Online Appendix for In Short Supply: Efficiency Implications of Rational Attention Allocation

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A Online Appendix

A.1 Model Solution and Proofs

We solve the model backward, starting with the optimal investment decision at $t = 2$. Given the signals s_{fj} and p_j, firm j chooses I_j to maximize the expected firm value v_j, which is defined in Eq. (1). It follows that $I_j = c^{-1}\mathbb{E}[r(\theta_j)|s_{fj}, p_j]$. If the private signal reveals $\theta_j = H$, then the firm invests $I_j = \frac{\rho}{c}$ and $v_j = \mu + \frac{\rho^2}{2c}$. Similarly, if it reveals $\theta_j = L$, then $I_j = 0$ and $v_j = \mu$. The firm relies on market feedback if the private signal is uninformative. As shown below, the equilibrium stock price either perfectly reveals θ_j or is uninformative. In the first case, we obtain the same I_j and v_j as before. In the latter case, the firm invests $I_j = \frac{\rho}{2c}$ and $v_j = \mu + r(\theta_j)\frac{\rho}{2c} - \frac{\rho^2}{8c}$.

To derive the financial market equilibrium at $t = 1$, we conjecture that rational traders buy (sell) the asset after a high (low) signal and do not trade otherwise. Then, we solve for the equilibrium stock price and confirm the conjecture.

If $\theta_j = H$, then a fraction κ_j observes the firm's fundamental and demands $\overline{x}_j$. The remaining mass does not observe an informative signal and chooses not to trade. Thus, total order flow is given by $X_j = \kappa_j\overline{x}_j + z_j$. Similarly, if $\theta_j = L$ total order flow is given by $X_j = \kappa_j\underline{x}_j + z_j$. Hence, $X_j > \kappa_j\underline{x}_j + \overline{x}_j$ reveals that $\theta_j = H$ and $v_j = \mu + \frac{\rho^2}{2c}$ because the market maker rationally anticipates the manager to invest $I_j = \frac{\rho}{c}$. Similarly, if $X_j < \underline{x}_j + \kappa_j\overline{x}_j$ the market maker learns that $\theta_j = L$ and $v_j = \mu$. Otherwise, he remains uninformed and sets the price equal to the unconditional expectation:

$$p^{\emptyset} = \mu + \frac{\lambda}{2}\frac{\rho^2}{2c} + \frac{1-\lambda}{2}\frac{\rho^2}{4c} = \mu + \frac{\rho^2}{8c}(1+\lambda). \tag{A.1}$$

Next, we derive the trading profits for rational trader i. First, we focus on the case $s_{ij} = H$. Traders know that with probability κ_j, order flow is perfectly revealing, and the stock price equals v_j. With probability $1-\kappa_j$, order flow is uninformative, and the price is equal to $p^{\emptyset}$. Plugging in the expressions for v_j and p_j yields that expected profits are given by $\overline{x}_j(1-\kappa_j)\frac{\rho^2}{4c} > 0$. If the trader deviates and demands $x_j = \underline{x}_j$, his expected profits turn negative. If he does not trade, his expected profits are zero. Hence, the trader's optimal demand given $s_{ij} = H$ is $\overline{x}_j$. Following the same steps, traders optimally demand $\underline{x}_j$ if $s_{ij} = L$. In this case, expected profits are $-\underline{x}_j(1-\kappa_j)\frac{\rho^2}{4c} > 0$.

If $s_{ij} = \emptyset$, traders are uninformed. It follows from the law of iterated expectations and $p_j = \mathbb{E}[v_j|X_j]$ that their expected profits are $x_j\left(\mathbb{E}[v_j] - \mathbb{E}[v_j]\right) = 0$. Hence, the trader's optimal demand given $s_{ij} = \emptyset$ is $x_j = 0$.

To solve for the firms' attention shares, we equate the traders' expected marginal profits: $\frac{\rho^2}{4c}(1-\kappa_j)\Delta_j$, which leads to the condition: $(1-\kappa_L)\Delta_L = (1-\kappa_N)\Delta_N$. Finally, we can use the capacity constraint to obtain the optimal values of κ_N and κ_L given in the main text.[25] To remain in the interior region $\kappa_j \in (0,1)$, we need to impose the restriction that $m_L < \frac{\Delta_L}{\Delta_L - \Delta_N}$. If this condition is violated, then non-listed firms receive no attention.

Main hypotheses. It follows from the optimal attention shares that:

$$\kappa_N - \kappa_L = -\frac{(m_L + m_N - 1)(\Delta_L - \Delta_N)}{\Delta_L m_N + m_L \Delta_N} < 0. \tag{A.2}$$

[25]Note that an individual trader will always choose κ_{ij} such that the capacity constraint holds with equality because expected trading profits are strictly increasing in κ_{ij}.

Similarly, we obtain the following comparative statics:

$$\frac{\partial \kappa_L}{\partial m_L} = -\frac{\Delta_N \left(m_N \left(\Delta_L - \Delta_N\right) + \Delta_N\right)}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} < 0 \tag{A.3}$$

$$\frac{\partial \kappa_N}{\partial m_L} = -\frac{\Delta_L \left(m_N \left(\Delta_L - \Delta_N\right) + \Delta_N\right)}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} < 0 \tag{A.4}$$

$$\frac{\partial(\kappa_N - \kappa_L)}{\partial m_L} = -\frac{\left(\Delta_L - \Delta_N\right)\left(m_N \left(\Delta_L - \Delta_N\right) + \Delta_N\right)}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} < 0. \tag{A.5}$$

Further predictions. For these predictions, we use that m_L only impacts the outcomes through its impact on the attention shares κ_L and κ_N.

1. We have shown that the stock price is informative with probability κ_j. Hence, the results for κ_j above imply that price informativeness decreases with m_L, and the reduction is stronger for non-listed firms. Return volatility is defined by $\sigma_j \equiv \sqrt{\text{Var}(v_j - p_j)}$. It follows from the derivations above that:

$$\sigma_j^2 = (1 - \kappa_j)\left(4 + \lambda(1 - \lambda)\right)\frac{\rho^4}{64}. \tag{A.6}$$

   Therefore, $\frac{d\sigma_j^2}{dm_L} = \frac{\partial \sigma_j^2}{\partial \kappa_j}\frac{\partial \kappa_j}{\partial m_L} = -\left(4 + \lambda(1-\lambda)\right)\frac{\rho^4}{64}\frac{\partial \kappa_j}{\partial m_L}$ so that an increase in m_L increases return volatility for listed and non-listed firms. The increase is greater for non-listed firms because κ_N drops more than κ_L.

2. The investment-price sensitivity of firm j is given as $\beta_j \equiv \frac{\text{Cov}(I_j, p_j)}{\text{Var}(p_j)}$. We derive the numerator and denominator separately (and drop the j subscript for convenience).

$$\begin{aligned} \text{Cov}(I, p) &= \frac{\kappa}{2}\left(\mu + \frac{\rho^2}{2c}\right)\frac{\rho}{c} + \frac{(1-\kappa)\lambda}{2} p^{\emptyset}\frac{\rho}{c} + (1-\kappa)(1-\lambda)p^{\emptyset}\frac{\rho}{2c} \\ &- \left[\frac{\kappa}{2}\frac{\rho}{c} + \frac{(1-\kappa)\lambda}{2}\frac{\rho}{c} + (1-\kappa)(1-\lambda)\frac{\rho}{2c}\right]\left[\kappa\left(\mu + \frac{\rho^2}{4c}\right) + (1-\kappa)p^{\emptyset}\right] \\ &= \frac{\kappa \rho^3}{8c^2}; \end{aligned} \tag{A.7}$$

and

$$\begin{aligned} \mathrm{Var}(p) &= \frac{\kappa}{2}\mu^2 + \frac{\kappa}{2}\left(\mu + \frac{\rho^2}{2c}\right)^2 + (1-\kappa)(p^\emptyset)^2 - \left[\frac{\kappa}{2}\mu + \frac{\kappa}{2}\left(\mu + \frac{\rho^2}{2c}\right) + (1-\kappa)p^\emptyset\right]^2 \\ &= \frac{\kappa\rho^4\left[5 - \kappa(1-\lambda)^2 - (2-\lambda)\lambda\right]}{64c^2}. \end{aligned} \tag{A.8}$$

Combining these two expressions yields:

$$\beta_j = \frac{\mathrm{Cov}(I_j, p_j)}{\mathrm{Var}(p_j)} = \frac{8}{\left[5 - \kappa_j(1-\lambda)^2 - (2-\lambda)\lambda\right]\rho}. \tag{A.9}$$

An increase in m_L leads to a reduction in κ_j and thus a reduction in β_N and β_L. It also follows from $1 > \kappa_L > \kappa_N > 0$ and $\frac{\partial \kappa_N}{\partial m_L} < \frac{\partial \kappa_L}{\partial m_L}$ that $\frac{d(\beta_N - \beta_L)}{dm_L} < 0$.

3. Expected value for firm j, the model equivalent to (expected) firm profitability, equals:

$$\mathbb{E}[v_j] = \mu + \frac{\kappa_j}{2}\frac{\rho^2}{2c} + (1-\kappa_j)\frac{\rho^2}{8c}(1+\lambda) = \mu + \frac{\rho^2}{8c}\left(1 + \lambda + (1-\lambda)\kappa_j\right). \tag{A.10}$$

It follows that $\mathbb{E}[v_j]$ is proportional to κ_j, so $\frac{\partial \mathbb{E}[v_L]}{\partial m_L} < 0$, $\frac{\partial \mathbb{E}[v_N]}{\partial m_L} < 0$, and $\frac{\partial(\mathbb{E}[v_N] - \mathbb{E}[v_L])}{\partial m_L} < 0$.

A.2 Model Extensions

Asymmetric effect on investment opportunity set. In this extension, we explore the possibility that the listing event has an asymmetric effect on the demand of rational traders and noise traders. As in the main model, the listing event expands the investment opportunity set from $[\underline{x}_N, \overline{x}_N]$ to $[\underline{x}_L, \overline{x}_L]$ for rational traders. However, for noise traders, we assume that the investment opportunity set increases to $[\alpha\underline{x}_L, \alpha\overline{x}_L]$. This extension collapses to our main model for $\alpha = 1$. $\alpha > 1$ is consistent with the empirical evidence in Hu (2018).

Proceeding as before, we find that the rational traders' indifference condition becomes: $(\alpha - \kappa_L)\Delta_L = (1 - \kappa_N)\Delta_N$. To remain in the interior region $\kappa_j \in (0, 1)$, we need to impose $\alpha < \frac{\Delta_L + m_L \Delta_N}{m_L \Delta_L}$ in addition to the previous condition $m_L < \frac{\Delta_L}{\Delta_L - \Delta_N}$. It follows that:

$$\kappa_N - \kappa_L = -\frac{(m_L + m_N - 1)(\Delta_L - \Delta_N) - (\alpha - 1)(m_L + m_N)(\Delta_L)}{\Delta_L m_N + m_L \Delta_N} < 0. \tag{A.11}$$

As a result, listed firms continue to receive more attention in this model variation. More importantly, we find that (i) $\frac{d(\kappa_N - \kappa_L)}{d\alpha} < 0$, i.e., the difference between the attention shares for listed and non-listed firms becomes more negative if α increases; (ii) $\frac{d^2(\kappa_N - \kappa_L)}{dm_L d\alpha} < 0$, i.e., the adverse effect of an increase in m_L on $\kappa_N - \kappa_L$ becomes more negative as α increases.

Endogenous private information for firms. In the main model, each firm receives a perfect signal about the fundamental with exogenous probability λ. Next, we endogenize this signal precision. At the beginning of the game, each firm can choose $\lambda_j \in [0, 1]$ at a cost $\frac{c_\lambda}{2}\lambda_j^2$. This cost is subtracted from the terminal firm value, so we define $\tilde{\mu}_j \equiv \mu - \frac{c_\lambda}{2}\lambda_j^2$.

As shown above, traders' equilibrium attention allocation does not depend on λ or μ. Hence, κ_N and κ_L are the same as in the main model. The expected firm value is given by:

$$\mathbb{E}[v_j] = \tilde{\mu}_j + \frac{\rho^2}{8c}\left(1 + \lambda_j^* + (1 - \lambda_j^*)\kappa_j\right). \tag{A.12}$$

Maximizing $\mathbb{E}[v_j]$ with respect to λ_j and assuming an interior solution leads to:

$$\lambda_j^* = \frac{\rho^2}{8cc_\lambda}(1 - \kappa_j) \tag{A.13}$$

so that $\lambda_N^* > \lambda_L^*$. Plugging in the equilibrium values for λ_j implies:

$$\mathbb{E}[v_j] = \mu + \frac{16c\rho^2 c_\lambda \left(1 + \kappa_j\right) + \rho^4 \left(1 - \kappa_j\right)^2}{128c^2 c_\lambda}. \tag{A.14}$$

As before, $\frac{d\mathbb{E}[v_j]}{d\kappa_j} > 0$ and $\mathbb{E}[v_L] > \mathbb{E}[v_N]$, i.e., firms continue to benefit from more attention.

Attention spillovers. Next, we consider the possibility that the listing event creates positive spillovers among listed firms. Such spillovers would arise, for instance, if new listings create additional pair-trading opportunities for already-listed firms. In our baseline model, the benefit of attention is represented by the parameters Δ_L and Δ_N, i.e., the investment opportunity sets for listed and non-listed firms. In this extension, we assume that Δ_L is an increasing function of the number of listed firms m_L. We can use the expressions for (κ_L, κ_N) from the main model, plug in $\Delta_L = \Delta_L(m_L)$, and differentiate with respect to m_L:

$$
\begin{aligned}
\frac{d\kappa_L}{dm_L} &= \frac{\Delta_L' \left(m_L + m_N - 1\right) m_N \Delta_N - \Delta_N \left(m_N \left(\Delta_L - \Delta_N\right) + \Delta_N\right)}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} \gtrless 0 \\
\frac{d\kappa_N}{dm_L} &= \frac{-\Delta_L' \left(m_L + m_N - 1\right) m_L \Delta_N - \Delta_L \left(m_N \left(\Delta_L - \Delta_N\right) + \Delta_N\right)}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} < 0 \qquad \text{(A.15)} \\
\frac{d(\kappa_N - \kappa_L)}{dm_L} &= \frac{-\Delta_L'(m_L + m_N - 1)(m_L + m_N)\Delta_N - \Delta_N(\Delta_L - \Delta_N) - m_N(\Delta_L - \Delta_N)^2}{\left(\Delta_L m_N + m_L \Delta_N\right)^2} < 0.
\end{aligned}
$$

The spillover term $\Delta_L' = \frac{d\Delta_L}{dm_L} > 0$ has a positive effect on $\frac{d\kappa_L}{dm_L}$, i.e., it mitigates the loss in attention for already listed firms. More specifically, if Δ_L' is sufficiently large, listed firms will receive more attention if the number of listed firms increases. Vice versa, the adverse effect on attention allocated to non-listed firms is amplified through the spillover. Finally, the difference in attention allocated to non-listed and listed firms becomes more negative as positive spillovers among listed firms increase.

A.3 Definition of Variables

- *Amihud*: A proxy for the degree of illiquidity of stocks, defined as the average ratio of returns over trading volume. We use a log transformation to avoid the effect of extreme values (see Section 4.3 for more details).
- *Analyst Coverage*: Number of analysts following the firm.
- *Analyst Revision*: The total number of revisions associated with a firm in a year.

- *CapEx*: Annual capital expenditure scaled by the lagged value of total assets (Compustat items: capx/l1.at).

- *Earnings*: Annual income before extraordinary items scaled by the lagged value of total assets (Compustat items: ib/l1.at).

- *Forecast Accuracy*: Negative of forecast error. Error is defined as the absolute difference between the actual earnings and the average forecast earnings scaled by the total number of forecasts made in the corresponding fiscal year.

- *ROA*: Earnings before interest, taxes, depreciation and amortization (EBITDA) scaled by the lagged value of total assets (Compustat items: oibdp/l1.at).

- *Sentiment Score*: Annual average firm-specific news sentiment score provided by RavenPack.

- *Trading Vol*: Total number of stock shares traded for the firm during the year normalized by the market's total trading volume.

- *Variance Ratio*: Absolute value of one minus the ratio of variance of daily returns over the variance of weekly returns, where both variances are calculated over the firm-year combination (See Section 4.3 for more details).

- *Volatility*: Standard deviation of daily stock returns calculated annually.

- *# of Article*: Total number of firm-specific news articles at yearly frequency provided by RavenPack.

- *8-K*: Total number of 8-K disclosures issued by the firm per year.

A.4 Additional Tables

Table A.3.1: Listed Firms: Alternate fixed effects
This table reports results from difference-in-differences (DiD) regressions that evaluate the association between the listing of options and main outcomes for the underlying listed firms. The first half of the columns reports results for the staggered DiD, while the second half reports results with the stacked regressions. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered			Stacked		
	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings	(4) Analyst Coverage	(5) Variance Ratio	(6) Earnings
Listing × Post	1.59***	-0.065***	0.006	1.81***	-0.073***	0.127***
	(3.10)	(-5.96)	(1.04)	(3.34)	(-6.71)	(6.39)
Firm-Cohort FE	Y	Y	Y	Y	Y	Y
Industry-Year-Cohort FE	Y	Y	Y	Y	Y	Y
Obs.	12,864	19,188	17,309	22,593	41,879	51,838
R^2	0.66	0.18	0.36	0.71	0.29	0.48

Table A.3.2: Attention Allocation: Alternate Fixed Effects

This table reports results from difference-in-differences (DiD) regressions that evaluate the association between the listing of options for peer firms and attention measures. The first half of the columns reports results for the staggered DiD, while the second half reports results with the stacked regressions. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered			Stacked		
	(1) Analyst Coverage	(2) Analyst Revision	(3) Forecast Accuracy	(4) Analyst Coverage	(5) Analyst Revision	(6) Forecast Accuracy
PeerListing ×Post	-0.951**	-4.38***	-0.095**	-1.09**	-5.23***	-0.10**
	(-2.33)	(-2.61)	(-2.09)	(-2.43)	(-2.84)	(-2.12)
Firm-Cohort FE	Y	Y	Y	Y	Y	Y
Industry-Year-Cohort FE	Y	Y	Y	Y	Y	Y
Obs.	6,234	6,218	6,234	16,413	16,399	16,413
R^2	0.71	0.68	0.74	0.78	0.74	0.51

Table A.3.3: Stock Price Characteristics: Alternate Fixed Effects
This table reports results from difference-in-differences (DiD) regressions that evaluate the association between the listing of options for peer firms and stock price characteristics. The first half of the columns reports results for the staggered DiD, while the second half reports results with the stacked regressions. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered			Stacked		
	(1) Amihud	(2) Volatility	(3) Variance Ratio	(4) Amihud	(5) Volatility	(6) Variance Ratio
PeerListing ×Post	0.448***	0.003***	0.004***	0.581***	0.004***	0.005***
	(4.64)	(2.91)	(3.20)	(5.45)	(3.67)	(4.08)
Firm-Cohort FE	Y	Y	Y	Y	Y	Y
Industry-Year-Cohort FE	Y	Y	Y	Y	Y	Y
Obs.	14,067	14,569	14,149	45,178	47,234	45,416
R^2	0.79	0.52	0.26	0.82	0.56	0.39

Table A.3.4: Stock Price Informativeness: Alternate Fixed Effects

This table reports results from triple interaction regressions that estimate the association between the listing of options for peer firms and stock price informativeness measured as the sensitivity of market prices to future earnings. The outcome variable is earnings measured at time t+1, t+3, and t+5 scaled by assets at time t. On the right-hand side, we interact our difference-in-differences coefficient with the market-to-book value of assets. Columns (1)-(3) report results for the staggered specification, while Columns (4)-(6) report results for the stacked approach. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered			Stacked		
	(1)	(2)	(3)	(4)	(5)	(6)
	$E_{i,t+1}/A_{i,t}$	$E_{i,t+3}/A_{i,t}$	$E_{i,t+5}/A_{i,t}$	$E_{i,t+1}/A_{i,t}$	$E_{i,t+3}/A_{i,t}$	$E_{i,t+5}/A_{i,t}$
PeerListing $\times$Post $\times$ Log(M/A)$_{i,t}$	-0.064*	0.028	0.146	-0.086***	-0.039	0.058
	(-1.75)	(0.38)	(1.46)	(-2.90)	(-0.65)	(0.76)
PeerListing $\times$Post	0.280	-0.325	-1.03	0.506***	0.192	-0.357
	1.29	(-0.67)	(-1.57)	(2.85)	(0.49)	(-0.73)
PeerListing $\times$ Log(M/A)$_{i,t}$	-0.061	-0.065	-0.129*	-0.002	0.035*	-0.071**
	(-1.63)	(-1.24)	(-1.81)	(-0.11)	(1.79)	(-2.11)
Post $\times$ Log(M/A)$_{i,t}$	-0.0158	-0.0910	-0.192**	0.010	-0.028	-0.062
	(-0.46)	(-1.29)	(-1.99)	(0.40)	(-0.50)	(-0.85)
Log(M/A)$_{i,t}$	-0.00550	-0.0463**	0.0616	-0.033**	-0.104***	-0.027
	(-0.22)	(-1.10)	(0.98)	(-2.55)	(-6.22)	(-1.19)
Firm-Cohort FE	Y	Y	Y	Y	Y	Y
Industry-Year-Cohort FE	Y	Y	Y	Y	Y	Y
Obs.	12,339	9,568	7,163	42,187	39,418	36,014
R^2	0.45	0.60	0.59	0.48	0.56	0.38

Table A.3.5: Investment-Q Sensitivity: Alternate Fixed Effects
This table reports results from triple interaction regressions that estimate the association between the listing of options for peer firms and investment sensitivity to Q. The outcome variable is annual capital expenditures (i.e., CapEx). The first column reports results for the staggered specification, while the second column reports them for the stacked approach. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered	Stacked
	(1)	(2)
	CapEx	CapEx
PeerListing×Post × Q	-0.003*	-0.005***
	(-1.72)	(-2.70)
PeerListing×Post	0.009	0.009
	(1.53)	(1.60)
PeerListing× Q	-0.00004	-0.0001
	(-0.02)	(-0.18)
Post × Q	0.0002	0.001
	(0.13)	(0.96)
Q	0.008***	0.008***
	(7.27)	(14.50)
Firm-Cohort FE	Y	Y
Industry-Year-Cohort FE	Y	Y
Obs.	14,273	43,146
R^2	0.714	0.70

Table A.3.6: Firm Value and Profitability: Alternate Fixed Effects
This table reports results from difference-in-differences (DiD) regressions that evaluate the association between the listing of options for peer firms and firm profitability as measured by earnings and returns on assets. The first half of the columns reports results for the staggered DiD, while the second half reports results with the stacked regressions. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	Staggered		Stacked	
	(1)	(2)	(3)	(4)
	Earnings	ROA	Earnings	ROA
PeerListing × Post	-0.015**	-0.008	-0.025***	-0.012**
	(-2.56)	(-1.38)	(-4.52)	(-2.14)
Firm-Cohort FE	Y	Y	Y	Y
Industry-Year-Cohort FE	Y	Y	Y	Y
Obs.	13,899	13,758	46,855	50,270
R^2	0.29	0.43	0.34	0.54

Table A.3.7: Alternate stacked approach
This table reports results from stacked difference-in-differences (DiD) regressions that evaluate the association between the listing of options for peer firms and our main outcomes. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing×Post	-1.01***	0.005***	-0.015***
	(-6.49)	(6.71)	(-5.09)
Firm-cohort FE	Y	Y	Y
Year-cohort FE	Y	Y	Y
Obs.	83,157	118,834	113,330
R^2	0.76	0.33	0.43

Table A.3.8: News Coverage

This table reports results from difference-in-differences regressions that evaluate the association between the listing of options for peer firms, and news coverage and 8-K disclosures. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) # of Article	(2) Sentiment Score	(3) 8-K
PeerListing $\times$Post	-55.28***	-0.032***	-0.269***
	(-2.85)	(-2.89)	(-3.20)
Firm-Cohort FE	Y	Y	Y
Year-Cohort FE	Y	Y	Y
Obs.	9,495	9,495	23,399
R^2	0.84	0.24	0.41

Table A.3.9: Controlling for 8-K-disclosures
This table reports results from difference-in-differences regressions that evaluate the association between the listing of options for peer firms and our main outcomes after controlling for 8-K disclosures. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing×Post	-1.41***	0.006***	-0.015***
	(-4.30)	(5.67)	(-2.94)
8-K	0.058*	0.0001	-0.002***
	(1.78)	(-0.98)	(-3.84)
Firm-Cohort FE	Y	Y	Y
Year-Cohort FE	Y	Y	Y
Obs.	11,398	21,985	22,057
R^2	0.74	0.28	0.31

Table A.3.10: Controlling for Analyst Coverage
This table reports results from difference-in-differences regressions that estimate the association between the listing of options for peer firms and our main outcomes. All columns control for analyst coverage. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Variance Ratio	(2) Earnings
PeerListing ×Post	0.002**	-0.013**
	(2.16)	(-2.19)
Analyst Coverage	0.0004***	0.002***
	(7.02)	(3.37)
Firm-Cohort FE	Y	Y
Year-Cohort FE	Y	Y
Obs.	11,075	10,017
R^2	0.27	0.40

Table A.3.11: Controlling for Disagreement
This table reports results from difference-in-differences regressions that evaluate the association between the listing of options for peer firms and our main outcomes after controlling for disagreement. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing ×Post	-1.41***	0.002*	-0.015**
	(-4.27)	(1.65)	(-2.43)
Disagreement	0.107**	0.0004**	0.006***
	(2.36)	(2.01)	(4.06)
Firm-Cohort FE	Y	Y	Y
Year-Cohort FE	Y	Y	Y
Obs.	11,398	11,075	10,017
R^2	0.74	0.26	0.40

Table A.3.12: Heterogeneity by Distance from Exchange
This table reports results from triple interaction regressions that estimate the heterogeneity in the association between the listing of options for peer firms and our main outcomes by distance from an options exchange. Outcome variables include analyst coverage, variance ratio, and earnings. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing × Post × Distance	-0.0004	-0.0000	0.0000
	(-0.99)	(-0.16)	(0.80)
PeerListing × Post	-0.921	0.006***	-0.018***
	(-1.56)	(4.29)	(-2.99)
Post × Distance	0.0004	-0.0000	0.0000
	(1.05)	(-1.32)	(0.18)
Firm-Cohort FE	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes
Obs.	9,951	19,249	18,462
R^2	0.74	0.29	0.29

Table A.3.13: Heterogeneity by Analyst Forecasts
This table reports results from triple interaction regressions that estimate the heterogeneity in the association between the listing of options for peer firms and our main outcomes by mean analyst forecasts in the quarter before listing. Outcome variables include analyst coverage, variance ratio, and earnings. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing × Post × Forecast	0.009*	-0.0000	0.0009
	(1.80)	(-0.84)	(1.58)
PeerListing × Post	-1.41***	0.006***	-0.015***
	(-4.29)	(5.64)	(-2.78)
PeerListing × Forecast	-0.011**	-0.00003	0.00006
	(-2.06)	(-0.44)	(0.52)
Firm-Cohort FE	Yes	Yes	Yes
Year-Cohort FE	Yes	Yes	Yes
Obs.	11,553	22,144	22,188
R^2	0.79	0.38	0.40

Table A.3.14: Can Firm Characteristics Predict Treatment?
This table reports results from predictive linear regressions that estimate the association between firm characteristics and the likelihood of treatment in our setting (i.e., peer firms' options listing). Standard errors are robust and clustered at the firm level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Listing	(2) Listing
Earnings	-0.002	-0.013
	(-0.07)	(-0.57)
Size	-0.009	-0.011
	(-0.88)	(-1.01)
Trading Volume	-1.909	-2.957
	(-0.68)	(-0.99)
Analyst Coverage	-0.000	0.0012
	(-0.03)	(0.63)
Volatility	-0.415	-0.409
	(-1.28)	(-1.11)
Variance Ratio	0.046	-0.252
	(0.20)	(-0.92)
Earnings $_{t-1}$	-0.013	-0.003
	(-0.67)	(-0.13)
Size $_{t-1}$	0.001	-0.017
	(0.14)	(-1.24)
Trading Volume $_{t-1}$	-5.329*	-6.276
	(-1.84)	(-1.57)
Analyst Coverage $_{t-1}$	0.001	0.001
	(0.39)	(0.35)
Volatility $_{t-1}$	0.354	0.318
	(0.97)	(0.71)
Variance Ratio $_{t-1}$	0.156	0.036
	(0.79)	(0.14)
Earnings $_{t-2}$		0.016
		(0.74)
Size $_{t-2}$		0.014
		(1.17)
Trading Volume $_{t-2}$		2.605
		(0.74)
Analyst Coverage $_{t-2}$		-0.002
		(-1.11)
Volatility $_{t-2}$		0.299
		(0.79)
Variance Ratio $_{t-2}$		0.471*
		(1.81)
Firm FE	Yes	Yes
Year FE	Yes	Yes
Obs.	8,725	6,939
R^2	0.18	0.18

Table A.3.15: Intensity of Treatment

This table reports results from regressions described in Equation (9) that estimate the differential response of industry peers to options listing based on how closely related they are to listed firms. Standard errors are robust and clustered at the firm level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PScore × Post	-0.009***	0.0001**	-0.0004*
	(-11.53)	(2.04)	(-1.91)
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
Obs.	14,902	31,479	21,400
R^2	0.80	0.23	0.75

Table A.3.16: Robustness to dropping different listing years
This table reports t-stats from difference-in-differences regressions that estimate the association between the listing of options on peer firms and our main outcome variables dropping firms associated with one listing year at a time.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
Excluding 1997	-4.13	5.40	-2.35
Excluding 1998	-3.35	5.10	-2.83
Excluding 1999	-3.84	5.51	-3.09
Excluding 2000	-4.28	4.83	-2.59
Excluding 2001	-4.32	5.40	-2.55
Excluding 2002	-4.35	5.33	-2.77
Excluding 2003	-3.71	5.13	-2.61
Excluding 2004	-4.22	5.47	-2.60
Excluding 2005	-3.87	5.54	-2.82
Excluding 2006	-4.65	5.25	-2.73
Excluding 2007	-4.42	5.30	-2.46
Excluding 2008	-4.23	5.57	-2.70
Excluding 2009	-4.52	5.64	-3.09
Excluding 2010	-4.60	5.38	-2.70
Excluding 2011	-4.34	5.54	-2.48
Excluding 2012	-4.45	5.52	-2.65
Excluding 2013	-4.45	6.05	-2.65
Excluding 2014	-4.31	5.63	-2.77

Table A.3.17: Short window around the event
This table reports results from difference-in-differences regressions that evaluate the association between the listing of options for peer firms and our main outcomes. The specification restricts to the observations that are within five years on either side of the event. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing $\times$Post	-1.19***	0.004***	-0.830***
	(-4.03)	(3.54)	(-3.40)
Firm-Cohort FE	Y	Y	Y
Year-Cohort FE	Y	Y	Y
Obs.	7,345	14,289	13,482
R^2	0.74	0.29	0.38

Table A.3.18: Robustness to adding linear controls
This table reports results from difference-in-differences regressions that estimate the association between the listing of options for peer firms and our main outcomes. All columns control for lagged volatility, illiquidity, and trading volume. Standard errors are robust and clustered at the firm-cohort level. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. t-statistics are reported in parentheses.

	(1) Analyst Coverage	(2) Variance Ratio	(3) Earnings
PeerListing×Post	-0.847***	0.006***	-0.014**
	(-2.86)	(6.55)	(-2.51)
LagVolatility	-15.86***	-0.080***	-0.315***
	(-3.90)	(-5.86)	(-4.92)
LagAmihud	-1.039***	-0.002***	-0.004***
	(-12.08)	(-14.69)	(-4.09)
LagTradingVol	0.000	-0.000	-0.000
	(1.63)	(2.06)	(-2.35)
Firm-Cohort FE	Y	Y	Y
Year-Cohort FE	Y	Y	Y
Obs.	10,093	19,629	17,231
R^2	0.78	0.32	0.33