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Francesco Celentano
University of Lausanne and Swiss Finance Institute

Oliver Levine
Wisconsin School of Business

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Francesco Celentano[a] Oliver Levine[b]

[a] *University of Lausanne and Swiss Finance Institute*

[b] *University of Wisconsin–Madison, Wisconsin School of Business*

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ABSTRACT

We quantitatively assess the role of activism in the market for corporate control by developing and estimating a model featuring both activism and M&A. We find that activism complements M&A, reducing the agency frictions associated with takeovers. However, activism simultaneously crowds out some M&A activity by substituting for disciplinary takeovers. Both the threat of activism and actual activist intervention create shareholder value by improving CEO incentives, while the value from reduced takeover frictions is primarily captured by acquirers. We find that activists have an information advantage, which is critical to overcoming the free rider problem in activist intervention.

JEL classification: G34, G32, G39, G23, G14
Keywords: Shareholder activism, Mergers and acquisitions (M&A), Corporate governance, Agency conflicts

*Celentano: francesco.celentano@unil.ch, Levine: oliver.levine@wisc.edu.
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The management and board of directors of a corporation may fail to maximize the value of the firm due to misaligned incentives with shareholders. While this agency conflict is costly to shareholders, mismanaged assets also represent an opportunity for outsiders that can intervene and capture a portion of the surplus generated. Both corporate takeover and shareholder activism are prominent examples of such market mechanisms, and both can serve similar disciplinary roles in overcoming agency conflicts (Manne, 1965; Grossman and Hart, 1980; Jensen, 1986; Shleifer and Vishny, 1986; Scharfstein, 1988; Admati et al., 1994). If these interventions are substitutes, activism has the potential to crowd out merger and acquisition (M&A) activity.

At the same time, shareholder activism can facilitate corporate takeover, for example, by acting as a credible negotiator (Corum and Levit, 2019), or by threat of a proxy fight should management resist acquisition (Johnson and Swem, 2021; Burkart and Lee, 2022; Burkart et al., 2024). Indeed, empirical evidence finds that much of the returns to activism comes from campaigns that involve M&A, suggesting a valuable role for activism in the takeover process (Greenwood and Schor, 2009; Boyson et al., 2017). To the extent that activists facilitate or bring about takeover, the roles of activism and M&A can serve as complements, and activism may promote takeover activity. The degree to which activism complements M&A and/or serves as a substitutable disciplinary mechanism is an open question (Denes et al., 2017) and requires considering equilibrium effects of the threat of these actors on the actions of managers and directors. Answering this question is necessary to understand the role activism plays in the market for corporate control and as an external governance mechanism.

We develop a quantitative model of shareholder activism and acquisition to assess the role of activism in shaping manager incentives and in the M&A market. In the model, activists have two technologies to affect firm outcomes during a campaign. The first is the ability to incentivize management to exert effort by reducing managerial entrenchment in the board's decision to replace a CEO. The second is the ability to facilitate takeover of the target firm by helping to align incentives between insiders and shareholders in takeover negotiations. In both cases, the activist is able to reduce managerial and board entrenchment as a credible representative of shareholders. The model also accommodates activist private information

about future project quality and the value of being acquired, informing the activist's decision to launch a campaign. The structural model allows us to estimate empirically the degree to which the activist affects both manager incentives and real outcomes at target firms, as well as disentangle the information and intervention channels of activist campaigns. By performing counterfactual experiments, we also quantify the effects of the *threat* of activism and takeovers in equilibrium outcomes.

We use the simulated method of moments (SMM) to estimate the model using data on U.S. public firms, shareholder activism, and M&A activity from 2001 to 2019. Our identification strategy consists of matching key moments related to firm performance, CEO turnovers, activist campaigns, and takeover bids. Our model matches well these data patterns that inform the unobserved parameters related to the effect of activism on the decisions of management and the board as well as the activists' private information and costs.

We find that an activist campaign significantly reduces the agency frictions to takeover, increasing the probability of takeover by 7.7 percent when a campaign is launched. In other words, about 7 percent of deals that occur during a campaign are marginal to activist intervention, suggesting a significant role of activism in the M&A market. However, takeover facilitation is a double-edged sword for shareholders of target firms because agency frictions strengthen the negotiating position of the board (Wang and Wu, 2020). Therefore, while an activist campaign increases the likelihood a takeover occurs by reducing agency frictions, it also lowers the price conditional on a takeover. Bid premia are 13.7 percent (5.2 percentage points) lower due to activist presence during negotiations. Taken together, the average activist campaign adds only a modest amount of shareholder value, about 6 basis points, through their takeover facilitation technology. However, shareholder benefits are large (15.4 percent) in the 7 percent of deals marginal to activist intervention.

Beyond takeover facilitation, activists improve manager incentives to exert effort by making it less costly for the board to replace an underperforming manager. This manifests in both the model and data as significantly higher CEO turnover rates during activist campaigns. We estimate that through this channel, the average activist campaign increases shareholder value by 0.35 percent, and increases firm productivity by 1.17 percent. These results suggest that the ability to incentivize management to improve operations adds more value for

shareholders than does takeover facilitation in the average campaign. This is consistent with studies that have shown that turnover rates are suboptimally low from the perspective of shareholders (Taylor, 2010; Taylor, 2013; Wu, 2018; Frydman and Papanikolaou, 2018), making a reduction in the agency frictions to turnover a valuable intervention provided by activists.

The results discussed so far consider the average effect of individual activist campaigns in the economy. However, to understand the role of activism more generally, one must consider the equilibrium effects of the possibility or threat of activism on manager and board decisions and firm outcomes. Indeed, the literature has found evidence that the threat of activism affects firm outcomes and behavior (Aslan and Kumar, 2016; Gantchev et al., 2018; Johnson and Swem, 2021; Eldar et al., 2023). For example, the possibility of an activist campaign may compel management to exert higher effort even when the activist is on the sidelines, leading to an equilibrium where few campaigns are launched. In this case, the equilibrium effect of activism as a mechanism may be large, even if activist campaigns are rare. Exploring the equilibrium effects of activism also allows us to determine whether activism crowds out or promotes takeover activity, and to better understand the social value of activism as a market mechanism.

To this end, we perform counterfactual experiments to quantify the effects of the threat of activism on equilibrium outcomes. While an individual activist campaign increases the likelihood of takeover, perhaps counterintuitively, we find that the presence of activists in the economy has essentially zero net effect on the volume of takeovers in equilibrium. To understand this result, we decompose the effects of activism. The activists' takeover facilitation technology significantly reduces frictions to takeovers when campaigns occur and this channel increases takeover activity. However, at the same time, the activists' role in providing effort incentives to management improves the standalone value of the firm, in turn reducing the potential surplus from takeover. This lower surplus means that some deals on the margin no longer occur. Through this channel, activism crowds out M&A activity—about 0.8 percent of total volume—acting as a partial substitute for takeovers. Combining the effects of these two channels, takeover volume is essentially unchanged by the presence of activists in the economy despite confirming evidence of a strong facilitation role of activists

in the M&A process.

Although we find no increase in takeover activity from the presence of activists in the economy, we find that their presence provides significant value to shareholders. We estimate that firm equity value is 0.33 percent higher on average than in an equivalent firm in the counterfactual economy without activists. In other words, the activist *threat* adds significant value to shareholders, even when a firm is not the target of a campaign. This increased shareholder value comes entirely from improved effort incentives for managers and the corresponding higher productivity, rather than reduced frictions to takeovers.

Surprisingly, the effect of the activist threat on shareholder value is of similar magnitude to that of an actual campaign. As the activist threat applies to *every* potential target, the economy-wide value effect of the activist threat is significantly greater than the campaigns themselves, which applies to only about 4 percent of firm-years. This also implies that activists capture only on a small fraction of the shareholder value they generate in the economy.

In light of our finding that activism crowds out some takeover activity, it is worth noting the externalities associated with activism in the M&A market. Externalities arise because the takeover surplus is shared between the target and acquirer, and the target shareholders do not internalize surplus lost (or gained) by a potential acquirer. Thus, when a takeover is crowded out due to improved manager incentives, acquirer surplus is lost, resulting in a negative externality to activism. We find that 0.37 percent of aggregate acquirer surplus is lost as a result of takeovers that are crowded out by activism. On the other side of the coin, takeover facilitation generates a positive externality, as marginal deals are more likely to be completed, generating acquirer surplus. We find that this channel more than offsets the negative externality and, on net, aggregate acquirer surplus increases 0.22 percent due to activism. This result highlights a social benefit of activism beyond returns to target shareholders, as more surplus-generating acquisitions occur when activists intervene.

Our model incorporates the possibility that the activist has private information about the target firm that informs their decision to launch a campaign. Before taking a position, the activist obtains a private signal about the quality of the firm's investment opportunities in the coming year; higher quality projects have higher expected returns to manager effort. The

activist receives a separate signal about the value that would be generated by being acquired in the coming year, reflecting the quality of a potential acquirer. The activist makes an entry decision based on these private signals, along with publicly observable firm performance. The role of information interacts with the activists' intervention technologies—specifically, the ability to incentivize manager effort and facilitate takeover during a campaign.

The model allows us to quantify the degree to which activists generate returns through interventions that generate shareholder value (treatment effects) or by having superior information about future firm outcomes (selection effects). Separating these effects is a fundamental question in the activism literature (Albuquerque et al., 2022), but is difficult to identify empirically in a reduced form setting.

The model estimates indicate that information serves a significant role in the activist's decision to launch a campaign, and the return that the activist generates. Of the 4.1 percent average return around the announcement of an activist campaign, we estimate that superior information about potential takeovers drives 76 percent of the announcement return, with 14 percent coming from information about projects. Of the return attributable to treatment effects, most is due to increased effort incentives.

Although most of the return to activist entry comes from superior information, this does not mean that the effects of intervention are not sizable. As discussed earlier, the presence of activists in the economy adds significant value to shareholders, and much of this value comes from the threat of intervention. If activists were ineffectual and trading was based solely on superior information, these benefits would disappear. Conversely, we show that if activists have less of an information advantage, they enter less often and shareholders are worse off. Therefore, shareholders benefit from the information advantage of activists. In summary, we find that the activists' information advantage is critical to overcoming the free-rider problem in activist intervention—namely, that the costs of a campaign are borne by the activist but the benefits are shared broadly—and increases shareholder value.

The regulatory and legal environment surrounding shareholder activism plays a significant role in the cost of activism and in the decision to launch a campaign. To quantify these effects, we perform a policy experiment in the model by varying the costs of activism. Consistent with our previous results, we find that making activism more costly reduces effort incentives

and productivity. However, it also increases the perceived effects of intervention, such as higher turnover rates when an activist is present, as activists require stronger signals before launching a campaign.

Many have argued that hedge funds are the most efficient market player to act as shareholder activists due to their expertise and the limited regulation to which they are subject. Accordingly, an extended literature focuses on the impact of hedge fund activists, documenting that hedge funds improve real and financial outcomes of the firms they target (Brav et al., 2010 provides a survey). To explore this possibility, we estimate our model in which we consider only activist campaigns that include a hedge fund. Consistent with these hypotheses, we find evidence that hedge fund activists are more effective in incentivizing managerial effort and better at facilitating takeovers. We also find that hedge funds appear to have more private information about potential acquirers. We further test whether the efficacy of activists has improved over time by estimating our model in the first and second half of our sample. We find evidence that it has, but only in terms of facilitating takeovers. Interestingly, we estimate a significant increase over time in the private information that activists obtain prior to launching a campaign.

We contribute to multiple strands of the literature. Our paper relates to the theoretical literature on shareholder activism.[1] Our estimates of a significant facilitation role of activism in the M&A market provide empirical support for Corum and Levit (2019), Burkart and Lee (2022), and Burkart et al. (2024). However, our results suggest that, despite the facilitation role, the presence of activists in the economy may not increase M&A volume, as the effort incentive provided by activists crowds out some takeover activity. We also show that much of the gains from takeover facilitation may be captured by acquirer rather than target shareholders.

We add to the empirical literature on activist investors and their impact on governance and firm policies.[2] Consistent with Greenwood and Schor (2009), we provide additional

[1]For example, Maug (1998), Kahn and Winton (1998), Mello and Repullo (2004), DeMarzo and Urošević (2006), Burkart and Lee (2015), Back et al. (2018), Levit (2019), Brav et al. (2022), Gorbenko and Malenko (2024), Gryglewicz et al. (2025a), and Gryglewicz et al. (2025b). Edmans and Holderness (2017) provides a survey of this work.

[2]For example, Brav et al. (2008), Cronqvist and Fahlenbrach (2009), Klein and Zur (2009), Brav et al. (2015), Norli et al. (2015), Boyson et al. (2017), Gantchev et al. (2018), Jiang et al. (2018), Brav et al. (2018), Fos (2019), Gantchev et al. (2020), Bebchuk et al. (2020), and Dasgupta et al. (2021).

evidence that activists generate significant returns in campaigns related to takeovers. However, we find that most of the value generated for shareholders comes from improving the manager's effort incentives. Our paper provides empirical evidence on three key research questions in the activism literature (Denes et al., 2017). First, we disentangle the extent to which the takeover market and shareholder activism are substitutes or complements for disciplining managers and driving corporate change. Second, we study not only the value generated when activists' campaigns are launched or takeovers occur, but also the value that stems from the threat of activist and acquirer intervention. Third, we quantify whether activist investors generate returns primarily through their stock-picking ability or their capacity to influence management and the board. We find that much of the activist announcement return is the result of superior information, a selection effect. This finding contrasts with Albuquerque et al. (2022) who finds that a majority of the activist announcement return is attributable to treatment effects. Our studies differ in several dimensions making a direct comparison difficult. Albuquerque et al. (2022) uses information on passive and active investor filings within a structural model of filing choice to identify treatment effects. In contrast, we use the full Compustat sample and consider only active investor filings within a model that quantifies the specific roles of activism in improving insider incentives. While not the primary focus of our study, we view our findings as an additional piece of evidence in understanding treatment and selection effects in activist returns.

Finally, our paper adds to the structural literature in corporate finance. We advance the structural empirical literature on activism (Albuquerque and Schroth, 2010; Gantchev, 2013; Albuquerque and Schroth, 2015; Johnson and Swem, 2021; Albuquerque et al., 2022) by studying the interplay between activism, M&A, information, and agency frictions. In line with these papers, we use a structural approach to provide empirical evidence on questions, such as the equilibrium effects of the threat of activism and takeovers, that are challenging to study in a reduced form setting. We also complement the structural finance literature on M&A by quantifying the role of activism in the market for corporate control.[3]

[3]For example, Dimopoulos and Sacchetto (2014), Gorbenko and Malenko (2014), Dimopoulos and Sacchetto (2017), Levine (2017), Li et al. (2018), Wang (2018), Gorbenko (2019), Gentry and Stroup (2019), Wang and Wu (2020), and Celik et al. (2022).

1. Model

The model features a firm led by a manager and overseen by a board of directors, a potential activist investor, and a potential acquirer. Time is discrete and indexed by t, and the horizon is infinite. All agents are risk-neutral and share a common discount factor, β.

Figure 1 illustrates the timeline of the model decision points and information environment, which we briefly summarize; details are provided in the following sections. At the beginning of each period, the firm generates profits based on its productivity (z_t) that all agents in the economy observe, and pays a dividend. The firm faces two i.i.d. shocks, one about the effect of a project, if implemented, on productivity (*project quality*, p_t) and another related to the value of being acquired (*acquirer quality*, w_t). Before these shocks are observed, the potential activist investor receives a private signal about each ($s_{p,t}$ and $s_{w,t}$). Based on this information, the investor decides whether to buy a stake in the firm and launch an activism campaign (ν_t). After the entry decision, the activist's choice and private information become common knowledge. Subsequently, the manager and the board observe the project's quality and the manager decides whether to exert effort and undertake the project (e_t). In response to the manager's choice, the board decides whether to replace or retain the manager (f_t). At that point, next period standalone firm productivity is realized (z_{t+1}). The potential acquirer and board learn the quality of the takeover opportunity, negotiate a price (P_t), and the decision as to whether the takeover will occur is made (a_t). If an agreement is reached, the takeover is announced and the share price adjusts. The activist sells their stake in the firm, ending the campaign. On a successful takeover, the firm exits; otherwise, the firm remains standalone and continues to operate in the next period.

1.1. Production technology

Each period, the firm generates profits,

$$\pi_t = z_t k_t^{\alpha} - c_k k_t, \tag{1}$$

where $\alpha \in (0, 1)$ captures the returns to scale of the production technology, and $c_k > 0$ is the rental rate of capital. The firm chooses capital k_t in each period without adjustment costs or lag, making its capital choice a static problem. The firm's productivity, z_t, evolves

according to the following process:

$$\exp\{\ln(z_{t+1})\} = \exp\{(1-\rho_z)\mu_z + \rho_z \ln(z_t) + \sigma_z \varepsilon_{t+1}\} + e_t\, p_t. \tag{2}$$

If one ignores the final term, the firm's productivity follows a standard AR(1) process in logs, where μ_z is the permanent component of the process, $\rho_z \in (0,1)$ governs the process persistence, σ_z captures the volatility of the process, and ε_{t+1} is an innovation shock that follows a standard normal distribution. The final term, $e_t\, p_t$, captures the productivity improvement that a firm obtains if the manager chooses to undertake, at private cost, the value-enhancing project. The first factor, e_t, is an indicator that equals 1 if the manager decides to exert effort and undertake the project and 0 otherwise. The second factor, $p_t \geq 0$, represents the project quality, which is drawn independently in each period and distributed as an exponential distribution with rate λ_p. The value of p_t is realized at the beginning of the period and known to the manager when choosing whether to undertake the project. The manager's effort choice is discussed in Section 1.3.

1.2. Activist's entry decision

Each period, after profits are realized and dividends paid, a potential activist investor receives two signals, $s_{p,t}$ and $s_{w,t}$, providing information about the firm's project quality, p_t, and the quality of a potential acquirer, w_t, respectively. We assume that the activist investor receives these signals at zero marginal cost.[4] Similar to project quality, the random variable capturing acquirer quality, $w_t \geq 0$, is exponentially distributed with rate λ_w. Each of the two signals that the activist receives follows

$$s_{t,x} = x_t + \sigma_x \eta_{t,x} \quad \text{with } x \in \{p, w\}, \tag{3}$$

where σ_x captures the degree of the signal's noise and $\eta_{t,x}$ is an i.i.d. standard normal shock.

After observing the private signals, the investor decides whether to initiate an activist campaign by acquiring a fractional ownership of size $\bar{\nu}$ in the firm. The activist chooses their

[4]We assume that information collection is part of the fixed costs of operation for these investors. As a sunk cost, adding this cost to the model would not affect the activist's decision to launch a campaign and is therefore omitted. The marginal costs associated with launching a campaign are discussed below.

ownership stake, ν_t, by solving the following problem:

$$\max_{\nu_t \in \{0,\bar{\nu}\}} \beta \mathbb{E}[V(z_{t+1}) \,|\, z_t,\, s_{p,t},\, s_{w,t},\, \nu_t]\nu_t - (1+\xi)(V(z_t) - \pi_t)\nu_t, \tag{4}$$

where $\mathbb{E}[V(z_{t+1}) \,|\, z_t,\, s_{p,t},\, s_{w,t},\, \nu_t]$ is the expected next period value of the firm, $V(z_t) - \pi_t$ is the ex-dividend value of the firm that does not yet incorporate the activist's private information, and $\xi > 0$ is a parameter capturing the marginal costs that an activist incurs from entering. For example, the term $\xi V(z_t)\nu_t$ reflects the costs arising from limited liquidity and information leakages associated with large share purchases as well as expected campaign costs.[5] After the activist makes its entry decision, the campaign and private signals become public information and the share price updates.

1.3. Manager's effort choice

After the activist's entry decision, the manager and board observe the true project quality p_t, in addition to learning the activist's private signals and entry decision. The manager decides whether to exert effort to undertake the project, $e_t \in \{0, 1\}$, by trading off private costs associated with undertaking the project and the benefits of increased firm productivity by maximizing their expected utility,

$$\begin{aligned} M(z_t) = \theta_d \pi_t + \max_{e_t \in \{0,1\}} \big\{ & e_t(-c_e \pi_t + \beta \mathbb{E}[(1-f_t)(1-a_t)M(z_{t+1}) \,|\, z_t,\, \nu_t,\, p_t,\, s_{w,t},\, e_t{=}1]) \\ & + (1-e_t)\beta \mathbb{E}[(1-f_t)(1-a_t)M(z_{t+1}) \,|\, z_t,\, \nu_t,\, p_t,\, s_{w,t},\, e_t{=}0] \big\}, \end{aligned} \tag{5}$$

where the manager's private cost from undertaking the project is $c_e \pi_t$ and $\theta_d \in (0, 1)$ is the fraction of the profits π_t that the manager receives each period while employed by the firm. The indicators f_t and a_t reflect whether the manager separates from the firm or a takeover occurs at the end of the period, respectively. If the board replaces the manager or the firm is acquired, the manager stops receiving compensation. Manager turnover and firm takeover are discussed in detail in the following sections.

The manager can reduce the possibility of replacement and takeover as well as increase expected future compensation by undertaking the project. However, implementing the project

[5] Modeling the marginal costs of each stage of an activist campaign, and the activists' decision to escalate a campaign, is beyond the scope of this paper. See Gantchev (2013) and Johnson and Swem (2021) for studies that provide estimates of these within-campaign marginal costs and choices.

entails a private cost to the manager who trades-off this personal disutility with higher survival chances and expected compensation. We assume that the cost of undertaking the project is increasing in firms profits. This assumption captures the idea that implementing changes is both operationally harder and strategically costlier in larger, more profitable firms. In addition, each period the manager receives a preference shock that affects the decision to undertake the project. Common in discrete choice models, the preference shock captures elements outside of the model that could affect the manager's decision to undertake the project.

1.4. Board's CEO turnover decision

Following the manager's decision on whether to undertake the project, the board decides whether to retain or replace the manager. If turnover occurs, we assume that the board chooses a replacement who will implement the project. This makes turnover a credible threat by the board that affects the manager's effort choice. However, turnover is privately costly for the board, capturing managerial entrenchment, similar to Taylor (2010) and Taylor (2013). Therefore, the board trades off the benefit of undertaking the project against the cost of turnover in their decision to replace the manager:

$$\max_{f_t \in \{0,1\}} \big\{ f_t(-c_f(\nu_t)\pi_t + \beta \mathbb{E}[V(z_{t+1}) \,|\, z_t,\, \nu_t,\, p_t,\, s_{w,t},\, e_t = 1]) + (1 - f_t)\beta \mathbb{E}[V(z_{t+1}) \,|\, z_t,\, \nu_t,\, p_t,\, s_{w,t},\, e_t]) \big\}, \tag{6}$$

where $c_f(\nu_t)\pi_t$ is the board's private cost of replacing the manager. We allow the board's private cost of CEO turnover, $c_f(\nu_t)$, to depend on the presence of an activist, as a campaign may help to align incentives between the board and shareholders and reduce agency frictions in the turnover decision. Through this channel, the activist is able to improve manager incentives and operational outcomes. Once the board has made its turnover decision, next period productivity is realized.

As with the manager's project decision, we assume the board receives an unobserved preference shock that affects its turnover decision. This means that the manager is not able to perfectly predict the board's action when making the project decision, and that turnover is possible even if the manager chooses to undertake the project. While the board

technically makes the turnover decision in the model, the combination of preference shocks on the manager's effort and board's turnover decisions means that the model generates some CEO turnover that occurs for purely idiosyncratic, rather than performance-based, reasons. This is a desirable feature of the model as we are not able to identify the specific cause of CEO turnover in our data.

1.5. Takeover phase

After next period productivity for the standalone firm (z_{t+1}) is realized, the quality of the potential acquirer, w_t, is revealed to the acquirer and board. If a takeover occurs, the firm's productivity z_{t+1} becomes w_t. This is a parsimonious approach to capture the surplus generated from a merger, reflecting a technological transfer from the acquirer to the target (Jovanovic and Rousseau, 2002). Therefore, from the perspective of the potential acquirer, we assume that the surplus from an acquisition for a given takeover price P_t is

$$V(w_t) - P_t. \tag{7}$$

In takeover negotiations, we allow the board to be imperfectly aligned with shareholders and have a private cost associated with takeover (Baron, 1983; Bebchuk and Cohen, 2005; Corum and Levit, 2019; Wang and Wu, 2020). Specifically, if takeover occurs at price P_t, the board's surplus is

$$(1 - c_m(\nu_t))P_t - V(z_{t+1}), \tag{8}$$

where $V(z_{t+1})$ is the standalone value of the firm. The board's private costs of takeover represent the potential loss of a board seat and the influence of entrenched management on the board's takeover decision. The level of entrenchment is captured by $c_m(\nu_t)$. As with the turnover decision, we allow the level of entrenchment to depend on the presence of an activist as a campaign may help to align incentives between the board and shareholders. This is the second way through which an activist can benefit shareholders, by reducing agency frictions in the takeover process.

The board and potential acquirer negotiate a takeover price P_t via Nash bargaining with acquirer bargaining power of θ_a. With the surplus of the board and potential acquirer defined

above, this gives a negotiated price of

$$P_t = (1 - \theta_a)V(w_t) + \theta_a \frac{V(z_{t+1})}{1 - c_m(\nu_t)}. \tag{9}$$

The acquisition is agreed to if both parties generate a positive surplus from the deal; otherwise, no takeover occurs.

1.6. Shareholder value

Shareholders value the firm as the expected discounted value of cash flows based on available public information. The shareholder value of the firm at the beginning of the period is

$$V(z_t) = \pi_t + \beta \mathbb{E}[a_t P_t + (1 - a_t)V(z_{t+1}) \mid z_t], \tag{10}$$

which updates in response to new information as it's revealed.

1.7. Model mechanism

Figure 2 illustrates the likelihood of an activist's entry as a function of their private signals and the firm's productivity. The left panel shows that the higher the signal value—either about the acquirer quality ($s_{w,t}$) or the project quality ($s_{p,t}$)—the higher the probability that an activist decides to launch a campaign. The two pieces of information are complementary in incentivizing the activist's intervention. The middle panel depicts the likelihood of an activist's entry as a function of the signal of the acquirer's quality and the firm's productivity (z_t). A better signal increases the likelihood of launching a campaign, and this is decreasing in the firm's productivity. This is because higher productivity increases the standalone value of the firm, reducing the potential surplus from takeover. Finally, the right panel shows the probability of activist entry as a function of the signal on project quality and firm productivity. Again, entry probability is increasing in the signal, but slightly decreasing in productivity. This reflects the higher returns to undertaking the project, in percent terms, when productivity is low.

The top two panels of Figure 3 show the probability of turnover and takeover as functions of project quality (p_t), acquirer quality (w_t), and the firm's productivity (z_t). The top left panel illustrates that the probability of managerial turnover is positively related to project

quality and negatively related to firm productivity. This is because the board's turnover costs are increasing in profits, while the returns to undertaking the project are not. The top right panel reveals an analogous relationship between the probability of a takeover and the acquirer quality and the firm's productivity. The probability of a takeover is increasing in the acquirer quality, but is decreasing in the firm's productivity. This is because the firm's standalone value is increasing in productivity, and therefore the takeover surplus is decreasing in productivity.

The bottom panels of Figure 3 illustrate the changes in the probabilities of turnover and takeover due to the entry of an activist. Both panels show that the activist increases the probabilities of replacing the CEO and of being acquired, and this change is increasing in both project quality and acquirer quality, and decreasing in firm productivity. Hence, activism has an effect on both turnovers and takeovers in states where interventions can unlock value, that is, when projects and takeover are promising.

2. Data

Our sample is constructed from several sources and covers the period 2001–2019. Table 1 presents descriptive statistics for our sample. Data about firms' financials come from the annual CRSP/Compustat merged database. We drop firms incorporated outside of the US, regulated utilities (SIC 4900-4999), financial firms (SIC 6000-6999), and quasi-governmental and nonprofit firms (SIC 9000-9999).

Data on M&A bids are from SDC Platinum. To merge this data with the CRSP-Compustat merged data, we use the data from Michael Ewens (see Phillips and Zhdanov, 2013 and Ewens et al., 2024).[6] We drop bids to targets outside the US, made by investment advisors (SIC 6282 and 6799), with the acquirer's CUSIP equal to the target's CUSIP, and related to divestitures, spin-offs, repurchases, IPOs, and acquisitions of divisions. We also exclude bids which were neither completed nor withdrawn, with missing acquired percentage of shares when the deals are flagged as completed, with both acquired and sought percentage of shares missing or below 50.01%, and made after the announcement of a completed deal. In cases of multiple bids for the same target within a twelve month period, we use

[6]The data were accessed at `https://github.com/michaelewens/SDC-to-Compustat-Mapping`.

only the initial bid. Our final sample includes 2,194 M&A bids, or 4.2 percent of firm-year observations.

Data on shareholder activism events are from Audit Analytics based on the initial filing of Schedule 13D with the Securities and Exchange Commission (SEC). We exclude amendments, following Albuquerque et al. (2022). If for a given company on a given date there are multiple investors filing a Schedule 13D, we use the filing with the largest percentage owned. We drop filings from investors that own more than 50% of the shares of the company. If there are multiple Schedule 13D filings for the same target during a twelve month period, we use only the first filing as subsequent filings are likely cases of wolf pack activism (Brav et al., 2022). To classify activist campaigns launched by hedge funds, we use data provided by Alon Brav (see Brav et al., 2008). Data on CEO turnover and compensation are from the Equilar database. We find a turnover in the CEO position at a frequency of 8.5 percent per year.

The model timeline, described in Section 1, implies an ordering, in time, of activist campaigns, CEO turnovers, and takeovers. Most cases observed in the data follow the ordering implied by the model. The primary exception is shareholder activism events occurring less than a year after a takeover bid. We ignore these campaigns, as they are typically motivated by risk arbitrage or an attempt to improve the terms of the announced deal (Jiang et al., 2018). Similarly, we ignore CEO turnover events that occur less than one year after a bid, as these are likely consequences of the acquisition itself (Kaplan and Minton, 2012). If an activist campaign occurs after turnover within the same fiscal year, we treat the turnover and campaign as two independent events.

We also make the following assumptions when classifying events. CEO turnovers and takeover bids occurring within two years of an SEC 13D filing are considered consequences of activism, following Boyson et al. (2017). In the absence of activism, a CEO turnover and a bid are deemed related if they occur within one year of each other. If there is no activism in the two years prior and no CEO turnover in the year before the bid, the bid is considered independent. Our final sample includes 2,083 activist campaigns, or 4.0 percent of firm-year observations.

We compute the bid premium of an offer as the ratio of the the bid price obtained from

the M&A data and the CRSP daily stock price 25 days before a bid. If a turnover or an activist campaign occurs during this 25 day pre-announcement period, we use the stock price 1 day after that event. We consider only bid premia between zero and one. The average bid premium is 36.6 percent in our sample. We compute an activist's return upon entry as the cumulative abnormal return for the target firms from 30 days before the filing of a Schedule 13D form to 1 day after using the market-adjusted model. The average return upon entry is 4.4 percent.

3. Identification

We estimate the model using the simulated method of moments (SMM), which chooses parameter values that minimize the distance between key moments generated by the model and their analogs in the data. Critical to identification is selecting moments that are sensitive to the parameters. In this section, we present the data moments used in the estimation and explain how they help identify the model parameters. The Internet Appendix provides further details about our estimation. Before describing the model's estimation, we discuss the parameters set in advance and additional assumptions. We select a curvature of the profit function (α) of 0.7 and discount rate of 5 percent ($\beta = 0.952$) in line with existing literature. The cost of capital (c_k) is chosen to be 20 percent, which represents a 15 percent depreciation rate plus a 5 percent cost of capital. We choose μ_z by normalizing capital to one at the unconditional mean of the exogenous portion of the productivity process. Bargaining in merger negotiations assumes equal power between the target and acquirer, similar to Dimopoulos and Sacchetto (2017) and Wang and Wu (2020). CEO compensation (θ_d) is set to 1.6% based on the average total compensation, as a fraction of operating income before depreciation, of public firm CEOs in the Equilar data. The size of the activist stake ($\bar{\nu}$) is set to the statutory disclosure threshold of 5 percent, which corresponds to the ownership threshold to file a Schedule 13D with the SEC.

We assume that the preference shocks attached to the manager's decision to undertake the project and the board's decision to replace the CEO follow a Type I extreme value distribution with location 0 and scale 1 following the standards in the computation and estimation of dynamic discrete choice models (Arcidiacono and Ellickson, 2011). This assumption im-

plies that the parameters affecting the manager and board value functions are identified up to a constant (Train, 2009).

We estimate the remaining twelve parameters by choosing values such that fifteen model-simulated moments approximate their empirical counterpart as closely as possible. While each parameter affects all of the model simulated moments, some moments are more sensitive to certain parameters.

The basic production parameters, ρ_z and σ_z, are directly related to the persistence and volatility of firm performance. Unlike a more standard fully exogenous productivity process, our model includes the manager's choice of effort and board's turnover decision that partially drive firm performance. Using an approach similar to Wang and Wu (2020), we use asymmetry in persistence of productivity to identify the manager's cost of effort, c_e. The degree to which the manager increases effort in response to poor performance drives a difference in the mean reversion in performance. Specifically, we run the regression

$$\log(s_{i,t+1}) = a + \rho_s^+ \log(s_{i,t})^+ + \rho_s^- \log(s_{i,t})^- + u_{i,t+1} \tag{11}$$

where $\log(s_{i,t})^+$ and $\log(s_{i,t})^-$ are the positive and negative values of log sales after demeaning by firm and year, in the model and data, and use the coefficient estimates ρ_s^+ and ρ_s^- as moments.[7] Matching the dynamics in log sales, rather than profits, avoids problems with observations that take negative values. We include the variance of the innovations, $u_{i,t+1}$, to help identify σ_z. The manager's effort choice is closely tied to the turnover decision, and we therefore include the frequency of turnover as a moment. This moment also helps identify $c_f(0)$, the cost of turnover when an activist is not present. To capture the sensitivity of turnover to past performance, we include the correlation between turnover and profit growth over the previous year, after demeaning by firm and year.[8] In addition, these moments will help identify the parameter governing stochastic project quality, λ_p, which is further discussed below.

Next, we have parameters related to activism. The activist incurs private costs from launching a campaign and these costs must be at least offset by the returns the activist

[7] As is common in this literature, we demean by firm and year to remove heterogeneity in the data that is outside of the model.

[8] Throughout, we measure growth rates as $2\frac{x_t - x_{t-1}}{|x_t| + |x_{t-1}|}$ as in Davis and Haltiwanger (1992) to accommodate negative values and keep growth rates bounded in $[-2, 2]$.

expects to generate. The average shareholder returns around activist entry thus helps to identify the activist's cost of entering, ξ. The activist is also more likely to enter when they have a positive private signal about the likelihood of takeover and/or project quality, and we include the frequency of activist entry to help identify the parameters governing the noise of the signals, σ_w and σ_p. In addition, we include the frequency of takeover during a campaign to capture how informed the activist is about the likelihood of takeover. Similarly, we include the frequency of turnover during a campaign to capture the role of activism in incentivizing manager effort and to help identify $c_f(\bar{\nu})$, the cost of turnover conditional on an activist being present.

We include moments on the dynamic relation between activism and firm operational performance outside of takeover. If activists predictably enter when firm performance is poor, this indicates an interventional role. We include the correlation between activist entry and profit growth over the previous year, after demeaning by firm and year, to capture this. We also include a moment capturing future firm performance following an activist campaign as this reflects the effects of intervention. To ensure that we capture the longer term effects associated with activism (Bebchuk et al., 2015), we regress future 3-year profit growth on an indicator for an activist campaign, and use this coefficient, controlling for firm and year fixed effects. This moment also helps identify the distributional parameter for project quality, λ_p, because project quality is partially observed by the activist.

Finally, we consider the parameters related to takeover. Takeovers occur when the surplus from acquisition is positive and large enough to offset the private board costs of takeover. The surplus is driven largely by the post-takeover firm productivity, w_t, which has mean $1/\lambda_w$. The frequency of takeover is closely tied to this parameter. Conditional on takeover, the bid premium reflects the private costs of the board, as the acquirer must offer a higher bid to offset those costs. The mean bid premium, both unconditionally and during a campaign, help to pin down these cost parameters, $c_m(0)$ and $c_m(\bar{\nu})$, respectively.[9] The surplus from takeover depends on the firm's performance, and we therefore include the correlation between takeover and profit growth over the previous year, after demeaning by firm and year, as an

[9]Analogous to the data, in the model the bid premium is calculated as the takeover price, P_t, relative to the price just prior to the takeover announcement. The pre-announcement price incorporates information on z_{t+1}, ν_t, and $s_{w,t}$.

addition moment to pin down the parameters related to takeover.

The validity of the identification strategy relies on a sufficient connection between the model parameters and moments. To illustrate these connections, in the Internet Appendix we report the elasticities of moments with respect to the parameters and of parameters with respect to the moments. These figures reiterate that most moments are linked to several parameters. It also shows that each parameter is sensitive to one or more of the targeted moments.

4. Empirical Estimation Results

In this section, we present the results of the SMM estimation, shown in Tables 2 and 3. The model does well to approximate the fifteen moments used for identification, as seen in the targeted moments reported in Table 2. Similar to Wang and Wu (2020), we find asymmetric persistence in firm productivity, consistent with managers exerting more effort when performance is low. The model also matches the frequency of activist entry and shareholder returns around the announcement of an activist campaign, as well as moments related to CEO turnover and takeover. The model does not match precisely the two moments related to the timing of turnover and firm takeover, shown in the final two rows of Table 2. However, in both cases, the model produces signs consistent with the data, and the economic magnitudes are similar.

Table 3 presents the parameter estimates along with their standard errors, in parentheses, clustered at the firm-level. The model estimates indicate that activists have private information about both the potential acquirer and project quality, but that these signals are quite noisy. The estimates for λ_w, σ_w, λ_p, and σ_p imply a signal-to-noise ratio of 3.2 percent for acquirer quality, and 14.6 percent for project quality.[10]

The board's private cost of CEO turnover is 2.1 times profits. This estimate is in line with previous estimates from models featuring CEO turnover, which typically find that the board places high private cost on replacing a CEO, and that this agency conflict leads to suboptimally low separation rates (Taylor, 2010; Taylor, 2013; Wu, 2018; Frydman and

[10]The signal-to-noise ratio is calculated as the variance of the underlying process, $1/\lambda_x^2$, divided by the variance of the signal noise, σ_x^2, for $x \in \{p, w\}$.

Papanikolaou, 2018). When an activist is present, we estimate a 22 percent reduction in agency frictions in the turnover decision, suggesting that activists help to align incentives between the board and shareholders. This corresponds to higher turnover rates during an activist campaign, consistent with the data, as seen in Table 2.

The board's private cost of the firm being acquired is estimated at 15.1 percent of firm value. When an activist is present, this cost is reduced by 11 percent (1.6 percentage points), a meaningful reduction in the agency frictions to takeover. For both turnover and takeover, the empirical estimates indicate an economically significant reduction in agency frictions when the activist is present, indicating a valuable role of activist intervention.

Finally, the activist's cost of entry parameter estimate corresponds to 3.0 percent of the pre-campaign market price of the shares acquired. This cost estimate is in line with the expected campaign costs estimated by Gantchev (2013), Johnson and Swem (2021), and Albuquerque et al. (2022). With an average announcement return of 4.1 percent, this implies an expected net return to the activist of 1.1 percent.

4.1. Model validation

The model does well to fit the fifteen moments targeted in the estimation. To further test the fit of the model, in this section we compare model and real-world outcomes in several dimensions that are not targeted in the estimation.

One critical question of the model is whether the type of firm targeted by activists is similar to that observed in the data. Panels A and B of Figure 4 explore this question by plotting the kernel density estimates of one-year profit growth and profitability, respectively, of firms that are targets of an activist campaign in both the real data (solid line) and the model-simulated data (dashed line). Profit growth measures short-term dynamics of performance, and profitability captures the level of firm performance at the time they are targeted. Profitability is measured as return on assets (ROA) in the actual data, and log productivity in the model, and normalized in both cases to standard deviations around the mean. We see in both Panels A and B that similar types of firms are the targets of activist campaigns in the the data and model. Notably, in both cases, firm performance is not a strong predictor of activist intervention, and firms with high and low profitability

are potential targets. In the model, this is because strong signals about project quality or acquirer quality can arrive for any firm, not just poorly performing ones.

We repeat this exercise to explore whether the model approximates the types of firms that are targeted for takeover (Panels C and D). In the case of takeover, the performance of firms that receive a takeover bid is slightly lower, on average, in the model than in the data. This is likely because our model assumes a technology transfer from the acquirer to the target, in the spirit of q-theory of mergers (Jovanovic and Rousseau, 2002), and does not explicitly model complementarities between the target and acquirer assets, as in Rhodes-Kropf and Robinson (2008) and Wang and Wu (2020). However, the model does quite well in matching the distribution of the performance of takeover targets, suggesting that the q-theory approach works well to approximate the takeover market in this setting.

Panels E and F of Figure 4 explore the performance of firms that experience CEO turnover. As with takeovers, the model slightly understates the average performance of firms that replace their CEO, but still does a good job to approximate the empirical distribution. A significant fraction of turnovers occur at firms with strong performance and the model does well to capture this feature of the data.

Finally, while the model targets the mean bid premium, it does not target higher moments of the distribution. The bid premium captures several features of the target/acquirer match, the information environment, and the activist's facilitation role. We compare the distribution of the bid premium in Figure 5 by presenting histograms of real and model-simulated data. We find a similar pattern across the two, suggesting that the model does a reasonable job approximating this dimension of the data.

5. Model Implications

With empirical estimates of the parameters in hand, we now explore implications and counterfactuals from the model.

5.1. Role of activism in M&A and manager incentives

In the model, M&A outcomes and the manager's effort choices are affected by activist campaigns. On the M&A side, the presence of an activist helps to align incentives between

insiders and shareholders when a potential acquirer arrives. This helps to facilitate acquisitions and increases the likelihood of a takeover, all else equal. On the incentive side, the presence of an activist reduces managerial entrenchment in the board's decision to replace a CEO. This changes the manager's incentive to exert effort in the presence of an activist.

The model allows us to compare the marginal effect of an activist campaign on M&A outcomes and manager choices. Table 4 compares various outcomes from the model conditional on an activist campaign to that same outcome in the counterfactual where the activist did not launch a campaign, keeping all else equal. The comparison of these two quantities gives the average change due to an activist campaign while holding the equilibrium fixed. The equilibrium effects of activism are considered in the next section. All values are reported as percentages. Column (1) considers all activist campaigns, and Column (2) includes only those campaigns that result in a takeover.

Panel A Table 4 isolates the effect of an activist campaign on outcomes related to M&A. We see that an activist campaign causes a significant increase in the likelihood of a takeover: in cases where an activist is present and a takeover occurs, 92.8 percent of those takeover would have been completed had an activist not been present, holding all else equal. In other words, takeover is marginal to activist intervention in about 7 percent of successful deals.

In the model, the activist facilitates takeovers by reducing the board's private cost of a takeover, effectively improving the incentive alignment between shareholders and insiders. Although takeover facilitation increases the likelihood that a takeover will occur, on the other side of the coin, it lowers the negotiating position and price demanded by the board in negotiations. As a result, an activist campaign decreases the bid price and takeover premium. Table 4 shows that in takeovers with an activist present, the bid premium is 13.7 percent (5.2 percentage points) lower than if the activist had not been present. All of the reduction in bid premium is due to activist intervention because the pre-announcement share price used to calculate the bid premium incorporates the activist's signal about a potential acquirer.

The last three rows of Panel A quantify the net benefit of an activist campaign attributable to takeover outcomes. In cases when an activist is present and a takeover is successful, the increased probability of a takeover adds 1.23 percent of value for shareholders on average, while the lower takeover premium reduces value by 0.78 percent. Together,

the average net benefit to shareholders is 0.44 percent. However, this shareholder benefit is bimodal: for the 7.2 percent of deals that are marginal to activist intervention, average shareholder benefit is 15.7 percent. In the 92.8 percent of non-marginal deals, shareholders lose on average 0.75 percent in value due to lower bid premia. When considering all activist campaigns, not just those that result in a takeover, the average shareholder benefit attributable to M&A is only about 6 basis points. To summarize, on average, the value of increased takeover likelihood is almost entirely offset by the reduced bid premium. However, the activist provides significant value to shareholders in cases when takeover is marginal to the campaign.

An activist campaign also increases the manager's incentive to exert effort by increasing the sensitivity of turnover to effort choice. Panel B of Table 4 reports the effect of an activist campaign attributable to changes in the manager's effort choice. In cases when the activist launches a campaign, this results in a 30.8 percent increase in the probability that the manager undertakes the project leading to a 1.17 percent increase in productivity. This translates to a 35 basis point increase in shareholder value attributable to the effort incentives provided by an activist campaign. Comparing Panels A and B, the shareholder benefit due to increased effort incentives is much larger in magnitude than that resulting from changes in M&A outcomes.

The results in Table 4 represent the marginal effects of an individual activist campaign. To fully understand the effects of activism as a market mechanism, we must consider the equilibrium effects of activism including that of the threat of activism. We turn to this next.

5.2. Activism: crowding-out or crowding-in M&A

In this section, we explore the equilibrium effects of the presence of activists in the economy on manager incentives, the M&A market, and shareholder value. In the model, activists are equipped with two intervention technologies that affect firm outcomes. First, the activist reduces agency frictions in the decision to replace an under-performing CEO. This intervention has similarities to takeover, which is another mechanism to remove the manager. Second, the activist reduces agency frictions in merger negotiations. The model allows us to quantify the effect of each of these technologies individually on firm outcomes in

equilibrium, and to explore whether activism crowds out takeover activity or has a positive spillover to the M&A market.

Table 5 reports outcomes under three counterfactual model experiments in Columns (1)–(3), plus the full-model baseline in Column (4). Column (1) reports equilibrium outcomes when activists have been excluded from the market, but keeping all other features of the model unchanged. Column (2) reports the equilibrium in which activists may enter, but activists have only the ability to incentivize effort by lowering the frictions to turnover; they have no effect on the takeover decision. Comparing Columns (1) and (2), we see that takeover activity *declines* 0.79 percent when activists are present in the economy. In other words, the effort incentives of activism crowds out a significant volume of M&A activity.[11] This occurs because the activist's ability to incentivize manager effort acts as a partial substitute for takeover activity. Specifically, the incentives generated by activism increases effort and reduces the surplus from potential takeovers, reducing M&A volume.

The effects on aggregate takeover surplus for targets, acquirers, and their sum, are also reported. All three quantities decline by a similar percent, a direct result of lower M&A volume. Critically, the reduced acquirer surplus represents a negative externality of crowded-out takeover activity: although improved effort incentives—and the corresponding improvements in productivity—are captured by target shareholders, the loss of acquirer surplus is not. From a social value perspective, acquirer surplus must also be considered, and this crowding out represents an unexplored potential downside of activism.

Column (2) also indicates that the incentive technology has a positive effect on manager effort, increasing the productivity growth due to manager effort and average productivity by 1.27 and 0.20 percent, respectively. This translates into a 0.33 percent increase in shareholder value relative to a comparable firm in a world in which activists are excluded. On the other side of the coin, managers face higher turnover and exert more effort, and their utility is 1.8 percent lower.

Column (3) considers the role of activist takeover facilitation. This column reports the equilibrium outcomes when the activist has only a facilitation technology but no ability

[11] Crowding out 0.79 percent of total M&A volume is especially notable given that activists are only present in 3.9 percent of firm-year observations.

to incentivize effort through reduced friction to turnover. Consistent with the ability to facilitate takeovers, the introduction of activism increases the frequency of takeover by 0.64 percent. The probability of a takeover occurring when an activist is present also increases to 14 percent. As discussed in Section 5.1, takeover facilitation is a double-edge sword for shareholders: an activist campaign increases the likelihood a takeover occurs, but it lowers the price conditional on a takeover. This is shown by the 0.63 percent decrease in the average bid premium in Column (3), as well as a negligible increase in the aggregate target surplus of 0.02 percent. On the other hand, aggregate acquirer surplus is significantly higher, by 0.49 percent, as a result of both the higher takeover volume and reduced bid premia, reflecting a positive externality of activism.

Because the activist, in Column (3), cannot incentivize the manager through the threat of turnover, the manager's effort choice and firm productivity are largely unchanged. Taken in combination with the small increase in takeover surplus, target shareholders are roughly indifferent to the introduction of activists that can only serve as facilitators. However, from a social perspective, aggregate surplus from M&A increases substantially from activists' presence. Interestingly, the benefits to activist intervention in the M&A market accrue to acquirers, not targets.

Finally, Column (4) reports the baseline equilibrium in which activists have both effort incentive and takeover facilitation technologies. Comparing this to Column (1) gives the equilibrium effects of activism as a whole. We see that takeover volume is roughly unchanged by the presence of activists, as the crowded out takeover activity from the activists effort incentives is roughly offset by their facilitation role. We also see that aggregate target surplus in M&A is reduced by the presence of activism, but that it increases for acquirers. In addition, combined target and acquirer surplus declines slightly, by 0.16 percent in aggregate. Thus, activism reduces total surplus generated by the market for corporate control.

For shareholders, the improved effort incentives provided by activism provides significant value, increasing the share price by 0.33 percent compared to a comparable firm in a world without activism. It is worth emphasizing that this effect on shareholder value applies to *all* potential targets of activism, not just those which are the active target of a campaign. These estimates indicate a significant effect of the *threat* of activism on real firm outcomes.

Specifically, this effect comes largely from improved incentives for management rather than increased likelihood of takeover. The results suggest a valuable role for activism in the economy, and that activists only capture a small percentage of the value that their presence generates.

We also consider the effects of the threat of takeovers on effort incentives, productivity, and shareholder value. Table 6 summarizes these effects by considering counterfactual equilibria. The table reports the percent change in equilibrium outcomes relative to the baseline by excluding activism (Column 1), takeovers (Column 2), and both activism and takeovers (Column 3). Column (1) repeats the exercise from Column (4) of Table 5, and summarizes the role of activism in the economy: removing activists marginally increases takeovers, reduces turnover rates and productivity, and lowers shareholder value.

Column (2) removes the threat of takeovers, which results in activism playing a different role in the economy: campaigns are launched primarily to ensure high-quality projects are undertaken, replacing the CEO if necessary. This is seen with the 69 percent increase in the turnover rate when the activist is present relative to the baseline. Productivity and effort are higher, yet, shareholders are significantly worse off: shareholder value declines by 26.6 percent, largely due to the loss of surplus generated by takeovers. This reflects the high aggregate value of reallocation in the M&A market. To summarize, without an M&A market, activists play a much more active role in disciplining managers.

Without the threat of either activists or takeovers, shown in Column (3), shareholders are significantly worse off, similar to Column (2). Interestingly, productivity and effort are higher when both takeover and activists are excluded from the market. This is partially explained by higher turnover rates with the board providing greater incentives without external governance mechanisms in place. In addition, managers internalize more of the value of effort because they are not subject to takeover threats, making the manager willing to exert more effort. Despite the higher effort, managers benefit from greater job security, and have 4.2 percent higher utility when these market-based disciplinary mechanisms are excluded.

5.3. Selection versus treatment in activist announcement returns

In the previous section, we saw that activists affect real outcomes by facilitating takeovers and improving manager incentives, i.e. the treatment, or intervention, effects of activism. Of course, intervention can only occur if the activist decides to launch a campaign, and this decision depends on their private information signals. In this section, we evaluate the role of information, or selection, in the activist's decision to enter and in the returns to activism.

In the model, activists receive two signals prior to their entry decision, one about the firm's project quality and the other about the quality of a potential acquirer. These signals represent the activist's information advantage relative to the market, and an activist receives this information prior to making an entry decision.[12] After this entry decision is made, the activist's position and the private information are revealed to the market and prices adjust. The shareholder return around announcement summarizes the change in expectations about takeover, the manager's and board's actions, and the activist's effect on firm outcomes. The model allows us to decompose the shareholder announcement return into selection and treatment channels.

Table 7 reports components of the shareholder return around activist entry in the estimated model. The first row reveals that 91 percent of the announcement return is due to the activist trading on superior information about the firm's projects and future takeover opportunities. This is constructed as the counterfactual shareholder return around announcement that would occur if the activist's private information was revealed to the market but the market believes that an activist will not enter, i.e., selection without treatment. The selection effect can be further decomposed into that attributable to each of the two signals, which reveals that information about potential takeovers drives 76 percent of the return. This result is consistent with the empirical literature that shows that activist returns are strongly correlated with campaigns related to takeover.

Although the selection effect is large, and most of the announcement returns are due to information about the potential acquirer, it is worth reiterating that the activist's signal

[12] An information advantage for the activist is not assumed in the model but rather accommodated. For example, the parameters for the signal noise, σ_w and σ_p, can be arbitrarily large. Our parameter estimates indicate noisy, but economically relevant, signals.

about potential takeovers is quite weak—the signal-to-noise ratio is only 3.0 percent. This can be seen in that the probability of a takeover conditional on an activist entering is only 12 percent. However, the returns to successfully picking a takeover target are high, with an average bid premium of 37 percent, giving high expected value to the noisy signal.

On the treatment side, most of the returns around activist entry are due to improved effort incentives rather than takeover facilitation. This is consistent with our earlier results which showed that the net benefit to target shareholder of takeover facilitation is small, and that most of the gains from activist intervention come from improved incentives to exert effort.

Our findings suggest that activists generate significant returns from superior information about takeover opportunities, consistent with Greenwood and Schor (2009). However, similar to Table 4, it is important to reiterate that the *marginal* effect of activist intervention reported in Table 7 captures only changes in *expectations* around activist entry; value coming from future anticipated activist intervention is already incorporated in the share price prior to the activist entry announcement. This marginal effect on the share price therefore does not capture the full value of activists in the economy, which requires an equilibrium analysis. As we saw in Table 5, the threat of activism adds significant value to target shareholders. We turn to the equilibrium effects of activist private information next.

5.4. The role of activist private information

Table 8 explores the effects of activist private information on the entry decision, the M&A market, and shareholder value. The table reports counterfactual equilibrium outcomes as a percent change relative to the baseline by shutting down the activists' private signal about the potential acquirer (Column 1), the signal about project quality (Column 2), and both signals (Column 3).

Without superior information regarding a potential takeover, shown in Column (1), the frequency of activist entry drops by an order of magnitude—by 88 percent relative to the baseline—demonstrating the value of the signal related to M&A in the decision to launch a campaign. Instead, the activist entry decision is based solely on information about project quality, the consequences of which are seen by a nearly two-fold increase in turnover rates

conditional on activism. This reflects activist entering to ensure that a valuable project is undertaken, replacing the CEO if necessary. However, average productivity is lower (-0.13 percent) than in the baseline due to far fewer activist campaigns. This lower productivity is associated with a decline in shareholder value of 0.17 percent. On the M&A side, despite fewer activist campaigns, takeover volume actually increases, by 0.14 percent, reflecting slightly lower average productivity and therefore higher takeover surplus. As activist takeover facilitation is rarely used—activists are present in only 3.6 percent of takeovers, compared to 12.5 percent in the baseline—bid premia, target surplus, and total surplus of successful deals are higher than in the baseline; in contrast, acquirers have lower aggregate surplus due to higher bid premia.

With no private information about project quality, shown in Column (2), the activist again reduces entry, but by only about one quarter. M&A volume is roughly unchanged (-0.02 percent) reflecting the balance of the crowding out and takeover facilitation effects discussed in Section 5.2. Unable to launch campaigns in advance of high-quality projects, manager effort and productivity drops, and shareholder value drops by 0.23 percent.

Finally, Column (3) turns off all private information for the activist. In this case, the activist never finds it optimal to enter as it is unable to trade on private information, and the returns to its treatment effects are not sufficiently large to overcome the cost of launching a campaign. M&A volume is roughly unchanged (0.05 percent increase), and effort and productivity decline relative to the baseline. Without activists present in the economy, shareholders lose 0.32 percent of value, highlighting the positive value of activism estimated in the model.

These results demonstrate that the activist's access to private information can be beneficial to shareholders. Because information is important for the activist's entry decision, and the treatment effects only occur if the activist enters, information complements treatment. Indeed, if the activist does not have superior information, they do not enter, eliminating any beneficial treatment effects. This is analogous to the classic free-rider problem in corporate takeovers (Grossman and Hart, 1980), as the costs of the campaign are borne solely by the activist, but the benefits are shared by all shareholders, leading to inefficiently low activism. An information advantage for the activist improves the outcomes of target shareholders by

helping to overcome this free-rider problem.

5.5. Policy experiment: the cost of activism

The regulatory and legal environment surrounding shareholder activism, proxy contests, and anti-activist tactics play a significant role in an activist's decision to launch a campaign. Examples include trade block disclosure requirements (Bebchuk et al., 2013; Back et al., 2018), universal proxy regulations (Hirst, 2018), and anti-activist poison pills (Eldar et al., 2023). These factors have the potential to change the cost of activism, and our model allows us to evaluate the effect of such changes.

Table 9 presents policy experiments in which the cost of activist entry is changed holding other parameters fixed. Columns (1) and (2) report the percent change, relative to baseline, in the counterfactual equilibrium outcomes for a 20 percent decrease or increase, respectively, in the activist's cost of entry, ξ.

With higher costs of entry, activists enter less frequently, resulting in a reduction in shareholder value as intervention occurs with less frequency. As with the earlier results, this loss in shareholder value is primarily due to reduced incentives for the manager to exert effort, resulting in lower productivity.

When costs are higher, activists require a higher signal in order to launch a campaign. This can be seen with a significant (11 percent) increase in the frequency of takeover when an activist is present. Similarly, through the project quality signal, turnover rates conditional on activism increase despite a decrease in overall turnover rates. Overall, with higher costs of entering, activism is more strongly correlated with project and acquirer quality, meaning the selection effect of activist entry is greater. This is seen with higher activist announcement returns and, in particular, the return component due to information.

6. Hedge funds, activist evolution, and golden parachutes

In this section, we consider the role of hedge fund activism, sample period, and golden parachutes on our estimation results.

6.1. Hedge fund activism

Several studies have argued that hedge fund activists have superior results in terms of improving real and financial outcomes of the firms they target (Brav et al., 2010). In this section, we explore whether hedge funds differ in the efficacy of their interventions or the private information they receive. We use data provided by Alon Brav on hedge fund activists' campaigns during the period 2001–2014 (Brav et al., 2008). Our sample includes 1,374 campaigns with hedge funds participation corresponding to 87% of the total number of campaigns during that period. We re-estimate the model using this subsample of hedge fund activist campaigns, excluding non-hedge fund campaigns. We also re-estimate the model using data on all activist events during the same sample period, 2001–2014, in order to isolate the effect of hedge fund activism. The parameter estimates are reported in Columns (1) and (2) of Table 10.

Comparing the estimates from the hedge fund only sample to those from the comparable all activist sample, we find evidence that hedge fund activists are more effective at reducing agency frictions in the turnover and takeover decisions. The reduction in agency frictions related to turnovers and takeovers are 38.8 and 8.3 percent, respectively, comparing favorably to the 36.5 and 7.5 percent reductions in the baseline estimation. While the difference is modest, it is worth noting that the number of non-hedge fund activist campaigns is also small. On the information side, hedge funds have a signal-to-noise ratio on acquirer quality of 2.6 percent, somewhat higher than the 2.4 percent found in the all activist sample. On the project quality side, hedge fund activists have a less noisy signal than in the all activist sample, but in both cases the signal value is economically insignificant. In summary, hedge funds appear to be more effective at intervention, and we find evidence that they are better informed about takeover opportunities, but only to a modest degree.

6.2. The efficacy of activism over time

Alongside an increase in hedge fund activism over time, the tactics, efficacy, and reputation of activists may have changed over our sample period (Krishnan et al., 2016; Denes et al., 2017; Johnson and Swem, 2021). To investigate this possibility, we divide our sample in half, into an early (2001–2009) and late period (2010–2019), and re-estimate the model pa-

rameters for each subsample. The parameter estimates are presented in Table 10 in Columns (3) and (4).

We find that the efficacy of intervention increases in the later period, but only in terms of takeover facilitation. Specifically, the estimated agency frictions of takeover are reduced by 15.6 percent when an activist is present in the late period, whereas there is no estimated reduction in the early period. In terms of reducing the agency frictions to CEO turnover, we find that the efficacy of intervention has declined somewhat, from 35.3 reduction in agency frictions in the early period to 28.9 percent in the late period.

On the information side, we find evidence of improved information content in the private signals that activists have prior to launching a campaign. On the takeover side, we find signal-to-noise increases from 3.2 to 5.4 percent over time. This is consistent with takeovers being an increasingly important source of return for activists, and coincides with an improvement in activists' role as a facilitator of takeovers discussed above. On the project side, the signal-to-noise ratio is economically insignificant in the early period, and increases to 13.1 percent in the late period. Overall, activists appear to be better informed in the late period, and activists role as facilitators of takeover appears to be strengthening over time.

6.3. Golden parachutes and severance pay

We extend the model to consider the effect of providing the manager with compensation in the case of takeover or turnover, which we refer to as severance pay. Some form of severance pay is common practice in executive compensation contracts (Hartzell et al., 2004; Yermack, 2006; Jenter and Lewellen, 2015). Using the approach of Rau and Xu (2013), we estimate the average payout to CEOs in the case of separation as 2.3 percent of profits.[13] We assume that severance compensation is the same for both turnover and takeover.

In untabulated results, we find that the inclusion of severance pay has only negligible effects on the model estimation. To understand this, consider that the manager's utility is composed of two components: the expected present value of future normal compensation, and the expected present value of severance pay. The manager chooses effort to maximize the sum of these values. For the first term, the marginal value of effort on normal compensation

[13]This is constructed as three times salary and bonus.

is not affected by severance pay. For the second term, the marginal value of effort primarily operates through a discounting channel: longer expected tenure lowers the present value of severance pay. Thus, higher severance pay reduces the manager's incentive to exert effort. However, the quantitative effect is small because neither discount rates nor severance pay are high. Therefore, severance pay of a size estimated in the data has only a small effect on the manager's effort decision; severance pay or discount rates would need to be much larger to have a significant effect on the manager's effort choice.

7. Conclusion

Activists and takeovers can be complementary or can serve as substitutable disciplinary mechanisms for management and the board. On the one hand, activist investors can facilitate takeovers with potential acquirers. On the other, the presence of activists and the threat of being acquired can incentivize managers to behave well, lowering the surplus to takeover. The joint effect of these two forces on the M&A activity and shareholder value is ex-ante ambiguous. To quantify these forces, we develop and estimate a model of shareholder activism and M&A featuring an activist that can buy a stake in a firm and incentivize the manager to exert effort through the threat of turnover and facilitate takeovers by reducing board entrenchment.

We find that activism crowds out takeover activity as a competing disciplining mechanism: the presence of activists in the economy cause managers to exert more effort, reducing the surplus from and likelihood of takeover. This crowding out has the externality of reducing the surplus of potential acquirers. At the same time, we find that activists significantly reduce agency frictions in the decision to be acquired. This channel increases takeover volume, and increases the surplus of potential acquirers. Taken together, the presence of activism has negligible net effect on M&A volume in equilibrium, and slightly reduces total surplus from M&A. We also find that activists generate value for target shareholders primarily through improved effort incentives rather than takeover facilitation.

We find that the threat of activism provides significant positive value to shareholders, in equilibrium, even when they are not the target of a campaign. This value, along with the surplus internalized by potential acquirers, cannot be captured by activists and contributes to

a free-rider problem. It also suggests that research measuring the social benefits of activism must look beyond just shareholder returns of active targets.

Our model estimates also indicate that much of the return generated around the announcement of an activist campaign is due to superior information of activists rather than to their ability to influence corporate outcomes. However, without private information, activists have a significantly reduced presence in the economy, reducing shareholder value coming from the threat of intervention. Therefore, private information benefits shareholders in that it helps to overcome the free-rider problem in the activist's decision to launch a campaign.

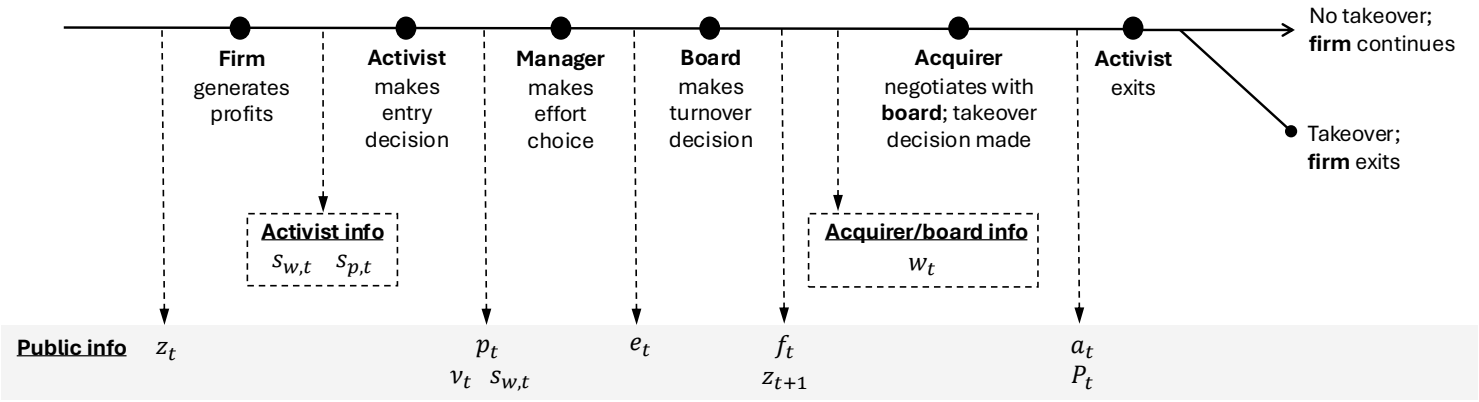

Fig. 1. **Timeline of the model.** This figure illustrates the timeline of the model actions and information environment. At the start of each period, the firm generates profits. A potential activist investor receives private signals about a project quality ($s_{p,t}$) and acquirer quality ($s_{w,t}$), and it decides whether to launch a campaign. The investor's decision and information become common knowledge. Then, the manager decides whether to undertake the project (e_t) based on the true project quality (p_t). Based on the manager's decision, the board decides whether to replace the manager (f_t). After the turnover phase, next period firm productivity (z_{t+1}) is realized. The potential acquirer and board learn the quality of the takeover opportunity (w_t), negotiate price (P_t), and a takeover decision is made (a_t). The activist exits. If the takeover occurs, the firm exits the economy; otherwise, the firm continues.

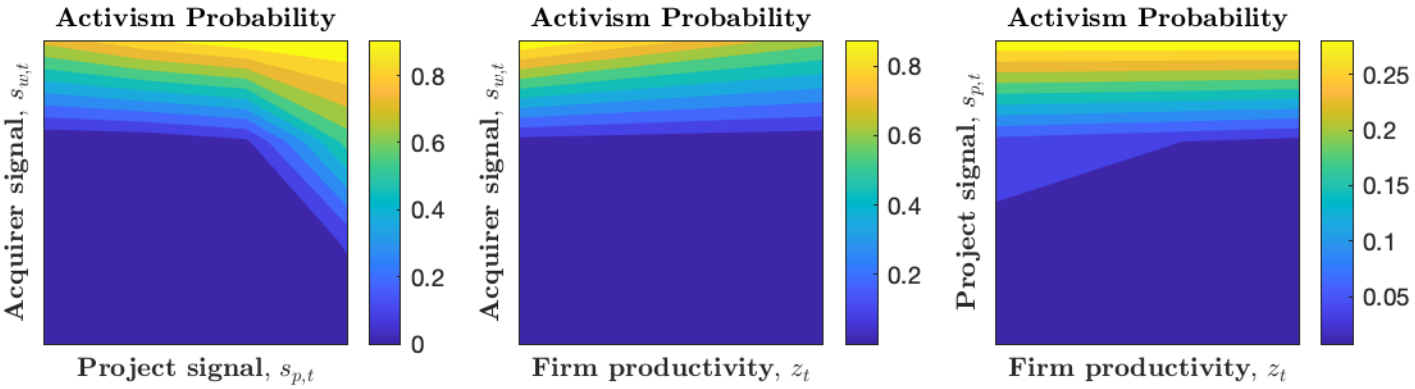

Fig. 2. **Activist's entry decision.** This figure illustrates the probability that an activist launches a campaign as a function of the signals (left panel), the acquirer signal and firm productivity (middle panel), and the project signal and firm productivity (right panel). Each panel is a heat map with lighter colors indicating a higher probability of an activist campaign.

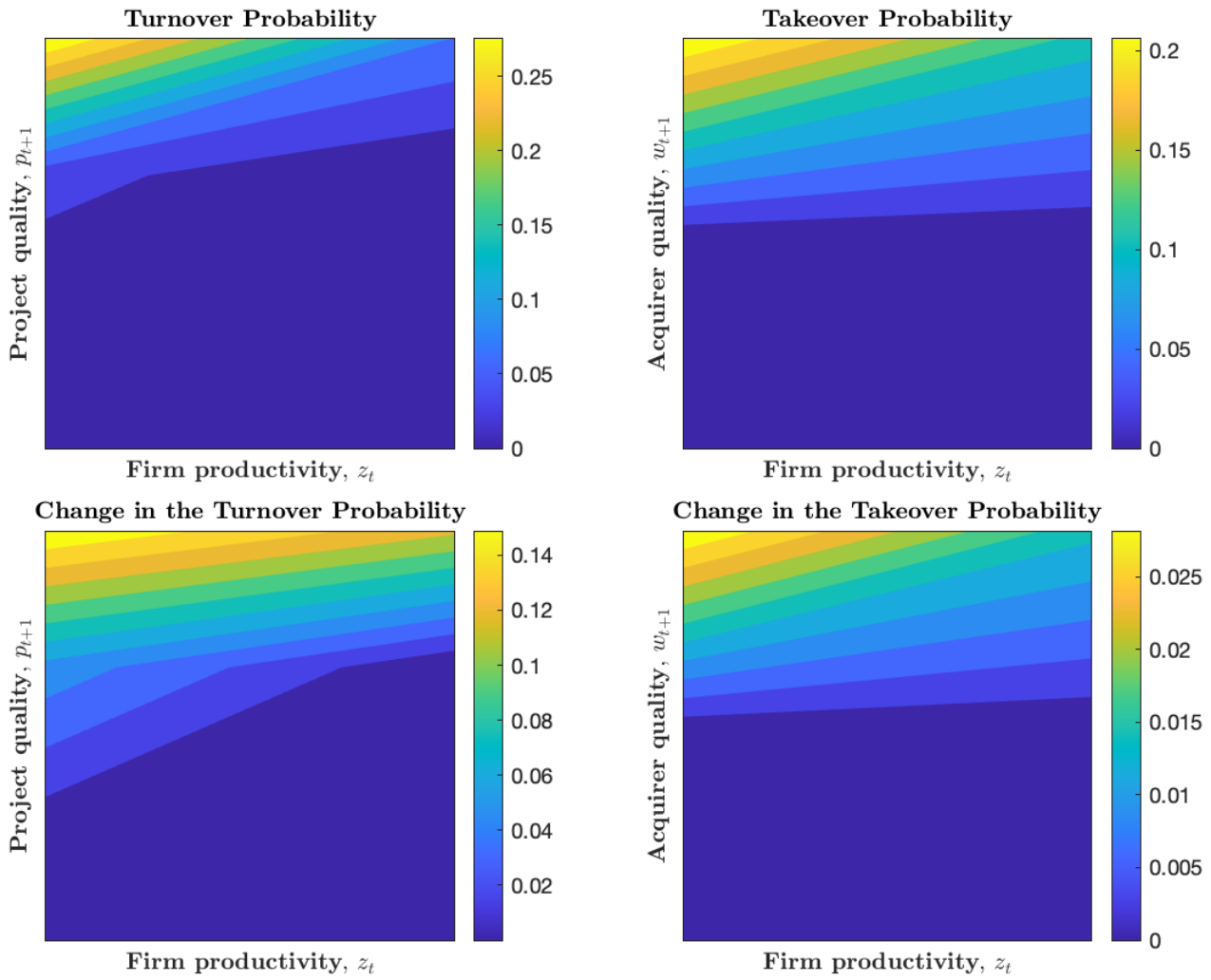

Fig. 3. **Policy functions.** The top two panels of the figure illustrate the probability of a turnover as a function of the project quality and firm productivity (left panel), and the probability of a takeover as a function of acquirer quality and firm productivity (right panel). The bottom two panels illustrate the changes in these probabilities following the entry of an activist. Each panel is a heat map with lighter colors indicating a larger probability of an event (top panels) or a larger increase in the probability of an event (bottom panels).

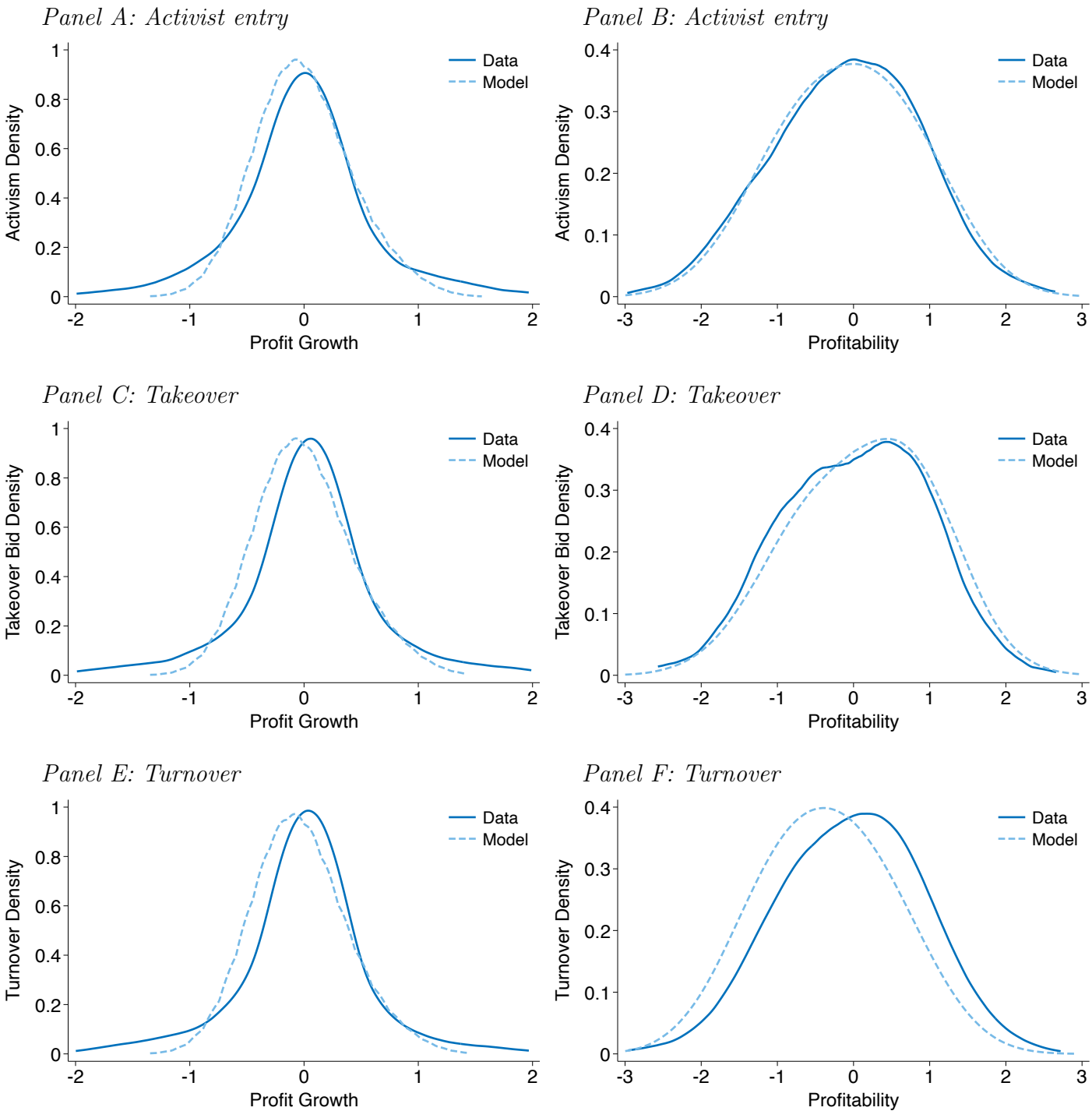

Fig. 4. **Non-targeted moments: Activist entry, takeover, and turnover.** The figure presents the kernel density estimates of profit growth and profitability for firms that are targeted by activists (Panels A and B), for firms that are targeted for takeover (Panels C and D), and for firms that have CEO turnover (Panels E and F). Kernel density estimates using real data and model-simulated data are shown with solid and dashed lines, respectively. One-year profit growth is measured using the approach of Davis and Haltiwanger (1992) trimmed to the range $(-2, 2)$. Profitability is measured as return on assets (ROA) in the data, and as log productivity in the model. In both the real and simulated data, profitability is measured as within-firm standard deviations from the mean, and trimmed at ± 3 standard deviations. In the ROA data, year effects are also removed.

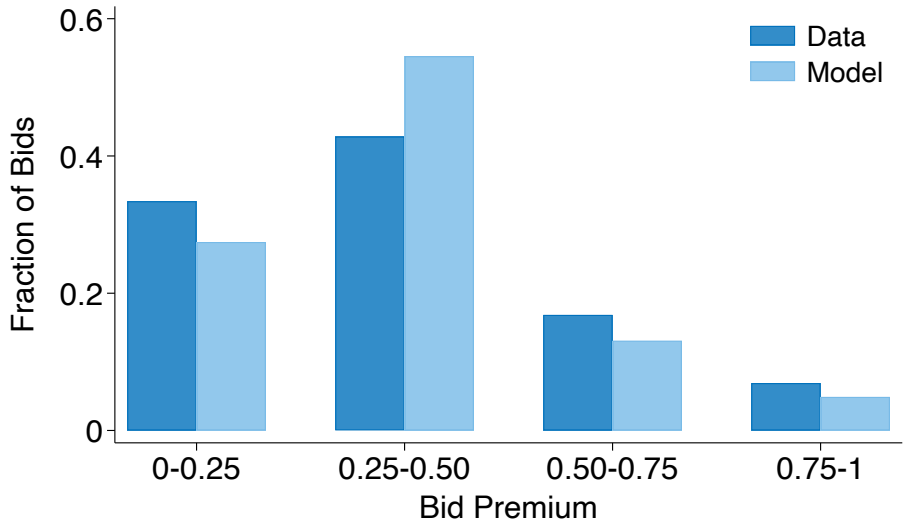

Fig. 5. **Bid premium distribution.** The figure presents histograms of the bid premium in the actual and simulated data.

Table 1: Descriptive statistics

This table reports descriptive statistics for the sample covering 2001–2019. Assets and sales are normalized in 2019 US dollars. Cumulative abnormal returns (CAR) are computed using the market-adjusted model from 30 days before the filing of a 13D form to 1 day after. Bid premia are computed using the stock price 25 days prior to the merger announcement. For each variable, we report the mean, the standard deviation, the 10th, 25th, 50th, 75th and 90th percentiles. The sample has 52,666 observations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean	Std	P10	P25	P50	P75	P90
Ln(Assets)	6.368	1.994	3.788	4.956	6.331	7.719	8.951
Ln(Sales)	6.119	2.323	3.293	4.769	6.287	7.650	8.849
Activist's entry, $[0, 1]$	0.040	0.195	0.000	0.000	0.000	0.000	0.000
CAR, activist entry	0.044	0.278	−0.220	−0.089	0.026	0.145	0.310
CEO turnover, $[0, 1]$	0.085	0.279	0.000	0.000	0.000	0.000	0.000
CEO turnover with activist, $[0, 1]$	0.007	0.085	0.000	0.000	0.000	0.000	0.000
Takeover bid, $[0, 1]$	0.042	0.200	0.000	0.000	0.000	0.000	0.000
Takeover bid with activist, $[0, 1]$	0.005	0.069	0.000	0.000	0.000	0.000	0.000
Bid premium	0.366	0.217	0.110	0.205	0.330	0.486	0.670
Bid premium with activist	0.332	0.228	0.083	0.151	0.290	0.456	0.659

Table 2: Targeted moments

The table presents the moments from the data, the model-simulated moments from the SMM estimation of the model, and t-statistics for the test of equality of the data and model-simulated moments. The persistence of good and bad performance are the regression coefficients from Eq. (11). The coefficient of future performance on activism is from a regression of future 3-year profit growth on an indicator for an activist campaign. The final three rows are the correlations of activist entry, turnover, and takeover, respectively, with profit growth over the previous year. All the coefficients and correlations are obtained after demeanining by firm and year.

Description	Model	Data	t-stat
Persistence of good performance	0.727	0.717	−0.43
Persistence of bad performance	0.643	0.637	−0.33
Variance of residuals	0.135	0.140	0.58
Frequency of activist entry	0.039	0.040	0.20
Mean return on activist entry	0.041	0.044	0.63
Coefficient of future performance on activism	0.100	0.080	−0.66
Frequency of takeover	0.042	0.042	−0.45
Frequency of takeover | activist	0.127	0.120	−0.89
Mean bid premium	0.367	0.366	−0.21
Mean bid premium | activist	0.331	0.331	−0.40
Frequency of turnover	0.085	0.085	−0.01
Frequency of turnover | activist	0.190	0.183	−0.73
Correlation of activism and lagged performance	−0.014	−0.017	−0.48
Correlation of turnover and lagged performance	−0.053	−0.030	4.12
Correlation of takeover and lagged performance	−0.033	−0.018	2.50

Table 3: Parameter estimates

This table presents parameters estimates from the SMM estimation of the model, with standard errors clustered at the firm level in parentheses.

Symbol	Description	Value
ρ_z	Productivity persistence	0.860
		(0.008)
σ_z	Productivity volatility	0.182
		(0.010)
λ_w	Acquirer quality distribution rate	2.285
		(0.056)
σ_w	Acquirer quality signal noise	2.438
		(0.264)
λ_p	Project quality distribution rate	11.909
		(1.171)
σ_p	Project quality signal noise	0.220
		(0.043)
c_e	Manager's cost of effort	0.740
		(0.271)
$c_f(0)$	Cost of turnover without activist	2.072
		(0.331)
$c_f(\bar{\nu})$	Cost of turnover with activist	1.618
		(0.296)
$c_m(0)$	Cost of takeover without activist	0.151
		(0.011)
$c_m(\bar{\nu})$	Cost of takeover with activist	0.135
		(0.047)
ξ	Activist's entry cost	0.030
		(0.004)

Table 4: Marginal effects of an activist campaign

This table reports the marginal effects of activist campaigns on merger and acquisition (M&A) outcomes and managerial effort within the baseline model. Panel A presents the marginal effect of an activist campaign isolated to its effect on M&A, showing changes in the probability of takeover, bid premia, and shareholder value. Panel B presents the marginal effect of an activist campaign isolated to its effect on effort, including changes in managerial effort, productivity, and shareholder value. All values are reported as percentages and are conditional on either an activist campaign or an activist campaign combined with a successful takeover.

Panel A: Activist effect on M&A

	Conditional on	
All values expressed as percentages	Activist	Activist & takeover
Probability of takeover		
Baseline	12.46	100.00
No activist (counterfactual)	11.57	92.84
Change due to activist campaign	7.70	7.71
Bid premium of completed deals		
Baseline	32.90	32.90
No activist (counterfactual)	38.12	38.12
Change due to activist campaign	−13.69	−13.69
Shareholder value	0.06	0.44
Due to takeover probability increase	0.15	1.23
Due to decline in bid premium	−0.10	−0.78

Panel B: Activist effect on effort

	Conditional on	
All values expressed as percentages	Activist	Activist & takeover
Change due to activist campaign		
Effort	30.76	28.02
Productivity	1.17	0.88
Shareholder value	0.35	0.25

Table 5: Effort incentives and takeover facilitation

This table examines the equilibrium implications of activist intervention by isolating two channels—managerial effort incentives and takeover facilitation. Columns (1) reports outcomes when activists are excluded. Columns (2)–(3) report outcomes under counterfactual scenarios where only one channel is active, while Column (4) reports the baseline equilibrium. All values are expressed as percentages.

	(1)	(2)	(3)	(4)
All values expressed as percentages	No activism	Substitutes: Only effort incentives	Complements: Only takeover facilitation	Baseline
Takeover				
Frequency of takeover	4.19	4.16	4.22	4.19
Change from no activism		−0.79	0.64	−0.05
Frequency of takeover | activist	–	11.57	14.00	12.46
Target surplus				
Change from no activism		−0.38	0.02	−0.36
Acquirer surplus				
Change from no activism		−0.37	0.49	0.22
Total (target + acquirer) surplus				
Change from no activism		−0.37	0.18	−0.16
Bid premium	36.92	36.98	36.69	36.70
Change from no activism		0.18	−0.63	−0.60
Turnover and effort				
Frequency of turnover	8.14	8.49	8.15	8.50
Change from no activism		4.35	0.10	4.50
Frequency of turnover | activist	–	19.00	12.07	19.00
Productivity due to effort				
Change from no activism		1.27	0.03	1.31
Productivity				
Change from no activism		0.20	−0.01	0.18
Activism and value				
Frequency of activist entry	0.00	3.88	2.93	3.94
Target shareholder value				
Change from no activism		0.33	0.00	0.33
Manager utility				
Change from no activism		−1.80	−0.11	−1.92

Table 6: The threat of activism and takeover

This table presents results from counterfactual experiments quantifying the impact of the threat of activism and takeovers on activist entry decisions, M&A outcomes, turnover, and shareholder value. The table reports the percent change in equilibrium outcomes relative to the baseline for counterfactuals excluding activism (Column 1), takeovers (Column 2), and both activism and takeovers (Column 3).

	(1)	(2)	(3)
Percent change from baseline	No activism	No takeovers	No activism & no takeovers
Takeover			
Frequency of takeover	0.05	−100.00	−100.00
Frequency of takeover | activist	–	−100.00	–
Target surplus	0.36	−100.00	−100.00
Acquirer surplus	−0.22	−100.00	−100.00
Total (target + acquirer) surplus	0.16	−100.00	−100.00
Bid premium	0.60	–	–
Turnover and effort			
Frequency of turnover	−4.30	11.49	4.64
Frequency of turnover | activist	–	69.23	–
Productivity due to effort	−1.29	2.89	1.12
Productivity	−0.18	4.72	4.41
Activism and value			
Frequency of activist entry	−100.00	−13.72	−100.00
Target shareholder value	−0.32	−26.64	−27.31
Manager utility	1.96	0.88	4.17

Table 7: Activist entry announcement return decomposition

This table decomposes shareholder announcement returns around activist entry into selection and treatment components. The selection component reflects returns from the activist's private information about project quality and acquirer quality, while the treatment component reflects returns from activist-induced changes in effort incentives and takeover facilitation. Reported values include both absolute percent returns and the share of total announcement returns attributable to each channel.

	(1)	(2)
	Percent Return	Percent of Total Return
Selection	3.69	90.8
Learn about project quality (s_p)	0.59	14.4
Learn about acquirer quality (s_w)	3.10	76.3
Treatment	0.38	9.3
Effort incentives ($c_f(0)$ vs $c_f(\bar{\nu})$)	0.36	8.8
Takeover facilitation ($c_m(0)$ vs $c_m(\bar{\nu})$)	0.02	0.5
Total activist announcement return	4.07	100.0

Table 8: The role of activist private information

This table reports the results of counterfactual experiments assessing the role of activist private information on entry decisions, M&A outcomes, turnover, and shareholder value. The baseline model is compared with counterfactual equilibria in which activists lack private information about potential acquirers (Column 1), project quality (Column 2), or any superior information (Column 3). Values are reported as the percent change from the baseline.

	(1)	(2)	(3)
Percent change from baseline	No info on acquirers ($s_{w,t}$ unobserved)	No info on project quality ($s_{p,t}$ unobserved)	No superior info
Takeover			
Frequency of takeover	0.14	−0.02	0.05
Frequency of takeover | activist	−71.08	16.15	–
Target surplus	0.41	−0.01	0.36
Acquirer surplus	−0.29	0.11	−0.22
Total (target + acquirer) surplus	0.17	0.03	0.16
Bid premium	0.47	0.19	0.60
Turnover and effort			
Frequency of turnover	−3.21	−1.99	−4.30
Frequency of turnover | activist	93.74	−29.36	–
Productivity due to effort	−0.92	−0.65	−1.29
Productivity	−0.13	−0.09	−0.18
Activism and value			
Frequency of activist entry	−88.26	−23.48	−100.00
Target shareholder value	−0.17	−0.23	−0.32
Manager utility	1.44	0.92	1.96
Activist announcement return	3.58	4.11	–
due to information	2.72	3.85	–
due to treatment	0.87	0.26	–

Table 9: Costs of activism policy experiment

This table reports the results of counterfactual experiments assessing the role of the activist's cost of launching a campaign on entry decisions, M&A outcomes, turnover, and shareholder value. Column (1) and (2) report the percent change in equilibrium quantities relative to the baseline for ±20% change in the activist cost parameter, ξ.

	(1)	(2)
Percent change from baseline	Lower cost	Higher cost
Takeover		
Frequency of takeover	0.07	0.02
Frequency of takeover | activist	−11.93	11.10
Target surplus	−0.14	0.12
Acquirer surplus	0.03	−0.06
Total (target + acquirer) surplus	−0.08	0.06
Bid premium	−0.39	0.23
Turnover and effort		
Frequency of turnover	3.20	−1.79
Frequency of turnover | activist	0.13	0.79
Productivity due to effort	0.99	−0.51
Productivity	0.13	−0.08
Activism and value		
Frequency of activist entry	72.18	−41.06
Target shareholder value	0.28	−0.15
Manager utility	−1.44	0.82
Activist announcement return	−14.65	14.26
due to information	−16.46	16.07
due to treatment	3.11	−3.48

Table 10: Hedge fund and early/late sample parameter estimates

This table presents parameters estimates from the SMM estimation of the model on four subsamples, with standard errors clustered at the firm level in parentheses. The hedge fund only sample (Column 1) includes only activist campaigns that include a hedge fund activist during the period 2001–2014. For comparison, Column (2) uses the full sample of activist campaigns during the same time period, 2001–2014. The early sample is 2001–2009, and the late sample is 2010–2019, shown in Columns (3) and (4); these include all activist campaigns.

		(1)	(2)	(3)	(4)
		Hedge fund activists	All activists	Early sample 2001–2009	Late sample 2010–2019
ρ_z	Productivity persistence	0.819	0.816	0.669	0.740
		(0.011)	(0.014)	(0.016)	(0.020)
σ_z	Productivity volatility	0.161	0.168	0.178	0.159
		(0.009)	(0.005)	(0.010)	(0.008)
λ_w	Acquirer quality distribution rate	2.575	2.550	2.599	2.351
		(0.137)	(0.114)	(0.114)	(0.082)
σ_w	Acquirer signal noise	2.396	2.555	2.163	1.829
		(0.580)	(0.205)	(0.229)	(0.515)
λ_p	Project quality distribution rate	12.199	12.383	17.872	11.815
		(0.667)	(1.232)	(2.673)	(0.851)
σ_p	Project quality signal noise	2.031	5.986	2.935	0.234
		(0.001)	(0.000)	(0.000)	(0.071)
c_e	Manager's cost of effort	2.137	2.412	1.782	1.356
		(0.341)	(0.793)	(0.885)	(0.578)
$c_f(0)$	Cost of turnover without activist	2.570	2.552	2.246	2.052
		(0.316)	(0.253)	(0.213)	(0.244)
$c_f(\bar{\nu})$	Cost of turnover with activist	1.572	1.621	1.453	1.458
		(0.359)	(0.292)	(0.178)	(0.489)
$c_m(0)$	Cost of takeover without activist	0.144	0.146	0.184	0.186
		(0.018)	(0.028)	(0.024)	(0.056)
$c_m(\bar{\nu})$	Cost of takeover with activist	0.132	0.135	0.184	0.157
		(0.024)	(0.038)	(0.021)	(0.047)
ξ	Activist's entry cost	0.025	0.023	0.020	0.028
		(0.001)	(0.003)	(0.005)	(0.007)

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Internet Appendix

Appendix A. Estimation Details

We estimate the model using the simulated method of moments (SMM) of Lee and Ingram (1991). Given the panel structure of our data, we follow the approach described in Nikolov and Whited (2014) and Bazdresch et al. (2018) for constructing the weight matrix and the standard errors. The intuition behind the SMM approach is to find the set of parameter values that minimizes the weighted distance between a set of moments generated by solving and simulating the model and their empirical counterparts in the data. Formally, the vector of SMM parameter estimates, $\hat{\theta}$, is given by

$$\hat{\theta} = \underset{\theta}{\operatorname{argmin}} \left(\hat{h} - \frac{1}{K} \sum_{k=1}^{K} h_k(\theta) \right)' \hat{W} \left(\hat{h} - \frac{1}{K} \sum_{k=1}^{K} h_k(\theta) \right), \tag{A.1}$$

where $\hat{h}$ denotes the vector of empirical moments, K is the number of times the model is simulated, $h_k(\theta)$ denotes the vector of model-simulated moments for the parameter vector θ and simulation k, and $\hat{W}$ is the weighting matrix.

Following Michaelides and Ng (2000), we set $K = 20$ to alleviate simulation bias. For the weight matrix, $\hat{W}$, we use the inverse of the covariance matrix of the empirical moments, constructed using the influence function approach of Erickson and Whited (2002), and applying the correction of Erickson and Whited (2012). Before computing all the moments except the means, we remove firm and year fixed effects. We solve the numerical minimization problem in equation (A.1) using a global genetic algorithm.

We employ small preference shocks in the activist entry decision and the takeover decision as a computational technique to avoid convergence issues. The scale of these Type I extreme value shocks are chosen to be of economically insignificant size to ensure that they do not substantively affect the model solution. Specifically, in the baseline model, the scale of the preference shocks imply an effect on activist, bidder, and board value on the order of 10^{-5} percent.

Appendix B. Model Elasticities

We report the elasticities of moments with respect to parameters and the elasticities of parameters with respect to moments to support our identification strategy. In Figures B.1, B.2, and B.3, we report the first type of elasticities, which we compute as

$$g_{i,j}\hat{\theta}_j / h(\hat{\theta})_i, \tag{B.1}$$

where $g_{i,j}$ is the element of the gradient matrix G that corresponds to moment i and parameter j, $\hat{\theta}_j$ is the estimated value of the j-th parameter, and $h(\hat{\theta})_i$ is the model implied i-th moment evaluated at the estimated values of the parameters. In Figures B.4 and B.5, we report the second type of elasticities, which we compute as

$$\lambda_{i,j} h(\hat{\theta})_j / \hat{\theta}_i, \tag{B.2}$$

where $\lambda_{i,j}$ is the element of the sensitivity matrix Λ that corresponds to moment i and parameter j, $h(\hat{\theta})_j$ is the model implied j-th moment evaluated at the estimated values of the parameters, and $\hat{\theta}_i$ is the estimated value of the i-th parameter. We compute the sensitivity matrix following Andrews et al. (2017).

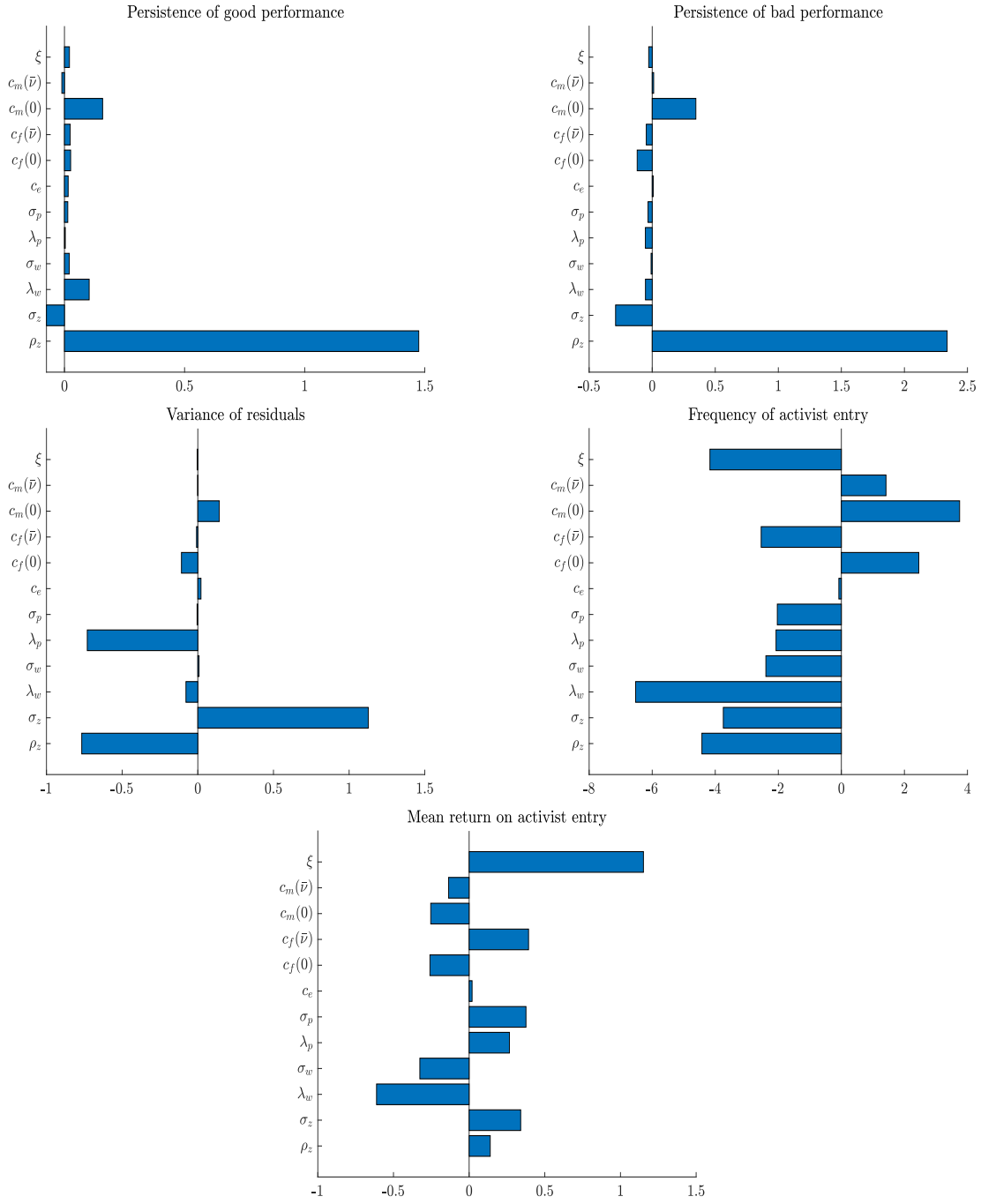

Fig. B.1. Elasticities of Moments to Parameters (Moments 1–5)

This figure shows the elasticities of moments with respect to parameters. Specifically, we plot the measure $g_{i,j}\hat{\theta}_j/h(\hat{\theta})_i$, where $g_{i,j}$ is the element of the gradient matrix G that corresponds to moment i and parameter j, $\hat{\theta}_j$ is the estimated value of the j-th parameter, and $h(\hat{\theta})_i$ is the model implied i-th moment evaluated at the estimated values of the parameters.

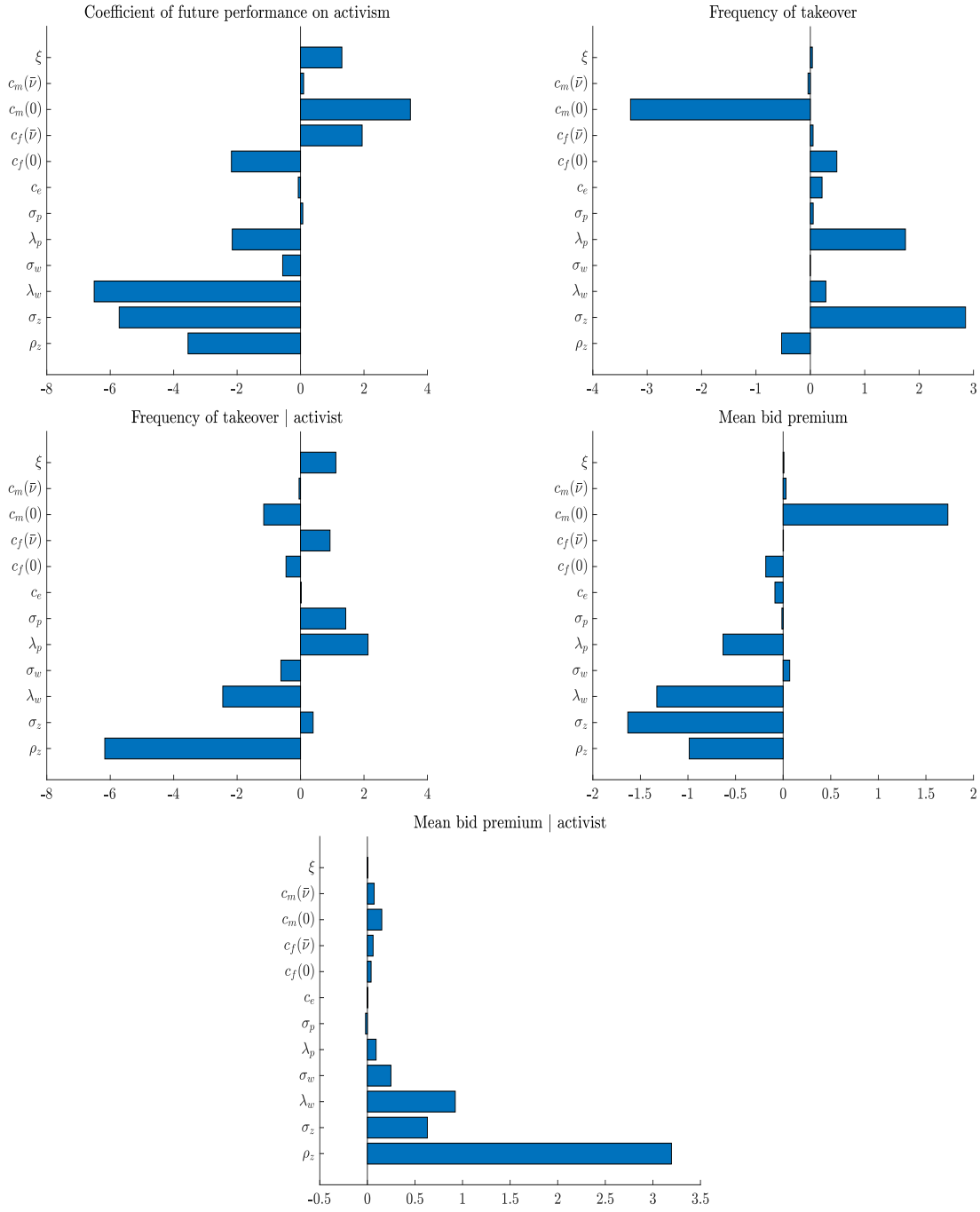

Fig. B.2. Elasticities of Moments to Parameters (Moments 6–10)

This figure shows the elasticities of moments with respect to parameters. Specifically, we plot the measure $g_{i,j}\hat{\theta}_j/h(\hat{\theta})_i$, where $g_{i,j}$ is the element of the gradient matrix G that corresponds to moment i and parameter j, $\hat{\theta}_j$ is the estimated value of the j-th parameter, and $h(\hat{\theta})_i$ is the model implied i-th moment evaluated at the estimated values of the parameters.

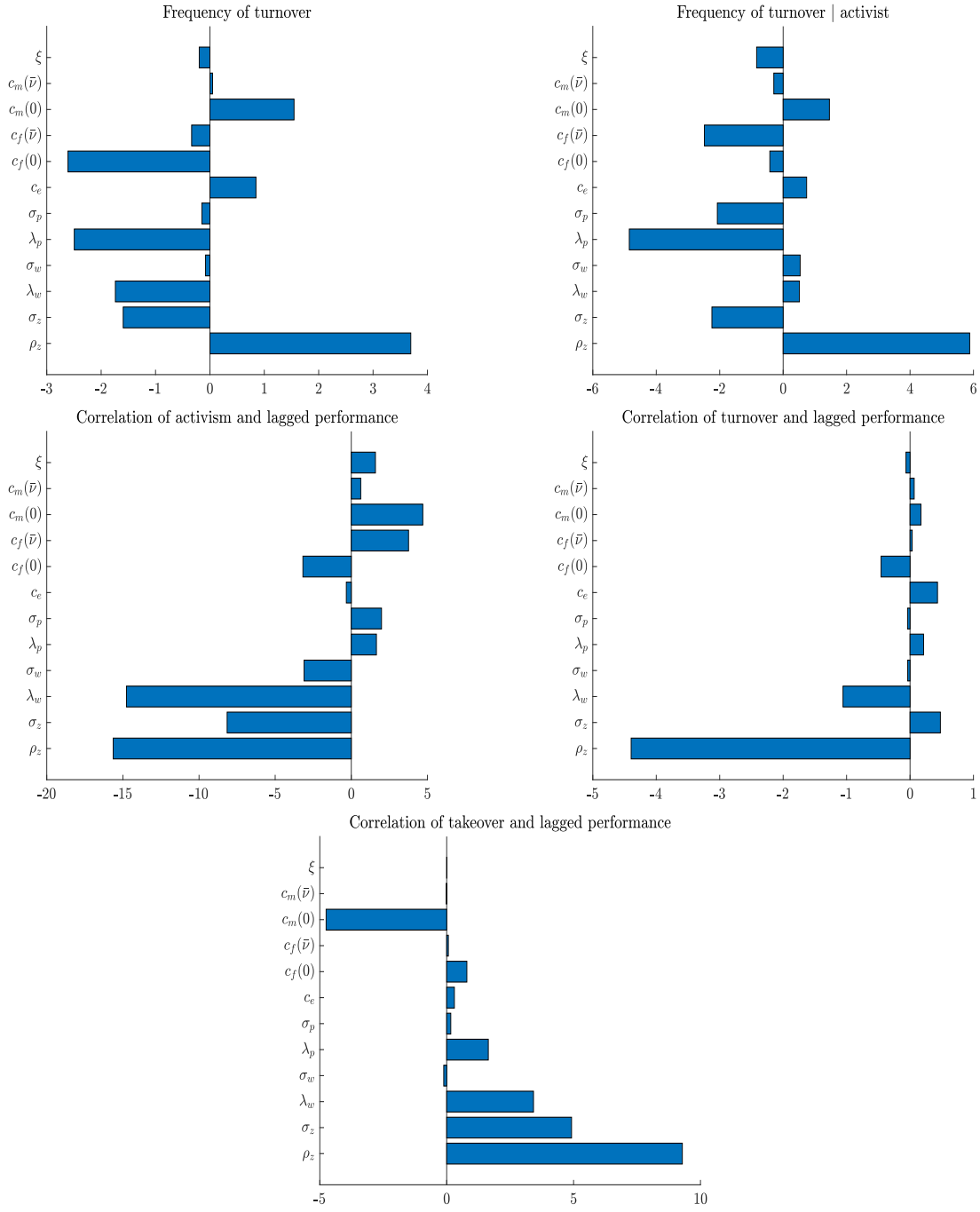

Fig. B.3. Elasticities of Moments to Parameters (Moments 11–15)

This figure shows the elasticities of moments with respect to parameters. Specifically, we plot the measure $g_{i,j}\hat{\theta}_j/h(\hat{\theta})_i$, where $g_{i,j}$ is the element of the gradient matrix G that corresponds to moment i and parameter j, $\hat{\theta}_j$ is the estimated value of the j-th parameter, and $h(\hat{\theta})_i$ is the model implied i-th moment evaluated at the estimated values of the parameters.

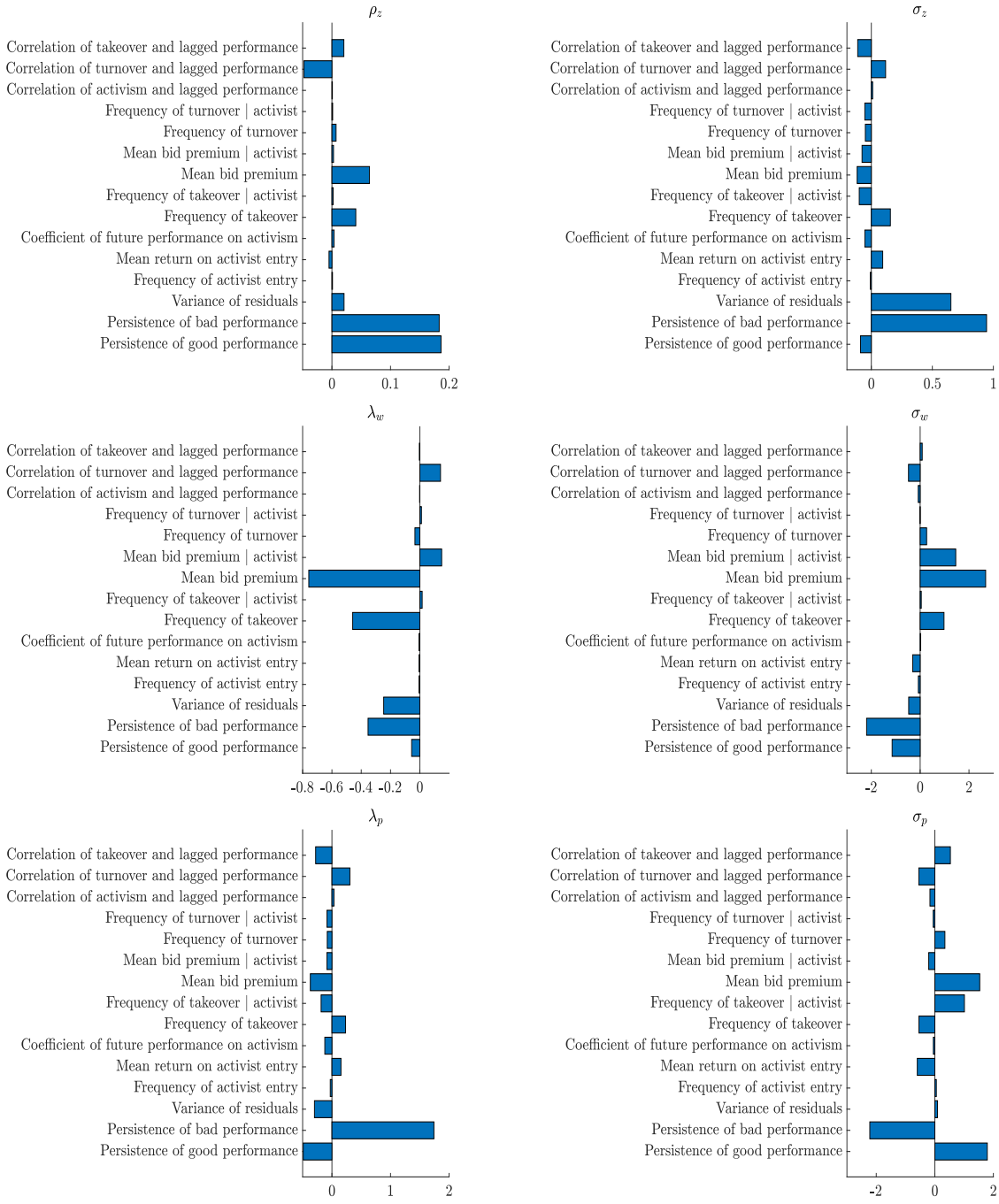

Fig. B.4. Elasticities of Parameters to Moments (Parameters 1–6)

This figure shows the elasticities of parameters with respect to moments. Specifically, we plot the measure $\lambda_{i,j} h(\hat{\theta})_j / \hat{\theta}_i$, where $\lambda_{i,j}$ is the element of the sensitivity matrix Λ that corresponds to moment i and parameter j, $h(\hat{\theta})_j$ is the model implied j-th moment evaluated at the estimated values of the parameters, and $\hat{\theta}_i$ is the estimated value of the i-th parameter. We compute the sensitivity matrix following Andrews et al. (2017).

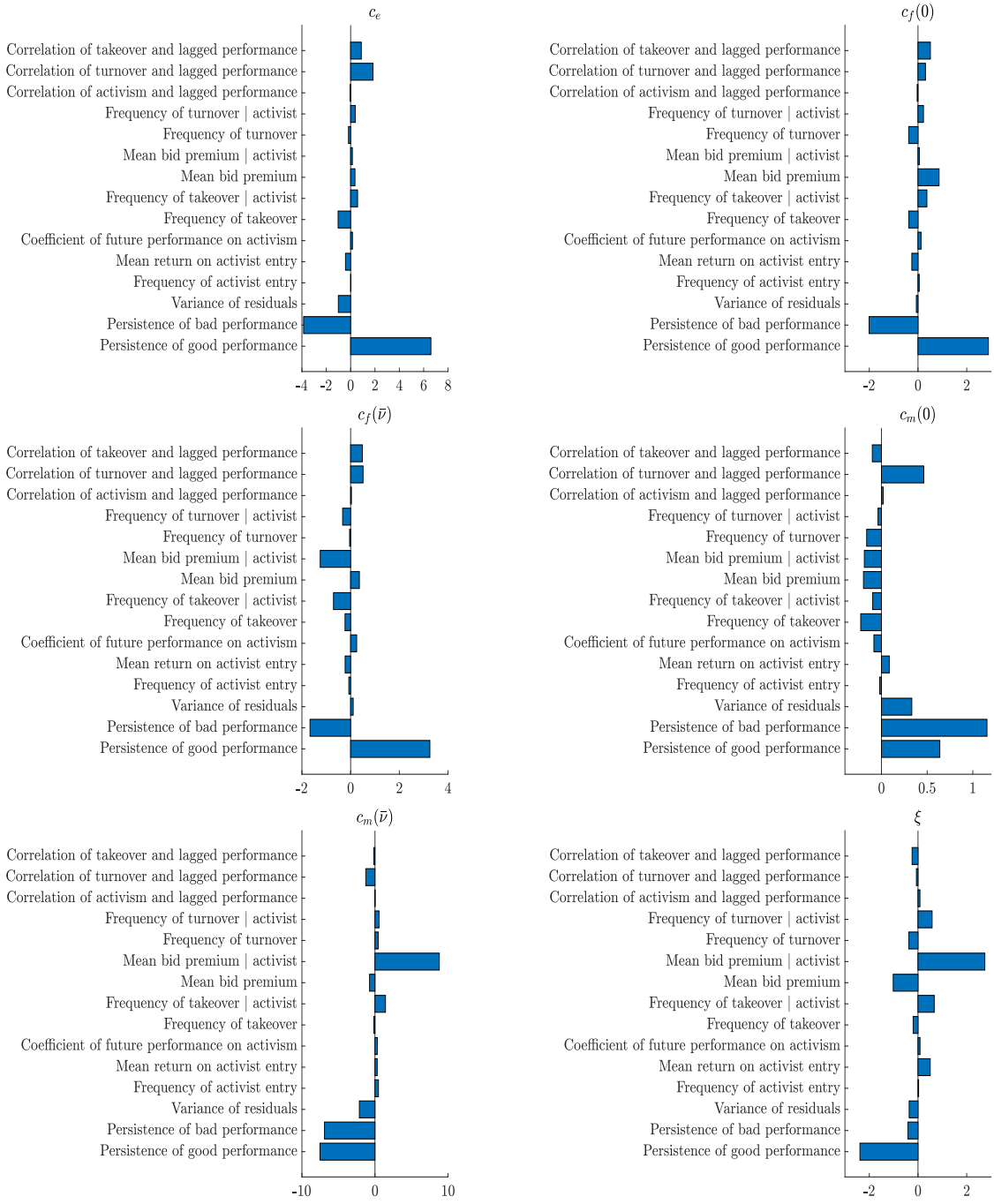

Fig. B.5. Elasticities of Parameters to Moments (Parameters 7–12)

This figure shows the elasticities of parameters with respect to moments. Specifically, we plot the measure $\lambda_{i,j} h(\hat{\theta})_j / \hat{\theta}_i$, where $\lambda_{i,j}$ is the element of the sensitivity matrix Λ that corresponds to moment i and parameter j, $h(\hat{\theta})_j$ is the model implied j-th moment evaluated at the estimated values of the parameters, and $\hat{\theta}_i$ is the estimated value of the i-th parameter. We compute the sensitivity matrix following Andrews et al. (2017).

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c/o University of Geneva, Bd. Du Pont d'Arve 42, CH-1211 Geneva 4
T +41 22 379 84 71, rps@sfi.ch, www.sfi.ch