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## The effects of mergers and acquisitions on the information production of financial markets

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### ABSTRACT

This paper shows that mergers and acquisitions (M&As) create opposing effects on the information production of financial markets. A merger between two related firms may generate technological synergy and profitability gains. This results in greater expected trading profits of speculators and incentivizes them to produce private information feeding back into investments. However, when merging firms announce the M&A deal, they typically disclose internal information. This levels the playing field among traders and eliminates speculators' incentive to produce information. The resulting tradeoff determines the equilibrium information production of financial markets.

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### 1. Introduction

Over the past decades, more and more firms have decided to disclose synergy estimates within the announcement of merger and acquisition (M&A) deals. In fact, in the period from 1995 to 2008, the fraction of such firms has increased by 20 percentage points, from 7% to 27% (Dutordoir, Roosenboom, & Vasconcelos, 2014). When a major merger is announced, outsiders aim to interpret the disclosed information in order to estimate the stock's future performance. One of the most cited examples is the merger between Hewlett-Packard (HP) and Compaq. On the day of the announcement, the stock price of HP fell by almost 19%. One possible explanation for this is that the announcement and disclosure of information related to the merger simply provided new information that led investors to sell the stock because of pessimistic expectations. However, there could be another explanation. That is, as investors and security holders obtain free access to such information, the announcement may have caused a reduction in informational asymmetries among traders. Speculators, brokers and market professionals lost their informational advantage over uninformed investors and sold the stock for lack of potential trading profits.

Moreover, in anticipation of a more level playing field, speculators had less incentive to produce costly, private information to trade on.<sup>1</sup>

To the best of my knowledge, this effect has not been studied in the context of M&As. Nonetheless, it is an important field of investigation because the information production of financial markets feeds back into firms and influences real decisions.<sup>2</sup> As empirically shown by Kau, Linck, and Rubin (2008) and Luo (2005), managers of merging firms learn from stock price movements and may cancel M&A deals, when cancelling the deal is easy, when the market provides new and valuable information, or when the market predicts low returns from the deal. This implies that the market responds to M&As. However, up to date, there is no theoretical study analyzing the preliminary stage of the aforementioned feedback effects. That is, the reaction of the market to the deal and its announcement with respect to information production. This paper aims to fill this gap by presenting a model to study the effects of M&As and their announcement on the information production of financial markets.

For this purpose, imagine a situation in which two related firms decide to merge in order to create technological synergy and improve efficiency. Typically, positive synergies emerge when the merging firms are related (Alhenawi & Krishnaswami,

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<sup>1</sup> Gao and Liang (2013), and Han et al. (2014) show that direct disclosure of firm internal information about growth prospects reduces speculators' incentive acquire private information.

<sup>2</sup> There is empirical evidence on the information feedback effect from prices to real decisions (Chen, Goldstein, & Jiang, 2007; Foucault and Fresard, 2014; Ozoguz and Rebello, 2013).

2015) which means that, for example, the firms have overlapping businesses or a certain organizational and strategic fit. Hagedorn and Duysters (2002) show that mergers can improve the technological performance of high-tech companies after the merger, if they fit organizationally and strategically. The neoclassical theory suggests the decision to merge with or acquire another firm may be the result of an industry shock (Mitchell & Mulherin, 1996). Jovanovic and Rousseau (2002) state that mergers have to be seen as a response to the reallocation opportunities that enhance the profitability of the firms. The present model adopts the central prediction of the neoclassical theory by assuming that mergers lead to profitability gains. However, as this paper focuses on the information production of financial markets, I do not endogenize the merging firms' incentives and decisions with respect to the merger or model the industry shock causing the merger.

Within the later announcement of the deal, the firms disclose internal information to the market which they may have learned during the M&A process. As mentioned above, direct disclosure levels the playing field among traders and thus eliminates informational asymmetries. Hence, speculators, who have better information with respect to macroeconomic and market issues relevant for the deal as well as investments, may produce less precise information. Interestingly, this model predicts that there is no clear effect. Instead, the analysis highlights a trade-off between two effects caused by the deal and its announcement. First, when the two firms merge, they generate synergies which enhance net expected cash flows from investment opportunities. This is in accordance with empirical results from the literature. Based on Data from mergers in the U.S. between 1979 and 1984, Healy, Krishna, and Ruback (1992) show that mergers enhance operating cash flow returns from more productive assets in place, especially in the case of highly related firms. Further, the authors point out that the merging firms maintain high levels of both investment and R&D rates.<sup>3</sup> More productive investments enable speculators to generate greater expected trading profits because the traded shares are also more valuable. Consequently, there is an incentive to increase private information production. This effect is labeled the "merger effect" which is new to the literature. Second, the "announcement effect" results from the potential disclosure of internal firm information which preempts speculators' informational advantage. This is consistent with empirical evidence (e.g., Brown & Hillegeist, 2007; Healy, Hutton, & Palepu, 1999; Heflin, Shaw, & Wild, 2005; Leuz & Verrecchia, 2000; Welker, 1995). As a result, there is a more level playing field among traders which reduces the speculator's incentive to acquire private information (e.g., Gao & Liang, 2013; Han, Tang, & Yang, 2014). The tradeoff between these two effects determines equilibrium information production of speculators.

One central assumption of this model is that financial markets are rational. That is, speculators are rational and trade on private information. Moreover, stock prices are the most informative source of information which is an immediate implication of the efficient market hypothesis. In this regard, the present paper is in accordance with Roll's (1986) hypothesis of rationality. However, unlike to Roll (1986), in this paper, managers are also rational and make rational investment decisions based on information learned from stock prices. Given the hypothesis of rationality of financial markets and decision makers, the question then arises to what extend markets and investment decisions are efficient since, in the economic research, efficient markets are regularly viewed as one desirable goal (Fama & Miller, 1972; O'Hara, 1997). In order to help explain this question in the context of M&As and their announcements, the present paper studies efficiency measures, such as market efficiency and real efficiency. One prediction is that the tradeoff affecting the information production of financial markets translates into an ambiguous effect on market efficiency. With regard to real efficiency, the model identifies another and yet similar tradeoff between profitability gains and an effect on the information production that can be both positive and negative. These findings shed an entirely new light on efficiency effects caused by M&As and their announcement.

The remainder of the paper is organized as follows: Section 2 presents the model setup. Section 3 derives equilibrium investments and information production. Furthermore, it analyzes the tradeoff determining equilibrium information production. Section 4 then discusses the effects of M&As on efficiency measures and highlights another tradeoff of the model. Section 5 relaxes the assumption that announcement is mandatory. Section 6 concludes the paper. All proofs are relegated to the Appendix.

## 2. The model

In this Section, I present a model to analyze the effects of M&As on the information production of financial markets. There are four dates. Table 1 illustrates the timeline of events.

<sup>3</sup> There is no consensus regarding the findings in the literature on the effects of M&A on technological synergies and R&D success. In fact, unlike Healy et al. (1992), Ravenscraft and Scherer (1987) do not find profitability gains of conglomerate mergers. However, the present model adopts the idea that M&As generate technological synergies since the focus is on related firms. Hence, this paper can sharpen the understanding of the effects of M&As on financial markets in the case of positive synergies.

**Table 1**  
 Timeline.

Date t=0	t=1	t=2	t=3
A and B commit to M&A agreement	Closing or cancellation of the deal	Observation of stock price	Realization of cash flows
Speculator acquires private information	Firms learn private information	Investment decisions	
	Announcement		
	Secondary market opens		

The economy is divided in two sectors, namely the public sector and the private sector. At date  $t=0$ , the public sector consists of a single peer firm (A) which is publicly traded. Firm A represents an existing incumbent firm. The private sector consists of two non-traded firms (B and C) which are born at date  $t=0$  and which can be viewed as new market entrants. In the first stage, the three firms have no private information to enhance research and development. Additionally, they share the same stochastic source of uncertainty  $\theta$  which is either high ( $H$ ) or low ( $L$ ) with equal probability. For simplification, I assume  $H > 0$  and  $L = 0$ . Each firm consists of an investment opportunity  $G_i$ . Hence, firm value of firm  $i \in \{A, B, C\}$  is given by:

$$G_i = g_i \theta I_i - \frac{1}{2} I_i^2 \quad (1)$$

$I_i$  is the volume of investment.  $g_i > 0$  measures the profitability of investment. The net cash flow from the investment at date  $t=3$  determines firm  $i$ 's expected value at date  $t=0$ . Furthermore, at date  $t=0$ , there is a risk-neutral speculator who acquires a private signal  $y \in \{H, L\}$  about the stochastic technology with  $Pr(y = H | \theta = H) = Pr(y = L | \theta = L) = \frac{\gamma+1}{2}$  and  $\gamma \in [0, 1]$ .  $\gamma$  measures the speculator's quality of private information and will be determined endogenously. If  $\gamma = 1$ , the speculator learns  $\theta$  perfectly. If  $\gamma = 0$ , he learns nothing about  $\theta$ . Expending resources on private information quality is costly for the speculator. The cost function is increasing and convex and given by:

$$C(\gamma) = \frac{c}{2} \gamma^2.$$

Now, consider the following scenario. The peer and one of the two private firms (firm B) agree to merge at date  $t=0$  in order to generate technological synergy because they assume to learn private information later. Think of a high-tech economy with a high level of technological uncertainty. For example, the three firms all produce electric motors or batteries. It is reasonable to presume that firms within such industry may not yet have private information when they make early M&A decisions to create competitive advantages. Consequently, learning during the M&A process may happen. Moreover, none of the firms may assume to learn perfect information about the future technological shock. Thus, in order to improve success in research and development and to gain competitive advantage, there is an incentive to generate learning synergies by merging with another firm. As a result, the two firms A and B combine knowledge and improve internal information production. However, they do not yet announce their plans at date  $t=0$  because the deal will be closed later at date  $t=1$ . The probability of closing is exogenously given by  $\pi$ . Thus, with probability  $\pi$  the deal will be closed and announced at date  $t=1$  and with probability  $1 - \pi$  the deal will be cancelled.<sup>4</sup>

<sup>4</sup> One can regard  $\pi$  as either the probability that non-influencable circumstances will lead to the conclusion of the agreement, or as the probability that the deal will be approved by the regulator (e.g., the Department of Justice and Federal Trade

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