

## Chapter 9

# Optimal Portfolio Construction Using Qualitative and Quantitative Signals

**Ronen Feldman**

*Hebrew University, Israel*

**Suresh Govindaraj**

*Rutgers University, USA*

**Sangsang Liu**

*Rutgers University, USA*

**Joshua Livnat**

*New York University, USA*

### **ABSTRACT**

*Finance and accounting research has recently focused on extracting the tone or sentiment of a document (such as an earnings press release, cover story about a company, or management's presentations to analysts) by using positive or negative words/phrases in the document. This chapter shows that signals based on tone or sentiment (extracted from qualitative data) can achieve abnormal returns, and in some studies, incremental abnormal returns beyond quantitative signals. In this chapter, the authors exploit the information content of qualitative data in addition to quantitative signals in selecting optimal portfolios. Using optimization techniques developed by Brandt, Santa-Clara, and Valkanov (2009), and later extended by Hand and Green (2011), the authors show that significantly higher returns can be obtained by combining quantitative and qualitative data obtained from firms' Management Discussion and Analysis (MD&A) sections of their Form 10-Q (10-K) SEC filings than using quantitative signals.*

DOI: 10.4018/978-1-4666-4999-6.ch009

## **INTRODUCTION**

The objective of this study is to construct an optimal portfolio of stocks using timely quantitative financial signals as well as firm-specific signals capturing changes in managerial optimism and pessimism from the Management Discussion and Analysis (MD&A) sections that accompany periodic (annual and quarterly) filings with the SEC. The metric of MD&A tone change was first developed by Feldman et al. (2010), and is based on analyzing text to construct a signal derived from qualitative data. We use a statistical methodology for portfolio optimization first proposed by Brandt, Santa-Clara, & Valkanov (2009), and later modified by Hand and Green (2011) to include accounting-based signals.

Specifically, we use firm size, book-to-market ratio, momentum, earnings change, accruals, and operating cash flow (rather than the asset growth variable used by Hand & Green (2011), in addition to the aforementioned qualitative MD&A signal to construct our optimal portfolio. The two main innovations in this study are: (1) we use an additional qualitative-based measure as an input in the optimization procedure; and (2) we use Point-In-Time (PIT) monthly data unlike the coarser annual data used by earlier papers. The former innovation is, to the best of our knowledge, a first in the literature, while the later innovation mimics portfolio optimization used in practice.

Our results indicate that using more timely data (i.e. monthly rather than annual quantitative data) in the portfolio construction yields higher portfolio returns. Furthermore, consistent with Feldman et al (2010), when the MD&A tone change signal is added to the quantitative financial and accounting signals, the optimal portfolio yields significantly higher returns than using just quantitative signals to construct the optimal portfolio.

Our study contributes to the literature in two ways. It shows that portfolio optimization can be improved by using signals based on qualitative data to supplement the traditional finance or

accounting-based signals. Further, it shows that using timely data in a manner that mimics portfolio rebalancing in quantitative asset management practice can yield higher returns than rebalancing based upon stale data.

The next section reviews the literature. Section 3 describes the methodology. Section 4 reviews the sample selection criteria and presents the main results. The last section summarizes the study and its conclusions.

## **BACKGROUND**

The literature on portfolio optimization goes back to Markowitz (1952), and there have been many variations of the model since then. However, a vexing problem that has plagued the Markowitz method (the so-called mean variance approach) for optimally constructing a portfolio of stocks has been the computational complexity involving large variance-covariance matrices. This problem becomes particularly acute when one tries to incorporate firm-specific characteristics that have been shown in recent years to be associated with the expected returns, variance, and covariance of the firm's stock returns. A complete implementation of the Markowitz approach for portfolio optimization would demand that the moments of every individual stock and its covariance with other stocks be modeled as a function of all these firm-specific characteristics. Given that the dimensionality of the variance-covariance matrix increases nonlinearly in the number of stocks being considered, solving the Markowitz model would be a daunting task theoretically, and its implementation would prove to be impractical for most portfolio managers. In fact, if the Markowitz model has to be implemented with anything other than for investors with quadratic preferences, then an unmanageable number of higher moments have to be considered in optimizing the portfolio. While some simplifications and approximations

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/optimal-portfolio-construction-using-qualitative-and-quantitative-signals/99371](http://www.igi-global.com/chapter/optimal-portfolio-construction-using-qualitative-and-quantitative-signals/99371)

## Related Content

---

### A Review of the Oxford Chichewa-English/English-Chichewa Dictionary by Steven Paas

Beaton Galafa, Madalitso Mulingo and Mtende Wezi Nthara (2019). *International Journal of Translation, Interpretation, and Applied Linguistics* (pp. 1-12).

[www.irma-international.org/article/a-review-of-the-oxford-chichewa-english-english-chichewa-dictionary-by-steven-paas/222828](http://www.irma-international.org/article/a-review-of-the-oxford-chichewa-english-english-chichewa-dictionary-by-steven-paas/222828)

### The Promotion and Rationalization of President Joe Biden's Authority and Power Through the Art of Persuasion

Min Wang (2024). *International Journal of Translation, Interpretation, and Applied Linguistics* (pp. 1-18).

[www.irma-international.org/article/the-promotion-and-rationalization-of-president-joe-bidens-authority-and-power-through-the-art-of-persuasion/366208](http://www.irma-international.org/article/the-promotion-and-rationalization-of-president-joe-bidens-authority-and-power-through-the-art-of-persuasion/366208)

### Critical Language Pedagogy in Scotland: The Case of Gaelic Medium Education

John M. Knipe (2021). *Indigenous Language Acquisition, Maintenance, and Loss and Current Language Policies* (pp. 21-52).

[www.irma-international.org/chapter/critical-language-pedagogy-in-scotland/260338](http://www.irma-international.org/chapter/critical-language-pedagogy-in-scotland/260338)

### Bridging Family-Teacher Relationships in a Predominately Latinx Title I School With a Spanish-English Dual Immersion Strand Program

Amy E. Kirkley Thomas, David R. Byrd and DeeDee Mower (2022). *Research Anthology on Bilingual and Multilingual Education* (pp. 194-218).

[www.irma-international.org/chapter/bridging-family-teacher-relationships-in-a-predominately-latinx-title-i-school-with-a-spanish-english-dual-immersion-strand-program/292719](http://www.irma-international.org/chapter/bridging-family-teacher-relationships-in-a-predominately-latinx-title-i-school-with-a-spanish-english-dual-immersion-strand-program/292719)

### Producing Personal Recounts Through Collaborative Tweets

Vania Castro (2021). *Digital Pedagogies and the Transformation of Language Education* (pp. 279-296).

[www.irma-international.org/chapter/producing-personal-recounts-through-collaborative-tweets/275524](http://www.irma-international.org/chapter/producing-personal-recounts-through-collaborative-tweets/275524)