SPACS' DIRECTORS NETWORK: CONFLICTS OF INTEREST, COMPENSATION, AND COMPETITION*

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Abstract

In 2010-2021, 972 SPACs raised $271 billion and hired 4,056 directors to facilitate mergers with private firms. We show theoretically and empirically that entrant SPACs inefficiently front-run the deal flow by hiring incumbent SPACs' directors. Incumbent SPAC's lower compensation and longer time to liquidation decrease directors' compensation from the entrant SPAC but increase the chance for the conflict of interest to emerge. Empirically, higher pay by the entrant SPAC increases the chance that a director misallocates the target, hurting the returns of the incumbent SPAC's investors. Our welfare analysis provides conditions when banning concurrent SPACs' board membership is desirable.

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1 Introduction

Talent is a scarce resource. Organizations constantly compete to secure the services of top-tier professionals (Rosen, 1981). Everyone wants to get the best money manager, financial advisor, CEO, director, tax advisor, surgeon, or copy editor. This competition, in turn, generates incentives for talented individuals to prioritize certain tasks over others, potentially leading to inefficiencies and welfare losses (Murphy et al., 1991). To ensure the optimal allocation of resources and the overall well-being of various stakeholders, it is crucial to understand the dynamics of competition for talent and how it influences the decision-making process of highly skilled professionals in finance and other disciplines.

In the context of this competition, talented experts are often required to manage multiple tasks with varying degrees of urgency and importance. When faced with competing demands, these individuals may be influenced by incentives offered by different firms, which can distort their priorities and lead to an inefficient allocation of their time and effort. Consequently, this misallocation can have negative repercussions on the welfare of organizations, their stakeholders, and the broader economy.

A prime example of this phenomenon can be observed in the case of a director involved in a Special Purpose Acquisition Company (SPAC). A SPAC director has a limited timeframe, typically two years, to identify a suitable private company for a merger and convert it into a publicly traded firm. If the director fails to complete a deal within the stipulated period, welfare losses may occur. Now, consider a scenario where a new SPAC enters the market and hires the same director, legally permissible in this context. The new SPAC also has a two-year deadline to identify a merger target and is a direct competitor to the incumbent SPAC.

If the new SPAC offers substantial incentives, such as stocks, to the director, the latter may prioritize allocating a lucrative target to the new SPAC, leaving the original SPAC without a deal. This situation highlights the inefficiencies that can arise when competition for talent generates incentives that skew the priorities of experts, ultimately leading to suboptimal outcomes. To develop effective policies and governance structures that mitigate such inefficiencies, it is essential to investigate the dynamics of competition for talent, the incentives that drive these experts, and the potential consequences of their prioritization decisions on various stakeholders and the economy as a whole.

In this paper, we build a novel model of sequential competition between two competing principals who hire a talented agent to perform time-sensitive tasks for them. The compensation that each principal pays and the deadline for each task determine the order in which the agent undertakes the tasks. This order is important because a welfare loss exists when the agent prioritizes tasks inefficiently. The main insight from the model is that competition between the principals generates a conflict of interest in prioritizing tasks and limits the economies of scale from skilled labor.

We apply this model to derive several testable predictions about competition and test these predictions using a hand-collected database for SPACs. In recent years, merging with a SPAC has become a major alternative way for companies to go public to traditional IPO. In 2020-2021, SPAC IPO volume reached more than $200 billion. Since 2010, 417 SPACs merged or announced a merger with private firms. These mergers created public firms with an aggregate pre-money valuation of $743 billion. At the end of 2021, 534 SPACs were still searching for a target. Even if no new SPACs raise money from investors, the M&A activity from the existing SPACs has the potential to generate mergers in excess of one trillion USD.

Specifically, we test our model's predictions on optimal director's compensation, director's conflict of interest in allocating targets, market reaction to directors' appointment to sit on another board, and non-redeeming investors' returns from losing targets to another SPAC that hired the same director. In addition, we use the model to perform an extensive welfare analysis of the trade-off between the benefit of hiring the same talented director by many firms and the cost of allocational efficiency due to the agency problem. We provide conditions when a policy that restricts SPAC directors to sit on multiple boards is beneficial.

To conduct our tests, we collect the most comprehensive data about SPACs currently available. We use this data to test whether the conflict of interest exists, whether competition for directors generates this conflict, and whether investors suffer from the conflicted directors' decisions. Overall, our empirical results provide strong evidence for inefficient mergers that hurt unsophisticated investors.

The theoretical contribution of the paper is to build a theoretical framework that analyzes how conflicts of interest limit the economies of scale in utilization of the best talent by several organizations. We show when it is optimal for an entrant SPAC to hire a director who sits on another SPAC's board and incentivize her to inefficiently redirect best merger deals to the entrant SPAC. To create the conflict of interest, the entrant needs not only to compensate the director more than her current compensation from the incumbent but also to pay a premium to compensate the director for the liquidation risk of the incumbent. This risk exists because of the limited time SPACs have to find a target. If a director misallocates a target to the entrant SPAC, she takes the risk that the incumbent SPAC will not be able to merge with a high-quality target before it needs to liquidate. In this case, the incumbent will inefficiently merge with a low-quality target, leading to lower returns for both the director and the investors. We identify two regions in the parameter space such that in the first region, the entrant decides to compete with the incumbent. In this region, the optimal compensation by the entrant is increasing in the liquidation risk of the incumbent. In the second region, it is costly for the entrant SPAC to compete. The compensation in this region does not depend on the liquidation risk of the incumbent. This asymmetry concerning the liquidation risk allows us to derive unique empirical predictions that we test in the data.

Another paper's contribution is to collect and merge data that provides a comprehensive view of SPACs' directors' network, SPACs' characteristics and returns, and directors' characteristics and compensation. We obtain the SPAC management teams' identities by web-scraping the 424-B4 and 424-B3 filings from EDGAR. To study SPACs' board composition and director credentials, we then hand-collect the SPAC directors' biographical information from Capital IQ and hand-match it with the SPAC sample. Our final sample contains information on 972 SPACs with 5,072 individual directors and officers from 2010 to 2021. To the best of our knowledge, this is one of the most comprehensive datasets on SPACs in general and on SPACs' board members in particular.

Using these data, we construct a novel dynamic network of SPACs' directors to conduct three tests of the model predictions. First, we use a triple interaction term to show that the elasticity of the entrant's compensation to the incumbent's compensation is increasing in the liquidation risk of the incumbent, but only in the competition region that is structurally derived from the model. In other words, if an entrant decides to buy the loyalty of the director, it is not sufficient to outbid the incumbent by one dollar, as a standard model would suggest, the entrant needs to pay a significant premium for stealing a target from a SPAC that is close to its liquidation boundary. When the initial compensation of the director is too high or when the liquidation risk is too high, the entrant is likely to wait patiently in the queue for its turn to get a good target. In this case, the director's compensation does not depend on the liquidation risk of the incumbent, exactly as predicted by the model.

To show how directors inefficiently allocate targets to SPACs, we construct a sample of incumbent-entrant pairs linked by a common director. We define a dummy equal to one if an entrant inefficiently received a target before the incumbent. We use a logit model to study how the probability of the inefficient allocation of a target depends on the compensation of the director in each of the SPACs and on the incumbent's liquidation risk. We find that this probability is increasing in the compensation that the entrant pays to the director and is decreasing in the incumbent's compensation and liquidation risk. Directors that have significantly more shares in the SPAC that has more remaining time to search for a target prefer for this SPAC to merge with a target rather than to allocate the target to the other

SPAC that IPOed earlier and has a tighter deadline to find a target. These results show that the endogenous conflict of interest that the entrant SPAC generates has real consequences.

Besides SPACs' decisions and directors' decisions, we also analyze investors' decisions. We use an event study to show that incumbent SPAC investors lose a significant cumulative abnormal return of up to 5% when one of their SPAC's directors joins a board of a new competing SPAC. There is no effect if the new SPAC is not generating a conflict of interest for the director. We also calculate investors' returns from merging with a target (deSPACing). The unconditional return from deSPACing is more than 18%. When a director misallocates a target, the return for non-redeeming investors in the incumbent SPAC is negative and significant. Moreover, we find that the return is positive for investors in the entrant's SPAC that finds the target first and shares a director with the incumbent SPAC. When a SPAC announces a target, investors have the right to redeem their shares for $10, which is the amount they paid at the IPO. In theory, this redemption option should provide sufficient protection for investors against conflicted directors. Sophisticated investors should exercise their options and redeem the shares when directors misallocate good targets. We find that there are unsophisticated or inattentive investors who do not redeem shares optimally. These investors' returns suffer significantly from the conflicted directors' decisions.

The conflict of interest between directors can have a significant welfare implication. The main concern is that some SPACs will merge with low-quality targets as they run out of time to find a high-quality one. We compute the expected number of mergers with low-quality targets under four scenarios. First, when there is only a risk that a SPAC will prefer to merge with a low-quality target rather than return funds to the investor. This baseline risk results in 2.6 bad mergers for every 100 SPACs. Then we compute the case when there is scarce financial talent who can find high-quality targets. If there is only one skilled director for every two SPACs, then the number of bad targets increases 100% relative to the benchmark case. The third case is when the scarcity of talent results in the endogenous conflict of interest, what happens in 65% of the cases in the data. In this case, the expected number of mergers with bad targets increases to 138% relative to the benchmark. In a hypothetical case when the conflict of interest would exist for every connected director, the expected number of bad targets would be 158% relative to the benchmark. This simple decomposition of the welfare losses helps us to see how different frictions result in welfare losses.

We find that the net effect of the conflict of interest on the expected number of bad targets is non-monotonic with respect to the skill of the director, because more skilled directors are more likely to encounter a situation of the conflict of interest but because of their skill the welfare loss from this conflict is limited because they are likely to find a good target to both

SPACs.

To derive policy implications, we study a policy proposal to limit the ability of a SPAC's directors to sit on multiple boards simultaneously. Our results suggest that the net benefit from the policy depends on whether talented directors can leave current boards to join a new board and on the general quality of SPAC directors who would replace experienced directors who currently sit on multiple boards.

Related literature. The paper contributes to several strands of literature. The theoretical contribution is to the principal-agent literature that studies optimal contracts between a principal and an agent who needs to exert unobservable effort. Sensitivity to performance is an important feature of such contracts (Grossman and Hart (1983); Holmstrom and Milgrom (1987)). Fershtman and Judd (1987) study a case with two competing principals, each one with one agent. Holmstrom and Milgrom (1991) study a case when the agent has multiple tasks to perform. Our model builds on this literature by studying sequential competition between two principals for the order in which an agent performs time-sensitive tasks they assign to him. Both principals provide contracts that are sensitive to performance and depend on the deadlines. We characterize when the inefficient competition will take place and, if it does, how much premium the second principal who hires the agent later needs to pay to outcompete the first principal and how this premium depends on the deadline the agent has on the first contract. The competition is inefficient because the planner's solution is for the agent to execute tasks in the order of their urgency.

Our paper also contributes to the corporate governance literature that studies interlocked boards. The principal in our model is a sponsor of a SPAC, and the agent is a director who can sit on several SPAC boards. The role played by directors is one of the most important questions in the corporate governance literature (Shleifer and Vishny, 1997). Extensive research studies board interlocks, in which the same director sits on the boards of multiple companies.[1] Levit and Malenko (2016) show that directors' desire to be invited to other boards creates strategic complementarity of corporate governance across firms. In recent work, Cai et al. (2022) shows that incumbent directors are more likely to appoint new directors who have connections to the incumbent board. The novelty of our paper is to theoretically and empirically show that interlocked boards introduce a trade-off between the economies of scale from reusing the scarce pool of talented directors and the conflicts of interest that these directors have due to serving on multiple boards. We analyze this conflict from the perspective of SPACs, directors, investors, and regulators. We find strong empirical

[1] See e.g. Pfeffer 1972, Palmer 1983, Westphal and Zajac 1997, Mizruchi 1989, Fich and White 2005, Larcker et al. 2013, Chiu et al. 2013, Renneboog and Zhao 2014, Faleye et al. 2014, Akbas et al. 2016, Garcia-Bernardo and Takes 2018, and Cheng et al. 2019.

evidence for the conflict of interest and inefficient mergers between SPACs and private firms.

Our paper also contributes to the literature on competition for scarce talent in finance that results in high equilibrium compensation. Berk and Green (2004) presents a model where the ability of active fund managers to identify investment opportunities is a scarce resource. Fama and French (2010) find few active funds generate returns sufficient to cover their costs after accounting for benchmark adjustments. To attract top talent, firms often offer high compensation packages. Ibert et al. (2018) study the compensation of Swedish mutual fund managers and find large income inequality where the top 10 percent of talented managers earn more than twice as median managers. But this competition for talent can also create welfare loss. Bénabou and Tirole (2016) demonstrate that high incentives offered by firms to attract talent can decrease managers' interest in unincentivized tasks and lead to a welfare loss. Acharya and Volpin (2010) and Dicks (2012) show that firms may need to overpay their executives to remain competitive when their (poorly governed) competitors offer high salaries. Bijlsma et al. (2018) find that competition for top traders can lead banks to take excessive risks due to both trader moral hazard over investment projects and adverse selection on trader abilities. Additionally, Acharya et al. (2016) show that competition for talent can increase risk-taking if firms gradually learn about the abilities of their managers. Our paper adds to this literature by studying the competition for skilled SPAC directors who have experience as CEOs of public companies, investment bankers, venture capitalists, or partners in private equity funds. We show how competition for this talent drives compensation upwards and introduces a conflict of interest problem that distorts the efficient allocation of resources.

The paper also belongs to a small but fast growing SPACs literature. Klausner et al. (2020) find that the post-merger performance of SPACs is worse than companies that went public through the traditional IPO process. They argue that SPACs suffer from much larger dilution than a traditional IPO, and investors who do not redeem their shares bear the dilution cost. Ritter et al. (2022) find that warrant investors enjoy a much higher return than common share investors. Aryal et al. (2022) study investors' motivation in participating in SPAC deals, they find that large repeated investors' participation signals the quality of the deal, and small investors participate in exchange for agency rent. Feng et al. (2022) build a structural model to study SPAC sponsors' incentives to merge with a low-quality target even if it is against the interest of SPAC investors. Gryglewicz et al. (2021) builds a theoretical model and shows that compared to PE-to-IPO financing, SPAC financing more efficiently resolves firms' adverse selection issues. Fortney (2021) puts forward a legal analysis of SPAC directors' compensation and its implications for SPAC's directors under Delaware law. Banerjee and Szydlowski (2021) build a theoretical model to study the role of SPAC investors' overconfidence in the security design for SPAC IPOs. Another theory work by Luo and Sun (2021) shows that SPACs are incentivized to merge with low-quality targets as they approach the deadline. Our paper contributes to the SPAC literature by linking the director network to SPACs' performance. Moreover, this paper looks at all SPACs that went through the IPO process, including those SPACs that have not gone through the de-SPAC process. Most importantly, our paper is the first to identify the conflict of interest faced by SPAC directors on interlocked boards. To the best of our knowledge, our paper is the first to present a comprehensive analysis of decisions by SPACs' investors, directors, sponsors, and regulators.

This paper also relates to the literature that studies incentives in the financial industry. Del Guercio et al. (2018) show that mutual funds whose managers also manage hedge funds significantly underperform their peers because of the managers' conflict of interest. Egan et al. (2017) show that brokers' conflicting interests can result in dominated bonds allocated to investors' portfolios. Egan et al. (2019) study the prevalence of misconduct in the financial industry. Chalmers and Reuter (2020) show how the conflict of interests affects financial advice about portfolio allocation. Our paper contributes to this literature by showing that SPAC directors' incentives result in losses to unsophisticated investors who trust directors to act in their best interest.

2 Institutional Details

2.1 SPAC Directors' Conflict of Interest

SPACs are known as "blank-check" shell companies created for the sole purpose of acquiring an unspecified target company. The nature of the blank check company means that the company has no operating business or assets other than a limited investment at the time of its IPO. All IPO proceeds are put into a trust account and cannot be used for any operating business up until the merger is completed. The sponsors put their own money as "risk" capital to cover the operating expenses and, in return, get "founder shares" equal to 20% of the total post-IPO outstanding shares. After IPO, the SPAC starts the target-searching process. Once a suitable target is located and a merger deal is negotiated, the SPAC announces the target to the public, and the "deSPAC" process starts. Before the merger is completed, public investors have the right to redeem their shares back in exchange for their initial investment plus any interest accumulated in the trust account. Through a successful merger, the private company becomes publicly listed using the deSPAC process. The target-searching and the deSPAC process need to be completed usually within two years (investors can vote to extend the deadline to finish an announced merger). Otherwise, the SPAC is liquidated, and all founder shares become worthless. Figure 1 illustrates the life cycle of a typical SPAC.

Figure 1: SPAC Life Cycle

This figure illustrates the typical timeline of a SPAC.

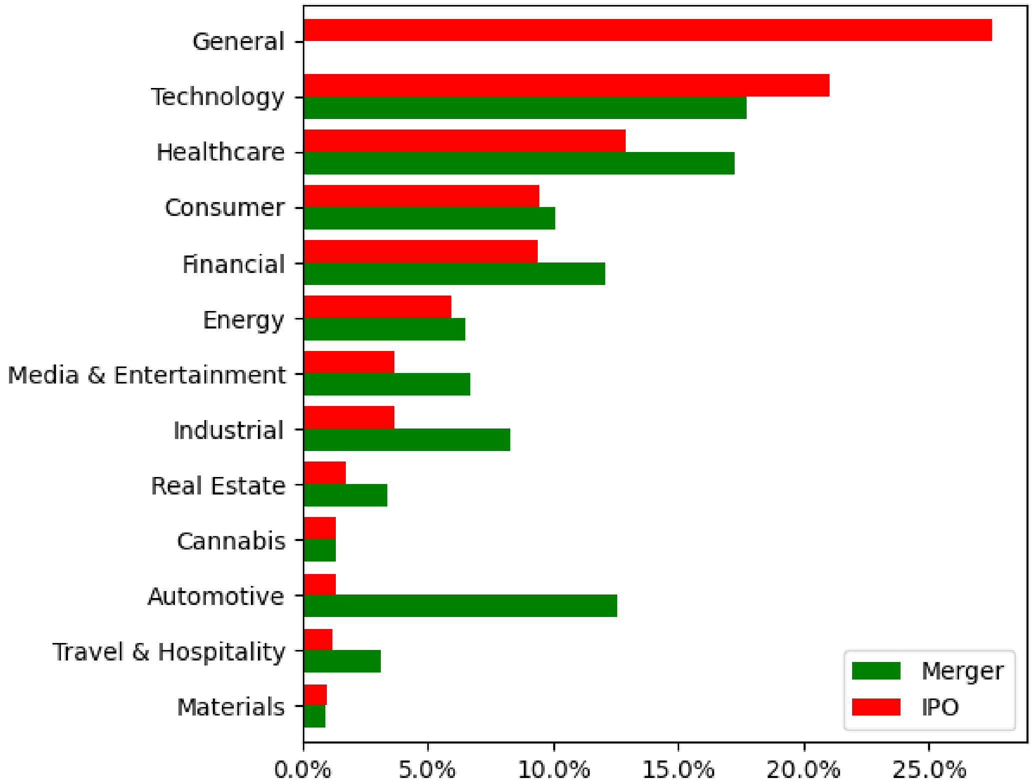
The SPAC's sponsor elects SPAC's directors. Unlike operating companies, the SPAC's board of directors also plays the management role. A SPAC's management team usually consists of around five directors and another non-director officer who is usually a secretary. For this reason, we do not distinguish managers and directors throughout our analysis.

The primary function of the SPAC board is to find and select a private operating company with which the SPAC can merge. Upon completion of the SPAC's IPO, the SPAC's directors begin the process of locating, identifying, pursuing and reviewing potential target companies. Directors may bring to the SPAC's attention target business candidates that they become aware of through their business contacts as a result of informal inquiries or discussions they may have, as well as attending trade shows or conventions. In addition, SPACs' directors' contacts and corporate relationships in various industries developed throughout their careers are also crucial in building proprietary deal flow opportunities.

Importantly, SPACs' directors are not obligated to bring all opportunities to the SPAC. Most SPACs are incorporated in Delaware, where the corporate opportunity waivers (COWs) introduced in 2000 exempted directors from fiduciary restrictions of using board information in pursuit of outside corporate opportunities. Other SPACs are also incorporated in states (countries) that are loose on the legal liability associated with the fiduciary duty of the director[2]. Without the fiduciary duty, overlapping SPAC directors are exempted from a particular legal liability as they could not be accused of carrying confidential board information to a rival SPAC board. This leads to serious concerns about the conflict of interest

[2]Table A.1 reports the state (if incorporated in the U.S.) or country in which the SPAC is incorporated at the time it files for its IPO for the SPAC sample used in our analysis.

Figure 2: Distribution of the SPAC's Target Sector at IPO



This figure reports the percentage distribution of sectors targeted at IPO and sectors of post-merger companies of SPACs that filed original S-1 filings from January 2010 to December 2021.

in interlocked SPACs boards.

Empirically, it is quite common that a SPAC's director also sits on the board of another SPAC competing with the focal SPAC for acquisition opportunities. At the time of an IPO, SPACs sometimes mention several industries that they intend to focus on. However, these targeted industries are broadly defined, and SPACs are not obligated to merge with a target in the specified industries. Figure 2 reports the distribution of target industries mentioned in SPACs' IPO prospectuses. About one-third of SPACs in our sample do not target any specific industry. The distribution of specified target industries and the industries of actual post-merger companies do not always match either. As a result, the director who sits on boards of competing SPACs may become aware of investment and business opportunities that are appropriate for presentation to both SPACs.

In such circumstances, the director may have conflicts of interest in determining to which SPAC a particular business opportunity should be presented. The conflicts may not be resolved in the focal SPAC's favor, and a potential target may be presented to a rival SPAC.

If the rival SPAC decides to pursue such an opportunity, the focal SPAC may be precluded from procuring such an opportunity. In the S-1 reporting to the SEC, SPACs usually warn investors that investment ideas generated within the SPAC, including by any of the SPAC's directors, may be presented by a director to the rival SPAC.

2.2 Directors' Compensation

Directors are expected to exert unobservable effort in finding a high quality target for a merger. To align their incentives, SPAC directors receive pre-IPO founder shares from the sponsor. The performance-based compensation is backloaded, which sets up a stage for the conflict of interest that we study. Unlike publicly issued SPAC shares, founder shares are not redeemable and become worthless if no suitable merger candidate is found within two years. On the other hand, these founder shares become very valuable upon a merger. For example, following Churchill III's merger, each director held, on average, shares valued at over $3 million. This level of compensation serves as a powerful economic incentive for the director to prioritize a competing SPAC that offers a larger number of founder shares, even though the focal SPAC faces a higher liquidation risk.

Taking the director's conflict of interest problem into account, entrant SPACs that are new to the market will have the incentive to endogenously induce the director to misallocate the target by aggressively compensating directors sitting on the board of incumbent SPACs. As a result, the incumbent SPACs may lose suitable targets to their competitors.

2.3 Consequences of Conflicts: Value-decreasing Mergers

The potential conflicts described above may limit the SPAC's ability to enter into a business combination, which may adversely affect the SPAC's performance. To avoid liquidation, a SPAC is incentivized to enter into a value-decreasing merger with a low-quality private company, leading to losses by unsophisticated investors.

The institutional background sheds light on the causes and consequences of the conflict of interest problem faced by directors sitting on the boards of competing SPACs. In the next section, we build a simple model to analyze the endogenous conflict of interest that emerges from competition between two principals (SPACs) and one agent (a director).

3 Model and Testable Hypotheses

3.1 Model Setup

Consider an incumbent SPAC and an entrant SPAC share a director. The director has ability to find good targets at Poisson rate λ. Bad targets are always available. When a good target arrives, the director decides whether to allocate it to an incumbent or to an entrant SPAC. If a good target is not allocated to a SPAC before its deadline, the SPAC merges with a bad target. Without loss of generality, the post-merger share price is normalized to 1 when the SPAC merges with a good target and normalized to 0 when the SPAC merges with a bad target. Both the SPACs and the director are risk neutral and have a common discount rate $r = 0$. We study the entrant's decision to compensate the director at the time of the entrant's IPO. The main role of the director is to find a target for the SPAC.

Figure 3: Timeline

Timeline Figure 3 represents the time flow of our model, which consists of events occurring in the following order:

1. At time 0, the incumbent SPAC gets publicly listed and offers the director S_I shares. The director starts searching for targets for the incumbent.

2. At time τ, the entrant SPAC gets publicly listed and invites the same director to sit on its board. The entrant offers the director S_E shares out of its S founder shares[3].

3. The director searches for good targets with the arrival rate λ. Good targets are short-lived. Receiving a good target, the director can choose to allocate the target to one of her SPACs that has not found a target. Allocated with a good target, the SPAC merges with the target through the deSPAC process and exits the game;

4. If no good target arrives during $[0, \tau]$, then during (τ, T), the director chooses to allocate available targets to either the incumbent or the entrant until both SPACs merge with a good SPAC.

5. At time T, if no target has been allocated to the incumbent, the incumbent merges with a bad target, and the game continues;

[3] SPACs' IPO offer prices are uniformly \$10, so we focus on the quantity.

6. At time $T + \tau$, if no target has been allocated to the entrant, the entrant merges with a bad target, and the game ends.

3.2 Equilibrium Concept

We focus on the subgame perfect equilibrium of the extensive game. There is perfect information in our game since each player when making any decision, is perfectly informed of all the events that have previously occurred. We begin by defining the notion of the game.

Definition 1. *An extensive game with perfect information that models the entrant and the director's decisions is* $< N, H, P >$*, which has the following components.*

- *A set of players* $N = \{entrant, director\}$*;*
- *A set* H *of finite sequences that consists of histories* $\emptyset$*,* (S_E)*;*
- *The entrant makes the first move,* $P(\emptyset) = entrant$*, and the director makes the second move,* $P(h) = director$ *for the history* $h \neq \emptyset$*.*

Next, we characterize the players' strategies. The strategy of the entrant is to choose director's compensation $S_E \in (0, S)$. The strategy of the director is to choose to allocate the first available target to the entrant or the incumbent. Therefore, her strategy can be characterized by $(\omega \in \{E, I\})$. Below we define the equilibrium concept used throughout the paper.

Definition 2. *A subgame perfect equilibrium with perfect information is a strategy profile* s^* *in* $\mathcal{T}$ *such that for every player* $i \in N$ *and every history* $h \in H$*, the strategy profile* $s^*|h$ *is a Nash equilibrium of the subgame* $\mathcal{T}(h)$*.*

3.3 Model Solution

We use backward induction to solve the model. We start with analyzing the director's problem. The director faces an allocation decision if the first target arrives after the entrant's IPO date τ and before the incumbent's liquidation deadline T. Let $\delta \in (\tau, T)$ be the arrival time of the first target, and F_ω be the director's expected payoff conditional on allocating the target to SPAC $\omega \in \{E, I\}$. Then, the director's problem can be represented by,

$$\max_{\omega \in \{E,I\}} F_\omega$$
$$s.t. \quad F_\omega \equiv \begin{cases} S_E + (1 - e^{-\lambda(T-\delta)})S_I, & \omega = E \\ S_I + (1 - e^{-\lambda(T+\tau-\delta)})S_E, & \omega = I \end{cases}$$

Proposition 1. *In equilibrium, the director allocates the first available target to the entrant when $S_E \geqslant e^{\lambda\tau} S_I$, and allocates it to the incumbent when $S_E < e^{\lambda\tau} S_I$.*

Proof. See Appendix. □

The intuition underlying Proposition 1 suggests that the director is more likely to allocate the first available good target to the entrant if she receives more compensation from the entrant and less compensation from the incumbent and if the incumbent faces a smaller liquidation risk.

Next, we turn to the entrant's problem. Taking the director's choice into consideration, the entrant chooses the optimal level of compensation for the director. Let π_c^n be the entrant's expected payoff when the number of good targets arrived between (τ, T) is n, and $S_E \geqslant e^{\lambda\tau} S_I$; π_{nc}^n be the entrant's expected payoff when the number of good targets arrived between (τ, T) is n, and $S_E < e^{\lambda\tau} S_I$. Then the entrant's problem can be represented by,

$$\max_{S_E} \{\pi_c, \pi_{nc}\}$$
$$s.t. \quad \pi_c = \Pr(n=0)\pi_c^0 + \Pr(n=1)\pi_c^1 + \Pr(n \geqslant 2)\pi_c^{2+}, \quad S_E \geqslant e^{\lambda\tau} S_I$$
$$\pi_{nc} = \Pr(n=0)\pi_{nc}^0 + \Pr(n=1)\pi_{nc}^1 + \Pr(n \geqslant 2)\pi_{nc}^{2+}, \quad S_E < e^{\lambda\tau} S_I$$

Proposition 2. *The unique equilibrium of the game is characterized by,*

- *if $S_I \leqslant \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}} S$, $S_E^* = e^{\lambda\tau} S_I$, the director allocates the first available good target to the entrant;*
- *if $S_I > \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}} S$, $S_E^* = 0$, the director allocates the first available good target to the incumbent.*

Proof. See Appendix. □

Proposition 2 defines two regions. In the region where $S_I \leqslant \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}}S$, it is optimal for the entrant to compete with the incumbent for the first available good target. To compete, the entrant offers a higher compensation than the incumbent does. Moreover, the elasticity of the compensation increases with the entrant's time advantage. In the second region where $S_I > \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}}S$, it becomes too expensive for the entrant to compete, and the entrant offers the director minimal compensation unrelated to the entrant's time advantage.

3.4 Investors' Payoffs

So far, we have shown that the director of a SPAC may have a conflict of interest and may prioritize the entrant over the incumbent. In this section, we compare the expected return for the incumbent when the entrant finds it optimal to compete versus when it is optimal for the entrant to wait.

Proposition 3. *The expected return of the incumbent is lower when the entrant finds it optimal to compete, as compared to the case when it is optimal for the entrant to wait. The difference in expected return is given by* $\lambda(T-\tau)e^{-\lambda(T+\tau)}$.

Proof. See Appendix. □

Proposition 3 demonstrates that the entrance of a competing SPAC can be a negative shock for the incumbent's shareholders. This is because the director may prioritize the entrant and postpone the search process for the incumbent, leading the incumbent to potentially merge with a lower quality target even if the director finds a target during the overlapping search period (between τ and T).

The expected returns of the incumbent and the entrant can also be analyzed based on the actual order in which they find targets. The following proposition outlines this relationship.

Proposition 4. *Conditional on finding a target at* $s \in [\tau, T]$*, the incumbent's expected return will be lowered by* $e^{-\lambda(T-s)}$ *if there is a conflict and the entrant obtains the target first. On the contrary, the entrant's expected return will be increased by* $e^{-\lambda(T+\tau-s)}$ *in this situation.*

Proposition 4 demonstrates that the director's conflict of interest can also impact the expected returns of SPACs on a conditional basis. It should be noted that the entrant's expected benefit is lower than the incumbent's expected loss, implying a potential welfare loss resulting from the director's conflict of interest. This will be further analyzed in Section 6.

3.5 Testable Hypotheses

The model provides unique implications on both the director's and the entrant's decisions as well as the entrant's and the incumbent's relative deSPAC performance. Specifically, we have the following hypotheses:

1. *Directors' Decisions.*—The director is more likely to allocate the first available target to the entrant when she receives more compensation from the entrant, less from the incumbent, and when the incumbent has a higher liquidation risk when the entrant enters. [Proposition 1]

2. *Entrants' Decisions.*—When competition is optimal, the entrant's compensation level is proportional to the number of founder shares the director receives from the incumbent. Specifically, the proportion increases in the two SPAC's liquidation deadline τ and follows an exponential function $e^{\lambda\tau}$. When waiting for the next available target is optimal, the entrant compensates the director for a minimum number of founder shares. [Proposition 2]

3. *Incumbents' Expected Returns.*—The incumbent's expected return is reduced at the time of the entrant's IPO if the entrant chooses to compete with the incumbent. This is in contrast to the case where the entrant decides to wait. [Proposition 3]

4. *SPACs' Conditional Expected Returns.*—If the director finds a target during the overlapped searching period and allocates it to the entrant due to a conflict of interest, the incumbent's conditional expected return will be lower, while the entrant's conditional expected return will be higher. [Proposition 4]

Next, we empirically test the above implications using a comprehensive SPAC dataset and provide evidence consistent with each of the implications. We start by describing our data sources and how we constructed our sample.

4 Data and Variables

4.1 Data Sources and Sample Construction

One of our contributions is to create one of the most comprehensive databases on SPACs, their performance, their investors, and their boards that is currently available. In this section we describe how we collect and merge the data to construct our sample.

The SPAC data come from two commercial SPAC databases: SPAC Research[4] and PrivateRaise's SPAC Search[5], which include all SPACs that register an S-1 filing with the Securities and Exchange Commission (SEC) from January 2010 to December 2021. The data show information about individual SPACs collected via public filings, including the deal structure, the timeline of key events, and the de-SPACing outcomes. We exclude SPACs that are traded in the Over-the-Counter (OTC) markets due to potential unobserved differences between SPACs traded in major exchanges and OTC markets. We further supplement our data sample with SDC Platinum's new issue database, which provides information about the exercise of the over-allotment option during the SPAC's IPO process. We further hand-collect historical pricing data for each SPAC from Bloomberg.

We construct a SPAC directors' network based on the SPAC's past and concurrent connections to other SPACs through common board members. We obtain the SPAC management team's identities at the time of its IPO by web-scraping the 424-B4 and 424-B3 filings from Edgar. For each SPAC, Edgar provides the name, age, and position of the SPAC manager. We match Edgar's SPAC management team to our SPAC sample using the Central Index Key (CIK). To the best of our knowledge, ours is the first paper to use web-scraped data for the SPAC's complete board member information from SEC filings 424-B4 and 424-B3.

To study the SPACs' board's composition and sponsors' credentials, we hand-collect biographical information on current and prior boards of directors and senior company officers from Capital IQ. Specifically, we collect the name, age, gender, the director's current and past roles, and the start and end years for every company at which they served, a binary variable indicating whether the individual serves (served) on the board of directors in the current (past) employment position, all the graduate and undergraduate degrees they received, and the institutions that granted the degrees. We group the degrees into four categories: (i) JD/MD (Juris doctorate or medical doctorate degree), (ii) MBA (Master of Business Administration), (iii) Master (Master of Arts or Master of Science), and (iv) Bachelor (general undergraduate). We group the work experience into three categories: (i) CEO Public (chief executive officer at a public company), (ii) Investment Banking (board director at an investment bank), and (iii) VC/PE (board director at a venture capital or private equity firm). We then manually match each individual in the SPAC's management team to individuals in Capital IQ.

In addition to the SPAC's characteristics and the director's biographical information, we

[4]https://www.spacresearch.com/
[5]https://www.privateraise.com/

also need to know the director's compensation. We complement our data with the director's beneficially owned shares data from the Capital IQ database.

Following the methodology described above, we identify 972 SPACs that IPOed between January 2010 and December 2021, and either merged (271), announced a target (146), are still looking for a target (534) or were liquidated (21). This is the base sample we use in our analysis.

Panel A of Table 1 shows the main characteristics of the SPACs in our sample. An average SPAC raises 279 million US dollars through its IPO process, which includes a base amount of 251 million dollars, and an exercised overallotment option of 29 million dollars. The average IPO investor earns a 1.83% first-day return. When a SPAC announces a target, it is roughly 13 months away from its liquidation deadline.

4.2 Directors' Network Measures

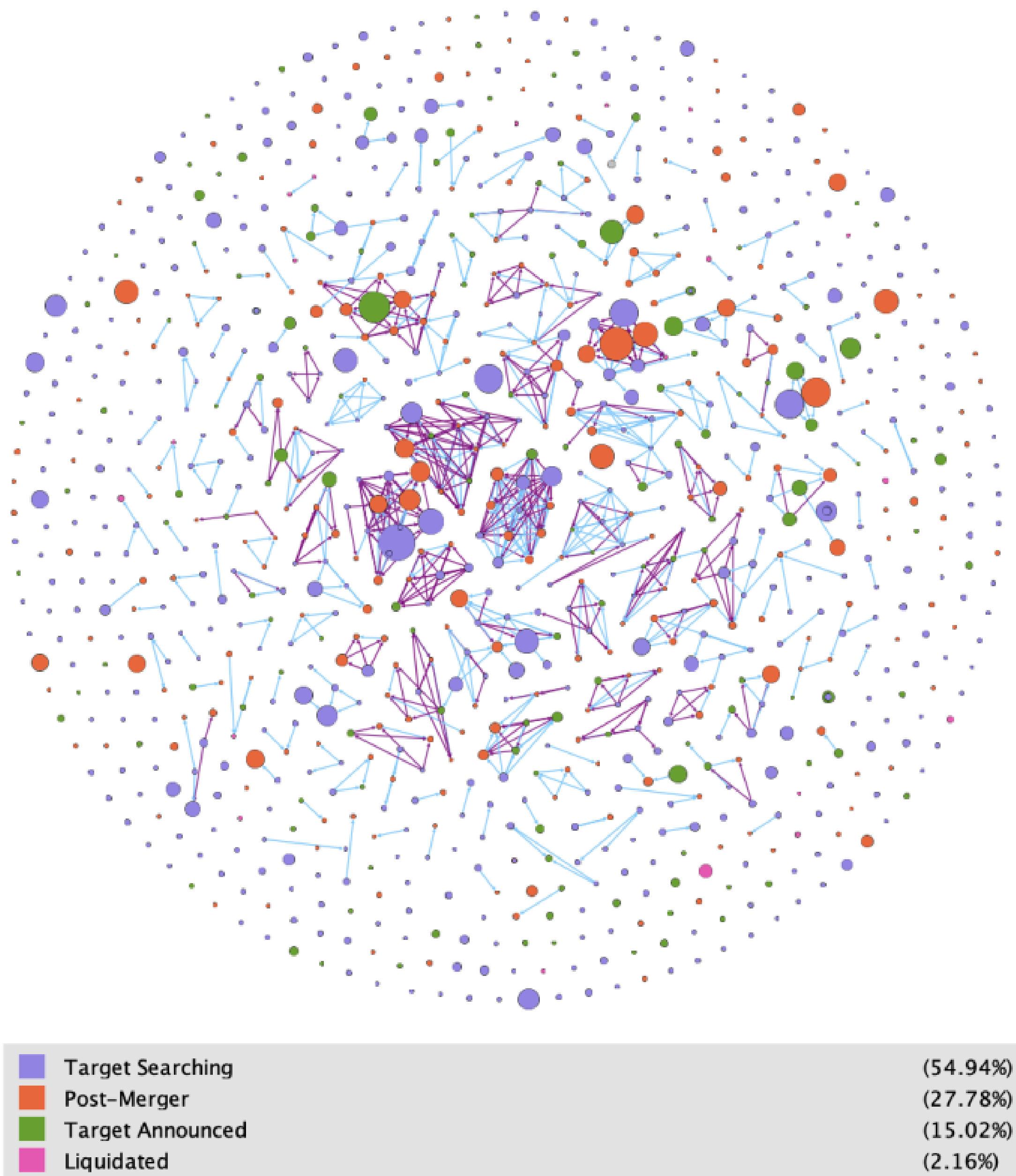
A SPAC's board contains roughly 5 directors, with an average age of 54 years old. The management team also has another officer that does not sit on the board. About 16 percent of SPAC directors are female and 17 percent are/were chief executive officers in a publicly-traded, non-SPAC company. 7 percent are/were directors in investment banks, and 14 percent serve/served in that role in venture capital or private equity firms. In terms of educational background, 13 percent of directors hold a JD/MD degree, 38 percent have a Master's in Business Administration (MBA) degree, 19 percent of directors have a general master's degree, and over 81 percent of directors have a bachelor's degree.

We define the SPAC director's network ("board interlock network") as a directed graph g, in which each SPAC is a node, and a SPAC has an out-edge to another SPAC if the two share at least one board member. Figure 4 visualizes the status of the SPAC's board interlock network in December 2021.

Two types of links exist based on the other SPAC's status: past connections to non-competing SPACs that have successfully deSPACed at the time of the focal SPAC's IPO, and connections to competing SPACs that have target-searching periods overlapping with the focal SPAC. We can further split connections into four groups based on the (1) if the director has a conflict of interest problem and prioritize the entrant; (2) if the SPAC is an incumbent or an entrant relative to its connected SPAC.

Figure 5 gives an illustrative example of the construction of our network measures. In this figure, SPAC A is our SPAC of interest. SPAC A's directors are connected to five different

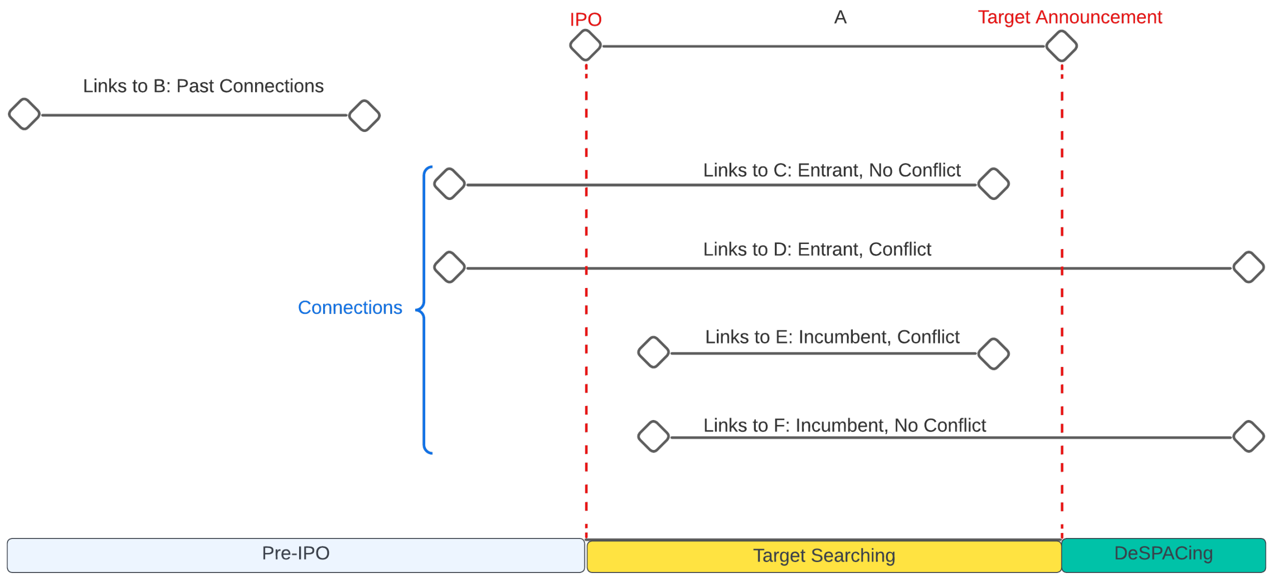
Figure 4: Network Visualization at December 2021



This figure shows the board interlock network for SPACs that filed original S-1 filings from January 2010 to December 2021. Each node is a SPAC, node size is proportional to the SPAC's IPO proceeds. A SPAC is connected to another SPAC through a board interlock. The more purple the edge is, the more board members are connected.

typoes of SPACs, B, C, D, E, and F. Since SPAC B has already found its target before SPAC A enters the market, we define "Past Connections" to be the number of SPACs like B. SPAC A has four competitors, C, D, E, and F, since SPAC A's target searching period overlaps with these four SPACs' searching periods. Compared to SPACs C and D, SPAC A is an

Figure 5: DeSPAC Network Measures



This figure illustrates different types of board interlock connections formed during a SPAC's target searching period.

entrant since it enters the market later. We define links to SPACs of type C as "Entrant, No Conflict" since the entrant (SPAC A) finds a target later than the incumbent (SPAC C), and accordingly, links to SPACs of type D as "Entrant, Conflict" since the incumbent (SPAC D) finds a target later than the entrant (SPAC A). SPAC A is an incumbent compared to SPACs E and F since they started searching for targets after SPAC A. Similarly, we define links to SPACs of type E as "Incumbent, Conflict" and links to SPACs of type F as "Incumbent, No Conflict".

Panel A of Table 1 shows that, on average, the SPACs in our sample have 0.56 past connections to successful previous SPACs and 0.48 connections to competitors. Out of the 0.48 connections, 29% are instances where the SPAC is an incumbent, while the remaining 71% are instances where the SPAC is an entrant. In approximately 14% of the connections where the SPAC is an incumbent, the director has a potential conflict of interest. In contrast, among the connections where the SPAC is an entrant, the director has a potential conflict of interest in about 85% of the connections.

4.3 DeSPAC Performance Measures

To measure SPAC performance we employ two measures that we define below.

Redemption Rate.—Percentage of public shares redeemed. Public investors have the choice to redeem their shares back after the business combination is announced if they do not want to invest in the post-merger company. Keeping holding on to shares instead of redeeming them is akin to traditional public equity investing and no longer comes with redemption rights after the merger is completed. Thus, a higher redemption rate indicates a worse market reaction to the proposed merger. In addition, most merger deals require the SPAC to meet a minimum cash requirement. If more than a certain share amount is redeemed, the minimum cash amount set forth in the merger agreement may not be satisfied, and the business combination may not be completed. Thus, the redemption rate also measures the liquidation risk of the SPAC.

Post-merger Return.—A SPAC's post-merger return is measured as the percentage return of the SPAC's share at the deSPAC stage. Specifically, we follow the methodology used in Klausner et al. (2020) by first defining the redemption price, which is the price at which the SPAC trades the day before the merger is announced. Using that price, we then calculate the post-merger returns for each SPAC as follows:

$$\textit{Post-merger return} := \frac{\textit{Business Combination Closing Price}}{\textit{Redemption Price}} - 1,$$

Panel A of Table 1 shows that after the target announcement, 46 percent of SPAC shareholders choose to redeem their shares. Investors who keep holding their SPAC shares on average receive 18.30% post-merger returns.

4.4 SPAC Pairs

To examine entrant and director decisions, we create a database of all connected SPAC pairs in our sample, where each pair consists of two SPACs: an incumbent and an entrant. The incumbent went public before the entrant, and the two SPACs share at least one board member. Thus, each observation represents a triplet of (entrant, director, incumbent).

Panel B of Table 1 summarizes the SPAC pairs. In total, we have 197 entrants linked with 205 incumbents, generating 557 triplets of (entrant, director, incumbent). On average, 60% of entrants found a target earlier than incumbents. Directors receive 0.89 million shares from entrants and 1.10 million shares from incumbents. There is a 90-day gap between the liquidation deadline of the incumbent and the entrant. Around 81% of entrants face a lower cost of competition. Entrants, in general, raise less cash through the IPO process. The average IPO proceeds for entrants and incumbents are 369 and 435 million dollars, respectively.

The incumbent and the entrant have similar board sizes, consisting of 6 directors.

We identify approximately 4,056 directors for our SPAC sample. 343 directors are invited to join an entrant SPAC's board while simultaneously searching for targets for other incumbent SPACs. We compare the key characteristics of these "connected" directors with other directors to understand the reason why entrant SPACs are chasing these directors, even though they may face conflicts of interest in allocating suitable targets.

Table 2 shows the main characteristics of connected directors and compares them to all other directors for SPACs in our sample. Connected directors, on average, have more experience in SPACs, managing public companies, and other investment-related business, i.e., they participated in more SPACs that deSPACed in the past, and have more work experience as either executives or directors in public companies, investment banks, as well as VC/PE companies. Moreover, they receive more than twice as many founder shares as those received by other directors.

Table 3 provides additional evidence on the connected directors' potentially higher ability in finding targets and completing SPAC deals using logistic regressions. SPACs are more likely to invite competitors' directors who have a history of making successful SPAC deals to join its board. In addition, directors who were directors in investment banks or current executives in VC/PE firms are more likely to join a competing SPAC board. Our results are consistent with the story that experienced SPAC directors who have developed long-term relationships with a wide range of private companies are well-positioned to identify and execute attractive business combination opportunities and are invited to join multiple SPACs that are simultaneously seeking targets.

Sitting on the boards of two competing SPACs, the director faces a conflicted choice when a target suitable for both SPACs becomes available: she can allocate the target to the incumbent SPAC that faces a higher liquidation risk, or she can allocate the target to the entrant SPAC when enough compensation is provided. Next, we show that new SPACs strategically set connected directors' compensation levels based on incentives to compete with the incumbent SPACs.

5 Empirical Methodology and Evidence

In this section, we empirically test the main implications of our model.

5.1 Directors' Decisions

The intuition behind Proposition 1 is as follows. A director evaluates both her skin in the game and the entrant's continuation value when she makes the decision. On the one side, she leans towards the entrant if she receives more compensation from the entrant and less from the incumbent. On the other side, she feels pressured to immediately sacrifice the incumbent if the incumbent faces a higher liquidation risk at the time when the entrant enters.

We use a logit regression to test the above implications. Specifically, we estimate the following empirical model,

$$\mathbb{1}\{\texttt{Entrant First}\} = logit(\beta_1 S_E + \beta_2 S_I + \beta_3 \tau + \mathbf{X}\boldsymbol{\Delta} + \epsilon), \tag{1}$$

where each observation is a triplet of {entrant, director, incumbent}. $\mathbb{1}\{\textit{Entrant First}\}$ is a dummy variable equal to one if the entrant announced the target before the incumbent, and zero otherwise. S_E and S_I are the number of shares the director receives from the entrant and the incumbent, respectively. τ is the number of days left for the incumbent when the entrant enters. $\mathbf{X}$ contains a set of control variables that control for the difference between the incumbent and the entrant, as well as the characteristics of the director.

According to Proposition 1, we should expect a positive estimation coefficient of β_1 and negative coefficients of β_2 and β_3.

We present estimation results of Eq. (1) in Table 4. Column (1) includes three key explanatory variables: the number of shares the director receives from the entrant, S_E; the number of shares the director receives from the incumbent, S_I; and the liquidation risk of the incumbent when the entrant enters, τ. The signs on the estimated coefficients align with the model predictions. If the director receives more compensation from the entrant, they are more likely to prioritize the entrant over the incumbent. Similarly, if the director receives less compensation from the incumbent, they are also more likely to prioritize the entrant. In addition, when the incumbent is facing a higher liquidation risk, the director is more likely to prioritize the incumbent over the entrant, as they are less willing to sacrifice the incumbent for the sake of the entrant.

In Table 4, column (2), we account for differences between the two SPACs and the directors' characteristics that can also explain the relative speed of target search. SPACs that obtained more capital through an IPO may seek out companies with a greater valuation, which is likely to take longer to negotiate. Having a larger number of board members could also increase the number of desirable candidates and improve the screening and bargaining process. The previous and present relationships of directors to other SPACs can also influence the relative priority of finding a target. If a director currently serves on the boards of a second incumbent, the conflicted director may allocate targets available to the second incumbent to the entrant too. Thus, the entrant may have a greater chance of locating a target first. In addition, the director's prior experience in the SPAC market may help her in the future. Thus, a director who has more past connections is more likely to identify a target than other directors within the same time frame. Therefore, an entrant with a more experienced director may be more ready to wait until the director identifies a target for the incumbent, rather than competing for the incumbent's target at a high cost. In addition, Column (2) also controls for the director's biographical information, working experience, and educational level.

In Table 4, column (3), we add additional dummies for the IPO quarter to account for the different market conditions. Column (4) adds the entrant's IPO sector dummies to account for any differences in the time required to discover targets across industries. Figure A.2 plots the area under the Receiver Operating Characteristic (ROC) curve using the specification in column (4). According to the rule of thumb from Hosmer Jr et al. (2013), our empirical model's classification accuracy is "excellent" given that the area under the curve equals 0.8618. We cluster standard errors at the director level for all specifications to allow for correlation between the same director's preferences.[6]

In Table 4, column (4), we demonstrate that if the director receives one standard deviation more shares from the entrant, the estimated probability of the entrant finding a target before the incumbent rises by 3.1 percentage points (5.2% of the sample mean), assuming that all other variables are held constant at their average values. In contrast, if the incumbent compensates the director with one standard deviation more shares, the entrant's likelihood of finding a target first is reduced by 9.4 percentage points (15.7% of the sample mean). In addition, if the incumbent's liquidation risk at the time of the entrant's entrance increases by one standard deviation, the likelihood that the entrant would locate a target before the incumbent reduces by 17.2 percentage points (28.6% of the sample mean).

[6] Results in Table 4 are robust to other clustering methods too, including clustering at the entrant level, at the (entrant, director) level, and the (entrant, director, incumbent) level.

5.2 Entrants' Decisions

Next, we test Implication 2, which directly flows from Proposition 2. The implication indicates that when an entrant decides to invite a director who also sits on a board of a competing incumbent to join its board, the entrant's optimal choice of compensation takes two different functional forms based on a cutoff: $\mathbb{1}\{Competition\} \equiv \mathbb{1}\{S_I \leqslant \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}} S\}$. When $\mathbb{1}\{Competition\}$ equals one, it is optimal for the entrant to compete with the incumbent for the first available target by providing the director with a compensation level that is an exponential function of the two SPACs' liquidation risk difference, τ. However, when $\mathbb{1}\{Competition\}$ equals zero, competition becomes too costly for the entrant, and minimal compensation is provided to the director.

We use a triple interaction to capture this nonlinear relationship. Specifically, we estimate the following regression model,

$$\begin{aligned} S_E = {} & \beta_1 \times \mathbb{1}\{\text{Competition}\} \times e^{\lambda\tau} \times S_I + \beta_2 \times e^{\lambda\tau} \times S_I \\ & + \beta_3 \times \mathbb{1}\{\text{Competition}\} \times S_I + \beta_4 \times \mathbb{1}\{\text{Competition}\} \times e^{\lambda\tau} + \beta_5 \times \mathbb{1}\{\text{Competition}\} \\ & + \beta_6 \times e^{\lambda\tau} + \beta_7 \times S_I + \mathbf{X}\Delta + \epsilon, \end{aligned} \tag{2}$$

where S_E, S_I, and τ are defined same as the previous section. $\mathbf{X}$ contains a set of control variables of the entrant and the director's characteristics that may affect the director's compensation.

According to Proposition 2, we expect a positive and significant estimate of β_1, which indicates that when it is optimal for the entrant to compete, the entrant offers the director with compensation proportional to what she receives from the incumbent, and the proportion increases exponentially as the incumbent's liquidation risk τ increases. In contrast, we expect a zero estimate of β_2 and a minimal estimate of β_7, indicating that when it is optimal for the entrant to wait, the entrant offers the director with a minimal compensationthat is unrelated to the incumbent's τ liquidation risk.

To conduct our study, we need an estimate of the arrival rate λ, which is the inverse of the number of searching days for the connected director. To avoid the complexity of multiple connections, we choose the subsample of SPACs that only connects to only one SPAC. To ensure that the connected directors do not prioritize competitors, we additionally select those SPACs that find their target before their competitors. The final sample includes 66 SPACs. Then, we estimate our λ by using their average target searching days of 201 days, i.e., $\lambda = 1/201$.

We present the estimation results of Eq. (2) in Table 5.[7] Column (1) includes the key explanatory variables in the model. The directions of the coefficient estimates align with the implications from Proposition 2. The positive sign on the triple interaction term, $\mathbb{1}\{\text{Competition}\} \times e^{\lambda\tau} \times S_I$, suggests that when competition is optimal, the entrant compensates the director with shares proportional to what she receives from the incumbent. In addition, the marginal compensation is larger if the incumbent faces a higher liquidation risk. In contrast, we find a zero coefficient estimate on $e^{\lambda\tau} \times S_I$, which aligns with the model prediction that when the competition cost is too high, the entrant chooses to wait for future targets instead of competing with the incumbent for currently available targets. Thus, the entrant no longer needs to consider the relative liquidation risk difference when compensating the director.

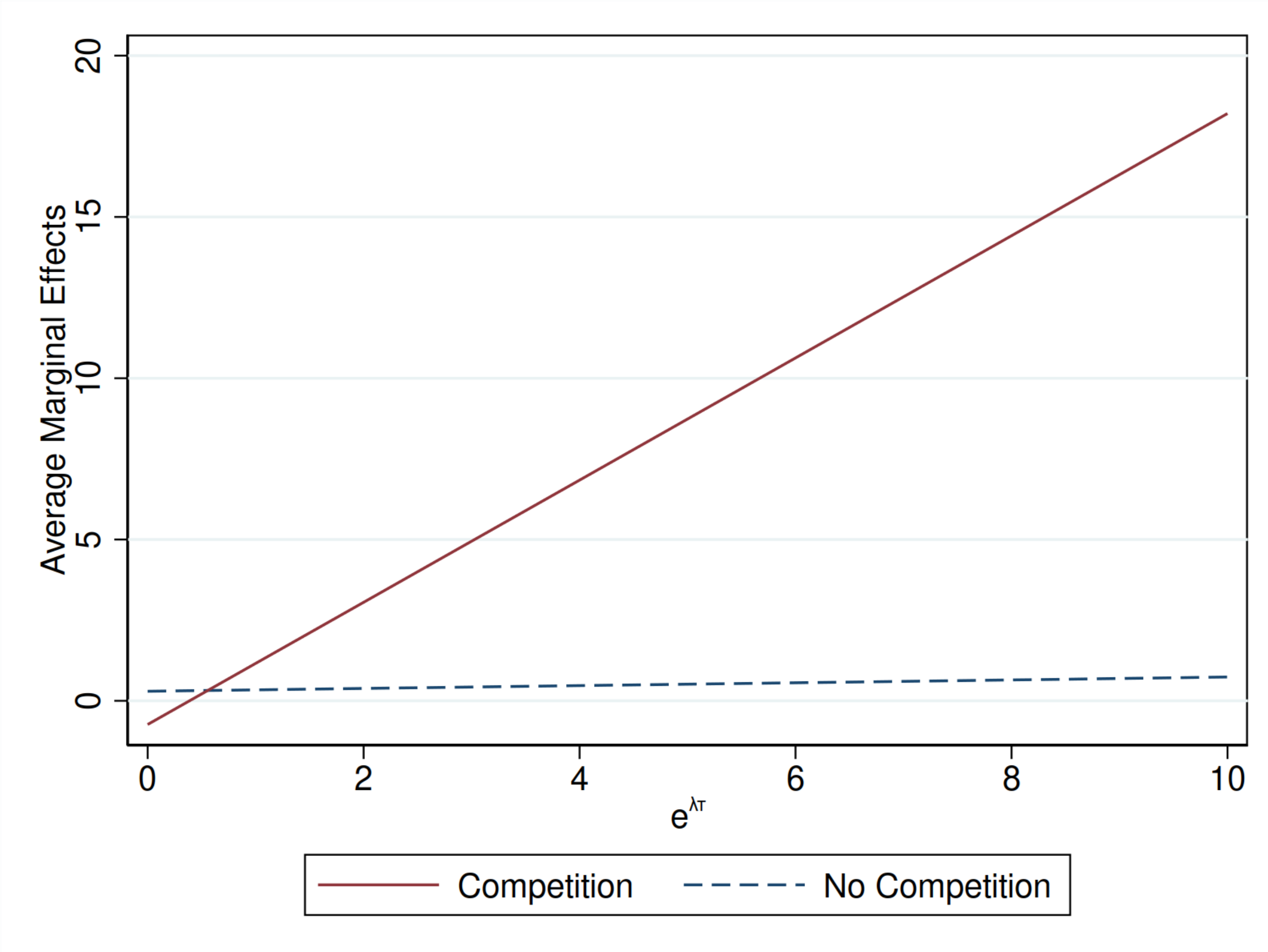
In Table 5, columns (2)-(4), we gradually introduce different sets of control variables that may also affect the director's compensation from the entrant. Column (2) controls the characteristics of the entrant and the director. Column (3) and column (4) additionally control for the entrant's IPO quarter and sector fixed effects to absorb unobserved common shocks at the time and industry level. All standard errors are double clustered at the entrant and director level to allow correlation among compensations given by the same SPAC and also received by the same director.[8]

Using coefficient estimates from column (4), Figure 6 plots the average marginal effects of S_I on S_E at different values of $e^{\lambda\tau}$. The solid line plots for the subsample where the competition is optimal. It is clear the marginal compensation is larger when the incumbent has a higher liquidation risk, i.e., when τ is larger. Specifically, for each share the director receives from the incumbent, an entrant needs to compensate the director 3.0 shares to compete with an incumbent of average liquidation risk (τ=93), and 6.8 shares if the incumbent's liquidation risk is one standard deviation higher than average (τ=259). The dashed line plots for the subsample where it is optimal for the entrant to wait. The marginal compensation stays constant and does not vary with the incumbent's liquidation risk. In terms of economic magnitude, the entrant compensates the director for 0.3 shares for each share she receives from the incumbent.

[7] We winsorize compensation shares S_I and S_E at 99^{th} percentile to reduce the influence of extreme values on our results, which can be particularly significant in triple interaction regressions.

[8] Results in Table 5 are robust when we cluster standard errors only at the entrant and only at the SPAC level.

Figure 6: Average Marginal Effects



This figure plots the average marginal effects of the entrant's shares on the incumbent's shares when $e^{\lambda\tau}$ is held constant at different values. The dashed line and the dot line plots for the subsamples where the entrant competes and does not compete with the incumbent, respectively, using the full sample. The solid line and the dash-dot line plots for the subsamples where the entrant competes and does not compete with the incumbent, respectively, using the subsample where the director has at least one past connection.

5.3 Event Study

In this section, we aim to verify Implication 3 by estimating the impact of a new entrant's IPO on the stock returns of incumbent SPACs. To do this, we will calculate the cumulative abnormal return (CAR) of incumbent SPACs around the event date of the entrant's IPO.

We use three benchmark models to estimate the expected return of the incumbent firm's stock: the Capital Asset Pricing Model (CAPM), the Fama-French three-factor model (FF3), and the Fama-French five-factor model (FF5). To calculate the CAR, we first specify an event window around the event date and then choose an estimation window starting from the incumbent's IPO and ending five days before the beginning of the event window. Using the returns data from the estimation window, we estimate the expected return and calculate the abnormal return (AR) for each incumbent firm as AR = actual return - expected return.

To measure the overall impact of the entrant's IPO on the incumbent SPACs over the event window, we sum up the abnormal returns within the event window to obtain the CAR. We then average the CARs across all incumbent SPACs to obtain the cumulative average abnormal return (CAAR). Table 7 reports the estimated CAARs using different event windows and benchmark models for the subsample where it is optimal for the entrant to either compete or wait.

The CAARs have the expected signs: on average, the CAAR is negative and statistically significant if it is optimal for the entrant to compete, and not significant when the entrant finds it optimal to wait. The economic magnitudes are also significant, with the CAAR ranging from -1.741 (CAPM, [-3,3]) to -5.153 (CAPM, [-10, 10]). This means that, on average, the incumbent SPAC's security price decreases by 1.741 to 5.153 percentage points after the IPO of an entrant who is predicted to compete.

5.4 DeSPAC Performance

In this section, we conduct an empirical examination of the Implication 4. Specifically, we look at both the incumbent and the entrant's performance conditional on a target being found. Based on the relative order of announcing a target, we say that conflict exists when the entrant first announces a target, and say that there is no conflict if the incumbent first announces a target.

Empirically, the estimate the following regression.

$$\begin{aligned} \texttt{DeSPAC Performance}_{i,t} = &\beta_0 + \beta_1 \texttt{Incumbent, Conflict}_{i,t} \\ &+ \beta_2 \texttt{Incumbent, No Conflict}_{i,t} \\ &+ \beta_3 \texttt{Entrant, Conflict}_{i,t} \\ &+ \beta_4 \texttt{Entrant, No Conflict}_{i,t} \\ &+ \mathbf{X}\Delta + \epsilon_{i,t}, \end{aligned} \tag{3}$$

where *DeSPAC Performance*$_{i,t}$ is the SPAC's merger performance measure. For each incumbent, *Incumbent, Conflict* counts the number of connected entrants that find targets before the incumbent, whereas *Incumbent, No Conflict* counts the number of connected entrants that find targets after the incumbent. Similarly, for each entrant, *Entrant, Conflict* counts the number of connected incumbents that find targets after the entrant, whereas *Entrant,* *No Conflict* counts the number of connected incumbents that find targets before the entrant.

First, we evaluate the deSPAC performance based on the SPAC's post-merger return. According to Implication 4, we expect $\beta_1 < \beta_2$ and $\beta_3 > \beta_4$. The estimation results in Table 6 validate our hypotheses. Column (1) shows that an incumbent's post-merger return is reduced by 68.6 percentagge points when it faces an additional conflict situation. This means that an average public investor who does not redeem their investment would experience a 50.3% loss, rather than earning an 18.30% return. In contrast, the incumbent's post-merger return on average does not change if there is no conflict. On the other hand, when an entrant connects to an additional incumbent, its post-merger return is increased by 25.7 percentage points if the director favors the entrant, but there is no such benefit if the director prioritizes the incumbent. Control variables include the SPAC's size, liquidation risk at the announcement, and board characteristics. In addition, we control for the IPO target sector, the merger sector, and time-fixed effects conditions out time-invariant differences across SPACs targeting different sectors and those across target companies in different sectors, as well as time-varying factors at the announcement quarter level. Robust standard errors are clustered at the target announcement quarter level.

It is possible that the network measures are simply benchmarks of the SPAC's quality (the quality of the sponsor, the abilities of other directors, etc.) that have nothing to do with the conflict of interest of the connected director. A superior entrant is more likely to swiftly identify a high-quality target quickly and hence has a larger chance of deSPACing before an incumbent. If true, the positive association between an entrant's post-merger return and the number of incumbents still seeking for targets at the time of the entrant's target announcement indicates the entrant's superior quality. Similarly, due to the incumbent's inferior quality, a negative relationship may also exist between its post-merger return and the number of entrants that locate targets before it.

If the benchmark effect is what drives our results, a SPAC should perform poorly in the deSPAC stage if a connected or unconnected competitor declares a target before it and perform well when the competitor declares a target after it. To alleviate the concern, we create a control variable for each of our network measures and reestimate Eq. (3). For example, for each incumbent, the number of *unconnected* entrants that find targets after the incumbent is counted and used as a control variable for *Incumbent, Conflict*. Column (2) of Table 6 shows that our results are robust and not driven by the benchmark effect.

Next, we measure the deSPAC performance of a SPAC based on its redemption rate. According to Implication 4, we expect $\beta_1 > \beta_2$ and $\beta_3 < \beta_4$. Column (3) of Table 6 contains the estimation results and validates our hypotheses. When the director additionally connects to and prioritizes an entrant, the incumbent's shareholders redeem significantly more (32.6 pps) of their shares back. In contrast, when the director allocates targets to the incumbent first, the incumbent's investors redeem 10.0 percentage points less. On the other hand, when an entrant connects to an additional incumbent and the director prioritizes the entrant, the entrant's shareholders redeem significantly fewer shares (10.7 pps), yet there is no change when the director allocates targets first to the incumbent. Column (4) of Table 6 confirms that our results are not driven by the benchmark effect.

6 Welfare Analysis

We conduct the welfare analysis in this section. A key implication of the model is that the incumbent faces a greater liquidation risk and may be forced to enter a value-decreasing merger if its director chooses to prioritize the entrant. Thus, we use the expected fraction of bad targets brought to the market per SPAC as our welfare measure.

Two key factors affect the welfare in this economy: the scarcity of talent and the director's conflict of interest problem. We start our analysis with the benchmark case where there is no scarcity of talent. Naturally, SPACs do not need to compete for skilled directors, and thus directors do not have conflicts of interest problems. The expected fraction of bad targets brought to the market is $W_1 = e^{-\lambda T}$, which is the probability that a SPAC does not find a good target during time T. In this case, SPAC sponsor prefers to deSPAC with a low quality target despite the fact that it hurts SPAC's investors. The conflict of interest for SPAC sponsors exists because they receive shares at a significant discount and they will lose their stake if they decide to return funds to the investors.[9]

Next, we study the second case where skilled directors are scarce but there is no conflict of interest. To distinguish skilled and unskilled directors' abilities in searching for good targets, we assume that unskilled directors can discover good targets at a rate of $k\lambda$, where $0 < k < 1$. Specifically, we study the case where a skilled director sits on both boards and prioritizes the incumbent. The expected fraction of bad targets brought to the market in this scenario is calculated as $W_2 = e^{-\lambda T} + \frac{1}{2}\lambda(T - \tau)e^{-\lambda(T+\tau)}$. The first term, $e^{-\lambda T}$, equals the fraction of bad targets in the first case. The second term, $\frac{1}{2}\lambda(T - \tau)e^{-\lambda(T+\tau)}$, represents the probability of the conflicted situation, where the skilled director only finds one good target in the overlapping period $[\tau, T]$ throughout the entire time period $[0, T + \tau]$. In this case, the entrant SPAC would have to merge with a bad target.

[9] Feng et al. (2022) provide a structural model to study this incentives problem of the sponsor.

Table 8: Expected Welfare Loss for Different Cases

Case	# Skilled Directors	# SPACS	% conflicted directors	# bad mergers	% increase	Friction
1	100	100	0	2.6	0	sponsor's conflict of interest (SCI)
2	50	100	0	5.3	99.7	SCI + scarcity of talent (ST)
3	50	100	65%	6.2	137.9	SCI+ST+ partial directors' conflict of interest
4	50	100	100%	6.9	158.4	SCI+ST+ directors' conflict of interest

In the third case, the limited availability of skilled directors and the endogenous creation of a conflict of interest by some entrants leads to an expected number of bad targets brought to the market of $W_3 = e^{-\lambda T} + \frac{1-p}{2}\lambda(T-\tau)e^{-\lambda(T+\tau)} + \frac{p}{2}\lambda(T-\tau)e^{-\lambda T}$, where p denotes the fraction of entrants that find it optimal to compete with the incumbent. The first term, $e^{-\lambda T}$, is the same as the first case. The second term, $\frac{1-p}{2}\lambda(T-\tau)e^{-\lambda(T+\tau)}$, represents the probability that $(1-p)$ of entrants face the same scenario as in the second case, where the entrant SPAC must merge with a bad target due to the limited availability of skilled directors. The last term, $\frac{p}{2}\lambda(T-\tau)e^{-\lambda T}$, represents the expected fraction of bad targets when p of entrants choose to compete and create a conflict of interest for the connected directors. In this case, the director would prioritize the entrant and the incumbent's search period would stop at time T. As a result, the incumbent would have to merge with a target if there is only one good target that arrives in the time period $[\tau, T]$ throughout the entire time period $[0, T]$.

In the fourth case, the expected fraction of bad targets brought to the market is $W_4 = e^{-\lambda T} + \frac{1}{2}\lambda(T-\tau)e^{-\lambda T}$. This scenario is similar to the third case but with the assumption that all directors face a conflict of interest and prioritize the entrant. The second term, $\frac{1}{2}\lambda(T-\tau)e^{-\lambda T}$, represents the probability that the entrant SPAC will merge with a bad target due to the limited availability of skilled directors and the fact that all directors prioritize the entrant. Essentially, this scenario is the same as the third case with $p = 1$, indicating that all entrants choose to compete and create a conflict of interest for the connected directors.

We present the welfare loss in relative terms: the percentage increase in the expected fraction of bad targets compared to the first case. From the data, we know that a SPAC typically has two years (730 days) following its IPO to find a target. On average, a new entrant enters the market 93 days after the incumbent, and on average, it is optimal for the entrant to compete 65% of the time. Using these numbers, we calculate the expected number of bad targets per SPAC.

Table 8 shows the welfare loss in each case. In the first (benchmark) case, 2.6 bad targets out of 100 are brought to the market due to the sponsor's conflict of interest. With the limited availability of skilled directors, the second case brings 5.3 bad targets. When entrants also create a conflict of interest problem for the directors, the third case has 6.2 bad targets. When all directors are conflicted, the number of bad targets increases to 6.9. In terms of welfare loss relative to the benchmark case, the scarcity of talent causes a 103.8% increase in the welfare loss, and the entrant's endogenous competition decision increases the welfare loss to 137.9% more than the benchmark case. When all entrants choose to compete, the welfare loss is 158.4% more than the benchmark case.

6.1 Welfare Loss from Directors' Conflicts of Interest

Next, we focus on the welfare loss caused by the director's conflict of interest problem when talent is scarce. That is, we compare the welfare loss under the fourth case where the director prioritizes the entrant and the second case where the director prioritizes the incumbent. The difference is summarized in the following proposition.

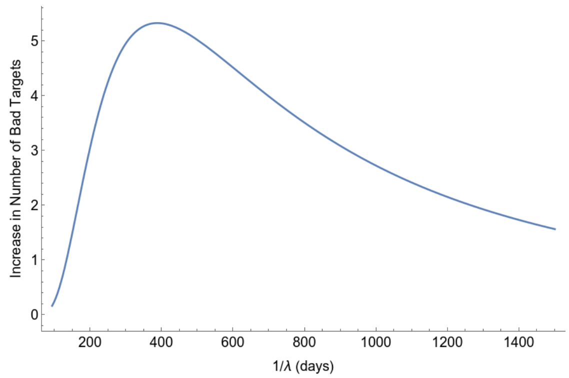
Proposition 5. *The additional number of bad targets brought to the market because of the director's conflict of interest can be represented as a product of the probability of the conflict situation (P) and the loss given conflict (LGC),*

$$\begin{aligned}\Delta W &:= W_4 - W_2 \\ &= \underbrace{\lambda(T-\tau)e^{-\lambda T}}_{\textit{Probability of Conflict (P)}} \times \underbrace{(1-e^{-\lambda\tau})}_{\textit{Loss Given Conflict (LGC)}}\end{aligned}$$

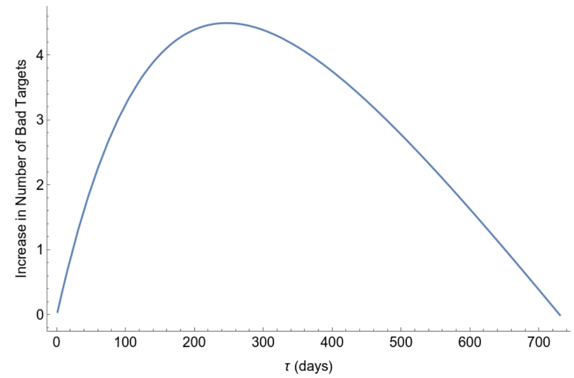
Comparative Statics. Next, we analyze the relationship between the welfare loss from the director's conflict of interest and three key parameters: (i) the expected time to find a good target, $1/\lambda$; (ii) the difference in time between the incumbent and the entrant's entrance, τ; and (iii) the maximum length of the searching period, T.

Figure 7 illustrates that the welfare loss is hump-shaped with respect to the expected time to find a target ($1/\lambda$), the entrant's entering time (τ), and the searching time endowment (T). As the director's ability decreases (corresponding to an increase in $1/\lambda$), the probability of the director encountering a conflict situation increases. However, the loss incurred in the event of a conflict decreases. When the entrant's entering time is postponed (corresponding to an increase in τ), the probability of conflict decreases because the overlapping window between the two SPACs' target searching periods shrinks. On the other hand, the loss given conflict increases due to the increased search time forfeited if the director prioritizes the incumbent lengths. Lastly, as the searching time endowment increases (corresponding to an increase in T), the probability of conflict first increases and then decreases, while the loss given conflict remains constant.

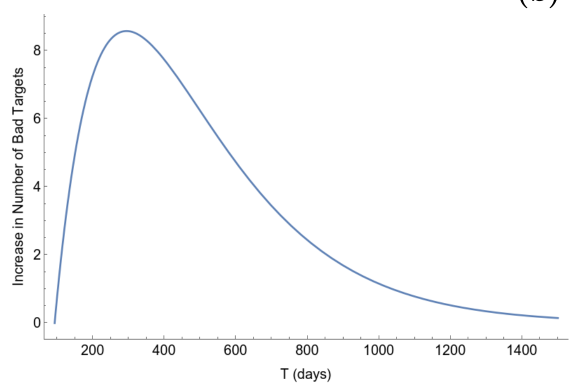
Figure 7: Welfare Loss: Comparative Statics



(a)



(b)



(c)

This figure plots the welfare loss from the director's conflict of interest as a function of λ, τ, and T, respectively, holding other variables constant at the sample average.

6.2 Regulation

We now consider the regulation that presents SPAC directors sitting on boards of multiple SPACs that are simultaneously searching for targets. Suppose there are two types of directors: skilled directors find targets at rate λ, and unskilled directors find targets at a discounted rate $k\lambda$, where $0 < k < 1$. Skilled directors are scarce, while unskilled directors have enough supply.

Consider the simple case that there is only one high-type director and she has joined the board of an incumbent SPAC. When an entrant SPAC enters the market. There are two possible outcomes of the proposed regulation. The first outcome has the skilled director staying with the incumbent until it finds a target, which we refer to as 'stay.' The second outcome is that the director resigns from the incumbent's board and joins the entrant's board, which we refer to as a 'switch.' If the director chooses to stay with the incumbent, then the entrant can only choose a low-type director. On the other hand, if the director chooses to switch to the entrant, the incumbent will keep searching for targets with the help of a low-type director.

We define the expected number of bad targets under the above two counterfactual cases as followings,

$$\begin{aligned} W_{\text{stay}} &:= \mathbb{E}[\text{bad targets under the `stay' outcome}] \\ &= \underbrace{e^{-\lambda T}}_{\mathbb{E}[\text{bad targets for the incumbent}]} + \underbrace{e^{-k\lambda T}}_{\mathbb{E}[\text{bad targets for the entrant}]}, \\ W_{\text{switch}} &:= \mathbb{E}[\text{bad targets under the `switch' outcome}] \\ &= \underbrace{e^{-\lambda(\tau+k(T-\tau))}}_{\mathbb{E}[\text{bad targets for the incumbent}]} + \underbrace{e^{-\lambda T}}_{\mathbb{E}[\text{bad targets for the entrant}]}, \end{aligned}$$

from the welfare perspective, it is clear that the 'switch' outcome dominates the 'stay' outcome because it allows the high-quality director to search for targets in a longer time window of τ. However, in reality, both outcomes are likely to happen.

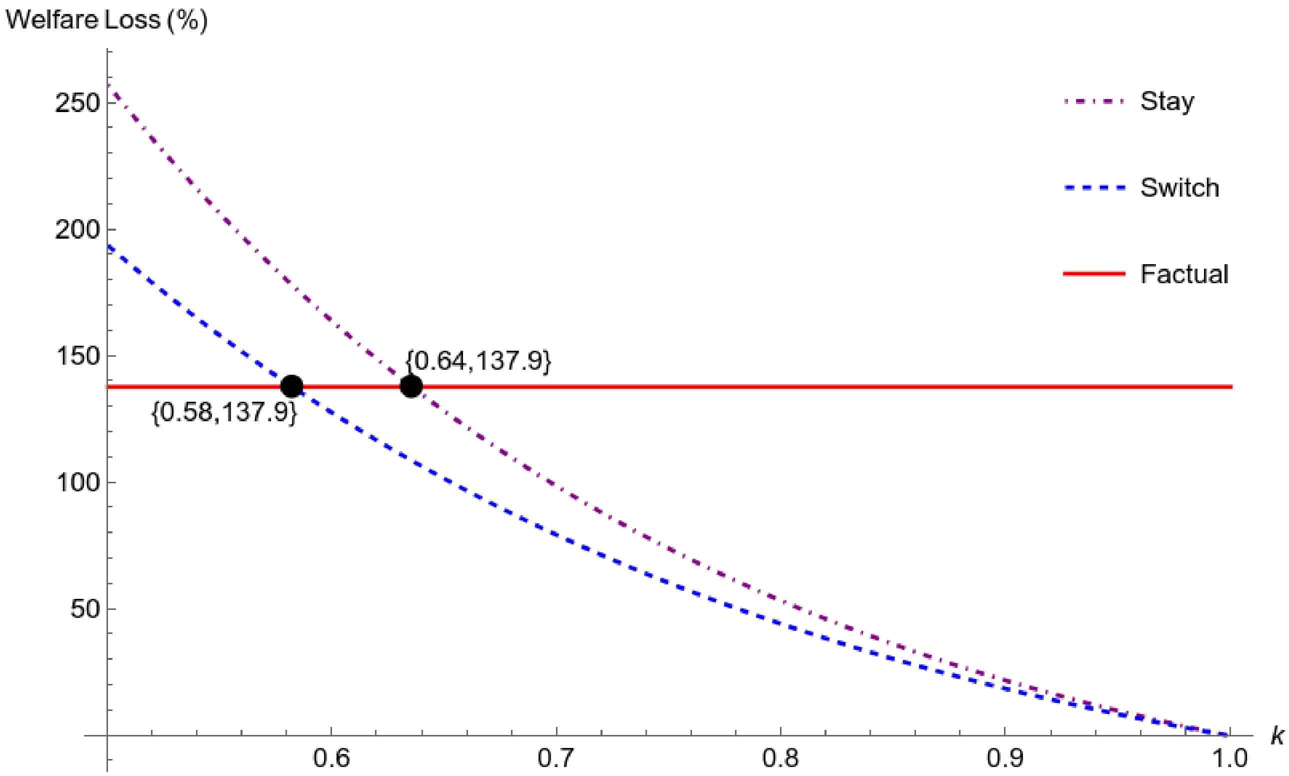
Figure 8 shows the increase in welfare loss compared to the benchmark case for the factual case 3 (solid line), the counterfactual case where the director stays with the incumbent (dotted line), and the other counterfactual case where the director switches to the entrant (dot-dashed line) as a function of k. The policy becomes more effective as the quality of unconnected directors improves, i.e., as k becomes larger. When unskilled directors can find good targets at a rate that is roughly more than half (0.58) of the rate of skilled directors, the regulation improves welfare if all directors are willing to switch to the entrant's board. If unskilled directors' rates of finding targets are 0.64 times the rates of skilled directors, the regulation will improve welfare in general.

In the data, it takes an unconnected director an average of 323 days to find a target, which implies an estimated k of 0.62. Therefore, a policy preventing directors from sitting on competing boards simultaneously will be effective if more than one-third of skilled directors find it profitable to switch. As more directors gain experience in the SPAC market, we expect k to increase over time, making the policy more effective in the long run.

6.3 Policy Implications

Our paper presents a new conflict of interest that is not addressed by the current rule-making. We use network analysis to show that SPAC directors who sit on several SPAC boards misallocate targets, impose losses on SPAC investors, and increase the likelihood

Figure 8: Effectiveness of a Ban



This figure plots the welfare loss from the director's conflict of interest as a function of λ, τ, and T, respectively, holding other variables constant at the sample average.

that some SPACs liquidate inefficiently or deSPAC with a low quality target. Moreover, we show both theoretically and empirically that the conflict of interest is endogenous because new SPACs "bribe" directors of existing SPACs to allocate targets inefficiently. A policy that bans concurrent board membership for SPAC board members would eliminate the conflict of interest concerns but it will also reduce the economies of scale from using skilled directors to find good targets. This is a new trade-off that regulators face in this market. Our policy analysis shows that the net benefit of the ban depends on whether directors will resign from incumbent SPACs to join new SPACs or not. It also depends crucially on the talent of a connected director to find targets relative to the second-best alternative. If the talent is very high, the economies of scale from having the same director on two boards outweigh the costs of the conflict of interest. Overall, the policy implication of our results is that smart regulation is needed to address the conflict of interest introduced by interlocked SPAC boards but a simple ban on concurrent board membership is not always optimal.

7 Conclusion

SPACs have become one of the major players in bringing private firms public. Private firms can benefit from a fast listing on major stock exchanges by merging with SPACs. In this paper, we show that the board of directors plays a crucial role in SPAC's performance. We document that the same board member can sit on multiple SPAC boards. That creates a conflict of interest because a board member needs to decide which SPAC should get a promising target. The efficient allocation rule is to allocate a target to the SPAC with the highest liquidation risk. We find that directors do not follow this rule. They are more likely to allocate a target to an entrant SPAC when they have a higher economic interest in this merger.

Investors are negatively affected by this conflict of interest. We see that the incumbent SPAC's redemption rate is higher, and the returns are significantly lower when an entrant SPAC deSPACs first. However, for the misallocation to take place, it is not sufficient for a director to have more shares in the entrant than in the incumbent because of the higher liquidation risk of the incumbent. Therefore, entrant SPAC's sponsors should compensate conflicted directors for this extra liquidation risk if they want to get the target first. We theoretically and empirically show that when incumbent SPAC directors are not highly compensated or the liquidation risk is not too high, entrant SPACs endogenously generate a conflict of interest for these directors. For directors who are already highly compensated or when the liquidation risk is very high, entrant SPACs prefer to wait for their turn to get a target because competition is too costly.

These results have an important policy implication. We study the benefits and the costs of a regulator that bans concurrent board membership for SPAC directors. SPACs are special because they usually do not introduce any synergy from the merger. Therefore, the competition between them is more severe, and as such, the conflict of interest is especially strong. However, there is also a significant benefit of highly skilled directors searching targets for more than one SPAC. We show that the regulation is beneficial when skilled directors switch to sit on boards of entrant SPACs while incumbent SPACs replace them with alternative directors of high enough quality.

While we use SPACs as the main laboratory to study scarce talent and an endogenous conflict of interest, the economic forces in our model are general. Any expert who works on two or more projects with deadlines can find herself in a situation where there are incentives to prioritize projects inefficiently. This conflict of interest is a fundamental force that exists due to the competition for talent. For optimal regulation, it is important to understand the trade-off between the economies of scale from using experts in more projects and the conflict of interest it generates.

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8 Tables

Table 1: Summary Statistics

This table contains summary statistics for SPACs that went through IPO during January 2010 to December 2021 (Panel A) and (Panel B). All variables are defined in Table A.2.

	Mean	Std.Dev.	P10	P50	P90	Obs.
Network Measures						
Past Connections	0.56	1.09	0.00	0.00	2.00	972
Connections	0.48	0.91	0.00	0.00	2.00	704
Incumbent, Conflict	0.02	0.15	0.00	0.00	0.00	704
Incumbent, No Conflict	0.12	0.43	0.00	0.00	0.00	704
Entrant, Conflict	0.29	0.71	0.00	0.00	1.00	704
Entrant, No Conflict	0.05	0.23	0.00	0.00	0.00	704
SPAC Measures						
IPO proceeds (mm USD)	279	227	97	250	460	972
IPO base proceeds (mm USD)	251	209	85	220	420	972
Overallotment(mm USD)	29	26	0	25	52	972
Listing-day return (%)	1.83	3.49	-0.70	0.50	6.00	840
Days left	392	194	135	402	627	429
Redemption(%)	46.36	37.20	0.00	52.70	93.50	327
Post-merger Return (%)	18.30	47.08	-23.53	3.22	80.95	206
SPAC Board Measures						
Board size	5.41	1.40	4.00	5.00	7.00	940
#Officer	1.23	1.09	0.00	1.00	3.00	940
Average age	54.38	6.34	45.93	54.71	62.41	940
%Female	15.94	18.84	0.00	14.29	40.00	940
%CEO Public	16.66	17.93	0.00	16.67	40.00	932
%Investment Banking	6.93	13.11	0.00	0.00	25.00	915
%VC/PE	13.73	17.07	0.00	0.00	40.00	915
%JD/MD	12.50	16.79	0.00	0.00	33.33	940
%MBA	37.80	23.11	0.00	40.00	66.67	940
%Master	18.83	19.04	0.00	16.67	42.86	940
%Bachelor	81.13	22.15	50.00	83.33	100.00	940
Panel B: SPAC Pair Sample						
S	7.32	5.46	3.00	5.52	11.27	557
S_I	1.24	4.89	0.03	0.25	1.38	557
S_E	1.03	3.44	0.03	0.25	1.38	557
τ	93	166.51	0	61	231	557
$\mathbb{1}\{\text{Competition}\}$	0.65	0.48	0	1	1	557
$\mathbb{1}\{\text{Entrant First}\}$	0.60	0.49	0	1	1	557
IPO proceeds$_{entrant}$	369.43	305.61	150.00	276.00	563.30	557
IPO proceeds$_{incumbent}$	434.60	365.23	172.50	345.00	690.00	557
Board size$_{entrant}$	5.53	1.67	4.00	5.00	8.00	557
Board size$_{incumbent}$	5.59	1.60	4.00	5.00	8.00	557

Table 2: Comparison of Directors

This table compares the mean of characteristics of directors who also sit on another competing SPAC's board at the time of the focal SPAC's IPO (Connected), and the characteristics of the rest directors (Not Connected). *Shares* is the number of founder shares the director receives measured in millions. *Past Connections* is the number of past SPAC deals the director participated before the focal SPAC. All other variables are defined in A.2.

	Connected	Not Connected	p-value
Shares	0.69	0.33	0.000
Past Connections	1.11	0.17	0.000
Biographical Information			
Age	54.23	54.87	0.271
Female	0.15	0.15	0.854
Educational Background			
MBA	0.43	0.34	0.001
Bachelor	0.83	0.74	0.000
Master	0.17	0.17	0.807
JD/MD	0.11	0.11	0.733
Prior Employment			
CEO Public	0.23	0.18	0.030
Investment Banking(Officer)	0.31	0.18	0.000
Investment Banking(Board)	0.18	0.08	0.000
VC/PE(Officer)	0.35	0.28	0.014
VC/PE(Board)	0.06	0.07	0.699
Current Employment			
CEO Public	0.09	0.06	0.024
Investment Banking(Officer)	0.11	0.06	0.004
Investment Banking(Board)	0.09	0.04	0.000
VC/PE(Officer)	0.60	0.38	0.000
VC/PE(Board)	0.22	0.13	0.000
Obs.	343	5,259	

Table 3: Which Directors Are Conflicted?

This table reports logit regression results of the probability of the SPAC's directors sitting on boards of other competing SPACs. *Past Connections* is the number of past SPAC deals the director participated before the focal SPAC. Robust standard errors are clustered at the director level, and are reported in the parentheses. *, ** and *** denote p-values less than 0.1, 0.05 and 0.01, respectively.

	$\mathbb{1}\{\text{Connected}\}$		
	(1)	(2)	(3)
Past Connections	1.058***	1.016***	0.930***
	(0.077)	(0.069)	(0.070)
Age		-0.018**	-0.015**
		(0.007)	(0.007)
Female		0.280	0.057
		(0.174)	(0.170)
MBA		0.252*	0.206
		(0.146)	(0.140)
JD/MD		-0.082	-0.103
		(0.230)	(0.232)
Bachelor		0.195	-0.003
		(0.279)	(0.214)
Master		0.260	0.200
		(0.170)	(0.163)
Prior Employment			
CEO Public		0.063	0.152
		(0.210)	(0.206)
Investment Banking(Officer)		0.320	0.380*
		(0.225)	(0.218)
Investment Banking(Board)		0.611**	0.674***
		(0.242)	(0.247)
VC/PE(Officer)		0.103	0.122
		(0.185)	(0.181)
VC/PE(Board)		-0.500	-0.494
		(0.309)	(0.300)
Current Employment			
CEO Public		0.475	0.337
		(0.296)	(0.296)
Investment Banking(Officer)		0.415	0.467*
		(0.264)	(0.262)
Investment Banking(Board)		-0.261	-0.375
		(0.374)	(0.353)
VC/PE(Officer)		0.667***	0.598***
		(0.152)	(0.146)
VC/PE(Board)		0.269	0.247
		(0.205)	(0.206)
IPO Quarter Dummies	No	No	Yes
Obs.	5,602	5,463	4,860

Table 4: Probability of Entrant Getting Target Before Incumbent

This table reports logit regression results of the probability of the entrant finds a target before the incumbent. $\mathbb{1}\{Entrant\ First\}$ equals one if the entrant finds a target before the incumbent, and 0 otherwise. S_E and S_I are the number of million shares the director hold in the entrant and in the incumbent, respectively. τ is the number of days left for the incumbent before liquidation at the time when the entrant enters. *#Incumbent* is the number of incumbents. *Past Connections* is the number of past successfully merged SPACs that the director sat on the board. Robust standard errors are clustered at the director level, and are reported in the parentheses. *, ** and *** denote p-values less than 0.1, 0.05 and 0.01, respectively.

	$\mathbb{1}$\{Entrant First\}			
	(1)	(2)	(3)	(4)
S_E	0.039*	0.058***	0.048***	0.063***
	(0.023)	(0.022)	(0.018)	(0.022)
S_I	-0.037*	-0.087***	-0.104***	-0.125***
	(0.021)	(0.026)	(0.026)	(0.033)
τ	-0.004***	-0.004***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.002)	(0.002)
Log(IPO proceeds)$_{entrant}$		-0.665***	-0.300	-0.134
		(0.240)	(0.256)	(0.300)
Log(IPO proceeds)$_{incumbent}$		0.232	0.496	0.573*
		(0.280)	(0.323)	(0.328)
Board size$_{entrant}$		-0.042	0.078	0.117
		(0.116)	(0.140)	(0.154)
Board size$_{incumbent}$		-0.257**	-0.392**	-0.661***
		(0.129)	(0.159)	(0.195)
#Incumbent		0.739***	0.644***	0.697***
		(0.153)	(0.159)	(0.207)
Past Connections		-0.098	-0.146	-0.257*
		(0.101)	(0.122)	(0.142)
Director's Characteristics	No	Yes	Yes	Yes
Entrant's IPO Quarter Dummies	No	No	Yes	Yes
Entrant's IPO Sector Dummies	No	No	No	Yes
Obs.	557	420	391	367

Table 5: Directors' Compensation from Entrants

This table shows regression results on the number of shares the entrant gives the director. S_I and S_E are the number of million shares the director holds in the entrant and the incumbent, respectively. t is the number of days from the entrant's IPO to the incumbent's liquidation deadline. τ is the number of days from the incumbent's liquidation deadline to the entrant's liquidation deadline. $\mathbb{1}\{Competition\}$ is a dummy variable indicating if the entrant competes with the incumbent. S_I and S_E are winsorized at the 99^{th} percentile. Robust standard errors are clustered at the entrant and director level, and reported in the parentheses. *, ** and *** denote p-values less than 0.1, 0.05 and 0.01, respectively.

	S_E			
	(1)	(2)	(3)	(4)
$e^{\lambda\tau} \times S_I \times \mathbb{1}\{\text{Competition}\}$	1.550**	1.852**	1.960**	1.888**
	(0.765)	(0.865)	(0.864)	(0.917)
$\mathbb{1}\{\text{Competition}\} \times e^{\lambda\tau}$	-0.027	-0.017	-0.143	-0.153
	(0.089)	(0.133)	(0.164)	(0.179)
$S_I \times \mathbb{1}\{\text{Competition}\}$	-0.117	-1.021	-1.065	-1.110
	(0.696)	(0.998)	(1.053)	(1.112)
$S_I \times e^{\lambda\tau}$	0.004	0.044	0.035	0.045
	(0.060)	(0.064)	(0.059)	(0.062)
S_I	0.384***	0.309**	0.322**	0.296**
	(0.132)	(0.147)	(0.141)	(0.148)
$\mathbb{1}\{\text{Competition}\}$	-0.390	-0.228	-0.055	0.020
	(0.275)	(0.310)	(0.339)	(0.333)
$e^{\lambda\tau}$	-0.003	-0.014	0.004	0.003
	(0.044)	(0.048)	(0.039)	(0.038)
Board $\text{size}_{entrant}$		-0.020	-0.064	-0.074
		(0.039)	(0.045)	(0.055)
Past Connections		0.202	0.166	0.180
		(0.140)	(0.138)	(0.140)
Director's Characteristics	No	Yes	Yes	Yes
Entrant's IPO Quarter FEs	No	No	Yes	Yes
Entrant's IPO Sector FEs	No	No	No	Yes
Adj. R^2	0.379	0.416	0.421	0.427
Obs.	557	471	469	462

Table 6: DeSPAC Performance

This table contains regression results using data on SPACs that went through IPO during January 2010 to December 2021. For each incumbent, *Incumbent, Conflict* counts the number of connected entrants find targets before the incumbent, and *Incumbent, No Conflict* counts the number of connected entrants that find targets after the incumbent. For each entrant, *Entrant, Conflict* counts the number of connected incumbents that find targets after the entrant, and *Entrant, No Conflict* counts the number of connected incumbents that find targets before the entrant. *Network Controls* include four similarly defined varaibles, except that the other SPAC do NOT share a director with the focal SPAC. All specifications control for the SPAC's size and the liquidation risk at the time of target announcement. Board characteristics include the size of the board, average age of the board, percentage of directors that are female, having work experience as CEO of a public company, as directors or executives of an investment bank or a VC/PE company, holding MBA/master degree. Robust standard errors are clustered at the quarter level, and are reported in parentheses. *, ** and *** denote p-values less than 0.1, 0.05 and 0.01, respectively. All other variables are defined in Table A.2.

	Post-merger Return(%)		Redeemption(%)	
	(1)	(2)	(3)	(4)
Incumbent, Conflict	-68.585***	-62.904***	32.634***	31.684***
	(21.079)	(17.487)	(8.443)	(9.111)
Incumbent, No Conflict	1.138	3.308	-10.042***	-9.971***
	(10.322)	(11.114)	(3.419)	(2.968)
Entrant, Conflict	25.703***	27.974***	-10.769**	-9.256**
	(5.346)	(8.494)	(3.829)	(3.667)
Entrant, No Conflict	-3.678	-7.609	0.523	-0.428
	(11.092)	(9.600)	(6.326)	(5.986)
SPAC&Board Characteristics	Yes	Yes	Yes	Yes
Merger Sector FEs	Yes	Yes	Yes	Yes
IPO Sector FEs	Yes	Yes	Yes	Yes
Quarter FEs	Yes	Yes	Yes	Yes
Network Controls	No	Yes	No	Yes
Adj. R^2	0.335	0.319	0.388	0.388
Obs.	150	150	285	285

Table 7: Summary Statistics of CAAR

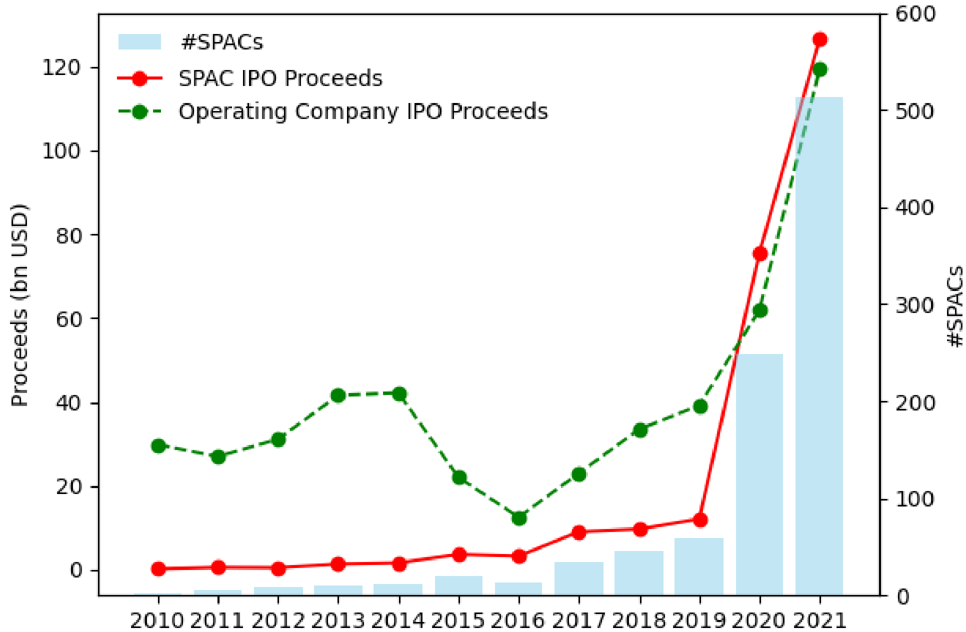
This table reports the incumbents' cumulative average abnormal return (CAAR) using different estimation windows around the IPO dates of entrants who find it optimal to compete or wait, respectively. The cross-sectional standard deviations of the cumulative abnormal returns are reported in parentheses. *, ** and *** denote p-values less than 0.1, 0.05 and 0.01, respectively.

	CAPM		FF3		FF5	
	Competition	No Competition	Competition	No Competition	Competition	No Competition
[-3, 3]	-1.741**	0.794	-2.519***	1.113	-2.220**	0.645
	(0.731)	(0.902)	(0.798)	(0.851)	(0.865)	(0.871)
[-5, 5]	-3.606***	-0.325	-3.144***	-0.789	-3.974***	-1.195
	(0.924)	(0.747)	(0.992)	(0.869)	(1.112)	(0.968)
[-10, 10]	-5.153***	-0.026	-3.794***	0.490	-3.156***	0.642
	(1.067)	(1.223)	(0.995)	(1.255)	(0.989)	(1.249)

Appendices

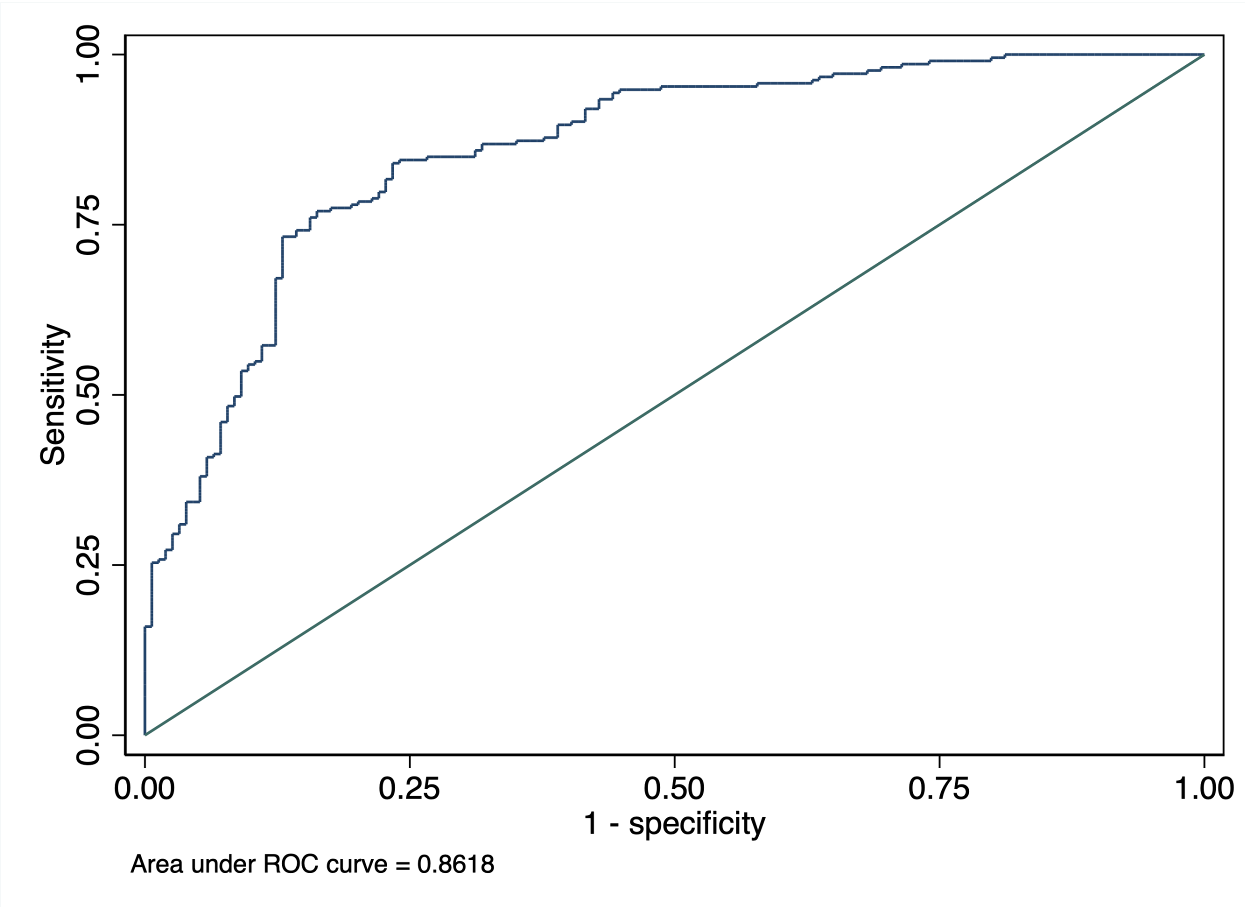
A. Figures and Tables

Figure A.1: SPACs' IPOs vs. traditional firms' IPOs in 2010-2021



This figure reports the number of SPACs, and IPO proceeds of SPACs operating companies from January 2010 to December 2021. Proceeds exclude overallotment options and is in billion of USD.

Figure A.2: Area Under the ROC Curve



This figure plots the area under the ROC curve for the logit regression specified in Table 4.

Table A.1: Jurisdiction of SPACs

This table reports state (if incorporated in the U.S.) or country in which the SPAC is incorporated at the time it consummates it files for its IPO or, if different, consummates its IPO. The SPAC sample contains SPACs IPOed between January 2010 and December 2021.

Jurisdiction	#Obs.
Delaware	563
Cayman Islands	368
British Virgin Islands	33
Marshall Islands	4
Nevada	3
Bermuda	1

Table A.2: **Variable Definition**

Variable	Unit	Definition
Network Measures		
Connections		The number of interlock links where the two SPACs' target searching periods overlap.
Past Connections		Number of past successfully merged SPACs of which that the director sat on the board.
Incumbent, Conflict		The number of connected entrants find targets before the incumbent.
Incumbent, No Conflict		The number of connected entrants that find targets after the incumbent.
Entrant, Conflict		The number of connected incumbents that find targets after the entrant.
Entrant, No Conflict		The number of connected incumbents that find targets before the entrant.
SPAC Measures		
IPO proceeds	Millions USD	Actual gross proceeds raised in the IPO, including any full or partial exercise of the overallotment option.
IPO base proceeds	Millions USD	Base/minimum (excluding overallotment/Greenshoe) amount the IPO is/was seeking to raise.
Overallotment	Millions USD	Dollar amount of the overallotment option that is exercised by the Underwriter(s) in the IPO.
Listing-day return	%	SPAC IPO investors' first-day return.
Redemption	%	Redeemed SPAC common shares as a percentage of total shares issued at IPO.
Days left	Day	The number of days between the SPAC's target announcement date and the liquidation deadline.
DeSPACing Return	%	Percent rate of return from one day before the target announcement to the business closing day.
Board Measures		
Board size		Number of directors.
#Officer		Number of senior officers who do not serve on the board.
Average age		Average age of directors.
%Female	%	Percentage of female directors
%CEO Public	%	Percentage of directors who is(was) a chief executive officer (CEO) at a public company
%Investment Banking	%	Percentage of directors who serve(d) on the board of an investment bank.
%VC/PE	%	Percentage of directors who serve(d) on the board of an venture capital (VC) or private equity (PE) firm.
%JD/MD	%	Percentage of directors who hold a Juris Doctor (JD) or Doctor of Medicine (MD) degree.
%MBA	%	Percentage of directors who hold a Master of Business Administration (MBA) degree.
%Master	%	Percentage of directors who hold a master's degree.
%Bachelor	%	Percentage of directors who hold a bachelor's degree.

Continued on next page

Table A.2: **Variable Definition** (Continued)

Variable	Unit	Definition
SPAC Pair Measures		
$\mathbb{1}\{Entrant\ First\}$	Dummy	One if the entrant finds a target before the incumbent, 0 otherwise.
S_E	Millions	Number of shares the director holds in the entrant SPAC.
S_I	Millions	Number of shares the director holds in the incumbent SPAC.
S	Millions	Number of founder shares of the entrant SPAC.
τ	Day	Number of days difference between the incumbent's IPO date and the entrant's IPO date.
$\mathbb{1}\{Competition\}$	Dummy	One if it optimal for the entrant to compete, and zero otherwise.
$\#Incumbent$		Number of incumbents of which the director is sitting on the board.
$IPO\ proceeds_{entrant}$	Millions USD	Actual gross proceeds raised in the entrant's IPO, including any full or partial exercise of the overallotment option.
$IPO\ proceeds_{incumbent}$	Millions USD	Actual gross proceeds raised in the incumbent's IPO, including any full or partial exercise of the overallotment option.
$Board\ size_{entrant}$		Number of the entrant's directors.
$Board\ size_{incumbent}$		Number of the incumbent's directors.
Age		The director's age at the time of the entrant's IPO.
Female	Dummy	One if the director is female, and zero otherwise.
CEO Public	Dummy	One if the director is(was) a chief executive officer (CEO) at a public company.
Investment Banking (Board)	Dummy	One if the director is serving or served on the board of an investment bank.
Investment Banking (Officer)	Dummy	One if the director is working or worked as an executive officer in an investment bank.
VC/PE (Board)	Dummy	One if the director is serving or served on the board of an venture capital (VC) or private equity (PE) firm.
VC/PE (Officer)	Dummy	One if the director is working or worked as an executive officer in an venture capital (VC) or private equity (PE) firm.
JD/MD	Dummy	One if the director holds a Juris Doctor (JD) or Doctor of Medicine (MD) degree.
MBA	Dummy	One if the director holds a Master of Business Administration (MBA) degree.
Master	Dummy	One if the director holds a master's degree.
Bachelor	Dummy	One if the director holds a bachelor's degree.

B. Proofs

Proof of Proposition 1

Proof. Let $F_E \geqslant F_I$, we have,

$$S_E + (1 - e^{-\lambda(T-\delta)})S_I \geqslant S_I + (1 - e^{-\lambda(T+\tau-\delta)})S_E$$
$$\Rightarrow S_E \geqslant e^{\lambda\tau} S_I$$

□

Proof of Proposition 2

Proof.

$$\pi_c^0 = [1 - e^{-\lambda\tau}](S - S_E)$$
$$\pi_c^1 = S - S_E$$
$$\pi_c^{2+} = S - S_E$$
$$\pi_{nc}^0 = [1 - e^{-\lambda\tau}](S - S_E)$$
$$\pi_{nc}^1 = [1 - e^{-\lambda\tau}](S - S_E)$$
$$\pi_{nc}^{2+} = S - S_E$$

Let $S^*_{E,c}$ and $S^*_{E,nc}$ be the optimal number of shares the entrant gives to the director when $S_E \geqslant e^{\lambda\tau} S_I$ and $S_E < e^{\lambda\tau} S_I$. Then let $\pi^*_c \geqslant \pi^*_{nc}$, we have,

$$\Pr(n = 0)\pi_c^{0*} + \Pr(n = 1)\pi_c^{1*} + \Pr(n \geqslant 2)\pi_c^{2+*} \geqslant \Pr(n = 0)\pi_{nc}^{0*} + \Pr(n = 1)\pi_{nc}^{1*} + \Pr(n \geqslant 2)\pi_{nc}^{2+*}$$
$$\Rightarrow \Pr(n = 0)[1 - e^{-\lambda\tau}](S - S^*_{E,c}) + \Pr(n = 1)(S - S^*_{E,c}) + \Pr(n \geqslant 2)(S - S^*_{E,c})$$
$$\geqslant \Pr(n = 0)[1 - e^{-\lambda\tau}](S - S^*_{E,nc}) + \Pr(n = 1)[1 - e^{-\lambda\tau}](S - S^*_{E,nc}) + \Pr(n \geqslant 2)(S - S^*_{E,nc})$$
$$\Rightarrow \Pr(n = 0)[1 - e^{-\lambda\tau}](S^*_{E,nc} - S^*_{E,c}) + \Pr(n = 1)(S^*_{E,nc} - S^*_{E,c})$$
$$+ \Pr(n = 1)e^{-\lambda\tau}(S - S^*_{E,nc}) + \Pr(n \geqslant 2)(S^*_{E,nc} - S^*_{E,c}) \geqslant 0$$
$$\Rightarrow \Pr(n = 1)e^{-\lambda\tau}(S - S^*_{E,nc})$$
$$\geqslant \big(\Pr(n = 0)[1 - e^{-\lambda\tau}] + \Pr(n = 1) + \Pr(n \geqslant 2)\big)(S^*_{E,c} - S^*_{E,nc}),$$

plugging in $S^*_{E,c} = e^{\lambda\tau} S_I$ and $S^*_{E,nc} = 0$, we have,

$$\begin{aligned}
&\Pr(n=1)e^{-\lambda\tau}S \\
&\geqslant \big(\Pr(n=0)[1-e^{-\lambda\tau}] + \Pr(n=1) + \Pr(n\geqslant 2)\big)e^{\lambda\tau}S_I, \\
&\Rightarrow S_I \leqslant \frac{\Pr(n=1)}{\Pr(n=0)[1-e^{-\lambda\tau}] + \Pr(n=1) + \Pr(n\geqslant 2)} e^{-2\lambda\tau}S,
\end{aligned}$$

where we have,

$$\begin{aligned}
&\Pr(n=0) = e^{-\lambda(T-\tau)} \\
&\Pr(n=1) = \lambda(T-\tau)e^{-\lambda(T-\tau)} \\
&\Pr(n\geqslant 2) = 1 - e^{-\lambda(T-\tau)} - \lambda(T-\tau)e^{-\lambda(T-\tau)} \\
&\Pr(n=0)[1-e^{-\lambda\tau}] + \Pr(n=1) + \Pr(n\geqslant 2) \\
&= \Pr(n=0) + \Pr(n=1) + \Pr(n\geqslant 2) - \Pr(n=0)\times e^{-\lambda\tau} \\
&= 1 - e^{-\lambda(T-\tau)} \times e^{-\lambda\tau} \\
&= 1 - e^{-\lambda T},
\end{aligned}$$

plugging the above equations back, we have,

$$\begin{aligned}
&\pi^*_c \geqslant \pi^*_{nc} \\
&\Rightarrow S_I \leqslant \frac{\lambda(T-\tau)e^{-\lambda(T-\tau)}}{1-e^{-\lambda T}} e^{-2\lambda\tau}S \\
&\Rightarrow S_I \leqslant \frac{\lambda(T-\tau)e^{-\lambda(T+\tau)}}{1-e^{-\lambda T}} S
\end{aligned}$$

□

Proof of Proposition 3

Proof. We compare the incumbent's expected payoff at the time of the entrant's IPO. We start with the case where it is optimal for the entrant to wait. In this case, the incumbent's expected return can be represented as follows,

$$\begin{aligned}
&\mathbb{E}[\text{Incumbent's return}|\text{no competition}] \\
&= \Pr(\text{at least one good target in } [\tau, T]) \\
&= 1 - e^{-\lambda(T-\tau)}
\end{aligned}$$

Next, we calculate the incumbent's expected return when the entrant finds it optimal to compete,

$$\begin{aligned}&\mathbb{E}[\text{Incumbent's return}|\text{competition}]\\&= \Pr(\text{at least two good targets in } [\tau, T])\\&= 1 - e^{-\lambda(T-\tau)} - \lambda(T-\tau)e^{-\lambda(T-\tau)}\end{aligned}$$

We then take the difference between the two expected return and have,

$$\begin{aligned}&\mathbb{E}[\text{Incumbent's return}|\text{competition}] - \mathbb{E}[\text{Incumbent's return}|\text{no competition}]\\&= -\lambda(T-\tau)e^{-\lambda(T-\tau)} \leqslant 0\end{aligned}$$

□

Proof of Proposition 4

Proof. First, consider the incumbent's expected return. If the director prioritizes the incumbent, its expected return is 1. However, if the director prioritizes the entrant, the director must find another target for the incumbent in the time period $[s, T]$. This means the incumbent's expected return is $(1 - e^{-\lambda(T-s)}$. Overall, the incumbent's conditional expected return is lowered by $e^{-\lambda(T-s)}$ if there is a conflict of interest.

Next, consider the entrant's expected return. If there is no conflict and the director prioritizes the incumbent, the director will search for targets for the entrant between s and $(T+\tau)$. This means the entrant's expected return is $(1 - e^{-\lambda(T+\tau-s)})$. On the other hand, if the director prioritizes the entrant, the entrant's conditional expected return is 1. Overall, the entrant's expected return increases by $e^{-\lambda(T+\tau-s)}$ if there is a conflict. □

Proof of Proposition 5

Proof.

$$
\begin{aligned}
&\mathbb{E}[\text{bad targets}] \\
=&\Pr(\text{at least one good target in } [0,\tau]) \times \mathbb{E}[\text{bad targets}|\text{at least one good target in } [0,\tau]] \\
&+\Pr(\text{no good targets in } [0,\tau]) \times \mathbb{E}[\text{bad targets}|\text{no good targets in } [0,\tau]] \\
=&(1-e^{-\lambda\tau}) \times \mathbb{E}[\text{bad targets}|\text{at least one good target in } [0,\tau]] \\
&+e^{-\lambda\tau} \times \mathbb{E}[\text{bad targets}|\text{no good targets in } [0,\tau]],
\end{aligned}
$$

where

$$
\begin{aligned}
&\mathbb{E}[\text{bad targets}|\text{at least one good target in } [0,\tau]] = e^{-\lambda T}, \\
&\mathbb{E}[\text{bad targets}|\text{no good targets in } [0,\tau]] \\
=&\underbrace{e^{-\lambda(T-\tau)} \times (1+e^{-\lambda\tau})}_{\substack{\text{no good targets in } [\tau,T] \\ \text{incumbent gets bad target} \\ \text{entrant keeps searching in } [T,T+\tau]}} + \underbrace{\lambda(T-\tau)e^{-\lambda(T-\tau)} \times \mathbb{E}[\text{bad targets}|\text{conflict}]}_{\text{only one good target in } [\tau,T]} \\
&+\underbrace{(1-e^{-\lambda(T-\tau)}-\lambda(T-\tau)e^{-\lambda(T-\tau)}) \times 0}_{\substack{\text{more than one good target in } [\tau,T] \\ \text{both get good targets}}},
\end{aligned}
$$

Conflict happens when there is only one good target arrives during $[\tau, T]$ throughout $[0, T]$. Under the no-conflict scheme, the director allocates the target to the incumbent, and keeps searching for the entrant during $[T, T+\tau]$. Thus, the total expected number of bad targets, $\mathbb{E}[\text{bad targets}|\text{no-conflict}] = e^{-\lambda\tau}$. Under the conflict scheme, the director allocates the target to the entrant, and the incumbent merges with a bad target. Thus, $\mathbb{E}[\text{bad targets}|\text{conflict}] = 1$. Plugging back and simplify, we have,

$$
\begin{aligned}
W_{\text{no conflict}} &:= \mathbb{E}[\text{bad targets}|\text{no-conflict}] = 2e^{-\lambda T} + \lambda(T-\tau)e^{-\lambda(T+\tau)} \\
W_{\text{conflict}} &:= \mathbb{E}[\text{bad targets}|\text{conflict}] = 2e^{-\lambda T} + \lambda(T-\tau)e^{-\lambda T}
\end{aligned}
$$

□