

Deep Learning Mutual Fund Disclosure: Risk Sentiment, Risk Taking, and Performance

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Why do we care?

- ▶ Mutual funds are an important financial intermediary
- ▶ Risk attitudes of financial intermediaries are central to the intermediary asset pricing literature
 - ▶ Theory (Brunnermeier-Pedersen 2009 RFS, He-Krishnamurthy 2013 AER; Brunnermeier-Sannikov, 2014 AER)
 - ▶ Evidence (Adrian-Etula-Muir, 2014 JF; He-Kelly-Manela, 2017 JFE; Haddad-Muir, 2020 JF)
- ▶ Text is a relatively new source of data
 - ▶ Better methods for textual analysis have broad applicability

What the paper does?

- ▶ Uses deep learning to measure “risk sentiment” in mutual fund managers’ discussions

Billionaire investor Ray Dalio warns the US is in a period of 'great risk' - and says the most important thing investors can do is diversify

Emily Graffeo
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What the paper does?

- ▶ Starts with a generic model for dependency parsing
(Chen-Manning, 2014)
- ▶ Identifies that 'great' modifies 'risk' in this *risk sentiment pair*
 - ▶ Because 'great' is a positive word according to the LM word lists, this would count as a positive risk pair
 - ▶ Use it to rank all manager letters each year on a [0,1] scale of NegRisk and of PosRisk
 - ▶ Q: why not one combined scale [-1,1]?
- ▶ Use risk sentiment to explain changes in risk taking and performance

Main findings

Managers with a more negative risk sentiment

1. reduce their future portfolio risk
2. generate superior risk-adjusted return and higher Sharpe ratio

Contribution

- ▶ Shows that a ground-up model of language can help measure textual context in an interesting finance application
 - ▶ Improves over dictionary-based sentiment measures based on unigrams (Loughran-McDonald, 2011) or simpler attempts to capture context (Hassan et al 2019)

Suggestion 1: Sharpen contribution

- ▶ “bag-of-words” does not preclude using higher order n-grams to capture context (e.g. Manela-Moreira, 2017 JFE; Kelly-Manela-Moreira, 2018)
- ▶ Deep learning, word embeddings have been used before (Cong-Liang-Zhang, 2018; Hanley-Hoberg, 2019 RFS; Ke-Kelly-Xiu, 2019)
- ▶ “state-of-the-art” is quite far from the LM word lists ...
- ▶ State-of-the-art NLP uses Transformers
 - ▶ Jha-Liu-Manela (2020, 2021) use BERT to measure public attitudes toward finance based on books



Suggestion 2: Portfolio returns

- ▶ Asset pricers worry about cross-correlation in errors
- ▶ Standard errors that cluster by firm do not help
 - ▶ Could be off by an order of magnitude
 - ▶ Maybe firm and time clustering
- ▶ Fama (1998) recommends calendar portfolio sorts

Suggestion 3: Face validity

Appendix C. Examples of Shareholder Reports with Risk Sentiment Statements

This appendix provides excerpts of shareholder reports in which risk sentiment statements, i.e., dependency pairs of risk and positive/negative words, appear. The fund name, filing date, and subsequent change in fund risk are reported.

Excerpts	Fund and filing information
<p>My team and I have continually worked, tirelessly, to improve the strategy while reducing risk each and every day. JFK once said, “Great accomplishments are not achieved by extraordinary men doing extraordinary things extraordinarily well, but by ordinary men doing ordinary things extraordinarily well.” I believe the team at IPS Strategic Capital is a group of very hard-working professionals that look to achieve extraordinary things.</p>	<p>IPS Strategic Capital Absolute Return Fund, May 07, 2018 $\Delta Risk = -0.63\%$</p>
<p>Although diversification doesn't eliminate the risk of loss or guarantee a profit, a careful selection of complementary asset classes may cushion your portfolio against excessive volatility.</p>	<p>AIM Funds Group, March 06, 2009, $\Delta Risk = -1.08\%$</p>
<p>As bottom-up, fundamental stock pickers, we maintain our focus on identifying businesses with idiosyncratic growth drivers that should power through a variety of economic or market scenarios and whose stocks present attractive risk/reward opportunities. We believe that if we can identify and invest in high-quality companies with more durable growth opportunities than the market expects, investors in the stocks of those companies should be rewarded.</p>	<p>Vanguard U.S. Growth Fund, October 25, 2017, $\Delta Risk = 7.88\%$</p>

My take

- ▶ Really nice contribution to our understanding of mutual fund managers who are important financial intermediaries
- ▶ Potential improvement over existing textual analysis methods

Other suggestions / minor points

- ▶ Could the result about NegRisk funds performing better be period specific? For example, if they are negative on risk just before a market crash (say 2008), then they would perform better, but maybe not in general
- ▶ Page 1: “Is mutual fund managers’ subsequent”