Chevron and Texaco (2001, $45 billion); and Royal Dutch Petroleum and the Shell Group (2004).[2] A first

---

☆ We are grateful to Ying Tung Chan and William Duan for their research assistance, and to Rick van der Ploeg, the editors and three anonymous referees for their insightful comments. We would also like to thank participants at the Tinbergen Institute conference "Combating Climate Change" (April 21–22, 2016). We thank the Canadian Social Sciences and Humanities Research Council (SSHRC) for financial support. Hassan Benchekroun also thanks the Fonds de recherche du Québec – Société et culture (FRQSC) for financial support.

* Corresponding author.
E-mail addresses: hassan.benchekroun@mcgill.ca (H. Benchekroun), Michele.Breton@hec.ca (M. Breton), a.raychaudhuri@uwinnipeg.ca (A.R. Chaudhuri).

[1] For example, exhaustible resource sectors, including oil, gas and minerals and mining, accounted for about 10% of Canadian GDP annually during 2008–2012, according to Statistics Canada.

[2] The global value of M&A in the oil sector rose from $88.99 billion in 1997 (representing about 25% of global income from the oil sector in 1997) to $372 billion in 2007 (representing about 22% of global income from the oil sector in 2007) (see Kumar, 2012, for further details). In Canada, for instance, exhaustible resource extraction industries have seen rising volumes of M&A in recent years. According to the data provided by the Canadian Competition Bureau, during 2012–2013, about 20% of the 330 mergers that were reviewed by the Bureau were in this sector, with 16% of mergers being realized in oil

https://doi.org/10.1016/j.euroecorev.2018.08.008
0014-2921/© 2018 Elsevier B.V. All rights reserved.

research question addressed in this paper is understanding why there is so much M&A activity in the exhaustible resource sector.

There exists a vast literature concerned with various aspects of horizontal mergers. Salant et al. (1983), henceforth referred to as SSR, is arguably one of the most influential papers in that literature. SSR's important contribution is to show that horizontal mergers can be unprofitable, that is, the profits of the merged entity is smaller than the sum of the pre-merger profits of the individual firms that merge. In particular, in the case of a symmetric oligopoly with linear demand and constant marginal production cost where firms compete in quantity, a merger of two firms is never profitable unless it is a merger to form a monopoly. Moreover, the merged entity must be significant enough for the merger to be profitable. The basic intuition driving this result is that, in the case of strategic substitutes such as in Cournot competition, when the merger participants decrease quantity, the non-merging firms respond by increasing their output levels, thereby mitigating the increase in market power of the merger participants. The increase in output of the outsiders more than offsets the benefit the merging firms can get from their reduction of output. SSR's result has proven to be very robust to various modifications of the basic benchmark model (see, e.g., Farrell and Shapiro, 1990; Gaudet and Salant, 1991; Kamien and Zang, 1990; Kamien and Zang, 1991; Kamien and Zang, 1993; Stigler, 1950).

The nonrenewable resource sector requires a specific merger analysis to account for the fact that the output of firms, that is, their cumulative extraction over time, is limited by their stock. In that context, we investigate the profitability of mergers. We find that the result of SSR does not carry over to the case of nonrenewable resource industries: even a small merger (merger of 2 firms) is always profitable when the resource stock owned by each firm is small enough.[3]

We then analyze the impact, on the profitability of a merger, of an environmental policy that raises firms' extraction costs (or reduces the price of the resource). This analysis is motivated by the fact that many important nonrenewable resources' production and/or consumption generate a negative externality (e.g., oil or phosphate). The impact of an environmental tax on the resource has received a lot of attention recently, as a carbon tax on fossil fuels is often viewed as a natural instrument to slow down global warming. An important stream of that literature examines whether a carbon tax may result in the *Green Paradox*, that is, the unintended consequence of speeding up fossil fuel extraction and therefore increasing pollution (see Sinn, 2008, and, e.g., Pittel et al., 2014, and Long, 2015).

Two papers that are closely related to ours are Benchekroun and Gaudet (2003), which examines the impact of an exogenous marginal production restriction in a nonrenewable resource duopoly, and Benchekroun and Gaudet (2015), which considers a renewable, common pool resource. In the case considered in this paper, the production restriction is non-marginal and is determined endogenously in equilibrium, each firm owning a private stock of the non-renewable resource. We find that a tax on extraction may prevent a merger from happening. We show that a merger slows down the industry's extraction rate, and therefore delays emissions. If a higher tax rate deters a merger, it follows that emissions occur earlier under the stricter environmental policy than under a laissez-faire scenario. This result clearly carries a similar flavor to a green paradox. However, the channel of the increase in pollution, i.e., the merger decision of the players, is novel.

In instances where resource owners are countries and not firms, coordination of interests among few resource owners is more likely to take the form of partial cartels rather than mergers. In the symmetric case where firms have identical constant marginal costs, all the results derived in our paper naturally extend to the case of a cartel.

We use a dynamic game model where firms compete in quantity in the output market while each firm faces a resource constraint (the cumulative extraction over time must not exceed its initial endowment of the resource). We use a continuous time framework with an endogenous time horizon. We follow much of the existing literature on oligopoly models of nonrenewable resource markets, and use open-loop strategies where firms choose a time path of extraction at the beginning of the game (see, e.g., Benchekroun et al., 2009; Benchekroun et al., 2010; Gaudet and Long, 1994; Lewis and Schmalensee, 1980; Loury, 1986; Salant, 1976; Salant, 1982).[4,5] We also generalize our results to the case of a marginal cost function that is decreasing in the remaining resource stock.

We proceed as follows. Section 2 presents the model. Section 3 presents the analysis of the profitability of mergers. Section 4 analyzes the impact of a tax on extraction. Section 5 analyses the case where the marginal cost function is decreasing in the resource stock remaining. Section 6 concludes.

---

and gas extraction industries. The highest value merger transactions in Canada in 2012 were realized in the oil and gas extraction industry in the form of cross-border acquisitions, according to Macleans and Blake Canadian Lawyers, including the C$15-billion acquisition of Nexen by China's CNOOC and the C$5.5-billion acquisition of Progress Energy Resources by Malaysia's Petronas.

[3] It is possible to overturn SSR's result if marginal cost is increasing (see, Perry and Porter, 1985). In this paper, we highlight a new mechanism through which this may occur, namely resource constraints.

[4] None of these papers analyze the impact of mergers. Nor do they examine the interplay of an environmental policy on firms' decisions to merge.

[5] We note that the equilibrium derived using open-loop strategies may not be subgame perfect (see, e.g., Groot et al., 1992; Groot et al., 2003; Karp and Newbery, 1991). A set of papers use stationary Markovian strategies, that is, strategies that depend on the vector of stocks. The equilibrium within this class of strategies is by construction subgame perfect, but much more challenging to characterize. In an effort to derive analytical solutions, these papers rely on specific functional forms or assumptions, such as isoelastic demand and zero extraction cost (Benchekroun and Long, 2006; Eswaran and Lewis, 1985; Reinganum and Stokey, 1985), economic abandonment where the resource is not exhausted in full (Salo and Tahvonen, 2001), an exogenously fixed time horizon (Hartwick and Brolley, 2008; Polasky, 1996; Wan and Boyce, 2014). For instance, Wan and Boyce (2014) offers, in a two-period model, a full characterization of the duopolistic equilibrium in the case of Cournot and Stackelberg games.

Download English Version:

https://daneshyari.com/en/article/11011979

Download Persian Version:

https://daneshyari.com/article/11011979

Daneshyari.com