Response to RFP for Investment Performance Evaluation

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Cover Letter

June 30th, 2023

Ms. Bethany Rhodes
Director and General Counsel
Ohio Retirement Study Council
30 E. Broad Street, 2nd Floor
Columbus, OH 43215

Economic Data Sciences

Dear Ms. Rhodes,

Economic Data Sciences, LLC (EDS) is pleased to submit our response to the Ohio Retirement Study Council (ORSC) Request for Proposal for Investment Performance Evaluation. We are proud to offer a truly unique technology-first solution to investment consulting. As a new firm, we readily acknowledge that we do not yet meet the minimum requirements for this mandate. Despite this fact, EDS is submitting this response to take the opportunity to introduce ourselves to the ORSC and make the case that we could provide a valuable secondary service.

Isn't It Time for A Technology-First Approach?

A major emphasis in the request for proposal sent by the Ohio Retirement Study Council is on making impartial reviews of recommendations and evaluations. It is our view that any attempt to be impartial must begin by being a data-driven process. In the context of investment performance within funds as complex as those covered by the ORSC, this challenge is made even more difficult as remaining truly impartial requires an approach that can simultaneously evaluate all of these complexities and how they are interconnected.

The EDS solution provides the only holistic approach to evaluating the multi-faceted complexities investors face in the real world, this allows for more 'apples-to-apples' comparisons of these issues. Our technology-first approach provides app-based tools that increase the frequency and transparency of analyses.

The EDS approach also has the benefit of a truly impartial record of investment decision making which comes from maintaining a record of risk trade-offs accepted, and investment environment and information available at that time. This provides a truly impartial, data-driven record of fiduciary duty and performance.

Lastly, the requirements on frequency within the scope of work are at most every 6 months and in many cases much longer. We submit that any snapshot at this frequency will be more difficult to evaluate, especially impartially, as much of the context of recent events is lost. It is our strong belief that the mission of the ORSC would be better served by having access to more frequent reports and alerts to provide a broader and deeper perspective. This can only be achieved in an economical way with a technology-driven approach.

Isn't it time for a technology-first approach?

EDS At A Glance

The EDS mission is to inform investment decision making and increase trust and transparency.

Leveraging both traditional investment philosophies and machine intelligence methods, the EDS Decision Engine evaluates trade-offs and provides simple insights to guide decisions. By recording preferences and decisions, the engine increases efficiency with time, while minimising miscommunication and potential conflicts.

With easy integration with legacy processes and systems and flexible delivery, our solutions are built for scale to allow clients to expand their reach and lower their costs.

Why Consider EDS?

As stated, EDS does not meet the minimum requirements for this mandate. In filling out this response, we do not expect to be considered as ORSC ultimate choice for investment performance evaluation. Our hopes are considerably more conservative.

Most of all, we seek to introduce ourselves to the ORSC. As of today, EDS as a company is the culmination of years of research, concept-proofing with real-world institutional funds and staff, product building/development, and getting-to-market. This is a long process that we are committed to, and we hope that this response is the first of many future correspondences with the ORSC as we truly believe our solution and approach can be a valuable addition for the board and the fund.

We also ask the board to consider EDS as a secondary provider, working alongside and in support of ORSC staff and the firm ORSC ultimately chooses. We make this request, with humility, simply to ask for the opportunity to demonstrate the value of our solution and approach.

Proposed Timetable and Fee

Our main goal is to introduce ourselves to the ORSC and we are hungry for the opportunity to serve you. As stated, we don't meet the minimum requirements for this mandate and therefore do not ask to be chosen as your main provider.

With that major caveat stated, what we do propose is an initial 6-month engagement during which, Economic Data Sciences will provide app-based reports, exportable to PDF format, covering all non-actuarial evaluations. These reports will be updated on a monthly basis or in cases where data is required from the individual pension funds, the reports will be updated as that data is provided.

For actuarial reports, the actuarial assumptions will remain constant for the mandated times and EDS will provide modelling based on those assumptions using updated market and investment performance data.

For this initial period, the total all-in fee will be $1. The engagement with EDS can be terminated at any time and the purpose of this initial engagement is simply to provide an opportunity to evaluate the value EDS apps and solutions can offer.

If at that time, the ORSC find services from EDS worth continuing we would like to offer the heavily discounted rate of $50,000 annually. Our other operations will subsidize this work and this competitive bid reflects our keen desire to serve the ORSC.

Sincerely,

Edmund Walsh
Founder, Data Scientist
Economic Data Sciences
ewalsh@economicdatasciences.com
1-617-514-0873

Proposal Summary

Economic Data Sciences, LLC (EDS) is filling out this response, fully acknowledging, that we do not meet the stated requirements. We take these requirements seriously and simply wish to document the current status of EDS.

The thrust of our proposal is simply that it is our view a technology-first approach offers the substantial benefit of being truly and undeniably impartial and data-driven. Our technology solutions allow for a higher frequency of reporting and more data and information to be evaluated in a timelier manner. In short, this allows for more informed decision-making.

As a new firm, we propose a 6-month period in which the ORSC can evaluate these claims for themselves and the value of a technology-first approach.

Our proposal is to create an automated reporting framework that will first replicate all of the standard analyses that the ORSC have become accustomed to. In total this represents 10 distinct apps following the 10 use-cases stated below. For each of these, a view will be available for each individual fund of the five Ohio state retirement systems (PERS, STRS, OP&F, SERS, and HPRS) as well as a total view which summarises the report and compares the five retirement systems. In total, this represents 60 distinct views.

The apps will present the report in a web-based view, as well as a downloadable PDF and excel format where applicable. The focus of the 10 applications or views will be:
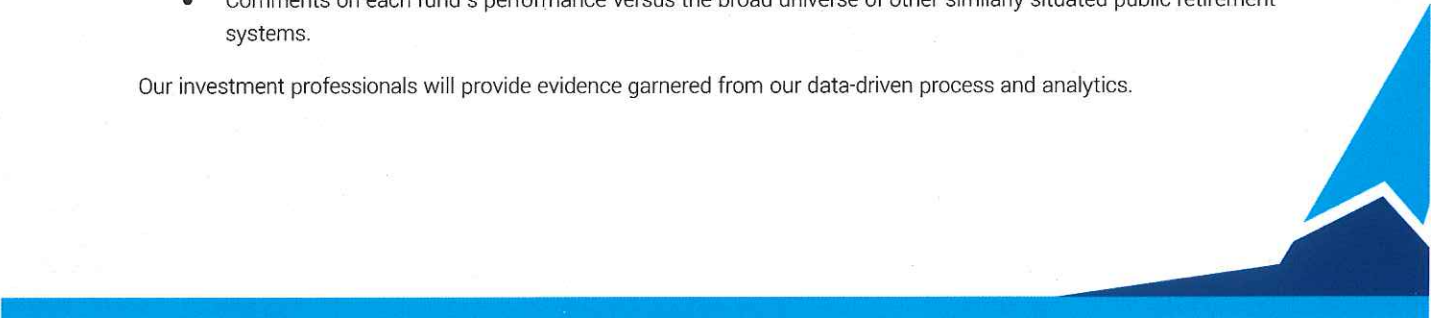
1. An overview analysis of the broad market environment of the preceding 6-month period and its general effect on investment performance.
2. A review of the median performance of similarly situated public funds during the preceding 6-month, one-year, three-year, five-year, and ten-year periods compared to each fund's performance in the same period.
3. A review of the asset allocation of the systems' funds compared to other similarly situated funds.
4. A comparison of the total performance of each of the system's funds against each fund's own policy benchmark; additionally, compare that total performance against their peer groups.
5. A comparison of each broad asset class in each of the system's funds against the fund's own policy benchmark; additionally, compare that performance against their peer groups.
6. A review of the risk-return performance of each system's total funds and of each asset class.
7. A comparison of each fund's actual asset allocation to the allocations approved by the respective Board to determine adherence to those Board guidelines.
8. A comparison of each fund's total fund performance with its assumed rate of return for the 6-month, 1-year, 3-year, 5-year, and 10-year period
9. A brief commentary on areas needing further review or that are of note either positive or negative) that would assist the ORSC in its duties.
10. A review of each fund's total return net of fees. Additionally, note the percentage of assets managed by external managers for each fund and the total fees associated with its management.

Overlaid and intertwined within each of these applications and views will be the EDS Decision Engine which highlights in a data-driven and impartial way the trade-offs, preferences, and objectives each fund is accepting as well as provide insight and a clear fiduciary record of decision making.

Complementing our technology-driven insights from above, our investment professionals will provide commentary on:

- An overall opinion as to the validity, completeness, and appropriateness of the investment performance data provided by the retirement systems.
- Comments on the appropriateness of performance benchmarks used by the systems.
- Comments on each fund's performance versus the broad universe of other similarly situated public retirement systems.

Our investment professionals will provide evidence garnered from our data-driven process and analytics.
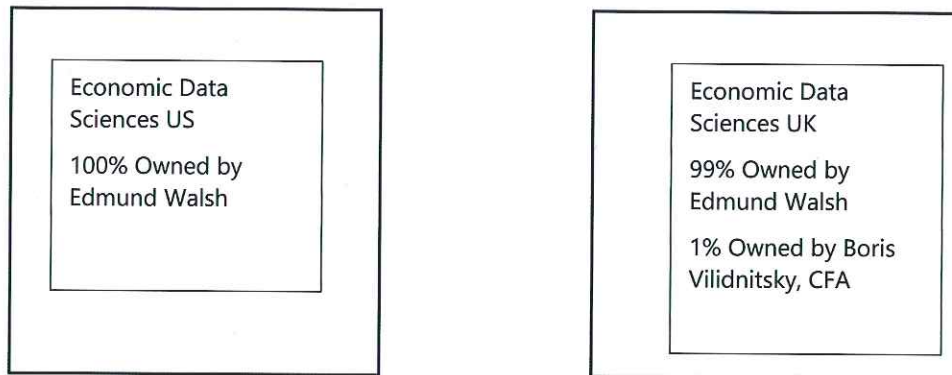
- **The firm's primary contact for ORSC staff use including the contact's address, telephone and e-mail address.**

	Primary Contact
Address	21 E. State Street, Suite 200, Columbus, Ohio 43215
Telephone	1-(617)-514-0873
Email	ewalsh@economicdatasciences.com

- **General ownership structure of the organization, including subsidiary and affiliated companies, and joint venture relationships.**

Economic Data Sciences has two independent entities and no other affiliations, subsidiaries, or joint ventures.

Economic Data Sciences US

100% Owned by Edmund Walsh

Economic Data Sciences UK

99% Owned by Edmund Walsh

1% Owned by Boris Vilidnitsky, CFA

- **Information regarding any material change in the firm's structure or ownership within the last eighteen months, or any material change in ownership, staff, or structure currently under review or being contemplated by the firm.**

    - Boris Vilidnitksy is no longer active with the firm.
    - Ivan Nikolov, join the firm as a director and is expected to gain 30% ownership in future, based on performance metrics.
    - We expect to seek outside investment from venture capital funds help us build and support client operations in the future.

- **If available, a third-party assessment or report concerning client satisfaction and measures of the firm's strengths and weaknesses;**

While no third-party assessment of the type we believe this question is references exist, we do have a significant list of third-party support based on their assessments of our core product's value and potential.

AWS Startup Loft	The AWS Startup Loft is an online space where start-up founders and developers receive free AWS technical & business guidance from AWS experts
AWS Activate	The AWS Activate program that provides start-ups with tools and resources to help start-ups quickly get started on AWS and grow their business
NVIDIA Inception	NVIDIA Inception is a program designed to nurture start-ups revolutionising industries with technology advancements
SAP PartnerEdge	PartnerEdge fosters a dynamic, vibrant ecosystem helping create new markets, accelerate

	innovation, fuel revenue growth, and deliver customer success
FCA Innovation Sandbox Graduate	Choosing EDS as one of the 18 firms selected that year, the sandbox is designed to allow innovative solutions to be tested in the marketplace with real consumers. Economic Data Sciences graduated from the sandbox and is now fully authorized and regulated by the Financial Conduct Authority.

Our weakness is certainly the fact that we are new firm, while we hope the record of our investment professionals addresses this concern, we lack a long record of services we have provided and to-date, our work has been on test cases. We now seek to put the proofs-of-concepts we have rigorously tested into practice.

- Any material litigation which has been threatened against the firm or to which the firm is currently a party; internally.

None.

- A list and brief description of litigation brought against the firm by existing or former clients over the last five years.

None.

- A list of any professional relationships involving the ORSC, the five Ohio public retirement systems, the State of Ohio, or its political subdivisions or the past five years, together with a statement explaining why such relationships do not constitute a conflict of interest relative to performing the proposed review, and, if necessary, an explanation of the actions that will be taken to ensure an independent review. Note that any media or social media comments opining on the state's retirement systems as an organization, whether positive or negative, may be viewed as pre-judgement of the system and result in disqualification. The firm must also disclose any staff relationships with other entities that evaluate pension systems and include a statement explaining why such relationships do not prevent an independent analysis or, if necessary, an explanation of the actions that will be taken to ensure an independent review.

None.

Capabilities and Experience

Economic Data Sciences fully acknowledges that as a firm we *do not* meet the minimum requirements for this mandate. As we have stated, our main goal is to simply introduce ourselves to the ORSC. We also want to be very clear that to-date all of our work within financial services utilizing our EDS Decision Engine have been test cases. As such, we are not able to provide much of the materials asked for in this section and we do not wish to imply that our test data is anything other than that. With that stated, we would be happy to share our test results upon request.

In all of our testing, our product has performed well and met the test metrics set out as the goal of the project. This success has led to the backing we have received from our technology partners (e.g., AWS, Nvidia, etc.) which is referenced above.

Collectively, the ORSC project team will have over 67 years of financial services experience. In particular, the key investment professional Edmund Walsh has worked with similar retirement plans to that of the Ohio Systems in his previous roles. These include CalSTRS, The State of Maryland, San Jose Police & Fire, among many others.

- **Have provided an investment performance evaluation comparable to that requested under this RFP in the past three years clients.**

Economic Data Sciences, LLC *does not* meet this requirement.

- **As of January 1, 2023, and for at least the five most recent continuous years, the firm must have a verifiable operating history with at least three institutional fund clients with similar size, complexity and asset mix to Ohio's systems clients.**

Economic Data Sciences, LLC *does not* meet this requirement.

- **As of January 1, 2023, the primary contact dedicated to the ORSC contract must have at least ten years of experience in providing investing consulting services to institutional fund clients 1940.**

Economic Data Sciences, LLC *does not* meet this requirement.

The key investment consulting professional Edmund Walsh does meet these criteria, under some important conditions.

Edmund Walsh previously worked for another investment consulting firm for 8 years and 4 months where he was an integral part of the investment consulting team to several public pension funds similar in size, scale, and complexity to the Ohio Pension System Plans.

Over the past 5+ years, Edmund has continued investment consulting services when building of test cases and product development for Economic Data Sciences, LLC. This includes working directly with public pension fund data and institutional investors. However, it is important to note that thus far, these have been proof-of-concept test cases and not paid engagements. With that important caveat stated, each engagement was successful in meeting the stated goal of the test/concept case.

- **The firm must be registered as an investment adviser under the Investment Advisers Act of 1940. The firm will promptly advise the ORSC if it, at any time, is not so registered.**

Economic Data Sciences, LLC registered in Ohio on June 14th, 2023, has applied and gone through the entitlement process with FINRA, and is in the process of filing form ADV and other relevant materials to be registered with the SEC. As of today, that is a work-in-progress, but we expect that by September this process will be completed and to be maintained.

Staff Qualifications

As we have stated in this response, we do not claim nor are we trying to give any impression that our staff members have the experience in investment performance evaluation.

What we do hope to convey is that our staff do have extensive experience across financial services and that each of us have gotten involved with EDS because we believe that the technology-first approach adopted by the firm and its' solutions will better aid the ORSC in their mission.

Lastly, although staff members do have experience working with pension plans of the size and complexity of the Ohio Pension system funds, we intentionally do not reference that here as we do not want to portray those past experiences as part of what we are offering through EDS.

Edmund Walsh
Founder, Data Scientist
Industry Experience: 15 Years
EDS Tenure: 5 Years

Brief Description

Edmund has 17 years of experience in research, 14+ with a focus within financial services on investor behaviour and asset allocation. Edmund has experience working with large and small pension funds, retail fund providers, financial intermediaries, banks, and hedge funds. Edmund has an MA in Economics and Finance from Brandeis University.

Current Responsibilities

Edmund performed the original research which led to the building of the firm and core products. He continues to lead development, data science, and consulting efforts for the firm.

Summary of Experience

- **Economic Data Sciences, Founder and Lead Scientist –** Built the original analytics and proof-of-concept examples for the EDS Decision Engine
- **Meketa Investment Group, Director –** Led the majority of quantitative projects for a wide variety of institutional funds and asset owners. Was a core contributor to the Asset Allocation process and participated in manager research analytics as well as a wide range of ad-hoc analytics. Built their optimization platform, which drove asset allocation for all clients.
- **State Street Associates, Intern –** Participated in this think-tank's research on portfolio and risk management as well has behavioural research efforts.
- **United Way of Central Ohio, Intern –** Prior to graduate school, Edmund participated in research for United Way of Central Ohio and worked with the State Legislature on research projects and policy initiatives.

Education

- **Brandeis University –** Master of International Economics and Finance
- **The Ohio State University –** Bachelor of Arts, Political Science

Credentials Current & Previous

- **SMF3 –** Executive Director
- **SMF16, CF10 –** Compliance Oversight
- **SMF17, CF11 –** Money Laundering Reporting Officer
- **CF1 –** Director
- **CF30 –** Customer Interaction

Ivan Nikolov, CFA
Product, Business Development
Industry Experience: 15 Years
EDS Tenure: 1 Year

Brief Description

Ivan has 15 years of experience in financial services, with a strong track record as a fund manager and research analyst at large institutions and hedge funds. Ivan has an MA in Economics and Management from Oxford University and is a CFA charterholder. He also holds the Certificate in ESG Investing and the Financial Data Professional (FDP) charter.

Current Responsibilities

Ivan is currently responsible for product management and business development. As a past portfolio manager, he is also responsible for manager research and analysis.

Summary of Experience

- **Economic Data Sciences, Product and Business Development** – Working to mould the raw power of the EDS Decision Engine into a more client-centred products and to extend the product range.
- **NN Investment Partners, Senior Portfolio Manager** – Directed the development of new investment solutions based on client needs and produced white papers and other marketing content for investors; Participated in media campaigns; Featured in major financial publications, including Investment Week and International Adviser.
- **ABRDN, Portfolio Manager** – Co-managed and presented the investment portfolio at internal and external meetings and marketed the convertible products to institutional clients.
- **NKG, Trader/Sales** – Brokered convertible bonds to European institutional clients.

Education

- **University of Oxford** – Masters, BA (Hons), Economics and Management

Credentials Current & Previous

- **CFA**
- **FDP** – Financial Data Professional
- **Certificate of ESG Investing**
- **CF30** – Customer Interaction
- **IMD** – Diploma in Investment Management

Juan Vargas, FRM
Data Scientist
Industry Experience: 12 Years
EDS Tenure: <1 Year

Brief Description

Juan has 17 years of experience solving quantitative, technology, and data-oriented problems in investment management, psychology, and educational development. He has experience on the buy side and sell side of the investment world and holds the FRM designation. He has experience with machine learning techniques in a number of different disciplines. Juan earned B.S. degrees in both Mathematics and Economics from the Massachusetts Institute of Technology (MIT)

Current Responsibilities

Juan is currently responsible for quantitative analytics and development.

Summary of Experience

- **Economic Data Sciences, Data Scientist** – Contributes to development projects and customize analytics to client needs.
- **BMO, Quantitative Researcher** – Work on development of quantitatively driven strategies within active management strategies.
- **State Street Associates, Quantitative Researcher** – Created and communicated research engaging clients with insights to inform the investment decision process.
- **Putnam, Analyst** – Measured portfolio risk and was tasked with report generation that conveyed those risks to stakeholders.

Education

- **Massachusetts Institute of Technology** – B.S. in Mathematics, B.S. Economics

Credentials Current & Previous

- **FRM**

John Bearman, CFA
Advisor
Industry Experience: 25 Years
EDS Tenure: <1 Year

Brief Description

John has 25 years of investment and executive experience, working for a range of large institutional and retail asset managers. His most recent executive role was as CIO of the BP plc UK DB pension scheme. John has a portfolio of non-exec and advisory roles working as Chair of investment oversight committees. John has a BSc in Accountancy Finance and Economics from Essex University and is a CFA charterholder.

Current Responsibilities

John is an advisor to EDS and Chairman of the Board

Summary of Experience

- **Economic Data Sciences, Advisor** – Advises on investment product creation and strategy and consults on client interactions.
- **BP, Head of Investment** – Implemented Board Investment Strategy and worked with board members.

Education

- **University of Essex** – BSc Economics

Credentials Current & Previous

- **CFA**

In closing out this section, we expect that the amount of work needed for this project to be in the initial months of the project. This is due to the fact that initial collection of data, the creation of the data pipeline and aforementioned applications will be a large endeavour. Our goal will be to ensure satisfaction on the part of the ORSC, so each staff member will commit as much as 80% of their time to this project until the initial build is completed. At that point, each analysis will receive an overview from a member of staff on a monthly basis. This equates to 60 hours per month, shared by each member of staff.

References

While EDS and members of staff can provide references, we wish not to do so at this point for two important reasons. First, we do not want to represent that our references can speak to our ability to provide this exact service. We have stated previously, and would like to reiterate, we do not claim to have carried this function out beyond testing.

With that important caveat stated, if the ORSC would like us to provide references to those test cases or references more generally, those case be provided upon request.
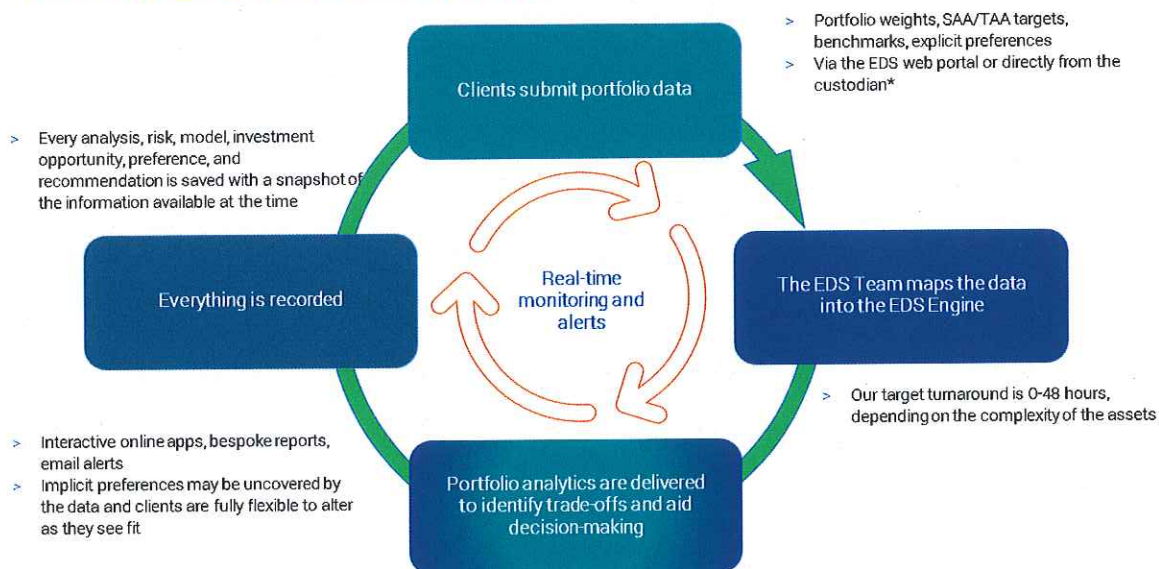
Proposed Methodology

In this case, our proposed methodology is simple. We have reviewed past examples of Investment Performance Evaluation presented to the ORSC. In doing so, we did not encounter any part of that analysis which would require proprietary models or data to be used.

Since this was the case in the examples we reviewed, we propose that, as our foundation, we will produce an equivalent set of reports. These reports will have all of the same evaluations and analytics. The major difference, of course, is that we will build those reports with a technology-first approach so that they are automated so they can be delivered with more frequency, in most cases monthly updates.

Building upon that foundation we will include automated email updates when data or changes of interest arise. Furthermore, we will incorporate insights from the EDS Decision Engine which will highlight in a transparent and impartial manner:
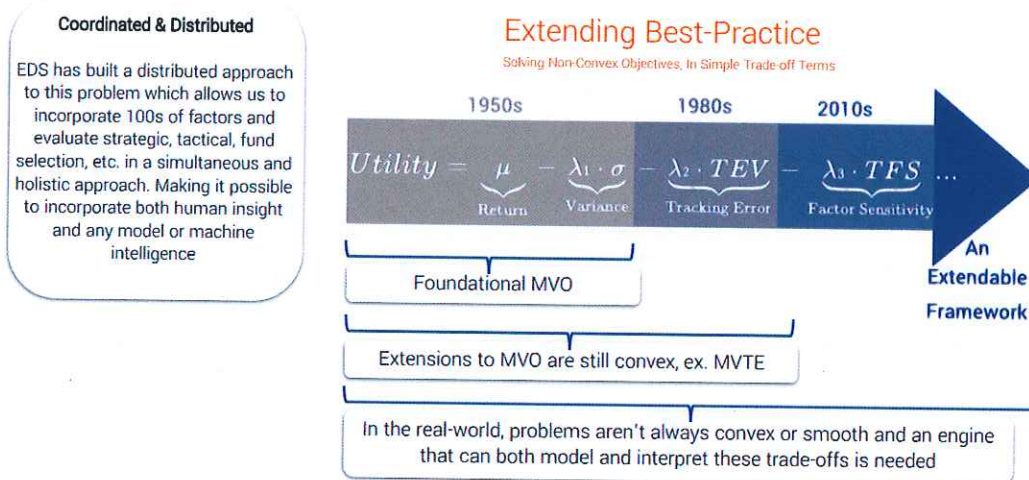
- Which factors are driving the performance within different funds and asset classes.
- How much risk each fund is accepting and the trade-offs available to them.
- This will highlight if they are exhibiting costly preferences which are hard to justify and how that impacts their fiduciary duty.
- The solution will also suggest how these imbalances can be addressed, through rebalancing of the portfolio, or even suggesting a policy or manager change along with a clear description of why that change is recommended.

How Do EDS Solutions Work?

> Portfolio weights, SAA/TAA targets, benchmarks, explicit preferences
> Via the EDS web portal or directly from the custodian*

Clients submit portfolio data

> Every analysis, risk, model, investment opportunity, preference, and recommendation is saved with a snapshot of the information available at the time

Everything is recorded

Real-time monitoring and alerts

The EDS Team maps the data into the EDS Engine

> Our target turnaround is 0-48 hours, depending on the complexity of the assets

> Interactive online apps, bespoke reports, email alerts
> Implicit preferences may be uncovered by the data and clients are fully flexible to alter as they see fit

Portfolio analytics are delivered to identify trade-offs and aid decision-making

Deep Research – Standing on the Shoulders of Giants

EDS combines strong foundations with modern machine learning techniques and a custom-built infrastructure to solve previously intractable problems.

Coordinated & Distributed

EDS has built a distributed approach to this problem which allows us to incorporate 100s of factors and evaluate strategic, tactical, fund selection, etc. in a simultaneous and holistic approach. Making it possible to incorporate both human insight and any model or machine intelligence

Extending Best-Practice

Solving Non-Convex Objectives, In Simple Trade-off Terms

1950s   1980s   2010s

$$Utility = \underbrace{\mu}_{Return} - \underbrace{\lambda_1 \cdot \sigma}_{Variance} - \underbrace{\lambda_2 \cdot TEV}_{Tracking\ Error} - \underbrace{\lambda_3 \cdot TFS}_{Factor\ Sensitivity} \dots$$

An Extendable Framework

Foundational MVO

Extensions to MVO are still convex, ex. MVTE

In the real-world, problems aren't always convex or smooth and an engine that can both model and interpret these trade-offs is needed

Deep Research – Extensions to Strong Foundations

The EDS technology stack has allowed for scalable extensions to several industry best-in-class models, tools, and methods. Here are a few examples:

● Foundations   ● Current Best Practices   ● EDS Extensions

> Stochastic Gradient Descent is an iterative optimization method using random sub-selections of data which is especially helpful for high-dimensional problems. Using preferences and probabilities, using informed as opposed to random selections can vastly lower the computational burden of this approach. This extension is inspired by insights from genetic algorithms.

> Elastic Net is a regulation method used for modelling that combines lasso and ridge methods. Using a search method to specify hyper-parameters, this method can be used to automatically test model creation and combine human insights with machine learnings.

> The Black-Litterman model is designed to combat the real-world challenges of implementing modern portfolio theory in practice. The model incorporates the forward-looking views and probabilities and communicates reasonableness. Extending this to factors and their influence the influence of market and economic factors can be highlighted.

> Chen-Roll-Ross is arguably the most famous macroeconomic model used to measure the impact of these factors on asset prices. As markets differ vastly in terms of global integration a global and regional model approach is useful to understand these markets.

In closing, we expect that the best way to appreciate the value that a technology-first approach can bring is to try this in practice. This is why we have priced our proposal in this way, to give the ORSC time evaluate this for themselves with no significant expense. To implement this, we would require only limited amount of collaboration from the ORSC and the underlying funds. We would need the to share data, in excel or even directly from their custodian in a consistent way each month. This could differ between funds as long as once set, each fund sent their data in the same fashion. Any further meetings or time from the ORSC or funds would only be required as we begin to expand the analytics beyond the initial foundational phase.

Additional Information

We again would simply like to thank you for your time. We realize that considering a firm like EDS is unusual. We truly believe that our approach has benefits that it can bring to the ORSC and industry at-large, but before getting too far ahead of ourselves, we simply wish to introduce ourselves and we hope this will be the first in several future conversations.

Glossary

- ORSC
    - Ohio Retirement Study Council
- EDS
    - Economic Data Sciences, LLC
- MVO
    - Mean-Variance Optimization
- MVTE
    - Mean-Variance Tracking Error Optimization
- LLC
    - Limited Liability Corporation
- AWS
    - Amazon Web Services
- FCA
    - Financial Conduct Authority, the UK's Financial Services Regulator
- PERS
    - Ohio Public Employees Retirement System
- STRS
    - Ohio State Teachers Retirement System
- OP&F
    - Ohio Police & Fire Retirement System
- SERS
    - Ohio School Employees Retirement System
- HPRS
    - Ohio Highway Patrol Retirement System
- CalSTRS
    - California State Teachers Retirement System
- SAA
    - Strategic Asset Allocation
- TAA
    - Tactical Asset Allocation

Cost Information

We are hungry for the opportunity to turn our test case success into real world practice. For that reason, we are pleased to offer a fee of $1, for a 6-month period. After 6 months, our fee will still be a heavily discounted $50,000 per annum. ORSC can terminate us at any time. Our other operations will cover our expense and we simply seek an opportunity to prove our solution to you.