Financial crisis and M&A in vertical markets: Some theoretical considerations*

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Abstract

This paper explores the incentives of a market leader in undertaking merger and acquisition (M&A) of its bankrupt rival firm under financial crisis in an oligopoly model of vertical product differentiation with heterogeneous consumers. I find that, such an M&A only arises if there are cost cutting benefits; else, the market leader would optimally behave like a natural monopoly. I also find that the market leader has a stronger incentive to undertake M&A of its bankrupt rival firm when the market leader is a state-owned enterprise than when it is a private company, and such an M&A always enhances social welfare. These results, which are consistent across Bertrand and Cournot modes of competition, suggest important roles played by antitrust authorities in supporting or facilitating M&A during an economic downturn.

JEL classification: D42, D43, L11, L42

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1 Introduction

Since the global financial crisis (GFC) 2007-2008, the trend on mergers and acquisitions (M&A) in the world has been on the rise. The Institute of Mergers, Acquisitions and Alliances reveals that in the period 2007-2014, the number of M&A announced deals averaged over 40,000 annually, which was higher than the same figure for each and every single year prior to 2007, except for 2006. At the same time, it is a common view shared among many scholars that the GFC has lead many firms to go bankrupt and that small firms who operate at the lower end of the relevant markets, who are often credit-constrained, are those that are most vulnerable to the crisis (Campello et al., 2010). It is expected in this context (of GFC) that M&A deals between market leaders, who operate at the high-end of the relevant markets, and small, bankrupt firms at the low-end of the same market, are an optimal solution when firms’ profitability is the primary concern. This is because in such vertical markets, M&A deals help participating firms
lower their production costs and/or enhance their capabilities and could therefore cope with the crisis in a stronger way than in the absence of such M&A deals.

M&A deals in vertical markets under financial crisis have been witnessed in many countries during the GFC. Below are some typical examples for those M&A deals taken from the airlines industry:

- In October 2014, Virgin Australia Holdings decided that it would buy the rest 40% of Tigerair Australia for A$1, just effectively controlled this heavy loss-making low-cost airline competitor amid ongoing subdued conditions in the leisure market. Virgin expected the deal to turn Tigerair to profitability by 2016.

- In December 2013, US Airways merged with the bankrupt American Airlines, creating the largest airline company in the United States.

- In October 2008, Delta Air Lines purchased its loss-making rival Northwest Airlines for US$2.6 billion. According to Delta Chief Executive, Richard Anderson, the merger would give Delta increased flexibility to face difficult economic environment around the world at that time.


In all of the above cases, the market leader (or the high-quality producer) is the acquirer and the small and bankrupt firm (or the low-quality producer) is the acquired firm. It should be noted that the small and bankrupt firms in these cases did not have many other options other than merging with the market leader, because it was very difficult for outsider firms to either enter the market or takeover the small bankrupt firms given the tough conditions in the market. The market leader in the acquisition, however, has many advantages to pursue such M&A deals. In particular, it can save a significant amount of costs due to lessening competition, pooling knowledge and combining in an efficient way.

\[\text{For more details, see } \url{http://www.smh.com.au/business/aviation/virgin-pays-1-to-take-full-control-of-tigerair-20141017-117g4x.html} \]

\[\text{For more details, see } \url{http://money.cnn.com/2013/02/14/news/companies/us-airways-american-airlines-merger/} \]

\[\text{For more details, see } \url{http://www.reuters.com/article/2008/10/30/us-delta-northwest-idUSTRE49S8BA20081030} \]

\[\text{For instance, in 2011, when American Airlines filed for bankruptcy, its share price was under US$1, but it had since been rising dramatically to reach US$22 in December 2013 on news of its merging with US Airways (see the details at } \url{http://online.wsj.com/articles/SB10001424052702304579404579236260563432596}).\]
effective way the market segments that it and the acquired firm had prior to M&A. This in turn allows the merged firm extract more surpluses from the market. For instance, Delta Air Lines estimated combined US$2 billion in cost savings and revenue enhancements annually by merging with Northwest Airlines in the aforementioned deal.

Given the vertical market nature of many cases of M&A between a market leader and its bankrupt rival firm during financial crisis (or, equivalently, economic downturn), in this paper, I adopt the vertical product differentiation framework to study conditions for such an M&A to occur and examine its welfare implications. More specifically, I investigate the case in which the market in which the acquirer and the acquired firms operate is shrinking in its size. I also consider the role of the government in such an M&A, where I extend the analysis to cover the possibility where the market leader is a state-own company, who is socially responsible in the sense that its objective is not to maximize its absolute profit but social welfare. The results of the paper, therefore, are not only expected to yield practical policy recommendations for antitrust authorities, but also contribute to the growing literature on both privatization in vertical markets and corporate social responsibilities.

Since the seminal contribution by Mussa and Rosen (1978), the vertical product differentiation framework has been well developed and applied to study various economic issues, such as second-hand market (Waldman, 1997), FDI and technology spillovers (Morita Nguyen, 2009; Kováč and Žigić, 2014), export of durable products (Waldman, 1996; Clerides and Hadjiyiannis, 2008), and third-degree price discrimination (Ikeda and Toshimitsu, 2010; Nguyen, 2014). However, to the best of my knowledge, no previous papers have adopted such a framework to examine welfare implications of M&A under financial crisis.

In my model, a high-quality producer and a low-quality producer supply differentiated products and compete for consumers who differ in their taste (or preference) for product quality. The size of the market effectively represents the economic condition in my model; an expansion of the market size captures high GDP growth whereas a reduction in the market size represents tougher economic conditions, which may come as a consequence of a financial crisis such as the recent GFC. The high-and low-quality producers (firms) compete in either a quality-then-price (Bertrand) or a quality-then-quantity (Cournot) fashion. Considering both Bertrand and Cournot competition is an usual practice in the vertical product differentiation.

See also Motta (1993) for a comparison between Bertrand and Cournot competition in a vertical oligopoly and Aoki and Prusa (1996) for a related analysis.
When financial crisis occurs and the market size shrinks, I find that the low quality-producer will eventually go bankrupt, which triggers the possibility of M&A between the two competing firms whereby the market leader purchases the entire bankrupt rival firm, including its fixed investment costs. I find that such an M&A is profitable for the market leader if and only if the post-merger size of the market is not too small; otherwise, behaving like a monopolist is optimal for the market leader to respond to its rival firms bankruptcy. The market leader’s incentive toward M&A becomes stronger when it is a state-owned enterprise (SOE) that aims to maximize social welfare rather than its absolute profit. More importantly, when M&A is profitable for the market leader, coped with cost cutting benefits, it always enhances social welfare, regardless of the modes of competition and whether or not the market leader is an SOE or a private company.

My results complement to the M&A literature under the approach of horizontal product differentiation, starting with the seminal contribution of Farrell and Shapiro (1990). In reality, the focus of practitioners thus far has been on applying theoretical results of the M&A literature under the approach of horizontal product differentiation. Notable evidences include official antitrust law documents issued by the governments of the United States, European Union, and Japan. The guidelines of those antitrust law documents, although having noticed the importance of changes in product quality following M&A, do not specifically instruct quantifying welfare effects of product quality when an M&A occurs, as they mostly consider the pro- and anti-competitive effects of M&A based on the changes in prices and market concentrations only.

My model and results highlight the roles played by cost cutting benefits of M&A, market size, and mixed oligopoly in the context of vertical markets (the first of which is related to Norman et al., 2005). My results also yield important policy implications. In particular, it provides an explanation for why the governments should support M&A between high-quality and low-quality producers in vertical markets. The benefits of such an M&A include cost saving for the society and more product diversification in the sense that consumers can choose from a larger set of product variety than in the absence of the M&A.

The rest of the paper will proceed as follows. Section 2 lays out the structure of the model, followed by its equilibrium characterizations in Section 3 (private oligopoly) and Section 4 (mixed oligopoly). Section 5 discusses the results of my model, and Section 6 concludes.

For some recent contributions of M&A literature under the approach of horizontal product differentiation, see Barcena-Ruiz and Garzon (2003), Artz et al. (2009) and Gelves and Heywood (2013), among others.
2 The model

In this section, I lay out the structure of my model where I extend the framework of Mussa and Rosen (1978) to the case the market is shrinking in its size.

2.1 The supply side

The economy consists of two firms: a producer of a high-quality product (firm 1) and a producer of a low quality product (firm 2). Production requires a fixed investment cost and a variable cost that is increasing in quality. To make it simple, I assume that each firm incurs a common fixed cost $F$ and the variable cost of firm $i$ ($i = 1, 2$) takes for form $q_i^2/2$, where $q_i$ is the quality level of the product it produces. In this way, quality is endogenous in my model. Industries in which inputs are expensive are typically captured by this setup (Motta, 1993). The producing firms have an objective of maximizing their absolute profit, which is simply revenue minus cost. In Section 4, I consider the case in which firm 1 is a state-owned enterprise (SOE) who has an objective of maximizing social welfare rather than its absolute profit.

I consider two different games played by firm 1 and firm 2. The first game is a quality-then-price game in which at stage 1 the firms choose quality levels for their product and at stage 2 they compete in prices (Bertrand competition). The second game is a quality-then-quantity game in which at stage 1 the firms choose quality levels for their product and at stage 2 they compete in quantities (Cournot competition). Although Bertrand and Cournot competitions carry different technicalities, as will be shown in the subsequent sections, my results are consistent across these different modes of competition.

2.2 The demand side

The market consists of a continuum of consumers, where each consumer is indexed by a taste parameter $\theta$, $\theta \in [0, a]$, where $a \in (0, 1)$ captures the size of the market. Each consumer is endowed with a reservation utility equal to zero. In line with the vertical product differentiation literature, I assume that $\theta$ is uniformly distributed with unit

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8Since earlier contributions by Mussa and Rosen (1978) and Shaked and Sutton (1982), the quality-then-price game has become a standard modeling choice in the vertical product differentiation literature.
density. Each consumer purchases zero or one unit of the product. Purchasing the product of quality $q_i$ at the price $p_i$ yields a net utility equal to $\theta q_i - p_i$ for the consumer.

### 2.3 Financial crisis

Parameter $a$ plays an important role in my model; a high value of $a$ implies that the market is large, whereas a low value of $a$ implies that the size of the market is small. Then, financial crisis (economic downturn) is represented by a fall in the value of $a$ in my model. Earlier studies that adopted a similar market size concept include Szymanski and Valletti (2005), Ikeda and Toshimitsu (2010), Nguyen (2014) and Nguyen et al. (2014). However, these earlier studies do not examine financial crisis and/or differentiated oligopoly industries, which is the focus of my paper.

### 3 M&A under private oligopoly

I solve both games (Bertrand and Cournot) by backward induction. I start with the case in which two firms operate in a private oligopoly industry where I characterize conditions under which the low-quality producer goes bankrupt. I then compare the market leader’s profitability when it merges with the bankrupt rival firm and when it behaves like a natural monopoly. Finally, I discuss welfare consequences of M&A between the two firms.

#### 3.1 Bertrand competition

**Private oligopoly**

Let me first consider Bertrand competition between firm 1 and firm 2 when they produce positive outputs. Let $\theta_1$ and $\theta_2$ respectively denote the taste parameter of the marginal consumer who is indifferent between purchasing the low-quality product and the high-quality product, and the marginal consumer who is indifferent between purchasing low-quality product and not purchasing it. We know that $\theta_2 q_2 - p_2 = 0$ and $\theta_1 q_1 - p_1 = \theta_1 q_2 - p_2$ hold. Hence, $\theta_1 = \frac{p_1 - p_2}{q_1 - q_2}$ and $\theta_2 = \frac{p_2}{q_2}$. Firm 1’s and firm 2’s profits are respectively given by:
\[ \pi_1 = d_1(p_1 - \frac{q_1^2}{2}) - F \]  
\[ \pi_2 = d_2(p_2 - \frac{q_2^2}{2}) - F \]

where \( d_1 = (a - \theta_1) \) and \( d_2 = (\theta_1 - \theta_2) \) are the demand for firm 1’s product and firm 2’s product, respectively. Consider stage 2. The first order conditions lead to the following optimal prices:

\[ p_1 = \frac{q_1(4aq_1 - 4aq_2 + 2q_1^2 + q_2^2)}{8q_1 - 2q_2} \]  
\[ p_2 = \frac{q_2(2aq_1 - 2aq_2 + q_1^2 + 2q_1q_2)}{8q_1 - 2q_2} \]

By plugging these optimal prices in (3.1) and (3.2), and solve for stage-1 optimal qualities, I find that the first order condition facing firm 1 and that facing firm 2 are respectively given by:

\[ \frac{q_1(4a - 2q_1 - q^2)(16aq_1^2 - 12aq_1q_2 + 8aq_2^2 - 24q_1^3 + 22q_1^2q_2 - 5q_1q_2^2 - 2q_2^3)}{4(4q_1 - q_2)^3} = 0 \]
\[ \frac{q_1(2a + q_1 - q^2)(8aq_1^2 - 14aq_1q_2 + 4q_1^3 - 19q_1^2q_2 + 17q_1q_2^2 - 2q_2^3)}{4(4q_1 - q_2)^3} = 0 \]

The solutions to (3.5) and (3.6) are given by \( q_1 = 0.8195a \) and \( q_2 = 0.3987a \). These yield firm 1’s and firm 2’s equilibrium profits, \( \pi_1 = 0.0328a^3 - F \) and \( \pi_2 = 0.0243a^3 - F \), respectively. Finally, consumer surplus associated with the consumption of firm 1’s product and firm 2’s product and social welfare are respectively given by:

\[ CS_1 = \int_{\theta_1}^{a} (\theta q_1 - p_1) d\theta \]  
\[ CS_2 = \int_{\theta_2}^{q_1} (\theta q_2 - p_2) d\theta \]  
\[ W = \pi_1 + \pi_2 + CS_1 + CS_2 \]

Their equilibrium values are found to be \( CS_1 = 0.0703a^3 \), \( CS_2 = 0.0237a^3 \) and \( W = 0.1511a^3 - 2F \).

\(^{9}\)Equations of first order conditions at stage 2 in all games in this paper are straightforward and hence skipped to conserve spaces. Second order conditions are also satisfied throughout and thus not reported.
Let $\pi_1$, $\pi_2$, $CS$, and $W$ be functions of $a$ (the market size), the following Lemma provides useful comparative statics concerning $a$ for future reference.

**Lemma 1.** Under Bertrand competition and private oligopoly, $\pi_1(a)$, $\pi_2(a)$, $CS(a)$, and $W(a)$ are all increasing in $a$. There exists a threshold value $\bar{a}_1 > 0$ such that $\pi_1(\bar{a}_1) > 0$ and $\pi_2(a) > (=, <) 0 \iff a > (=, <) \bar{a}_1$.

**Proof.** The proof follows immediately from comparative statics concerning $a$, based on the equilibrium levels of profits, consumer surplus and welfare as computed above. The threshold $\bar{a}_1$ is given by $\pi_2 = 0 \Rightarrow 0.0243a^3 - F = 0 \Rightarrow a = 3.4526F^{1/3} \equiv \bar{a}_1. \square$

Lemma 1 says that when the market is shrinking in size, firm 2, the low-quality producer, might go bankrupt while firm 1, the high-quality producer, is still in profit. When that happens, two possibilities become relevant for firm 1: behaving like a natural monopoly, and offering firm 2 an M&A deal, in which it acquires all production facilities of firm 2 and its debt (fixed cost). In what follows, I examine these two possibilities to determine firm 1’s optimal operation plan (natural monopoly or M&A) when financial crisis occurs and its rival, firm 2, goes bankrupt.

**Natural monopoly**

Given that firm 1 is the only producer in the market, firm 1 chooses the levels of quality (stage 1) and price (stage 2) to maximize its profit:

$$\pi_1 = (a - \frac{P_1}{q_1})(p_1 - \frac{q_1^2}{2}) - F$$

subject to $\pi_2 \leq 0$.

To avoid quality reversal, I assume that the possibility in which firm 2 chooses a higher quality level than what it would choose prior to its bankruptcy does not occur. Soving firm 1’s problem, I find that at stage 2, the optimal price is $p_1 = \frac{a(2a + q_1)}{4}$. Consequently, stage-1 optimal quality is found to be $q_1 = \frac{2a}{3}$. Firm 1’s equilibrium profit, consumer surplus and social welfare are $\pi_1 = \frac{2a^3}{27} - F$, $CS_1 = \frac{a^3}{27}$ and $W = \frac{a^3}{9} - F$, respectively.\textsuperscript{10}

\textsuperscript{10}I find that given firm 1’s behaving as a natural monopoly, firm 2 would choose $q_2 = \frac{a}{9}$ if it wants to enter the market. Then, its profit is $\frac{a^3}{27}$ which is below the pre-crisis level. Thus, firm 2 would stay out of the market.
M&A

If firm 1 acquires firm 2 through an M&A deal, firm 1 (for simplicity I assume that firm 1 controls the entire merged firm) sets both quality levels, $q_1$ and $q_2$, at stage 1 and prices, $p_1$ and $p_2$, at stage 2 of the game to maximize its profit. I assume that there is cost-saving benefit of undertaking M&A, represented by a reduction in marginal costs from $\frac{q_1^2}{2}$ to $k\frac{q_1^2}{2}$ and from $\frac{q_2^2}{2}$ to $k\frac{q_2^2}{2}$ for producing quality $q_1$ and $q_2$, respectively, where $k < 1$. Firm 1’s profit under M&A is then given by:

$$\pi_1 = d_1(p_1 - k\frac{q_1^2}{2}) + d_2(p_2 - k\frac{q_2^2}{2}) - 2F$$

(3.11)

where $d_1 = (a - \theta_1)$ and $d_2 = (\theta_1 - \theta_2)$. At stage 2, first order conditions yield the following optimal prices:

$$p_1 = \frac{kq_1^2 + 2aq_1}{4}$$

(3.12)

$$p_2 = \frac{kq_2^2 + 2aq_2}{4}$$

(3.13)

By plugging these optimal prices in (3.12) and solve for stage-1 optimal qualities, I find that the first order conditions facing firm 1 are given by:

$$\frac{3k^2q_1^2 + 2k^2q_1q_2 - k^2q_2^2 - 8akq_1 + 4a^2}{16} = 0$$

(3.14)

$$\frac{k^2q_1(q_1 - 2q_2)}{16} = 0$$

(3.15)

The solutions to (3.15) and (3.16) are given by $q_1 = \frac{0.8a}{k}$ and $q_2 = \frac{0.4a}{k}$. I find that firm 1’s equilibrium profit, consumer surplus and social welfare are $\pi_1 = \frac{0.08a^3}{k} - 2F$, $CS = \frac{0.04a^3}{k}$ and $W = \frac{0.12a^3}{k} - 2F$, respectively.

By comparing equilibrium levels of firm 1’s profit and social welfare under natural monopoly and M&A, I can now present the first result of the paper.

**Proposition 1.** Under Bertrand competition and private oligopoly, for any given value of $F$ and $a \in (0, \bar{a}_1)$, there exist threshold values $\bar{a}_2 \leq \bar{a}_1$ and $\bar{a}_1 \leq \bar{a}_2$ such that the following hold:

(i) M&A arises as an equilibrium outcome if and only if $\bar{a}_2 \leq a \leq \bar{a}_1$ and natural monopoly arises as an equilibrium outcome otherwise.
(ii) Social welfare under natural monopoly is always higher than that under private oligopoly.

(iii) Social welfare under M&A is higher (lower) than that under private oligopoly if $k < (>) 0.7942$.

(iv) Social welfare under M&A is higher (lower) than that under natural monopoly if $a > (<) \bar{a}_1$.

**Proof.** Firm 1 is more profitable under M&A than natural monopoly if 
\[ \frac{0.08a^3}{k} - 2F \geq \frac{2a^3}{k} - F \iff a \geq \left( \frac{F}{k^2 - \frac{2}{k}} \right)^{1/3} \equiv \bar{a}_{2a}. \]

Note that $\bar{a}_{2a} \leq \bar{a}_1 \iff k \leq 0.8132$. Define $\bar{a}_2 \equiv \bar{a}_{2a}$ if $k < 0.8132$ and $\bar{a}_2 \equiv \bar{a}_1$ otherwise. Then, comparison of social welfare under M&A with that under natural monopoly and private oligopoly yields (ii)-(iv), where $\bar{a}_1 = \min(\left( \frac{F}{k^2 - \frac{2}{k}} \right)^{1/3}, \bar{a}_1)$.

Proposition 1 tells us that when the financial crisis occurs with the market size shrinking, if the post-crisis market size is large enough, M&A will arise as the only equilibrium outcome. Cost saving allows the merged firms to enjoy higher profit margins which might yield a better outcome for it compared to what it would get by behaving like a natural monopoly. The sufficient condition for M&A to arise is that the post-merger market size is not too small so that the merged firm can cover the total fixed costs. If the market is too small, the benefits of merging will be small and natural monopoly is a better choice for firm 1 and thus natural monopoly will arise as the only equilibrium outcome.

Proposition 1 also suggests that if the efficiency of the merged firm, captured by the cost cutting benefits, is large enough, M&A will improve social welfare. This is an important finding of the paper as it uncovers a subtle issue concerning the trade-off between market power and efficiency during financial crisis. See Section 5 for some discussions of this result.

### 3.2 Cournot competition

**Private oligopoly**

Under Cournot competition, firms’ profits are still given by (3.1) and (3.2).
Inverse demands are given by:

\[ p_1 = q_1 a - d_2 q_2 - d_1 q_1 \]  \hfill (3.16)

\[ p_2 = (a - d_1 - d_2) q_2 \]  \hfill (3.17)

Plugging these into (3.1) and (3.2) and solve for stage-2 quantities, first order conditions lead to:

\[ d_1 = \frac{4 a q_1 - 2 a q_2 - 2 q_1^2 + q_2^2}{8 q_1 - 2 q_2} \]  \hfill (3.18)

\[ d_2 = \frac{q_1 (2 a + q_1 - 2 q_2)}{8 q_1 - 2 q_2} \]  \hfill (3.19)

Using these results, I can solve for stage-1’s optimal qualities. First order conditions facing firm 1 and firm 2 are respectively give by:

\[
\frac{(4 a q_1 - 2 a q_2 - 2 q_1^2 + q_2^2)(16 a q_1^2 - 4 a q_1 q_2 + 2 a q_2^2 - 24 q_1^3 + 10 q_1^2 q_2 - 4 q_1 q_2^2 - q_2^3)}{4 (4 q_1 - q_2)^3} = 0
\]  \hfill (3.20)

\[
\frac{q_1^2 (2 a + q_1 - 2 q_2)(8 a q_1 + 2 a q_2 + 4 q_1^2 - 23 q_1 q_2 + 2 q_2^2)}{4 (4 q_1 - q_2)^3} = 0
\]  \hfill (3.21)

The solutions are \( q_1 = 0.7381 a \) and \( q_2 = 0.5856 a \). It then follows that equilibrium profit of firm 1, that of firm 2, consumer surplus associated with the consumption of firm 1 and firm 2 product, and social welfare are respectively given by \( \pi_1 = 0.0353 a^3 - F \), \( \pi_2 = 0.0350 a^3 - F \), \( CS_1 = 0.0489 a^3 \), \( CS_2 = 0.0175 a^3 \) and \( W = 0.1366 a^3 - 2 F \).

**Lemma 2.** Under Cournot competition and private oligopoly, \( \pi_1(a) \), \( \pi_2(a) \), \( CS(a) \), and \( W(a) \) are all increasing in \( a \). There exists a threshold value \( \tilde{a}_3 > 0 \) such that \( \pi_1(\tilde{a}_3) > 0 \) and \( \pi_2(a) > (=, <) 0 \Leftrightarrow a > (=, <) \tilde{a}_3 \). Furthermore, \( \tilde{a}_3 < \tilde{a}_1 \) holds.

**Proof.** The proof follows immediately from comparative statics concerning \( a \), based on the equilibrium levels of profits, consumer surplus and welfare. The threshold \( \tilde{a}_3 \) can be found from the bankruptcy condition, \( \pi_2 = 0 \Rightarrow 0.0350 a^3 - F = 0 \Rightarrow a = 3.0496 F^{1/3} \equiv \tilde{a}_3. \square \)

Lemma 2 states that when firms compete in quantities and the size of the market declines, firm 2, the low-quality producer, might go bankrupt while firm 1, the high-quality producer, is still in profit. This is consistent with Lemma 1, which identifies a similar condition for bankruptcy to occur to the low-quality producer. It should be noted however that, all else being equal, bankruptcy occurs faster under Bertrand competition.
than under Cournot competition in the sense that when the market size, \( a \), falls to be in the range \( a \in (\tilde{a}_1, \tilde{a}_2) \), firm 2 goes bankrupt in Bertrand competition but it would still be in profit under Cournot competition.

When bankruptcy happens to firm 2, again, two possibilities become relevant for firm 1: behaving like a natural monopoly, and undertaking M&A of firm 2. Similar to the case of Bertrand competition, in what follows, I examine these possibilities in turn.

**Natural monopoly**

Under natural monopoly, firm 1 chooses the levels of quality (stage 1) and price (stage 2) to maximize its profit:

\[
\pi_1 = d_1(p_1 - \frac{q_1^2}{2}) - F
\]  

subject to \( \pi_2 \leq 0 \).

Notice that \( p_1 = q_1(a - d_1) \). Assuming that the possibility in which firm 2 chooses a higher quality level than what it would choose prior the bankruptcy does not occur and solving firm 1’s problem, I obtain the stage-2 optimal quantity \( d_1 = \frac{2a - q_1}{4} \) and consequently stage-1 optimal quality \( q_1 = \frac{2a}{3} \), which is the same as was the case of Bertrand competition. Consequently, firm 1’s equilibrium profit, consumer surplus and social welfare are found to be the same as with Bertrand competition, \( \pi_1 = \frac{2a^3}{27} - F \), \( CS_1 = \frac{a^3}{27} \) and \( W = \frac{a^3}{9} - F \). It can be easily verified that firm 2 would not stay in the market in this case.

**M&A**

Under M&A, I will show that the outcomes of the game will be the same as with Bertrand competition. In this case, at stage 1, firm 1 sets both quality levels, \( q_1 \) and \( q_2 \), and at stage 2, it sets the quantities, \( d_1 \) and \( d_2 \). I assume that cost cutting benefits are the same as with Bertrand competition. Then, firm 1’s profit under M&A is given by:

\[
\pi_1 = d_1(p_1 - k\frac{q_1^2}{2}) + d_2(p_2 - k\frac{q_2^2}{2}) - 2F
\]  

where \( p_1 = q_1a - dq_2 - dq_1 \) and \( p_2 = (a - d_1 - d_2)q_2 \). At stage 2, first order conditions yield the following optimal quantities:

\[
d_1 = \frac{2a - kq_1 - kq_2}{4}
\]  

(3.24)
By plugging these quantities in (3.25) and solve for stage-1 optimal qualities, I find that the first order conditions are given by:

\[
\frac{4a^2 - 8kaq_1 + 3k^2q_1^2 + 2k^2q_1q_2 - k^2q_2^2}{16} = 0 \quad (3.26)
\]

\[
\frac{k^2q_1^2 - 2k^2q_1q_2}{16} = 0 \quad (3.27)
\]

The solutions to (3.15) and (3.16) are \( q_1 = \frac{0.8a}{k} \) and \( q_2 = \frac{0.4a}{k} \) which coincide that under Bertrand competition. Hence, \( \pi_1 = \frac{0.08a^3}{k} - 2F \), \( CS = \frac{0.04a^3}{k} \) and \( W = \frac{0.12a^2}{k} - 2F \) in equilibrium. Comparing these values with their counterparts under natural monopoly leads to Proposition 2.

**Proposition 2.** Under Cournot competition and private oligopoly, for any given value of \( F \) and \( a \in (0, \bar{a}_3) \), there exist threshold values \( \bar{a}_4 \leq \bar{a}_3 \) and \( \bar{a}_2 \leq \bar{a}_4 \) such that the following hold:

(i) M&A arises as an equilibrium outcome if and only if \( \bar{a}_4 \leq a \leq \bar{a}_3 \) and natural monopoly arises as an equilibrium outcome otherwise.

(ii) Social welfare under natural monopoly is always higher than that under private oligopoly.

(iii) Social welfare under M&A is higher (lower) than that under private oligopoly if \( k < (>) 0.8785 \).

(iv) Social welfare under M&A is higher (lower) than that under natural monopoly if \( a > (<) \bar{a}_2 \).

**Proof.** Firm 1 is more profitable under M&A than natural monopoly if \( \frac{0.08a^3}{k} - 2F \geq \frac{2a^3}{2F} - F \leftrightarrow a \geq \left( \frac{F}{2a^2} - \frac{2F}{a} \right)^{1/3} \equiv \bar{a}_{2a} \). Note that \( \bar{a}_{2a} \leq \bar{a}_3 \leftrightarrow k \leq 0.7334 \). Define \( \bar{a}_4 \equiv \bar{a}_{2a} \) if \( k < 0.7334 \) and \( \bar{a}_4 \equiv \bar{a}_3 \) otherwise. Then, comparison of social welfare under M&A with that under natural monopoly and private oligopoly yields (ii)-(iv), where \( \bar{a}_2 = \min((\frac{F}{2a^2} - \frac{2F}{a})^{1/3}, \bar{a}_3) \). □

Similar to Proposition 1, Proposition 2 tells us the necessary condition for M&A to arise in the equilibrium is that the post-crisis market size is not too small. However,
a close look at the sufficient condition reveals that the cost cutting benefits must now be larger compared to the case of Bertrand competition (i.e. a lower cut-off level of $k$ is required). This is because the pre-merger condition for firm 2 is better under Cournot competition than under Bertrand competition. In other words, competition is less intense under Cournot competition, inducing monopoly when financial crisis occurs unless the merged firms can save a significant amount of production costs. Furthermore, Proposition 2 also suggests that M&A not only benefits the producing firms but also enhances social welfare. The intuition lies in the cost cutting benefits that the merged firm has over pre-merger separate entities.

Finally, as pointed out by Huschelrath and Muller (2013), we should not rule out the quantity and price effects of M&A even in cases where partner firms do not have ex ante overlaps. Evidence from the U.S. airline industry in the 1995-2011 period, according to these authors, indeed confirms this conjecture where an increase in price and reduction in quantity of service have been observed. In what follow, Corollary 1 provides some theoretical justifications for their result, based on equilibrium outcomes under both Bertrand and Cournot competition.

**Corollary 1.** Under private oligopoly, comparing to pre-merger, M&A reduces quantity of both high-quality and low-quality products but raises the price of these product.

Proof. Straightforward calculation yields price of firm 1 and firm 2 and quantity of firm 1 and firm 2 under Bertrand competition as $p_1 = 0.4533a^2$, $p_2 = 0.1500a^2$, $d_1 = 0.2792a$ and $d_2 = 0.3445a$, respectively. Under Cournot competition they are given by $p_1 = 0.43376a^2$, $p_2 = 0.3145a^2$, $d_1 = 0.2186a$, and $d_2 = 0.2443a$. Their post-merger equilibrium values under either Bertrand or Cournot competition are given by $p_1 = 0.56a^2/k$, $p_2 = 0.24a^2/k$, $d_1 = d_2 = 0.2a$. □

In summary, in this section, I have examined the producing firms’ incentives toward M&A under financial crisis when they compete in either Bertrand or Cournot game. I have found the necessary and sufficient conditions for M&A to occur, and have demonstrated the welfare benefits of M&A in this context. In the next section, I will extend the model to consider the case of mixed oligopolies in which firm 1, the market leader, is a state-owned enterprise (SOE) who targets maximizing social welfare rather than its absolute profit. I will show that as an SOE, firm 1’s incentive toward M&A differ greatly compared to the case it was a private firm. Such differences will also lead to important welfare implications of M&A under financial crisis.
4 M&A under mixed oligopoly

Similar analysis to Section 3 is carried out in this section for the case in which the market leader is an SOE who has an objective of maximizing social welfare. The assumption that the SOE plays the role of a market leader is consistent with reality: in many industries (including the airlines industry), the governments around the world often subsidize (even control) the leading firm which sells the highest quality product in the market. The results of this section helps us see if mixed oligopoly and private oligopoly generate different policy implications regarding M&A under financial crisis.

4.1 Bertrand competition

Mixed oligopoly

At stage 2, SOE and the private firm (or the low-quality producer) choose levels of prices for their product to maximize their objective functions $V_1$ and $\pi_2$ that are respectively given by:

$$V_1 = d_1(p_1 - \frac{q_1^2}{2}) + d_2(p_2 - \frac{q_2^2}{2}) + \int_{\theta_1}^{a} (\theta q_1 - p_1) d\theta + \int_{\theta_2}^{b} (\theta q_2 - p_2) d\theta - 2F$$

(3.28)

$$\pi_2 = d_2(p_2 - \frac{q_2^2}{2}) - F$$

(3.29)

where $d_1 = (a - \theta_1)$ and $d_2 = (\theta_1 - \theta_2)$. The first order conditions lead to the following optimal prices:\[11]

$$p_1 = \frac{q_1(2q_1^2 - q_2^2)}{4q_1 - 2q_2}$$

(3.30)

$$p_2 = \frac{q_2(q_1^2 + q_1 q_2 - q_2^2)}{4q_1 - 2q_2}$$

(3.31)

By plugging these optimal prices in (3.30) and (3.31), and solve for stage-1 optimal qualities, I find that the solutions are $q_1 = 0.7797a$ and $q_2 = 0.5198a$.\[12] Hence,

---

\[11\] Equations of first order conditions at stage 2 in all games in this paper are straightforward and hence skipped to conserve spaces. Second order conditions are also satisfied throughout and thus not reported.

\[12\] The lengthy first order equations are skipped to conserve space, which are available from the author upon the request.
The equilibrium levels of firm 2’s profit and social welfare are \( \pi_2 = 0.0148a^3 - F \) and \( W = 0.1558a^3 - 2F \), respectively. Let \( V \) and \( \pi_2 \) be functions of \( a \), we establish the following Lemma:

**Lemma 3.** Under Bertrand competition and mixed oligopoly, \( V_1(a) \) and \( \pi_2(a) \) are both increasing in \( a \) and there exists a threshold value \( a_5 > 0 \) such that \( V_1(a_5) > 0 \) and \( \pi_2(a) > (\leq, <)0 \iff a > (\leq, <)a_5. \)

**Proof.** The proof follows immediately from comparative statics concerning \( a \), based on the equilibrium levels of firm 2’s profit and social welfare. The threshold \( a_4 \) is given by \( \pi_2 = 0 \Rightarrow 0.0148a^3 - F = 0 \Rightarrow a = 4.0720F^{1/3} \equiv a_5. \)

Lemma 3 identifies conditions in the form of a market size threshold under which firm 2 becomes bankrupt. This threshold is larger than that under private oligopoly due to the fact that pre-merger competition is more intense when the market leader is an SOE than when it is a private firm, since consumer surplus is included in its objective function so that enlarging market share becomes critical for the SOE. Hence, the pre-merger level of profit for firm 2 is greater under private oligopoly than under mixed oligopoly, allowing firm 2 to stay longer in the market under private oligopoly when economic downturn occurs.

### Natural monopoly

Given that firm 1 is the only producer in the market, firm 1 chooses the levels of quality (stage 1) and price (stage 2) to maximize its objective function:

\[
V_1 = d_1(p_1 - \frac{q_1^2}{2}) + \int_{\theta_1}^{a} (\theta q_1 - p_1) d\theta - F
\]

subject to \( \pi_2 \leq 0. \)

Notice that \( d_1 = (a - \theta_1). \) I find that at stage 2, the optimal price is given by \( p_1 = \frac{q_1}{2}. \) Using this result and solve for firm 1’s stage-1 optimal quality, I find that \( q_1 = \frac{2a}{3}, \) which is the same as that under private oligopoly. Therefore, the equilibrium level of social welfare is \( W = \frac{4a^3}{27} - F \)

### M&A

Given firm 1’s behaving as a natural monopoly, firm 2 would choose \( q_2 = \frac{4a}{9} \) if it wants to enter the market. Then, its profit is \( \frac{a^3}{108} \), which is below the profit level prior to bankruptcy. Thus, firm 2 would stay out of the market.
Under M&A, firm 1 acquires firm 2 and targets maximizing social welfare by simultaneously choosing quality levels, \( q_1 \) and \( q_2 \), at stage 1 and price levels, \( p_1 \) and \( p_2 \), at stage 2. Firm 1’s problem is to maximize:

\[
V_1 = d_1(p_1 - k q_2) + d_2(p_2 - k q_2) + \int_{\theta_1}^{a} (\theta q_1 - p_1) d\theta + \int_{\theta_2}^{\theta_1} (\theta q_2 - p_2) d\theta - 2F \tag{3.33}
\]

Stage-2 first order conditions yield optimal prices:

\[
p_1 = \frac{k q_2}{2} \tag{3.34}
\]

\[
p_2 = \frac{k q_2}{2} \tag{3.35}
\]

These prices help us solve stage-1 problem of firm 1. First order conditions facing firm 1 are given by:

\[
\frac{3k^2 q_1^2 + 2k^2 q_1 q_2 - k^2 q_2^2 - 8akq_1 + 4a^2}{16} = 0 \tag{3.36}
\]

\[
\frac{k^2 q_1 (q_1 - 2q_2)}{8} = 0 \tag{3.37}
\]

The solutions to (3.15) and (3.16) are given by \( q_1 = \frac{6a}{k} \) and \( q_2 = \frac{2a}{k} \), which coincide with that under private oligopoly. I also find that equilibrium social welfare is \( W = \frac{4a^3}{2k^2} - 2F \).

**Proposition 3.** Under Bertrand competition and mixed oligopoly, for any given value of \( F \) and \( a \in (0, \bar{a}_5) \), there exists a threshold value \( \bar{a}_6 \leq \bar{a}_5 \) such that the following hold:

(i) M&A arises as an equilibrium outcome if and only if \( \bar{a}_6 \leq a \leq \bar{a}_5 \) and natural monopoly arises as an equilibrium outcome otherwise.

(ii) Social welfare under natural monopoly and M&A are always higher than that under private oligopoly.

(iii) Social welfare under M&A is higher (lower) than that under natural monopoly if \( a > (\leq) \bar{a}_6 \).

**Proof.** The proof follows by comparing social welfare under M&A, natural monopoly, and mixed oligopoly. Specifically, the necessary condition for M&A to arise is that
\[
\frac{4a^3}{25k} - 2F \geq \frac{4a^3}{27} - F \leftrightarrow a \geq (\frac{F}{27a^3 - 2})^{1/3} \equiv \bar{a}_{6a}.
\] Note that \(\bar{a}_{6a} \leq \bar{a}_5 \leftrightarrow k \leq 0.9818\). Define \(\bar{a}_6 \equiv \bar{a}_{6a}\) if \(k < 0.9818\) and \(\bar{a}_6 \equiv \bar{a}_5\) otherwise, we obtain the results. \(\square\)

Proposition 3 tells us that for M&A to arise under financial crisis, the post-crisis market size should not be too small. A close look at the sufficient condition reveals that there must also be cost cutting benefits associated with M&A, otherwise natural monopoly would arise as the equilibrium outcome. Nevertheless, the required cost cutting benefits are much smaller compared to the case of private oligopoly. This implies that the SOE has stronger interest in undertaking M&A of the bankrupt rival firm under financial crisis than the private market leader. Again, the sufficient condition for M&A to arise is that the post-merger market size is not too small so that the merged firm can cover the total fixed costs. Otherwise, natural monopoly is the better choice for the SOE.

### 4.2 Cournot competition

Mixed oligopoly

Let me finally turn to Cournot competition where the market leader (firm 1) is an SOE. The objective functions of the SOE and firm 2 are respectively given by:

\[
V_1 = d_1(p_1 - \frac{q_1^2}{2}) + d_2(p_2 - \frac{q_2^2}{2}) + \int_{\theta_1}^{a} (\theta q_1 - p_1)d\theta + \int_{\theta_2}^{\theta_1} (\theta q_2 - p_2)d\theta - 2F \quad (3.38)
\]

\[
\pi_2 = d_2(p_2 - \frac{q_2^2}{2}) - F \quad (3.39)
\]

where \(p_1\) and \(p_2\) are same as equations (3.17) and (3.18). Solving for stage-2 quantities, first order conditions lead to:

\[
d_1 = \frac{4aq_1 - 2aq_2 - 2q_1^2 + q_2^3}{4q_1 - 2q_2} \quad (3.40)
\]

\[
d_2 = \frac{q_1(q_1 - q_2)}{4q_1 - 2q_2} \quad (3.41)
\]

Using these results, at stage-1, first order conditions facing firm 1 and firm 2 yield optimal quality levels \(q_1 = 0.7314a\) and \(q_2 = 0.4384a\). Equilibrium profit of firm 2 and social welfare are respectively given by \(\pi_2 = 0.0055a^3 - F\) and \(W = 0.1542a^3 - 2F\).
Lemma 4. Under Cournot competition and mixed oligopoly, $V_1(a)$ and $\pi_2(a)$ are both all increasing in $a$ and there exists a threshold value $\bar{a}_7 > 0$ such that $V_1(\bar{a}_7) > 0$ and $\pi_2(a) > (\Rightarrow, <)0 \iff a > (\Rightarrow, <)\bar{a}_7$.

Proof. The proof follows immediately from comparative statics concerning $a$, based on the equilibrium levels of firm 2’s profit and social welfare. The threshold $\bar{a}_7$ is given by

\[ \pi_2 = 0 \Rightarrow 0.0055a^3 - F = 0 \Rightarrow a = 5.6496F^{1/3} \equiv \bar{a}_7. \]

Lemma 4 says that when financial crisis occurs, firm 2 might go bankrupt while the SOE is still producing as it is in profit. Furthermore, given its modest profit, firm 2 goes bankrupt quicker in this case comparing to the case of private oligopoly.

I next examine natural monopoly and M&A as alternative options for firm 1 when bankruptcy happens to firm 2.

Natural monopoly

Under natural monopoly, firm 1 chooses the levels of quality (stage 1) and price (stage 2) to maximize its objective function:

\[ V_1 = d_1(p_1 - \frac{q_1^2}{2}) + \int_{\theta_1}^{\theta} (\theta q_1 - p_1)d\theta - F \]  

subject to $\pi_2 \leq 0$.

Notice that $p_1 = q_1(a - d_1)$. I obtain at stage 2 optimal quantity $d_1 = \frac{2a-a}{2}$, and subsequently at stage 1 optimal quality $q_1 = \frac{2a}{3}$, which is the same as was the case of Bertrand competition and/or private oligopoly. Consequently, the equilibrium level of social welfare is $W = \frac{4a^3}{27} - F$. It can be easily established that firm 2 would not stay in the market in this case.

M&A

If the SOE chooses M&A rather than natural monopoly when firm 2 goes bankrupt, firm 1’s objective function becomes:

\[ V_1 = d_1(p_1 - kq_1^2) + d_2(p_2 - kq_2^2) + \int_{\theta_1}^{\theta} (\theta q_1 - p_1)d\theta + \int_{\theta_2}^{\theta} (\theta q_2 - p_2)d\theta - 2F \]  

where $p_1 = q_1a - d_2q_2 - d_1q_1$ and $p_2 = (a - d_1 - d_2)q_2$. At stage 2, first order conditions yield the following optimal quantities:

\[ d_1 = \frac{2a - kq_1 - kq_2}{2} \]
\[ d_2 = \frac{kq_1}{2} \]  

(3.45)

Using these results and solving for stage-1 optimal qualities, I find that the solutions are \( q_1 = \frac{0.8a}{k} \) and \( q_2 = \frac{0.4a}{k} \), which are the same as with Bertrand competition. Equilibrium level of social welfare is \( W = \frac{4a^3}{25k} - 2F \).

**Proposition 4.** Under Cournot competition and mixed oligopoly, for any given value of \( F \) and \( a \in (0, \bar{a}_7) \), there exists a threshold value \( \bar{a}_8 \leq \bar{a}_7 \) such that the following hold:

(i) M&A arises as an equilibrium outcome if and only if \( \bar{a}_8 \leq a \leq \bar{a}_7 \) and natural monopoly arises as an equilibrium outcome otherwise.

(ii) Social welfare under natural monopoly and M&A are always higher than that under private oligopoly.

(iii) Social welfare under M&A is higher (lower) than that under natural monopoly if \( a > (\leq) \bar{a}_8 \).

**Proof.** The proof follows by comparing social welfare under M&A, natural monopoly, and mixed oligopoly. The necessary condition for M&A to arise is given by \( a \geq \bar{a}_{6a} \) which is captured in the proof of Proposition 3. Note, however, that \( \bar{a}_{6a} \leq \bar{a}_7 \) is always satisfied. Define \( \bar{a}_8 \equiv \bar{a}_{6a} \), we obtain the results. \( \square \)

Proposition 4 tells us that under Cournot competition the only determinant of whether or not M&A arises in equilibrium under mixed oligopoly is the intensity of the financial crisis - or the market size, \( a \). Even if there are no cost cutting benefits, the SOE still has an interest in undertaking M&A provided that the post-merger market size is not too small. This is in sharp contrast to either Bertrand competition under mixed oligopoly and Bertrand/Cournot competition under private oligopoly where cost cutting benefits are the prerequisites for M&A.

Finally, similar to the case of private oligopoly, Corollary 2 provides some resulting findings concerning the price effect and quantity effect of M&A under mixed oligopoly which mostly contrast those under private oligopoly.

**Corollary 2.** Under mixed oligopoly, comparing to pre-merger, M&A increases total quantity in the market. There exists a threshold value \( \hat{k} \) such that if \( k < \hat{k} \), M&A also raises the price of both high-quality product and low-quality product.

**Proof.** With Bertrand competition, pre-merger equilibrium price of firm 1 and firm 2 and
quantity of firm 1 and firm 2 under Bertrand competition are given by $p_1 = 0.3456a^2$, $p_2 = 0.1857a^2$, $d_1 = 0.3503a$ and $d_2 = 0.2924a$, respectively. With Cournot competition, these values are given by $p_1 = 0.2675a^2$, $p_2 = 0.0936a^2$, $d_1 = 0.5766a$ and $d_2 = 0.1315a$. Their post-merger equilibrium values (under either Bertrand or Cournot competition) are given by $p_1 = 8a^2/25k$, $p_2 = 2a^2/25k$, and $d_1 = d_2 = 0.4a$. Letting $\hat{k} = 0.4307$ under Bertrand competition and $\hat{k} = 0.8548$ under Cournot competition leads to the results. □

To sum up, in this section, I have shown that when the market leader is an SOE, it has stronger interest in undertaking M&A of its bankrupt rival firm compared to the case the market leader is a private firm. Although M&A under mixed oligopoly carries different content and requirements compared to M&A under private oligopoly, I have demonstrated the welfare benefit of M&A for the economy. In the next section, I will discuss these findings in relation to the literature on M&A and suggest policy implications for the antitrust authorities in the context of vertical markets with economic downturn.

5 Discussions of the results

The focus thus far of antitrust policy toward merger and acquisition (M&A) has been on the pro- and anti-competitive effects of M&A where prices and market concentrations are the main indicators upon which the authorities decide whether an M&A should be allowed or prohibited (Farrell and Shapiro, 1990; Whinston, 2007). Although both the Competition Bureau’s Merger Enforcement Guidelines in Canada and the U.S. Federal Trade Commission Merger Guidelines recognize the roles played by cost efficiency of merger, the exact welfare impact of cost efficiency especially in vertical market is still an unexplored topic from the theoretical standpoint (Norman et al. 2005). Perhaps this is due to the fact that most M&A studies focus on horizontal models where firms do not deal with heterogeneous consumers. In practice, however, many M&A deals occur in vertical markets between high-quality producers and low-quality producers. Furthermore, M&A that involves state-owned companies has mostly been neglected in the industrial organization literature.

This paper has attempted to touch the base on the above research gaps. The findings of the paper, therefore, generate a number of insightful implications that antitrust authorities should consider in designing policies toward M&A in vertical markets. First, I have proposed financial crisis as the rationale/condition of M&A. This direction is supported by real world evidence, especially the number of firms going bankrupt and the volume of M&A deals in the world post the GFC (see Section 1). The financial
crisis significantly reduces the size of the markets and, in turn, it results in changes in welfare calculations, especially when firms face bankruptcy challenges, less competition due to exit and possibility of collaboration with their rivals to better respond to tougher market conditions. Clearly the incentives towards M&A in a booming market and those in a falling market are very different; the former has more to do with firms profitability, whereas the latter is about loss cutting, and both of these should be incorporated in the antitrust guidelines.

The second important element in my model is the cost cutting benefits of M&A in vertical markets, which although have been identified by the antitrust authorities but not yet been incorporated in an explicit way in welfare calculation in earlier studies, including antitrust guidelines, at least from the theoretical standpoint. My model suggests that the degree of cost efficiency plays a vital role in firms’ strategic choice of production strategies, which in turn impacts on social welfare when firms face with heterogeneous consumers (in their perception for quality). To the best of my knowledge, Norman et al. (2005) is the only paper that has tried to address this issue. However, the authors assume a marginal cost that is independent of quality and consider only the polar case of zero cost when merger occurs whereas in this paper I consider quality-development marginal cost and continuous cost cutting benefits.

Finally, I have introduced mixed oligopoly in the context of M&A where I have shown that the state-owned firm always has a stronger incentive toward M&A of its bankrupt rival firm when financial crisis occurs than a private firm. The benefits of M&A on the society when the market leader is an SOE are obvious in my model, suggesting an important area that could potentially be included in the antitrust guidelines. Barcena-Ruiz and Garzon (2003), Artz et al. (2009) and Gelves and Heywood (2013) have studied mixed oligopoly and M&A; however, their focus was on horizontal product differentiation rather than vertical product differentiation and they also consider homogeneous consumers rather than heterogeneous consumers. My model and results therefore complement these earlier studies.

6 Conclusions

Since the GFC 2007-2008, many firms have gone bankrupt and been acquired by stronger firms. In this paper, I examine the incentives of the market leader in undertaking merger and acquisition (M&A) of its bankrupt rival firm in models of vertical product differentiation with heterogeneous consumers and financial crisis. I have found that the post-merger
market size and the efficiency of merging in the form of cost cutting benefits both play a vital role in determining whether M&A is more profitable than natural monopoly. More importantly, with cost cutting benefits, M&A between the market leader and its bankrupt rival firm is found to improve social welfare, and thus should be supported by the authority. The findings of the paper yield practical antitrust policy implications, as they provide a theoretical argument for why the antitrust authority should support rather than restrict M&A during financial crisis.

References


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