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Zusammenfassung / Abstract:

When shareholders of a target firm expect a value improving takeover to be successful, they are individually better off not tendering their shares to the buyer and the takeover potentially fails. Squeeze-out procedures can overcome this free-riding dilemma by allowing a buyer to enforce a payout of minority shareholders and seize complete control of the target firm. However, it is often argued that shareholder protection laws and litigation restore or intensify the free-riding dilemma. Applying a game theoretic setting, we demonstrate that it is not shareholder litigation that brings back the free-riding dilemma, but rather the strategic gambling of buyers for lower prices and flaws in the design and application of squeeze-out laws. We find, for example, that lawmakers should refrain from setting separate legal thresholds for corporate control and squeeze-outs. We also analyze a favorable change in jurisdiction of the German Federal Court and provide implications for legal policy.

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1. INTRODUCTION

It is commonly accepted that takeovers of firms play a crucial role in the economy. Given effective competition, successful takeovers accelerate the restructuring and rightsizing of formerly weak and cost inefficient target firms. Through the acquisition, buyers are able to realize synergies in production and economies of scope and scale. Furthermore, takeovers often lead to the replacement of the previous management, and this ideally favors change and a quicker adjustment to the market situation (see, among others, YARROW 1985, SCHERER 1988, HOLMSTRÖM and NALEBUFF 1992).¹

Despite these desirable features, successful takeovers may be impeded due to an underlying free-riding problem among shareholders. GROSSMAN and HART (1980) advanced the insight that shareholders will reject the tender offer from the buyer when they expect the takeover to be successful and value improving. Given that the other shareholders tender, holding out and keeping the shares will enable minority shareholders to participate in the takeover gains as stock prices increase. It is thus individually profitable to free-ride on the buyer's improvement of the firm, leading to a possible failure of the takeover as the buyer may not collect enough shares to assume control of the target.

In order to facilitate takeovers, legislators have introduced squeeze-out procedures into national corporate laws (e.g., United States Delaware law, European Directive

¹ In this perspective, one could regard takeovers as a part of SCHUMPETER's 'creative destruction' (see SCHUMPETER 1947, pp.113). Though takeovers may also show undesirable consequences, such as reduced competition and market power (see SCHERER 1988 for an overview), this is not the focus of our paper.

2004/25/EC, German § 327 AktG). In principle, squeeze-out procedures enable a buyer who collects the majority of the shares to pay out all remaining minority shareholders and assume complete control. Under this legal mechanism, shareholders are now incentivized (or coerced) into accepting the tender offer right from the beginning, as holding out only results in the forced pay out. Squeeze-out procedures thus basically solve the free-riding problem (see YARROW 1985). However, squeeze-outs also enable the buyer to seize the complete gains of the takeover and force shareholders out of their investments. Most countries thus enacted specific shareholder protection laws. Standard legal remedies for shareholders include the right to appeal the squeeze-out, i.e. enforce a verification of its legitimacy, and the judicial review on the fairness of the offered payout price. Several scholars claim that such shareholder litigation effectively restores the free-riding problem and thus frustrates the underlying incentive mechanism of squeeze-out procedures (see, e.g., MUELLER and PANUNZI 2004 and BURKART and LEE 2018).

In this paper we show that such shareholder protection rights and shareholder litigation induce a redistribution of takeover gains, as intended by the legislator, and do not impede efficient takeovers or sizeable rents for the acquirer per se. Applying a game theoretic setting in the tradition of GROSSMAN and HART (1980) and BEBCHUCK (1989), we demonstrate that it is not shareholder litigation that restores the free-riding dilemma, but the strategic gambling of buyers for lower prices and flaws in the design of squeeze-out laws and judicial review.

The paper is organized as follows: chapter 2 provides an overview of related literature and chapter 3 introduces the institutional background of squeeze-out procedures

and shareholder protection laws. Chapter 4 describes the stylized takeover game and derives first theoretic results. We analyze the specific impact of a change in jurisdiction on the economics of squeeze-outs, as exemplified by the German Federal Court in 2010, in chapter 5. We discuss our findings in chapter 6, and chapter 7 concludes.

2. RELATED LITERATURE

Our paper extends the literature on takeovers, squeeze-outs and shareholder litigation. Following the seminal work by GROSSMAN and HART (1980) on the fundamental free-rider problem in takeovers, literature has addressed various possible solutions and aspects of the dilemma, allowing for, among others, mixed strategies of shareholders in the tendering decision (e.g., BEBCHUK 1989 and HIRSHLEIFER and TITMAN 1990), a finite number of shareholders or large initial shareholdings (e.g., SHLEIFER and VISHNY 1986, BAGNOLI and LIPMANN 1988, HOLMSTRÖM and NALEBUFF 1992, and AMIHUD et al. 2004), post-takeover moral hazard by the buyer (e.g., BURKART, GROMB, and PANUNZI 1998), and share trading and arbitrage during the tender offer period (e.g., KYLE and VILA 1991, CORNELLI and LI 2002, and GOMES 2012).

A number of authors have pointed out that squeeze-out rules can offer a simple way to overcome the free-rider problem.² YARROW (1985) shows this for bids that are conditional upon the buyer collecting enough shares to satisfy the required threshold for

² In their conclusion, GROSSMAN and HART (1980) already note that a second step merger or liquidation of the target firm is a common ‘exclusionary device’ (a mechanism that excludes minority shareholders from a part of the takeover gain, thus resolving the free-riding dilemma) in practice.

conducting a squeeze-out. BURKART and PANUNZI (2003) examine dual takeover thresholds, requiring fifty percent of shares for control and a higher threshold, such as ninety percent of shares, for the right to conduct a squeeze-out and assume complete control of the target company. They find that takeover offers at a price lower than the post-takeover share value can be successful if the tender offer is made conditional upon the buyer obtaining enough shares to reach the squeeze-out threshold. AMIHUD et al. (2003) propose a rule for setting the pay-off in squeeze-outs at the higher of the pre-bid market price and tender offer price. They contend that such a rule enables value-enhancing takeovers in the basic GROSSMAN and HART setting as well as in modifications, allowing for large shareholdings, asymmetric information in relation to the post-takeover value of the firm, post-takeover moral hazard and risk arbitrage. Their work also considers the effects of principle shareholder remedies against a squeeze-out (i.e. appraisal rights and breach of fiduciary duty claims), finding that these do not alter the basic outcome.

Other authors argue that squeeze-out rules are (at best) ineffectual in a takeover, because shareholder protection laws and litigation restore or even intensify the basic free-rider problem. Focusing on how a merger with an indebted buyer can overcome the free-rider problem, MUELLER and PANUNZI (2004) extend the original GROSSMAN and HART framework for squeeze-outs and shareholder litigation. In their setting, non-tendering is a dominant strategy, as shareholders who do not tender their shares either receive the tender offer price, or a higher post-takeover share value awarded to them by the court. MUELLER and PANUNZI thus conclude that shareholder litigation reinstates the free-rider problem 'in full force' (p. 28). BURKART and LEE (2018) examine two-step takeovers and take into

account the possibility of a price revision in a subsequent legal challenge. They argue that the availability of a squeeze-out intensifies the free-rider problem because the possibility of a higher price in the squeeze-out will cause shareholders to hold out for a higher price already in the initial offer. BURKART and LEE conclude that a buyer “must offer a price (at least) equal to the post-freeze-out value to succeed with the initial offer” (p. 21).

Taking different approaches, GOMES (2012) and DALKIR et al. (2018) show that the legal squeeze-out threshold plays an important part. GOMES (2012) studies takeovers in a dynamic environment, allowing for offer revisions and trading in target shares during the takeover. His analysis shows that, when a takeover is conditional upon the squeeze-out threshold, a part of the takeover gains is redistributed to the shareholders, because arbitrageurs can accumulate shareholdings that are large enough to hold out, forcing bidders to pre-emptively offer a higher price in the initial offer. He furthermore reasons that higher squeeze-out thresholds require higher offer prices, as less shares are required to veto the transaction, thus raising the bargaining power of arbitrageurs. Building on BAGNOLI and LIPMAN’S (1988) tender offer model with a finite number of shareholders, DALKIR et al. (2018) support the view that higher squeeze-out thresholds lower the buyer’s share of the takeover gains. They also demonstrate that a legal setting with dual thresholds restores the free-rider problem, as shareholders can be pivotal for the takeover.

Our model is most closely related to the works of BEBCHUK (1989) who extends the GROSSMANN and HART setting for mixed strategies and BURKART and LEE (2018) who model a dynamic two-step tender offer and squeeze-out with an exogeneous probability of a price revision in a subsequent legal challenge.

3. INSTITUTIONAL BACKGROUND

Squeeze-out procedures facilitate takeovers by enabling a buyer who collects the majority of shares in a target company to pay out all remaining shareholders and assume complete control. Many national legislators have introduced squeeze-out regulations within their jurisdictions resulting in a variety of rules regarding required thresholds for squeeze-outs, provisions on fair price and shareholder remedies.

Under United States Delaware law³ a squeeze-out of minority shareholders in a public company generally can be structured as a ‘one-step’ statutory merger or as a ‘two-step’ tender offer for control followed by a (short-form⁴) merger (KREBS 2012). In most U.S. states, including Delaware, a buyer can conduct a squeeze-out with a simple voting majority, i.e. often less than fifty percent of share capital⁵ (e.g., DALKIR et al. 2018, GOMES 2012, KREBS 2012). Though not a general requirement, a larger shareholding can simplify the squeeze-out procedure by avoiding the need for shareholder approval (e.g., the ninety percent threshold in sec. 253a DGCL).

³ We limit the judicial analyses in the United States to Delaware law under which most U.S. companies are incorporated (AMIHUD et al. 2003, p. 22).

⁴ Short-form mergers pursuant to sec. 253(a) DGCL or sec. 251(h) DGCL do not require shareholder approval and can be initiated if the buyer holds at least ninety percent of the target’s share capital (sec. 253a DGCL) or if the buyer holds a majority of the listed target’s share capital following a friendly tender offer for all of the target’s share capital and the merger consideration is the same as the tender offer consideration (sec. 251h DGCL).

⁵ The corporate charter may specify otherwise (GOMES 2012, p. 1).

European legislation frequently requires buyers who have obtained a controlling shareholding in a target company to meet more demanding levels of shareholder acceptance in order to initiate a squeeze-out process.⁶ The European Directive 2004/25/EC (the Takeover Directive) grants buyers the right, following a tender offer, to squeeze-out minority shareholders at a 'fair price' if (1) the buyer holds a minimum of ninety percent⁷ of the target's share capital, or, (2) the buyer has acquired a minimum of ninety percent of the target's share capital targeted in the preceding tender offer. European member states have adopted one or both conditions alongside (often more restrictive) national squeeze-out regulations already in place. In Germany, for example, most squeeze-outs are conducted within the existing legal frameworks of § 327 AktG (German Stock Corporation Act) or § 62 UmwG (German Transformation Act). Both squeeze-out procedures require a shareholders' resolution with minimum acceptance levels of ninety-five percent (Stock Corporation Act) and ninety percent (Transformation Act). The German legislator has additionally adopted European Takeover Directive standards in § 39a-39c WpÜG (German Securities Acquisition and Takeover Act) with a minimum threshold of ninety-five percent of the target's voting capital.⁸

⁶ See, e.g., KREBS 2012 or VENTORUZZO 2010 for a more detailed comparison of European and U.S. legislation on squeeze-outs.

⁷ Member states may increase this threshold up to ninety-five percent (Art. 15, No. 2, DIRECTIVE 2004/25/EC).

⁸ The Takeover Act squeeze-out is rarely employed in practice, possibly because of untested court procedures when the buyer fails to obtain the additional ninety percent majority of minorities condition (KREBS 2012, p. 971), or possibly because buyers seldom attain the required ninety-five percent threshold in the preceding voluntary or mandatory tender offer (Allen & Overy 2017, p. 21).

Thus, in the United States, a buyer who has collected a controlling shareholding in a target company can frequently assume complete control of the target in a squeeze-out, whereas in many European jurisdictions such as Germany the buyer is required to meet the more demanding dual thresholds for control and squeeze-out.

The buyer sets the price of the squeeze-out.⁹ In practice, the squeeze-out price often matches the price in the preceding tender offer (DALKIR et al. 2018), although this is not expressly required by U.S. takeover regulation or by the European Takeover Directive. In the United States, Delaware courts have established that tender offers by controlling shareholders are exempted from the more stringent *entire fairness* standard of judicial review, if the controlling shareholder guarantees a follow-on squeeze-out at the same price (SUBRAMANIAN 2005, p. 22). In Europe, the *equal treatment* principle of the Takeover Directive is understood to entail that the squeeze-out price may not be lower than the price offered in a preceding bid (KAISANLAHTI 2007). Correspondingly, the tender offer price is under certain conditions¹⁰ presumed to be fair for the purposes of a squeeze-out and thus unlikely to be subjected to extensive judicial review in shareholder litigation (VENTORUZZO 2010, p. 893).

⁹ More precisely, in a U.S. statutory merger freezeout, the buyer will have to negotiate terms with the target company (SUBRAMANIAN 2005).

¹⁰ The Takeover Directive provides that, in cases of a voluntary tender offer, the consideration offered in the tender offer is presumed to be fair where, through acceptance of the bid, the buyer has acquired shares representing not less than 90 percent of the capital carrying voting rights comprised in the bid. In cases of a mandatory tender offer, the consideration offered in the tender offer is unconditionally presumed to be fair (see Art. 15, Directive 2004/25/EC).

There is also no general legal requirement for the squeeze-out price to meet or exceed the market price of the target's shares before the squeeze-out or before an earlier bid for control. However, in the United States, appraisal rights ensure that minority shareholders receive at least the pre-bid market price (AMIHUD et al. 2003, pp. 22-23). In Europe, corresponding regulations vary across national jurisdictions. In the United Kingdom, for example, the squeeze-out price may be lower than the pre-bid market price (KAISANHAHTI 2007, p. 503). In Germany, the Federal Court of Justice (BGH) has previously held that the average share price during a reference period of three months before the day of the shareholder resolution that approves the squeeze-out sets the lower boundary for the calculation of adequate compensation in a squeeze-out pursuant to § 327 AktG (BGH II ZB 15/00). A more recent court ruling by the BGH has moved the reference period to end at the (earlier) announcement date of the squeeze-out (BGH II ZB 18/09).

In both the United States and Europe almost all squeeze-outs are subject to shareholder litigation and are eventually settled in court (see, e.g., CAIN and SOLOMON 2014, or KRISHNAN et al. 2012 for the United States, and CROCI et al. 2017, or GEHLING et al. 2007 for Europe). Standard legal remedies for shareholders include the right to appeal the squeeze-out, i.e. enforce a verification of its legitimacy, and the judicial review on the fairness of the offered payout price. The conditions regarding eligibility, awarding of compensation and delay of deal completion are dependent on the respective jurisdictional area (see, e.g., KAISANLAHTI 2007, KREBS 2012, RESTREPO and SUBRAMANIAN 2015 or VENTORUZZO 2010 for a more detailed review).

4. TAKEOVER MODEL WITH SQUEEZE-OUT LITIGATION

Following the established methodology in the literature (see, among others, GROSSMAN and HART 1980, BEBCHUCK 1989), we apply a game-theoretic approach to analyze the impact of squeeze-out litigation on takeovers.

4.1 Assumptions

Consider a game of complete information with a unique Buyer B and N atomistic Shareholders S_i of a target firm with $i = 1, \dots, N$, where N is large. The target firm has an ex-ante value of V_0 , which means a per share value of $V_0/N = v_0$. The target is subject to a potential takeover, and a successful buyer may cut its operating costs by reorganizing production procedures or changing the firm's current management. Thus, the firm value increases to V_1 (i.e., a value v_1 per share) if the takeover is successful. We assume $V_1 > V_0$, which implies that the takeover is socially desirable. All players are assumed to be risk-neutral.

In order to take over the target firm, the Buyer can make a public tender offer to shareholders with the tender price p_T per share. All tender offers in this game are unconditional. The administration of this tendering process produces transaction costs C_B for the Buyer. Shareholders tender X shares to the Buyer, and the takeover is successful if $X \geq \bar{k}N$. Let $0 < \bar{k} < 1$ specify the fraction of shares required for obtaining corporate control (e.g., fifty percent). If all shares are tendered, $X = N$, the Buyer obtains complete control

of the target.¹¹ We denote the private value of complete control as V_2 with $V_2 \geq V_1$ (or $v_2 \geq v_1$ per share, respectively). Typically, we believe that complete control of a firm reduces transaction costs operating the target. If the post-takeover firm value equals the value of complete control, $V_2 = V_1$, then efficiency only requires successful takeovers.

The Buyer may announce squeeze-out procedures after the takeover to assume complete control of the firm. Initially, we assume that the Buyer may squeeze-out minority shareholders whenever the takeover is successful, that is, whenever at least $\bar{k}N$ shares are tendered.¹² Then, minority shareholders must turn in the remaining shares, and receive a compensation p_s per share from the Buyer. Squeeze-out procedures create additional transactions costs C_s for the Buyer.

Courts enforce shareholder protection laws. We assume that minority shareholders may legally challenge the fairness of the cash compensation and move to court (which we designate ‘*price fairness procedures*’ in the following).¹³ In this case, court procedures last T periods, and shareholders discount future payments with the interest rate r . Eventually,

¹¹ We distinguish between a situation where the buyer has a controlling shareholding, for example, through a majority of voting shares, and a situation we refer to as ‘complete control’, in which the buyer holds *all* of the shares in the target company.

¹² We relax this assumption and apply a higher squeeze-out threshold (frequently required in European jurisdictions) in the Annex A3.

¹³ We use this broader term of price fairness to identify the general implications of judicial price review, a major feature of shareholder protection in most legal systems, in our game. We thus leave a closer look at specific legal remedies, such as entire fairness review or appraisal procedures, to the discussion. A second group of legal remedies is the legal challenge of the squeeze-out itself (‘action of avoidance’) which we also specify in the Annex A2. However, we find this legal remedy to be less restrictive for takeovers.

the court decides in favor of the Buyer with probability $\lambda \in [0,1]$. We assume the allocation of legal fees under the American rule, i.e. each party bears its own litigation costs L . In order to evade court proceedings, the Buyer can make a take-it-or-leave-it settlement offer to litigating shareholders.

The noncooperative takeover game consists of four stages as displayed in Fig. 1: The bid by the Buyer (Stage 1), the tendering process (Stage 2), the squeeze-out decision (Stage 3) and shareholder litigation (Stage 4).

The game begins with the Buyer who decides at stage 1 whether to make an offer to shareholders in order to take over the target firm. If a bid is made, shareholders may either accept the offered price and tender their shares or holdout and potentially benefit from higher share prices if the takeover is successful. If sufficient shares are tendered at stage 2, the takeover is successful and the Buyer may decide if he wants to squeeze-out the minority shareholders at stage 3. In case of a squeeze-out, the Buyer pays a compensation to the minority shareholders for collecting the remaining shares. Minority shareholders may accept this payout price, or move to court for price fairness procedures at stage 4. The court then decides the case in favor of the Buyer with the exogenous probability λ .

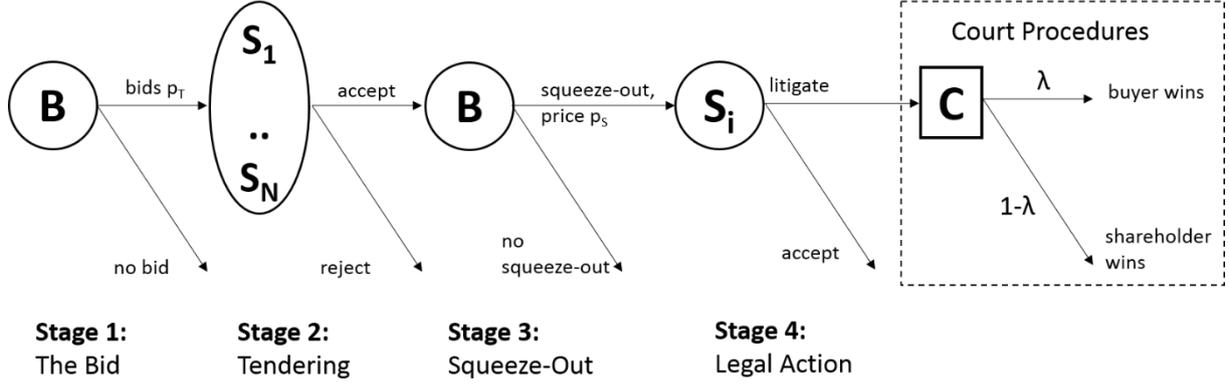


Figure 1. Extensive form of the takeover game.

4.2 The Optimal Bid

In this sequential takeover game with complete information, the Buyer makes a profit-maximizing bid to take over the target. The optimal bid is determined via backward induction.

At stage 4, the shareholder S_i considers the squeeze-out price p_S of the Buyer. A rational shareholder will legally challenge the ‘fairness’ of the offer and litigate only if the expected outcome of court procedures π_S^{4L} exceeds the offered price, $\pi_S^{4L} > p_S$. Note that such fairness procedures generally do not stall the squeeze-out itself, but only put the offered markup under judicial scrutiny. Thus, the litigating shareholder still receives the payment p_S , and pays the litigation costs L upfront. The litigating shareholder can expect

$$\pi_S^{4L} = p_S - L + \frac{(1-\lambda)(\eta v_1 - p_S)}{(1+r)^T} \quad (1)$$

We stylize price fairness procedures as follows: if the court believes the shareholder to have a righteous claim, it will discard the squeeze-out price of the Buyer and determine the ‘fair’ compensation. As a proxy for ‘fairness’, the court considers the post-takeover value v_1 .¹⁴ A pro-shareholder court ($\eta > 1$) will then enforce higher compensations, while a pro-buyer court ($\eta < 1$) will allow lower payments. The shareholders win fairness procedures with probability $1-\lambda$, and receive the present value of the difference between the court-determined ‘fair’ price and the offered price. We assume that this difference cannot be negative, that is, price fairness procedures cannot reduce the cash compensation to the shareholder.

At stage 3, the Buyer realizes that the takeover was successful and decides whether to squeeze-out minority shareholders and what price should be offered as compensation.¹⁵ The Buyer anticipates that any squeeze-out price p_S with $p_S \geq \pi_S^{4L}$ will evade price fairness procedures with certainty, as shareholders are better off accepting the offer. Using (1), we thus find the minimum squeeze-out price to avoid litigation with

¹⁴ This is not always the case. For example, in appraisal proceedings under Delaware law, the court determines the fair value “exclusive of any element of value arising from the accomplishment or expectation of the merger” (sec. 262h DGCL), i.e. a value that represents the pre-bid price v_0 .

¹⁵ Note that the squeeze-out will only be a credible threat to tendering shareholders in order to overcome the free-riding problem of takeovers (stage 2), if and only if it is indeed in the interest of the Buyer at stage 3 to push for the squeeze-out when he learns that the takeover was successful.

$$p_S \geq \eta v_1 - \frac{(1+r)^T L}{1-\lambda} = p_{MIN} \quad (2)^{16}$$

Trivially, the squeeze-out price increases in the courts' evaluation of a 'fair' stock price. It is also straightforward that litigation costs L ¹⁷, expected case disposition time T , time preference of shareholders r and the probability of a success for the Buyer in court λ reduce the required minimum offer. It is also worth mentioning that in pro-shareholder courts ($\eta > 1$), only positive litigation costs for shareholders allow a minimum offer below the post-takeover value, $p_S < v_1$.

The Buyer, holding $X \geq \bar{k}N$ shares after the tender offer, will decide to squeeze-out remaining shareholders if the gained value from complete control exceeds the additional buy-out costs. Thus, a credible squeeze-out requires the condition $V_2 - v_1 X \geq (N - X)p_S + C_S$ to be fulfilled. Solved for p_S , the paid squeeze-out price that is profitable for the buyer cannot exceed p_{MAX} with

$$p_S \leq v_2 + \frac{(v_2 - v_1)X - C_S}{N - X} = p_{MAX} \quad (3)$$

Clearly, condition (3) is only restrictive if procedural takeover costs C_S are high or if there is little or no added value of complete control ($v_2 \approx v_1$). In these cases, it may be overly costly to buy out the remaining shareholders and the squeeze-out is not credible. Given

¹⁶ Lower offers ($P_S < P_{MIN}$) fail to rule out costly shareholder litigation, even though the squeeze-out itself may be credible. We will show later that if shareholders can expect to increase profits from holding out (and litigating), then the free-riding problem reoccurs, and takeovers may not be successful at stage 2.

¹⁷ The British fee-shifting rule ('the winner takes all') would increase the effective settlement payment by L.

these considerations, the Buyer sets a credible and profit-maximizing squeeze-out price p_S with $p_S = p_{MIN} \leq p_{MAX}$ and litigation is avoided with certainty.

At stage 2, shareholders accept or reject the tender price offer p_T . In the following, we only focus on tender prices in the range $v_0 < p_T < v_1$. It is easy to see that lower tender prices will never succeed, and higher tender prices will typically lead to a successful but very costly takeover.¹⁸ We call it a *free-rider-problem* in the tradition of GROSSMAN and HART (1980), if each individual shareholder is better off holding out when takeover success is expected with certainty. In our model, the decision to tender is a (weakly) dominant strategy for shareholders if and only if the tender price is never below the expected squeeze-out price, $p_T \geq E(p_S)$,¹⁹ and squeeze-outs are credible: if shareholders expect a successful takeover, holding out and rejecting the offer does not lead to an expected payment higher than p_T . If shareholders expect the takeover to fail, accepting the tender offer is always better than holding out and being stuck with v_0 . Thus, squeeze-out procedures in our game allow a (weak) Nash-equilibrium in pure strategies where all shareholders tender, and the takeover occurs with certainty.²⁰

¹⁸ Note that costless price fairness procedures in pro-shareholder courts may even require tender offers above the post-takeover value.

¹⁹ GOMES (2012) demonstrates that ‘coercive’ offers, i.e. offers where the squeeze-out price is below the tender offer price, are ineffectual because arbitrage traders can accumulate enough shares to prevent the buyer from reaching the squeeze-out threshold.

²⁰ Without squeeze-outs, only equilibria in mixed strategies exist, and takeover success is not certain.

The free-rider-problem is restored, however, if the tender price is below the expected outcome of a squeeze-out, $p_T < E(p_S)$. Then, shareholders who expect a successful takeover are better off rejecting the offer and waiting for the squeeze-out payment (and possible court appraisal). In this case, there is no Nash-equilibrium in pure strategies. Equilibria in mixed strategies exist and takeovers still occur with positive probability (see proposition 2).

At stage 1, the Buyer decides whether to take over the target firm. If he decides to make a bid, he chooses the tender price that maximizes his expected profits. The Buyer will bid for the target if the following condition holds

$$\pi_B^1 = V_2 - Xp_T - (N - X)p_S - C_S - C_B > 0 \quad (4).$$

Given (4) holds, any price scheme with $p_T = E(p_S)$ achieves the takeover. Lower tender offers restore the free-rider-problem and create the risk of failure, and higher tender offers only increase takeover costs. We summarize:

Proposition 1. *(i) Any tender offer that fulfils $p_T = p_S = p_{MIN} \leq p_{MAX}$ ensures a complete takeover with certainty. (ii) This tender price is the profit-maximizing offer from the Buyer to achieve the takeover with certainty.*

In order to achieve a certain takeover of the target, the buyer chooses the price scheme $p_T = p_S = p_{MIN}$. Using (2) and (4), a takeover will be profitable if

$V_2 - \left(\eta v_1 - \frac{(1+r)^T L}{1-\lambda} \right) N - C_S - C_B > 0$. We find that socially desirable takeovers will thus be

executed under squeeze-out litigation if $V_2 + \frac{(1+r)^T N}{1-\lambda} L > \eta \cdot V_1 + C_S + C_B$ holds. It is straightforward that efficient takeovers are more likely to occur even under shareholder litigation if the private value of complete control over the target is high for the Buyer. In addition, sizeable costs of litigation, lengthy court procedures or lower transaction costs are disadvantageous for shareholders and allow the favorable takeover. Low litigation fees for shareholders and pro-shareholder courts, however, may turn some efficient takeovers not profitable for the buyer, and potentially produce an inefficiency.²¹ Without an added value of complete control ($v_2 = v_1$), complete takeovers will then be undesirable for the Buyer.

Buyers may increase their profits in a takeover if they are willing to accept potential failure in the tendering phase. We call this the *gambling offer*. In this case, buyers tolerate the free-riding problem of shareholders in order to reduce takeover costs, and gamble that a lower bid, $p_T < p_S$, will still be successful. For an equilibrium in mixed strategies, all shareholders must be indifferent between tendering and holding out. We concentrate on the focal solution where all shareholders tender with probability t with $0 < t < 1$, and takeovers occur with probability $P(t)$. Thus, t must satisfy $(1-P(t))(p_T - v_0) - P(t)(p_S - p_T) = 0$. Solved for $P(t)$, takeovers occur with probability

$$P(t) = \frac{p_T - v_0}{p_S - v_0}, \text{ and } 0 < P(t) < 1 \text{ holds for } p_T < p_S. \text{ Any reduction of the tender offer } p_T$$

²¹ The buyer may still become the majority shareholder of the target, and thereby increase its efficiency. However, without squeeze-outs, the free-riding-problem unfolds and takeovers occur with a probability lower than one.

below the squeeze-out price p_S will thereby also reduce the probability of success. We thus have the following proposition:

Proposition 2. *For any tender offer $p_T < p_S = p_{\min} \leq p_{\max}$, takeovers occur with a probability less than one.*

So far, our results demonstrate that squeeze-out litigation (i.e. price fairness procedures) primarily induces some redistribution of social gains to shareholders, as intended by shareholder protection laws. From this perspective, the risk of litigation induces higher (tender) offers to avoid free-riding shareholders. This restricts the occurrence of some efficient takeovers, and thus potentially produces an allocative inefficiency. However, we find that squeeze-out litigation does not restore the free-riding problem per se (in contrast to MUELLER and PANUNZI 2004, p. 25; BURKART and LEE 2018, p. 20): Buyers may choose bids below the post-takeover value and successfully make tendering the (weakly) dominant strategy of shareholders. In other words, we demonstrate that the underlying incentive compatibility mechanism of squeeze-out procedures is not destroyed by litigation, and allows for certain success. The common observation that some takeovers actually fail can be well explained, however, as maximizing buyers are tempted to tolerate some free-riding in order to further increase profits. Given that the redistribution of takeover gains is not desirable to buyers, we would c.p. expect more gambling offers and a higher risk of failure when shareholder protection rights are expanded by legislators.

From an efficiency perspective, a more serious constraint to takeovers than litigation (“the legal risk”) is the application of different thresholds for majority control and initiating

squeeze-out procedures: if, for example, a raider may assume effective control of a corporation when he collects more than fifty percent of the shares, but squeeze-out laws require a ninety percent majority, the free-rider-problem manifests again.

Proposition 3. *For two distinct legal thresholds for the ratio of acquired shares, k_1 (for takeovers) and k_2 (for squeeze-outs), with $k_2 > k_1$, any tender offer $p_T < v_1$ implies (i) that takeovers fail with a positive probability and (ii) that the risk of failure increases in the gap between k_1 and k_2 .*

In this two-threshold scenario, shareholders have an incentive to holdout if they believe that enough shares are tendered for the takeover to be successful but still not enough for the squeeze-out, in line with prior results of DALKIR et al. (2018). As a consequence, there exists no equilibrium in pure strategies for any takeover offer that is below the post-takeover firm value, and efficient takeovers always occur with a probability smaller than one.²² In other words, while the introduction of squeeze-out procedures helps to overcome the free-riding problem in takeovers, the use of two different thresholds at least partly restores it. The more restrictive the legislator is on the requirements for a squeeze-out, i.e. the more unlikely it is that the result of the tendering process meets these criteria, the lower is the desirable incentive effect of squeeze-outs on tendering shareholders in the mixed strategy equilibrium.

²² Such restrictive squeeze-out laws are still preferable to laws which generally prohibit squeeze-outs. This case is analyzed in the Annex A2.

5. JUDICIAL FAIRNESS REVIEW AND UNCERTAIN STOCK PRICES

5.1 Stock Prices as Judicial Proxy

So far, we assumed a complete information setup where courts know the true value of the target when verifying the fairness of a squeeze-out payment. In the following, we turn to the more realistic case when courts only observe the volatile stock market price and attempt to infer the true firm value. For this, courts typically impose a reference period during takeovers and take the average share price of that period. Exemplified by the fundamental change in jurisdiction of the German Federal Court in 2010, we explicitly study the economic impact of different judicial proxies.

Let the target be a listed firm. We apply the well-established *efficient market hypothesis* (see SAMUELSON 1965, FAMA 1970, RUBINSTEIN 2001, MALKIEL 2005, and YEN and LEE 2008) to describe the development of the target's share price at the stock market. Before the takeover at stage 1, the share price z equals the ex-ante firm value, $z^1 = v_0$. At stage 4, the share price equals the post-takeover value $z^{4,TO} = v_1$ if the takeover was successful, and $z^F = v_0$ in case of a failure. In between, we stylize the share price as a random variable with Z if the market believes in the success of the takeover, and specify $z = v_0$ otherwise. For simplicity, assume that there are only three realizations of the share price Z : it can be higher, lower or equal to the true post takeover value.²³ We specify that $Z = v_1$ occurs with

²³ One could also imagine that stock price is normally distributed with mean value v_1 . Even though the results are qualitatively similar, this complicates the analysis. Thus, we apply the described simplification.

probability $(1 - \rho)$. The higher stock price \bar{z} , with $\bar{z} = v_1 + d$, and the lower stock price \underline{z} , with $\underline{z} = v_1 - d$, are equidistant from v_1 and are realized with symmetric probability $\frac{\rho}{2}$. Thus, d can be interpreted as the average deviation from the expectancy value, and $E(Z) = v_1$ applies. We assume that all this is known to the informed parties of the takeover, the Buyer and the target's shareholders. Only the court, as the external enforcement agency, does not know the true firm value, but observes the stock market price.

5.2 Reference Period after the Squeeze-out Announcement

In this scenario, the court will observe the realization of the share value after the squeeze-out price is set by the Buyer at stage 3.²⁴ Given the success of the takeover and the squeeze-out, the decision to litigate by minority shareholders is then also based on the observed realization of the stock price Z . For example, when the high stock price \bar{z} is realized, then minority shareholders can expect to extract from court procedures

$$E(\pi_s^{4L} | \bar{z}) = p_s - L + \frac{(1 - \lambda)(\eta(v_1 + d) - p_s)}{(1 + r)^T}. \text{ In order to evade costly litigation and}$$

legal uncertainty, the Buyer should clearly offer $p_s \geq \pi_s^{4L}$ as before.

As the Buyer has to set the squeeze-out price before the realization of Z is observed, he is unable to rule out shareholder litigation without increasing the payout price p_s . More specifically, the previously minimum payout offer (2) will prove insufficient whenever

²⁴ This broadly reflects the earlier German jurisdiction of a reference period of three months before the day of the shareholder resolution that approves the squeeze-out (see above Chapter 3).

$Z = \bar{z}$ is observed and lead to costly shareholder litigation with probability $\frac{\rho}{2}$. Any higher payout price increases takeover costs due to the increased payment. Any lower payout price increases takeover costs due to increased litigation. Furthermore, any payment that falls short of the high stock price, $P_S < \eta \bar{z} - \frac{(1+r)^T L}{1-\lambda}$, effectively restores the free-riding dilemma. Then holding out and waiting for the realization of Z is preferable to tendering for shareholders if the takeover is deemed certain.

Consequently, a judicial routine that refers to the development of the stock price after the squeeze-out announcement of the Buyer incentivizes shareholders to wait for the realization of the stock price.²⁵ Such procedures increase c.p. the risk of a failed takeover or require higher payout offers from the Buyer. Marginal takeovers are potentially discouraged under this judicial regime. Note that the inefficiency is caused only by the information disadvantage of the Buyer about the enforced stock price by courts.

Our findings suggest that the change in jurisdiction of the German Federal Court in 2010 had a sizeable and positive economic impact on corporate takeovers. Since then, the court has applied a judicial decision rule that uses a time period prior to the squeeze-out announcement as a reference period for assessing the true stock value. Such a rule imposes no additional restrictions on takeovers and thus does not reduce allocative efficiency and incentive compatibility. Under this rule, both decision-makers, the Buyer and shareholders,

²⁵ Note that we derive this finding under the assumption of efficient financial markets. The incentive to holdout may be even higher if shareholders engage in strategic trading to further increase the stock price.

have symmetric information about the potential reference price of the court when it comes to squeeze-out procedures.

6. DISCUSSION

Our results support the basic notion of, among others, YARROW (1985), AMIHUD et al. (2003), and BURKART and PANUNZI (2003) that squeeze-out rules can resolve the free-rider problem. Unlike the works of YARROW (1985) and BURKART and PANUNZI (2003), which rely on uncontested takeovers, our model more realistically allows for shareholders to challenge the squeeze-out in court. We show that, if the courts are not pro-buyer oriented, the feasibility of a takeover crucially depends on the shareholders' litigation cost and the buyer's efficiency gains from complete control. Whereas AMIHUD et al. (2003) also consider basic shareholder remedies, they do not contemplate the consequences of litigation cost and court-awarded payments above the pre-bid share price. Furthermore, in contrast to AMIHUD et al. our results more plausibly do not imply takeover premiums of zero.

The perception that shareholder protection laws and litigation routinely restore or intensify the free-rider problem (e.g., MUELLER and PANUNZI 2004, BURKART and LEE 2018) is not supported in our setting. In MUELLER and PANUNZI (2004) shareholders hold out in a tender offer because even the slightest chance of a price mark-up by the courts in a squeeze-out is preferable to the (certain) original tender price. Importantly, MUELLER and PANUNZI do not consider shareholders' litigation cost, shareholders' time preferences, and the buyer's potential efficiency gains from complete control. They also do not take into account that, in practice, most court proceedings are ended early by settlement. Collectively, these factors

reduce the value of litigation for shareholders and increase the attractiveness of a squeeze-out for buyers, thus allowing for more profitable takeovers. BURKART and LEE (2018) point out that the outcome described by MUELLER and PANUNZI is intensified, if the value improvement of the target firm grows with the buyer's ultimate stake and the court awards the post squeeze-out value to shareholders. Indeed, such judicial ruling would also be harmful to takeovers in our setting (although not eliminating all profitable takeovers), highlighting the importance of law and jurisdiction.

Finally, our findings support the views of GOMES (2012) and DALKIR et al. (2018) that higher squeeze-out thresholds are harmful to takeovers. Whereas GOMES bases his results on the increased bargaining power of arbitrageurs with higher thresholds and DALKIR et al. establish their results in a non-atomistic model where shareholders can be pivotal for the takeover, we can confirm the outcome in a setting with atomistic shareholders and no arbitrage. We also corroborate the assertion by DALKIR et al. that dual thresholds for control and squeeze-outs are detrimental to takeovers and show that the problem increases in the gap between the two thresholds.

7. CONCLUSION

Squeeze-out procedures are a widespread legal institution to overcome the free-riding problem of takeovers. In order to protect the financial interest of minority shareholders and to balance the distribution of takeover gains, legislators deem it necessary to enact subsequent shareholder protection laws. Although extensive shareholder litigation can be observed to follow squeeze-outs in many countries, it remains unclear whether this is the result of a basic conflict between the efficiency of squeeze-outs and shareholder protection laws or whether other factors actually restore the free-riding dilemma. This paper addresses these questions.

We apply a sequential takeover game with a potential buyer and atomistic shareholders of a target firm. After a tender phase, the buyer may announce squeeze-out procedures and, in exchange for a compensation payment, force all remaining shareholders out of the target. Given shareholder protection laws, shareholders may then legally challenge the fairness of this payout price and seek a review by the court. Applying backward induction, we find that a rational buyer will usually be able to implement a price offer below the post-takeover stock value that achieves a successful takeover with certainty. Despite the risk of litigation, the buyer is able to acquire some part of the takeover gains. While a judicial price fairness review clearly increases the price offer above the pre-takeover stock value, thus making the takeover costlier to the buyer, it does not restore the free-riding problem: an equilibrium in pure strategies exists where the buyer offers the expected outcome of litigation to shareholders, and all shareholders tender. In other words,

the risk of shareholder litigation requires higher (tender) offers to incentivize tendering and thus avoid the free-riding problem. Lengthy court procedures and a high time preference of shareholders work in favor of the buyer and reduce required payments, while pro-shareholder courts imply higher takeover costs. While the effects of shareholder litigation are thus mainly redistributive, some allocative inefficiency is induced for takeovers with marginal gains, as they may no longer be desirable for buyers.

Even though shareholder litigation does not contradict the incentive compatibility mechanism of squeeze-outs, several considerations may explain the common observation of litigation and takeover failure.

First, profit-maximizing buyers will often tolerate a limited degree of free-riding behavior and thus accept a certain probability of failure, as they decrease their tender offer below the later payout price. In this regard, rational buyers gamble as they trade the increased risk of failure against the lower takeover costs through the tendering phase. This is a strategic reaction of buyers to the redistribution of takeover gains as desired by lawmakers. Such gambling is expected to increase with the level of shareholder protection.

Second, the existence of relevant litigation costs to shareholders enables buyers to limit the costly increase in takeover premiums in order to incentivize tendering. Given the potential costs of litigation and the risk of losing in court, shareholders will be willing to accept some reduction in the offered payout price. Particularly in pro-shareholder courts, buyers can only succeed at paying below post-takeover stock prices when litigation costs

are sizeable. Any legislation that reduces litigation costs for shareholders makes takeovers less favorable to buyers, gives rise to fraudulent lawsuits and eventually induces gambling.

Third, the existence of two different legal thresholds for corporate control and the feasibility of squeeze-out procedures effectively restores the free-riding dilemma. In this case, shareholders may speculate that the takeover succeeds without meeting the higher threshold of the squeeze-out which would make holding out the dominant strategy. Consequently, the more rigid the threshold for squeeze-outs is, the stronger the free-riding problem resurfaces. As the use of two distinct thresholds is particularly widespread in European takeover laws, this creates a major inefficiency in squeeze-out procedures. Given that shareholder protection and redistribution is still enforced by courts, lawmakers should consider applying a one-threshold approach.

Forth, an additional limitation lies in the judicial evaluation of the firm value. Such an evaluation often uses stock prices as a reference for the fair value, but significant fluctuations during takeovers create uncertainty to buyers. Exemplified by the change in jurisdiction of the German Federal Court, it appears reasonable that courts apply a reference period of the firm's stock price that ends prior to the announcement of the squeeze-out decision. Otherwise, the buyer has an informational disadvantage when defining the payout price and this would cause either higher takeover costs or a higher probability of failure.

8. ANNEX

A.1 Proof of Proposition 1

(i) A certain takeover requires that there is no free-riding problem. First, a price $p \leq p_{MAX}$ ensures that the squeeze-out is credible. Second, the price $p = p_{MIN}$ is the lowest price that rules out litigation. Any lower price will incentivize shareholders to holdout and legally challenge the 'fairness' of the payment, which puts the takeover at risk. Third, any price that suffices $p_T \geq p_S$ makes tendering at least as preferable for shareholders as holding out. Only then, tendering is the pure strategy equilibrium. (ii) Consider an alternative price scheme $[p_T = p_S + \Delta p; p_S \leq p_{MAX}]$ with $\Delta p > 0$. Again, this price set achieves a certain takeover. However, incentive compatibility only requires the condition $p_T \geq p_S$ to be binding. Thus, takeover costs are higher by $\Delta p X$. For any $\Delta p < 0$, tendering is no more a dominant shareholder strategy and takeovers fail with positive probability. ■

A2. Proof of Proposition 3.

Assume two legal thresholds, k_1 and k_2 : the threshold k_1 defines the ratio of shares required for obtaining majority control of a firm. Threshold k_2 defines the required ratio of shares for starting squeeze-out procedures, with $k_2 > k_1$. For simplicity, the Buyer makes the offer $p_T = p_S$. There is no equilibrium in pure strategies: Given that a shareholder expects $k_2 > k > k_1$, that is, the takeover is successful but a squeeze-out is not possible, it is best not to tender. For expectations of $k < k_1$, tender is preferable as the takeover is expected to fail.

For $k \geq k_2$, the decision to tender is irrelevant for shareholder payoffs. For an equilibrium in mixed strategies, shareholders must be indifferent between tendering and holding out.

We concentrate on the focal solution and assume that all shareholders tender with probability t . Let $F(x, y, z)$ be the Binomial distribution function with x trials, probability of success y , and no more of z trials to be successful, then the probability of a successful takeover can be determined by $P_1(t) = 1 - F(N, t, k_1 N - 1) = \sum_{j=k_1 N}^N \frac{N!}{j!(N-j)!} t^j (1-t)^{N-j}$

. Trivially, $P_2(t) = 1 - F(N, t, k_2 N - 1) < P_1(t)$ holds, which implies that a takeover is strictly more likely than a takeover with a subsequent squeeze-out. Shareholders are indifferent if the gains of holding out equal the loss of tendering,

$(1 - P_1(t))(p_T - v_0) - (P_1(t) - P_2(t))(v_1 - p_T) = 0$. Solving for the probability of a takeover, we find $P_1(t) = \frac{p_T - v_0 + P_2(t)(v_1 - p_T)}{v_1 - v_0} < 1$. We know that $P_1(t)$ and $P_2(t)$ increase monotonically in the interval $(0,1)$. This implies that the existence of squeeze-out procedures increases the probability of a takeover for any $P_2 > 0$. However, the higher c.p. the legal threshold for squeeze-out procedures, k_2 , the lower P_2 and the lower the positive impact on the probability of successful takeovers. Note that this result equals the solution of BEBCHUCK (1989, p. 175) for the case $P_2 = 0$. If $k_1 = k_2$, then $P_1 = P_2$. Thus, tendering is the dominant strategy and takeovers are always successful, $P(t) = 1$. Also, for the case $P_T = v_1$, no free-riding problem exists and takeovers occur with certainty. ■

A3. Action of Avoidance.

If the Squeeze-Out is annulled, minority shareholders receive the post-takeover value v_1 , otherwise they receive the pay-out price p_s at the end of litigation procedures. In contrast to appraisal procedures, payments are distributed only at the end of litigation. At stage 4, the litigating shareholder thus expects the payment $\pi_s^{4L} = \frac{\lambda p_s + (1-\lambda)v_1}{(1+r)^T} - L$.

Consequently, the minimum payout offer that avoids litigation is

$$p_s \geq \frac{(1-\lambda)v_1 - (1+r)^T L}{(1+r)^T - \lambda} = p_{MIN}^{Avoidance}. \quad \text{Analogously, any price scheme}$$

$$p_T = p_s = p_{MIN}^{Avoidance} \leq p_{MAX} \text{ ensures a certain takeover.}$$

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