Discussion of *Nonparametric Assessment of Hedge Fund Performance*

Paper by Caio Almeida, Kym Ardison and René Garcia

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Context

- Consider a set of tradable risk factors F_t (basis assets)
- An efficient portfolio (mean-variance sense) is $\beta' F_t$ and gives the highest Sharpe ratio.
- Can a HF generate returns in excess of that efficient portfolio?

From the investor's point of view

We are looking for positive and significant α

Context

Several problems arise in this standard framework however:

- SDF is implicitly linear: $m_{t+1} = a + b' F_t$
- If markets are incomplete, there is a multiplicity of SDFs.

Questions

- How to pick a SDF? (Almeida & Garcia 2016)
- How to design a performance measure?

This paper

- HFs are very likely to deviate from linearity and represent a nice paradigm
  - Investing in nonlinear strategies (derivative)
  - Investors are not mean-variance

Idea

Use the technology from Almeida & Garcia (2016) to design a performance measure in a HF context where it is particularly needed.

In this paper we have

- A summary and interpretation of Cressie-Read minimum discrepancy SDF.
- The development and asymptotic inference on the implied α.
- Application on HF returns and comments on their performance.

Cressie-Read MD SDF

$$m_{1:T}(\gamma, F_t) = \operatorname{argmin} \frac{1}{T} \sum_{t=1}^{T} \frac{m_t^{\gamma+1} - 1}{\gamma(\gamma+1)}$$

such that:

$$\frac{1}{T} \sum_{t=1}^{T} m_t(F_t - 1) = 0 \quad \text{and} \quad \frac{1}{T} \sum_{t=1}^{T} m_t = 1,\ m_t > 0$$

- it prices base assets perfectly (constraint)
- it is positive
- it gives a closed-form SDF!

$$m_t(\gamma, F_t) = \left(a_\gamma + \gamma \lambda' F_t\right)^{1/\gamma}$$

Performance measure

- Think about the **risk-neutral** return equivalent of a HF return R_t.

$$R_t^{\mathbb{Q}} = m_t(\gamma, F_t) R_t = \left(a_\gamma + \gamma \lambda' F_t\right)^{1/\gamma} R_t$$

- If $R_t^{\mathbb{Q}}$ has a positive expectation, it means that
  - The SDF cannot price this asset with the basis assets
  - The HF performs well **in bad times**.

Performance measure

$$\alpha(\gamma, F_t) = \mathbb{E}\left(\left(a_\gamma + \gamma \lambda' F_t\right)^{1/\gamma} R_t\right)$$

- α depends on the γ parameter (weights on the co-moments)
- α depends on the basis assets

Rest of the paper

- Asymptotics
  - Once you have α, asymptotics are standard-ish GMM-type with delta-method (M-estimator)
  - Subtleties on positivity constraints for the SDF and values of γ.

- Application to HF data
  - Emphasis on filters because HF data is dirty (alive and grave funds!)
  - Several basis assets are tested (from CAPM to option factors)
  - Comparison for different values of γ
  - Individual performance measures and by management styles
  - Interesting result: all investor types want portfolios selling insurance (think about variance swaps for instance).

General impression

- I like the idea of this paper a lot!
- It has some issues that can be easily overcome to improve both its quality and accessibility.

Three main comments:

#1 $\rightarrow$ Form and structure of the paper.

#2 $\rightarrow$ Practical application of the performance measure.

#3 $\rightarrow$ Hedge funds realized defaults.

Comment #1: Form and structure of the paper

Main issue for financial econometrics

You have two sorts of audience: *econometricians* and *finance people*

- The paper explores an important financial issue while developing an adequate and clean econometric framework
- However, you repeatedly switch from one type of audience to the other.
  - An econometrician will be interested in proofs for asymptotics.
  - A typical finance guy wants to know how to use the method and to gain intuition on **why it matters**.
- I think the paper has a great potential in the finance literature but needs to be reorganized for such an audience. I'm treating it as such.
- *Possible additions:* financial performance of portfolios (Ghosh et al. 2018), number of funds with positive alphas, projections of the pricing kernel (Rosenberg & Engle 2002, Kitsul & Wright 2012).

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Comment #2: Practical application

- I didn't find anything about the ranking: is it consistent across γ's? Should it be?
- $R_t^{(m)} \sim \mathcal{N}(0, \sigma^2)$. Fund 1: $\left(R_t^{(m)}\right)^3$. Fund 2: $\left(R_t^{(m)}\right)^5$
- Performance measures:
  - $\gamma = 1 \Longrightarrow \alpha_1 = 3\lambda_1\sigma^4$ and $\alpha_2 = 15\lambda_1\sigma_6$
  - $\gamma = 0 \Longrightarrow \alpha_1 = e^{a_0+\sigma^2\lambda_0^2/2}\sigma^4\lambda_0(\sigma^2\lambda_0 + 3)$ and $\alpha_2 = e^{a_0+\sigma^2\lambda_0^2/2}\sigma^6\lambda_0(\sigma^4\lambda_0^4 + 10\sigma^2 + 15)$
- The ratio gives: $\frac{\alpha_1(1)}{\alpha_2(1)} = 5\sigma^2$ and $\frac{\alpha_1(0)}{\alpha_2(0)} = \sigma^2\frac{\sigma^4\lambda_0+10\sigma^2+15}{\lambda_0\sigma^2+3}$
- **Consistent?**
- What about **conditional moments?** (link with EL, Kitamura *et al.* 2004, or TV parameters Gagliardini *et al.* 2016)

Comment #2: Practical application

- This raises the question of **how to use in practice?**
- As an investor, you know your own SDF (utility) and you can rank funds with your own value of γ

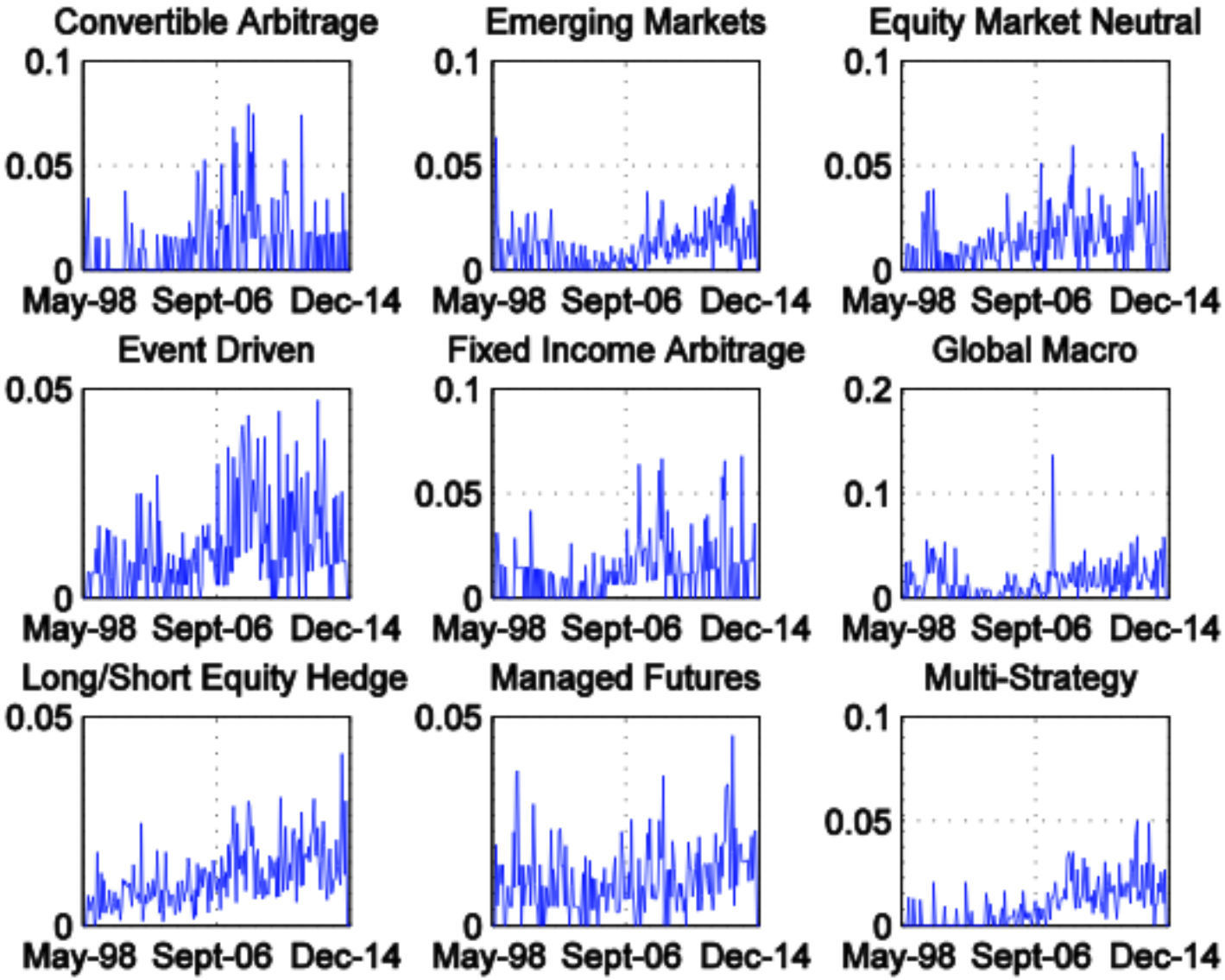
Aggregation

Is there a way to come back to an "aggregated" view of the investors?

- What does the majority investors actually care about in terms of moments?
- If $\gamma \sim f(\gamma)$, then is $\int \alpha(\gamma, F_t) f(\gamma) d\gamma$ the **skill** of the HF?
- Can we combine Cressie-Read MD SDFs in something like:

$$m_t(F_t) = \operatorname{argmin} \frac{1}{T} \sum_{t=1}^{T} \int \frac{m_t^{\gamma+1} - 1}{\gamma(\gamma+1)} f(\gamma) d\gamma$$

Comment #3: Realized defaults (Darolles *et al* 2014)



Comment #3: Hedge funds realized defaults.

- Funds are exposed to default risk but they also **experience default**.
- Former captured by the credit spread variable (*ex-ante*)
- How about the latter?

This is a particularly important issue:

- Think about a fund selling variance protection
- The fund generates high positive returns in excess of the market
- If spike in variance, the fund will likely go bankrupt.

Problem

The method will most likely attribute a positive α if this is not properly taken into account.

- Also, other fund liquidity characteristics? (redemption freq, lockup...)