Journal of Business Research 69 (2016) 395–399

Contents lists available at ScienceDirect

Journal of Business Research

Cement in Central America: Global players in a local industry Teaching guide

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ARTICLE INFO

Article history:
Received 1 February 2015
Received in revised form 1 April 2015
Accepted 1 June 2015
Available online 15 September 2015

Keywords:
Cement
Collaborative pricing
Multinationals
Multimarket contact

ABSTRACT

The cement industry provides an ideal setting to explore how contact of firms across markets can reduce rivalry and how this contact might create value added for multinational investment. This note guides the instructor on how to use this case in class. The discussion is organized around three pastures. The first reviews the acquisition of cement assets in Central America by multinationals, analyzes the evolution of capacity and prices, and determines the level of cost asymmetry in each country. The second pasture introduces a simple model that shows how capacity and cost asymmetries affect the viability of cooperative pricing. The third pasture analyzes how contact across the Central American markets by the major multinational cement firms may enhance cooperative pricing and explores how this contact might explain the firms' investment in the region.

1. Introduction

Starting in the 1990s, the major cement firms pick up the pace of their international acquisitions in Eastern Europe, Asia and Latin America. In Central America, Holcim acquires a controlling share in the incumbent of El Salvador and in one of the two producers in Honduras and Panama; Cemex acquires the state-owned firms in Costa Rica, Nicaragua and Panama, and Lafarge acquires the other operator in Honduras. By 2006 Holcim, Cemex and Lafarge hold a stake in every cement producer in Central America.

High R&D intensity and high advertising intensity are important drivers of multinational investment (Caves, 1996), but these drivers are absent in the cement industry. Ghemawat and Thomas (2008) show that big cement firms do not agglomerate randomly, but rather, tend to locate in countries where they meet the same rivals as in other markets. Such collocation adds value because this practice reduces rivalry.

The cement industry has characteristics that make this business a particularly good setting to test the market power motivation behind multinational expansion (Ghemawat & Thomas, 2008). Since cement firms usually enter new markets through acquisition, industry capacity does not increase (Baum & Korn, 1999). In other industries, the aggressive response by the incumbent to capacity expansion confounds the competition softening effect of entry by firms that are familiar through their joint presence in other locations.

Scholars interpret the relation between multimarket contact and a reduction in rivalry in two ways. Jayachandran, Gimeno, and Varadarajan (1999) argue that multimarket contact leads to greater familiarity between firms and to a clearer understanding of the costs of competitive actions, as rivals perceive a "thicker shadow of the future". Bernheim and Whinston (1990) use a game theoretic model to show that multimarket contact enhances collaboration when the positions of competitors in different markets are asymmetric. Intuitively, firms restrain from price cutting in markets where they are strong, because they fear punishment in markets where they are weak.

This teaching case provides a particularly fertile setting to explore the relations between multimarket contact, reduced rivalry and multinational investment. Students of this case can measure differences between players in cost and determine intuitively how these differences make the contact across markets attractive. Students can then calibrate a simple model of competition to characterize how multimarket contact might enhance the incentive for collaborative pricing.

In our simple framework each firm assumes that its rival plays a grim trigger strategy in which the rival punishes any undercutting by an indefinite move to a non-cooperative equilibrium. Each firm finds that maintaining the status quo is convenient if its loss from undercutting current prices is sufficiently large in relation to the gain from doing so. The acquisition of cement plants in Central America by multinational players results in a business landscape with cost and capacity asymmetries conducive to reduced rivalry. This case has the following teaching objectives:

- Explain how cooperative pricing might exist in an industry with low product differentiation, which might otherwise experience intense rivalry;

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http://dx.doi.org/10.1016/j.jbusres.2015.06.044
0148-2963/

- Show that the impact of multimarket contact depends on firms having asymmetric positions in different markets; and
- Explain multinational expansion in an industry which does not have important brands and is not subject to significant advances in technology.

2. Characterize the evolution of the cement industry in Central America

The Novella family establishes the first cement operation in Central America at the beginning of the last century. Local entrepreneurs build cement plants in Nicaragua and Panama in the 1940s, in El Salvador and Honduras in the 1950s, and in Costa Rica in the early 1960s. In the 1970s and early 1980s the governments of Costa Rica, Honduras and Panama establish new plants and Honduras and Nicaragua nationalize private plants.

2.1. How do the multinational players establish their presence in Central America?

Cement multinationals enter Central America at four times. First, in the early 1960s, Holcim partners with local investors to establish the first cement plant in Costa Rica. Second, Cemex starts investing in Central America in 1994 when the company acquires the state-owned cement firm in Panama and starts buying shares of the state-owned Cempasa in Costa Rica. Third, beginning in 1998, Holcim acquires stakes in the private firms of El Salvador, Guatemala and Panama. Lafarge acquires the state-owned firm of Honduras in 1998 and Cemex leases the state-owned plant in Nicaragua in 2001. Fourth, in 2004, Lafarge acquires the Cemar mill, which entered Honduras the year before and, in 2006, Cemex acquires Global Cement, an independent mill in Guatemala.

Cemex controls all its operations in Central America. Holcim, with a presence in each country, does not have control in Guatemala or Honduras.

2.2. How does capacity expand from 1999 to 2006? How do prices evolve?

Fig. TG 1 shows how milling capacity expands 36.7% while kiln capacity increases by only 16.6% from 1999 to 2006. Two factors explain this difference. First, independent mills establish themselves in Honduras and Guatemala. Second, Holcim decides to meet increased demand in Panama in 2001 and 2003 by expanding its mill.

Integrated producers increase their capacity by less. Holcim expands in El Salvador by 20% in 2004, which leads to excess capacity as subsequent growth is disappointing. Holcim expands more aggressively in Costa Rica, increasing capacity by 50% in 2005. That same year, Cemex increases capacity in Panama by 30%.

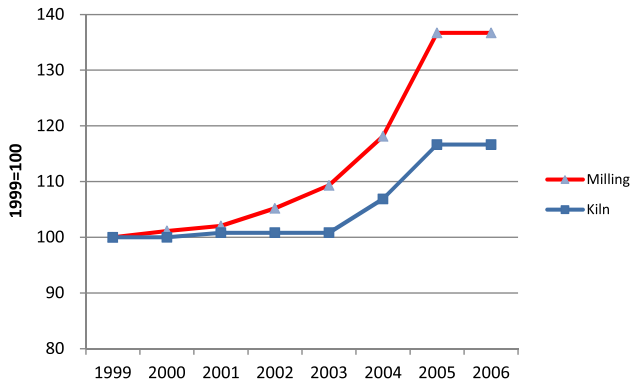

Fig. TG 1. Capacity expansion in Central America (1999–2006).

By 2006, the three multinationals have free standing mills. Cemex and Lafarge acquire the mills installed by two entrants and Holcim operates mills in Nicaragua and Panama.

Table 13 of Raventós and Zolezzi (2015) shows that US dollar prices increase in each of the Central American countries. Table 14 of Raventós and Zolezzi (2015) shows the evolution of cement prices in constant local currency. Nicaragua, Panama and Costa Rica show the largest increase, while El Salvador and Guatemala the smallest. In Honduras, the price war that ensues after Cemex enters the market interrupts the upward trend.

Fig. TG 2, based on Tables 1, 5 and 13 of Raventós and Zolezzi (2015), compares the prices of Holcim and Cemex in Central America with the average world prices for these firms. Prices in Central America are high compared to world prices.

2.3. How asymmetric are costs between competitors in 2006? Why does this matter? Please use λ, the ratio of the contribution of the large firm to the contribution of the small firm, as your measure of cost asymmetry

Integrated plants require large investments which result in high fixed costs. Free standing mills require lower commitments of capital, but have higher variable costs as they use imported clinker which is extremely expensive to transport.

Using the information of Table 3, Tables 6 to 10 and Fig. 2 of Raventós and Zolezzi (2015), students can calculate the variable costs per ton for each firm. For each integrated plant, students can find the capacity in Table 3 of Raventós and Zolezzi (2015), the corresponding thermal energy per metric ton of clinker from Fig. 2 of Raventós and Zolezzi (2015), the average fuel price per MBTU from Tables 6 to 8 of Raventós and Zolezzi (2015), and the electricity cost using the input requirements in the text of the case together with the prices in Table 9 of Raventós and Zolezzi (2015). Since integrated cement plants size their mills to grind the clinker produced by their kilns, their clinker factor should be approximately the ratio of clinker capacity from Table 3 of Raventós and Zolezzi (2015) (converted to tons per annum) to grinding capacity from Table 4 of Raventós and Zolezzi (2015). To find the variable cost per ton of free standing mills, students can take the cost of imported clinker from Table 10 of Raventós and Zolezzi (2015), apply the average country clinker factor, calculate the cost of the electricity to grind the imported clinker using Table 9 of Raventós and Zolezzi (2015), and add the cost of packaging and gypsum. In the analysis that follows, the authors will refer simply to costs, rather than unit variable cost.

For integrated plants the four drivers of cost are integration, scale, energy prices and energy mix. The lowest variable costs of cement occur in Costa Rica and Guatemala, as both countries have large, energy efficient plants. The similarity in unit variable cost between these countries, however, hides very large differences in composition. Guatemala has the highest electricity prices of the region, making grinding very expensive, while Costa Rica has the highest fuel prices, which increase the cost of firing the clinker. The variable cost per metric ton in Honduras and El Salvador follow each other rather closely as both countries have similar fuel efficiency and similar electricity and fuel prices. Nicaragua's small plant still relies on the wet-process with lower fuel efficiency, but benefits from the second lowest coke price in the region. For free standing mills the main driver of cost is the freight to haul imported clinker.

Integrated and free standing mills have very different costs leading to important cost asymmetries in three of the six Central American countries. For reasons explained below, the authors use the relative contribution margin of the two competitors to measure cost asymmetry. Fig. TG 3 shows the ratio of the contribution margin of the large firm relative to the contribution margin of the small firm, a ratio we call λ. Since the price received by both firms is the same, λ exceeds one if the cost of the small firm exceeds the cost of the large firm. λ is therefore a measure