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READING BETWEEN THE LINES: HOW AI CAN UNCOVER THE REAL STORY BEHIND FUND REPORTS

December 2025

Overview

Monitoring the performance of private equity funds is a critical responsibility for Limited Partners (LPs), as it plays a key role in shaping investment decisions throughout the life of a fund. General Partners (GPs) assist LPs in this process by periodically providing detailed reports, with the Multiple on Invested Cost (MOIC) serving as a key metric summarising fund performance. However, the MOIC alone offers a limited snapshot of the fund's unrealised and realised value.

To provide more context, GPs also include additional financial figures (e.g., sales, EBITDA) and qualitative insights (e.g., drivers of growth, strategic initiatives, and market conditions) about underlying portoflio companies. Such reports help LPs accurately assess a GP's ability to deliver consistent value over time and whether these assets are positioned for growth. It also supports risk management assessment, provides a deeper understanding of the portfolio's overall health and, allows LPs to ensure the GP's investment strategy aligns with broader portfolio diversification goals.

In this paper, we analyse a unique dataset of semi-annual fund reports sent by 162 GPs to Unigestion between June 2000 and June 2024[1]. We employ Natural Language Processing (NLP) to transform the qualitative information in these reports into a summary statistic that captures the GP's tone toward each portfolio company over time and assess the differences in this tone when GPs are fundraising or not. This enables us to examine whether qualitative data can complement quantitative metrics, such as MOICs, and provide a more comprehensive view of performance to LPs.

Next, we leverage machine learning (ML) algorithms to evaluate how combining qualitative and quantitative information, such as tone and interim performance, can enhance the ability to predict the performance of portfolio companies. This integrated approach provides LPs with a powerful tool for improving the accuracy of performance forecasts, thus supporting more informed decision-making around re-ups, secondary transactions, and broader portfolio management.

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Key Points

1. Machine learning algorithms can use both qualitative and quantitative information available to LPs to effectively predict the performance of private equity investments.

2. Large language models are effective in extracting valuable insights from qualitative data, such as quarterly reports, and translating them into actionable indicators of future performance.

3. In our model, Report Tone and EBITDA Margin Growth are the most influential positive performance predictors, while higher Markdown (%) and Realisation (%) are linked to lower future returns.

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[1] See Fernández Tamayo, Braun, López-de-Silanes, Phalippou, and Sigrist (2025) for the academic paper.

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Report tone and quantitative information

In the first part of this paper, we explore the relationship between the tone of the reports (Report Tone) and their quantitative metrics. To achieve this we leverage FinBERT, a financial language model developed by Wang and Yang (2023). FinBERT adapts Google's BERT model, specifically trained for the finance domain, to capture and quantify the tone of GP reports [2]. Report Tone enables us to evaluate the relationship between the GPs' narrative descriptions of portfolio companies and performance-related metrics, such as Interim MOIC, MOIC Uplift (exit MOIC − Interim MOIC), Staleness (%) (percentage of past periods without change in MOIC), Markdown (%) (percentage of past periods with MOIC markdown), and Realisation (%) (ratio of all capital distributions to the sum of capital distributions and the last reported Fair Market Value, excluding fees).

Table 1 shows correlations between Report Tone and performance-related metrics. It reveals that higher Interim MOICs are positively associated with a more favourable Report Tone, increased Realisation (%) and some degree of MOIC Uplift. However, the strength of this positive relationship is notably greater for Report Tone and Realisation than for MOIC Uplift, where the effect is more limited. Additionally, a positive Report Tone correlates with fewer markdowns and higher future performance. Notably, more frequent markdowns are associated with lower Interim MOICs and diminished future uplifts. These patterns suggest that the tone of reports and current valuations can provide valuable insights into future performance, with positive reports typically leading to better outcomes.

Table 1: Correlation matrix of Interim MOIC, MOIC Uplift, Staleness (%), Markdown (%), Realisation (%) and Report Tone [3]

		1	2	3	4	5
1	Interim MOIC					
2	MOIC Uplift	0.03[a]				
3	Staleness (%)	-0.13[a]	0.04[a]			
4	Markdown (%)	-0.35[a]	-0.15[a]	-0.27[a]		
5	Realisation (%)	0.29[a]	-0.05[a]	-0.08[a]	-0.01	
6	Report Tone	0.16[a]	0.13[a]	-0.02[b]	-0.21[a]	-0.03[a]

Source: Unigestion

Table 2 presents the average MOIC Uplift and MOIC variation (Mark-up, Stale, Mark-down) across different Report Tone categories (Positive, Neutral, Negative). The results highlight a significant relationship between the tone of reports and subsequent MOIC changes. Positive-toned reports are associated with the highest proportion of mark-ups (43.5%) and the largest mean MOIC uplift (0.86x, significant at 1% level compared to Negative-toned reports). Neutral reports show a more balanced distribution of valuation changes and a moderate uplift (0.64x). In contrast, negative reports have the highest proportion of mark-downs (38.6%) and the lowest mean uplift (0.34x). Overall, there's a tendency towards mark-ups (39.4%) over mark-downs (23.3%), with a positive aggregate mean MOIC uplift (0.75x).

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[2] Results remain unchanged if we use alternative measure of tone such as Financial-RoBERTa or the dictionary developed by Loughran and McDonald (2011).

[3] Significance level: * p<0,10, ** p<0,05, *** p<0,01.

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Table 2: MOIC Uplift and MOIC changes across Report Tone categories [4]

MOIC variation To Next Report (t+1)				
Categories				Ø Exit MOIC - Interim MOIC
	Mark-up	Stale	Mark-down	
Report Tone (t)				
Positive	43.5%	36.8%	19.7%	0.86[a]
Neutral	33.3%	41.2%	25.5%	0.64
Negative	24.7%	36.7%	38.6%	0.34
Total	39.4%	37.3%	23.3%	0.75

Source: Unigestion

One of the benefits of being a global investor is the ability to compare the relationship between Report Tone and performance metrics across the two most active regional private equity markets in the world: Europe and United States. Figure 1 illustrates how performance-related metrics and Report Tone are associated with MOIC uplift. This analysis takes into consideration various factors, including deal-level performance metrics (e.g., realisation status), industry, region, deal-level financial metrics (e.g., sales growth, EBITDA margin growth, valuation growth), and fund-level controls (e.g., fund size, fund sequence, fund age).

The coefficient of a variable (e.g., Interim MOIC) indicates how changes in that variable relate to changes in MOIC uplift, accounting for all these other factors, across regions. Positive Report Tone is a predictor of better performance in both regions, with slightly stronger effects observed in Europe than in the United States. Conversely, Markdown Frequency exhibits a negative relationship with MOIC Uplift in both regions. Interestingly, MOIC Staleness Frequency and Interim MOIC shows contrasting effects: they are slightly positive in Europe but negative in the United States.

These findings suggest that while there are similar trends in how tone relates to performance across both markets, distinct regional differences in valuation practices and market dynamics emerge, with Europe appearing more conservative overall.

Figure 1: Europe versus North America [5]
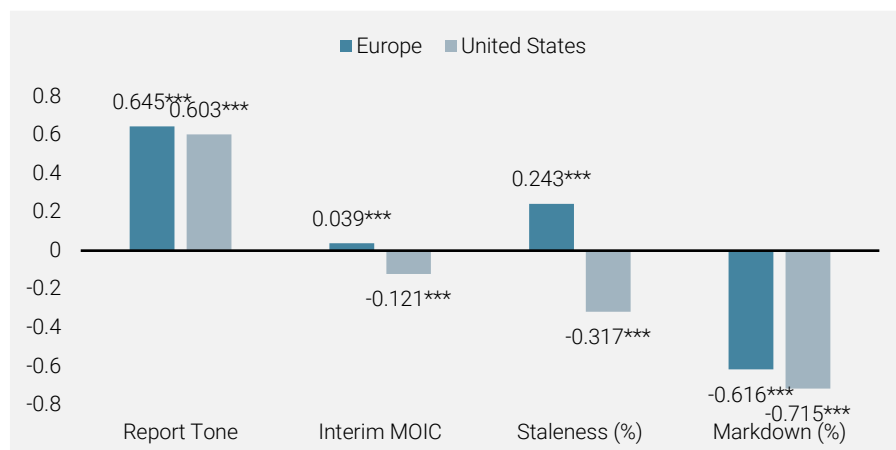
Source: Unigestion

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Can Report Tone uncover reporting tricks during fundraising?

GPs typically raise a new fund every three to five years in order to continue investing and secure management fees. Previous literature shows that some GPs inflate interim performance when raising a follow-on fund. While Table 1 suggests that GPs use their tone to communicate important information to LPs, we have dug deeper into fund reports to assess, using econometrics, how Report Tone and Interim MOIC evolve around the time of fundraising.

We examine the relationship between Report Tone and MOIC Uplift, accounting for various deal- and fund-related metrics described above, both during and outside fundraising periods. The results demonstrate that Report Tone remains a strong predictor of final performance, regardless of whether the GP is in a fundraising phase. However, the coefficient of tone is lower when the GP is not fundraising (71 % vs. 85 %). This reinforces our finding that GPs place greater emphasis on tone during fundraising periods. During these times, reports serve as a tool to influence LPs' evaluations and boost confidence in future performance.

Overall, the findings highlight that LPs should be cautious about relying solely on Interim MOIC as a future performance indicator during fundraising periods, as these values may be less reflective of final outcomes, due to potential overvaluation. In contrast, Report Tone consistently provides meaningful insights into future performance.

Predicting private equity success: the power of Report Tone and Machine Learning

Based on the results shown in Tables 1 and 2 and Figure 1, both Report Tone and Interim MOIC provide valuable, yet distinct, signals about the final performance of investments. This nuanced relationship highlights the need for a more sophisticated approach to fully capture the interplay between these variables and their impact on final outcomes. Additionally, factors such as sales growth, valuation changes, and markdown frequency are likely to contribute to the shape of final performance.

To better leverage the richness of both qualitative and quantitative data, we propose the use of machine learning (ML) models to predict final investment performance. ML algorithms are particularly well-suited to this task as they can process large datasets with multiple interacting variables, detecting patterns that traditional methods might overlook. By integrating Interim MOIC, Report Tone, and other key performance metrics such as sales growth, EBITDA margin, and markdown frequency, ML models can dynamically assess the likelihood of different outcomes, accounting for both the GP's narrative tone and quantitative trends.

In our analysis, we apply two commonly used techniques in this field: Lasso Regression and Random Forest [6]. Both techniques are used to predict a binary outperformance measure that benchmarks each deal's final gross MOIC against the median final gross MOIC for its exit year to define outperformance. In this case, a binary indicator takes the value of one if a company outperforms, and zero otherwise. The algorithms are fed with a wide set of variables, including the Report Tone.

To ensure a rigorous and time-consistent analysis, we adopt a training-test split based on a cut-off period. Specifically, we train the models on deals realised prior to the cut-off date and test them on deals entered within one year after the cut-off date. For the years 2014 to 2020, the training sample consists of deals realised before this period, and the test sample includes deals realised by June 2024. This split ensures

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[6] Lasso Regression is a linear model that provides coefficient estimates, which can be interpreted similarly to traditional regression, with the added benefit of regularisation to avoid overfitting. Random Forest, on the other hand, is a non-linear ensemble method that offers robust predictive power but lacks easily interpretable coefficients.

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there is no look-ahead bias in our analysis, providing a realistic out-of-sample evaluation of the models' predictive power.

Figure 2 shows the statistical and economic performance of applying the above process by training algorithms with information available one year after investing. The AUC scores[7] (0.65 for Random Forest and 0.57 for Lasso) demonstrate that both models have comparable overall predictive accuracy. As far as economic returns are concerned, Random Forest model delivers the best results: deals predicted to outperform show an average MOIC uplift of 2.13x, whereas those predicted to underperform exhibit an average uplift of 1.20x.

Figure 2: MOIC Uplift of underperformers (MOIC uplift<median MOIC uplift) and outperformers (MOIC uplift≥ median MOIC uplift)
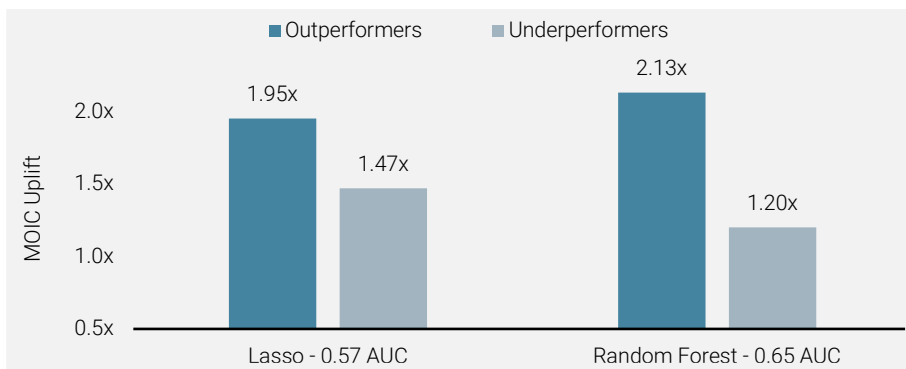
Source: Unigestion

For regression tasks (predicting MOIC Uplift), we train the algorithms to minimise the absolute difference between predicted values and actual values. Table 3 presents the Exit MOIC segmented by quartiles of Lasso-predicted Exit MOIC. It shows that ML models, trained on quantitative and qualitative information provided by GPs, can predict an investment's final outcome very well.

For example, deals in the highest quartile of predicted outperformance deliver a median MOIC Uplift of 1.19x for the fund – 1.20x higher than the -0.01x median MOIC Uplift observed for deals in the lowest quartile. The difference in performance is significant even when we look at deals that have been in the portfolio for just one year (i.e., 1.53x).

Table 3: MOIC Uplift by Lasso

|		Predicted MOIC Uplift quartiles:				
	Median	Lowest	3rd	2nd	Highest	High − low
Average		-0.01x	0.12x	0.64x	1.19x	1.20x
Deal Age (in Years):						
1	1.33x	-0.13x	0.36x	1.26x	1.40x	1.53x
2	0.96x	-0.28x	0.22x	0.92x	1.27x	1.55x
3	0.49x	-0.01x	0.13x	0.62x	0.83x	0.84x

Source: Unigestion

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[7] Area Under the Curve (ROC-AUC) metric that measures a model's ability to distinguish between classes. A ROC-AUC score of 0.5 indicates a model that performs no better than random chance, while a score of 1 indicates perfect predictions.

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Key predictors of private equity performance

In this final section, we explore which factors have a stronger impact on the MOIC Uplift and whether this impact is positive or negative, as shown in Figure 4. We use the Lasso model trained to predict whether a deal will outperform the median MOIC Uplift (see Figure 3). The model identifies Report Tone and Interim MOIC as the most significant positive predictors of MOIC Uplift. Conversely, Markdown (%) and Realisation (%) have the most substantial negative impact on MOIC uplift. Other important factors include Sales Growth, Big Four Auditor, Fund Age, and Number of sentences although their influence is comparatively smaller. These results emphasise the importance of combining performance metrics with qualitative indicators to create a robust prediction of investment success starting just one year after the investment was made.

Figure 3: Most relevant variables to make predictions
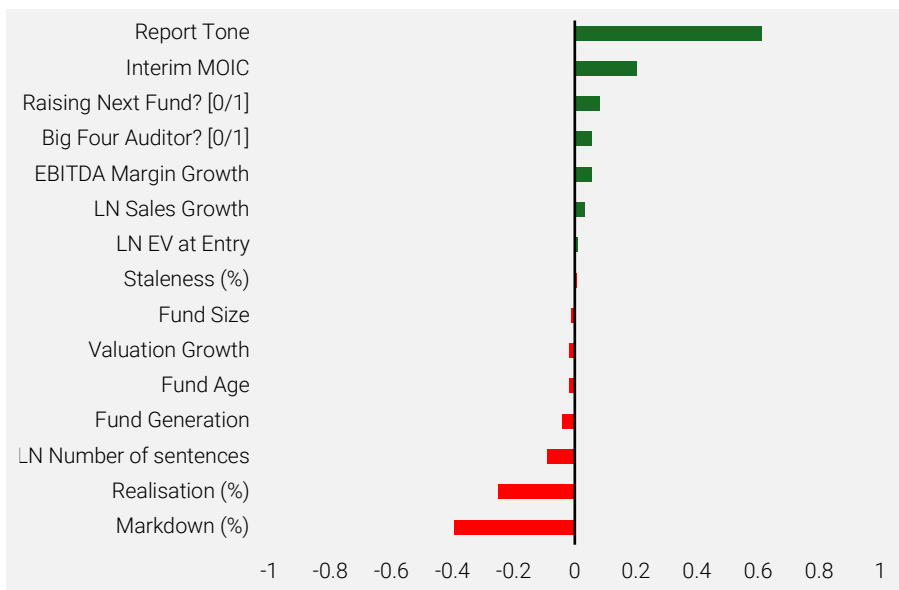
Source: Unigestion

Conclusion

Our results indicate that the combination of qualitative and quantitative information available to LPs throughout a fund's life can effectively signal its potential performance outcomes, even at the very early stages of investment (e.g. one year post-acquisition). Our study demonstrates the effectiveness of large language models (LLMs) in extracting valuable insights from qualitative information, such as the text in quarterly reports. Moreover, ML models prove to be powerful tools in maximising the value of this information, translating it into clear, actionable indicators of future performance. This makes them highly valuable for pricing secondary transactions and supporting portfolio management. Although this study focuses on buyout and growth capital deals, we believe these algorithms could also be beneficial in venture capital and other private capital asset classes.

I. References

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