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Working Paper

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IFN Working Paper, No. 1199

Provided in Cooperation with:
Research Institute of Industrial Economics (IFN), Stockholm

Suggested Citation: Norbäck, Pehr-Johan; Persson, Lars; Tåg, Joacim (2018) : Threatening to buy: Private equity buyouts and antitrust policy, IFN Working Paper, No. 1199, Research Institute of Industrial Economics (IFN), Stockholm

This Version is available at:
https://hdl.handle.net/10419/183428

IFN Working Paper No. 1199, 2018

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Threatening to Buy: Private Equity Buyouts and Antitrust Policy*

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January 2018

ABSTRACT

Private equity firms (PE firms) have become common owners of established firms in concentrated markets. We show that the threat of a PE acquisition can trigger incumbent mergers in an otherwise merger-stable industry. This can help antitrust authorities maximize consumer surplus because previously privately unprofitable—but consumer surplus-enhancing—mergers now take place. We thus predict that merger waves among incumbents should follow the development of a local PE industry.

Keywords: Antitrust policy, M&As, Private equity, Temporary ownership.

JEL Codes: G32, G34, L13, L22, L40.

*Financial support from the Marianne and Marcus Wallenberg Foundation and the Jan Wallander and Tom Hedelius Foundation is gratefully acknowledged. We thank Kevin Amess, Ulf Axelson, Florian Ederer, Ioannis Floros, Richard Gilbert, Denis Gromb, Björn Hansson, Michael Katz, Evgeny Lyandres, Ludovic Phalippou, Gordon Phillips, Ramana Sonti, Yossi Spiegel and seminar participants at various places for excellent comments. Declarations of interest: none. Corresponding Author: Lars Persson (lars.persson@ifn.se), Box 55665, SE-102 15 Stockholm, Sweden, +46-(0)8-665 45 00. This paper replaces our working paper entitled "Buying to Sell: Private Equity Buyouts and Industrial Restructuring."

1 Introduction

Private equity firms earn money by buying and reselling established firms. McKinsey & Company (2017) reports that private equity as an asset class has total assets under management exceeding $2.45 trillion of which buyout funds account for 59.8%. The funds they raise run for a limited time, so they must resell the firms they buy. Thus, they are temporary owners of corporate assets. The focus is on buying established firms in concentrated markets. Their activities, therefore, influence rival firms and consumers and antitrust authorities sometimes get involved. For example, in October 2011 a federal judge in the US blocked H&R Block from acquiring 2nd Story Software owned by the private equity firm TA Associates. The Justice Department argued that the merger would harm competition in the market for digital tax preparation services dominated by three players (H&R Block, 2nd Story Software, and Intuit).[1]

We show how the presence of PE firms can, in fact, aid antitrust authorities in maximizing consumer surplus. An active private equity market can thus be pro-competitive. The intuition is that the threat of a PE acquisition can *trigger mergers* in a merger-stable industry. As pointed out by Salant, Switzer, and Reynolds (1983), consumer surplus enhancing or welfare enhancing mergers in an oligopoly may not be privately profitable. This presents antitrust authorities with a problem since they cannot force firms to merge. We show that introducing PE firms as bidders in acquisition auctions changes the bidding behavior of incumbents because they now have incentives to outbid PE firms to prevent overinvestment in the industry. Thus, the mere threat of a PE acquisition acts as a trigger for previously privately unprofitable mergers. If an antitrust authority can prevent mergers that reduce consumer surplus, all mergers triggered by an active PE market are beneficial for consumers.

Our paper contributes by introducing PE firms to the industrial organization literature on antitrust policy and mergers. The traditional literature on exogenous mergers has focused on how mergers affect prices, profits, and welfare but it has ignored the effects of owner asymmetries and pre/post merger investments.[2] Recently, a literature on endogenous mergers has emerged in which the central question is who merges with whom. A part of this literature has studied pre-merger investments and auctions with externalities.[3] Closest in spirit to our paper is Norbäck and Persson (2009), who develop an auction-investment-auction model with overinvestment aimed at studying how venture capital firms help entrepreneurs develop an innovation for a market. This paper extends Norbäck and Persson (2009) by discussing antitrust policy in the presence of temporary owners. Baziki, Norbäck, Persson, and Tåg (2017) study bidding competition between incumbents and PE firms, but they do not incorporate product market competition or antitrust policy. Finally, our paper relates to the literature on corporate finance, industrial organization, and mergers.[4] This literature has not studied the effects of temporary ownership by PE firms in an oligopoly.

2 The Model

Consider an oligopoly industry served by n symmetric incumbents, $\{1, 2, .., i, .., n\}$, and a target firm T (an incumbent up for sale). The target is in need of restructuring, but cannot undertake the restructuring process by itself because of lack of cash or knowledge. There is also a set of m symmetric PE firms that can bid for the target in competition with the incumbents, $\{1, 2, .., p, .., m\}$.

In stage one, an acquisition of the target by incumbent i or PE firm p potentially occurs. The acquisition is subject to review by antitrust authorities. In stage two, if the acquisition happened, the new owner determines the amount of restructuring $r(l)$ to undertake. In stage three, if the target was bought by a PE firm, the PE firm lets the n incumbents bid for the restructured target and sells it to the highest bidders. Trade sales of this kind are frequent; they occur in about 40% of all exits by PE firms (Kaplan and Strömberg, 2009). In stage four, product market competition takes place. We solve the game through backwards induction.

[1] For more, see the New York Times Dealbook story at http://dealbook.nytimes.com/2011/11/01/judge-scuttles-hr-block-deal/.

[2] See, for example, Perry and Porter (1985), Deneckere and Davidson (1985), and Farrell and Shapiro (1990).

[3] See, for instance, Fridolfsson and Stennek (2005) or Norbäck and Persson (2012).

[4] See Maksimovic and Phillips (2002) on how productivity changes or cost of capital changes can trigger mergers, Banal-Estanol and Ottaviani (2006) on mergers with product market risk, or Chod and Lyandres (2015) on strategic IPOs.

2.1 Stage 4: Product Market Interaction

Ex-ante, the firms are symmetric. So we can distinguish between the target ($h = T$), the acquiring firm ($h = A$) and the non-acquiring firms ($h = \{NA, NT\}$). If the target got acquired in stage one, there is one acquiring firm (A) and $n-1$ non-acquiring firms (NA) that compete. If the target was not acquired, n non-target firms (NT) and the target (T) compete in the market. A firm of type $h = \{A, NA, T, NT\}$ chooses an action $x_h \in R^+$ to maximize the direct product market profit $\Pi_h(x_h, \mathbf{x}_{-h}, r)$. The profit depends on its actions x_h, its rivals' actions $\mathbf{x}_{-h}$, how much the target was restructured (r), and firm type (h).

We assume that a unique Nash-Equilibrium in actions, $\mathbf{x}^*(r)$, exists and that it is defined from the first-order conditions

$$\begin{aligned} \frac{\partial \Pi_A}{\partial x_A}(x_A^*(r), \mathbf{x}_{-A}^*(r), r) &= 0, \quad \frac{\partial \Pi_{NA}}{\partial x_{NA}}(x_{NA}^*(r), \mathbf{x}_{-NA}^*(r), r) = 0, \\ \frac{\partial \Pi_T}{\partial x_T}(x_T^*(0), \mathbf{x}_{-T}^*(0), 0) &= 0, \text{ and } \frac{\partial \Pi_{NT}}{\partial x_{NT}}(x_{NT}^*(0), \mathbf{x}_{-NT}^*(0), 0) = 0. \end{aligned} \tag{1}$$

We can then define the reduced-form product market profits as direct functions of the level of restructuring r: $R_A(r) \equiv \Pi_A(x_A^*(r), \mathbf{x}_{-A}^*(r), r)$, $R_{NA}(r) \equiv \Pi_{NA}(x_{NA}^*(r), \mathbf{x}_{-NA}^*(r), r)$, $R_T(0) \equiv \Pi_T(x_T^*(0), \mathbf{x}_{-T}^*(0), 0)$ and $R_{NT}(0) \equiv \Pi_{NT}(x_{NT}^*(0), \mathbf{x}_{-NT}^*(0), 0)$.

We assume that restructuring increases the profits of the acquirer, but reduces the profits for non-acquiring incumbents as they must compete with a more competitive rival.

Assumption 1. *$\frac{dR_A(r)}{dr} > 0$ and $\frac{dR_{NA}(r)}{dr} < 0$.*

Assumption 1 is compatible with several oligopoly models, and it also fits well with descriptions of the activities of PE firms. Research suggests that PE firms are oriented towards operational improvements, cost cutting, and helping capital-starved firms grow.[5] These activities likely increase profits in the target while also making the target more competitive.

We will also suppose, which is consistent with several oligopoly models, that consumer surplus, $CS(r)$, is increasing in restructuring ($dCS/dr > 0$) and in the number of firms in the market: $CS_A(0) < CS_T(0)$, where subscript A denotes that the target was acquired and T that it remained on the market.

2.2 Stage 3: The Exit Auction

If the PE firm acquired the target in stage one, it now needs to resell it. We model the exit as a first price perfect information auction with externalities and solve it for the Nash equilibrium in pure undominated strategies. The n incumbents simultaneously post bids, which are accepted or rejected by the PE firm. Each incumbent announces a bid b_i, with $\mathbf{b} = (b_1, ..., b_i, ...b_n) \in R^n$. The incumbent with the highest bid gets to buy the target.

An incumbent's maximum willingness to pay for the target is

$$\omega_{ii} = R_A(r) - R_{NA}(r). \tag{2}$$

The first term shows the profit for the incumbent if it obtains the target. The second term shows the profit of the same incumbent if it does not obtain the target and is forced to compete with a rival that obtained the target.

The following Lemma details the trade sale price:

Lemma 1. *The equilibrium trade sale price is $S^3(r) = \omega_{ii} = R_A(r) - R_{NA}(r)$.*

Intuitively, the incumbents are ex-ante symmetric so they will all post the same bid equal to their maximum valuation ω_{ii}.[6]

[5] See, for instance, Kaplan and Strömberg (2009) and Olsson and Tåg (2017).

[6] Norbäck and Persson (2009) provide a formal proof.

2.3 Stage 2: Restructuring

Restructuring takes place at variable cost $C(r)$ with $dC/dr > 0$ and $d^2C/dr^2 > 0$. There is also a fixed restructuring cost of F. We obtain the following Lemma

Lemma 2. *PE firms do more restructuring than incumbents ($r_S^* > r_A^* > 0$).*

To see this result, which echoes a proposition in Norbäck and Persson (2009), suppose first that an incumbent obtained the target in stage one. The incumbent will maximize net profits by choosing restructuring r optimally: $r_A^* = \arg\max_r [R_A(r) - C(r) - F]$ with the associated first-order condition

$$\frac{dR_A}{dr} = \frac{dC}{dr}. \tag{3}$$

Suppose now that a PE firm obtained the target in stage one. The PE firm will maximize the equilibrium trade sale price by choosing restructuring r_S optimally: $r_S^* = \arg\max_r [S^3 - C(r) - F]$ with $S^3 = R_A(r) - R_{NA}(r)$. The associated first-order condition is

$$\frac{dS^3}{dr} = \frac{dR_A}{dr} - \frac{dR_{NA}}{dr} = \frac{dC}{dr}. \tag{4}$$

Compare the first order conditions in equations (3) and (4). Both types of firms have the same marginal cost ($\frac{dC}{dr}$). However, the marginal revenue is not the same. An incumbent accounts for how restructuring affects product market profits ($dR_A/dr > 0$), while a PE firm accounts for how restructuring affects the trade sale price. The trade sale price increases in restructuring both because product market profits increase ($dR_A/dr > 0$), and because product market profits of non-acquiring incumbents decrease ($dR_{NA}/dr) < 0$).

2.4 Stage 1: The Acquisition Auction and Merger Policy

The acquisition auction in stage one is a first price perfect information auction with externalities. We solve for Nash equilibria in pure undominated strategies. The n incumbents and the m PE firms simultaneously post bids, which are accepted or rejected by the target. Each incumbent and PE firm announces a bid b_j, contained in the vector $\mathbf{b} = (b_1, ..., b_i, ...b_{n+m}) \in R^{n+m}$. The highest bidder gets to buy the target if the bid exceeds the valuation (reservation price) of the target.

The valuations are as follows:

- v_s is the valuation of obtaining the target for a PE firm:

$$v_p = \underbrace{R_A(r_S^*) - R_{NA}(r_S^*)}_{\text{Trade sale price } S^{3*}(r_S^*)} - C(r_S^*) - F. \tag{5}$$

- v_{ii} is an incumbent's valuation of obtaining the target if another incumbent would otherwise have obtained it:

$$v_{ii} = \underbrace{R_A(r_A^*) - C(r_A^*) - F}_{\text{Acquire and restructure.}} - \underbrace{R_{NA}(r_A^*)}_{\text{Compete with rival that bought the target.}}. \tag{6}$$

- v_{ip} is an incumbent's valuation of obtaining the target if a PE firm would otherwise have obtained it, restructured it, and sold it back to the industry:

$$v_{ip} = \underbrace{R_A(r_A^*) - C(r_A^*) - F}_{\text{Acquire and restructure.}} - \underbrace{R_{NA}(r_S^*)}_{\text{Compete with rival that bought the target from the PE firm.}}. \tag{7}$$

- v_{it} is an incumbent's valuation of obtaining the target if the target otherwise remains in the market and is not restructured:

$$v_{it} = \underbrace{R_A(r_A^*) - C(r_A^*) - F}_{\text{Acquire and restructure.}} - \underbrace{R_{NT}(0)}_{\text{Compete in market with target firm present.}}. \tag{8}$$

- v_t is the target's reservation price:

$$v_t = R_T(0) \tag{9}$$

The antitrust authority can interfere in the auction by blocking winning bids that reduce consumer surplus. Following Motta and Vasconcelos (2005) and Fumagalli, Motta, and Persson (2009), suppose that the antitrust authority is forward-looking such that it considers whether other mergers could occur if a merger is blocked or allowed and that it accounts for the implications of such alternative mergers on consumer surplus. Formally, the antitrust authority then allows a merger if and only if $CS_A(r) > CS_T(0)$, where $r = \{r_A^*, r_S^*\}$.

We can state the following proposition:

Proposition 1. *The emergence of an active PE market can increase consumer welfare by triggering otherwise unprofitable but consumer surplus-enhancing mergers.*

Note first that $v_{ip} > v_{ii}$ and that $v_p > v_{ii}$. The first inequality follows from Assumption 1 and Lemma 2. The second inequality follows from the fact that $r_S^* = \arg\max_r [R_A(r) - C(r) - F - R_{NA}(r)]$. Then note that the target will never sell its assets for a lower price than v_t, which is the reservation price of the target. To illustrate our main mechanism we assume that no merger would occur absent a PE market, i.e. $v_t > \max(v_{ii}, v_{it})$.

Bidding competition between symmetric PE firms implies that PE firms always bid v_p. The acquisition game can the be solved, following Norbäck and Persson (2009), such that the equilibrium owner is

$$l^* = \begin{cases} p & \text{if } v_p > \max\{v_{ip}, v_t\} \\ i & \text{if } v_{ip} > \max\{v_p, v_t\} \\ t & \text{if } v_t > v_p \end{cases}. \tag{10}$$

Suppose now that there is initially no PE market. PE firms cannot then outbid the target: $v_t > v_p$. An acquisition by an incumbent of the target is the only possible merger and it will be allowed by the antitrust authority if $CS_A(r_A^*) > CS_T(0)$.

The merger will not, however, take place if the initial market structure is merger stable: if $v_t > \max(v_{ii}, v_{it})$. While the antitrust authority can block consumer welfare reducing mergers, it cannot force firms to merge when the merger is beneficial for consumers but is not privately profitable (as pointed out by Salant et al. (1983)).

PE firms alleviates this problem by threatening to buy the target. To see this, suppose that an active PE market develops such that PE firms will then bid higher than the reservation price of the target ($v_p > v_t$ is possible). Incumbents will anticipate that PE firms will induce more restructuring in stage two to drive up trade-sale prices in stage three. An incumbent then has an incentive to preempt the PE firm from acquiring the target since $v_{ip} > v_p$. Hence, the mere threat of a PE buyout is enough to trigger the otherwise privately unprofitable merger.

3 Concluding remarks

We have shown that the threat of a PE acquisition could trigger mergers in a merger-stable industry. This can help antitrust authorities maximize consumer surplus since previously unprofitable, but consumer surplus-enhancing mergers now can happen. Is there any evidence that such mergers are taking place? These mergers should have the characteristics that (i) the mergers take place even though firm value decreases (consistent with that the mergers are happening because of pre-emption), and that (ii) the firm value of rivals decrease (consistent with the presence of synergies between the merging parties). Empirical evidence suggests that these are common characteristics of mergers: Moeller, Schlingemann, and Stulz (2004) show that acquiring-firm shareholders lose $25.2 million on average upon announcement and Derrien, Frésard, Slabik, and Valta (2017) find negative average stock price reactions for rivals around deal announcements for horizontal mergers.

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