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Startup Acquisitions: Acquihires and Talent Hoarding

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Abstract

We study how competitive forces may drive firms to inefficiently acquire startup talent. In our model, two rival firms have the capacity to acquire and integrate a startup operating in an orthogonal market. We show that firms may pursue such *acquihires* primarily as a preemptive strategy, even when they appear unprofitable in isolation. Thus, acquihires, even absent traditional competition-reducing effects, need not be benign, as they can lead to inefficient talent allocation. Additionally, our analysis underscores that such talent hoarding can diminish consumer surplus and exacerbate job volatility for acquihired employees.

Keywords: acquihire, talent hoarding, startup acquisition, competition

JEL Codes: L41, G34, M13

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1 Introduction

Historically, competition authorities were concerned with mergers and acquisitions (M&As) only when they were likely to reduce effective competition. Since startups, almost by definition, hold small or nonexistent market shares, their acquisitions were rarely challenged (e.g. Bryan and Hovenkamp, 2020b). But competition authorities are starting to scrutinize the effects of M&A activity not only on current but also on *potential* competition. In this context, Cunningham, Ederer, and Ma (2021) have shown that in the pharmaceutical industry, 5.3%–7.4% of all acquisitions are so-called "killer acquisitions," aimed at inhibiting future competition. Against this backdrop, competition authorities believe that there may be a case for carefully scrutinizing startup acquisitions.[1]

This increased scrutiny is deemed unnecessary by critics arguing that startup acquisitions typically do not hamper competition – even when they result in the killing of the startup's product or service. One common argument (e.g. Barnett, 2023) to support this view is that such acquisitions are so-called "acquihires." As the name suggests, acquihires are essentially a hiring instrument: the acquiring firm is primarily interested in hiring the startup's employees, not removing a potential competitor. Consider the case of Drop.io, a startup offering easy file sharing. In 2009, Drop.io was a successful startup, having been named a winner of CNET's Webware 100 award and listed among the 50 best websites by *Time* magazine. After acquiring Drop.io in 2010, Facebook promptly terminated it and announced that its CEO, Sam Lessin, would be assigned to a new role.[2] While the startup was "killed," the motivation for doing so is different from the killer acquisitions of Cunningham et al. (2021). Yet does that necessarily mean the acquisition was benign?

The goal of our paper is to contribute to this discussion by presenting a simple yet general framework allowing for the study of acquihires. We consider a model in which two symmetric incumbents are competing in one market while a startup is operating in an orthogonal market. This rules out the elimination of potential competitors as the motivation for an acquisition. The incumbents can attempt an acquihire – that is, acquire the startup and integrate its employees into own operations. An acquihire leads to an efficiency gain for the acquiring firm so that profits of the acquirer increase while those of the competitor decrease. We allow for different degrees of efficiency gains by modeling two levels of match quality between the incumbents and the startup employees.

We present three main results. First, we show that inefficient acquisitions may occur even if the startup is not a potential competitor to the incumbents. The inefficiency is manifested through *talent hoarding*: firms are engaging in acquihires even when it leads

[1]In 2020, the Federal Trade Commission investigated "whether large tech companies are making potentially anticompetitive acquisitions of nascent or potential competitors" (FTC, 2020). The European Commission has also indicated stricter enforcement (see e.g. European Commission, 2021).

[2]See "Webware 100 winner: Dropio," *CNET*, May 2009, "50 Best Websites 2009 – Drop.io," *Time*, August 2009, and "Facebook Acquires Simple File-sharing Service Drop.io," *Mashable*, October 2010.

to lower aggregate profits for the startup and the acquirer afterward. Essentially, we find that a low-match firm can increase its expected profits by acquiring the startup before the (potentially high-match) competitor learns of its existence. Such acquihires generate an inefficiency because the startup employees would be more productive by either staying with the startup or (if the option is available) moving to the high-match competitor. Our model thus suggests that startup acquisitions need not be benign even when potential-competition motives are ruled out.

Talent hoarding in our model is driven by the preemption effect, with firms acquiring talent partly to prevent competitors from becoming stronger. Many papers have identified the preemption effect in various settings, from patent races (Gilbert and Newbery, 1982), to M&As in the international-trade setting (Norbäck and Persson, 2004, 2007), to technology acquisitions (Bryan and Hovenkamp, 2020a), to the case of duopolists facing capacity constrained suppliers in a decentralized market (Burguet and Sákovics, 2017). Indeed, the point of our paper is to highlight that preemptive motives can be at work even when a startup operating in a different market is being acquired. However, preemptively acquiring labor is different from acquisitions of physical assets or technology because firms do not acquire property rights over labor. In our setting, this implies that some solutions to preemption, such as licensing (Katz and Shapiro, 1987), do not apply. Moreover, additional issues, such as the impact of the business cycle discussed in our thrid result, appear.

Our second result concerns the effect of acquihires on consumer surplus. While increasing the efficiency of the acquirer, an acquihire leads to a loss of surplus induced by the disappearance of the startup. Assuming that part of the efficiency gain is passed on to consumers, the overall effect of the acquihire on consumer surplus is ambiguous. In particular, if high-match acquisitions increase it while low-match acquisitions decrease it, competition authorities who cannot identify match quality may face complex challenges in regulating acquihires. For instance, the welfare effects of banning acquihires might not depend straightforwardly on the ex-ante likelihood of a high-match deal. As we show, prohibiting acquihires tends to decrease consumer welfare when that probability is either very high or very low. In the former case, even though low-match firms have a strong incentive to hoard talent, the potential negative impact rarely materializes. In the latter case, low-match firms *endogenously* choose not to engage in (expensive) talent hoarding, so all observed acquihires are with high-match firms and thus welfare enhancing. It is when the probability of a high match is intermediate – such that low-match firms remain tempted to hoard talent and are not rare – that banning acquihires has the largest scope for enhancing expected consumer welfare.

Our final result is that the labor-market outcomes (hiring, layoffs, and unemployment) for acquihired employees may become more volatile because of firms' talent hoarding. To obtain this result, we expand our baseline model by adding a second period. In between periods, the economy may fall into a recession, and consequently, firms may get hit by potentially correlated adverse shocks. We show that relative to a benchmark case in which firms have no motive to hoard talent, talent hoarding always leads to more hiring and may also lead to more layoffs and unemployment for acquihired employees when the adverse shocks are sufficiently likely or sufficiently positively correlated. This finding lends support to the view that talent hoarding was a major contributing factor to the substantial number of layoffs in the tech industry following the increased downward pressure on the US economy in 2022.[3]

We explore several extensions to our baseline model in the Online Appendix. These extensions include allowing the acquiring firm to differentiate between startup talent and technology, incorporating asymmetry in market power among potential acquirers, expanding the number of firms, introducing uncertainty in the order of moves, and accounting for partial acquisitions. Toward the paper's end, we discuss these extensions in detail, arguing that they not only confirm the robustness of our core findings but provide additional insights. For instance, our extension with asymmetric firms highlights that, under reasonable profit assumptions, dominant firms have stronger incentives to hoard talent – an observation that resonates with concerns expressed by many regulators regarding the overhiring prevalent among tech giants.

Related literature. Our paper is most closely related to the literature studying the economics of startup acquisitions. Much of the early literature examined, in various settings, how the prospect of an acquisition affects the incentives of startups and incumbents to invest in innovation (e.g., Gans and Stern, 2000; Mason and Weeds, 2013; Norbäck and Persson, 2012; Phillips and Zhdanov, 2013; Rasmusen, 1988). Following Cunningham et al. (2021), who demonstrated that incumbents may acquire startups for anticompetitive reasons, a large literature has studied the effects a more restrictive merger policy would have on innovation and overall welfare (Cabral, 2020, 2023; Katz, 2021; Letina, Schmutzler, and Seibel, 2023; Motta and Peitz, 2021). Others examine how acquisitions can steer the direction of innovation (Bryan and Hovenkamp, 2020a; Callander and Matouschek, 2022; Dijk, Moraga-González, and Motchenkova, 2021), and Fumagalli, Motta, and Tarantino (2023) consider the impact of financial constraints. Several papers consider dynamic incentives (Bryan and Hovenkamp, 2020a; Cabral, 2018; Denicolo and Polo, 2021; Hollenbeck, 2020). A key insight is that if the incumbent pulls too far ahead in the technology space, the pace of innovation will go down. There is also the possibility that the incumbent creates a kill-zone that disincentivizes entry, either by acquiring entrants, copying their products, or heavily investing in innovation (Bao and Eeckhout,

[3]See "Tech's Talent Wars Have Come Back to Bite It," *New York Times*, November 2022.

2023; Kamepalli, Rajan, and Zingales, 2021; Shelegia and Motta, 2021; Teh, Banerjee, and Wang, 2022). On the empirical side, Ederer and Pellegrino (2023) show that startups increasingly favor acquisitions over IPOs as exit strategies. Finally, several papers empirically study acquisitions in the tech sector (Affeldt and Kesler, 2021a,b; Eisfeld, 2022; Gautier and Lamesch, 2021; Gugler, Szücs, and Wohak, 2023; Jin, Leccese, and Wagman, 2023; Prado and Bauer, 2022). Our paper differs from this literature by considering startups that are not potential competitors of the incumbents. The main channel through which acquisitions create inefficiencies is thus fundamentally different.

We do not examine why firms engage in acquihires instead of directly poaching valuable employees. This question is tackled by Bar-Isaac, Johnson, and Nocke (2023), who show that an acquihire can increase the monopsony power of the acquirer by removing the most relevant labor-market competitor. This in turn lowers wages, making acquihiring more profitable than direct hiring. Coyle and Polsky (2013) argue that firms engage in acquihires for reputational reasons, while Selby and Mayer (2013) add that acquihiring is a method of acquiring entire teams.

Our paper also relates to the empirical literature that directly studies acquihires. Ouimet and Zarutskie (2020), Ng and Stuart (2021), Chen, Gao, and Ma (2021), and Chen, Hshieh, and Zhang (2022) show that acquiring talent is indeed an important motivation for acquisitions. However, acquihired employees separate at a higher rate than regularly hired employees (Ng and Stuart, 2021; Verginer, Parisi, de Jeude, and Riccaboni, 2022), possibly out of a preference for working at startups or a misalignment with the acquirer's plans (Kim, 2020; Loh, Khashabi, Claussen, and Kretschmer, 2019). This empirical finding is consistent with our theoretical result.

More broadly related is Haegele (2022), who finds evidence of talent hoarding by managers *within* firms. We identify strategic motives for talent hoarding across firms. The literature on endogenous technological spillovers caused by workers' changing jobs is also broadly related. The possibility that workers might move to the competitor influences whether multinational enterprises export or produce locally (Fosfuri, Motta, and Rønde, 2001) and how much firms may invest in innovation (Gersbach and Schmutzler, 2003a,b). Also broadly related is the concept of *labor* hoarding from macroeconomics, which refers to firms' employing more workers during economic contractions than is necessary for production. The firms do this to avoid incurring hiring and training costs once the economy recovers (for an overview, see Biddle, 2014). Our model predicts that *talent* hoarding implies more volatile hiring and firing decisions during economic expansions and contractions, which dampens the observed *labor* hoarding during contractions. This is exactly what Biddle (2014, pp. 209-210) reports has been happening recently, especially during the Great Recession. If talent hoarding has become more common, then our model provides a potential explanation for this observation.

2 Model

Two symmetric firms $i \in \{1, 2\}$ are competing in a market.[4] There is a second market in which entrepreneur E's startup is active. In the status quo, the firms' payoffs are given by Π_F and the entrepreneur's payoff is π_E. Our model does not specify any direct linkage between the two markets (e.g. through consumer demand), as we prefer to consider them as orthogonal to each other. This allows us to rule out conventional competition motives for the firms when acquiring the startup, as will become clear later.

A firm can engage in an "acquihire," whereby it acquires and integrates the startup by making a bid p to the entrepreneur. If successful, the payoff consequences of the transaction depend on the match quality $\theta \in \{H, L\}$ between the acquirer and the startup. This match quality is the acquirer's private information, and it is drawn i.i.d. for each firm according to $\Pr(\theta = H) = 1 - \Pr(\theta = L) = \lambda \in (0, 1)$. Specifically, if firm i with match θ_i successfully pursues an acquihire at bid p, its payoff is $\bar{\Pi}_F^{\theta_i} - p$, while the other firm's payoff is $\underline{\Pi}_F^{\theta_i}$ and the entrepreneur receives p.

We assume that an acquihire leads to an efficiency gain over the competitor.

Assumption 1 *We assume that*

(i) $\bar{\Pi}_F^H > \Pi_F + \pi_E > \bar{\Pi}_F^L$

(ii) $\Pi_F \geq \underline{\Pi}_F^L > \underline{\Pi}_F^H$

According to Assumption 1(i), the joint profits of the startup and the acquirer are highest when a high-match firm acquires the startup, second highest when the would-be acquirer does not acquire the startup, and lowest when a low-match firm acquires the startup. Assumption 1(ii) says that the profits of the non-acquiring firm are highest when its competitor does not engage in an acquihire, followed by when a low-match competitor engages in an acquihire and lowest when a high-match competitor does so.

From the consumers' point of view, there are three possible outcomes. First, absent an acquihire all three firms are active in their respective markets. In this case, the consumer surplus arising from the competition between the two symmetric firms is CS_F and that from the startup is CS_E. Second, a low-match acquihire results in competition between the two (now asymmetric) firms generating the entire consumer surplus (CS_L). Third, a high-match acquihire results in a similar competition that generates the entire consumer surplus (CS_H). Whenever an acquihire occurs, the consumer surplus generated by the startup (CS_E) is lost. The next assumption captures the idea that as one of the two firms becomes more efficient, it passes on some of that efficiency gain to consumers.[5]

[4] In many relevant applications there will be a dominant firm in the market. We discuss this extension in Section 5, where we also consider the effect of more than two firms.

[5] While it is possible that this assumption does not hold, extending our analysis to those cases is straightforward but would come at the cost of more complex exposition.

Assumption 2 *Let* $CS_H \geq CS_L \geq CS_F$.

Finally, the timing is as follows. At the outset, nature draws the private match types of the firms. In the first stage, firm 1 has the opportunity to attempt an acquihire. The entrepreneur can accept or reject the bid. If the entrepreneur accepts the bid, the game ends. Otherwise, we move to the second stage. In this stage, firm 2 has the opportunity to attempt an acquihire. The entrepreneur can accept or reject the bid, after which the game ends.[6]

We expect our model to be more applicable to situations in which the startup is still relatively young and not widely known, so that firms becoming aware of it sequentially is appropriate. Should the startup already be more mature or the founder(s) actively looking for an exit, a simultaneous-move model may be more suitable. In such instances, talent hoarding, as outlined in Proposition 1 below, is less likely to occur, as a firm with high match value should be able to outbid a low-match-value competitor.

Example. Our reduced-form model is consistent with many standard oligopoly models. With a specific application in mind, one could fix a demand function and derive more precise results. For example, consider a Cournot duopoly with (inverse) demand function $P(q_1, q_2) = a - bq_1 - bq_2$ and constant marginal cost of production c. Let a high-match acquihire reduce the acquirer's marginal cost to $c - H > 0$ while a low-match acquihire reduces it to $c - L$, with $H > L$. Assuming that both firms are active after a high-match acquihire (that is, $a - c > H$), it is easy to calculate the firms' profits after the various outcomes:

$$\Pi_F = \frac{(a-c)^2}{9b}, \qquad \bar{\Pi}_F^H = \frac{(a-c+2H)^2}{9b}, \qquad \bar{\Pi}_F^L = \frac{(a-c+2L)^2}{9b},$$
$$\underline{\Pi}_F^H = \frac{(a-c-H)^2}{9b}, \qquad \underline{\Pi}_F^L = \frac{(a-c-L)^2}{9b}$$

It can be shown that Assumption 1(i) is satisfied for an interval of π_E values (which is essentially a free parameter), while 1(ii) is always satisfied. Moreover, standard calculations give us consumer surplus for the three possible outcomes:

$$CS_H = \frac{(2a-2c+H)^2}{18b}, \qquad CS_L = \frac{(2a-2c+L)^2}{18b}, \qquad CS_F = \frac{(2a-2c)^2}{18b}$$

It follows immediately that Assumption 2 is satisfied. □

[6]In Online Appendix B.5 we show that the emergence of incentives to hoard talent does not hinge on firms' knowledge of the order of moves nor on the fact that the firm gets the full surplus from the acquihire.

3 Talent Hoarding

We define talent hoarding as a situation in which a firm employs a group of workers although they could be more efficiently employed elsewhere. In our model, talent hoarding occurs whenever a low-match firm acquires and integrates the startup because the employees of the startup would generate higher profits if it remained operational. Moreover, if the acquiring firm's competitor turns out to be a high match with the startup, the forgone efficiency is even greater.

Proposition 1 (Talent hoarding) *Under Assumption 1, firm 1's behavior in any perfect Bayesian equilibrium (PBE) is uniquely specified. Namely, if firm 1 is a high match with the startup, it will pursue an acquihire; if it is a low match, it will pursue an acquihire if and only if*

$$\lambda \geq \lambda_A \equiv \frac{\pi_E + \Pi_F - \bar{\Pi}_F^L}{\Pi_F - \underline{\Pi}_F^H}. \tag{1}$$

Proof: Suppose firm 1 has not done an acquihire. It follows from Assumption 1 that, for any belief, firm 2 does an acquihire if and only if it is a high type. Moving to stage 1, firm 1's belief is given by the prior. A high-match firm 1 will always do an acquihire by Assumption 1. A low-match firm 1 will do so whenever $\bar{\Pi}_F^L - \pi_E \geq \lambda \underline{\Pi}_F^H + (1-\lambda)\Pi_F$ or, equivalently,

$$\lambda > \lambda_A \equiv \frac{\pi_E + \Pi_F - \bar{\Pi}_F^L}{\Pi_F - \underline{\Pi}_F^H}.$$

Note that π_E is firm 1's bid for the startup, leaving the entrepreneur just indifferent between accepting and not accepting. ■

The result in Proposition 1 shows that talent hoarding may occur when (i) $\bar{\Pi}_F^L - \underline{\Pi}_F^H > \pi_E$ so that $\lambda_A < 1$, and (ii) the probability of a high match is sufficiently high. The condition $\bar{\Pi}_F^L - \underline{\Pi}_F^H > \pi_E$ guarantees that the gain for a low-match firm from an acquihire when facing a high-match competitor is bigger than the cost of the acquihire. However, since a low-match firm makes a negative profit from the acquihire per se, it will only proceed when facing a high-match competitor is likely enough.[7] Effectively, a low-match firm 1 is willing to overpay when making the acquihire to prevent the potential emergence of a highly competitive firm 2. While a low-match firm 1 does reap some efficiency gain from the acquihire, it is the threat of a more competitive firm 2 that motivates the

[7] In classical labor models where firm-employee match value matters (e.g., Jovanovic, 1979), firms only care about their own match value. In our model, because of oligopolistic competition, the potential match value between the competitor and the worker is driving the results.

acquihire. Thus, talent hoarding is more likely if the price of the acquisition π_E is low and the probability of a high-match competitor λ is high.[8]

The discussion so far has focused exclusively on the firms. We now turn to the implications of talent hoarding for consumers. Following an acquihire, the consumer surplus generated by the startup vanishes. Thus, whether consumers benefit from the acquihire, and hence what the appropriate response of the regulators is, depends on the change in consumer surplus created by the competition between the firms following the acquihire.

By Assumption 2, acquihires always increase consumer surplus in the two-firm market ($CS_H > CS_L > CS_F$) but lead to the loss of CS_E in the startup market. If CS_E is very low, so that $CS_H > CS_L > CS_F + CS_E$, then both the low-match and high-match acquihires increase consumer surplus and the policy makers should always allow acquisitions.[9] Similarly, if CS_E is very high so that both the low-match and high-match acquihires lower consumer surplus ($CS_F + CS_E > CS_H > CS_L$), then the policy makers should prohibit all acquisitions.

A more subtle case appears if CS_E is intermediate, so that $CS_H > CS_F + CS_E > CS_L$. Now, prohibiting a high-match acquihire would decrease consumer surplus, while prohibiting a low-match one would increase it. Hence, a policy maker unable to discern low- from high-match acquihires faces a trade-off. Our next result characterizes the optimal policy in all the cases discussed. Define

$$\lambda_{CS} \equiv \frac{CS_F + CS_E - CS_L}{CS_H - CS_L}. \tag{2}$$

How the values of this cutoff and the one defined in (1) relate to each other are crucial for the effect of acquihires on consumer surplus.

Proposition 2 (Effect of acquihires on consumer surplus)

(i) If $CS_F + CS_E > CS_H > CS_L$, then all acquisitions reduce consumer surplus.

(ii) If $CS_H > CS_L > CS_F + CS_E$, then all acquisitions increase consumer surplus.

(iii) Suppose that $CS_H > CS_F + CS_E > CS_L$. Acquihires reduce consumer surplus in expectation if and only if $\lambda \in [\lambda_A, \lambda_{CS})$.

Proof: Cases (i) and (ii) are straightforward. We demonstrate (iii). When $\lambda < \lambda_A$, by Proposition 1 only high-match firms engage in an acquihire. Since $CS_H > CS_F + CS_E$,

[8] One may wonder why the low-match firm does not keep the startup operational or what would happen if the startup was *also* valuable because of its technology. We discuss these issues in Section 5. Briefly, we argue that operating the startup as a subsidiary might be less profitable than integration due to moral-hazard issues. We also show that when startups own valuable technology, the firms have no incentive to hoard technology but still hoard talent.

[9] Observe that when $CS_E = 0$ (e.g., because the startup is not viable) an acquihire always increases consumer surplus.

any acquihire in this case increases consumer surplus. When $\lambda \geq \lambda_A$, both low-match and high-match firm 1 engage in an acquihire and the expected consumer surplus is $\lambda CS_H + (1-\lambda)CS_L$. Since the expected consumer surplus when acquihires are prohibited is $CS_F + CS_E$, acquihires reduce consumer surplus if and only if $\lambda \geq \lambda_A$ and

$$\lambda CS_H + (1-\lambda)CS_L < CS_F + CS_E \iff \lambda < \frac{CS_F + CS_E - CS_L}{CS_H - CS_L} \equiv \lambda_{CS}.$$

Thus, acquihires reduce consumer surplus if and only if $\lambda_A \leq \lambda < \lambda_{CS}$. ■

The intuition for Proposition 2 (iii) is that when $CS_H > CS_F + CS_E > CS_L$, acquihires are harmful only when there is talent hoarding (i.e., both low- and high-match firms engage in an acquihire, requiring $\lambda \geq \lambda_A$) and the probability of a high match is sufficiently low (requiring $\lambda < \lambda_{CS}$). Hence, consumer-surplus-destroying acquihires can occur only for intermediate λ, that is, when $\lambda \in [\lambda_A, \lambda_{CS})$.

Figure 1 illustrates Proposition 2(iii) using our Cournot example with $\pi_E = 0.9$. The two panels only differ in the level of consumer surplus generated by the startup. We set $CS_E = 0.4$ for the left panel and $CS_E = 0.5$ for the right panel. In both panels, as λ grows from 0 to λ_A, the consumer surplus when acquisitions are allowed increases (the solid line). For these parameters, firms endogenously only engage in high-match acquihires, which benefit consumers. At λ_A, low-match firms start talent hoarding, causing a discontinuous drop in consumer surplus visible on both panels. However, in the left panel $\lambda_{CS} < \lambda_A$, so the drop at λ_A is not sufficient to lower the consumer surplus below the level achieved when acquisitions are prohibited (the dash-dotted line). In the right panel, $\lambda_A < \lambda_{CS}$, so that for all $\lambda \in [\lambda_A, \lambda_{CS})$ the average consumer surplus is lower when acquihires are allowed than when they are not. As λ increases beyond λ_{CS}, high-match acquihires become so likely that the overall consumer surplus is again higher than when acquisitions are prohibited. Thus, when $CS_H > CS_F + CS_E > CS_L$, allowing acquihires only lowers consumer surplus for *intermediate* values of λ. Finally, the dashed line represents the consumer surplus that could be achieved if the regulators could differentiate between the low-match and high-match acquihires. In that case, allowing only high-match acquihires always increases consumer surplus. Of course, if the regulators can only imperfectly detect match types, that lowers the expected consumer surplus below the dashed line.

Finally, the regulator may be interested in the effect of talent hoarding on total surplus, that is, the sum of firms' profits and consumer surplus. It follows directly from our discussion of Propositions 1 and 2 that talent hoarding reduces total surplus unambiguously when the transaction reduces consumer surplus. Otherwise, the impact depends on the structure one imposes on our reduced-form model. In the Cournot example, total surplus with a low-type acquihire is always lower than with a high-type acquihire, while the total surplus without an acquihire hinges on the startup's profits and consumer surplus.

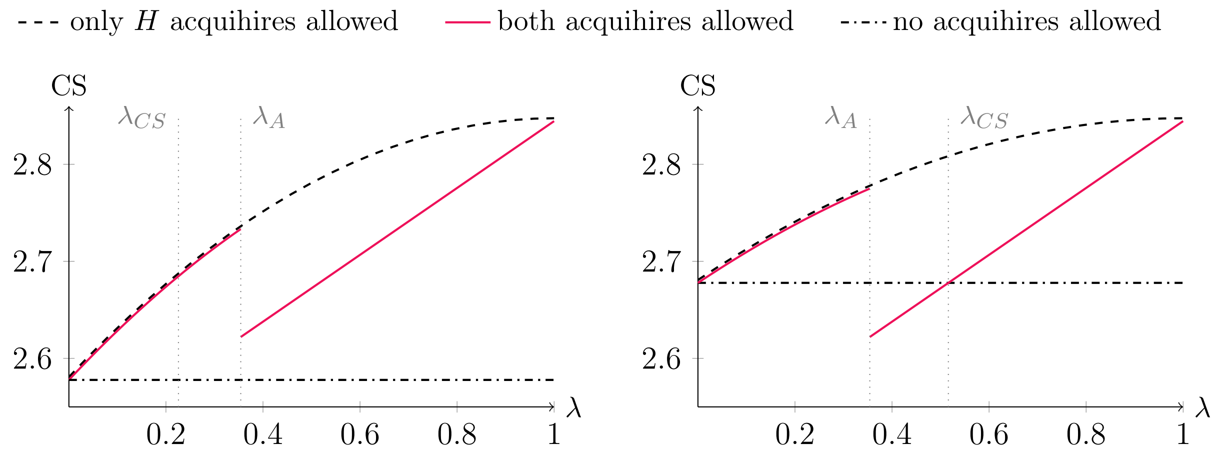

Figure 1: Consumer surplus in the Cournot example when Proposition 2(iii) applies. In the left panel $\lambda_{CS} < \lambda_A$ so that all acquihires increase consumer surplus. In the right panel $\lambda_A < \lambda_{CS}$ so that acquihires decrease consumer surplus if and only if $\lambda \in [\lambda_A, \lambda_{CS}]$.

4 Hiring, Separation, and Unemployment

We now discuss the implications of talent hoarding on the hiring, separation, and unemployment of acquihired employees. To do so, we expand our baseline model by introducing a second period and allowing for economic downturns between the two periods.

The first period of this expanded model is identical to the baseline model in Section 2: the firms' match types are private information, and firm 1 has the opportunity to pursue an acquihire before firm 2. Between the periods, the economy suffers a downturn with probability $\delta \in (0, 1)$. If a downturn materializes – an event that is publicly observable – the firms may be hit by adverse shocks (see details below). In period 2, the entrepreneur has the option of creating a new startup, once more leading to an outside option of π_E for her.[10] If the entrepreneur was employed by a firm in period 1, that firm must decide whether to continue the relationship (at the cost of π_E) or lay off the entrepreneur, who might then be hired by the other firm. If there was no acquihire in period 1, it is again firm 1 that moves first in period 2.

The adverse shocks come with a commonly known joint probability distribution over "downgrades" for firms, though each firm only observes the realization of its own shock. More specifically, firm i is hit by a shock $S_i \in \{D, N\}$, where it is either downgraded from high to low match (if possible) or not affected by the shock. Thus, if a low-match firm is hit by a downgrade, it stays a low-match firm, while a high-match firm turns into a low-match firm. If a firm is not affected by the shock, its match quality stays the same. Let $(S_1, S_2) \in \{D, N\}^2$ be the profile of shocks hitting the firms, which follows the

[10]There is empirical evidence that acquihired employees who leave the acquirer are likely to join a new startup (Kim, 2020, 2022; Ng and Stuart, 2021).

distribution

$$\Pr(D, D) = r\gamma(1-\gamma) + \gamma^2, \qquad \Pr(D, N) = (1-r)\gamma(1-\gamma),$$
$$\Pr(N, D) = (1-r)\gamma(1-\gamma), \qquad \Pr(N, N) = r\gamma(1-\gamma) + (1-\gamma)^2,$$

where $\gamma \in (0, 1)$ is the probability that a firm will be downgraded and $r \in [0, 1]$ measures the positive correlation between the firms' shocks. In particular, for $r = 0$ the shocks are independent and for $r = 1$ they are perfectly positively correlated.

To make a comparative statement, we need a benchmark relative to which we can compare the hiring, separation, and unemployment in our model with talent hoarding. To do so, consider the case in which $\Pi_F = \underline{\Pi}_F^H = \underline{\Pi}_F^L$ so that an acquihire by firm i does not affect firm j's profits. Thus, there are no incentives to hoard talent in this benchmark.

Before we state the formal result, consider the following intuition. If the entrepreneur was hired by a high-match firm in period 1 and this firm is not affected by the economic downturn (i.e., remains high-match), the firm will continue to employ the entrepreneur. Therefore, no separation or unemployment is observed in that case.[11] In contrast, if the entrepreneur was hired by a low-match firm in period 1 or a downgraded high-match firm, several period 2 outcomes can arise. Talent-hoarding motives may induce the continued employment of the entrepreneur if the competitor is believed to have a high match value with a high enough probability. Thus, we do not observe any separation or unemployment of the entrepreneur. Otherwise, we may observe a layoff of the entrepreneur, who is subsequently hired by a high-match competitor. Hence, while we observe separation, the entrepreneur does not become unemployed. Finally, the entrepreneur may be laid off and not hired by the competitor, resulting in both separation and unemployment.[12] Note that these distinct period 2 outcomes in turn affect the behavior of low-match firms in period 1, changing the acquihire threshold. Solving the game fully and deriving the probabilities of period 1 hiring as well as observing separation and unemployment in period 2, we obtain the following result, proved in the appendix.

Proposition 3 (Effect on employment outcomes) *The presence of talent-hoarding motives always leads to more hiring than in the benchmark. Additionally, provided that* $\min\left\{\frac{\lambda_A}{\lambda}, \frac{1-\lambda}{\lambda}\right\} > (1-r)(1-\gamma)$, *talent hoarding also leads to more separation and unemployment than in the benchmark.*

The increase in hiring follows immediately because in the presence of talent hoarding, not only high-match firms but also low-match firms may pursue an acquihire. The increase

[11] In the video game industry, Loh et al. (2019) document that when the skills of the employees and the needs of the acquirer match well, the employees are more likely to stay with the acquirer.

[12] The term "unemployment" here means that the entrepreneur is laid off and then not employed by the competitor. Since the entrepreneur can start their own business, unemployment in the precise sense of the term does not occur.

in separation and unemployment is more subtle. Essentially, when either the correlation between firms' adverse shocks or or the (marginal) probability of suffering a downgrade γ is sufficiently high, talent hoarding raises separation and unemployment. In the case in which r is high, this is because firm 1's shock is informative of firm 2's shock because of the correlation, hence allowing firm 1, whenever it draws a negative shock, to forgo the costly talent hoarding in the second period. Similarly, when γ is sufficiently high, firm 1 can be fairly confident that whenever a downturn occurs, the competitor will be downgraded, once more prompting the firm to forgo talent hoarding. Further, when γ or r is sufficiently high, firm 1 is often right in laying off the entrepreneur, as firm 2 will indeed have a low match, which in turn will lead to unemployment. Finally, all statements in the proposition are strict whenever λ is sufficiently high so that any talent hoarding at all takes place.

5 Discussion and Conclusion

We have presented a simple, yet general, reduced-form model of startup acquisitions. We showed that acquihires may not only reflect firms' desire to hire talented employees but also be rooted in an incentive to engage in inefficient talent hoarding, thus potentially warranting regulators' attention. Further, we showed that acquihires may decrease consumer surplus and increase job volatility of acquihired employees, thereby giving further reasons for regulatory scrutiny.

Our baseline model relies on several simplifying assumptions. As we discuss below, the main results hold even if we relax some of those assumptions. Moreover, the extensions of our baseline model reveal several additional insights. The formal analysis and results can be found in the Online Appendix.

People and technology. In our baseline model, the startup's value lies solely in its employees. However, some startups also possess valuable technology. We posit that the key distinction between people and technology is that firms can sell or license acquired technology but not employees.[13] We extend the model so that some share of the startup's value is also due to its technology. An acquirer can trade the startup's technology (but not the employees) to its competitor. As we show, a low-match acquirer indeed has an incentive to sell the technology to a high-match competitor because the price compensates her for any decrease in profit due to a more efficient competitor. Thus firms do not have an incentive to hoard technology, while the incentive to hoard talent remains. Interestingly, talent hoarding now occurs for a strictly larger set of parameters, as the option to resell

[13] For a discussion of technology markets, see, e.g., Arora, Fosfuri, and Gambardella (2001) and Gans and Stern (2000).

technology effectively subsidizes talent hoarding.

Dominant firm. Instead of symmetric firms, the market could be characterized by a dominant firm and a challenger. We show that the incentives to hoard talent also emerge in this asymmetric model. Further, under reasonable assumptions about the impact of acquisitions on the profits of the dominant firm and the challenger, the dominant firm is more likely to hoard talent.

Multiple firms. Here we examine markets with multiple firms that may sequentially try to acquihire the startup. Focusing on the Cournot-Oligopoly setting, we show that in the limit, as the number of firms grows large, no talent hoarding takes place. Intuitively, the profit at risk from a competitor's acquihire becomes smaller as the number of competitors increases, reducing the incentive to engage in costly talent hoarding. However, the effect of the increase in the number of competitors on the incentive to hoard talent is not necessarily monotonic. The reason for the non-monotonicity is that an increase in the number of competitors, in addition to decreasing profit at risk, also increases the probability that a high-match competitor will acquire the startup. Which effect is stronger for a small number of firms is not clear. Indeed, we show in a parametric example that we may observe more talent hoarding when there are three firms than when there are two.

Partial acquisitions. Instead of integrating the startup after acquiring it, the acquirer could allow it to continue operating independently in its own market. Moreover, instead of buying the startup outright, a firm could acquire a partial stake in it. In this context, the key questions are how the startup's profits and control rights are allocated. First, we assume that following an investment the entrepreneur receives a dividend and a wage, while an investor only receives a dividend as their share of the startup's profits. To microfound these payoffs, we assume that the presence of an outside investor gives rise to an agency problem, which we capture in reduced form, thus allowing for a wide range of agency models while maintaining a simple and (relatively) tractable setup. Second, considering control rights, we are primarily interested in the investor's ability to block and the entrepreneur's ability to push through an acquihire by the investor's competitor. We assume that the entrepreneur can always block an acquihire, as she could sell her shares but refuse to work for the acquiring firm. If the entrepreneur would like to be acquihired and the investor does not want the acquihire to go through, the entrepreneur can (in the spirit of typical shareholder agreements) try to "drag along" the investor and force the transaction. We assume that the investor has a probabilistic chance of blocking this attempt and merely impose that the probability of successfully blocking an acquihire is increasing in the investor's stake in the startup.

We find that an acquihire can be more profitable than buying a startup and letting it operate independently, implying that talent hoarding persists in this extension. With sufficiently strong blocking rights, an investment may constitute a viable and cheaper alternative to an acquihire. Therefore, as investments are cheaper than acquihires, the possibility of partial ownership may reduce the frequency of acquihires while increasing the frequency with which some transaction takes place. Notably, the reduction in overall profits is lower in the case of investments than the case of low-match acquihires. Therefore, the possibility of investments is more likely to lead to inefficient market outcomes, albeit at a lower degree of inefficiency.

We close by noting that our model gives rise to several hypotheses that could be tested empirically. First, our model predicts a positive relationship between talent hoarding and job volatility of acquihired employees. Second, an acquihire by a dominant firm is more likely to be motivated by talent hoarding. Third, increasing market competitiveness can curb talent hoarding but not always monotonically. Fourth, the strength of blocking rights implied by shareholder agreements should have an impact on the relative frequency of acquihires and investments.

A Proof of Proposition 3

The result is reached in three steps: solving the benchmark game without talent hoarding, with talent hoarding, and then comparing both.

Benchmark. Absent incentives to hoard talent, only high-match firms do an acquihire. Thus, a layoff only takes place if the economy enters a downturn and the period-1 acquirer is hit by an adverse shock. Further, following a layoff, we observe unemployment only if the competitor was a low-match firm or if it was a high-match firm that got hit by an adverse shock. Finally, hiring takes place in period 1 unless both firms are low-match. Taken together, the probability of observing a layoff in period 2 is

$$l^* = \delta[\lambda + (1-\lambda)\lambda]\gamma = \delta(2\lambda - \lambda^2)\gamma \tag{A.1}$$

and the probability of observing unemployment in period 2 is

$$u^* = \delta(2\lambda - \lambda^2 - \lambda^2(1-r)(1-\gamma))\gamma. \tag{A.2}$$

Talent hoarding. First, note that period-2 incentives coincide with those in period 1 absent an economic downturn, ruling out layoffs and unemployment. Following a downturn, three cases arise in period 2:

- Suppose firm 1 acquihired in period 1. Then, firm 2 does an acquihire in period 2 iff it has a high match. In period 2 a high-match firm 1 does an acquihire. A low-match firm 1 that received a D shock, believes its competitor has a high match with probability $\lambda(1-r)(1-\gamma)$ and will do an acquihire if this is larger than λ_A. Analogously, a low-match firm 1 receiving a N shock will do an acquihire if $\lambda(1-\gamma(1-r)) \geq \lambda_A$.
- Suppose firm 2 acquihired in period 1, so firm 1 is a low-match and will not do an acquihire moving second. Thus, firm 2 does an acquihire iff it has a high match.
- Suppose no acquihire took place in period 1. Then, both firms have a low match and this is commonly known, leading to no acquihires in period 2 either.

Moving to period 1, firm 2 does an acquihire iff it has a high match, knowing that firm 1 has a low match, since a high-match firm 1 would always do an acquihire. For a low-match firm 1, doing nothing yields

$$\lambda\left(\underline{\Pi}_F^H(2-\gamma\delta) + \gamma\delta\Pi_F\right) + (1-\lambda)2\Pi_F = \lambda(2-\gamma\delta)(\underline{\Pi}_F^H - \Pi_F) + 2\Pi_F.$$

The payoff of an acquihire depends on parameters and reads:

- $2(\bar{\Pi}_F^L - \pi_E)$ if $\lambda(1-r)(1-\gamma) > \lambda_A$;
- $(\bar{\Pi}_F^L - \pi_E)(2-\delta\gamma) - \delta\gamma\lambda(1-r)(1-\gamma)(\Pi_F - \underline{\Pi}_F^H) + \delta\gamma\Pi_F$ if $\lambda(1-\gamma(1-r)) > \lambda_A > \lambda(1-r)(1-\gamma)$;
- $(\bar{\Pi}_F^L - \pi_E)(2-\delta) - \delta\lambda(1-\gamma)(\Pi_F - \underline{\Pi}_F^H) + \delta\Pi_F$ if $\lambda_A > \lambda(1-\gamma(1-r))$.

In case 1, a low-match firm will always hoard talent in period 2. In case 2, it will hoard talent unless it receives a D shock in an economic downturn. In case 3, it will hoard talent as long as the economy does not experience a downturn. Thus, comparing the total payoffs from doing nothing or an acquihire in period 1, the acquihire thresholds for period 1 read, respectively,

$$\lambda_A^1 = \lambda_A \cdot \frac{2}{2-\gamma\delta},$$
$$\lambda_A^2 = \lambda_A \cdot \frac{2-\delta\gamma}{2-\delta\gamma-(1-r)(1-\gamma)\delta\gamma},$$
$$\lambda_A^3 = \lambda_A,$$

so that $\lambda_A^1 \geq \lambda_A^2 \geq \lambda_A^3$.

Comparison. To compare hiring, separation, and unemployment, we need to consider three cases.

Case 1: $\lambda(1-r)(1-\gamma) > \lambda_A$. Then, $\lambda \geq \lambda_A^1 = \lambda_A \frac{2}{2-\gamma\delta}$. Hence, a low-match firm will do an acquihire in both periods so no layoffs or unemployment are observed, which is less than in the benchmark. Thus, irrespective of whether the economy hits a downturn, the entrepreneur is always employed without separation.

Case 2: $\lambda(1-\gamma(1-r)) > \lambda_A > \lambda(1-r)(1-\gamma)$. Hence, $\lambda > \lambda_A^2$ so firm 1 will always do an acquihire in period 1. In period 2, firm 1 will maintain employment of the entrepreneur unless it receives shock D. Hence, the probability of a layoff will be $\delta\gamma$, which is larger than the benchmark layoff rate l^*. Moreover, the probability of transition to unemployment will be $\delta(\gamma - \lambda P(D,N))$, which is larger than u^* iff $\frac{1-\lambda}{\lambda} > (1-r)(1-\gamma)$.

Case 3: $\lambda_A > \lambda(1-\gamma(1-r))$. If $\lambda > \lambda_A^3$ then firm 1 will do an acquihire in period 1. Firm 1 will maintain employment in period 2 unless it was hit by a downturn and has a low match. Hence, the probability of observing a layoff is $\delta(\gamma + (1-\lambda)(1-\gamma)) = \delta(1-\lambda(1-\gamma))$, which is larger than l^*. The probability of observing a transition to unemployment is $\delta([2\lambda - \lambda^2]\gamma - \lambda^2 P(D,N) + (1-\lambda)^2)$ which is larger than u^*. If instead $\lambda < \lambda_A^3$, then we have no talent hoarding in either stage and the equilibrium is identical to the benchmark.

Finally, observe that the condition $\min\left\{\frac{\lambda_A}{\lambda}, \frac{1-\lambda}{\lambda}\right\} > (1-r)(1-\gamma)$ implies that we are either in Case 2 or 3. Further, in Case 2, it ensures that we have more unemployment than in the benchmark.

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B Online Appendix: Not for Publication

The online appendix covers the extensions discussed in the conclusion of the paper, as well as the robustness exercises concerning the timing and surplus sharing in the baseline model mentioned in footnote 6.

B.1 People and Technology

Consider a situation where the total value of the startup consists of the people who work for the startup and the technology owned by the startup. The fundamental difference between the employees and the technology, from the acquirer's point of view, is that technology can be sold (or licensed), while the people cannot. In our model, this implies that the acquirer can resell the startup's technology to the competitor, whenever such a sale increases joint profits. Suppose that the share of the value of the startup generated by the technology is $\delta \in [0, 1]$, while the share generated by employees is $(1 - \delta)$. Moreover, for simplicity, assume that acquiring just the technology (or just the employees) generates δ (or $1 - \delta$) of the impact that acquiring the entire startup would have. Just as before, a firm can have a high match value with the startup with probability λ, where we assume for simplicity that the match value of the startup to a firm applies to both the people and the technology identically. The match value of the firm is private information at the beginning of the game. The timing of the game in stage 1 is:

1. Firm 1 observes the match quality with the startup and makes an acquisition of the startup at price p or does nothing.

2. The startup accepts or rejects the bid.

3. If the bid is rejected, the game proceeds to stage 2. If accepted, firm 1 can sell the startup's technology at the price q to firm 2.

Stage 2 is like stage 1 but the roles of firms 1 and 2 are reversed. To accommodate the possibility of selling the startup's technology, we slightly adapt the notation from the main text. Suppose firm 1 with match θ_1 did an acquisition at price p. Absent any sale of the startup's technology, profits read

$$\begin{aligned} \text{Firm 1} &: \Pi_F + \bar{\pi}_F^{\theta_1} - p \\ \text{Firm 2} &: \Pi_F - \underline{\pi}_F^{\theta_1} \\ \text{Startup} &: p, \end{aligned}$$

which coincides with profits in the baseline model (although the notation is different).[14] If the technology part is sold at price q, the profits read

$$\begin{aligned}\text{Firm 1} &: \Pi_F + (1-\delta)\bar{\pi}_F^{\theta_1} - \delta\underline{\pi}_F^{\theta_2} - p + q\\ \text{Firm 2} &: \Pi_F - (1-\delta)\underline{\pi}_F^{\theta_1} + \delta\bar{\pi}_F^{\theta_2} - q\\ \text{Startup} &: p.\end{aligned}$$

Thus, the people who have joined firm 1 from the startup increase firm 1's profits and decrease firm 2's profits, respectively. Conversely, the startup's technology increases firm 2's and decreases firm 1's profits, respectively.

To simplify the model and the exposition, we do not explicitly model the bargaining process between the two firms. Instead, we assume that the two firms meet at the bargaining table, their types are revealed and the resulting surplus from selling the technology is shared equally. The surplus resulting from the sale of the technology is then given by

$$\begin{aligned}&\Pi_F + (1-\delta)\bar{\pi}_F^{\theta_1} - \delta\underline{\pi}_F^{\theta_2} - p + \Pi_F - (1-\delta)\underline{\pi}_F^{\theta_1} + \delta\bar{\pi}_F^{\theta_2} - \left(\Pi_F + \bar{\pi}_F^{\theta_1} - p + \Pi_F - \underline{\pi}_F^{\theta_1}\right)\\ &=\delta\left(\bar{\pi}_F^{\theta_2} + \underline{\pi}_F^{\theta_1} - \bar{\pi}_F^{\theta_1} - \underline{\pi}_F^{\theta_2}\right).\end{aligned}$$

The case we are interested in, is when a low-match firm 1 sells technology to a high-match firm 2. Then, the surplus reads $\delta\left(\bar{\pi}_F^H + \underline{\pi}_F^L - \bar{\pi}_F^L - \underline{\pi}_F^H\right)$. We now make two assumptions on profits. The first corresponds to Assumption 1 in the baseline model in the main text (in this extension's notation). The second ensures that the surplus resulting from a technology sale from a low-match to a high-match firm is positive.

Assumption B1 $\bar{\pi}_F^H > \pi_E > \bar{\pi}_F^L$ *and* $\underline{\pi}_F^H > \underline{\pi}_F^L \geq 0$.

Assumption B2 $\bar{\pi}_F^H + \underline{\pi}_F^L - \bar{\pi}_F^L - \underline{\pi}_F^H > 0$.

Finally, to break ties, we assume that firms of the same match type do not trade the startup's technology. We obtain the following result

Proposition B1 *Under Assumptions B1 and B2, firm 1's behavior in any PBE is uniquely specified. Namely, if firm 1 has a high match, it will make an acquisition and not sell the technology; if it has a low match, it will make an acquisition and sell the startup's technology to a high-match (but not a low-match) firm 2 if and only if*

$$\lambda \geq \lambda_A(\delta) \equiv \frac{\pi_E - \bar{\pi}_F^L}{\underline{\pi}_F^H + \frac{\delta}{2}\left(\bar{\pi}_F^H + \underline{\pi}_F^L - \bar{\pi}_F^L - \underline{\pi}_F^H\right)}$$

and do nothing otherwise.

[14] For instance, the payoff of an acquiring firm with match type θ_1 in the main text is $\bar{\Pi}_F^{\theta_1}$ while it now reads $\Pi_F + \bar{\pi}_F^{\theta_1}$.

PROOF: Suppose firm 1 has not made the acquisition. It follows from Assumption B1 that firm 2 makes the acquisition if and only if it has a high match type, irrespective of its beliefs. Moving to stage 1, firm 1's beliefs are given by the prior belief. Suppose a high-match firm 1 acquired the startup. By Assumption B2 a low-match firm 2 would not buy the technology part of the startup and by our tie-breaking assumption neither would a high-match firm 2. Then, by Assumption B1 a high-match firm acquires the startup and keeps the technology. Suppose a low-match firm 1 acquired the startup. By our tie-breaking assumption, a low-match firm 2 would not buy the startup's technology. However, by Assumption B2, the technology part would be sold to a high-match firm 2. Anticipating this, the threshold for a low-match firm 1 to acquire the startup changes relative to the model in the main text. Formally, doing nothing yields

$$\Pi_F - \lambda \underline{\pi}_F^H,$$

while making an acquisition yields

$$\Pi_F - \pi_E + (1-\lambda)\bar{\pi}_F^L + \lambda(q + (1-\delta)\bar{\pi}_F^L - \delta\underline{\pi}_F^H),$$

where

$$q = \frac{\delta\left(\bar{\pi}_F^H + \underline{\pi}_F^L + \bar{\pi}_F^L + \underline{\pi}_F^H\right)}{2},$$

is the surplus-splitting sale price. Thus, an acquisition takes place whenever

$$\Pi_F - \pi_E + (1-\lambda)\bar{\pi}_F^L + \lambda\left(\frac{\delta\left(\bar{\pi}_F^H + \underline{\pi}_F^L + \bar{\pi}_F^L + \underline{\pi}_F^H\right)}{2} + (1-\delta)\bar{\pi}_F^L - \delta\underline{\pi}_F^H\right) \geq \Pi_F - \lambda\underline{\pi}_F^H,$$

which we can rearrange to the expression in the Proposition. ∎

One can verify that for $\delta = 0$ the above condition reduces to the condition (1) in the main text. As δ increases, the threshold $\lambda_A(\delta)$ decreases, i.e., the acquisition happens for a larger set of parameters. Intuitively, as the technology part of the startup can be sold to a high-match firm 2, the expected cost of hoarding the talent falls for the low-match firm 1, leading to more talent hoarding.

B.2 Dominant Firm

Consider a situation where instead of two symmetric firms, the industry is characterized by a dominant firm and a challenger firm. The firms now have different payoffs, which we denote $(\bar{\Pi}_D^H, \bar{\Pi}_D^L, \Pi_D, \underline{\Pi}_D^L, \underline{\Pi}_D^H)$ for the dominant firm and $(\bar{\Pi}_C^H, \bar{\Pi}_C^L, \Pi_C, \underline{\Pi}_C^L, \underline{\Pi}_C^H)$ for the challenger. We maintain Assumption 1 for both firms, that is we assume that both (i)

$\bar{\Pi}_F^H > \Pi_F + \pi_E > \bar{\Pi}_F^L$ and (ii) $\Pi_F \geq \underline{\Pi}_F^L > \underline{\Pi}_F^H$ hold for each $F \in \{D, C\}$. We consider the setting as in Proposition 1, that is firms can either engage in acquihires or do nothing.

Corollary B1 (Acquihires with a dominant firm)

(i) If either the dominant or the challenger firm moves second it engages in an aquihire if and only if it is the high match type.

(ii) If the dominant firm moves first, it engages in an acquihire if it is the high match type or if it is the low match type and the probability that the challenger firm is the high match type is

$$\lambda > \lambda_D \equiv \frac{\pi_E + \Pi_D - \bar{\Pi}_D^L}{\Pi_D - \underline{\Pi}_D^H}. \tag{B.1}$$

(iii) If the challenger firm moves first, it engages in an acquihire if it is the high match type or if it is the low match type and the probability that the dominant firm is the high type is

$$\lambda > \lambda_C \equiv \frac{\pi_E + \Pi_C - \bar{\Pi}_C^L}{\Pi_C - \underline{\Pi}_C^H}. \tag{B.2}$$

The corollary follows directly from Proposition 1. An interesting question is under which conditions would the dominant firm be more prone to talent hoarding than the challenger firm, i.e., when is $\lambda_C > \lambda_D$? The following result gives a set of simple sufficient conditions.

Proposition B2 *If the following two inequalities hold, then $\lambda_C > \lambda_D$:*

$$\Pi_C - \underline{\Pi}_C^H < \Pi_D - \underline{\Pi}_D^H,$$
$$\bar{\Pi}_C^L - \Pi_C < \bar{\Pi}_D^L - \Pi_D.$$

Proof: From Corollary B1 we have the threshold values

$$\lambda_D \equiv \frac{\pi_E + \Pi_D - \bar{\Pi}_D^L}{\Pi_D - \underline{\Pi}_D^H}, \quad \text{and} \quad \lambda_C \equiv \frac{\pi_E + \Pi_C - \bar{\Pi}_C^L}{\Pi_C - \underline{\Pi}_C^H}.$$

Note that the conditions stated in the proposition imply

$$\lambda_D = \frac{\pi_E + \Pi_D - \bar{\Pi}_D^L}{\Pi_D - \underline{\Pi}_D^H} < \frac{\pi_E + \Pi_D - \bar{\Pi}_D^L}{\Pi_C - \underline{\Pi}_C^H} < \frac{\pi_E + \Pi_C - \bar{\Pi}_C^L}{\Pi_C - \underline{\Pi}_C^H} = \lambda_C,$$

completing the proof. ■

Intuitively, the two inequalities above require that the dominant firm both stands to lose more if a startup is acquired by the challenger (maybe because the dominant firm has a larger market share, so it has more to lose) and stands more to gain by acquihiring the startup itself (a larger market share might be an explanation again, as any improvement could be offered to more consumers more rapidly).

A simple specification that satisfies these inequalities is an "equal proportional gain/loss". Formally, let the profit functions be given by

$$\begin{aligned} \bar{\Pi}_D^H &= H\Pi_D, \quad \bar{\Pi}_D^L = L\Pi_D, \quad \underline{\Pi}_D^L = \ell\Pi_D, \quad \underline{\Pi}_D^H = h\Pi_D, \\ \bar{\Pi}_C^H &= H\Pi_C, \quad \bar{\Pi}_C^L = L\Pi_C, \quad \underline{\Pi}_C^L = \ell\Pi_C, \quad \underline{\Pi}_C^H = h\Pi_C, \end{aligned}$$

where $H > L > 1$ and $1 \leq \ell > h \geq 0$. This implies that an acquihire (either own or by the competitor) has a proportionally equal effect on both the dominant firm and the challenger firm. As long as $\Pi_D > \Pi_C$ (i.e., absent any acquihire, the dominant firm has higher profits than the challenger), straightforward calculations show that the two inequalities of Proposition B2 are satisfied and the dominant firm is more prone to acquihires than the challenger.

B.3 Multiple Firms

Often, more than two firms are competing in a given market. In this extension, we thus allow for $n \geq 2$ firms competing in the same market. As in the baseline, firms may sequentially attempt to do an acquihire of the startup and each firm's match type $\theta \in \{L, H\}$ is an independent draw with identical probability $\Pr(\theta = H) = \lambda$. In the absence of an acquihire, each firm makes profits $\Pi_F(n)$. If firm i with match type θ makes an acquihire profits read $\bar{\Pi}_F^\theta(n)$ for firm i and $\underline{\Pi}_F^\theta(n)$ for firms $j \neq i$.

To make things concrete, we focus on a Cournot oligopoly setting with n firms and the following inverse demand function:

$$P(q_1, ..., q_n) = a - b \cdot \sum_{i=1}^{n} q_i, \tag{B.3}$$

where q_i indicates the quantity choice of firm $i \in \{1, ..., n\}$ and $a, b > 0$. We assume that the demand intercept a is sufficiently large to ensure an interior solution. Let $c > 0$ denote the constant marginal cost when no acquisitions occur. An acquihire by one firm is assumed to reduce its marginal cost to $c - \theta > 0$, where $\theta \in \{H, L\}$ satisfies $H > L \geq 0$.

We first establish that increasing competition eliminates talent hoarding in the limit: as $n \to +\infty$, firms acquire startups if and only if it is efficient to do so.[15] To see this,

[15]As it will become clear, this result does not hinge on the Cournot specification; it holds as long as

take any one of the n firms and suppose that its match value with the startup is θ. It is clear that if $\pi_E < \bar{\Pi}_F^\theta(n) - \Pi_F(n)$, this firm will acquire the startup whenever possible. In contrast, if

$$\pi_E > \bar{\Pi}_F^\theta(n) - \Pi_F(n), \tag{B.4}$$

acquihiring is inefficient. At the same time, a necessary condition for the firm to have incentives to do an acquihire is

$$\bar{\Pi}_F^\theta(n) - \underline{\Pi}_F^H(n) > \pi_E. \tag{B.5}$$

Note that the LHS of (B.5) is the maximum difference in the firm's profits between acquiring and not acquiring the startup. In our Cournot specification, as $n \to +\infty$, both $\Pi_F(n)$ and $\underline{\Pi}_F^H(n)$ converge to zero. Therefore, conditions (B.4) and (B.5) cannot hold simultaneously when n is sufficiently large. This implies that, whenever (B.4) holds, no firm with a match value θ will conduct an acquihire, therefore the talent hoarding problem cannot occur in equilibrium.

Next, we argue that the impact of competition on talent hoarding can be non-monotone. Note that when $n = 2$, talent hoarding arises in equilibrium if and only if

$$\pi_E \leq \lambda \left(\Pi_F(2) - \underline{\Pi}_F^H(2)\right) + \bar{\Pi}_F^L(2) - \Pi_F(2). \tag{B.6}$$

In comparison, suppose that $n = 3$ and firm 1 anticipates that firms 2 and 3 will acquire the startup when their match values are high. Then, firm 1 will be inclined to conduct an acquihire even when it draws a low match value, if the following condition holds:

$$\pi_E \leq (2\lambda - \lambda^2) \left(\Pi_F(3) - \underline{\Pi}_F^H(3)\right) + \bar{\Pi}_F^L(3) - \Pi_F(3). \tag{B.7}$$

Now, consider a parametric example with $\lambda = 0.1$, $a = 10$, $b = 1$, $c = 3$, $H = 2$, $L = 0$, and $\pi_E \in (0.534, 0.54)$. One can show that Assumption 1 holds. In addition, condition (B.6) is violated but condition (B.7) is satisfied. Thus, in the current example, talent hoarding will not occur in equilibrium when there are two firms. However, with three firms, talent hoarding will for sure arise in equilibrium.

B.4 Partial Acquisitions

This section extends the baseline model to incorporate the possibility of partial investments. That is, a firm may acquire a (minority) stake in the startup without integrating it. To do so, we need to specify the payoffs resulting from such partial acquisitions as well

the benchmark profit Π_F converges to zero as the number of firms increases.

as the rights that come with partial ownership.

Formally, the ability to make partial acquisitions means that firms can additionally try to acquire a share $s \in (0, 1]$ of the startup and continue to operate it as a stand-alone entity. In contrast to the model in the main text, we allow for upfront and deferred payments (p, d) as is standard in such transactions. In the main text, doing so would not change anything. In the presence of partial ownership, it allows the acquiring firm to distinguish at least partially between the investor (who only gets a part of the upfront payment) and the entrepreneur (who can also receive deferred payments). If a firm acquires a share s with bid (p, d), its payoff reads $\Pi_F + s\pi_E(s) - p - d$, while the entrepreneur's payoff is $(1 - s)\pi_E(s) + w(s) + p + d$. Here, $\pi_E(s)$ captures the startup's profit net of potential wages paid to the entrepreneur as a function of the size of the external ownership. These profits accrue to the firm and the entrepreneur proportionate to their stake in the startup. Correspondingly, $w(s)$ constitutes the entrepreneur's wage (net of effort costs) for different degrees of outside ownership. In particular, $\pi_E = \pi_E(0) + w(0)$. That is, when the entrepreneur owns the entire startup and thus obtains all of its profit and "pays herself" a net-of-effort wage, her payoff coincides with the initial payoff in the baseline model. The other firm's payoff is unchanged at Π_F. When a firm acquires a stake in the startup it receives a share of profits, while the dilution of ownership gives rise to moral hazard on the entrepreneur's side, which we capture in reduced form, only imposing the following assumption.

Assumption B3 *We assume that $\pi_E(s) + w(s)$ is decreasing in s with $\pi_E(0) + w(0) > \pi_E(1) + b(1)$.*

Assumption B3 captures the moral hazard arising when the entrepreneur no longer fully owns the startup. $\pi_E(s) + w(s)$ being decreasing reflects the reduced effort of the entrepreneur as a result of agency. $\pi_E(0)+w(0) > \pi_E(1)+w(1)$ captures that the first-best value of a startup fully owned by the entrepreneur is strictly higher than the second-best value, when the entrepreneur is actually an employee and has no stake in the startup.

The timing of the game is as follows. In the first stage, firm 1 has the opportunity to make a bid to the entrepreneur to acquire a share $s_1 \in (0, 1]$ of the startup or make an acquihire. If the entrepreneur accepts a bid for an acquihire, the game ends. Otherwise, we move to stage 2, the ownership structure of the startup depending on whether the entrepreneur accepted firm 1's bid. In the second stage, firm 2 can make an acquihire by making a (per-share) bid to the owner(s) of the startup, where we restrict attention to bids (p, d) with $p \geq \pi_E(s_1)$, so that no owner can be expropriated. If the entrepreneur does not accept the bid, the game ends. If the entrepreneur accepts, firm 1 can either also accept or try to block the transaction and succeeds in doing so with probability $q(s_1)$, where q is a weakly increasing function with $q(0) = 0$ and $q(1) = 1$. Nature determines whether a potential blocking attempt succeeds and the game ends.

As a benchmark, we first consider the case where ownership of a stake does not convey any blocking rights.

Proposition B3 *Under Assumptions 1 and B3 and without blocking rights, i.e., $q(s) = 0$ for all $s \in [0, 1]$, firm 1's behavior in any PBE is uniquely specified. Namely, if firm 1 draws a high match type, it will make an acquihire; if it draws a low type it will make an acquihire if and only if $\lambda \geq \lambda_A$ and do nothing otherwise.*

PROOF: See the proof of Proposition B4, which contains this as a special case. ■

The result in Proposition B3 shows that partial ownership of the startup is not enough to change firm 1's behavior relative to the setting with only acquihires in Proposition 1. Indeed, since an investment is not profitable in itself and does not prevent a high-match firm 2 from making an acquihire, firm 1 will continue to either do nothing or make an acquihire, depending on the probability of a high-match firm 2 materializing. As the next result shows, it is ownership accompanied by some measure of control over the startup, which makes investments attractive to firm 1.

Proposition B4 *Under Assumptions 1 and B3 and with blocking rights, firm 1's behavior in any PBE is uniquely specified. Namely, if firm 1 draws a high type, it will make an acquihire. If it draws a low type, there is a threshold value for λ below which it does nothing. Above the threshold, it will do an investment and, depending on the model's parameters, there may be an even higher threshold above which it does an acquihire.*

Comparing the thresholds across Propositions 1, B3 and B4, we can observe that the presence of blocking rights on investments increases the parameter space for which some form of talent hoarding occurs. However, the possibility of making investments instead of an acquihire may also have "mitigating" effects relative to a setting with only acquihires, as talent hoarding by means of investments create smaller inefficiencies than by means of acquihires. Put differently, allowing for investments increases the extensive margin of talent hoarding but partially decreases its intensive margin.

PROOF: We solve the game backward.

Stage 2 Observe that firm 2 believes with probability 1 that firm 1 is a low type, as otherwise, an acquihire would have taken place in stage 1. Firm 2 has three actions: doing nothing, making a bid that is accepted by both the entrepreneur and firm 1 and making a bid which is accepted only by the entrepreneur. To understand this, observe that the payoffs of firm 1 and the entrepreneur following a firm-1 investment of size s_1 at price (p_1, d_1) read

$$\begin{aligned} \text{Firm 1}: &\ \Pi_F + s_1\pi_E(s_1) - p_1 - d_1 \\ \text{Entrepreneur}: &\ (1-s_1)\pi_E(s_1) + w(s_1) + p_1 + d_1. \end{aligned}$$

Hence, firm 1 would try to block any bid (p_2, d_2) resulting in a lower payoff than the above, while the entrepreneur would not accept any bid yielding a lower payoff than the above. Given these constraints, firm 2 will choose among three options: (i) do nothing and receive payoff Π_F; (ii) make the minimum bid such that both firm 1 and the entrepreneur accept, yielding payoff $\bar{\Pi}_F^\theta - \pi_E(s_1) - w(s_1) - \Pi_F + \underline{\Pi}_F^\theta$ for firm 2; or (iii) make a bid that only the entrepreneur accepts, risking a blocking attempt by firm 1. This third option provides an expected payoff for firm 2 of $q(s_1)\Pi_F + (1-q(s_1))(\bar{\Pi}_F^\theta - \pi_E(s_1) - w(s_1))$.

Let us consider a low-match firm 2 first. Comparing doing nothing with inducing only the entrepreneur to accept, we obtain that the latter move is is better for firm 2 whenever

$$\bar{\Pi}_F^L - \pi_E(s_1) - w(s_1) \geq \Pi_F.$$

It follows from Assumptions 1 and B3 that this condition is not necessarily satisfied. Let $\hat{s}$ be the threshold above which this condition is satisfied. Now let's compare doing nothing with inducing both for $s_1 < \hat{s}$. We obtain that inducing both is better whenever

$$\bar{\Pi}_F^L - \pi_E(s_1) - w(s_1) - \Pi_F + \underline{\Pi}_F^L \geq q(s_1)\Pi_F + (1-q(s_1))(\bar{\Pi}_F^L - \pi_E(s_1) - w(s_1)),$$

which, after rearrangement, can be rewritten as

$$q(s_1)(\bar{\Pi}_F^L - \Pi_F - \pi_E(s_1) - w(s_1)) \geq \Pi_F - \underline{\Pi}_F^L \tag{B.8}$$

Since the right-hand side of (B.8) is positive and the left-hand side of it is negative for $s_1 < \hat{s}$, this condition is never satisfied. Thus, for $s_1 < \hat{s}$ the low type does nothing.

Now let us compare firm 2 inducing only the entrepreneur versus inducing both to accept when $s_1 \geq \hat{s}$. As above, inducing both is better whenever condition (B.8) holds. Since the left-hand side of (B.8) is increasing in s_1, we define $s^L \in [\hat{s}, 1]$ as the threshold above which the condition is satisfied. Overall, a low-match firm 2 will take the following actions: for $s_1 < \hat{s}$, do nothing; for $\hat{s} \leq s_1 \leq s_L$, induces only the entrepreneur to accept; and for $s_1 > s_L$, induce both the entrepreneur and firm 1 to accept the offer.

Next, we turn to the high-match firm 2. Comparing payoffs of doing nothing and inducing only the entrepreneur, it follows from Assumption 1 that the firm will always find the former option inferior. So we only need to compare the payoffs of inducing both versus only the entrepreneur. In particular, inducing both is optimal whenever

$$q(s_1)(\bar{\Pi}_F^H - \Pi_F - \pi_E(s_1) - w(s_1)) \geq \Pi_F - \underline{\Pi}_F^H,$$

which may be satisfied for s_1 above some threshold $s^H \in [0,1]$. Below this threshold, the high type will induce only the entrepreneur. Note that it is not clear whether s^H or s^L are bigger.

Stage 1 Observe that firm 1's belief about firm 2's type is given by the prior. Firm 1 can acquire different stakes s_1 which in turn may induce different responses from firm 2. Specially, we have learned that a low-match firm 2 may do either nothing (N), induce only the entrepreneur (E), or induce both the entrepreneur and firm 1 to accept a bid (B). As for a high-match firm 2, it may either do E or B. In what follows let (A_1, A_2) denote the action profiles of the low- and high-match firm 2, e.g, (N, B) means firm 2 does nothing when it is a low type, and it induces both to accept when its type is high. Let $\Delta(s_1) \equiv \pi_E(s_1) + w(s_1) - \pi_E(0) - w(0)$. The following are the firm-1 payoffs resulting from an acquisition of s_1 which induces the indicated firm-2 behavior:

$$\begin{aligned}
&(N,E) : \lambda(1-(q(s_1)))\underline{\Pi}_F^H + (1-\lambda(1-q(s_1)))\Pi_F + \Delta(s_1)\\
&(N,B) : \Pi_F + \Delta(s_1)\\
&(E,B) : (1-(1-\lambda)(1-q(s_1)))\Pi_F + (1-\lambda)(1-q(s_1))\underline{\Pi}_F^L + \Delta(s_1)\\
&(B,B) : \Pi_F + \Delta(s_1)\\
&(E,E) : q(s_1)\Pi_F + (1-q(s_1))(\lambda\underline{\Pi}_F^H + (1-\lambda)\underline{\Pi}_F^L) + \Delta(s_1)\\
&(B,E) : \lambda(1-(q(s_1)))\underline{\Pi}_F^H + (1-\lambda(1-q(s_1)))\Pi_F + \Delta(s_1)
\end{aligned}$$

To illustrate how to calculate these payoffs, consider the case (N, E), where the low-match firm 2 does nothing and the high-match induces only the entrepreneur to accept (while firm 1 would try to block such an acquihire attempt by firm 2). Observe that the lowest bid at which the entrepreneur is willing to sell a stake s_1 to firm 1 is $p_1 + d_1 = \pi_E(0) + w(0) - (1-s_1)\pi_E(s_1) - w(s_1)$. As we are considering the case (N, E), so that a low-match firm 2 would do nothing, yielding a payoff of

$$\Pi_F + s_1\pi_E(s_1) - (\pi_E(0) + w(0) - (1-s_1)\pi_E(s_1) - w(s_1)) = \Pi_F + \Delta(s_1). \tag{B.9}$$

A high-match firm 2 would make a bid that firm 1 will try to block, succeeding with probability $q(s_1)$, yielding the following payoff to firm 1

$$q(s_1)\left(\Pi_F + \Delta(s_1)\right) + (1-q(s_1))\left(\underline{\Pi}_F^H + \Delta(s_1)\right). \tag{B.10}$$

Adding (B.9) and (B.10) up while multiplying them with the probabilities $1-\lambda$ and λ, respectively, we obtain the expression in the above list.[16] Finally, to complete the list, note that an acquihire gives a payoff $\bar{\Pi}_F^L - \pi_E(0) - w(0)$ to firm 1 and doing nothing results in $\lambda\underline{\Pi}_F^H + (1-\lambda)\Pi_F$.

To determine firm 1's equilibrium strategy, we need to further distinguish between three cases three cases based on the values of the thresholds s^H, s^L, and $\hat{s}$. Recall that a low-match firm 2 will do nothing below $\hat{s}$, induce the entrepreneur between $\hat{s}$ and s^L and potentially induce both above s^L, while a high-match firm 2 will induce only the entrepreneur below s^H and may induce both above it.

Case 1: $s^H \leq \hat{s} \leq s^L$. Note that this allows only for four types of firm-2 behavior following an investment. If $s_1 \leq s^H$, then we have (N, E), a low-match firm 2 does nothing and a high-match induces only the entrepreneur ; if $s^H < s_1 \leq \hat{s}$, then we have (N, B), namely a low-match firm 2 does nothing and a high-match induces both; if $\hat{s} < s_1 \leq s^L$, then a low-match firm 2 induces the entrepreneur and a high-match induces both, so we have (E, B); and if $s_1 > s^L$, both types of firm 2 induce both, so we end up with (B, B). Comparing these payoffs, we observe that an acquihire dominates investments inducing (B, B) and (E, B), while an investment inducing (N, B) dominates an acquihire. Thus, the remaining actions are doing nothing, inducing (N, E) or inducing (N, B).

$$\begin{aligned}
(N, E) &: \lambda(1-(q(s_1)))\underline{\Pi}_F^H + (1-\lambda(1-q(s_1)))\Pi_F + \Delta(s_1) \\
(N, B) &: \Pi_F + \Delta(s_1) \\
(N) &: \lambda\underline{\Pi}_F^H + (1-\lambda)\Pi_F,
\end{aligned}$$

where the investment necessary to induce (N, B) is bigger than the one for (N, E) but both are smaller than $\hat{s}$ so that $\Pi_F + \pi_E(s_1) + w(s_1) \geq \bar{\Pi}_F^L$. We note that:

- As $\lambda \to 0$ doing nothing dominates both types of investment
- For $\lambda > \frac{\pi_E(0)+w(0)-\pi_E(s_1)-w(s_1)}{\Pi_F - \underline{\Pi}_F^H}$ inducing (N, B) dominates (N)
- Depending on parameters, (N, E) or (N, B) is the better investment, but for low enough λ inducing (N, E) is always better

In summary, there is a threshold value for λ below which doing nothing is best, then for larger λ inducing (N, E) is better, and for very large λ, depending on parameters, inducing (N, B) may be best.

Case 2: $\hat{s} \leq s^H \leq s^L$. Note that this allows only for four types of firm-2 behavior following an investment: (N, E), (E, E), (E, B) and (B, B). Proceeding as above, we find

[16]Observe that the size of firm 1's investment s_1 is not the same across cases in the above list, as different investment sizes induce the different behaviors of firm 2.

that there is a threshold value for λ below which doing nothing is best, then for larger λ inducing (N, E) is better, and for very large λ, depending on parameters, doing an acquihire may be best.

Case 3: $\hat{s} \leq s^L \leq s^H$. Note that this allows only for four types of firm-2 behavior following an investment: (N, E), (E, E), (B, E) and (B, B). Proceeding as above, we find that there is a threshold value for λ below which doing nothing is best, then for larger λ inducing (N, E) is better, and for very large λ, depending on parameters, doing an acquihire may be best. ■

B.5 Unknown Order of Moves

We consider a variation of our baseline model in which the order in which the firms move is privately drawn by nature with uniform probabilities. Hence, firm 1 is not necessarily moving first anymore. Specifically, when firm i gets to interact with the startup, it does not directly observe whether the other firm has already interacted with the startup. Still, firm i can make a bid to acquihire the startup, which the entrepreneur can accept or reject. Ex-ante probabilities of the firms' private match types are unchanged and the payoffs following an acquisition, too. We obtain the following result.

Proposition B5 *Under Assumption 1, there exists a symmetric equilibrium in which all firms acquihire the startup at price π_E independently of their type if*

$$\lambda \geq \lambda'_A \equiv \frac{\pi_E + \underline{\Pi}_F^L - \bar{\Pi}_F^L}{\underline{\Pi}_F^L - \underline{\Pi}_F^H}. \tag{B.11}$$

PROOF: Suppose that firm j behaves as suggested in the proposition and that the entrepreneur accepts bids if and only if they are at least π_E. We consider the incentives of firm i. Given Assumption 1, it is a dominant strategy for a high-match firm i to make a bid π_E to do an acquihire whenever it has the chance to do so. Now, consider a low-match firm i. Given that firm j would always do an acquihire, firm i knows that it is moving first. Hence, doing nothing yields a payoff of $\lambda\underline{\Pi}_F^H + (1-\lambda)\underline{\Pi}_F^L$, while doing an acquihire yields $\bar{\Pi}_F^L - \pi_E$. Hence, doing the acquihire is optimal if and only if $\lambda \geq \lambda'_A$, completing the proof. ■

The result shows that our result in Proposition 1 remains qualitatively unchanged when firms do not the order in which they move. In particular, talent hoarding continues to arise as long as high types are sufficiently likely.

B.6 Surplus Sharing

We modify our baseline model to allow for arbitrary degrees of surplus sharing between the entrepreneur and the firm when an acquihire takes place. Thus, firms still move sequentially, but in case of an acquihire the entrepreneur receives a share $\gamma \in [0,1]$ of the surplus. We define surplus here as the difference between the joint payoffs arising from an acquihire and the joint payoffs arising in the case of no acquihire.

Proposition B6 *Talent hoarding can happen if the following condition holds:*

$$\gamma \leq \frac{\bar{\Pi}_F^L - \underline{\Pi}_F^H - \pi_E}{\bar{\Pi}_F^H - \Pi_F - \pi_E}.$$

PROOF: We solve the game backward. Consider a high-match firm 2. The surplus resulting from an acquihire is given by $\bar{\Pi}_F^H - \Pi_F - \pi_E > 0$ so that an acquihire takes place and the resulting payoffs for firm 2 and the entrepreneur read $\Pi_F + (1-\gamma)(\bar{\Pi}_F^H - \Pi_F - \pi_E)$ and $\pi_E + \gamma(\bar{\Pi}_F^H - \Pi_F - \pi_E)$, respectively. Consider a low-match firm 2. The surplus then reads $\bar{\Pi}_F^L - \Pi_F - \pi_E < 0$ so that no acquihire takes place.

Moving to period 1, consider a high-match firm 1. The surplus resulting from an acquihire reads

$$\begin{aligned}&\bar{\Pi}_F^H - (\lambda\underline{\Pi}_F^H + (1-\lambda)\Pi_F) - ((1-\lambda)\pi_E + \lambda(\pi_E + \gamma(\bar{\Pi}_F^H - \Pi_F - \pi_E)))\\&= (\bar{\Pi}_F^H - \Pi_F - \pi_E)(1-\lambda\gamma) + \lambda(\Pi_F - \underline{\Pi}_F^H) \geq 0,\end{aligned}$$

so that an acquihire takes place. Consider a low-match firm 1. The surplus resulting from an acquihire reads

$$(\bar{\Pi}_F^H - \Pi_F - \pi_E)(1-\lambda\gamma) + \lambda(\Pi_F - \underline{\Pi}_F^H) + \bar{\Pi}_F^L - \bar{\Pi}_F^H.$$

This expression is positive (implying that an acquihire is profitable) whenever

$$\lambda \geq \lambda_{A,S} \equiv \frac{\pi_E + \Pi_F - \bar{\Pi}_F^L}{\Pi_F - \underline{\Pi}_F^H - \gamma(\bar{\Pi}_F^H - \Pi_F - \pi_E)},$$

for $\Pi_F - \underline{\Pi}_F^H - \gamma(\bar{\Pi}_F^H - \Pi_F - \pi_E) > 0$. We have $\lambda_{A,S} \leq 1$ whenever the condition stated in the proposition holds. ■