Interim Valuations, Predictability, and Outcomes in Private Equity

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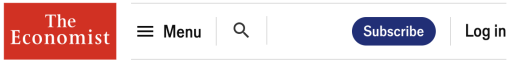
Motivation



Finance & economics | Buttonwood

Has private equity avoided the asset-price crash?

No, but everyone is enjoying the charade

Markets

SEC Ramps Up Scrutiny of Private Equity Firms' Writedowns

- Examiners asking questions on fee calculations when bets sour
- Regulators have looked into whether firms delayed write-offs

Home › News & Analysis › Investor Reporting › Caught up in the Marketing Rule's net

Compliance & Regulation

Caught up in the Marketing Rule's net

Private equity managers are relying on different methodologies to calculate net performance as the Marketing Rule's compliance date passes

Opinion

Cliff Asness

Why Does Private Equity Get to Play Make-Believe With Prices?

Investors and managers are playing a dangerous game of "volatility laundering," Cliff Asness writes.

Introduction

Research Question: How reliably can PE investments' outcomes be predicted based on the interim reports provided by GPs?

Answer: Interim reports are predictive. But, critically, the *history* of interim reports are also highly predictive.

Why do Limited Partners care about interim performance?

1. LPs may need to periodically report performance (e.g., CalPERS)
2. Some employees in LPs may be compensated by annual performance.
3. GPs tend to raise new funds before all investments pay off.
4. Emerging secondary market of LP stake sales.

What do we do?

Using a novel dataset of U.S. buyout and VC investments, we study the informativeness of managers' interim valuation reports of portfolio companies on final outcomes.

At the end of the 1st, 2nd, 3rd, 4th, and 5th years of investments, we predict future returns and whether the investment will end up in a tail based on interim reports.

Preview of Results

Both the latest *and* the history of interim reports predict the future.

Staleness frequency (i.e., quarters with no price change) and markdown frequency (i.e., quarters with negative returns) are bad news *even* conditional on latest reported valuation.

Past reports economically and statistically significantly predict future outcomes: History of reports are often as important as the latest report.

Even as early as the 1st year of an investment, latest multiple, interim staleness, and interim markdowns are informative of the future.

Literature

Fundraising and Strategic NAVs: Barber and Yasuda (2016), Chakraborty and Ewens (2017), Brown et al. (2019), Jackson et al. (2022), Huther (2022), and others.

NAV Staleness: Easton et al. (2022), Jenkinson et al. (2013), Harris et al. (2023), Korteweg and Westerfield (2022), Korteweg (2022), and others.

DATA

Data Description

For the funds in which StepStone invests or advises investment, StepStone receives quarterly reports from PE funds that include information on fund performance and on individual portfolio companies.

This information includes invested capital, interim valuation on the date of the report, and, if appropriate, exit valuation.

We include investments that have been exited, have a report on the exit valuation, and have at least one interim return. We exclude investment positions that are public securities or derivative hedge positions and those that have negative MOICs.

Comparison to Burgiss

Table 1: Summary Statistics Comparing Fund-Level Data: Burgiss vs StepStone

(a) Buyout

Variables	StepStone	Burgiss	Difference (S-B)	Correlation
Capitalization ($B)	91.80	73.00	18.80	0.96
# of Funds	65.14	55.86	9.29	0.87
Weighted-Average MOIC	1.89	1.84	0.05	0.90
Cross-Sectional Std. Dev. MOIC	0.85	-	-	-
95th Percentile MOIC	3.39	2.98	0.41	0.33
75th Percentile MOIC	2.25	2.22	0.03	0.91
50th Percentile MOIC	1.81	1.78	0.03	0.81
25th Percentile MOIC	1.48	1.43	0.05	0.69
5th Percentile MOIC	0.98	0.92	0.06	0.33

(b) VC

Variable	StepStone	Burgiss	Difference (S-B)	Correlation
Capitalization ($B)	23.67	21.53	2.14	0.81
# of Funds	70.10	70.71	-0.62	0.91
Weighted-Average MOIC	2.14	2.37	-0.23	0.95
Cross-Sectional Std. Dev. MOIC	2.46	-	-	-
95th Percentile MOIC	5.75	5.82	-0.07	0.75
75th Percentile MOIC	2.75	2.67	0.08	0.95
50th Percentile MOIC	1.89	1.80	0.09	0.98
25th Percentile MOIC	1.30	1.19	0.11	0.95
5th Percentile MOIC	0.71	0.68	0.03	0.89

Note: All statistics are averaged across vintages 1999–2019. That is to say, Avg. # of Funds captures the average number of funds within vintages. Weighted-Average MOIC is calculated as the mean MOIC of funds in each vintage, weighted by fund size, which is then averaged over all vintages. The 95th Percentile MOIC is a fund's MOIC at the 95th percentile within a vintage, averaged over all vintages in the data. So, the 95th Percentile MOIC is the typical fund performance at the 95th percentile that we can expect to see if we chose a vintage at random.

EMPIRICS

Defining Variables

Latest Interim Report: A part is past payout and another is forecasted payout.

- **Interim Realized:** Cash already paid out over invested capital.
- **Interim Unrealized:** Investment's reported value over invested capital.
- **Interim Multiple =** Interim Realized + Interim Unrealized

History of Interim Reports:

- **Interim Staleness Freq.:** Frac. of quarters in which interim multiple is unchanged.
- **Interim Markdown Freq.:** Frac. of quarters in which interim multiple decreases.

Predicting Future Realizations

For investment i in the interim period t, using information on the latest and the history of interim reports, we predict future returns:

$$\begin{aligned}\text{exit multiple}_i - \text{interim multiple}_{i,t} = \gamma_0 &+ \gamma_1 \text{interim multiple}_{i,t} \\ &+ \gamma_2 \text{interim staleness}_{i,t} \\ &+ \gamma_3 \text{interim markdown}_{i,t} + \epsilon_{i,t}\end{aligned}$$

and

$$\begin{aligned}\text{exit multiple}_i - \text{interim multiple}_{i,t} = \tilde{\gamma}_0 &+ \tilde{\gamma}_1 \text{interim unrealized}_{i,t} \\ &+ \tilde{\gamma}_2 \text{interim realized}_{i,t} \\ &+ \tilde{\gamma}_3 \text{interim staleness}_{i,t} \\ &+ \tilde{\gamma}_4 \text{interim markdown}_{i,t} + \tilde{\epsilon}_{i,t}\end{aligned}$$

Null Hypothesis

W/ martingale pricing and w/out strategic reporting, behavioral valuations, and unobserved heterogeneity, we would have:

1. $\gamma_1 = \mu_R$ where μ_R is the expected net return (reasonably, $\mu_R > 0$).
2. $\gamma_2 = 0$
3. $\gamma_3 = 0$

However, empirically, we generally find $\gamma_1 < 0$, $\gamma_2 \neq 0$, $\gamma_3 \neq 0$

Figure 2: Predicting Future Returns

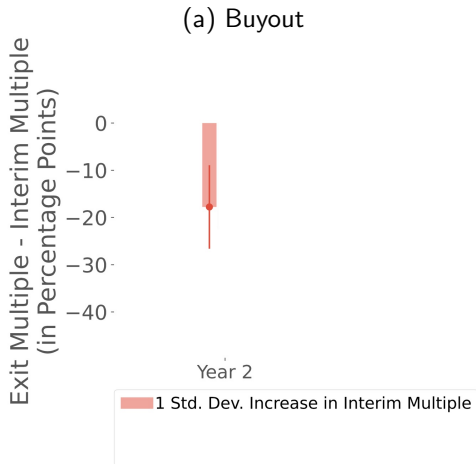


Figure 4: Predicting Future Returns

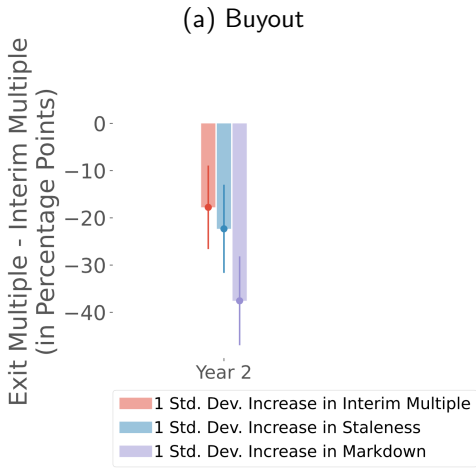
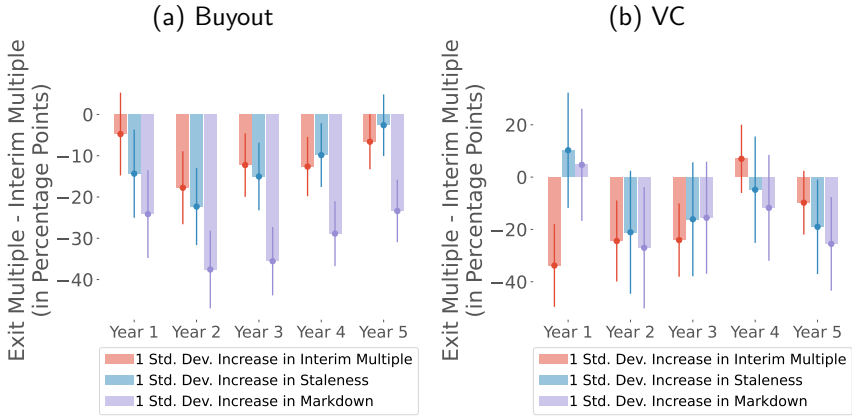


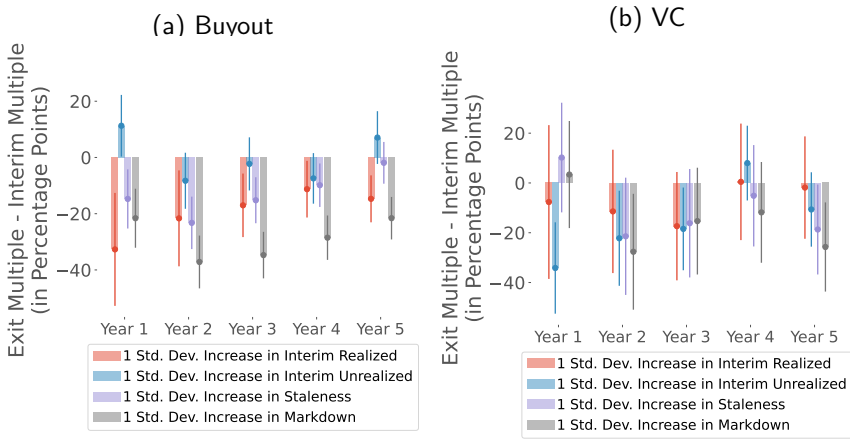
Figure 6: Predicting Future Returns



- Interim multiples negatively predict future realizations.
- Particularly for buyouts, the history of interim reports are informative.

Table GP FE

Figure 8: Predicting Future Returns, Decomposed



- Interim realized negatively predicts future realizations.

Table GP FE

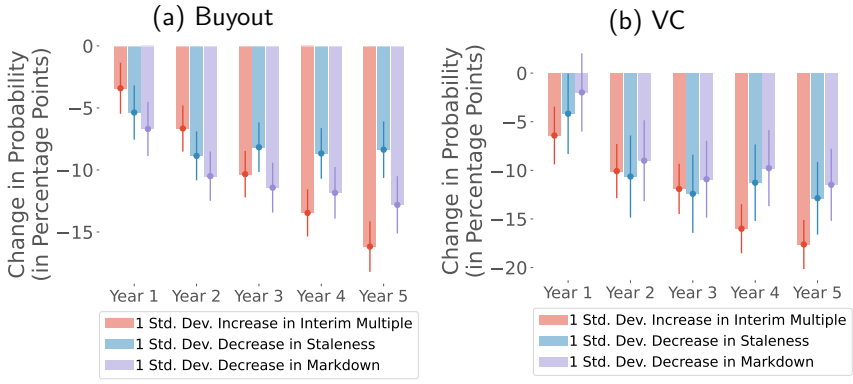
Predicting Tail Outcomes

Given that we can predict future realizations, can we also predict which investments will end up in the left tail and which ones will end up in the right tail of outcomes?

To see how well we can predict tail-outcomes given interim reports, we run the following regression:

$$\begin{aligned}\text{exit multiple}_i > \text{threshold} = \gamma_0 &+ \gamma_1 \text{interim multiple}_{i,t} \\ &+ \gamma_2 \text{interim staleness}_{i,t} \\ &+ \gamma_3 \text{interim markdown}_{i,t} + \epsilon_{i,t}\end{aligned}$$

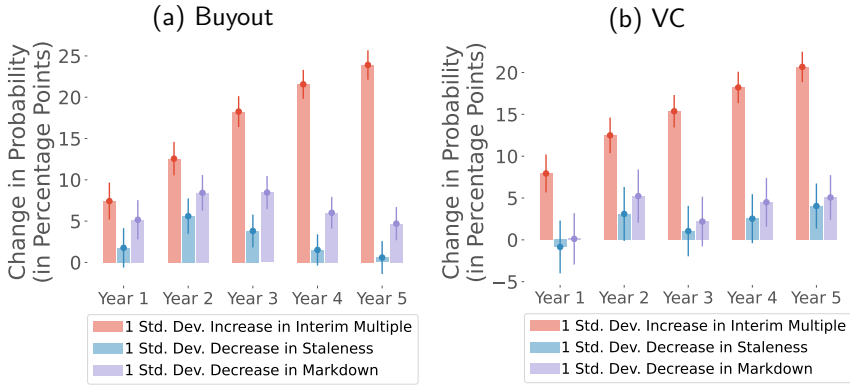
Figure 10: Predicting Exit Multiple Below 1



- Staleness/markdowns predict the worst outcomes as strongly as the latest report.

Table GP FE

Figure 12: Predicting Exit Multiple above 3



- History is informative but latest report is more strongly predictive.

Table GP FE

CONCLUSION

Conclusion

Important to note that we are **not** refuting smoothing.

The latest and the history of interim multiples have high predictive power.

When LPs assess the performance of individual portfolio companies, they can do better than just rely on the most recent reported valuation.

APPENDIX

Table 3: Predicting Future Returns

(a) Buyout

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	1.590***	1.763***	1.336***	1.059***	0.772***
	(0.141)	(0.118)	(0.105)	(0.099)	(0.098)
Interim Multiple	-0.073	-0.169***	-0.098**	-0.087***	-0.042
	(0.079)	(0.043)	(0.031)	(0.025)	(0.022)
Interim Staleness Frequency	-0.338**	-0.657***	-0.459***	-0.306*	-0.083
	(0.128)	(0.140)	(0.128)	(0.122)	(0.121)
Interim Markdown Frequency	-0.830***	-1.557***	-1.451***	-1.215***	-1.042***
	(0.186)	(0.199)	(0.172)	(0.169)	(0.172)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,697	1,965	2,102	2,106	1,828
R^2	0.012	0.032	0.033	0.025	0.026

(b) VC

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.593	1.169**	0.825*	0.303	0.743**
	(0.309)	(0.361)	(0.341)	(0.335)	(0.287)
Interim Multiple	-0.341***	-0.194**	-0.163***	0.041	-0.049
	(0.081)	(0.063)	(0.048)	(0.039)	(0.031)
Interim Staleness Frequency	0.264	-0.645	-0.504	-0.161	-0.632*
	(0.289)	(0.367)	(0.347)	(0.346)	(0.306)
Interim Markdown Frequency	0.206	-1.331*	-0.789	-0.640	-1.324**
	(0.480)	(0.582)	(0.555)	(0.561)	(0.473)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,181	1,233	1,384	1,380	1,273
R^2	0.020	0.010	0.008	0.003	0.007

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Table 5: Predicting Future Returns, GP FE

(a) Buyout

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	0.009	-0.189	-0.100	-0.085	-0.040
	(0.235)	(0.162)	(0.095)	(0.051)	(0.044)
Interim Staleness Frequency	-0.508**	-0.687***	-0.428*	-0.388*	-0.013
	(0.180)	(0.174)	(0.168)	(0.170)	(0.156)
Interim Markdown Frequency	-0.724***	-1.262***	-1.201***	-0.974***	-0.718***
	(0.215)	(0.208)	(0.217)	(0.209)	(0.197)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,667	1,935	2,076	2,087	1,804
R^2	0.194	0.194	0.181	0.172	0.182

(b) VC

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	-0.445**	-0.269*	-0.184	0.052	-0.027
	(0.157)	(0.131)	(0.094)	(0.072)	(0.061)
Interim Staleness Frequency	0.151	-0.742*	-0.600	-0.139	-0.604
	(0.261)	(0.348)	(0.320)	(0.398)	(0.369)
Interim Markdown Frequency	0.166	-1.243*	-0.592	-0.553	-1.159*
	(0.492)	(0.502)	(0.357)	(0.548)	(0.514)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,168	1,211	1,366	1,362	1,258
R^2	0.129	0.098	0.086	0.062	0.063

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Table 7: Predicting Future Returns, Decomposed

(a) Buyout

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	1.331***	1.711***	1.267***	1.041***	0.669***
	(0.143)	(0.118)	(0.106)	(0.100)	(0.100)
Interim Unrealized Multiple	0.194*	-0.091	-0.023	-0.066*	0.066*
	(0.086)	(0.048)	(0.038)	(0.032)	(0.031)
Interim Realized Multiple	-1.062***	-0.417***	-0.211***	-0.116**	-0.125***
	(0.158)	(0.083)	(0.046)	(0.036)	(0.027)
Interim Staleness Frequency	-0.348**	-0.684***	-0.464***	-0.306*	-0.061
	(0.127)	(0.140)	(0.127)	(0.122)	(0.120)
Interim Markdown Frequency	-0.743***	-1.541***	-1.417***	-1.201***	-0.962***
	(0.184)	(0.198)	(0.172)	(0.169)	(0.172)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,697	1,965	2,102	2,106	1,828
R^2	0.041	0.038	0.038	0.026	0.039

(b) VC

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.662*	1.207**	0.811*	0.301	0.753**
	(0.314)	(0.368)	(0.343)	(0.335)	(0.287)
Interim Unrealized Multiple	-0.406***	-0.219**	-0.150**	0.055	-0.066
	(0.094)	(0.077)	(0.057)	(0.045)	(0.038)
Interim Realized Multiple	-0.158	-0.151	-0.187*	0.005	-0.016
	(0.159)	(0.100)	(0.075)	(0.070)	(0.052)
Interim Staleness Frequency	0.263	-0.656	-0.506	-0.172	-0.621*
	(0.289)	(0.367)	(0.347)	(0.347)	(0.306)
Interim Markdown Frequency	0.148	-1.362*	-0.779	-0.643	-1.335**
	(0.481)	(0.585)	(0.556)	(0.561)	(0.474)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,181	1,233	1,384	1,380	1,273
R^2	0.021	0.010	0.008	0.003	0.007

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Table 9: Predicting Future Returns, Decomposed, GP FE

(a) Buyout

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Realized	-0.720***	-0.387***	-0.208**	-0.134**	-0.136**
	(0.155)	(0.097)	(0.071)	(0.041)	(0.046)
Interim Unrealized	0.170	-0.126	-0.029	-0.048	0.087
	(0.224)	(0.218)	(0.152)	(0.078)	(0.066)
Interim Staleness Frequency	-0.506**	-0.701***	-0.418*	-0.384*	0.016
	(0.190)	(0.170)	(0.176)	(0.173)	(0.156)
Interim Markdown Frequency	-0.675**	-1.244***	-1.165***	-0.954***	-0.639**
	(0.221)	(0.223)	(0.249)	(0.222)	(0.205)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,667	1,935	2,076	2,087	1,804
R^2	0.205	0.197	0.185	0.174	0.197

(b) VC

	Exit Multiple - Interim Multiple				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Realized	-0.126	-0.216*	-0.203*	-0.005	-0.020
	(0.087)	(0.101)	(0.093)	(0.030)	(0.031)
Interim Unrealized	-0.544*	-0.296	-0.174	0.074	-0.030
	(0.214)	(0.175)	(0.134)	(0.095)	(0.090)
Interim Staleness Frequency	0.152	-0.752*	-0.602	-0.159	-0.603
	(0.256)	(0.354)	(0.316)	(0.394)	(0.366)
Interim Markdown Frequency	0.111	-1.266*	-0.588	-0.558	-1.164*
	(0.505)	(0.514)	(0.367)	(0.547)	(0.524)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,168	1,211	1,366	1,362	1,258
R^2	0.132	0.098	0.086	0.063	0.063

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Table 11: Predicting Exit Multiple Below 1

(a) Buyout

	Exit Multiple < 1				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.212***	0.163***	0.222***	0.259***	0.275***
	(0.029)	(0.025)	(0.025)	(0.026)	(0.030)
Interim Multiple	-0.053**	-0.063***	-0.083***	-0.093***	-0.104***
	(0.016)	(0.009)	(0.008)	(0.007)	(0.007)
Interim Staleness Frequency	0.127***	0.261***	0.249***	0.269***	0.266***
	(0.026)	(0.030)	(0.031)	(0.032)	(0.037)
Interim Markdown Frequency	0.230***	0.435***	0.466***	0.498***	0.571***
	(0.038)	(0.042)	(0.042)	(0.045)	(0.052)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,697	1,965	2,102	2,106	1,828
R^2	0.041	0.120	0.167	0.208	0.250

(b) VC

	Exit Multiple < 1				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.567***	0.416***	0.372***	0.390***	0.350***
	(0.058)	(0.065)	(0.063)	(0.065)	(0.059)
Interim Multiple	-0.065***	-0.080***	-0.081***	-0.094***	-0.088***
	(0.015)	(0.011)	(0.009)	(0.008)	(0.006)
Interim Staleness Frequency	0.108*	0.326***	0.388***	0.377***	0.428***
	(0.054)	(0.066)	(0.064)	(0.067)	(0.063)
Interim Markdown Frequency	0.087	0.444***	0.555***	0.532***	0.596***
	(0.090)	(0.105)	(0.102)	(0.109)	(0.098)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,181	1,233	1,384	1,380	1,273
R^2	0.026	0.081	0.112	0.156	0.192

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Table 13: Predicting Exit Multiple Below 1, GP FE

(a) Buyout

	Exit Multiple < 1				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	-0.096***	-0.076***	-0.091***	-0.099***	-0.107***
	(0.020)	(0.012)	(0.011)	(0.010)	(0.011)
Interim Staleness Frequency	0.124***	0.236***	0.226***	0.225***	0.210***
	(0.031)	(0.037)	(0.044)	(0.042)	(0.052)
Interim Markdown Frequency	0.192***	0.371***	0.414***	0.430***	0.490***
	(0.041)	(0.041)	(0.052)	(0.062)	(0.077)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,667	1,935	2,076	2,087	1,804
R^2	0.205	0.258	0.292	0.323	0.359

(b) VC

	Exit Multiple < 1				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	-0.054***	-0.072***	-0.077***	-0.096***	-0.094***
	(0.010)	(0.014)	(0.017)	(0.010)	(0.010)
Interim Staleness Frequency	0.089	0.267***	0.392***	0.354***	0.390***
	(0.071)	(0.072)	(0.073)	(0.078)	(0.083)
Interim Markdown Frequency	0.111	0.399***	0.563***	0.538***	0.602***
	(0.107)	(0.114)	(0.100)	(0.114)	(0.106)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,168	1,211	1,366	1,362	1,258
R^2	0.125	0.154	0.184	0.209	0.260

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Table 15: Predicting Exit Multiple above 3

(a) Buyout

	Exit Multiple ≥ 3				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.206***	0.247***	0.160***	0.081***	0.039
	(0.032)	(0.027)	(0.025)	(0.024)	(0.026)
Interim Multiple	0.115***	0.120***	0.146***	0.149***	0.153***
	(0.018)	(0.010)	(0.008)	(0.006)	(0.006)
Interim Staleness Frequency	-0.042	-0.165***	-0.116***	-0.047	-0.019
	(0.029)	(0.032)	(0.031)	(0.030)	(0.032)
Interim Markdown Frequency	-0.177***	-0.349***	-0.345***	-0.253***	-0.209***
	(0.042)	(0.046)	(0.042)	(0.041)	(0.046)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,697	1,965	2,102	2,106	1,828
R^2	0.045	0.137	0.238	0.291	0.346

(b) VC

	Exit Multiple ≥ 3				
	Year 1	Year 2	Year 3	Year 4	Year 5
(Intercept)	0.062	0.141**	0.056	0.110*	0.140**
	(0.044)	(0.050)	(0.047)	(0.048)	(0.043)
Interim Multiple	0.080***	0.099***	0.104***	0.107***	0.103***
	(0.012)	(0.009)	(0.007)	(0.006)	(0.005)
Interim Staleness Frequency	0.022	-0.095	-0.033	-0.084	-0.134**
	(0.041)	(0.050)	(0.048)	(0.050)	(0.046)
Interim Markdown Frequency	-0.005	-0.258**	-0.111	-0.244**	-0.263***
	(0.069)	(0.080)	(0.077)	(0.081)	(0.071)
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,181	1,233	1,384	1,380	1,273
R^2	0.042	0.126	0.170	0.242	0.316

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Table 17: Predicting Exit Multiple above 3, GP FE

(a) Buyout

	Exit Multiple ≥ 3				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	0.141***	0.117***	0.141***	0.147***	0.149***
	(0.029)	(0.024)	(0.018)	(0.012)	(0.013)
Interim Staleness Frequency	-0.062*	-0.173***	-0.128**	-0.085	-0.036
	(0.031)	(0.038)	(0.039)	(0.043)	(0.045)
Interim Markdown Frequency	-0.145**	-0.280***	-0.309***	-0.206***	-0.147*
	(0.045)	(0.043)	(0.045)	(0.051)	(0.060)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,667	1,935	2,076	2,087	1,804
R^2	0.210	0.276	0.351	0.383	0.421

(b) VC

	Exit Multiple ≥ 3				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interim Multiple	0.067***	0.089***	0.101***	0.106***	0.104***
	(0.008)	(0.012)	(0.013)	(0.008)	(0.009)
Interim Staleness Frequency	0.016	-0.130*	-0.070	-0.105*	-0.162**
	(0.042)	(0.053)	(0.058)	(0.049)	(0.056)
Interim Markdown Frequency	0.005	-0.270***	-0.094	-0.179*	-0.204*
	(0.072)	(0.070)	(0.077)	(0.090)	(0.080)
GP FE	Yes	Yes	Yes	Yes	Yes
Estimator	OLS	OLS	OLS	OLS	OLS
N	1,168	1,211	1,366	1,362	1,258
R^2	0.129	0.183	0.228	0.293	0.365

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