



**Paper: “A Comparative Study of Bayesian Portfolio Optimization: Evidence from U.S. Large-Cap AI-Related Stocks”**

**Submitted: 19 January 2026**

**Accepted: 03 March 2026**

**Published: 31 March 2026**

Corresponding Author: Mironov Mikhailm

Doi: 10.19044/esj.2026.v22n7p31

Peer review:

Reviewer 1: James X. Varney  
School of Economics, Shanghai University, China

Reviewer 2: Behruz Akhmedov  
IMC University of Applied Sciences Krems, Krems an der Donau, Austria

Reviewer 3: Robert Szucs  
University of Debrecen, Hungary

-----  
Reviewer A:

Recommendation: Revisions Required

-----

**The TITLE is clear and it is adequate to the content of the article.**

Yes.

**The ABSTRACT clearly presents objectives, methods, results, and conclusions.**

Consider reporting 1–2 headline quantitative results (e.g., top Sharpe values) to align the abstract with the results section.

**There are a few grammatical errors and spelling mistakes in this article.**

Yes.

A thorough language edit is recommended (copyediting pass).

Pay special attention to consistency in tense, singular/plural agreement, and article use.

Standardize terminology (e.g., “bets” vs “betas” in Figure 3.3 description).

**The study METHODS are explained clearly.**

Some additional information and clarification would be great:

1. Fully specify the Bayesian models (B1–B5): likelihood, priors, how posterior sampling/optimization is performed, and how “sigma” is used operationally. Right now, Table 3.2 gives partial hyperparameter descriptions but not a complete statistical model.
2. Clarify the optimization objective for each Bayesian generation: what exactly is being maximized/minimized and how the “penalty multiplied by 1000/10000/100000” enters the objective.
3. Justify or sensitivity-check the assumption of risk-free rate = 0 or specify the timeframe context and why 0 is acceptable.
4. Provide implementation details: software/packages used, convergence diagnostics (if MCMC), grid granularity (for Bayesian 5), and whether weights are constrained to sum to 1 with no shorting (implied, but should be explicit).

**The results are clear and do not contain errors.**

Good but presentation could be improved.

**The CONCLUSION or summary is accurate and supported by the content.**

Temper or qualify broad claims such as “Bayesian portfolio optimization model is a great choice...” by linking explicitly to the tested setting (10-stock AI universe, specific dates, fixed-weight out-of-sample).

Add a short limitations paragraph.

**The list of REFERENCES is comprehensive and appropriate.**

There appears to be at least one in-text citation that is not included in the reference list: “World Economic Forum (2018)”.

**Please rate the TITLE of this paper.**

[Poor] 1-5 [Excellent]

5

**Please rate the ABSTRACT of this paper.**

[Poor] 1-5 [Excellent]

4

*Please rate the LANGUAGE of this paper.*

[Poor] 1-5 [Excellent]

3

*Please rate the METHODS of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the RESULTS of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the CONCLUSION of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the REFERENCES of this paper.*

[Poor] 1-5 [Excellent]

3

**Overall Recommendation!!!**

Accepted, minor revision needed

**Comments and Suggestions to the Author(s):**

-----

-----  
Reviewer B:

Recommendation: Revisions Required

-----  
**The TITLE is clear and it is adequate to the content of the article.**

The title is clear, concise, and accurately reflects the content, methodology, and scope of the study. It appropriately highlights the comparative approach, Bayesian framework, and empirical focus on AI-related stocks.

**The ABSTRACT clearly presents objectives, methods, results, and conclusions.**

The abstract clearly presents the objectives, methodology, key findings, and conclusions of the study. It provides a coherent overview of the comparative portfolio optimization approaches and summarizes the main empirical outcomes effectively.

**There are a few grammatical errors and spelling mistakes in this article.**

The manuscript is generally well written. However, there are a few grammatical errors, minor spelling mistakes, and awkward sentence constructions. These issues do not affect comprehension but should be corrected through careful proofreading.

**The study METHODS are explained clearly.**

The study methods are clearly and rigorously explained. The theoretical framework, model specifications, and estimation techniques are appropriate and sufficiently detailed, allowing replication and proper understanding.

**The results are clear and do not contain errors.**

The results are clearly presented and logically organized. Tables and figures are relevant, and interpretations are consistent with the empirical findings. No significant errors are observed in the results.

**The CONCLUSION or summary is accurate and supported by the content.**

The conclusion accurately summarizes the findings and is well supported by the results presented in the paper. It directly addresses the research objectives and does not overstate the implications.

**The list of REFERENCES is comprehensive and appropriate.**

The reference list is comprehensive and appropriate. It includes relevant foundational and recent literature related to portfolio optimization, Bayesian methods, and financial econometrics. Minor formatting consistency checks are recommended.

***Please rate the TITLE of this paper.***

[Poor] 1-5 [Excellent]

5

***Please rate the ABSTRACT of this paper.***

[Poor] 1-5 [Excellent]

5

***Please rate the LANGUAGE of this paper.***

[Poor] 1-5 [Excellent]

4

***Please rate the METHODS of this paper.***

[Poor] 1-5 [Excellent]

5

***Please rate the RESULTS of this paper.***

[Poor] 1-5 [Excellent]

5

***Please rate the CONCLUSION of this paper.***

[Poor] 1-5 [Excellent]

5

***Please rate the REFERENCES of this paper.***

[Poor] 1-5 [Excellent]

5

## Overall Recommendation!!!

Accepted, minor revision needed

### Comments and Suggestions to the Author(s):

1. Perform a thorough language and grammar review to improve clarity and readability.
2. Reduce minor repetition in methodological explanations.
3. Explicitly discuss the study's limitations, particularly regarding sample selection and market scope.
4. Enhance figure and table captions to improve standalone interpretability.
5. Consider expanding the discussion on practical implications for investors and portfolio managers.

-----  
Reviewer C:

Recommendation: Resubmit for Review

### **The TITLE is clear and it is adequate to the content of the article.**

The title clearly communicates the main focus of the paper, Bayesian portfolio optimization applied to AI-related stocks. It reflects both the methodological and empirical dimensions of the study. However, since the paper also includes conditional CAPM and DCC-GARCH analysis, the title does not fully capture the broader analytical scope of the research.

### **The ABSTRACT clearly presents objectives, methods, results, and conclusions.**

The abstract outlines the objective of the study, describes the comparative approach, and mentions the key methodologies used. It also briefly summarizes the main findings, particularly regarding Sharpe ratios and concentration risk. While it gives a solid overview, it could be slightly more precise about the training versus out-of-sample framework and the specific structure of the Bayesian models.

### **There are a few grammatical errors and spelling mistakes in this article.**

The manuscript contains a noticeable number of grammatical errors, awkward phrasing, and stylistic inconsistencies. Some sentences are unclear or imprecise, and there is repetition in the acknowledgements section. While the overall meaning remains understandable, the language would need careful editing before publication in a peer-reviewed journal.

### **The study METHODS are explained clearly.**

The paper presents the theoretical background and provides the main equations for the models used. The research design, including the training and out-of-sample periods, is described clearly enough to follow the logic of the analysis. That said, some methodological aspects would benefit from further clarification. For example, the specification of priors, the exact estimation procedure, and the rationale behind certain parameter choices are not fully explained. This somewhat limits reproducibility.

### **The results are clear and do not contain errors.**

The results are presented in a structured and readable way, with detailed tables covering both in-sample and out-of-sample performance. The interpretation is consistent with the reported

statistics. No obvious numerical inconsistencies are visible. However, the absence of statistical significance tests slightly weakens the strength of the empirical claims.

**The CONCLUSION or summary is accurate and supported by the content.**

The conclusions are generally aligned with the empirical findings. The discussion of Markowitz concentration risk and the performance of later Bayesian generations is consistent with the reported results. The claims are mostly balanced, although a slightly more cautious tone regarding the superiority of certain models would strengthen the argument.

**The list of REFERENCES is comprehensive and appropriate.**

The reference list includes key foundational works and several relevant recent studies. The selection is appropriate for the topic. However, some sources are working papers or arXiv preprints, and formatting is not fully consistent. Including more recent peer-reviewed empirical studies would strengthen the literature base.

*Please rate the TITLE of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the ABSTRACT of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the LANGUAGE of this paper.*

[Poor] 1-5 [Excellent]

2

*Please rate the METHODS of this paper.*

[Poor] 1-5 [Excellent]

3

*Please rate the RESULTS of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the CONCLUSION of this paper.*

[Poor] 1-5 [Excellent]

4

*Please rate the REFERENCES of this paper.*

[Poor] 1-5 [Excellent]

3

**Overall Recommendation!!!**

Return for major revision and resubmission

**Comments and Suggestions to the Author(s):**

Overall, the article presents a structured and technically grounded analysis. The main improvements needed relate to language quality, methodological transparency, and deeper

statistical validation.

The paper has a solid structure and a relevant topic. The empirical analysis is coherent and the results are interpretable. However, there are several substantial issues:

- Language quality requires thorough editing.
- Methodological transparency is not sufficient in parts, especially regarding Bayesian specification and estimation details.
- No statistical significance testing is provided.
- Some claims about innovation and machine learning are overstated.
- Reference quality and formatting need improvement.

These are not minor cosmetic corrections. They require meaningful revision of both the methodological and presentation aspects. At the same time, the study is not fundamentally flawed, so rejection would be too strong.

-----