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# Decoding Sentiment: Methodology Behind SAFE's Manager Sentiment Index

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# Decoding Sentiment: Methodology Behind SAFE's Manager Sentiment Index<sup>1</sup>

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## *Abstract*

*SAFE's monthly Manager Sentiment Index is constructed by extracting sentiment from corporate financial disclosures of listed companies in Germany, offering significant insights into top management's perspectives. This white paper outlines the methodology behind the index and its financial implications. Information about managers' assessment of firms' performance and financial conditions is material to investors but, at the same time, hard to observe. The SAFE Manager Sentiment Index quantifies managers' beliefs using textual analysis of financial reports and earnings conference call transcripts. We show that the index is a strong predictor of future stock market returns. In summary, the SAFE Manager Sentiment Index provides a practical tool for key stakeholders such as investors, analysts, and policymakers seeking timely signals of corporate sentiment.*

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<sup>1</sup> SAFE Policy Publications represent the personal views of the authors and not necessarily those of SAFE or its staff.

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## I. Introduction

SAFE's monthly Manager Sentiment Index is constructed by extracting sentiment from corporate financial disclosures, offering significant insights into managerial perspectives. This white paper outlines the methodology behind the index, describes the regulatory framework governing corporate financial disclosures, and highlights the economic and financial significance of the index. The index captures management's assessment of past performance and expectations for future developments. The revealed managerial sentiment exhibits strong predictive power for future market returns, outperforming traditional macroeconomic variables and complementing existing measures of investment sentiment. The methodology for this index is based on the study by Jiang et al. (2019), which highlights the economic and financial value of managerial sentiment as a key indicator for asset pricing and market behavior for the U.S. market.

### I.1 Policy background: corporate financial disclosure mandates

Corporate disclosures play a critical role in shaping the financial information environment. The information firms provide in voluntary or mandatory disclosures benefits the key stakeholders in different ways. For one, it improves transparency and reduces information asymmetry, contributing to a more efficient financial market. In addition, firms' disclosures enable investors and other stakeholders to assess a firm's performance, risks, growth prospects, and pecuniary and non-pecuniary such as Environmental, Social, and Governance (ESG) values.

In 2000, the U.S. Securities and Exchange Commission (SEC) introduced [Regulation Fair Disclosure \(Reg FD\)](#), which required publicly traded companies to share material information with all investors simultaneously. This regulation led to conference call transcripts becoming publicly accessible starting around late 2002. Additionally, in response to major accounting scandals such as Enron and WorldCom, Congress passed the [Sarbanes–Oxley Act \(SOX\)](#) in 2002. SOX introduced rigorous reforms aimed at enhancing financial reporting quality and protecting investors from corporate fraud.

While an electronic archive of 10-K and 10-Q filings (annual and quarterly reports, respectively) have been available on the SEC's EDGAR system since 1995, the implementation of SOX likely influenced their content. To account for this, Jiang et al. (2019) construct a monthly manager sentiment index using 10-Ks,

10-Qs, and conference call transcripts for the period after 2002. This approach helps to minimize the impact of the structural changes brought about by Regulation Fair Disclosure and SOX. Besides, conference call transcripts are not publicly available for the period before 2002.

In Europe, the EU Transparency Directive ([Directive 2004/109/EC](#), amended by [Directive 2013/50/EU](#)) aims to enable investors and other stakeholders to access corporate information by imposing mandatory regular financial reporting for publicly listed companies in Europe. In addition, many European countries have implemented national corporate governance frameworks based on the "comply or explain" principle and hence impose further information disclosure requirements on firms.

Due to the large amount of (mandatory) information that is disclosed by firms, human processing capacity might reach its limits. Textual analysis and machine learning techniques assist stakeholders in extracting their desired information from this extensive and valuable pool of unstructured data. The manager sentiment index is a product of processing qualitative disclosure text from companies, providing insights into how the managers' subjective opinions about the companies evolve monthly.

## **II. Data overview**

The study of Jiang et al. (2019) uses the text information from earnings conference calls and 10-K and 10-Q filings. More specifically, the authors study 113,570 earnings conference call transcripts for 5,859 unique non-financial and non-utility firms from January 2003 to December 2014 as well as 264,335 filings for 10,414 firms from the SEC EDGAR system.

For the SAFE manager sentiment index, we collect the quarterly and annual financial reports of publicly listed German companies from the Refinitiv Workspace database. For most companies, the reports are available both in German and English. As the sample for annual reports in German is larger, we use the German reports to construct the index. The earnings conference call transcripts are also collected from the Refinitiv Workspace database. The transcripts are only available in English.

The sample comprises all publicly listed German firms that were part of at least one major German stock market index (DAX, MDAX, SDAX, and TecDAX) during the period from 2003 to 2023. For firms to be included in the sample, it is sufficient that a company has been part of the index at one point in time. It is not required that they were an index member at the beginning or are still an index member today. This selection mechanism makes the sample survivorship-bias-free, as "dead" companies like, for example,

WireCard and Hypo Real Estate are included in the data until their delisting. This feature is important to get an unbiased estimate of managers' sentiment.

### III. Textual analysis in economics

Textual analysis has found its way into finance and economics literature in the last decade. In one of the first studies in this area, Price et al. (2012) find that managers' sentiment in earnings conference calls, measured by the Loughran and McDonald (2011) dictionary, predicts future stock returns and trading volume. The Loughran and McDonald (2011) dictionaries account for the financial jargon's nuances. Dictionary-based textual analysis is well-established in previous and recent research such as in García (2013) and Hassan et al. (2019) among others. In another study, Davis et al. (2015) explore the determinants of managers' sentiment in earnings conference calls and find that it reflects a firm's past performance and future performance but also a manager-specific component. In other words, some managers have a systematically more positive (or more pessimistic) talking style than others. In the same strand of research, Cohen et al. (2020) use textual analysis to identify text changes in firms' form 10-K and 10-Q filings and show that these subtle changes in the text are a strong predictor for future firm performance. In a recent study, Barth et al. (2023) use machine learning to identify instances in which managers do not properly answer analysts' questions in earnings conference calls (so-called "nonanswers"). Then, the authors show that nonanswers are associated with lower stock returns and higher uncertainty. Finally, in Jiang et al. (2019), the monthly manager sentiment is measured using the bag-of-words approach, which quantifies the sentiment from positive and negative word frequency based on Loughran and McDonald (2011) dictionaries.<sup>3</sup>

In the paper at hand, the main source of information is the quarterly financial reports and conference calls. As companies do not report on the monthly but on the quarterly level, there is a strong seasonal pattern in the monthly number of conference calls. To account for seasonality, a moving average is used. More specifically, the SAFE manager sentiment index is a three-month moving average weighted by the number of financial reports/conference calls per month. The three-month window makes sure that the average firm is included with one financial report and one earnings conference call in each monthly calculation of the index.

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<sup>3</sup> The dictionaries are available at <https://sraf.nd.edu/loughranmcdonald-master-dictionary/>. We thank Tim Loughran and Bill McDonald for sharing them.

The index is calculated based on the portion of the positive and negative words, determined by the dictionaries from Loughran and McDonald (2011) compared to the total number of words in the document.<sup>4</sup>

This computation is performed separately on the earnings call and on the financial reports. For the financial reports in German language, the German translation of the Loughran and McDonald (2011) dictionaries developed by Bannier et al. (2019) is used.<sup>5</sup>

The authors calculate the monthly composite Manager Sentiment Index,  $S^{MS}$ , by taking an equal weight average between the aggregated textual tone in conference calls  $S^{CC}$  and financial statements  $S^{FS}$ .

$S^{CC}$ : Aggregated tone from conference call transcripts.

$S^{FS}$ : Aggregated tone from the quarterly and annual financial statements.

$$S^{MS} = 0.5 \times S^{CC} + 0.5 \times S^{FS}$$

#### IV. Economic and financial analysis

The SAFE Manager Sentiment Index illustrates the fluctuations in manager sentiment over time, reflecting their perception of economic developments as well as the significance of these developments as captured by changes in this index over time. From this background and shown in the figure below, the time series development of this sentiment index is characterized in the early 2000s by moderate volatility with an initial downturn followed by an upward shift until the end of 2007. Arguably, these developments reflect improvements in the managers' sentiments following the early 2000s downturn from the burst of the dot-com bubble. Following this, the index shows a sharp and prolonged decline starting in early 2008 and continuing until the end of 2009, thereby capturing the manager sentiment continued decline followed by the economic shock of the Global Financial Crisis (GFC). This steep drop aligns with the subprime mortgage crisis's severe impact on global markets.

Following the financial crisis, the index increased sharply from 2010 until the end of 2011 onwards, reflecting improving manager sentiment in the recovery period in the aftermath of the initial shock of the

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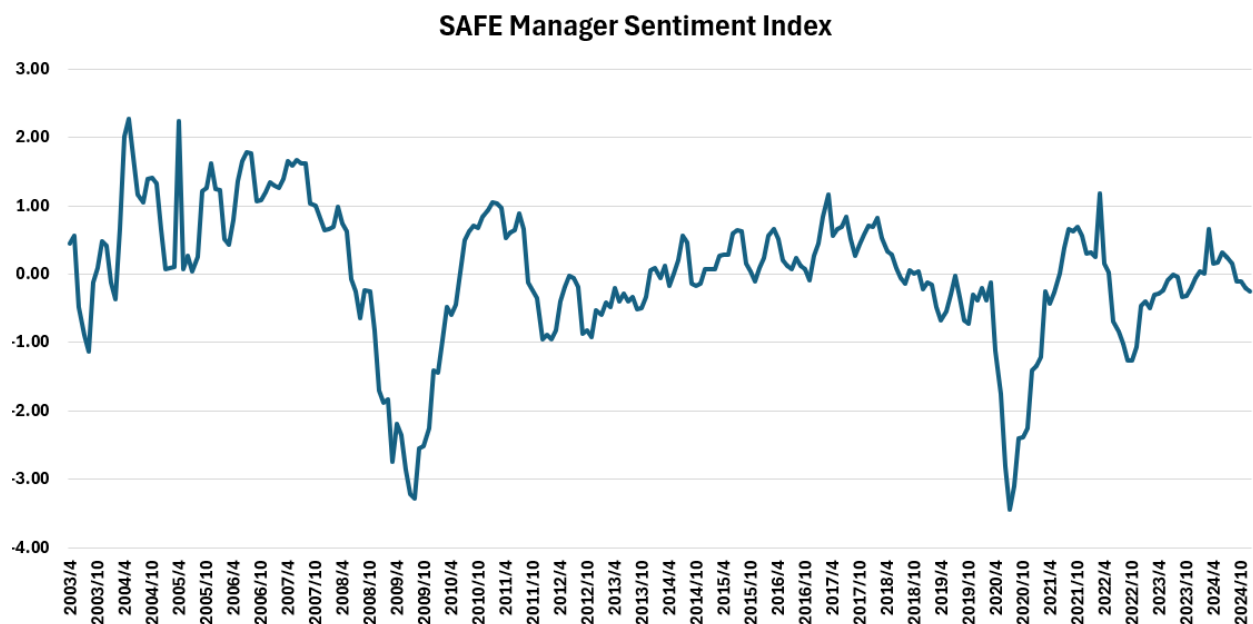
<sup>4</sup> Prior to the analysis, all the non-text items including encoded images, tables, exhibits, HTML code and special symbols are removed.

<sup>5</sup> The dictionaries are available at [https://www.uni-giessen.de/de/fbz/fb02/forschung/research-networks/bsfa/textual\\_analysis/index](https://www.uni-giessen.de/de/fbz/fb02/forschung/research-networks/bsfa/textual_analysis/index). We thank Christina Bannier, Thomas Pauls, and Andreas Walter for sharing them.

GFC. Following a drop in the index which lasted until the end-of Q1 2012, the index was characterized by a phase of mild fluctuations until the end of 2019, suggesting periodic economic uncertainties. Notably, the index experienced a sharp drop from the beginning of 2020 until mid-of 2020, there capturing the severe impact of the COVID-19 Pandemic on the managers' sentiment, reaching its lowest point in two decades and, thereby also illustrating the impact of the global economic disruption during the COVID-19 pandemic from the viewpoint of the managers' perception.

In the aftermath of this initial shock, an overall sharp improvement in the managers' perceptions can be observed until early 2022 when Russia invaded Ukraine resulting in another decline in manager sentiment. Starting in late 2022 manager sentiment has increased again. Overall, the current manager sentiment levels are comparable to the pre-pandemic period.

Taken together and from the background of recent historical events, the SAFE Manager Index appears to capture key economic shocks from the background of the managers' sentiments as well as their potential uncertainties, thereby highlighting the sensitivity of manager sentiment to major economic events.



*Note: the figure shows the development of the SAFE manager sentiment index over time. The sample period starts in April 2003 and ends in December 2024. The index is standardized to have a mean of zero and a standard deviation of one. Therefore, a positive (negative) value for the index indicates more optimistic (more pessimistic) manager sentiment than usual.*



## V. Manager sentiment and stock market performance

Jiang et al. (2019) analyze whether manager sentiment is predictive of future stock market performance. More specifically, they regress future market returns (in excess of the risk-free rate) on manager sentiment. They find a robust negative relation. For example, an increase in manager sentiment by one standard deviation today predicts an 8.58% lower market excess return over the subsequent 12 months (see Table 2 in Jiang et al. (2019)).

The authors interpret this negative relation between manager sentiment and future market performance as evidence of managers having biased beliefs about the future. In times of high sentiment, managers overinvest resulting in overcapacities and lower firm profits. These lower future cash flows then translate into lower stock returns.

We test whether this core result of Jiang et al. (2019) also holds in the German stock market. More specifically, we regress future stock market performance, measured by the DAX excess return over the return of German government bonds, on the SAFE manager sentiment index. Table 1 in the Appendix of this paper shows our empirical results in detail.

The regression results show a strong negative relation between manager sentiment and future market returns over the subsequent 3 to 36 months. An increase in sentiment by one standard deviation today predicts 3.13% and 5.68% lower stock market returns over the subsequent 6 and 12 months, respectively.

The coefficients over the 24- and 36-month horizon are very similar to the coefficient for the 12-month horizon indicating that the decrease in returns happens in the first 12 months. At the same time, the coefficients show that there is no reversal, i.e., stock market prices remain at a lower level after periods of positive sentiment.

To conclude, in line with Jiang et al. (2019), we find a strong negative relation between manager sentiment and future stock returns for Germany. This result suggests that managers of publicly listed German companies have, on average, biased beliefs about their firms' future economic conditions.

Investors should be cautious when manager sentiment is high as it may forecast lower market returns going forward. At the same time, periods of low manager sentiment may indicate attractive investment opportunities.

## VI. Conclusion

Information about managers' assessment of firms' economic and financial conditions is material to investors but, at the same time, hard to observe. Using textual analysis and corporate disclosures (financial reports and earnings conference call transcripts), we are able to quantify managers' beliefs.

Aggregating managers' sentiment across publicly listed German companies yields a monthly manager sentiment index that is highly predictive of future stock market performance. In line with Jiang et al. (2019)'s results for the U.S. market, we find evidence for managers having biased beliefs, as more optimistic sentiment today predicts lower future performance.

In contrast to existing survey-based economic indicators, which are usually based on the responses from lower-ranked managers, SAFE's manager sentiment index is based on top managers' statements. Thus, it reflects the beliefs of the people who set firms' strategies and shape their economic and financial development.

To sum up, SAFE's monthly manager sentiment index provides a comprehensive quantitative overview for the stakeholders who may have any interest in listed companies in Germany. Furthermore, it highlights the informativeness of corporate disclosures. Future research may explore the topics that are on executives' minds and their effects on corporate decisions.

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## Appendix:

Regression of future DAX excess returns over various horizons on the SAFE manager sentiment index

	3m	6m	12m	24m	36m
SAFE Manager Sentiment	-1.16* (-1.75)	-3.13*** (-3.25)	-5.68*** (-3.76)	-5.80** (-2.14)	-5.47** (-2.02)
Constant	2.33*** (2.91)	4.49*** (3.68)	8.51*** (5.00)	17.62*** (7.86)	26.58*** (9.96)
R <sup>2</sup>	0.017	0.063	0.115	0.078	0.056
T	251	248	242	230	218

*Notes: this table shows predictive time-series regressions of future cumulative DAX excess returns over the risk-free rate on manager sentiment. Excess returns are measured from month  $t+1$  to month  $t+T$ , where  $T$  is the forecasting period ranging from 1 to 36 months. SAFE manager sentiment is measured in month  $t$  (based on the financial reports and earnings call transcripts over the previous three months). Returns are expressed in percent (e.g., the coefficient of -5.68 indicates a negative return of 5.68% over the subsequent 12 months). t-statistics are shown in parentheses below coefficients. Standard errors are computed using Newey and West (1984) standard errors with 2 lags. The sample period is from April 2003 to April 2024.*