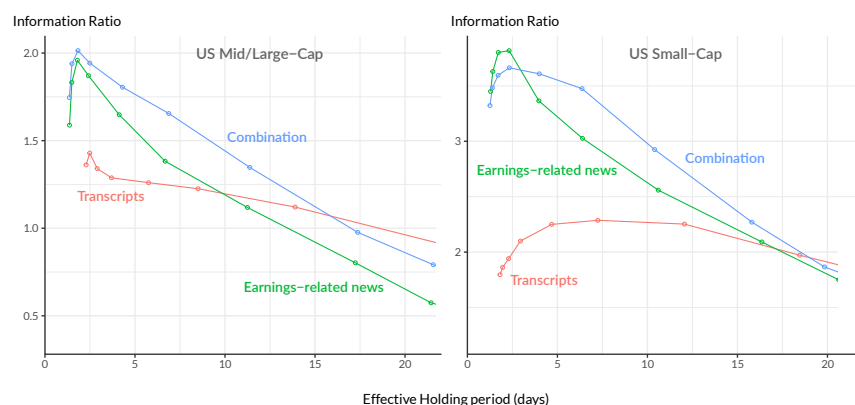


From Earnings News to Earnings Intelligence: Combining News and Earnings-call Transcripts

Key Takeaways

In this paper, we take a deeper dive into the earnings intelligence provided by RavenPack as we explore the combination of earnings-related news and earnings call transcripts. We find that:

- When focusing on earnings-related news, signals based on quarterly sentiment change provide more long-term value than raw sentiment. For U.S. Mid/Large-Cap companies, the Information Ratio improves from 0.4 to 1.2 for a two-week holding period, while for U.S. Small-Caps, the Information Ratio increases from 0.5 to 1.9 at a monthly horizon.
- Earnings news and earnings call transcript signals complement each other and the combination outperforms the individual signals for up to three week holding periods for U.S. Mid/Large-Caps and for up to one month for Small-Caps.
- For an effective holding period of 10 days, the Information Ratio of the combined strategy rises from 1.2 to 1.4 for US Mid/Large-Caps, and from 2.6 to 3.0 for Small-Caps.



Information Ratio for U.S. Mid/Large-Caps (left) and U.S. Small-Cap companies (right)
for the Combination of earnings-news and transcripts signals compared to the
individual signals using different smoothing decays.

Source: RavenPack, November 2021

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1. Introduction

In recent research (HAFEZ 2021), we introduced the RavenPack Transcripts product and demonstrated how trading signals generated from earnings call transcripts can be used to construct portfolios that outperform the market across trading horizons ranging from days to a month. In this paper, we incorporate additional earnings-related event information detected in RavenPack Analytics (RPA) to develop a more complete picture of the earnings cycles. These events originate from company-disclosed press releases, news reports and commentary around earnings, as well as information incorporated from FactSet Earnings estimates.

As shown in our prior research, trading signals based on the cross-sectional ranking of RavenPack news sentiment indicators¹ are particularly strong over short-term horizons. However, such signals demonstrate a relatively fast decay over longer holding periods, particularly in liquid markets such as the U.S. Mid/ Large-Cap universe. Inspired by the results in HAFEZ (2021), in the context of signals extracted from earnings call transcripts, we find that the quarterly change in earnings-news sentiment is also characterised by a slower decay, providing more value in long-term horizons.

Using this alternative approach to build trading signals from news, we show how signals extracted from earnings call transcripts can be combined with earnings-related events to enhance portfolio performance. The two signals exhibit low correlation and meaningfully different behaviour, complementing each other over a wide range of holding periods. Namely, the earnings call transcripts signals generally perform better over longer horizons, while the news-based ones show higher impact over shorter horizons, despite relating to the same earnings cycle.

This paper is split as follows: Section 2 briefly describes the earnings news and transcripts datasets and outlines the process for constructing the daily sentiment signals. Section 3 discusses the performance differentials between the two approaches. Section 4 showcases the benefits of splitting factual and guidance-based events to construct earnings-related signals. Section 5 describes how we combine the earnings call transcripts and the earnings-news signals to enhance portfolio performance. Finally, Section 6 summarizes our concluding remarks.

1 Sum Excess Sentiment Indicator (SESI), introduced in Hafez, P. and Matas Navarro, R. (2018). *"Effects of Event Sentiment Aggregation: Sum vs. Mean"* RavenPack Quantitative Research, May 2018, app.ravenpack.com/research/sum-vs-mean-event-sentiment-aggregation/

2. Data Description & Signal Construction

We use two different datasets for this research: the earnings-related news analytics are obtained from RavenPack Analytics (RPA 1.0); the earnings call transcripts are based on analytics within RavenPack Edge, sourced from FactSet Transcripts. For every document received in each of the data feeds, RavenPack generates a large number of structured records containing analytics for the documents as a whole, as well as for all entities and events detected within the text².

Among all events detected from the news content, we filter only for “earnings”, “revenues” and “dividends” event groups, which is a subset of the RavenPack Event Taxonomy directly related to earnings. Of those, we only consider non-neutral, highly relevant, and novel events³, and aggregate the corresponding Event Sentiment Scores⁴ to construct trading signals for each company.

Earnings call transcript analytics are available in RavenPack Edge under the FactSet Transcripts provider (FSTR). Here, we include a broader range of analytics related specifically to companies hosting the earnings calls, as compared to news, where we only consider the events that satisfy the previously outlined filtering conditions. More details about the analytics we use to build trading signals from transcripts can be found in HAFEZ (2021).

Transcripts are typically delivered with a delay of less than a day after the actual call takes place and frequently on the same day as the press release is published. Therefore, earnings-related news and transcripts signals usually coincide on the same day when trading at market close⁵, with both signals exhibiting a similar seasonality pattern.

Our signal construction process always starts with a daily aggregation of document or event analytics over the trailing 24 hours prior to the chosen daily cutoff, which we set to 30 minutes before market close for our strategy backtests that trade on the closing prices.

We create two daily indicators using earnings-related events from the news: the SESI, a raw daily sentiment aggregation signal, and “Sentiment Change”, which measures the change in company sentiment over time. Specifically, the SESI signal is used for stock selection based on the cross-sectional comparison of company sentiment relative to the universe⁶. The Sentiment Change indicator is a temporal signal that tracks the sequential change in sentiment over the previous reporting period and is meant to normalize the signals from potential company-specific effects.

2 See RP Edge user guide for more details.

3 This is done by applying the filters `EVENT_SENTIMENT_SCORE≠0`, `EVENT_RELEVANCE≥90` and `EVENT_SIMILARITY_DAYS≥90`.

4 The Event Sentiment Score is a granular score between -1 and 1 that represents the entity-specific sentiment for any particular event defined in the RavenPack Taxonomy. The score is determined by systematically matching stories usually categorized by financial experts as having a positive or negative financial or economic impact. ESS probes many different sentiment proxies typically reported in financial news. The RavenPack algorithm produces a score for more than 7,000 categories of business, economic, and geopolitical events, ranging from earnings announcements to natural disaster.

5 For US Mid/Large-Caps, 95% of the transcript signals are accompanied by an earnings-related new signal on the same trading day. For US Small-Caps, the percentage is 86%.

6 Further details on the implementation of SESI can be found in HAFEZ (2018).

The Sentiment Change signal follows the same construction methodology as the earnings call signals detailed in HAFEZ 2021. For each company within the U.S. Mid/Large- and Small-Cap universes, the changes are measured quarterly, in line with the typical earnings cycle, by subtracting from the daily sentiment its rolling average over a lookback window of the previous four months⁷. The additional month allows for some flexibility in the calendars (e.g. a window of exactly 3 months may not capture the news around the earnings release that took place a few days prior in the previous quarter). If $S_i(t)$ is the raw signal for company i on day t , the sentiment change indicator $C_i(t)$ is measured as:

$$C_i(t) = S_i(t) - \frac{1}{T} \sum_{\tau=t-1}^{t-1-T} S_i(\tau),$$

where $T=21 \times (3+1)$ days for the U.S.⁸.

For the earnings call transcripts indicator, we use the Full Combination signal introduced in previous research (HAFEZ 2021), which incorporates the changes in document sentiment, event sentiment, and executive transparency scores.

Next, we apply backward-looking exponential smoothing as a way to ensure adequate breath within the cross-section and to control the effective holding period of the resulting portfolios. We then construct long-short dollar-neutral portfolios for sizes ranging from 20 to 640 stocks. The long and short legs of the portfolio are normalized individually to reach 50% long and 50% short exposures. Additionally, we apply a maximum allocation constraint of 5% per stock using an iterative reallocation process whereby entities that do not reach this constraint are allocated additional capital, proportional to the signal, until maximum gross exposure of 100% is achieved.

Our backtesting period spans from January 2007 through October 2021. In an effort to focus on showcasing the value of combining the signals, we do not consider trading costs in our analysis. In the following section, we show the results of our backtests for the U.S. Mid/Large and Small-Cap strategy portfolios of 320 stocks⁹. Results across other portfolio sizes, as well as for Europe and Asia are shown in the Appendices.

7 While we talk in terms of trading calendars throughout the paper, in practice a complete calendar is employed for signal construction, which allows us to also capture news or transcripts information received on non-trading days.

8 For other universes we have followed the same periods as the ones used for the earnings-call signals in (HAFEZ 2021): semi-annual changes for Europe Mid/Large-Cap companies and annual for Europe Small-Cap and both APAC universes, although other periods could be explored due to a better signal breath compared to transcripts.

9 The Global Universe consists of the top 3000 companies in the US and the top 7000 companies worldwide ex. US, based on market capitalization. The Large-, Mid-, and Small-Cap categorizations worldwide ex. US are achieved by splitting companies into groups based on their market cap percentile (p), i.e. $p > 87.5$ for Large/Mid-Cap and $p \geq 87.5$ for Small-Cap. In addition, we apply some stricter stability requirements on how companies move from one group to another, adding ± 2.5 to each of the threshold values. The US market-cap categorizations are achieved by assigning top 1000 ranked companies by market-cap to Large/Mid- and 1001-3000 companies to Small-Cap groups.

3. Raw Sentiment vs Quarterly Change

In this section, we compare the performance of the SESI indicator, a raw sentiment signal, against the Sentiment Change indicator, using only earnings-related news events from RavenPack Analytics. As mentioned previously, the former is used to compare sentiment direction and magnitude over a cross-section of companies, while the latter measures company-specific sentiment changes over time.

Strategy performance comparisons in **FIGURE 1** show a markedly slower decay for the Sentiment **CHANGE** indicator relative to **SESI** across both U.S. universes. The Information Ratio increases from 0.4 to 1.2 for the Mid/Large-Caps at

the 10-day effective holding period and from 0.5 to 1.9 for the Small-Caps at the monthly horizon. However, SESI tends to produce higher Annualized Returns over the short-term horizons, in line with our expectations when working with the raw news sentiment signals.

Given the superior performance of the Sentiment Change indicator over longer trading horizons, we will use it as our news signal of choice to be combined with the earnings call signals, which have a similarly slow decay profile. However, higher frequency strategies could also benefit from considering the faster-moving SESI.

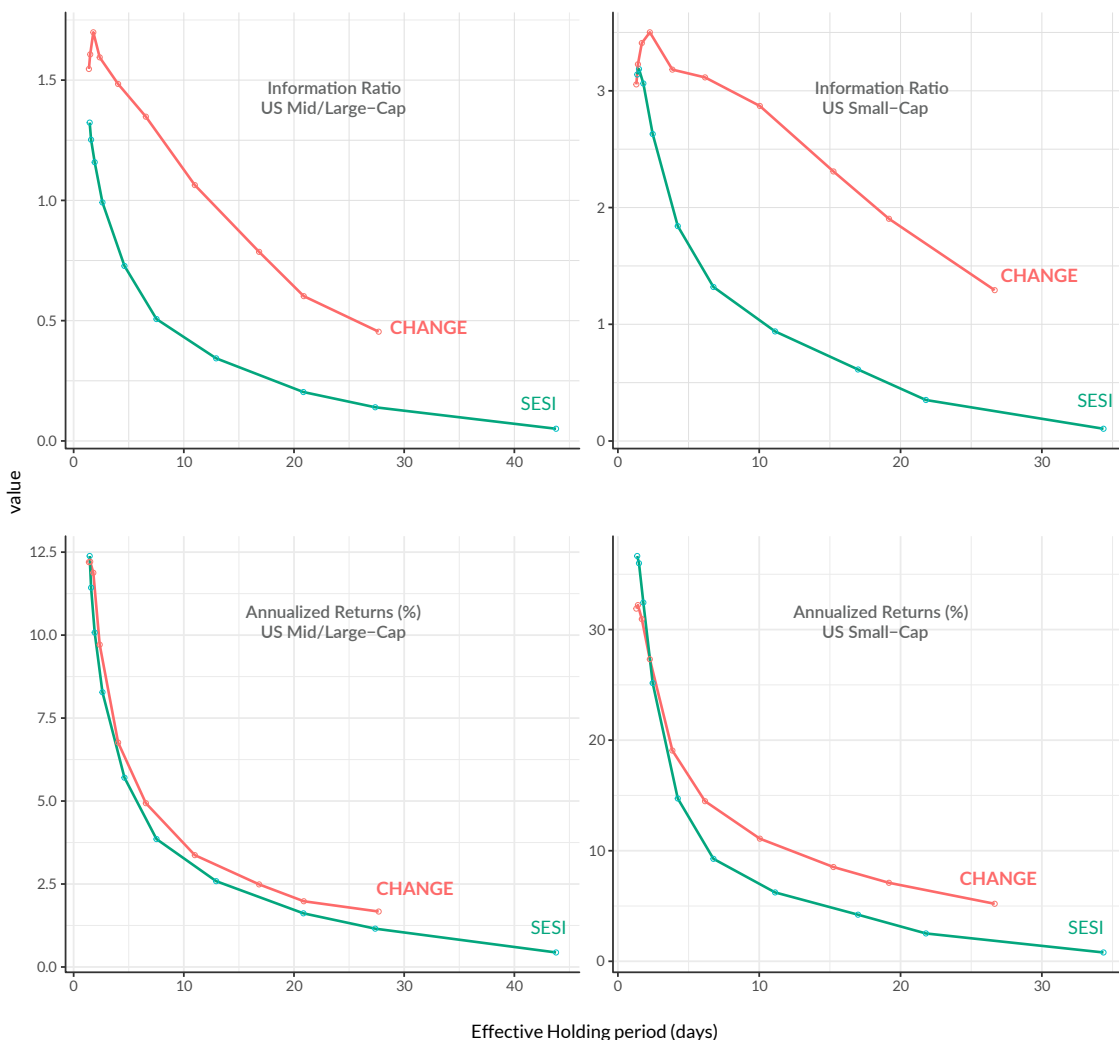


FIGURE 1:
Earnings-related events performance using SESI and Quarterly Sentiment Change for Mid/Large-Cap (Left) and Small-Cap (Right) companies in the U.S.
Source: RavenPack, November 2021

4. Splitting Factual and Guidance Events

It is important to highlight that the earnings-related portion of the taxonomy is quite broad with around 400 different event categories. This rich taxonomy allows for many potential groupings or could be used to apply restrictive filtering while maintaining a reasonable volume of events. One of the beneficial splits is the one that distinguishes between earnings events related to factual reporting and company guidance¹⁰, as these events are most often characterised by different market reactions. This notion is supported by the relatively low correlation between the factual and guidance earnings signals at about 11% for the U.S. Mid/Large-Caps and 8% for the Small-Caps, indicating that they contain different information.

The sentiment change signals for factual and guidance earnings events are generated separately and then summed after performing a cross-sectional daily normalisation:

$$\bar{I}_i^\alpha(t) = \frac{I_i^\alpha(t)}{\sum_{i=1}^N |I_i^\alpha(t)|},$$

where in the set of signals $\{I_i^\alpha(t)\}$ α identifies each of the individual signals¹¹.

When evaluated individually (FIGURE 2), both ■ fact and ■ guidance signals demonstrate attractive performance, showing that there is value in both types of events. The low correlation between them, also observed in the meaningful differences in performance, suggests that the combined signal is likely to add value. In FIGURE 3, we evaluate whether the previously described combination approach proves more valuable than simply aggregating all events without first separating the two groups. We can see that the split and combine approach (■ fact+guidance) outperforms the full earnings event aggregation without distinction (■ earnings). Specifically, we observe significant improvements in both Annualized Returns and Information Ratios over short term horizons, while the decay profile when moving towards longer holding periods remains similar. With a smoothing decay of two days, for instance, which translates into an effective holding period between two and three days, the Information Ratio within Mid/Large-Caps improves from 1.7 to 1.9 when treating the two earnings groups separately, while the Information Ratio within Small-Caps increases from 3.5 to 3.8.

10 To do this we simply split the events into a group of all categories that contain the word “guidance” and the rest.

11 In this case, we only consider factual earnings and guidance earnings. This follows the same combination approach as for the transcripts signals, which comprises the event sentiment, document sentiment and transparency signals.

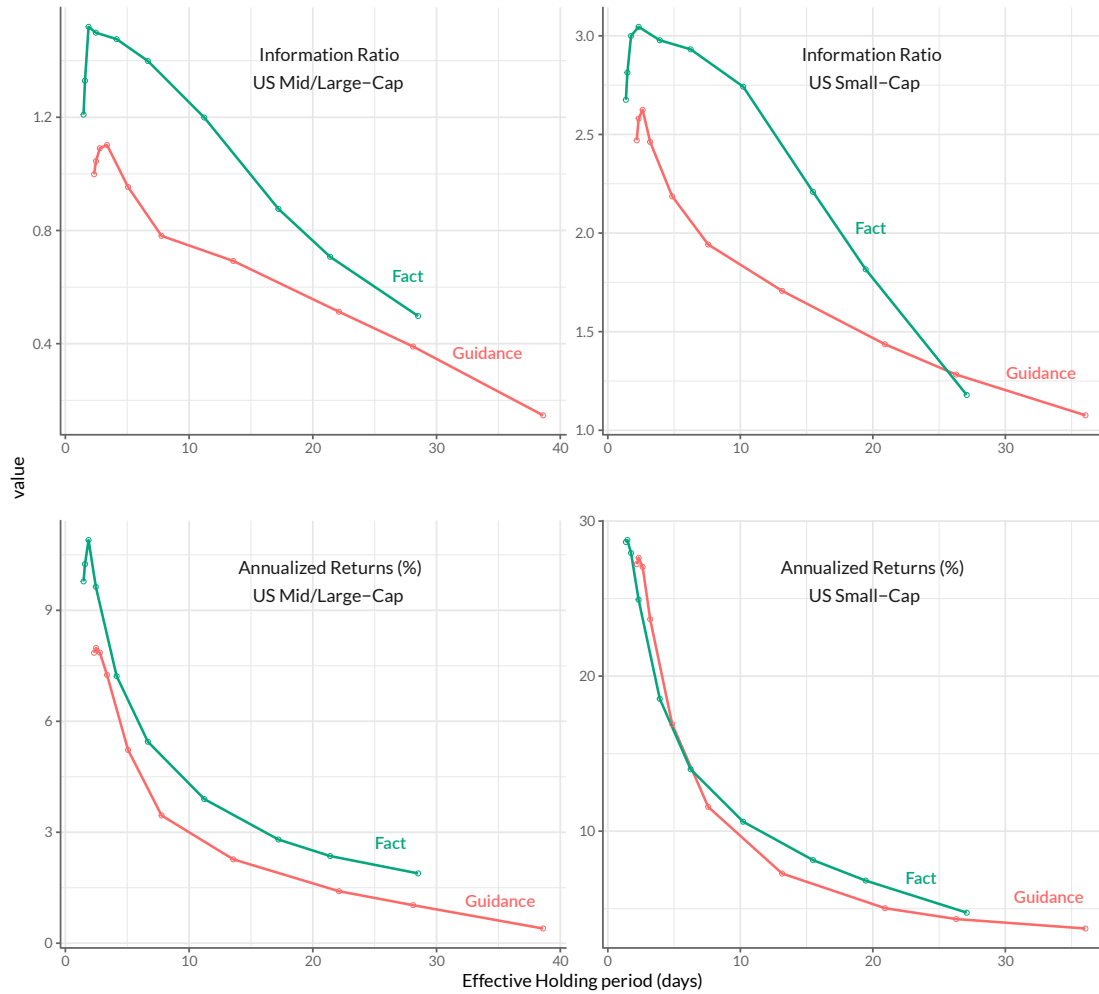


FIGURE 2: Portfolio performance stats for separated factual and guidance event signals for US Mid/Large-Caps (Left) and US Small-Caps (Right). Source: RavenPack, November 2021

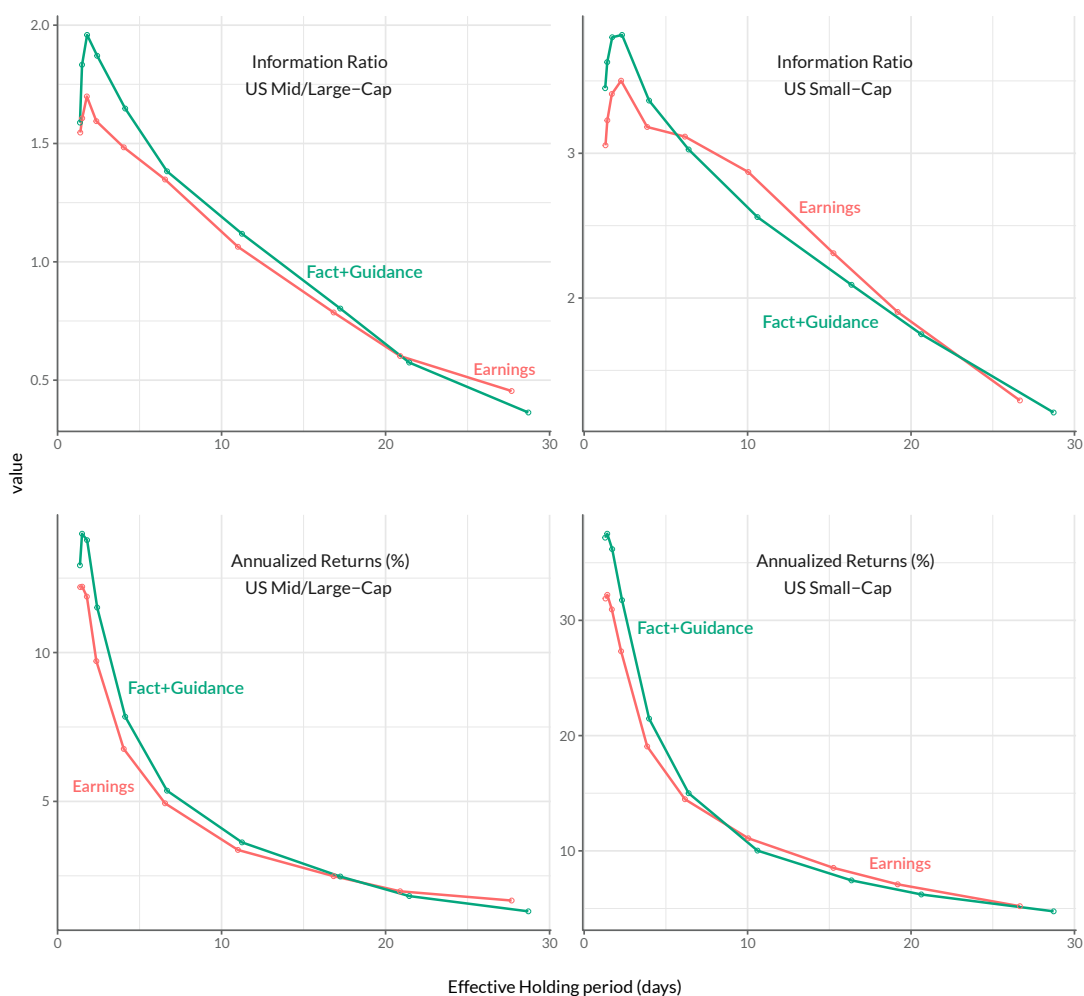


FIGURE 3: Portfolio performance for the combination of factual and guidance event signals (Fact+Guidance) vs. the full earnings event aggregation without split (Earnings), for US Mid/Large-Caps (Left) and US Small-Caps (Right). Source: RavenPack, November 2021

5. Combining Transcripts and Earnings-related News Signals

In the previous sections, we have shown that earnings-related events from news sources can be further optimised by computing sentiment changes over time and splitting factual and guidance information. The final step involves combining the earnings-related news and RavenPack transcripts signals. We do this by summing the Fact+Guidance and the Full Combination signals after performing another cross-sectional normalization.

The backtest performance metrics shown in **FIGURE 4** demonstrate how the two signals complement each other. The ■ **transcripts** signals typically perform better over longer horizons, while the ■ **news-based** signals achieve better results over short horizons. The relatively low correlation between the signals, typically well below 20% in the U.S. markets, is corroborated by the significant differences in the performance profiles. While all earnings-related signals are inextricably linked to the financial performance of a company, it is apparent that transcripts and news each bring diverse information into the mix. More importantly, the blended signal enhances performance over a wide range of trading horizons. Specifically, the ■ **combined signal** outperforms the individual signals up to a 15-day effective holding period (three weeks) in the U.S. Mid/ Large-Cap and up to one month in the U.S. Small-Cap universe. For an effective holding period of ten days, for instance, combining the signals improves

the Information Ratio within the Mid/Large-Caps to 1.4 compared to 1.2 when using only transcripts or earnings-news. Similarly, the IR within the Small-Caps improves to 3.0 from 2.2 for transcripts and 2.6 for earnings-news only.

The cumulative log-returns shown in **FIGURE 5** demonstrate robust performance over time across both Mid/Large and Small-Cap universes¹². We also observe smooth changes in performance when increasing the decay length λ , which effectively reduces portfolio turnover (ranging from a 2-day holding period for $\lambda=1$, and 30-day for $\lambda=63$).

To examine the alpha profile of our strategies, we also evaluate our strategies using a traditional risk factor model.¹³ As shown in **TABLE 1**, we observe low factor exposures across our portfolios when adjusting for the contribution attributed to traditional factors: the resulting adjusted portfolio performance is very similar to that of the original portfolios across all trading horizons and market capitalizations, showing that RavenPack transcripts and RPA earnings-related news are reliable sources of robust alpha generation. Moreover, the results indicate that controlling for traditional factors improves Information Ratios by reducing portfolio volatility.

12 The performance deterioration in 2020 over shorter horizons can be explained by two factors. First, the onset of the Covid-19 crisis in March 2020 has led to meaningful price reactivity increase in efficient markets, such as the mid/large-caps in the U.S., characterised by a faster reaction to news information. Second, we observed an unusual increase/decrease of negative/positive events in the transcripts data over the quarters following the crisis, which impacted the short-term behaviour more strongly.

13 We employ an in-house risk-factor model that uses an exponentially-weighted least squares dynamic regression of 10 common factors (Growth, Quality, Yield, Profitability, Investment, Market, Low Vol, Low Size, Momentum and Value). The raw vs adjusted comparison is carried out from December 2008 to September 2021.

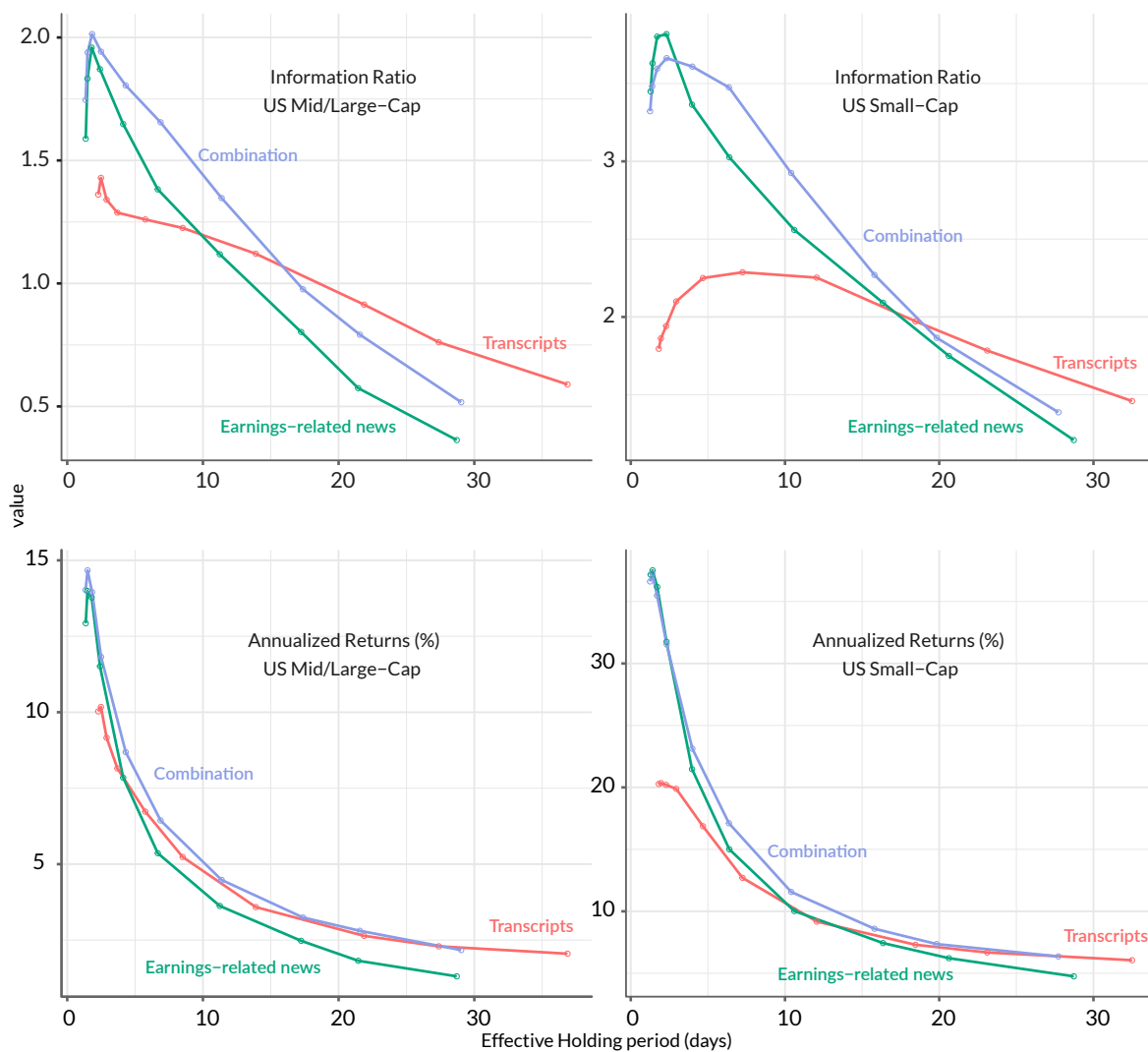


FIGURE 4: Portfolio performance for strategies using individual and signals and transcripts signals for U.S. Mid/Large-Caps (Left) Small-Caps (Right) Source: RavenPack, November 2021

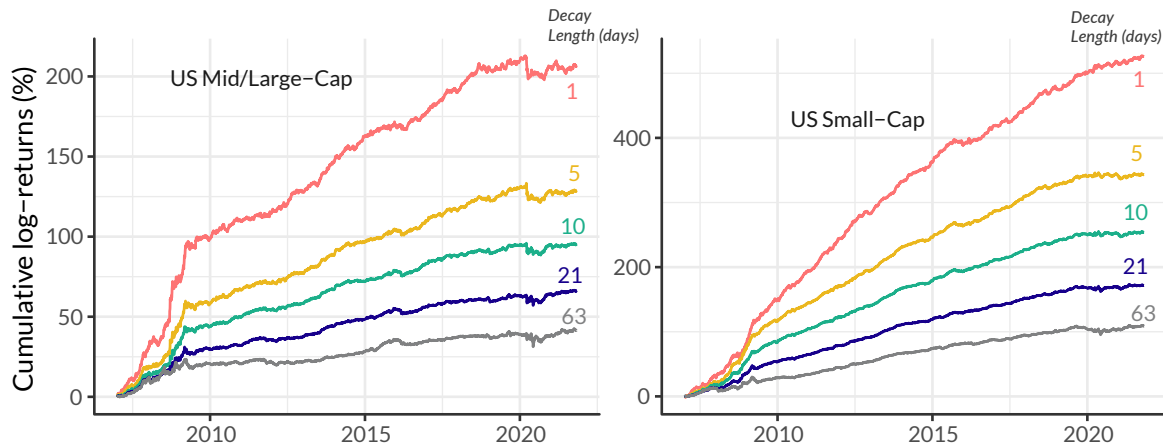


FIGURE 5: Cumulative log-returns for the U.S. Mid/Large- (left) and U.S. Small-Cap universe (right), for the Transcripts and Earnings News Combination, and over several decay lengths when applying exponential signal smoothing. Source: RavenPack, November 2021

| Decay | US Mid/Large-Caps | | | | US Small-Caps | | | |
|-------|-------------------|-------------|------------|-----------------|---------------|-------------|------------|-----------------|
| | Raw IR | Adjusted IR | Raw AR (%) | Adjusted AR (%) | Raw IR | Adjusted IR | Raw AR (%) | Adjusted AR (%) |
| 1 | 1.7 | 2.0 | 10.4 | 10.4 | 3.7 | 4.5 | 35.0 | 35.2 |
| 5 | 1.5 | 1.8 | 6.7 | 6.9 | 3.5 | 4.3 | 21.3 | 22.6 |
| 10 | 1.4 | 1.6 | 5.0 | 5.0 | 3.4 | 3.9 | 15.8 | 16.8 |
| 21 | 1.1 | 1.2 | 3.4 | 3.5 | 2.8 | 3.2 | 10.8 | 11.5 |
| 63 | 0.5 | 0.7 | 2.2 | 3.2 | 1.8 | 2.1 | 6.9 | 7.6 |

TABLE 1: Risk-adjusted performance for the Transcripts and Earnings News Combination, over several decay lengths when applying exponential signal smoothing. IR: Information Ratio, AR: Annualized Returns

Source: RavenPack, November 2021

6. Conclusion

In this paper, we showed how to create investment strategies that take advantage of earnings-related news events along with signals based on earnings call transcripts. We provided a brief overview of earnings-related events and the earnings call transcripts datasets, where we discussed the use of the sentiment-based indicators for generating daily trading signals. When focusing on earnings-related news, we found that indicators based on sequential changes in company sentiment over consecutive reporting periods deliver more value over longer holding periods relative to indicators based on raw sentiment, in line with our findings for earnings call transcripts.

We also discussed the benefits of splitting the earnings news events into factual and guidance-related categories. The low orthogonality between the factual and guidance sentiment change signals translates to improvements in combined strategy portfolio performance compared to a simple aggregation of earnings-related events without the split.

Next, we showed that the signals based on RavenPack Transcripts and earnings-related news each bring complementary and diverse information into the mix, despite relating to analogous financial performance of a company. Notably, the correlation between the transcripts and earnings-news-based signals is relatively low at well below 20% in the U.S. markets, with the former performing better over longer horizons and the latter achieving better results over short horizons. We demonstrated that blending the two signals enhances Information Ratios and Annualized Returns up to a 15-day effective holding period (three weeks) within the U.S. Mid/Large-Caps and up to 1-month in the U.S. Small-Cap universe compared to the standalone strategies. For an effective holding period of ten days, for instance, combining the signals improves the Information Ratio within the Mid/Large-Caps to 1.4 compared to 1.2 when using only transcripts or earnings-news. Similarly, the IR within the Small-Caps improves to 3.0 from 2.2 for transcripts and 2.6 for earnings-news only. In addition, the cumulative log-returns of the combined strategy demonstrates robust performance over time, with gradual changes across different effective holding periods.

Finally, evaluating our combined strategy using a traditional risk factor model showed low factor exposures across our portfolios. Controlling for traditional factors results in similar annualized returns, lower volatility and higher effective Information Ratios across all trading horizons.

Appendix A

In the main paper, we confined our results to a fixed portfolio size of 320 names; in this Appendix, we include results across different portfolio sizes. **FIGURE A1** shows that performance typically converges when moving towards larger portfolio sizes, which tend to exhibit similar returns but with lower volatility, and higher Information Ratios.

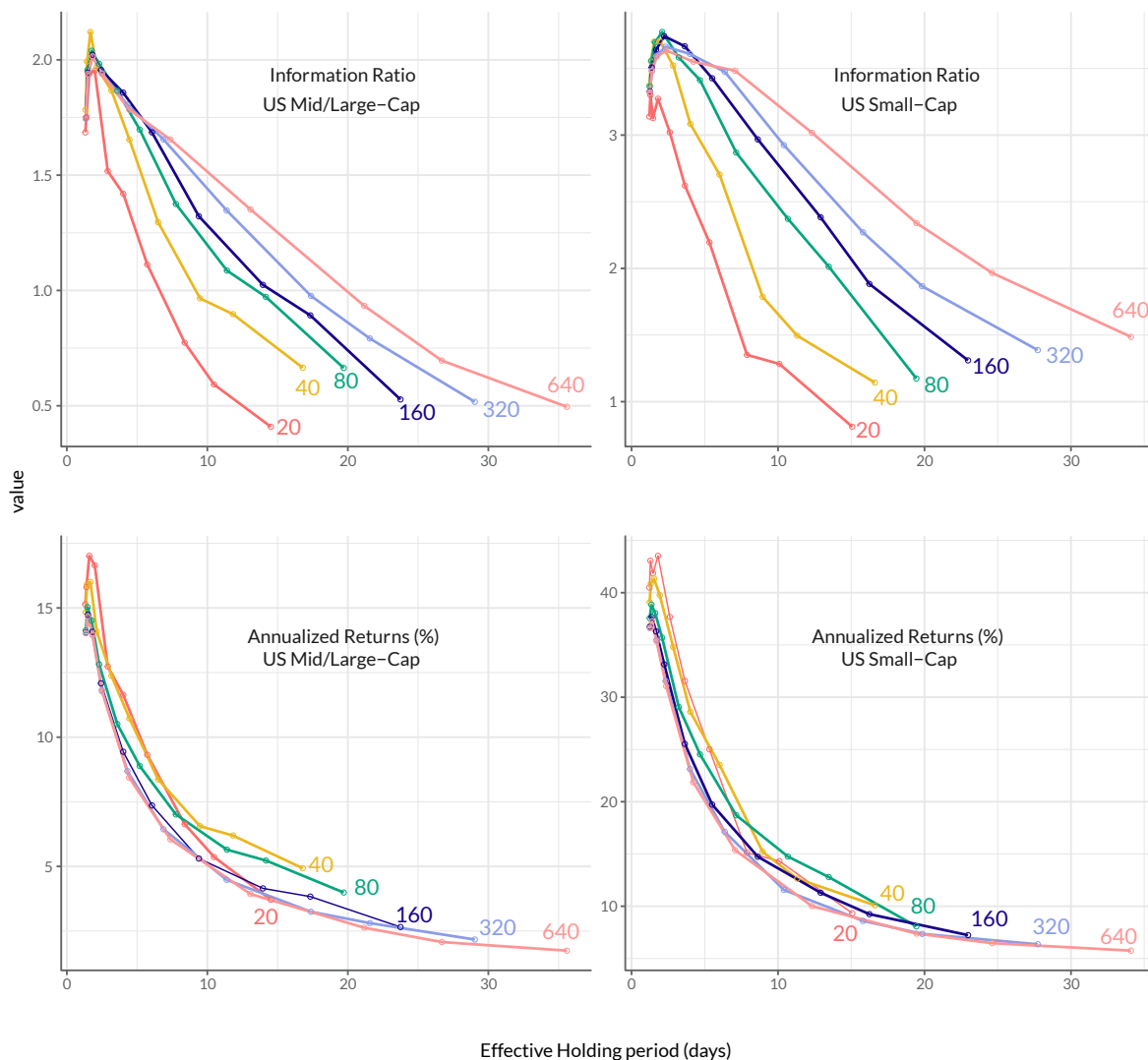


FIGURE A1: Information Ratios and Annualized Returns for Mid/Large-Caps (left) and Small-Caps (right) U.S. companies, for strategies combining earnings-related news and transcript content over different holding periods and portfolio sizes.

Source: RavenPack, November 2021

Appendix B

Here we show the performance of transcripts and earnings-related news for European and Asian regions. **FIGURE B1** shows that combining the two signals using the methodology presented in this paper can add value in Europe Mid/Large-Caps, where the coverage of transcripts is still reasonably high. Transcripts coverage is lower in other universes, which negatively impacts the transcripts' signal performance, adding no value on top of the very robust earnings-news portfolios.

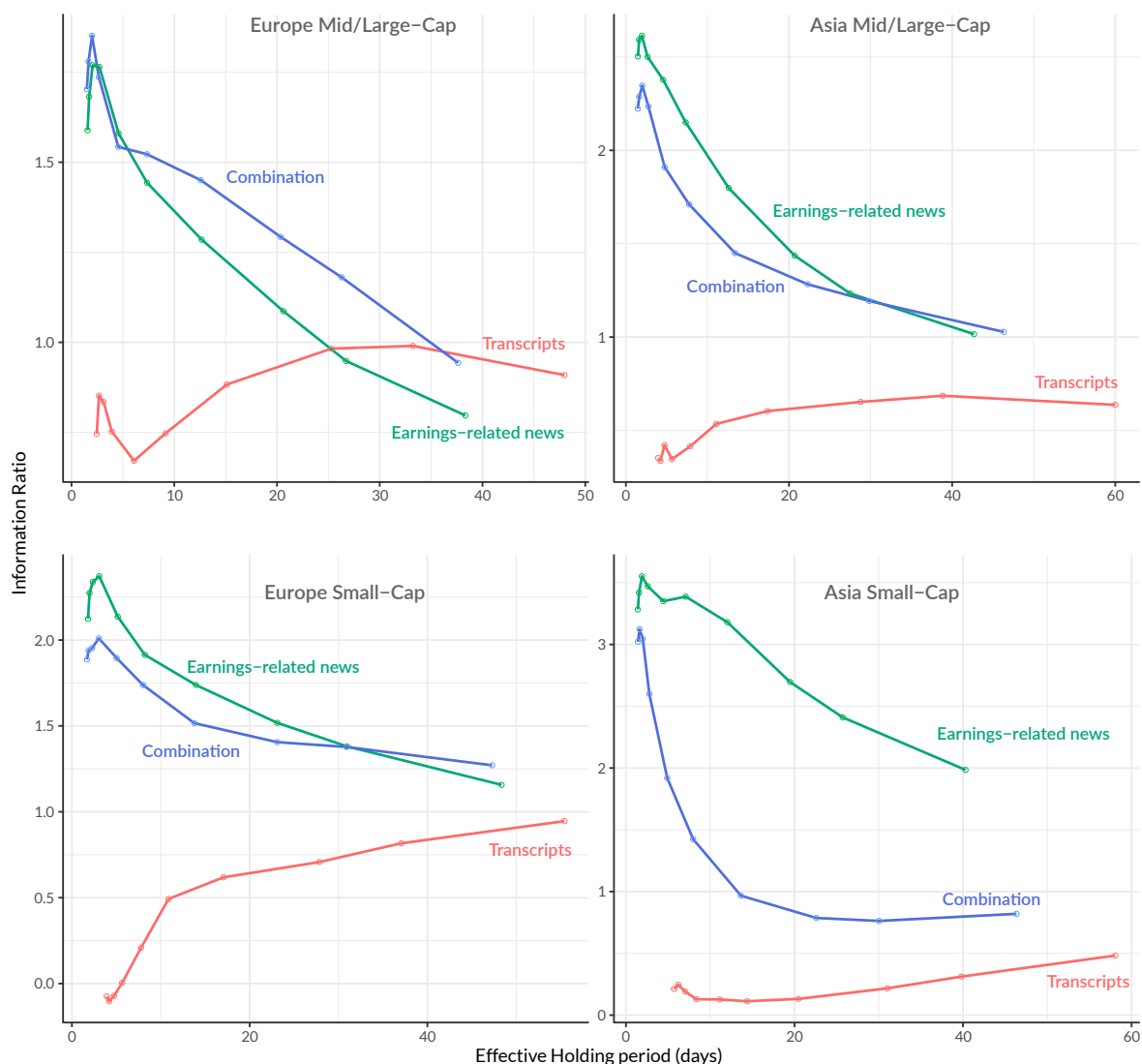


FIGURE B1: Performance of the individual earnings-related news signals and transcripts signals, and its combination, for different trading universes and for a portfolio size of 320 companies (when available).¹⁴ Source: RavenPack, November 2021

¹⁴ Portfolios including news always have enough signals to pick 320 names, but for transcripts signals alone, portfolio sizes can be smaller for universes with low coverage (mainly APAC).

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