AlphaManager: A Data-Driven-Robust-Control Approach to Corporate Finance

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1. **What are the research questions?**

   • Can we develop a data-driven-robust-control approach to corporate finance?

2. **Why are the research questions interesting?**

   • There is a lack of systematic understanding of corporate decision-making in Corporate finance.
     – Many theory models are either static or have firms rarely interacting with environment or other firms.
   • Managerial actions and firm outcomes are recorded with great granularity and timeliness in the era of big data and AI
   • Integrating DL, RL, and robust control based on ambiguity to cast the theory and practice of corporate finance as a DDRC problem can help slove challenges in data-driven approach.

3. **What is the paper's contribution?**

   • Contributes to the emerging literature on AI in finance.
     – Prior: Applications beyond creating or improving the measure of some explanatory variables are rather limited
     – Ext: Apply model-based offline RL in economics to offer a data-driven alternative to reduced-form models and structural estimations
   • Literature on model uncertainty（"ambiguity"）and robust control
     – Prior: Studies about robust control are mostly theoretical, except for Barnett et al. (2020)
     – Ext: First empirical/methodological application of the ambiguity concept in corporate finance
   • Literature on offline RL
     – Ext: First study utilizing transfer learning in finance

4. **What hypotheses are tested in the paper? list them explicitly**

   • H1:The DDRC approach can help a systematic understanding of corporate decision-making.

   (a) **Do these hypotheses follow from and answer the research questions?**
       Yes
   (b) **Do these hypotheses follow from theory or are they otherwise adequately developed?**
       • DDRC approach allows us to search in a larger modeling space for:
         – best depiction of economic system, map and explain corporate outcomes make high-dimensional
         – effective recommendations for enterprise decisions.

5. **Sample: comment on the appropriateness of the sample selection procedures**

   • More firm-level variables.

6. **Dependent and independent variables: the appropriateness of variable definition and measurement**

   • Why ΔX?

7. **Regression/prediction model specification: the appropriateness of the regression/prediction model specification**

   - Need to prove the first module is convincing

8. **What difficulties arise in drawing inferences from the empirical work**

   - How to prove the model's suggested decisions is better?

9. **Describe at least one publishable and feasible extension of this research**

   - Government decision-making