

# Anomalies and Multiple Hypothesis Testing: Evidence from Two Million Trading Strategies

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# Excel in Multiple Hypothesis Testing (MHT)

## Construction of strategy space:

- Harvey, Liu, and Zhu (2015)—316
- Green, Hand, and Zhang (2013)—400
- This paper—2.4 million!
  - have been studied and published
  - have been studied but not published (statistical hurdles)
  - have yet to be studied (economic foundations, missed)

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## Proper evaluations of tests:

- FWER (Bonferroni and Holm)
- FDR (BH and BHY)
- FDP (FDP-StepM)
  - Reasonable size and power (esp. adaptive)
  - 3.79 for alpha and 3.12 for FM
  - CHT gives false detection 91% for alpha and 59% for FM

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# Excel in Multiple Hypothesis Testing (MHT)

- Well executed
- Comprehensive
- Guidance for empirical factor search, model search, etc.

What else could be done (differently)?



- Theory motivation
- Alternative strategies
- Investment funds
- Minor comments

# Comment 1: Theory Motivation

Harvey: “...theory motivated factor only need 2...” (1.96)

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- *Investment*: ..., Zhang (2005)
- Pure empirical factor: size, B/M, etc.

—Theory research ex ante and ex post

—Bayesian approach?

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# Comment 2: Alternative Strategies

## Why limited to CRSP/COMPUSTAT?

For example, OptionMetrics:

- Trading volume, open interest, ...
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—Maybe too much, 1 billion strategies?

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In addition to the *statistical hurdle* and *economic significance* used by economists:

- How many funds are trading on a particular strategy?
- How much capital is invested in a particular strategy?
- *Real world* economic significance

—Self reporting fund style?

—Could it be measured? (FinTech, big data approach)



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# Comment 3: Investment Funds

2018/5/21

AVRPX Analysis & News - Stone Ridge All Asset Variance Risk Premium Fund | Seeking Alpha

**AVRPX** **\$9.58** ▲ **0.01 (0.10%)**

Stone Ridge All Asset Variance Risk Premium Fund | Mutual Fund

4:00 PM 5/18/18 Data delayed 15 minutes

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Analysis & News

Returns

Holdings

Dividends

StockTalk

Key Data

1D 5D 1M 6M 1Y 5Y 10Y



Category:	-
No Load Fund:	No
Index Fund:	No
# of Holdings:	-
% TopTenHoldings:	-
Net Assets:	-
Turnover Ratio:	-
Expense Ratio:	%

Analysis ▼



**New Stone Ridge Multi-Asset Class Fund Can Invest In Reinsurance**

Steve Evans • Mar. 25, 2015

News ▼

There are currently no headlines for this stock.

# Comment 3: Investment Funds

Online filing:

The new fund will focus on "Variance risk premium", which Stone Ridge defines as; "The tendency for "implied volatility" - the expected level of volatility priced into different types of investments - to be higher, on average, than the volatility actually experienced on the asset underlying the investment."

# Comment 3: Investment Funds

2018/5/21

Stone Ridge Asset Management Funds



Visit Stone Ridge Asset Management LLC Website

REINSURANCE RISK PREMIUM

VARIANCE RISK PREMIUM

ALTERNATIVE LENDING RISK PREMIUM

## Stone Ridge U.S. Large Cap Variance Risk Premium Fund

Share Class	Ticker	CUSIP	XBRL
Class I	VRLIX	861728 707	
Class M	VRLMX	861728 806	

## Stone Ridge U.S. Small Cap Variance Risk Premium Fund

Share Class	Ticker	CUSIP	XBRL
Class I	VRSIX	861728 889	
Class M	VRSMX	861728 871	

## Stone Ridge U.S. Variance Risk Premium Master Fund

Share Class	Ticker	CUSIP	XBRL
Class I	VRPIX	861728 863	
Class M	VRPMX	861728 855	

## Stone Ridge International Developed Markets Variance Risk Premium Fund

Share Class	Ticker	CUSIP	XBRL
Class I	VRFIX	861728 848	
Class M	VRFMX	861728 798	

## Stone Ridge Global Equity Variance Risk Premium Master Fund

Share Class	Ticker	CUSIP	XBRL
Class I	VRGIX	861728 756	
Class M	VRGMX	861728 749	

## Stone Ridge All Asset Variance Risk Premium Fund

Share Class	Ticker	CUSIP	XBRL
Class I	AVRPX	861721 109	

*Stone Ridge Funds are generally sold only to (i) institutional investors, including registered investment advisors (RIA's) that meet certain qualifications and have completed an educational program provided by Stone Ridge Asset Management LLC, (ii) clients of such institutional investors, and (iii) certain other eligible investors. Investors and RIAs allocating to client accounts should carefully consider a Fund's risks and investment objectives, as an investment in a Fund may not be appropriate for all investors and is not designed to be a complete investment program. Investing in the Funds involves a high degree of risk. It is possible that investing in the Funds may result in a loss of some or all of the amount invested. Before making an investment/allocation decision, investors and RIAs allocating to client accounts should (i) consider the suitability of this investment with respect to each investor's or client's investment*

## Literature

Prospectus  
U.S. Large Cap Variance Risk Premium Fund  
U.S. Small Cap Variance Risk Premium Fund  
U.S. Variance Risk Premium Master Fund  
Int'l Developed Markets Variance Risk Premium Fund  
Global Equity Variance Risk Premium Master Fund  
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U.S. Large Cap Variance Risk Premium Fund  
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All Asset Variance Risk Premium Fund  
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- Level, growth, ratio of two, *ratio of three*
- Model mining exercise by Kogan and Tian (2015)
- Market efficiency?

# Summary

- Interesting, fun paper to read
- At the apex of multiple hypothesis testing
- Think outside the box—Bayesian
- Bigger data approach—web-based
- Real world investor approach—all signals