



RON GALPERIN
CONTROLLER

July 20, 2022

Honorable Members of the Los Angeles City Council
Los Angeles City Employees' Retirement System Board of Administration

Re: Management Audit Report of the Los Angeles City Employees' Retirement System

As required under City Charter Section 1112, the Los Angeles City Controller, the Office of the Mayor and the Los Angeles City Council regularly conduct a management audit of this pension and retirement system by an independent qualified management auditing firm. The audit examines whether the system is operating in the most efficient and economical manner and evaluates its asset allocation.

Representatives from the Mayor's Office, City Council and Controller's Office (Joint Administrators) identified several audit objectives to be addressed in the current management audit. The attached "Management Audit Report of the Los Angeles City Employees' Retirement System" is the firm's final report addressing the audit objectives, which cover the following areas:

- Performance of the Los Angeles City Employees' Retirement System's (LACERS) investments and asset allocation;
- Adequacy and reasonableness of LACERS administrative expenses;
- Reasonableness of actuarial methods and validity of assumptions;
- Adherence to sound management policies and leading best practices;
- Governance and fiduciary responsibilities; and
- Assessment of the implementation status of the prior audit recommendations.

Attached to the final report is a response from LACERS, which indicates they are in general agreement with the recommendations.

If you have any questions about the report, please contact Devang Panchal, Director of Auditing, at (213) 978-7388 or at devang.panchal@lacity.org.

Sincerely,



RON GALPERIN
City Controller



ERIC GARCETTI
Mayor



NURY MARTINEZ
City Council President

Enclosure

cc: Honorable Michael Feuer, City Attorney
Andre Herndon, Chief of Staff, Office of the Mayor
Neil M. Guglielmo, General Manager, LACERS
Matthew W. Szabo, City Administrative Officer
Holly L. Wolcott, City Clerk
Sharon Tso, Chief Legislative Analyst
Independent City Auditors

Management Audit Report of the Los Angeles City Employees' Retirement System



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Final Management Audit Report

Los Angeles City Employees' Retirement System
July 1, 2022



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Background

Introduction

The Los Angeles City Employees' Retirement System (System or LACERS) was established by the City of Los Angeles (City) in 1937 and operates under the provisions of the Los Angeles City Charter and Administrative Code. The System is a single employer public employee retirement system whose main function is to provide retirement benefits to civilian employees of the City of Los Angeles. The City Charter grants authority to the Board of Administration, General Manager, and Staff to administer a multi-tiered defined benefit retirement plan for approximately 25,200 active and 22,000 retired City of Los Angeles employees. Benefits are based on the member's pension tier, age, years of service, and final average salary.

For the year ending June 30, 2021, LACERS paid approximately \$1.2 billion in annual benefits to approximately 22,000 retirees and beneficiaries. The average monthly per retiree/beneficiary benefit amount paid was \$4,304. As of June 30, 2021, plan tiers included Tier 1, Tier 1 Enhanced and Tier 3.

The LACERS portfolio of investments that provided support for these benefits payments was valued at approximately \$22.2 billion as of June 30, 2021. Investment management expense was \$100 million over this same period. LACERS has 173 positions, with an administrative expense of \$34.3 million.

Section 1112 of the Los Angeles City Charter requires the City, through the Mayor, Council and Controller (Joint Administrators), to jointly conduct a Management Audit of LACERS every five years. The purpose of the Management Audit is to examine whether LACERS is operating in the most efficient and effective manner. The Management Audit also requires an evaluation of LACERS' allocation of assets.

Aon Investments USA Inc. (Aon) was retained by the City through a competitive bidding process to conduct the LACERS Management Audit. The Agreement between Aon and the City of Los Angeles establishes that the Management Audit covers the time period 2013 to September 30, 2021¹.

The full Scope of Work, including the specific methodology for each of these objectives, is defined by the Agreement between the City of Los Angeles and Aon.

The stages undertaken in developing this Report included document collection, analyses, interviews and discussions, research and report drafting. LACERS and the Joint Administrators provided comments on both our preliminary observations and draft version of the Report. This Final Report takes into account all relevant comments and represents Aon's independent full findings, analysis, conclusions, and recommendations for enhancements.

¹ September 20, 2021 is the contract attestation date.

Disclaimer

The findings in our Report are based upon the information we received, which we presumed to be accurate and could be relied upon. We sought to verify certain information among different interviewees and the documents reviewed, but the process of cross-checking and verification was limited. We were not retained to detect or investigate fraud, concealments, or misrepresentations, or to conduct a legal investigation or otherwise use judicial processes or evidentiary safeguards in developing the Report.

This Report does not, and is not intended to, provide legal advice. Although the Report considers various legal matters, Aon's findings and recommendations are not intended to provide legal interpretations, legal conclusions, or legal advice. For that reason, action upon legal matters should not be taken without obtaining legal advice addressing the appropriate statutory or regulatory interpretation regarding such matters.

Acknowledgements

Aon thanks the Joint Administrators for their time, diligence, and feedback throughout this project. We also thank the LACERS Board and Staff for their time, cooperation, feedback, and openness.

Executive Summary

This Executive Summary is an abridged version of the key findings and recommendations contained in the Report. It is a high-level summary and is not intended as a replacement for the full Report. We encourage readers to examine the full Report as it provides the technical support for the key findings and recommendations. A recommendation matrix, which aggregates all the recommendations that appear in the Report, can be found at the end of this Executive Summary, and in the Appendix.

An overview of key findings and recommendations for the main sections of the Report is highlighted below.

Actuarial Methods, Assumptions & Funding

Financial sustainability of the pension plan is rooted in three (3) primary drivers:

1. accurate calculations of plan liabilities;
2. thoughtful investment strategy; and
3. sound actuarial contribution policy along with a commitment to such funding.

Accurate Calculations of Plan Liabilities

To understand the numerical values associated with the pension plan (e.g., actuarial liability, funded ratio, contribution levels), one must first evaluate the assumptions and methods used to derive them.

Pension plans are subject to numerous assumptions, both economic and demographic, that impact the calculation of the liability and, by extension, the funding calculations. Optimal management of pension plans necessitates having defined procedures in place to determine if adjustments to those assumptions are needed. The goal is to increase the predictability of the calculations and, as best possible, avoid surprises.

We believe that the plan actuary is relying on actuarial standards of practice in setting assumptions for LACERS. Those assumptions, highlighted by the investment return assumption, are in-line with U.S. public pension peers. Additionally, the plan actuary conducts an actuarial experience study every three years to assess how actual plan experience has differed from assumptions and whether adjustments to those assumptions are needed in the actuarial valuations.

Thoughtful Investment Strategy

Overall, the System's assets and liabilities work in tandem with one another in determining future funded ratio calculations and contribution rates.

LACERS has conducted regular asset-liability studies – a comprehensive study that models the possible future results of different asset allocations under a variety of market conditions – to analyze the risk/reward merits of its investment strategy. Understanding how an asset allocation

and its range of future outcomes will impact contribution rates, funded ratio, and net cash flows allows stakeholders to make informed decisions to set the Plan up for future success.

Aon's best practice is to conduct asset-liability studies every three to five years or as conditions warrant. We believe LACERS' policies have been adhering to a similar timeline and would not recommend any changes.

Sound Actuarial Contribution Policy Along with a Commitment to Such Funding

Over the last decade, the City has made contributions in-line with the calculated actuarial amounts. However, the System's funded ratio progression was slowed by a Board decision in 2012 to combine actuarial amortization bases and extend the payment period over which they would be made. This decision created a negative amortization impact over the last decade – i.e., interest on the liability outweighing the amortization payments.

The emphasis on this combined base is due to its relative size when compared with the total LACERS amortization payment. It should also be noted that while the negative amortization payment exists for this specific base created in 2012, subsequent amortization bases have adopted either 15- or 20-year payment periods, largely avoiding any negative amortization impact.

The LACERS plan will start moving beyond this negative amortization period soon, with amortization payments becoming greater than the interest on the liability thereby closing the funding shortfall. As the years progress, and the City stays committed to the existing contribution policy, more of the unfunded liability will be paid down which will improve the Plan's funded status.

Funded ratio progress can be due to a host of reasons, but one key reason is the commitment to the actuarial funding policy, and not deviating from it. The actuarial funding principles are designed to work by creating a laddered amortization approach to smooth out budgetary impacts with the eventual goal of closing the funding gap over time. We have found that plans that have stayed with their original amortization schedules, without making adjustments to refresh (or re-start) components of their amortization schedules, are more likely to be in healthier funded positions.

We also recognize that actuarial calculations can often be at odds with budget realities. We would caution against similar adjustments that were done in 2012, which created a negative amortization environment and extended the time period for paying down the unfunded liability. Avoiding instances like this in the future will allow the actuarial assumptions and methods for the LACERS plan to improve the overall funded ratio and financial stability.

Investment Performance/Asset Allocation

Use of Active and Passive Management

The LACERS portfolio has increased its use of passive investments over time and maintains a level of passive investment exposure greater than its peer public pension plan.

Passive % Total Portfolio (excluding cash investments)		
Asset Class	LACERS 9/30/2021	Peer Group (Public Funds +\$5B)
U.S. Equity	19.7%	11.5%
Non-U.S. Equity	12.1%	4.1%
Core Fixed Income	5.0%	5.4%
Credit Opportunities	0%	0%
Private Equity	0%	0%
Real Assets	0%	0%
Other	0%	0%
TOTAL	36.8%	21.0%

LACERS has a robust and formal process for evaluating its use of passive investments documented in its Investment Policy Manual. This analysis was performed three times during the scope period but was not performed as frequently as required by the Investment Policy Manual (every three years). It is common practice in the industry for programs such as LACERS to perform active vs passive cost/benefit studies on an ad hoc basis. However, compliance with the documented policy is critical.

We recommend creating a formal procedure to ensure governance processes articulated in the policy are completed on the mandated cycle.

Impact of the Use of Active Management

The most efficient way to evaluate the impact of active investment management is through the review of investment results after the fees have been paid. The table below provides the impact to the Total Fund performance relative to the benchmark for each asset class where passive implementation is viable over the scope period. As shown, active implantation has added 0.32% (32 bps) annualized (every year on average) over the 8-year scope period.

Asset Class	Net of Fee Excess Return (8-Years ending 9/30/2021)
U.S. Equity	-6
Non-U.S. Equity	31
Core Fixed Income	7
Total	+32 bps (0.32%)

Aon's Advice on Passive Management Moving Forward

We believe some investors are well-suited for active management, and the body of the Report outlines some of the factors that make passive investing more desirable. For those institutional investors who are well equipped to incur active risk, and do so prudently, we believe they can

achieve superior outcomes. Boards implementing actively managed investment strategies should be comfortable with:

- The level of active risk within the investment program – Achieved through active vs passive education and risk budgeting discussions – **Currently performed by LACERS every three years**
- The ability of its staff and consultant to identify alpha generating investment opportunities – Achieved through ongoing oversight
- Experiencing periods (**potentially long periods**) of underperformance relative to passive implementation – Achieved by understanding the potential of underperformance prior to implementation

If the Board is comfortable with these factors, Aon is supportive of active management within the investment program.

The Investment Policy Statement (IPS) and Associated Processes

The LACERS Board reviews the IPS on an annual basis. The purpose of the annual reviews is to ensure the document reflects desired long-term asset allocation, the evolving investment portfolio, legal and regulatory developments, and current best practices. We believe the review process could be enhanced by requiring all recommended changes to be reviewed by external counsel and the applicable investment consultant.

We recommend adding language to the IPS that states all modifications to the document are to be reviewed by the applicable consultant as well as fiduciary counsel prior to being presented to the Board. **We believe** the Board should consider requiring a memo from the applicable consultant and fiduciary counsel for all amendments of the IPS. The memo would articulate and document their agreement or disagreement with the proposed changes.

Aon evaluated the IPS relative to what we believe to be the key sections of policy and how we think about IPS development. The LACERS IPS includes all components that we believe a well-structured IPS should have. This includes documentation of the rebalancing process and articulation of the roles and responsibilities of the key parties involved in the investment program. The document does not explicitly outline the asset allocation policy targets and ranges.

We believe the Board should consider including the policy targets and ranges within the Policy.

Based on our interviews with Staff, and experience with other clients performing these functions, we believe that LACERS generally has appropriate controls and procedures in place to regularly review compliance with its policies.

We observed that LACERS is in compliance with the mandated statutory investment requirements regarding the IPS. However, the Policy does not define applicable statutory requirements that are to be followed by the System.

We recommend all federal, state, and local legal requirements be explicitly stated together within the IPS.

Compliance With Established Objectives in the Policy

There is no one true measurement to define the success of a retirement program. We believe the best process for evaluating the success of implementation is to review the results of the program relative to the objectives articulated in the investment policy statement. The policy articulates 7 investment objectives that we believe are in-line with best practice. Our Report provides analysis for the Objectives where quantitative or qualitative review is possible.

- The portfolio has produced net of fee returns that approximate the benchmark return over recent trailing periods
- The portfolio has produced meaningful returns over inflation over time
- The portfolio has produced favorable risk adjusted net of fee returns relative to peer public funds and its benchmark.
- As of September 30th, 2021, recent trailing performance was above the legacy actuarially stated rate of return of 8%, as well as the current 7% rate

Process to Derive Strategic Asset Allocation

Asset allocation is viewed by many as the single most important factor to a pension fund's investment success over the long-term. The primary importance of asset allocation over other investment decisions is a generally accepted concept in finance theory and practice. Aon finds the process followed by LACERS to be robust and in line with best practice. The Board is provided with ample information and analysis to more than adequately consider the risk/return/cost impacts of either staying with the current policy allocation or moving to an alternative asset allocation. The analysis also reviews the impact these changes will have on the overall funded status of the Plan.

Aon also evaluated the approach for deriving the forward-looking expected returns, volatility, and assumed correlation of returns. We found the process for deriving capital market assumptions, as well as the final assumptions themselves, to be reasonable.

Appropriateness and Suitability of the Adopted Asset Allocation

The asset allocation of an investment program should be derived through the asset-liability process (outlined above). However, Aon also evaluated the asset allocation of LACERS relative to peers and its projected ability to produce the actuarially assumed rate of return.

Asset Allocation relative to peers

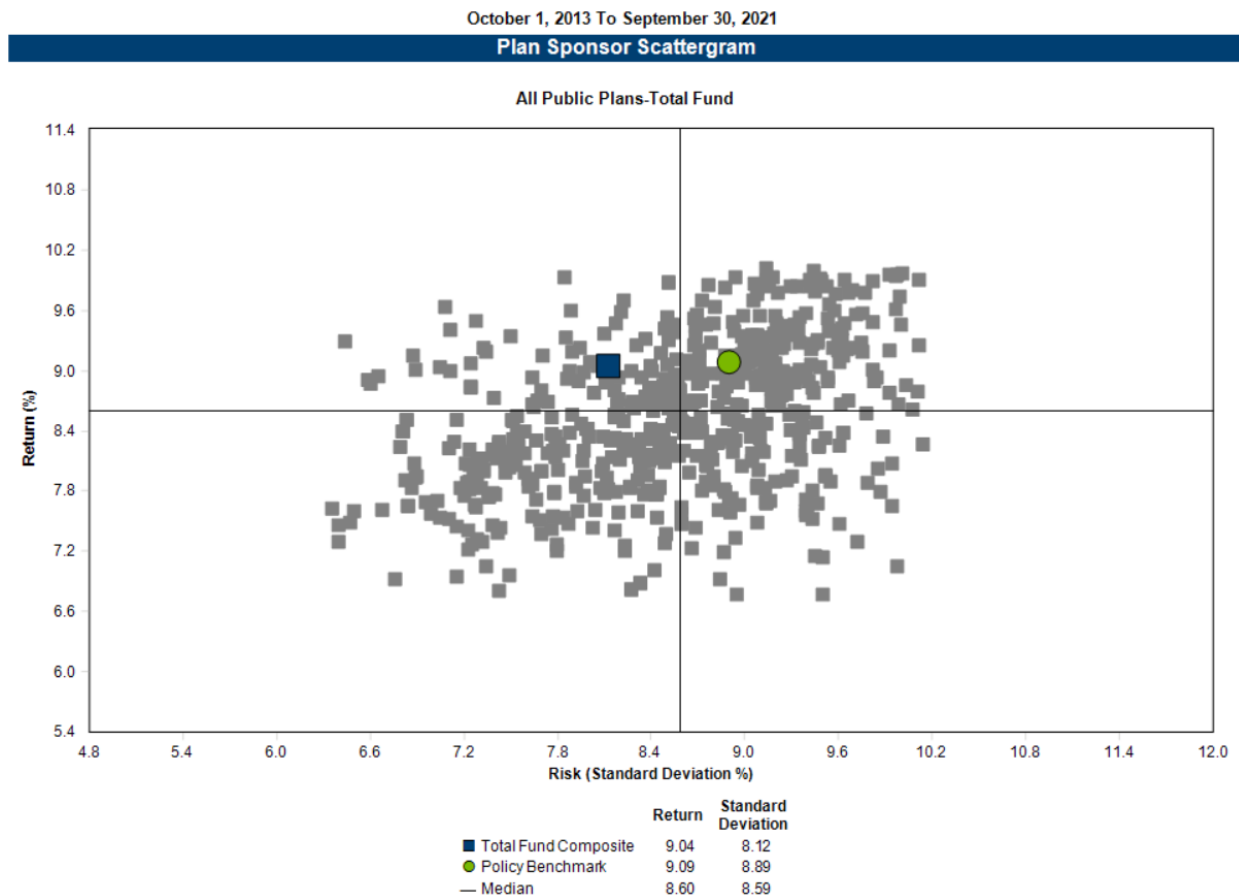
The Plan's asset allocation is not materially different than that of other public fund peers. In review of the asset classes utilized by the System, Aon found that they are similar to those commonly utilized in the institutional investor market (i.e., public funds, corporate defined benefit plans, endowments, and foundations).

Ability to produce the actuarially assumed rate of return

Using Aon's 30-year capital market assumptions we expect the portfolio to earn 6.3% over time, with a 38% probability of achieving 7% over 30-years. It is important to note that our expected returns are updated on a quarterly basis. Given the recent decline in equity markets and rising interest rates, our forward-looking expected returns are now a bit higher than when the analysis was performed.

Investment Results, Benchmarks and Universe Comparisons

The body of the Report includes an evaluation of Total Fund and asset class performance relative to the primary benchmark and peer performance over various time periods. Additionally, detailed performance attribution for various time periods have been included as appendix E. Generally speaking, Total Fund investment performance has been in-line with the benchmark and greater than the median peer. Over the scope period the portfolio produced a return above the median peer with a lower standard deviation than the peer median. Additionally, the portfolio has produced a net of fee return commensurate with the benchmark at a lower level of risk (chart below on next page).



Aon reviewed the benchmarks and universes used throughout the LACERS performance reporting documents and have found that they adequately represent the Plan, asset class, and

investment manager in which they are compared against.

Administration/Management of the System

The LACERS Board and Staff are legally required to discharge their duties solely in the interest of members and beneficiaries for the exclusive purpose of providing benefits to those members and beneficiaries, while defraying reasonable expenses of administering the System. In order to fulfill this duty, the System has a budgeting process to ensure it has the required resources and staffing necessary to the operation of the System. In reviewing the administrative and investment management expenses over the Scope period, we observed that these two expenses make up a small portion of overall expenditures. The majority of expenditures are for benefit payments. The broad drivers of costs are consistent with what we see represented in other public funds' expenses.

In reviewing actual v. budgeted administrative expenses over the Scope period, actual administrative expenses remained under budget for every year with the exception of FY 2020, which necessitated expenditures primarily related to the new LACERS headquarters building. Actual and budgeted investment management expenses increased over the Scope period in accordance with the increase of assets under management.

A 2018 CEM peer benchmarking study of LACERS pension administrative costs reflect that LACERS pension administrative costs per member were slightly above peer average to the identified peer group, and below the peer average for California pension systems. LACERS was also below the peer average when reviewing total administrative costs in relation to asset size. The CEM study also found that the number of administrative staff appears to be higher than the peer average. This was due to the complexity of the benefits and the transaction volume necessary to provide services the LACERS membership.

LACERS has a cost sharing arrangement with the Los Angeles Fire and Police Pensions (LAFPP) and Water and Power Employees' Retirement Plan (WPERP) relative to the City Attorney's Office's representation of the Systems. The three Systems also share legal costs related to investment fund documents when making the same investment. **Aon recommends** LACERS explore additional cost sharing/saving opportunities relative to a group purchase of management liability insurance.

Governance

We observed that LACERS exhibits best practices through the adoption of a thorough Board Governance Manual and transparency by posting the Manual on its public website. In comparing the content of the Board Governance Manual and related governance policies against a best practices policies list, we concluded that LACERS has adopted most of the policies we expect to find. **We do recommend** that LACERS consider the adoption of a Reporting and Monitoring Policy setting forth a schedule of the Board's expected reports, with an annual verification of compliance with such policy.

LACERS has a Board Education and Travel Policy with a required number of hours of education for Trustees, which is in line with best practices. The Policy also contains transparency reporting on board education and related travel to which LACERS adheres.

With respect to independence of the System, **we recommend** that the City consider a change in the City Charter to grant LACERS the ability to determine its own frequency and timing of its board meetings, and to be able to have independent authority regarding the hiring and compensation of its staff.

Progress towards prior Management Audit Recommendations

We independently confirmed that LACERS promptly considered all of the prior Management Audit Recommendations. We discuss our findings in the corresponding section of the Report, along with a matrix of each recommendation and conclusion.

Table of Recommendations

Red= high priority, Blue=medium priority, Green=lower priority

Number	LACERS Management Audit
	I. Actuarial Methods, Assumptions, Funding and Innovative Strategies
I.1.	LACERS should review whether securities lending and agent oversight could result in opportunity cost savings/revenue enhancements or additional risk mitigation benefits.
	II. Investment Performance/Asset Allocation
II.1.	Aon recommends creating a formal procedure to ensure governance processes articulated in the policy are completed on the mandated cycle.
II.2.	Aon recommends all federal, state, and local legal requirements be explicitly stated together within the IPS.
II.3.	Aon recommends adding language to the IPS that states all modifications to the document are to be reviewed by the applicable consultant as well as fiduciary counsel prior to being presented to the Board.
II.4.	Consider including a memo from the applicable consultant and fiduciary counsel for all amendments of the IPS. The memo would articulate and document their agreement or disagreement with the proposed changes.
II.5.	Consider the creation of a compliance calendar to facilitate the oversight of compliance with the governance items articulated within the IPS.
II.6.	Consider including policy targets and ranges within the IPS.
	III. Economy and Efficiency of Administration/Management of the System
III.1.	Explore additional cost sharing arrangements with LAFPP and WPERP regarding management liability insurance.
	IV. Governance
IV.1.	We recommend that LACERS consider adoption of the best practices policies that have not been adopted. Furthermore, LACERS should consider adding references to existing policies that are not contained in the Board Governance Manual itself.
IV.2.	Adopt a Reporting and Monitoring Policy and conduct an annual Reporting and Monitoring verification report to the Board.

IV.3.	We recommend that the City consider changing the City Charter to grant LACERS independence to determine the frequency and timing of LACERS board meetings.
IV.4.	We recommend that the City amend the City Charter to give LACERS independent authority regarding LACERS staff hiring and compensation.

I. Actuarial Methods, Assumptions, Funding, and Innovative Strategies

Background:

LACERS is responsible for ensuring the promise of future benefit payments to its plan participants. The expected future benefit payments of all plan participants are calculated annually by the plan actuary. These expected future payments are discounted based on an assumed interest rate to calculate the total pension liability. That liability is compared to the assets held in the plan trust in the annual actuarial valuation report. The plan assets will be used to pay for future benefit payments to plan participants and administrative expenses. Assets are expected to grow by a combination of contributions (from both the plan participants and the City) and investment returns. The cost ultimately borne by the System (and by extension, the City) will be represented by the financing equation shown below (Chart I-1.):

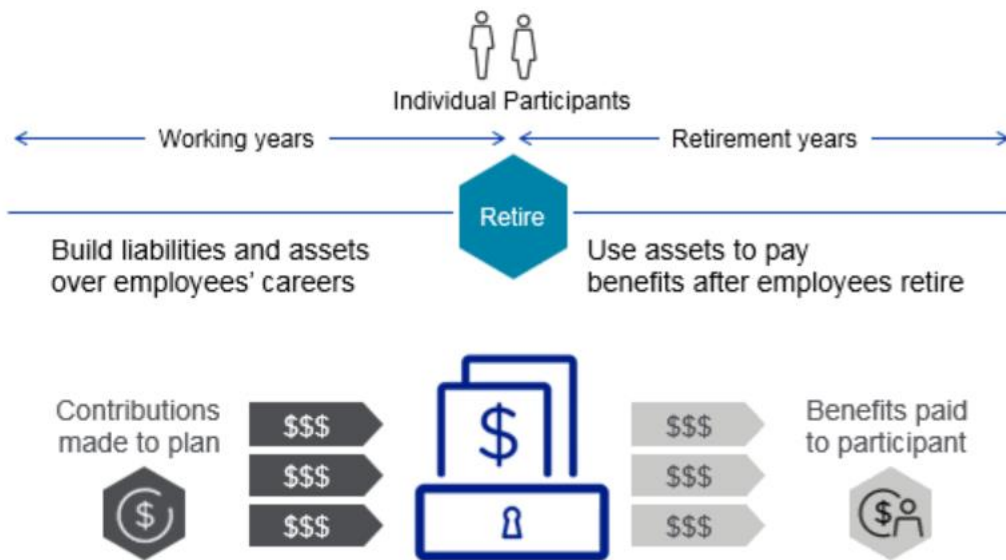
Chart I-1. Ultimate Retirement Benefit Cost Equation



Pension liability is calculated on an individual participant basis and then aggregated in total. To calculate this liability, the plan actuary makes assumptions about the future demographic behavior of each plan participant (e.g., turnover rates, retirement rates, and mortality rates) as well as overall economic assumptions (e.g., future expected asset return and salary growth). One key assumption for public pension plans is the future expected asset return as it also represents the discount rate used to convert the future expected benefit payments to today's dollars. When focusing only on the expected return assumption, a higher expected return will lead to a lower actuarial liability (and vice versa).

Once the total liability is determined and compared to the plan's assets, the actuarial valuation will also specify the annual contribution to be made to the pension plan. In general, the funding of the plan follows the graphic below (Chart I-2.) where contributions are made over a participant's working career, building up assets to match the participant's total liability with expected investment returns, and then paying down that liability in retirement years for the life of that participant.

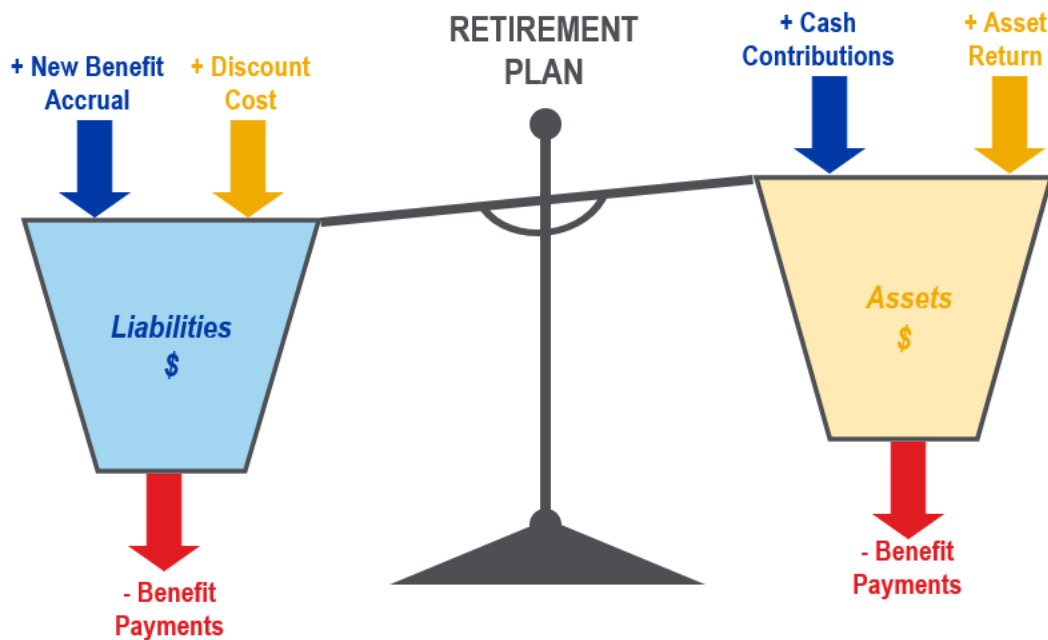
Chart I-2. Funding Cost Recognition



Economic and demographic assumptions are expectations which will differ from actual experience. These differences will impact the total plan liabilities in each successive actuarial valuation, which can also impact the funding calculations. For example, in its own silo, asset returns that are higher than expected in a given year will generally lead to lower contributions going forward (and vice versa). As differences occur over time, those differences are amortized (or smoothed) into the contribution calculations to create more stability in the rates themselves, as opposed to sharp increases/decreases.

Overall, the System's assets and liabilities work in tandem with one another in determining future funded ratio calculations and contribution rates. The illustration below (Chart I-3.) highlights the key factors that influence both the assets and liabilities, which will work overtime to balance one another.

Chart I-3. Balance of Assets and Liabilities



A. Performance of actuarial methods, adequacy and validity of actuarial assumptions and COVID-19 pandemic implications on the pension funds

Background:

Pension plans are subject to numerous assumptions, both economic and demographic, that impact the calculations of the liability and, by extension, the funding calculations. Optimal management of these plans necessitates having defined procedures in place to determine if adjustments to those assumptions are needed.

Specifically for LACERS, their actuary (Segal) conducts an actuarial experience study every three years to assess how actual plan experience has differed from assumptions and whether adjustments to those assumptions are needed in the actuarial valuations.

Conclusions:

The most recent actuarial experience study was completed by Segal on June 17, 2020. This study utilized the census data for the period July 1, 2016 to June 30, 2019 and proposed actuarial assumptions, both economic and demographic, to be used in the June 30, 2020 valuation. Per Segal's report, *"The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27 "Selection of Economic Assumptions for Measuring Pension Obligations" and ASOP No. 35 "Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations."* These Standards of Practice provide

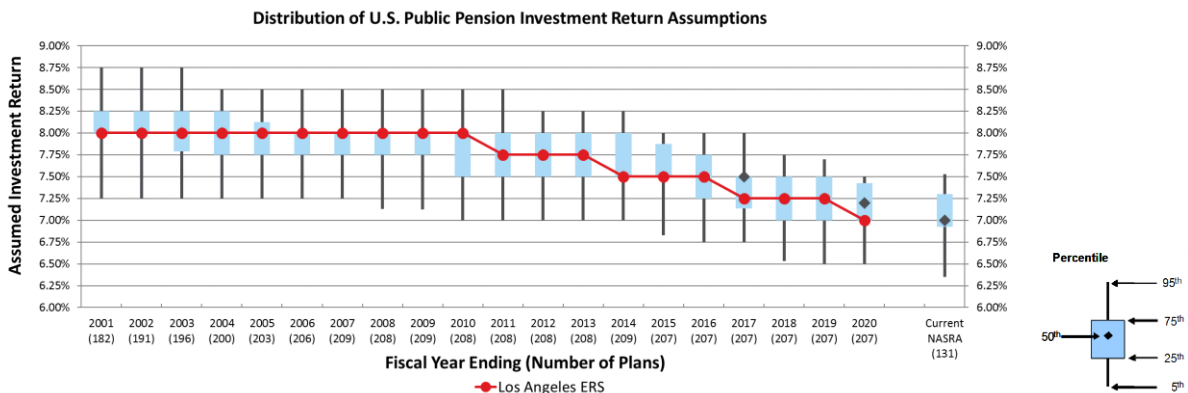
guidance for the selection of the various actuarial assumptions utilized in a pension plan actuarial valuation.”

As a result of the actuarial experience study, recommendations were made by Segal to change the following assumptions:

- inflation,
- investment return,
- crediting rate for employee contributions,
- cost-of-living adjustments (COLA),
- merit and promotion salary increases,
- retirement from active employment,
- percentage of members with an eligible spouse or domestic partner,
- reciprocal salary increases,
- pre-retirement mortality,
- healthy life post-retirement mortality,
- beneficiary mortality,
- disabled life post-retirement mortality,
- termination, and
- disability incidence.

One of the most influential assumptions for a public pension fund is the expected return on plan assets. Historically, plans in California have been at the forefront of U.S. public pension plans in lowering their expected return assumption over the past decade. California plans have, on average, been quicker to reduce their expected return assumption with national peers following shortly thereafter. LACERS’ assumption for FYE 2020 was 7.00%, which was slightly below the U.S. public pension median for FYE 2020 (using data from publicplansdata.org as of October 2021 as illustrated in Chart I-4.). Using more recent data tracked by NASRA (provided by NASRA as of October 2021), LACERS’ return assumption is at the median relative to peers.

Chart I-4. U.S. Public Pension Investment Return Assumptions



Additional actuarial methods utilized by Segal are noted below. These methods are reasonable and common approaches for public sector pension plans.

- Actuarial Cost Method: the method used to determine the liability amount
 - Entry Age Cost Method, level percent of salary. Entry age is calculated as age on the valuation date minus years of employment service. Both the normal cost and the actuarial accrued liability are calculated on an individual basis.

- Actuarial Value of Assets (AVA): the method for smoothing asset returns over time
 - Market value of assets (MVA) less unrecognized returns in each of the last seven years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value and is recognized over a seven-year period. The actuarial value of assets (AVA) is limited by a 40% corridor; the AVA cannot be less than 60% of MVA, nor greater than 140% of MVA.

- Amortization Policy: the method for recognizing differences in actual versus expected results
 - The amortization method for the UAAL is a level percent of payroll, assuming annual increases in total covered payroll equal to inflation plus across the board increases (other than inflation). Changes in the UAAL due to actuarial gains/losses are amortized over separate 15-year periods. Changes in the UAAL due to assumption or method changes are amortized over separate 20-year periods. Plan changes, including the 2009 Early Retirement Incentive Program (ERIP), are amortized over separate 15-year periods. Future ERIPs will be amortized over 5 years. Any actuarial surplus is amortized over 30 years. All the bases on or before June 30, 2012, except those arising from the 2009 ERIP and the two (at that time) GASB 25/27 layers, were combined and amortized over 30 years effective June 30, 2012.

COVID Impact: The pandemic is going to have both short and long-term impacts on all pension plans. The magnitude of those impacts will vary by plan and specific circumstances. The actuarial valuation, which represents a snapshot in time of the LACERS plan, will self-correct annually with new demographic data changes. As experience differs from assumptions, adjustments will be made to the actuarial liabilities and, by extension, the contribution rates. An important note is that while there may be short-term deviations in actual experience, one year does not necessarily make a trend for future liability assumption purposes. **The next experience study conducted by the plan actuary will serve to determine if long-term assumption changes are warranted.**

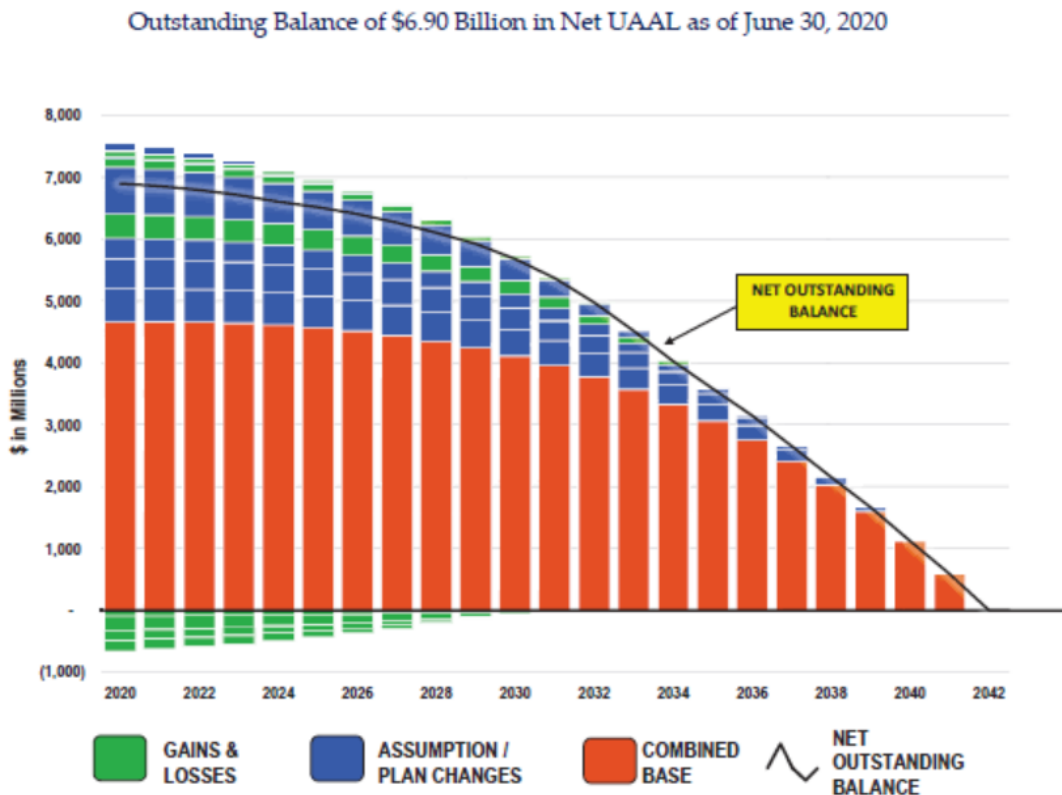
Overall, the plan actuary is relying on actuarial standards of practice in setting assumptions for LACERS. Those assumptions, highlighted by the investment return assumption, are in-line with U.S. public pension peers. The policies and procedures are in place, through the triennial actuarial experience studies, to determine if changes to the actuarial assumptions brought on by the COVID pandemic will be needed.

B. Past performance and trajectory of LACERS investments, actuarial predictions, contributions and unfunded liabilities and comparative benchmarking

Background:

The exhibit below (Chart I-5.) was sourced from the June 30, 2020 actuarial valuation performed by Segal for LACERS. It illustrates that the projected schedule of actuarial contributions will fully fund LACERS over time.

Chart I-5. Segal’s Projected Schedule of Actuarial Contributions

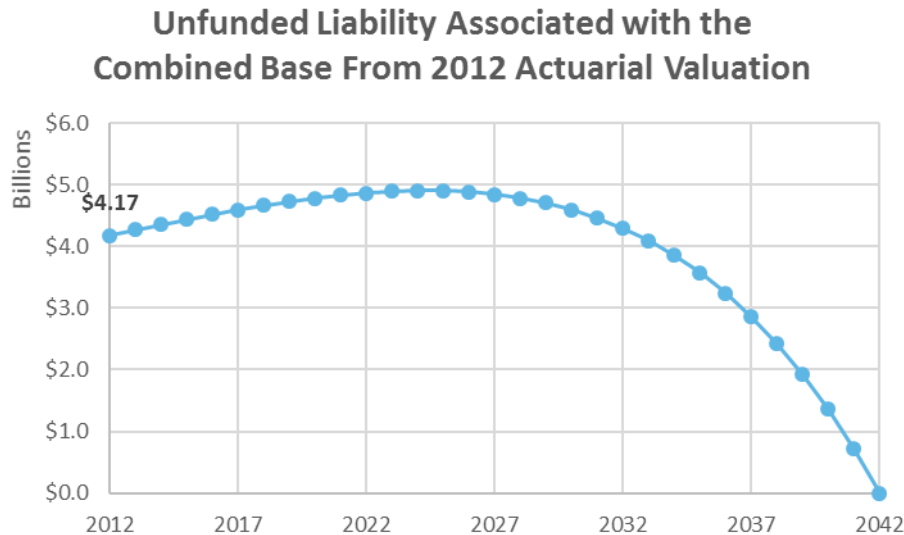


An important aspect of the illustration above is the combined base. Per the documentation found in the June 30, 2012 actuarial valuation report (https://publicplansdata.org/reports/CA_LACITY-LACERS_AV_2012_139.pdf), “On October 23, 2012, the Board elected to combine all amortization bases as of June 30, 2012, except for the basis associated with the 2009 ERIP and the two GASB 25/27 bases, which remain on their original schedules. In addition, the Board adopted an initial amortization period of 30 years for the combined bases as of June 30, 2012.”

Using assumptions as of the June 30, 2012 actuarial valuation (expected return on plan assets = 7.75%; expected payroll growth = 4.25%), this new combined base would have the following progression of unfunded actuarial liability (UAL) as shown in Chart I-6. The UAL associated with the combined base will increase in the first 12 years of the 30-year amortization period as

interest on the UAL grows faster than the amortization payments being made, resulting in negative amortization over this time frame.

Chart I-6. Progression of Unfunded Actuarial Liability (Combined Base from 2012 Actuarial Valuation)



Note: the exhibit above shows only the figures based on the June 30, 2012 actuarial valuation report for illustrative purpose without adjustments for assumption changes that have occurred after that date.

Conclusions:

This period of negative amortization for the combined base is currently where LACERS finds itself and is a key reason that the funded ratio progression has slowed over recent years as this particular base represents most of the amortization payment made. It should also be noted that while the negative amortization payment exists for this specific base created in 2012 (originally using a 30-year amortization period), subsequent amortization bases have adopted either 15- or 20-year periods, largely avoiding any negative amortization impact.

Continuing to make the actuarial contributions that the City has been doing, with time moving LACERS past the period of negative amortization and into the period where the amortization payments outweigh interest on the liability, should see the funded ratio of the LACERS plan begin to improve.

Funded ratio progress can be due to a host of reasons, but one key reason is the commitment to the actuarial funding policy, and not deviating from it. The actuarial funding principles are designed to work by creating a laddered amortization approach to smooth out budgetary impacts with the eventual goal of closing the funding gap over time. We have found that plans that have stayed with their original amortization schedules, without making adjustments to refresh (or re-start) components of their amortization schedules, are more likely to be in healthier funded positions.

We also recognize that actuarial calculations can often be at odds to budget realities. We would caution against similar adjustments that were done in 2012, which created a negative amortization environment and extended the time period for paying down the unfunded liability. Avoiding instances like this in the future will allow the actuarial assumptions and methods for the LACERS plan to improve the overall funded ratio and financial stability.

C. Opportunities and risks of variances in actuarial assumptions.

Background:

Economic and demographic assumptions are expectations which will differ from actual experience. The key is whether policies and procedures are in place to learn from and adjust as deviations occur. LACERS' annual actuarial valuations along with the triennial actuarial experience studies performed will serve to self-correct assumptions over time as actual experience differs from expectations.

Conclusions:

Based on analysis provided by the plan actuary's annual valuation report, the unfunded liability is projected to be completely settled in the future based on the actuarial contribution policy in place. A headwind to LACERS is the combined amortization base which has exhibited negative amortization since its inception, slowing funded ratio progress. As years progress, and the City stays committed to the existing contribution policy, more of the unfunded liability will be paid down which will improve the Plan's funded status.

D. Funding ratios and Liabilities, employer/employee contributions, and projected pension benefits growth

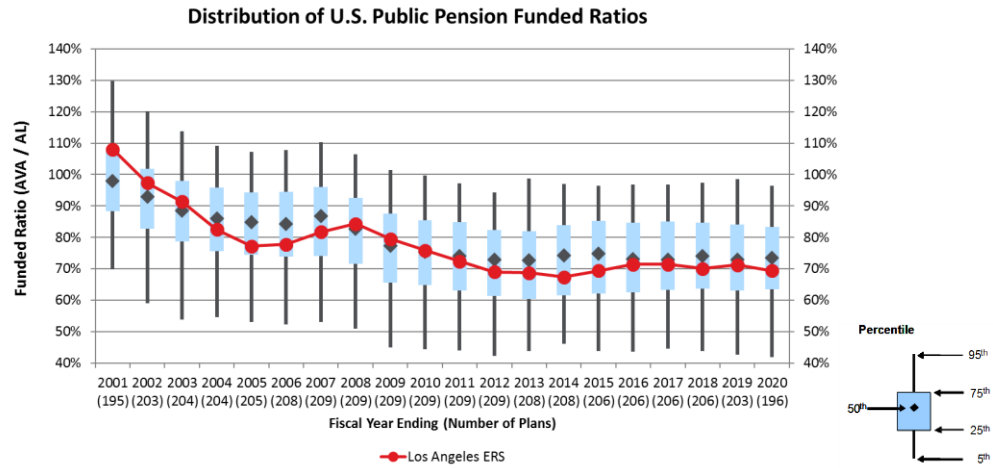
Background:

For purposes of peer comparisons, the data is sourced from Public Plans Data (<https://publicplansdata.org/>) which is a collaborative Partnership between the Center for Retirement Research at Boston College (CRR), the MissionSquare Research Institute (formerly the Center for State and Local Government Excellence), National Association of State Retirement Administrators (NASRA), and Government Finance Officers Association (GFOA). The Public Plans Data contains detailed annual data on the largest state/local pension in the United States. The sample spans fiscal years 2001 to 2020 and includes 210 plans (119 state-run and 91 locally-run) which account for 95 percent of state/local pension assets and members in the U.S.

Conclusions:

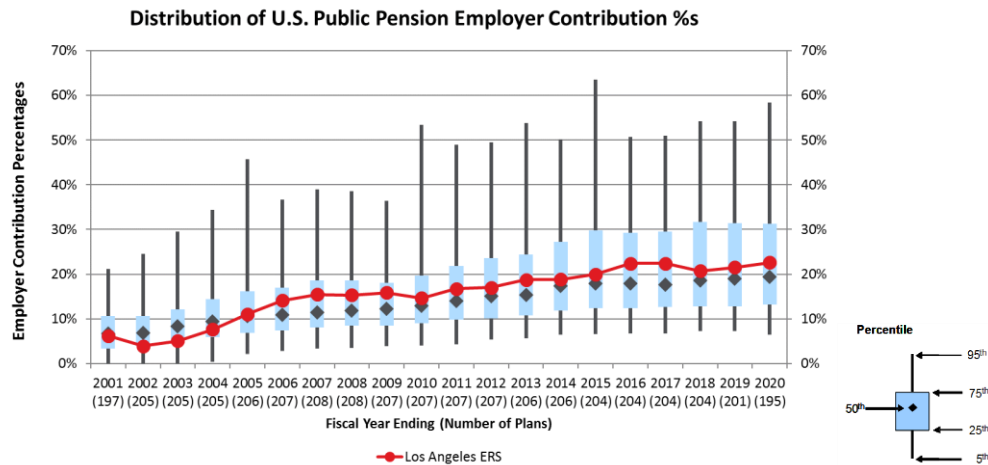
- *Funded Ratio (Chart I-7):* LACERS' funded ratio as of 6/30/2020 (based on an actuarial value of plan assets) was slightly below the peer median (using data from publicplansdata.org as of October 2021). The funded ratio is an important data point as any unfunded liability will be systematically incorporated into future contribution amounts. As funded ratio moves lower, future contributions will need to increase (and vice versa).

Chart I-7. U.S. Public Pension Funded Ratios



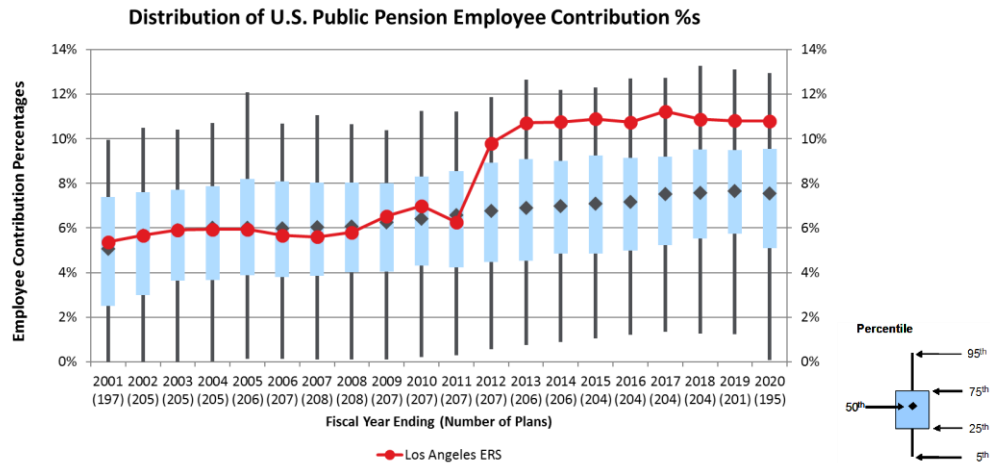
- *Employer Contribution Rate (Chart I-8.):* LACERS' aggregate employer contribution rate as of 6/30/2020 (as a percent of payroll) was slightly above the peer median (using data from publicplansdata.org as of October 2021). Employer contribution rates will be a byproduct of future performance. As funded ratio increases and less unfunded liability exists, contribution rates should tend to decline (and vice versa).

Chart I-8. U.S. Public Pension Employer Contribution Rates



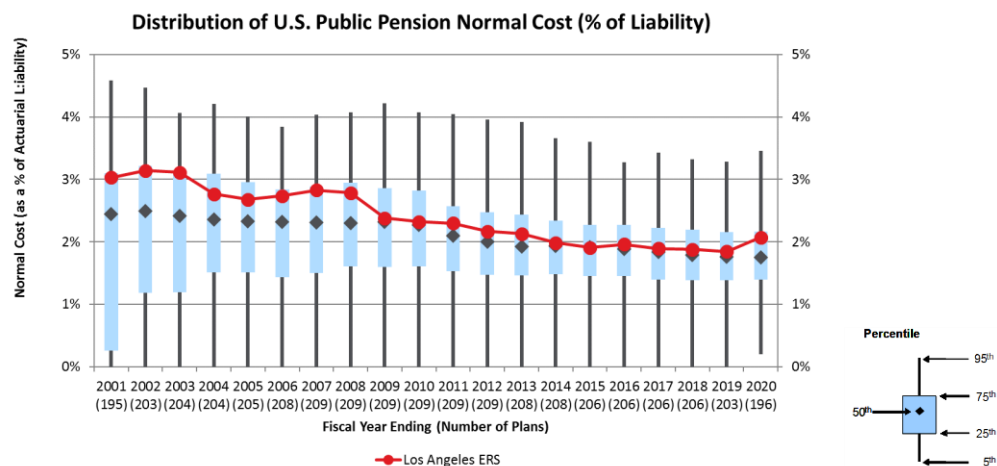
- Employee Contribution Rate (Chart I-9.): LACERS aggregate employee contribution rate as of 6/30/2020 (as a percent of payroll) was between the 75th and 95th percentile relative to peers (using data from publicplansdata.org as of October 2021).

Chart I-9. U.S. Public Pension Employee Contribution Rates



- Future Benefit Accruals (Chart I-10.): Future new benefit accruals for the LACERS plan can be thought of by measuring the level of normal cost (i.e., new benefit accruals) as a percent of the total pension liability. Using this measure as of 6/30/2020, LACERS' benefits were expected to grow slightly more than the peer median rate (using data from publicplansdata.org as of October 2021). Higher benefit accruals will be directly proportional to higher overall annual costs (and vice versa).

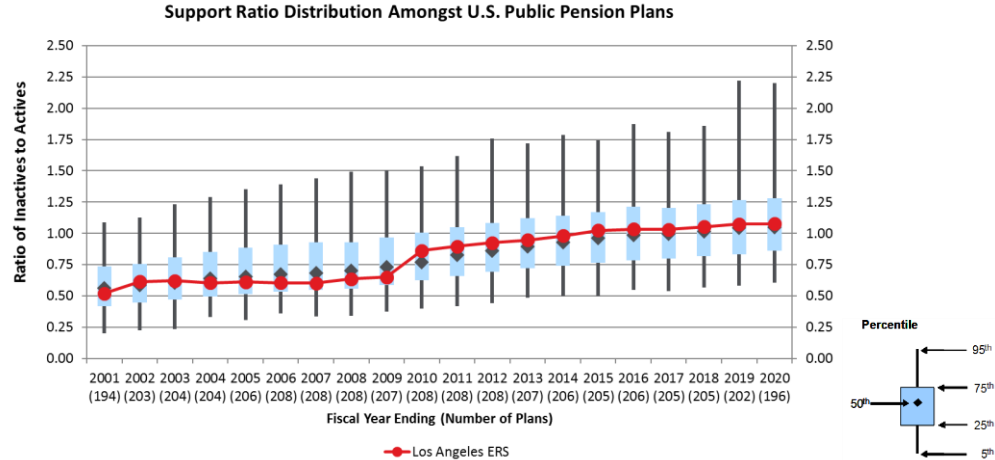
Chart I-10. U.S. Public Pension Future Benefit Accruals



- Support Ratio (Chart I-11.): Support ratio is defined as the ratio of inactive participants to active participants. This ratio is relevant when considering contribution percentages. A ratio above 1 implies that active participants support more than their number of inactive and that changes to the unfunded liability associated with all participants could result in sizable

adjustments to the active payroll-based contributions. Over time, as seen in the illustration below, both LACERS and peers (using data from publicplansdata.org as of October 2021) have seen this ratio increase.

Chart I-11. U.S. Public Pension Plans Support Ratio



E. Innovative pension fund sustainability strategies

Background:

Financial sustainability of the pension plan is rooted in three primary drivers: 1) accurate calculations of plan liabilities; 2) thoughtful investment strategy; and 3) sound actuarial contribution policy along with a commitment to such funding.

Conclusions:

- *Accurate Plan Liabilities:* LACERS' annual actuarial valuation utilizes sound actuarial assumptions and methods which have been (and will continue to be) refined through its regular process of actuarial experience studies every three years.
- *Thoughtful Investment Strategy:* LACERS has conducted regular asset-liability studies to analyze the risk/reward merits of its investment strategy. Understanding how an asset allocation and its range of future outcomes will impact contribution rates, funded ratio, and net cash flows will allow stakeholders to make informed decisions to set the Plan up for future success.
- *Commitment to Funding:* Over the last decade, the City has made contributions in-line with the calculated actuarial amounts. Continuing to do so without deviating from the future actuarial contribution schedule will lead to a sustainable pension plan.

As it relates to LACERS' funding and the slow progression to date of the funded ratio, a key item was the creation of the combined amortization base in the June 30, 2012 actuarial valuation which used a 30-year amortization period. Since that base was established, LACERS

has been in the period of negative amortization with interest on the liability outweighing the amortization payments. The LACERS plan will start moving beyond this negative amortization period soon, with amortization payments becoming greater than the interest on the liability thereby closing the funding shortfall.

The emphasis on the combined base is due to its relative size when compared with the total LACERS amortization payment. It should also be noted that while the negative amortization payment exists for this specific base created in 2012, subsequent amortization bases have adopted either 15- or 20-year payment periods, largely avoiding any negative amortization impact.

We would caution against similar adjustments that were done in 2012, which created a negative amortization environment and extended the time period for paying down the unfunded liability. Avoiding instances like this in the future will allow the actuarial assumptions and methods for the LACERS plan to improve the overall funded ratio and financial stability.

Other Innovative Strategies

F. Cybersecurity

Background:

Cybersecurity has always been an important component of protecting member data and is a critical risk that must be properly managed by retirement systems. The Employee Retirement Income Security Act of 1974 (ERISA) governs private pension plans and is administered and enforced by the U.S. Department of Labor (DOL) Employee Benefits Security Administration. ERISA is very influential for public pension funds as it sets forth fiduciary duties and standards, is often modeled by state laws, and serves as guidance in the absence of state precedent with respect to fiduciary matters.

On April 13, 2021, the DOL issued guidance for protecting plan data from internal and external cybersecurity threats. The guidance focuses on cybersecurity obligations in the context of fiduciary obligations and makes it clear that responsible plan fiduciaries have an obligation to ensure proper mitigation of cybersecurity risks to protect participant data. The guidance was issued in three parts and is good guidance for public pension systems: 1) cybersecurity best practices for plan fiduciaries and record keepers; 2) tips for plan sponsors and fiduciaries in prudently selecting a service provider with strong cybersecurity practices and monitoring their activities; and 3) online security tips for plan participants and beneficiaries who access their accounts online.

The cybersecurity best practices include having a formal, well documented cybersecurity program, conducting risk assessments and annual third-party audits of security controls, having strong access control procedures, and conducting periodic cybersecurity awareness training.

Through our review of documentation and our interviews, it is clear that LACERS has recognized the need to prudently manage cybersecurity risks. The current LACERS Strategic

Plan and Business Plan Initiatives include adopting a cybersecurity risk management framework. Additionally, LACERS secured cyber liability insurance in 2021. At its January 25, 2022 Board meeting, the Board reviewed a Cybersecurity Controls Audit Report issued by LACERS internal audit in conjunction with outside consultant Grant Thornton. The audit consisted of a review of LACERS information technology system controls, with detailed recommendations for enhancements. LACERS will implement these recommendations during the 2022-2023 fiscal year.

LACERS should continue its ongoing oversight and management of cybersecurity risks for the foreseeable future.

G. Securities Lending Program and Agent Oversight

Why Lend

Assets sitting in an institutional investor's portfolio, such as LACERS, may have incremental revenue potential beyond dividend payments and market value appreciation. As a beneficial owner, by lending out those assets institutional investors like LACERS can unlock that potential by collecting fee income from a borrower that wishes to temporarily obtain securities owned by the institutional investor.

Basic parties that are involved with a securities lending transaction:

- **Beneficial Owner/Lender:** Institutional investors, e.g., retirement plans like LACERS, endowments, foundations, insurance companies, investment managers, etc.
- **Securities Lending Agent:** Typically, the custodian and securities lending agent are one in the same, however, beneficial owners can also utilize a 3rd party to lend their assets. The securities lending agent acts on the beneficial owner's behalf to lend their assets.
- **Borrower:** Generally, a broker, dealer or bank that borrows securities from the beneficial owner to engage in a hedging, arbitrage or other investment strategy.

A securities lending transaction is simply a temporary loan of securities in exchange for acceptable (cash or securities) collateral between a lender and an approved borrower, and one that meets certain requirements that make it unique from a sale. Due to the high volume of loans, collateral and entitlement tracking, the transaction is most typically facilitated by a lending agent.

Securities lending offers a viable way to enhance returns and generate incremental return/alpha. Asset owners consider it a low-risk way to offset pension obligations or custodian fees. Securities lending also plays a significant role in today's capital markets. In general, securities lending is believed to improve overall market efficiency and liquidity. In addition, securities lending plays a critical role in certain hedging strategies, acts as a useful tool in risk management and helps facilitate the timely settlement of securities trades.

Regulators, academia, lenders and borrowers empirically recognize that lending improves market liquidity and price transparency. Some view it as an astute investment management technique to further mitigate downside portfolio risk.

Sizing the Securities Lending Market

Globally, at the end of 2021, there was estimated to be approximately \$37 Trillion of client securities enrolled in lending programs approaching \$3 Trillion on loan. The largest lenders are asset owners (e.g., corporate and government retirement plans and other governmental entities) comprising about 70%, and asset managers (insurance companies, investment managers, and central banks) comprising another 30% of transactions.



*Source: ISLA March 2022.

2021 marked the highest recorded revenue generating year for securities lending across the industry approaching \$11 Billion dollars in revenue and almost \$3 Trillion on loan, both driven largely by equities that typically derive the higher returns.

Securities that are Lendable

There are a limited number of lendable securities - global equities (including exchange-traded funds), corporate bonds, sovereign and supranational debt.

Non-Lendable Securities

Many securities are not lendable due to tax or other issues such as municipal bonds, commercial paper, money market instruments, comingled funds & other line items, real estate, and alternative investments.

The Mechanics of Securities Lending

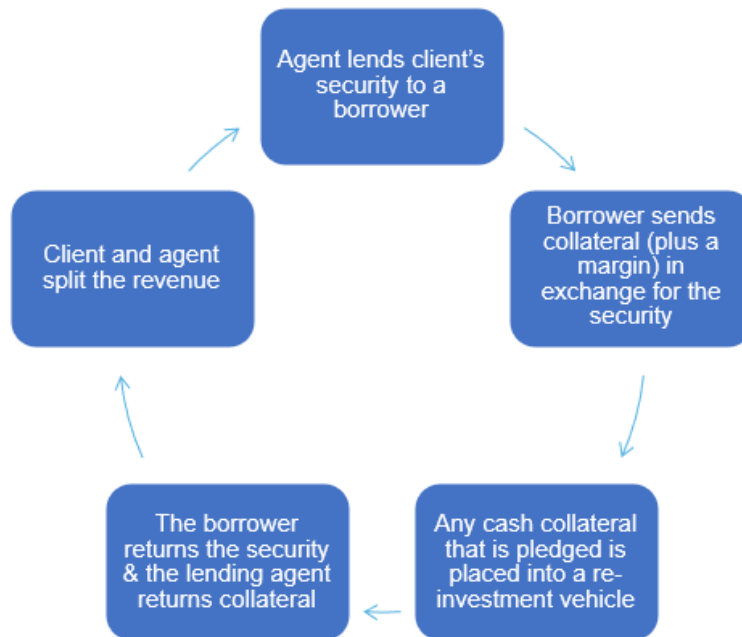
Virtually any long-term, beneficial owner of securities can lend. Owners of securities have an incentive to lend securities as the fees received in return for lending can boost portfolio performance or otherwise offset costs of managing a portfolio. These lenders of securities earn a return in two complementary ways – from fees often received in connection with lending securities, particularly those that are in high demand, and from the investment return on cash collateral received in return for a loan.

Securities lending is, most fundamentally, a collateralized transaction that takes place between two parties. In a loan of securities, the beneficial owner of those securities (the “lender”) temporarily transfers title to a security as well as the associated rights and privileges of ownership to a borrower. While the borrower receives all interest, dividends and corporate action rights on the security, the borrower is required to repay the economic value of these benefits back to the lender. The borrower also holds any voting rights attached to the security while the loan.

In return for lending the security, the lender receives collateral from the borrower. The value of the collateral typically exceeds the value of the lent security. This collateral typically takes the

form of cash or other highly liquid securities such as short-term government bonds or equities. The typical market practice for the collateral value is 102% (same currency loans and collateral) or 105% (different currency loans and collateral) of the value of the lent security. The margin levels are “marked-to-market,” or valued, on a daily basis to ensure that the loan is sufficiently collateralized at all times.

Securities Lending Process



Institutional Investor’s Role in Securities Lending

As a beneficial owner lender, the institutional investor (often times in conjunction with a securities lending consultant) stipulates the securities in their portfolio they are willing to lend, identify the types of borrowers to whom they are willing to lend to and the types of acceptable non-cash collateral, and the guidelines that instruct how any cash collateral is reinvested. This cash is invested in short-term money market instruments for the duration of the loan. A borrower instructs the agent that they wish to borrow a lendable asset, posting cash collateral or non-cash collateral against the loan in excess of 100% of the market value of the borrowed securities.

Oversight of Securities Lending Programs

Those responsible for approving and overseeing their securities lending service providers will play a role in defining the parameters of the program and overseeing it on an ongoing basis. The beneficial owner should be satisfied that full due diligence has been undertaken at the commencement of a securities lending arrangement, and that compliance and due diligence are regularly performed as the program continues. On an ongoing basis, the beneficial owner should employ its business judgment to evaluate the nature and quality of the services provided by the securities lending agent, as well as the competitiveness of the fees charged by the agent.

As an institutional investor, a public pension fund's securities lending cash collateral portfolio often becomes its largest, single investment by assets under management. The fund is responsible for overseeing this cash, along with the non-cash collateral, so it is critical for public pension funds to complete daily, monthly and quarterly compliance monitoring on the lending program. Many institutional investment programs, including public funds, often do not have the expertise and holistic view of the lending industry to thoroughly oversee a program. If this is the case, they should employ an independent expert that specializes in securities lending oversight.

Due to the growing complexities and considerations of the securities lending industry and the level of knowledge required to oversee a securities lending program, a recent trend has occurred where beneficial owners are outsourcing the oversight responsibilities of securities lending programs to an independent 3rd party securities lending consultant.

Oversight should include performing an in-depth due diligence on the agent's capabilities and capacities to assess alignment with industry best practices. It should examine a program from a number of perspectives including:

- Contractual provisions to mitigate risk
- Technology systems
- Trading competitiveness
- Risk oversight
- Collateral capabilities and practices
- Applicable benchmarking
- Optimization of portfolio risk-adjusted performance

Regarding risk, the reinvestment of cash collateral introduces a combination of risks including interest rate, credit, market, liquidity, legal, tax, regulatory, and country risk. It is important to have a clear understanding of the risks and the wherewithal of the lender to effectively manage and mitigate those risks through experience, technology, procedural expertise, compliance and control systems.

There are often wide disparities of performance and risk management capabilities and expertise among lending providers. This can lead to significant opportunity costs from lending programs that are implemented without appropriate oversight.

Analysis performed to differentiate lenders is often based on revenue estimates and fee splits. While revenue and fees are important, there should be a thorough review of how the revenue is generated (i.e., risk-adjusted returns) and the detailed practices used to mitigate the risks inherent in any program.

A comprehensive Securities Lending Program and Agent Oversight service would enhance the lending program for many public funds. In Aon's experience of overseeing multiple securities lending programs, there are opportunities to strengthen the contractual risk of loss provisions, and collateral and program guidelines. This mitigates risks for the beneficial owner while increasing revenue earning potential. Through annual oversight, Aon has frequently found a

significant increase to securities lending revenue earning potential through program and guideline adjustments.

The value of 3rd party oversight and possible revenue enhancements have the ability to offset securities lending consulting fees. The oversight service should detail how to best mitigate risks with a well-defined, customized program overseen to operate in accordance with the 'spirit' of the fund's appropriate guidelines.

Oversight should include several public pension fund specific reports and compliance checks performed over the course of a year including:

- A detailed annual agent due diligence,
- An analysis for performance optimization and risk mitigation enhancement,
- A performance and benchmarking analysis, and
- A quarterly evaluation of, and compliance with, detailed Key Performance Indicators (KPIs), that should cover the most detailed facets of a lender and the clients program,
- Periodic updates to a board or committee.

Oversight should analyse the risk/reward trade-offs between collateral options, structures, and guidelines for the assets while optimizing parameters that are in the public pension fund's best interest.

Recommendation I.1.:

High Priority	Medium Priority	Low Priority X
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- LACERS should review whether securities lending and agent oversight could result in opportunity cost savings/revenue enhancements or additional risk mitigation benefits.
-
-

II. Investment Performance/Asset allocation

Active and passive management

- ***LACERS use of active and passive management of the funds***

Background:

As has been pointed out many times over the years, given an investment universe, active investment management is a zero-sum game. Within any time period an active investment manager is only able to outperform their peers if there are other investment managers who underperform. On an asset weighted basis the average gross of fee performance of all investment managers has to be the same as that of the market in which they are active. While we acknowledge the average active manager is likely to underperform after fees, we also believe that actively managed, long-only public equities are likely to add value for skilled investors willing to employ well diligenced investment strategies and stick with them over the long-term.

The decision on how much to invest actively and passively in each asset class can be very client specific. The optimal mix depends on factors such as risk control preferences, desired number of managers, level of confidence in active management, propensity to deal with active manager underperformance over short term periods, and sensitivity to investment manager fees. The key is to determine the approach that will maximize the success of the investment program maximizing the net of fee investment return over time.

The key to success is to identify truly skilled investment managers and invest with them. The challenge is to identify such managers on a forward-looking basis. It is not enough that a manager has a proven track record. They have to show that their superior performance came from a solid investment process instead of luck, and that they are able to keep adding value in the future, even as their performance attracts more assets. An investment manager can only identify a finite number of investable opportunities and it may be very difficult to scale up some opportunities and strategies as assets under management grow.

After an active investment manager has been hired, they must be carefully monitored on several dimensions. If they experience personnel changes, the continued integrity of their investment process must be verified. If performance is below expectations for a longer period of time, the validity of their investment process must be reassessed. They may also engage in style creep where, e.g., a small-cap value manager starts investing in large-cap growth stocks, or they may engage in market timing by moving in and out of cash. If serious enough, any of these events should lead to replacement of the manager, which necessitates a costly and time-consuming search process. Passive management, on the other hand, is a relatively more simple mandate that requires much less use of resources to diligence.

Background on LACERS' use of passive investments

The following data on aggregate and asset class level use of passive investments, were extracted from LACERS' quarterly performance reports as of 9/30/2013 and 9/30/2021. Cash holdings represents a de minimis portion of most investment programs and are excluded from the Total Fund analysis (far right column) to allow for more direct comparability among portfolios.

Table 2-1. LACERS Asset Class Weights (9/30/2013 Quarterly Performance Report)

Asset Class	Weight	Policy	Active Share of Asset Class	Passive Share of Asset Class	Passive % of Total Fund ex. Cash
U.S. Equity	38.2%	24.0%	35.2%	64.8%	25.6%
Non-U.S. Equity	21.7%	29.0%	53.4%	46.6%	10.5%
<i>Developed Ex-U.S.</i>	19.4%	21.8%	47.8%	52.2%	10.5%
<i>Emerging Markets</i>	2.3%	7.2%	100%	0%	0%
Core Fixed Income	21.2%	19.0%	100%	0%	0%
Credit Opportunities	0.8%	5.0%	100%	0%	0%
Real Assets	5.3%	10.0%	100%	0%	0%
Private Equity	9.3%	12.0%	100%	0%	0%
Cash	3.5%	1.0%			
Total Fund (cash excluded)			63.9%	36.1%	36.1%

Table 2-2. LACERS Asset Class Weights (9/30/2021 Quarterly Performance Report)

Asset Class	Weight	Policy	Active Share of Asset Class	Passive Share of Asset Class	Passive % of Total Fund ex. Cash
U.S. Equity	23.4%	22.5%	16.0%	84.0%	19.7%
Non-U.S. Equity	26.0%	27.0%	53.9%	46.1%	12.1%
<i>Developed Ex-U.S.</i>	19.3%		46.0%	54.0%	10.5%
<i>Emerging Markets</i>	6.7%		76.4%	23.6%	1.6%
Core Fixed Income	16.1%	16.7%	69.2%	30.8%	5.0%
Credit Opportunities	8.1%	7.3%	100%	0%	0%
Real Assets	11.5%	12.0%	100%	0%	0%
Private Equity	14.5%	13.5%	100%	0%	0%
Cash	0.4%	1.0%			
Total Fund (cash excluded)			63.2%	36.8%	36.8%

The LACERS portfolio has increased the weighting of passive investments very slightly during the review period, going from 36.1% to 36.8%, when excluding cash. U.S. Equity, Developed Ex-U.S., Emerging Markets, and Core Fixed Income increased their use of passive investments, as seen in the table below. This shift was offset by an increased allocation to Credit Opportunities, Real Assets, and Private Equity. Passive investing is not as common within these asset classes, and not an option at all within some sub-asset classes.

Table 2-3. Passive Share of Portfolio as of 3/31/2013 and 9/30/2021

Asset Class	Passive Share of Asset Class 3/31/2013	Passive Share of Asset Class 9/30/2021
U.S. Equity	64.8%	84.0%
Developed Ex-U.S.	52.2%	54.0%
Emerging Markets Equity	0%	23.6%
Core Fixed Income	0%	30.8%

Conclusion:

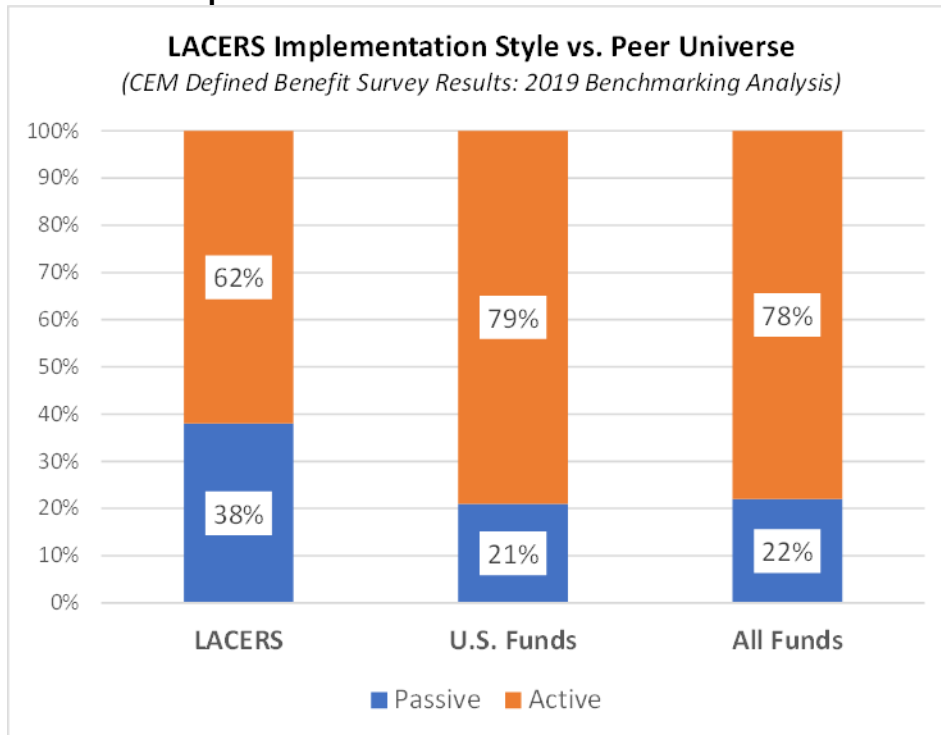
LACERS has increased its use of passive investments within asset classes where it is possible to do so. Due to the independent decision to increase allocations to asset classes that do not lend themselves to passive investing, the aggregate level of passive exposure increased slightly.

- ***Benchmark and comparison of LACERS' use of passive management***

Background:

In the Implementation Style section of the CEM Defined Benefit Survey Results: 2019 Benchmarking Analysis (most recent benchmarking analysis LACERS performed) LACERS' use of active and passive investment managers is compared to a peer universe of U.S. funds.

Chart 2-1. Passive Exposure Relative to Peer Public Funds



According to this benchmarking analysis (shown above), the peer universe of U.S. Funds

averaged 79% active management and 21% passive management. LACERS had 62% active and 38% passive management. This is consistent with the ~37% weight in passive management, from the 9/30/2021 performance report.

In 2019 LACERS had a 17% higher allocation to passive management than its peer universe reported in the CEM Defined Benefit Survey Results.

Additionally, we used the Greenwich Associates 2020 Market Trend Data Tables for U.S. Institutional Investors to compare LACERS' implementation style against a peer group of public funds greater than \$5B. (The Greenwich Associates data is not part of the documentation provided by LACERS, but was independently sourced)

When excluding cash, we get the following average portfolio allocation to passive investments.

Table 2-4. Total and by Asset Class Passive Exposure for LACERS and Public Fund Peers

Passive % Total Portfolio ex. Cash		
Asset Class	LACERS 9/30/2021	Peer Group (Public Funds +\$5B)
U.S. Equity	19.7%	11.5%
Non-U.S. Equity	12.1%	4.1%
Core Fixed Income	5.0%	5.4%
Credit Opportunities	0%	0%
Private Equity	0%	0%
Real Assets	0%	0%
Other	0%	0%
TOTAL	36.8%	21.0%

LACERS 37% allocation to passive investments was ~16% higher than the peer group's 21% allocation. The difference is primarily due to LACERS' higher passive portfolio weight in U.S. Equity (19.7% vs. 11.5%) and Non-U.S. Equity (12.1% vs. 4.1%).

Conclusion:

LACERS has implemented passive investment mandates to a larger extent than its peers. This move has been consistent with consultant recommendations and its risk budgeting process. For more detail concerning LACERS' risk-budgeting process, please refer to the section below.

- ***LACERS' cost benefit analysis of active vs. passive management***

Background:

LACERS performed cost-benefit analysis of active vs. passive investment management three times during the scope period (2013, 2018, and 2021). LACERS has a formal risk budgeting process documented in its Investment Policy Manual (IPM). The risk budgeting process provides a framework for deriving the allocation between passive and active investments of a given asset class, where applicable, as articulated on pages 199-200 of the IPM:

Asset Class Risk Budgets

*The next greatest driver of the System's return and risk is the asset class structure. Asset class structure decisions involve determining which strategies will be included within the asset class, the allocations to these strategies, and **setting the active versus passive exposure.***

A "risk budget" represents the amount of active risk the Board is willing to assume for each asset class. The Board adopts a risk budgeting approach to construct, measure, and monitor asset classes that include active and passive strategies. The Board believes that this approach provides an objective and systematic yet flexible means of constructing asset classes in a way which will maximize the probability of meeting long term asset class objectives while managing the risk of its public markets asset classes in a proactive manner.

LACERS' Risk Budgeting Process

*In order to arrive at the optimal risk budget objective for each asset class, the Board engages in an objective, disciplined process that will be uniformly **applied to all asset classes that include active and passive strategies.** This process involves a mean variance optimization approach which employs the following inputs for each strategy under consideration by the Board:*

- 1. Expected excess return over the asset class benchmark*
- 2. Expected excess risk over the asset class benchmark*
- 3. Expected correlations between strategy excess returns*
- 4. Constraints to ensure prudent exposures to strategies and risk factors*

The objective of this mean variance optimization exercise is to arrive at an excess risk target (i.e., the risk budget) which maximizes the excess return desired by the Board. The risk budget reflects the amount of excess risk the Board is willing to take for that desired excess return.

Framework for Policy Implementation

*The risk budgeting process outlined above will be conducted in conjunction with the Board's asset-liability valuation process. **The frequency of this process will be at least every three years or sooner if warranted** based upon changes in market conditions or benefits to plan participants. The Board may choose at that time to revise or retain its existing risk budget as a result of this process.*

The IPM articulates that an active vs. passive review will be performed at least every three years, as part of the asset allocation process. During the scope period there was a five-year gap between the 2013 and the 2018 reviews.

Conclusion:

LACERS has formally performed cost benefit analysis of active vs. passive management during Final Management Audit Report of the Los Angeles City Employees' Retirement System | Fiduciary Services Practice Aon Investments USA Inc.

the scope period. However, they were not performed as frequently as required by the IPM. We believe ongoing reviews of active vs. passive are a component of good governance, but do not believe a review cycle needs to be articulated in policy.

Recommendation II.1.:

High Priority X	Medium Priority	Low Priority
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- Aon recommends creating a formal procedure to ensure governance processes articulated in the policy are completed on the mandated cycle.
-
-

- ***Adequacy of the active vs passive analysis performed***

Background:

The primary analysis performed by LACERS which drives the level of active vs passive management within the portfolio is its “Risk Budgeting Process”. Within this section of our report we have reviewed the adequacy of the risk budgeting analysis performed during the scope period, and its role in selecting the desired level of passive investments. The Risk Policy in the IPM outlines a number of steps that are required for the Risk Budgeting Process. It appears that the 2013, 2018, and 2021 reviews performed all the steps outlined, as summarized in the table below.

Table 2-5. Risk Budgeting Process Documented in IPM

Required by Policy	2013 Review	2018 Review	2021 Review
Update expected excess net return over the asset class benchmark, for active strategies	X	X	X
Update expected excess risk over the asset class benchmark, for active strategies	X	X	X
Update expected correlations between strategy excess returns, for active strategies	X	X	X
Update constraints to ensure prudent exposures to strategies and risk factors	X	X	X
Perform mean variance optimization with the updated inputs	X	X	X

The risk budgeting process also included additional analysis beyond what was required by the IPM, but noteworthy with regards to our review.

Table 2-6. Additional Applicable Analysis Included within the Risk Budgeting Process

Additional analysis performed in reviews	2013 Review	2018 Review	2021 Review
Analysis of expected asset class returns	X	X	O

Analysis of beta risk of asset classes	X	X	O
Review of how best to pursue active management	X	X	X
Review of asset classes with best opportunities for excess returns through active management	X	X	X
Review of active fees by asset class	X	X	O
Analysis of LACERS use of passive investments	X	X	O
Comparison against other pensions funds' use of passive investments	O	X	O

The complete risk budgeting process has two components. The first component is the allocation of absolute risk to the various asset classes in the portfolio. The second component is the active risk budgeting process to determine how much active risk (difference in return between the portfolio and the benchmark) the Board is willing to accept within each asset class.

Active risk (or tracking error) measures the amount of deviation between the return of the portfolio and the benchmark. Lower active risk implies that differences relative to the benchmark are expected to be small and is typically associated with larger allocations to passive investments or lower risk active mandates. Larger active risk implies that differences relative to the benchmark will be more meaningful and is typically associated with smaller allocations to passive investment management or higher risk active mandates. As of 9/30/2021, LACERS had the following active risk budget.

Table 2-7. Active Risk Relative to the Risk Budget and Peers (9/30/2021)

Public Markets Asset Class	Previous Target Risk Budget	Current Target Risk Budget	Actual 3-Yr Tracking Error	Peer Group 5-Yr Active Risk
U.S. Equity	0.50%	1.25%	0.93%	1.34%
Non-U.S. Equity	1.20%	1.75%	1.71%	1.81%
Core Fixed Income	1.00%	1.75%	0.60%	1.01%
Credit Opportunities	1.50%	3.50%	1.87%	
Public Real Assets	3.00%	1.25%	4.14%	

(Peer Group 5-Yr Active Risk sourced from Aon's Client Universe Risk Data)

The current active risk targets for U.S. Equity and non-U.S. Equity are both relatively close to their peer group values and the actual tracking errors. The current risk target for Core Fixed Income is a bit higher than the peer group level, but the actual tracking error is well below. It is expected that actual tracking errors will deviate from the targets over time. The current targets were approved on 6/22/2021, according to the performance report, and will not yet be fully reflected in the 3-year tracking error. Additionally, risk budgeting is in some ways more of an art than a science and realized tracking error is not expected to exactly track the budgeted amount.

Conclusion:

The primary analysis performed by LACERS which drives the level of active vs passive management within the portfolio is its "Risk Budgeting Process". This analysis was performed in 2013, 2018, and 2021.

As outlined above, we consider the risk budgeting process used to derive the level of passive management to be in-line with best practice.

- ***Recommended frequency of cost/benefit studies***

Conclusion:

It is common practice in the industry to perform active vs passive cost/benefit studies on an ad hoc basis. We would consider it best practice to review the implementation of active vs passive whenever asset allocation is reviewed, so in many scenarios annually. However, we see these annual reviews more as an opportunity to re-affirm the previous decision and ensure that the exposures continue to be in-line with expectations. We do not expect clients to make material changes to their active vs passive implementation on a frequent basis. Furthermore, we believe that the active vs passive decision should be predicated on forward looking expectations and not recent performance.

- ***LACERS' response to studies***

Conclusion:

As shown in the analysis above, the Board has been significantly increasing its exposure to passive investment management during the scope period in asset classes where passive investment management is most common. Additionally, the portfolio has a larger allocation to passive investment than peers.

- ***Advantages/Disadvantages relative to passive management***

Conclusion:

We believe that actively managed equities are likely to add value for skilled investors who have performed robust diligence and do not over-emphasize short-term performance. However, these characteristics are rare, so most of the world's investors are better off investing equities passively. We apply these views to several specific situations:

Investment committees with turnover: Investors need to remember why they hired each manager and how they expect them to perform in various markets over different time periods. This is especially important for high-conviction managers, whose performance can have large swings. Institutional memory can be short when committees turn over frequently, and committee members may be less knowledgeable about, or patient with underperformance from investment managers they did not select. For investment committees with significant turnover, we suggest possible options to manage this risk:

- Develop a written set of investment beliefs, including the role and expectation for each manager. When a high-conviction equity manager is experiencing bumpy performance, this could be resurfaced to remind the committee that it was aware such an experience was likely and help them keep a steady hand.
- Delegate the investment decision to the CIO or consultant. In this approach, the CIO monitors performance and the committee will be less focused on hiring and firing decisions for individual managers.

Investors with external pressures: Most institutional investors have external pressures. For example, it is common to be reviewed by a board, and chief investment officers may have career risk associated with their investment decisions. Public pension plans are often subject to scrutiny from taxpayers, legislators, and the media. These influences can be both good and bad; most notably, it often makes it difficult for investors to be different from the norm. We have seen some investors hire (what we believe are) good investment managers, experience short-term underperformance, then be pressured to terminate the managers. “Know thyself” is key; investors should only pursue strategies that they can implement successfully.

Investors with high return needs: It is tempting to say that investors needing high returns should use active management. It is critical to start by asking whether the investor is likely to add value with active management—active management used poorly is worse than passive management. Is the investor well-suited for active management, including being comfortable with active risk? If not, passive management may be preferable, and the investor may need to find another way to address its return needs.

We believe that actively managed fixed income is likely to add value for skilled investors or strong fee negotiators willing to employ loosely constrained or unconstrained strategies. However, active management is more complex and less liquid, so investors looking for simplicity or liquidity may be better served by investing passively. The primary reason we would consider passive fixed income as a viable alternative is if the client is particularly fee sensitive.

Investors who are particularly fee-sensitive: All investors should be fee-sensitive, as fees erode performance and net-of-fee performance is what truly matters.

- ***Potential cost savings***

Conclusion:

Increased exposure to passive investment management could be utilized to negotiate lower investment consulting, custody, and potentially lower staff costs. However, we believe these gains would be relatively modest and not a compelling rationale for increasing passive investment management. We believe increased exposure to passive investment management would be based on the Board’s views on the topics outlined below in our recommendations going forward on the next page of this Report.

- ***Impacts***

Conclusion:

The most efficient way to evaluate the impact of active investment management is through the review of net of fee performance attribution for the applicable period. Aon performed net of fee performance attribution for the scope period. The table below provides the impact to the Total Fund performance relative to the benchmark for each asset class where passive implementation is viable over the scope period. As shown, active implantation has added 0.32% (32 bps) annualized over the period. This represents an economic gain vs choosing to passively invest over the period evaluated.

Table 2-8. Excess Returns Achieved By Active Management During Scope Period

Asset Class	Net of Fee Excess Return (8-Years ending 9/30/2021)
U.S. Equity	-6
Non-U.S. Equity	31
Core Fixed Income	7
Total	+32 bps (0.32%)

- ***Performance of passively v. actively managed assets***

Conclusion:

Passive investment management represents an elegant, efficient, and low-cost implementation of market exposure. Over long and short periods of time the exposure can typically replicate the investment results of the market. However, there is often modest underperformance associated with fees and transactions costs. This tracking tends to be small (a few bps), but boards need to understand that the decision to passively implement does not equate to a complete elimination of underperformance. Furthermore, it likely guarantees a very small level of underperformance over time (due to fees and transaction cost; potentially partially offset by securities lending income). The comparison of the success of passively managed assets measured against actively managed assets in the same classes is best articulated in the table in the previous response. Asset classes with a positive value represent areas where active investment decisions have added value, and asset classes with a negative value represent areas where active investment decisions have detracted value. As shown, these exposures added ~0.32% annualized over the scope period, as opposed to a small level of underperformance that would likely be associated with a passive implementation. Another method for evaluating this information is by reviewing the asset class attribution provided in Appendix E of this Report.

- ***Our recommendations going forward***

Background:

We have provided an overview of our views of active vs passive below. For a more thorough articulation of our views, we have attached our white paper “Debating Active vs. Passive” as Appendix D.

Aon’s Active vs. Passive Views

The active versus passive management debate is both nuanced and rich. There are good reasons why this is a hotly-debated topic, and reasonable people fall on both ends of the spectrum. Our views are not rigid or ideological: they are based on research, the details of which are contained in several of our white papers we have published and are referenced within our white paper included as an appendix.

We believe some investors are well-suited for active management, while others are likely to perform best with passive investments. Suitability will vary based on both investor circumstance and asset class. While we acknowledge the average active manager is likely to underperform after fees, we also believe that actively managed, long-only public equities are likely to add

value for skilled investors willing to employ well diligenced investment strategies and stick with them over the long-term. However, conviction in active equity investment management is challenging to maintain, so most of the world's investors are better off investing equities passively.

Active management in fixed income has higher odds of success than equities, especially for broad, multi-sector mandates. Passive mandates may make sense for those needing a high level of simplicity or liquidity, or those investors who are cost sensitive.

Conclusion:

We believe some investors are well-suited for active management, while others are likely to perform best with passive investments. We have highlighted some of the factors that make passive investing more desirable above. For those institutional investors who are well equipped to incur active risk, and do so prudently, we believe they can achieve incremental return over a passive benchmark over long periods of time. Boards implementing actively managed investment strategies should be comfortable with:

- The level of active risk within the investment program – Achieved through active vs passive education and risk budgeting discussions – Currently performed by LACERS
- The ability of its staff and consultant to identify alpha generating investment opportunities – Achieved through ongoing oversight
- Experiencing periods (potentially long periods) of underperformance relative to passive implementation – Achieved by understanding the potential of underperformance prior to implementation

If the Board is comfortable with these factors, Aon is supportive of active management within the investment program.

- ***Mandated statutory investment requirements***

Background:

The City Charter requires that LACERS adopt an Investment Policy Statement (IPS) with the desired rate of return and acceptable levels of risk for each asset class, asset allocation goals, guidelines for the delegation of authority, and information on the types of reports used to evaluate investment performance. LACERS is required to conduct an annual IPS review and subsequently share with the Mayor and City Council. Furthermore, the Plan is required to disclose fees for all alternative investment vehicles entered into on or after January 1st, 2017.

Conclusion:

We observed that LACERS is in compliance with the mandated statutory investment requirements regarding the IPS. However, based on a review of the most recent Investment Policy Statement, dated May 25, 2021, Aon determined that the Policy does not define applicable statutory requirements that are to be followed by the System.

Recommendation II.2.:**High Priority****Medium Priority****Low Priority**

X

- Aon recommends all federal, state, and local legal requirements be explicitly stated together within the IPS.
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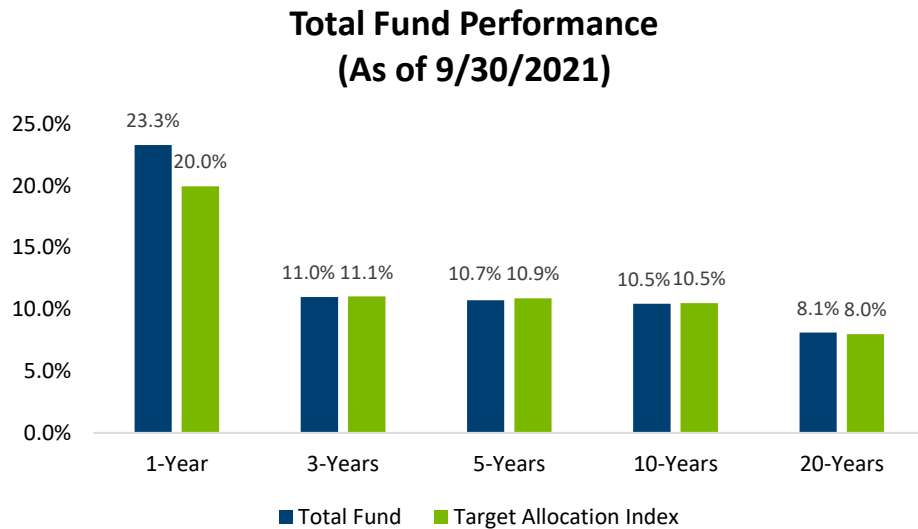
- ***The Investment Policy Statement (“IPS”) and associated processes***

Background:

The IPS outlines various objectives in section I.II titled “Investment Goal Statement”. Below we have included a list of each objective (bullets A-G), as well as analysis on the objectives where quantitative or qualitative review is possible.

- A. The overall goal of the System’s investment assets is to provide plan participants with postretirement benefits as set forth in the System documents. This will be accomplished through a carefully planned and executed investment program.
 - a. We believe this objective could be best measured in two ways:
 - i. The adequacy of the Asset-Liability/Asset Allocation process - Reviewed later in this section of the report.
 - ii. Ability to produce investment results commensurate with the strategic asset allocation derived by during the Asset-Liability/Asset Allocation process.
 - 1. The chart below illustrates the performance of the Total Fund relative to the policy benchmark as of September 30th, 2021. Over long-term trailing periods, the Fund, on a net of fees basis, has been able to produce results generally in-line with the policy allocation.

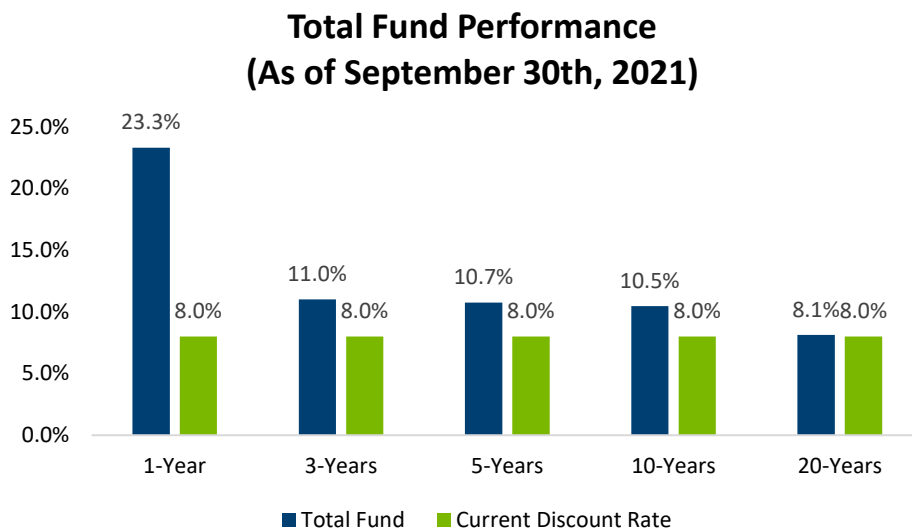
Chart 2-2. Total Fund Performance Relative to the Primary Benchmark



B. A secondary objective is to achieve an investment return that will allow the percentage of covered payroll the City must contribute to the System to be maintained or reduced and will provide for an increased funding of the System's liabilities.

a. We believe this objective is best evaluated by comparing the investment performance of the Plan relative to the actuarially stated rate of return or discount rate. During the scope period the expected return ranged between 7% and 8%. As shown in the table below, the Plan has produced investment returns in excess of the 8% discount rate, as well as the current 7% target.

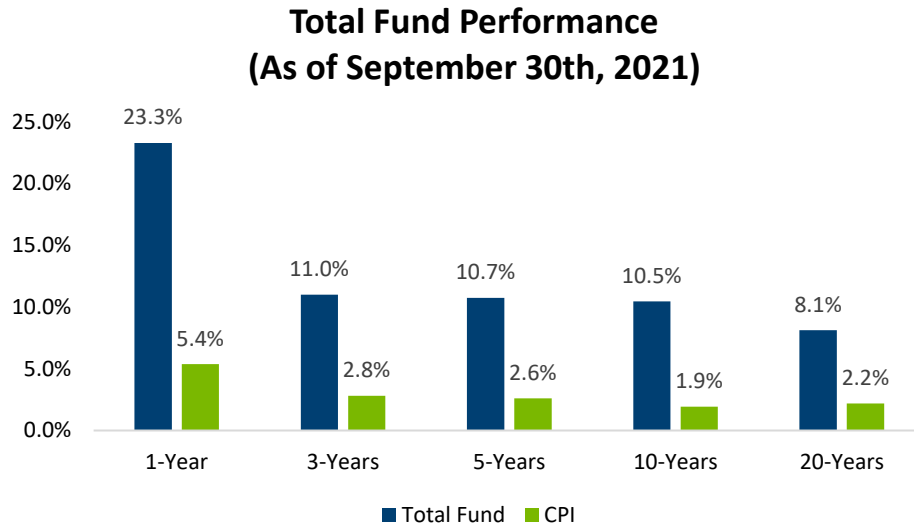
Chart 2-3. Total Fund Performance Relative to the Higher of the Recent Discount Rates



b. This objective can also be evaluated by comparing the trailing investment

results to inflation. The table below reviews the trailing returns of the portfolio against the Consumer Price Index (CPI or inflation). As shown, the portfolio has generated meaningful real rates of return over time (i.e., returns greater than inflation).

Chart 2-4. Total Fund Performance Relative to Inflation



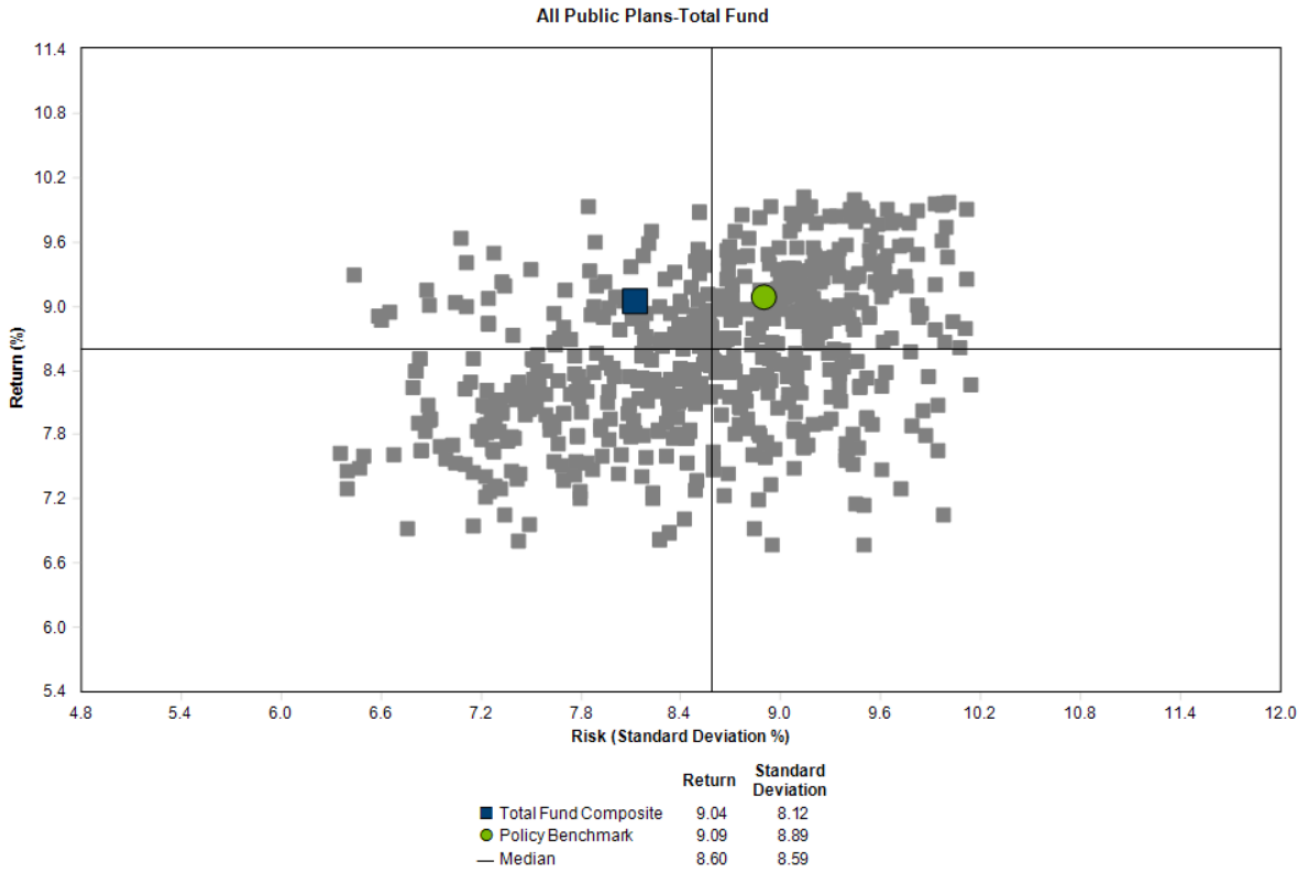
C. The System’s assets will be managed on a total return basis. While the System recognizes the importance of the preservation of capital, it also adheres to the principle that varying degrees of investment risk are generally rewarded with compensating returns. The Board’s investment policy has been designed to produce a total portfolio, long-term real (above inflation) positive return above the Policy benchmark on a net-of-fee basis as referenced in the quarterly Portfolio Performance Review (“PPR”). Consequently, prudent risk-taking is warranted within the context of overall portfolio diversification. As a result, investment strategies are considered primarily in light of their impacts on total plan assets subject to the provisions set forth in Section 1106 of the City Charter with consideration of the Board's responsibility and authority as established by Article 16, Section 17 of the California State Constitution.

a. We believe this objective is best evaluated by comparing the risk adjusted investment results of the Plan relative to the primary benchmark and peers. The chart below plots the net-of-fees risk/return characteristics of the System and Policy Custom Index against a peer universe of other public funds. As shown, the portfolio has produced a return which is above median from a return perspective, as well as a lower standard deviation than the peer median. Additionally, the portfolio has produced a net of fee return commensurate with the benchmark at a lower level of risk.

Chart 2-5. Risk Adjusted Total Fund Performance Relative the Benchmark and Peers During the Scope Period

October 1, 2013 To September 30, 2021

Plan Sponsor Scattergram



- b. Section XII “Risk Management Policy” of the IPS provides an overview of the System’s policy regarding how risk should be evaluated in the asset allocation process and liquidity considerations. The consultant’s quarterly investment performance review provides various measures of risk at the Total Fund level for the Board to evaluate, as shown below (this data is provided on a gross of fee basis). The rank information represents the percentile ranking relative to peer public funds with assets of \$5-\$50 billion, with 1 representing the best and 100 representing the worst.

Table 2-9. Risk Analysis from Quarterly Performance Report

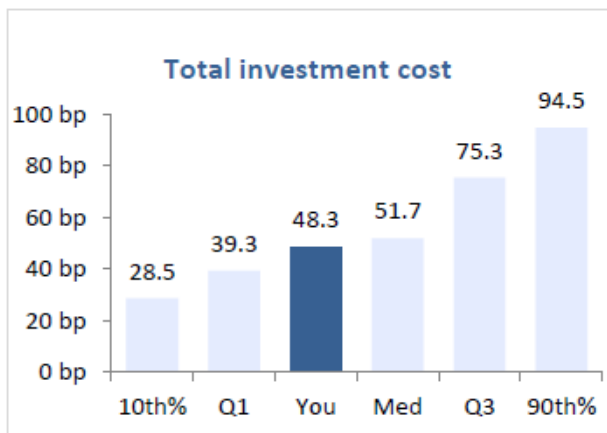
	5 Years Ending September 30, 2021							
	Annualized Return (%)	Rank	Annualized Standard Deviation	Rank	Sharpe Ratio	Rank	Sorino Ratio RF	Rank
LACERS Master Trust	10.93%	41	8.83%	74	1.11	70	1.23	67
Policy Index	10.90%	44	10.01%	99	0.98	94	1.09	81
InvMetrics Public DB \$5-50B Gross Median	10.75%	--	7.86%	--	1.17	--	1.27	--

- D. The System's investment program shall, at all times, comply with existing applicable local, state, and federal regulations.
 - a. See above for review of compliance with statutory requirements

- E. All transactions undertaken will be for the sole benefit of the System's participants and beneficiaries and for the exclusive purpose of providing benefits to them and defraying reasonable administrative expenses associated with the System.
 - a. LACERS participates in various CEM benchmarking studies that evaluate the cost of administration as well as the cost of investment management. These studies provide a great source for understanding the relative cost of implementation from an administrative and investment perspective. We more fully discuss the CEM administration expense benchmarking report later in this Report in Section III.
 - i. Investment Cost Findings – CEM Defined Benefit Survey Results 2019 Investment Benchmarking Analysis

Total investment cost

Your plan's total investment cost, excluding transaction costs and private asset performance fees, was \$84.9 million or 48.3 bps. This was below the U.S. median of 51.7 bps.



Your total investment cost consists of asset management costs and oversight, custodial and other costs. A breakdown of these costs can be found on page 17.

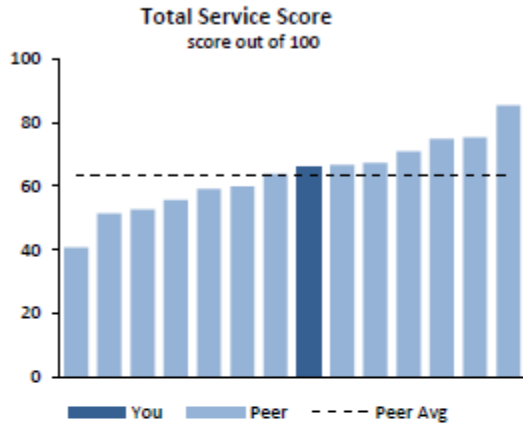
Total investment cost excludes transaction costs, private asset performance fees and actuarial costs.

Comparisons of total investment cost must be interpreted with caution because differences are often due to differences in size and asset mix. Therefore, CEM calculates a benchmark cost for each fund to help them understand whether they are high or low cost after adjusting for differences in size and asset mix. The benchmark cost is determined using regression analysis on all participating funds in the CEM database.

ii. Administrative Cost Findings – CEM Benchmarking 2018

Benchmarking Analysis

Key Takeaways:



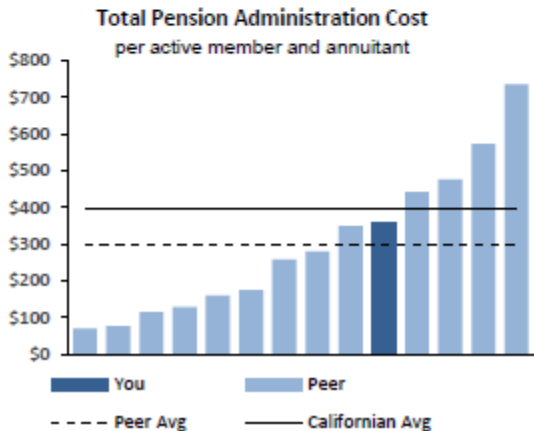
Your total service score was above the peer average.

The activities with the biggest positive impact on your service score were:

- Website: You offer 8 online transaction tools versus 6 for your peers.
- Written estimates: Your turnaround time was 1 day versus a peer average of 20 days.

This was offset by:

- Disability: Your turnaround was 11 months (versus 10 month peer average).
- Member contacts: Your call wait time was 217 seconds versus 96 seconds for your peers.



Your pension administration cost was \$61 above the peer average and \$35 below the Californian peer average.

The main reason why was that you used more FTEs per 10,000 members to serve your members.

Your total complexity score was 42. This was above the peer average of 37.

- F. The System has a long-term investment horizon and uses an asset allocation, which encompasses a strategic, long-run perspective of capital markets. It is recognized that a strategic long-run asset allocation plan implemented in a consistent and disciplined manner will be the major determinant of the System's investment performance.
- Performance based components of this objective are evaluated in our review of Investment Objectives A, B, and C above.
- G. Investment actions are expected to comply with "prudent expert" standards as described:

"...with the care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims."

The "standard of care" will encompass investment and management decisions evaluated not in isolation but in the context of the portfolio as a whole and as part of an overall investment strategy having risk and return objectives reasonably assigned. The circumstances that the System may consider in investing and managing the investment assets include any of the following:

1. General economic conditions;
2. The possible effect of inflation or deflation;
3. The role that each investment or course of actions plays within the overall portfolio;
4. The expected total return from income and the appreciation of capital;
5. Needs for liquidity, regularity of income, and preservation or appreciation of capital;
6. A reasonable effort to verify facts relevant to the investment and management of assets.

Conclusion:

There is no one true measurement to define the success of a retirement program. We believe the best process for evaluating the success of implementation is to review the results of the program relative to the objectives articulated in the investment policy statement. The IPM articulates 7 investment objectives (Investment Objectives A-G) that we believe are in-line with best practice. Our review above provides analysis for the Objectives where quantitative or qualitative review is possible.

- The portfolio has produced net of fee returns that approximate the benchmark return over recent trailing periods
- The portfolio has produced meaningful returns over inflation over time
- The portfolio has produced favorable risk adjusted net of fee returns relative to peer public funds and its benchmark.
- As of September 30th, 2021, recent trailing performance was above the legacy actuarially stated rate of return of 8%, as well as the current 7% rate

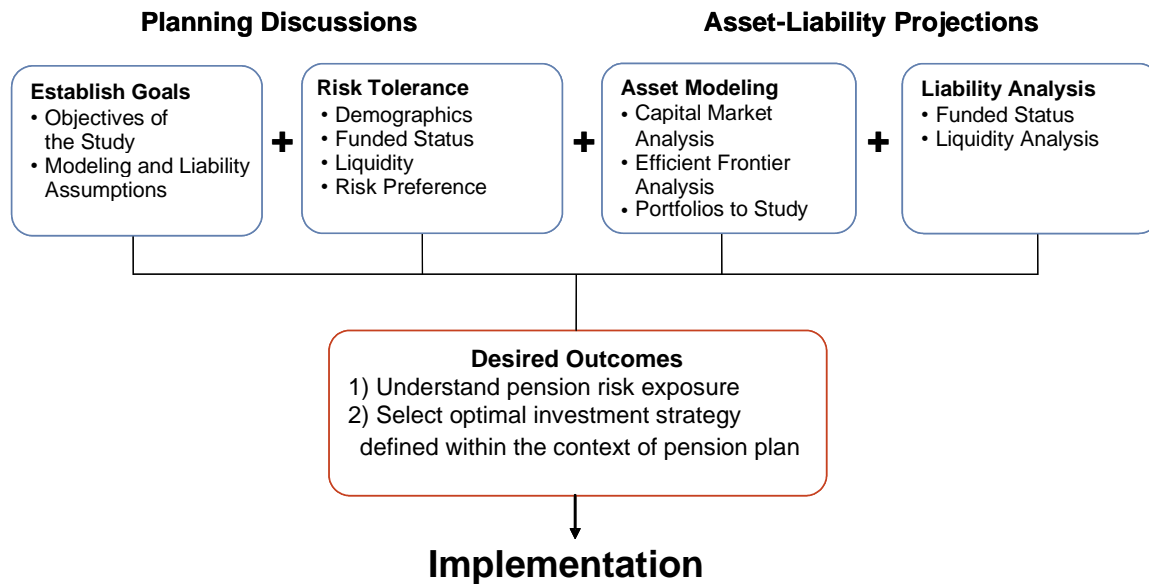
- ***The most recent asset allocation study***

Background:

An asset-liability study is a comprehensive study that models the possible future results of different asset allocations under a variety of market conditions. The modeling of asset allocations does not assume the same conditions during the entire time period but allows for changes in market conditions over the modelled period. Examples of “conditions” include periods of good equity markets, poor equity markets, high inflation, low inflation, and other similar topics. The results are the costs that could be expected to be generated by a specific asset allocation. The study provides information which allows for a more informed discussion about the appropriate asset allocation for an investment program and helps decision-makers understand the worst possible outcomes of a particular asset allocation so they can determine if changes to the current asset allocation are appropriate for the risk exposure. Asset-liability modeling also provides a unique perspective since it incorporates the characteristics of the plan’s cash flows (i.e., cash contributions and benefit payments). If the nature of cash flows for the pension plan is ignored, the review of the plan’s asset allocation would only address risk versus return of the individual asset classes and how they are correlated.

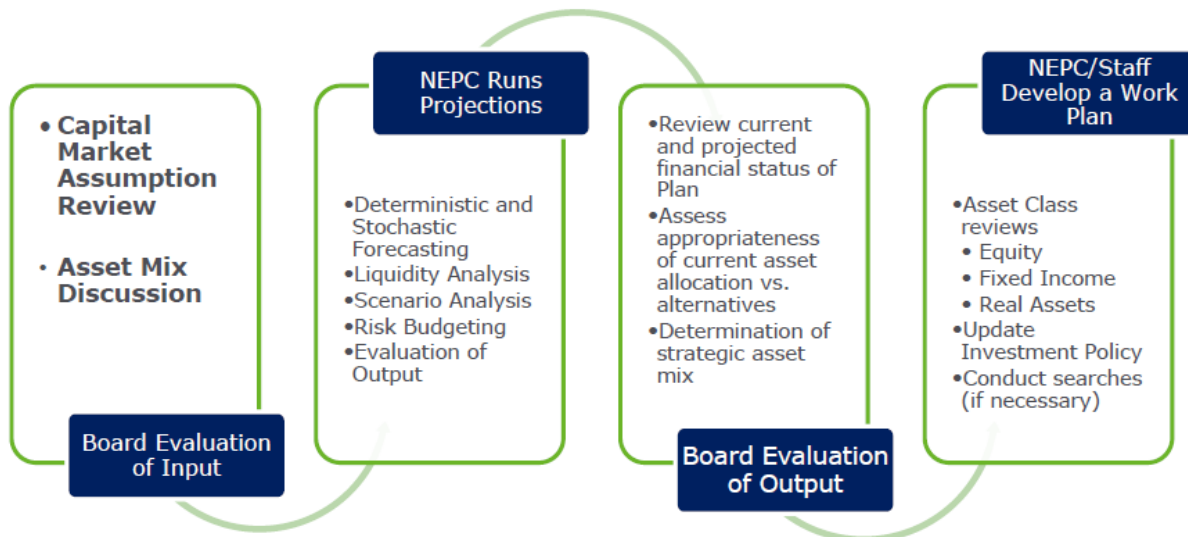
The chart below illustrates the steps in the development of an asset allocation which considers both assets and plan liabilities. This integrated approach provides a more holistic view. In Aon’s experience, asset-liability modeling and a formal asset allocation study are typically performed every three to five years with the best practice being a study done every three years or when material changes are made to the investment program or projected liabilities.

Chart 2-6. Aon’s Desired Process for Developing Asset Allocation



Based on the documentation provided to Aon, the System’s investment consultant has performed an asset-liability study every three years (2012, 2015, 2018, and 2021) which is in line with best practice. The below table provides an overview of the analysis provided to the Board by the investment consultant:

Chart 2-7. Asset Allocation Process Followed by LACERS



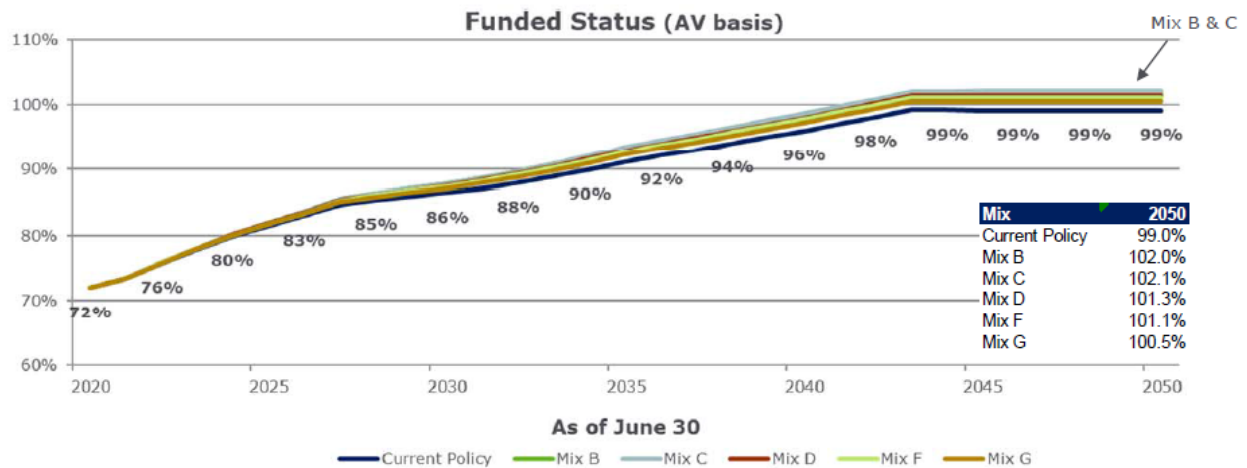
Aon finds the process followed by the investment consultant to be robust and in line with best practice. The Board is provided with ample information and analysis to more than adequately consider the risk/return/cost impacts of either staying with the current policy allocation or moving to an alternative asset allocation. The analysis also reviews the impact these changes will have on the overall funded status of the Plan. The table below, from the consultant’s analysis, compares the current policy targets relative to various alternatives. The table also includes the probability of each mix’s ability to achieve the targeted 7% discount rate.

Table 2-10. LACERS Expected Return Analysis From the Most Recent Asset Allocation Review

	Current Policy	Mix A	Mix B	Mix C
Cash	1.0%	1.0%	1.0%	1.0%
Total Cash	1.0%	1.0%	1.0%	1.0%
US Large-Cap Equity	14.0%	16.2%	15.0%	16.0%
US Small/Mid-Cap Equity	5.0%	7.0%	6.0%	7.0%
Non-US Developed Equity	17.0%	15.0%	15.0%	17.0%
Non-US Developed Small-Cap Equity	3.0%	3.0%	3.0%	3.0%
Emerging Market Equity	5.67%	5.67%	6.67%	6.67%
Emerging Market Small-Cap Equity	1.33%	1.33%	1.33%	1.33%
Private Equity	14.0%	14.0%	16.0%	14.0%
Total Equity	60.0%	62.2%	63.0%	65.0%
Core Bonds	13.75%	13.75%	11.25%	13.75%
High Yield	2.0%	2.0%	1.5%	2.0%
Bank Loans	2.0%	2.0%	1.5%	2.0%
EMD (External Currency)	2.25%	2.25%	2.00%	2.25%
EMD (Local Currency)	2.25%	2.25%	2.00%	2.25%
Private Debt	3.75%	3.75%	5.75%	3.75%
Total Fixed Income	26.0%	26.0%	24.0%	26.0%
TIPS	3.6%	2.6%	3.6%	3.6%
Commodities	1.2%	0.0%	0.0%	0.0%
REITS	1.2%	1.2%	1.4%	2.4%
Core Real Estate	4.2%	4.2%	4.2%	4.2%
Non-Core Real Estate	2.8%	2.8%	2.8%	2.8%
Total Real Assets	13.0%	10.8%	12.0%	13.0%
Expected Return 10 yrs	5.8%	5.9%	6.1%	6.1%
Expected Return 30 yrs	6.8%	6.9%	7.1%	7.1%
Standard Dev	13.9%	14.1%	14.5%	14.9%
Sharpe Ratio (10 years)	0.36	0.36	0.37	0.36
Sharpe Ratio (30 years)	0.36	0.35	0.36	0.35
Probability of Reaching 7.0% (1 year)	46.7%	46.9%	47.6%	47.7%
Probability of Reaching 7.0% (10 years)	39.5%	40.4%	42.3%	42.6%
Probability of Reaching 7.0% (30 years)	47.3%	48.3%	51.3%	51.4%

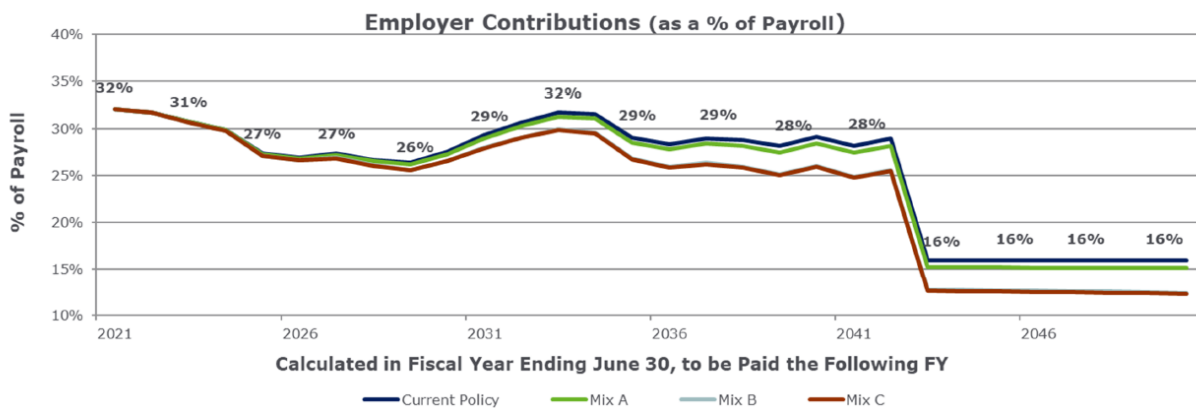
The chart below was provided to the Board in the most recent asset-liability study. This chart outlines how the alternative asset allocations will alter the anticipated funded status trajectory.

Chart 2-8. LACERS Projected Funded Ratio From the Most Recent Asset Allocation Review



The discussion also included analysis on the long term expected employer contributions under each allocation.

Chart 2-9. LACERS Projected Employer Contributions From the Most Recent Asset Allocation Review



Conclusion:

The System has performed an asset-liability study every three years (2012, 2015, 2018, and 2021) which is in line with best practice. The process and type of analysis performed during the study was also in line with best practice.

- ***IPS-comprehensiveness and compliance process***

Background:

There is no uniform standard for the content and no absolute model to follow when drafting an IPS. The IPS should ideally be a highly customized document that is uniquely tailored to the preferences, attitudes, and situation of the Plan. At LACERS, the Board reviews the IPS on an

annual basis. Staff has the ability to review and recommend changes on an ad-hoc basis. The purpose of such reviews is to ensure the document reflects desired long-term asset allocation, the evolving investment portfolio, legal and regulatory developments, and current best practices. It is up to Staff's discretion to solicit feedback and input from external fiduciary counsel and the Board's investment consultant when proposing changes to the document.

To facilitate our review of the IPS, we have included a table outlining what we believe to be the key sections of an IPS and how we think about IPS development. The table includes a broad title of each section type, the type of information we expect to be included in each section, and any comments on the LACERS IPS. As shown in the table, the IPS includes all components that we believe a well-structured IPS should have.

Table 2-11. LACERS Inclusion of Key IPS Components

Section	Purpose of Section	Comments
Introduction	- Reference to the purpose and benefit to be provided by the Trust	No Comment
	- Intended beneficiaries of the Trust	No Comment
	- Overview of fiduciary obligation	No Comment
Statement of Purpose	- Investments made for the exclusive purpose of providing benefits to participants	No Comment
	- Plan fiduciaries must act in the sole interest of plan participants and beneficiaries and for the exclusive purpose of providing benefits	No Comment
Investment Goals or Objectives	- To preserve the actuarial soundness of the Trust in order to meet benefit obligations	No Comment
	- To obtain a long-term rate of return, net of fees, equal to or in excess of the policy benchmark	No Comment
	- The policy benchmark and asset allocation targets should be defined	No Comment
Asset Allocation	- Purpose is to provide an optimal mix of investments to produce desired returns and meet current and future liabilities, with minimal volatility	No Comment
	- Frequency and methodology of asset-liability modeling and resetting allocation	No Comment
	- Describe permissible asset classes as well as minimum, maximum, and target ranges	No Comment
Identification of Roles and Responsibility	- Board of Trustees – general and investment related duties	No Comment
	- External investment consultants – advise on best practices, trends and support staff and Board/Investment Committee with fiduciary responsibilities	No Comment
	- Other external providers' duties, expectations and fiduciary responsibilities	No Comment
Asset Class Guidelines / Benchmarks	- Benchmarks – who sets them and how often they are revisited, and their rationale	No Comment
	- Diversification - Provide an overview on the importance of diversification and how it is achieved in the Trust	No Comment
Rebalancing Policy	- Purpose of rebalancing – to ensure that the investment program adheres to its strategic asset allocation	No Comment
	- Describe how often the portfolio will be reviewed for rebalancing and whether a fixed threshold or proportional threshold will be used	No Comment

Risk Management	- Acknowledgement and definition of risk to be managed in investment portfolio (active risk, credit risk, counterparty risk, market risk, operational risk, etc.)	No Comment
	- Define parameters for risk management (what does success look like)	No Comment
Monitoring and Reporting	- Describe monthly, quarterly and annual reporting - Outline monitoring and reporting process	No Comment No Comment
Shareholder Activity	- Proxy positions – describe the policy and how votes are cast and recorded	No Comment
	- Identify core principals of the Board (Board independence, Board management, shareholder rights) and communicate importance of fiduciary duty, integrity, and transparency	No Comment
Governance	- Identify obligations to the Trust are consistent with the fiduciary obligations of ERISA	No Comment
	- Require ongoing review of investment policy statement	No Comment

Conclusion:

We believe the IPS is robust and follows best practice. The IPS includes sufficient detail on all items we desire in a well-structured IPS, as outlined above.

- ***Processes used to adopt, monitor, periodically review, and update the IPS***

Background:

Within the IPS, section V.I titled “Evaluation of Policy” outlines that the Investment Policy Statement shall be reviewed by the Board at least annually, with the assistance of the Staff and investment consultant(s) and be revised when necessary.

Conclusion:

After discussion with Staff and a review of the supporting documents, Aon determined that the stated policy within the IPS to review on an annual basis is followed, which includes the following process:

- The full review process is started by the CIO, but the Board can also request an ad-hoc review if they feel it is prudent.
- Asset class heads will then review their respective sections for areas of improvement or look for items that might be outdated.
- Once Staff has formulated recommended changes, those changes are sent to the consultant for their review and input. Internal counsel may also review recommended changes based on the magnitude of the changes.
- Changes are approved by the Board
- The revised IPS is provided to the City Attorney

Aon finds the annual and ad hoc process used to adopt, monitor, periodically review, and update the IPS to be robust. The process includes numerous individuals inside the System and

typically includes a review by counsel and the applicable investment consultant. We believe the process could be enhanced by including a required review by external counsel and the applicable investment consultant.

Recommendation II.3.:

High Priority	Medium Priority X	Low Priority
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- Aon recommends adding language to the IPS that states all modifications to the document are to be reviewed by the applicable consultant as well as fiduciary counsel prior to being presented to the Board.
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Recommendation II.4.:

High Priority	Medium Priority	Low Priority X
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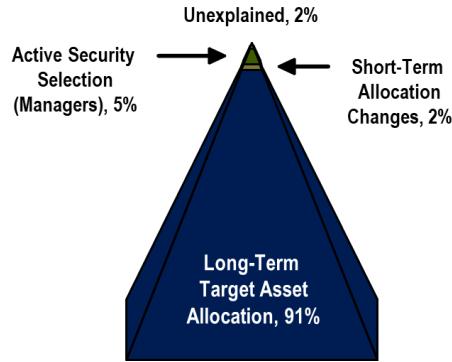
- Consider including a memo from the applicable consultant and fiduciary counsel for all amendments of the IPS. The memo would articulate and document their agreement or disagreement with the proposed changes.
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-

- ***Process used to set, monitor, and revise the asset allocation, including the need for the retirement system to conduct an asset-liability study***

Background

Asset allocation is viewed by many as the single most important factor to a fund's success over the long-term. The primary importance of asset allocation over other investment decisions is a generally accepted concept in finance theory and practice. Several well-known industry research papers have documented that asset allocation is the primary driver of the level of investment returns, and volatility of investment returns from year to year.

Chart 2-10. Primary Drivers of Difference in Investment Results Among Investors



The above chart outlines research done by Brinson, Singer and Beebower in their 1991 research paper “Determinants of Portfolio Performance II: An Update” which outlines that 91% of the difference in returns among investors is driven by differences in the long-term target asset allocation, or said differently, strategic asset allocation differences drive 91% of the difference in returns across investors.

Conclusion:

The IPS sets the policy for conducting an asset-liability study every three years in section IV “Asset Allocation Policy”. As noted earlier in our report, the last asset-liability study was performed in 2021. Aon believes that an asset-liability study is the best practice in setting, monitoring, and revising asset allocation.

- ***Due diligence processes including controls and reporting to ensure adherence to the IPS***

Background:

Maintaining proper compliance controls and monitoring processes are critical components of good governance and effective implementation of the IPS. It is critical that processes are in place to ensure that guidelines that are documented in the IPS and manager agreements are monitored on a regular basis to ensure ongoing compliance. Within many sophisticated investment programs this function is largely performed by the custodian and reviewed by internal investment compliance personnel.

Additionally, there are other important functions that require ongoing monitoring for compliance that are typically outside the scope of the custody relationship. This includes, but is not limited to, ensuring compliance to:

- All applicable federal, state, and local laws
- Internal trading policy
- Internal checklist and requirements for cash movement
- Ethics policy
- Proxy policy
- Soft dollar usage

The LACERS Investment Policy includes significant detail on the general investment guidelines, manager selection, manager oversight, as well as policies for various investment management and governance items, including:

1. Emerging Investment Manager Policy
2. Private Equity Investment Policy
3. Private Real Estate Investment Policy
4. Risk Management Policy
5. Geopolitical Risk Investment Policy
6. Proxy Voting Policy
7. Securities Lending Policy
8. Securities Litigation Policy

Based on our interviews with Staff we understand that the monitoring of the various policies and guidelines is performed by the custodian as well as the applicable investment consultant. LACERS provides the investment guidelines to its custodian, Northern Trust, who tracks compliance with the applicable trading and holdings guidelines on a daily basis. Additionally, the manager monitoring policy is monitored by the investment consultant and included in the quarterly performance report. The monitoring of private markets falls upon the private market consultant to ensure the program falls within the documented guidelines.

In addition to the monitoring of investment managers, their compliance with their guidelines, and their reporting requirements, the IPS includes numerous governance processes that are required to be performed over various time periods. Examples of these processes include.

1. The review of strategic asset allocation every three years
2. Reporting on commission recapturing annually
3. Approval of a new TAAP annually
4. CIO delivery of an annual report of all Tactical Rebalance Proposals
5. Annual review of the Board's Investment Policy and investment structure, asset allocation, and financial performance
6. Perform an active vs. passive review every three years

In the active vs passive section of our review, Aon recommended the creation of a formal procedure to ensure governance processes articulated in the policy (like those outlined above) are completed within the required timeline. Board oversight of these processes could be facilitated through the creation of a governance calendar which outlines each process included in the IPS, the timing requirement, when it was last performed, and when it is expected to be performed next.

Conclusion:

Based on our interviews with Staff, and experience with other clients performing these functions, we believe that LACERS generally has appropriate controls and procedures in place to regularly review compliance with its policies. Having this function performed by the custodian and the applicable investment consultants is in-line with common practice. However, we believe the

creation of a governance calendar (recommended in the active vs passive section of our review) could assist the Board and Staff in ensuring compliance with the policy.

Recommendation II.5.:

High Priority

Medium Priority

Low Priority
X

- Consider the creation of a compliance calendar to facilitate the oversight of compliance with the governance items articulated within the IPS.

-
-
- ***Rebalancing processes, including controls and reporting to ensure adherence to the IPS***

Background:

It is expected that over time, changes in capital markets will cause the actual mix of portfolio assets to diverge from target allocations and the need to rebalance the portfolio will occur. Rebalancing is an important tool for controlling the risk of a diversified investment program. The goal of a rebalancing program is to balance tracking risks against rebalancing costs while keeping the administration of the process manageable. Rebalancing may be necessary when the actual allocation falls outside a pre-determined range (e.g., +/-5%). There are two common ways to rebalance:

1. Rebalancing to policy target or to policy bands once a breach of an upper or lower limit occurs
2. Periodically rebalance the portfolio based on a specific schedule

Standard institutional best practice is to rebalance when actual allocations deviate materially from target allocations (#1 above), rather than rebalancing at specified time intervals (#2 above). If available, monitoring the portfolio's actual allocation daily for breaches of policy limits is preferred but reviews of actual allocations should be examined monthly or quarterly at a minimum. Having stated policy ranges within the IPS sets the framework for when a rebalancing action is needed. Having narrow ranges (+/-3%) is generally acceptable for publicly traded asset classes while wider ranges (+/-5%) for illiquid asset classes is often necessary.

The IPS in section V.G (Rebalancing Policy) provides an outline of the process in which Staff should follow for the rebalancing of the Plan's assets, which includes rebalancing within the policy target ranges if the actual allocation falls outside the predetermined range. The Board has delegated the responsibility of rebalancing to the Chief Investment Officer. The CIO is required to seek the concurrence of the general fund consultant prior to rebalancing. It is also the responsibility of the CIO to report all rebalancing activities to the Board in a timely manner.

The table below outlines the current policy target and allowable ranges for each asset class.

The investment policy requires that these targets be monitored on a monthly basis, but Staff currently reviews these exposures on a weekly to daily basis. This detail is typically included within the IPS of institutional investors, but it is not currently included within the LACERS IPS. The Board also receives asset allocation relative to the policy targets on a quarterly basis within its performance reports, these serve as a key tool in the Board’s ability to oversee the rebalancing process and ensuring compliance with its policy.

Table 2-12. LACERS Policy Allocation and Rebalancing Guidelines

	Policy Allocation	Lower Limit	Upper Limit	Nominal Range
U.S. Equity	22.50%	16.50%	28.50%	+ or – 6.00%
Non-U.S. Equity	27.00%	21.00%	33.00%	+ or – 6.00%
Core Fixed Income	16.75%	13.25%	20.00%	+ or – 3.25%
Credit Opportunities	7.25	7.25%	12.75%	+ or – 5.50%
Private Equity	13.59%	--	--	--
Real Assets	12.00%	--	--	--
Cash	1.00%	0.00%	2.00%	+ or – 1.00%
Total Fund	100.00%			

In addition to the rebalancing guidelines, LACERS also has a Tactical Asset Allocation Plan (TAAP) documented in the IPS. The TAAP allows greater discretion to the CIO, with the concurrence of the investment consultant, to implement rebalancing procedures prior to the ranges outline above being broken. Once the asset allocation of the portfolio is within 30% of the upper or lower limit, a tactical rebalance could occur to move the portfolio halfway back to the policy target. The intent of the TAAP is to allow the CIO (with agreement of the investment consultant) the ability to reduce the active risk of the portfolio if it is expected to achieve at least one of the following objectives:

1. Enhance Total Fund value
2. Protect Total Fund value
3. Enhance the risk/return profile of the Total Fund pursuant to the Asset Allocation Policy and Risk Budget

Conclusion:

Aon finds the current policy and process of rebalancing followed by Staff to be in line with best practice. The use of the TAAP is less common in the industry, but given it is primarily intended to reduce active risk, we are comfortable with its use. We believe the transparency to the Board provides adequate detail on the rationale for rebalancing and the actions taken. It is typical for institutional investors to include the detail within the table above in their IPS and believe LACERS should consider adding it to their IPS.

Recommendation II.6.:**High Priority****Medium Priority****Low Priority**
X

- Consider including policy targets and ranges within the IPS.
-
-

- ***IPS-delineation of roles and responsibilities, due diligence and monitoring***

Background:

The IPS includes section III.0 “Duties of Responsible Parties”, this section of the IPS outlines the roles and responsibilities of the:

1. The Board or its Designate(s)
2. Staff
3. Investment Managers
4. Master Custodian
5. General Investment Consultant
6. Duties of Parties Involved in LACERS’ Matters

Further defined within section of III.0, each party's role and responsibilities for the following topics are outlined as:

Investment Program:

- The Board or its Designate(s)
 - The Board develops and approves policies for the execution of the investment program
 - The Board will conduct a formal review of the Investment Policy and investment structure, asset allocation and financial performance
 - The Board shall review investments quarterly, or as needed, to ensure that policy guidelines are met
 - The Board may retain investment consultants to provide services in aide of managing the investment program
 - The Board shall expect Staff to administer the Plan’s investments in a cost-effective manner
 - The Board may delegate certain duties of the Board to the Investment Committee
- Staff
 - Invest the Fund’s cash without requiring Board’s permission
 - Oversee and direct the implementation of Board policies and manage the

- Fund on a day-to-day basis
 - Organize and/or participate in any special research for the Board
 - Advise and apprise the Board of any other events of investment significance
- Investment Managers
 - Contract by written agreement with the Board to invest within approved guidelines
 - Provide the Board with proof of liability and fiduciary insurance coverage
 - Be a registered SEC investment advisor under 1940 Act or authorized bank or trust
 - Adhere to investment management style concepts and principles
 - Obtain best execution for all transaction
- Master Custodian
 - Provide complete global custody and depository services
 - Manage Short-Term Investment Fund for investment of any uninvested cash
 - Assist the System to complete annual audit, transaction verification, or other unique issues
 - Manage a security lending program
 - Maintain frequent and open communication with the Board and Staff
- General Investment Consultant
 - Make recommendations for Board presentation regarding investment policy and strategic asset allocation
 - Provide topical research and education on investment topics
 - Communicate information that concerns the Board

The Selection Process:

- The Board or its Designate(s)
 - The Board shall be responsible for selecting qualified investment managers, consultants, and custodian
- General Investment Consultant
 - Assist the Board in the selection of qualified investment managers and a qualified custodian

The Due Diligence Process:

- Staff
 - Provide analysis and recommendation to the Board on a wide variety of investments and investment related matters
 - Conduct the manager search process, as approved by the Board

The Monitoring Process:

- The Board or its Designate(s)
 - Voting of proxies in stocks held by the System according to policy
- Staff
 - Monitor investment managers for adherence to policies and guidelines
 - Evaluate and manage the relationships with brokers, managers, and custodians
 - Manage portfolio restricting resulting from rebalancing or terminations with assistance of consultant and managers, as needed
 - Ensure that managers conform to the terms of their contracts and that performance-monitoring systems are sufficient to provide the Board with timely, and accurate information
- Investment Managers
 - Reconcile monthly accounting, performance, transaction and asset summary data with custodian
- Master Custodian
 - Provide in a timely and effective manner a monthly report of investment activities
 - Provide monthly and fiscal year-end accounting statements
 - Report situations where accurate security pricing, valuation, and accrued income are either not possible or subject to uncertainty
- General Investment Consultant
 - Review quarterly performance, including performance attribution

Conclusion:

Section III.0 of the IPS provides a thorough, yet succinct overview of the roles and responsibilities for each applicable group associated with investment decisions and oversight in a level of detail that is appropriate for an investment policy statement. Roles are also further defined throughout the document. We find the IPS documentation of the roles and responsibilities of the key parties involved in the investment program, the selection process, the due diligence process, and the monitoring processes used for purpose of the investment program to be in-line with common practice.

Asset Allocation

- ***Process used to establish the inputs used in the most recent asset allocation study and asset-liability modeling***

Background:

In evaluation component 2, Aon reviewed the process that established the current asset allocation. The following analysis focuses on reviewing the process to establish the inputs that serve as the base for the performed asset allocation reviews and asset-liability modeling.

An asset-liability study stands as the current process for setting the Plan’s long-term asset allocation. An asset-liability study is a comprehensive toolkit for making decisions on a Plan’s

asset allocation and investment risk that align with the liabilities those funds support. The intent of the study is to:

- Provide fiduciaries with an understanding of the dynamic relationship between plan assets and liabilities over time
- Illustrate the impact of various asset allocations on key financial metrics, such as required contributions and funded status, under a range of different macro-economic scenarios
- Identify future trends in the financial health of the fund based on economic uncertainties that may not be evident from an actuarial valuation, which provides only a snapshot at a point in time
- Help determine the level of risk that is appropriate in the context of the Plan's liabilities

At the core of the analysis are the capital market assumptions that make up the long-term outlook for various asset classes currently in the Plan and those for consideration. The evaluation on how a firm develops their capital market assumptions is equally as important as the evaluation of the assumptions themselves.

Across the investment industry there are various ways to approach the development of capital market assumptions. These include the capital asset pricing model (CAPM), historical investment performance, survey data, and the building block approach. The Board's investment consultant develops proprietary capital market assumptions using a building block approach. A building block approach represents a forward-looking estimate of market returns based on the applicable observable components that are believed to drive future investment results. This approach is consistent with Aon's approach, and we believe it to be in-line with best practice.

The consultant's capital market assumptions include assumptions on returns, volatilities (standard deviations), and correlations. They are updated on an annual basis by the Firm's research team and represent the Firm's long-term capital market outlook (>10 years).

The tables below provide additional detail on the building blocks utilized by LACERS' investment consultant. Additional detail on these building blocks can be found in the investment consultant's asset allocation presentation presented to the Board on 1/26/2021.

Chart 2-11. Primary Drivers of Expected Return by Asset Type

Fixed Income Building Blocks		Equity Building Blocks		Real Assets Building Blocks	
Illiquidity Premium	The return expected for investments with illiquidity risk	Illiquidity Premium	The return expected for investments with illiquidity risk	Illiquidity Premium	The return expected for investments with illiquidity risk
Government Rates Price Change	Valuation change due to shifts in the current yield curve to forecasted rates	Valuation	Represents P/E multiple contraction or expansion relative to long-term trend	Valuation	The change in price of the asset moving to a terminal value or real average level
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates	Inflation	Market-specific inflation based on country revenue and region-specific inflation	Inflation	Based on the inflation paths as defined by TIPS breakeven and NEPC assumptions
Spread Price Change	Valuation change due to shifts in credit spreads over the duration of the investment	Real Earnings Growth	Market-specific real growth based on a weighted-average derived from country revenue contribution and GDP growth	Growth	Market-specific real growth based on a weighted-average derived from country revenue contribution and GDP growth
Credit Spread	Yield premium provided by securities with credit risk	Dividend Yield	Income distributed to shareholders adjusted to reflect market trends	Real Income	The inflation-adjusted income produced by the underlying tangible or physical asset
Government Rates	The yield attributed to sovereign bonds that do not have credit risk				

Conclusion:

We find the building block approach utilized by the investment consultant to derive its capital market assumptions to be in-line with best practice. The investment consultant utilized various inputs for determining the expected return of the various asset classes. These methodologies incorporate both quantitative and qualitative inputs. The assumptions reflect current market valuations and future prospects rather than relying solely on historical averages, a particularly important feature when markets move to extremes as they have done over the past few years.

- ***Thoroughness of the asset allocation***

Conclusion:

The primary tool for reviewing funding targets, time horizon, demographics, cash flow needs, near-term volatility tolerance levels, as well as statutory mandates (which address minimizing contributions) is an asset-liability study. An asset-liability study will elegantly consider each of these items in a presentation format which is digestible to stakeholders. An asset-liability study was last performed in 2021, and that analysis is expected to be updated in three years. A review of the analysis performed in 2021 is provided in scope area II.

We believe the asset allocation process performed by LACERS took into consideration the retirement system’s distinct circumstances articulated in the scope area.

- ***LACERS’ asset allocation***

Conclusion:

The table below shows the current asset allocation of the Plan, relative to a peer group of public funds with assets greater than \$5 billion, represented in the 2019 Greenwich Institutional Market Trends Survey. Relative to peers, the Plan has a slightly higher allocation to equities (public & private) and a lower allocation to more stable allocations such as core fixed income. The Plan also has no exposure to hedge funds, which differentiates it from peers.

Table 2-13. Asset Allocation Relative to Peer Public Funds

	Policy Allocation (%)	Greenwich 2019 U.S. Institutional Markets Trends Survey
U.S. Equity	22.50%	20.8%
Non-U.S. Equity	27.00%	25.1%
Core Fixed Income	16.75%	22.4%
Opportunistic Credit	7.25%	2.9%
Private Equity	13.50%	11.1%
Real Assets	12.00%	9.7%
Other (Hedge Funds, etc.)	0.00%	6.4%
Cash	1.00%	1.6%
Total Fund	100.0%	100.0%

- **Overall returns of the investment portfolio relative to risk**

Conclusion:

The table below represents performance for the Total Fund, on a net of fee basis, relative to the policy benchmark, a peer universe of other public plans, and the Plan's discount rate. On a net of fee basis, the Fund has been able to successfully produce a return commensurate with the benchmark, outperform the median public fund peer, and outperform the actuarial discount rate.

Table 2-14. Investment Returns Relative to the Benchmark, Peer Public Funds, and the Current Assumed Rate of Return

As of 9/30/2021	1-Year	3-Year	5-Year
Total Fund	23.3%	11.0%	10.7%
<i>Policy Benchmark</i>	19.7	10.7	10.7
All Public Plans -Median	19.8	10.7	10.4
<i>Rank</i>	13	40	34
Actuarial Discount Rate	7.0	7.0	7.0

We have also reviewed risk adjusted returns of the investment program. On a risk adjusted basis, the Plan has been able to deliver superior risk-adjusted returns relative to the benchmark and peers (i.e., has produced a higher Sharpe ratio). The below table illustrates the Plan's 5-year Sharpe ratio, which is a measure of risk adjusted returns, relative to the policy benchmark and peer universe.

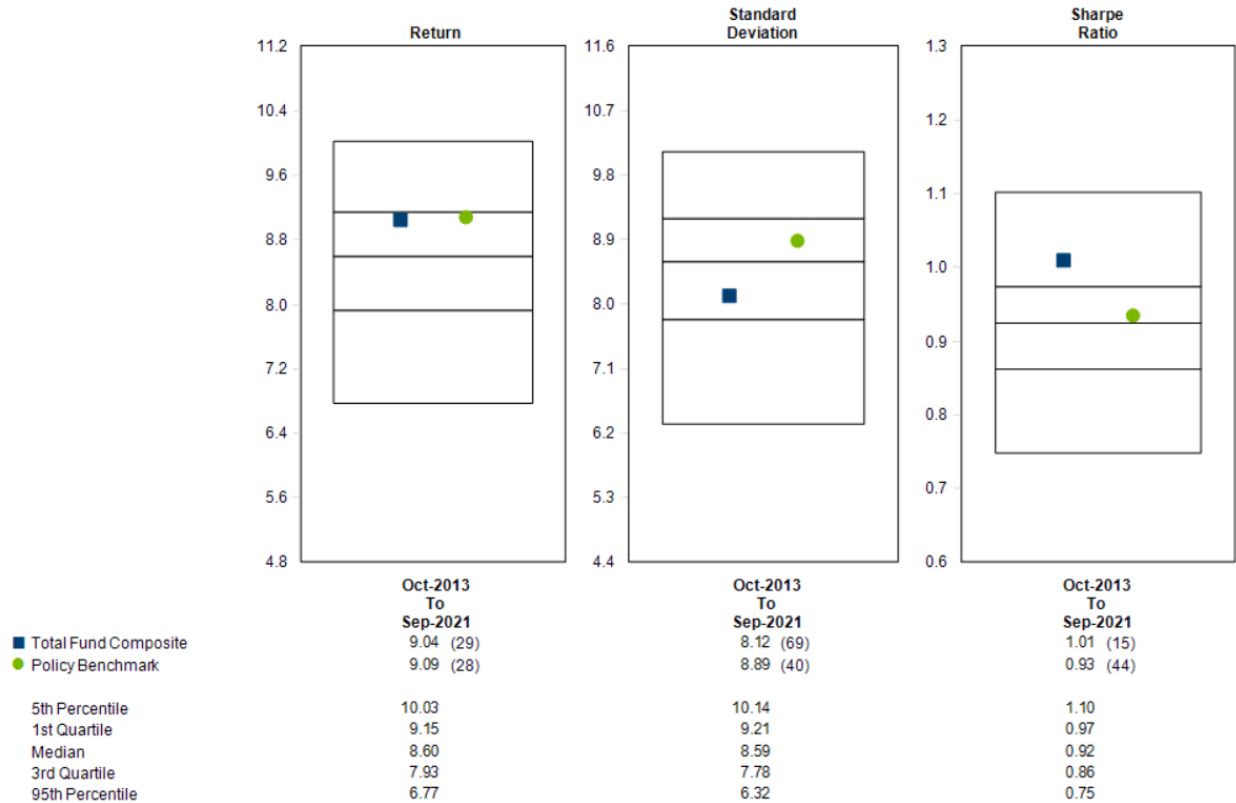
Table 2-15. Risk Adjusted Investment Returns Relative to the Benchmark and Peers

Sharpe ratio As of 9/30/2021	5-Year
Total Fund	1.06

Policy Benchmark	0.98
All Public Plans -Median	0.96

The chart below outlines the trailing return, standard deviation, and Sharpe ratio of the portfolio relative to the benchmark as well as the rank within the public fund peer group during the scope period. Again, the portfolio has produced strong risk adjust performance relative to the benchmark and peers on a net of fee basis.

Chart 2-12. Nominal Investment Return, Risk, and Risk Adjusted Returns Relative to the Benchmark and Peers



- ***Reasonableness of the estimates of expected return, volatility, and assumed correlation of returns among included asset classes and subclasses***

Conclusion:

Capital market assumptions are a critical input to the process of setting the asset allocation. There is not a single established methodology to develop capital market assumptions. Different firms may use different approaches to derive their expectations – all of which may be based on capital market theory and practice. Given the importance of capital market assumptions in setting the asset allocation, it is useful to review the assumptions used and compare them to

those of others to ensure a degree of reasonableness.

The table below compares the NEPC 10-year capital market assumptions relative to Aon and the 2021 Horizon Study Average, which is a collection of capital market assumptions from investment firms to aid in determining reasonable assumptions used by plan's expected return on assets. NEPC's assumptions relative to the study's average, in which there is a like-for-like comparison, had the majority of assumptions within the 25% and 75% percentile and only a few asset classes fell within the 5% through 25% and 75% through 95% percentile range. As shown in the table below, the NEPC assumptions are generally within the 25%-75% percentile of peers. We consider the estimates of expected return, volatility, and assumed correlation to be well within the range of reasonableness, and comparable to both Aon's capital market assumptions and peer averages. In general, the NEPC assumptions tend to be slightly lower than the Aon assumptions as well as the peer group.

Table 2-15. Capital Market Assumptions Utilized by LACERS (NEPC) Relative to the Aon Assumptions and Peers (2021 Horizon Study Average)

	Policy Allocation 12/31/2020 (%)	NEPC		Aon Investments USA		2021 Horizon Study Average	
		10-Yr. Expected Return	Expected Volatility	10-Yr. Expected Return	Expected Volatility	10-Yr. Expected Return	Expected Volatility
Cash	1.00%	0.8%	0.6%	0.6%	1.0%	1.1%	1.3%
Total Cash	1.00%						
U.S. Large Cap Equity	14.00%	5.4%	16.6%	5.8%	17.0%	5.8%	16.4%
U.S. Small/Mid-Cap Equity	5.00%	5.7%	20.7%	6.0%	23.0%	6.3%	20.2%
Non-U.S. Developed Equity	17.00%	5.9%	19.7%	7.1%	20.0%	6.4%	18.3%
Non-U.S. Developed Small Cap	3.00%	6.1%	22.5%	--	--	--	--
Emerging Markets Equity	5.67%	7.5%	28.7%	6.9%	27.0%	7.2%	24.3%
Emerging Markets Small Cap	1.33%	8.1%	31.5%	--	--	--	--
Private Equity	14.00%	9.3%	24.8%	8.2%	25.0%	8.8%	22.3%
Total Equity	60.00%						
Core Bonds	13.75%	1.4%	5.7%	1.3%	4.0%	2.1%	5.5%
High Yield	2.00%	2.9%	11.5%	3.3%	12.0%	3.8%	9.9%
Bank Loans	2.00%	3.9%	9.2%	3.7%	7.0%	--	--
EMD (External Currency)	2.25%	3.0%	13.0%	3.7%	13.0%	4.4%	11.3%
EMD (Local Currency)	2.25%	5.0%	13.0%	3.6%	14.0%	--	--
Private Debt	3.75%	6.1%	11.9%	6.3%	16.0%	6.5%	11.4%
Total Fixed Income	26.00%						
TIPS	3.60%	1.0%	5.8%	1.1%	3.5%	1.6%	5.6%
Commodities	1.20%	0.9%	18.5%	2.9%	17.0%	3.1%	17.3%
REITS	1.20%	5.5%	21.4%	6.1%	18.5%	-	--
Core Real Estate	4.20%	4.4%	15.0%	5.6%	15.0%	5.5%	17.6%

Non-Core Real Estate	2.80%	5.5%	21.0%	7.4%	25.0%	--	--
Total Real Assets	13.00%						
Expected Return 10yrs	--	5.83%		6.29%			
Standard Deviation	--	13.89%		12.93%			
Sharpe Ratio 10yrs	--	0.36		0.44			

25% - 75% Percentile	
5% - 25% and 75% - 95%	
>5% and >95%	

- ***Process used for adjusting the asset allocation (e.g., portfolio rebalancing)***

Conclusion:

Earlier in this Report, we reviewed the rebalancing policy utilized by the System. The authority to conduct a rebalance has been delegated by the Board to the Chief Investment Officer with the concurrence of the general fund consultant. The portfolio is monitored on a weekly/daily basis in order to determine whether any public market asset classes are near breaching stated policy bands. Private market asset classes are generally not considered for rebalancing due to their illiquid nature. The following process is followed by the CIO and Staff:

- An analyst will produce an asset allocation report in which the CIO/COO and director of private markets review and discuss rebalancing on a weekly basis.
- If the group determines a rebalancing should be initiated, the COO will direct the Investment Officer responsible for rebalancing implementation to develop a rebalancing plan.
- The Investment Officer will distribute the plan to Staff for review and feedback.
- Upon agreement, the Investment Officer will submit the plan to the General Fund Consultant for review.
- Once reviewed, the Consultant, Investment Officer, and COO will seek formal approval from the CIO.
- Upon completion of the rebalancing, the CIO will notify the Board of the rebalance.

The below screenshot provides an example of previously communicated rebalancing actions taken.

We believe the process in place is in-line with common practice.

Background

On March 11, 2021, the U.S. Equities asset class breached its 26% upper threshold, triggering a rebalancing event pursuant to the LACERS Asset Allocation Policy and Rebalancing Policy. With concurrence from NEPC, LLC, LACERS' General Fund Consultant, LACERS staff initiated a rebalancing to pare U.S. Equities to approximately 21.5% of the total fund portfolio (19% target allocation to U.S. Equities plus the approximate 2.5% underweight to Private Equity). Assets were reallocated to two underweight asset classes, Credit Opportunities and Real Assets, and to Cash, as detailed in the table below. The market value of assets involved in this rebalancing amounted to approximately \$1.045 billion.

Withdrawals		
<i>Asset Class/Strategy</i>	<i>Manager</i>	<i>Amount (mil)</i>
U.S. Equities		
Large-Cap	Rhumblin Advisors S&P 500	\$ 750
Mid-Cap	Principal Global Advisors	55
Small-Cap	Rhumblin Advisors Russell 2000	50
	Rhumblin Advisors Russell 2000 Value	45
	Copeland Capital Management	45
	EAM Investors	50
	Granahan Investment Management	20
	Segall, Bryant & Hamill	30
Total		\$ 1,045

- ***Appropriateness and suitability of the adopted asset allocation and overall investment strategies***

Background:

The below table outlines the broad strategic asset allocation of the Plan, as outlined in the IPS, and compares the allocation to a peer universe of public funds with asset greater than \$5 billion in total assets. Previously in this Report, Aon evaluated the appropriateness of the Plan's asset allocation to achieve the System's stated performance objectives.

Table 2-17. Asset Allocation Relative to Peer Public Funds

	Policy Allocation (%)	Greenwich 2019 U.S. Institutional Markets Trends Survey
U.S. Equity	22.50%	20.8%
Non-U.S. Equity	27.00%	25.1%
Core Fixed Income	16.75%	22.4%
Opportunistic Credit	7.25%	2.9%
Private Equity	13.50%	11.1%
Real Assets	12.00%	9.7%

Other (Hedge Funds, etc.)	0.00%	6.4%
Cash	1.00%	1.6%
Total Fund	100.0%	100.0%

Additionally, we have evaluated the ability of the current strategic asset allocation to produce a 7.0% return into the future. The chart below shows our expected return of the portfolio (6.3%) as well as the range of potential outcomes. The table below the chart outlines the probability of the portfolio achieving a 7% in each period using the Aon 30-year capital market assumptions. These projections were created using Aon’s 12/31/2021 capital market assumptions. Given the rise in interest rates experienced in 2022, our forward-looking expected returns are likely slightly higher.

Chart 2-13. Expected (forward looking) Return of the Current Strategic Asset Allocation

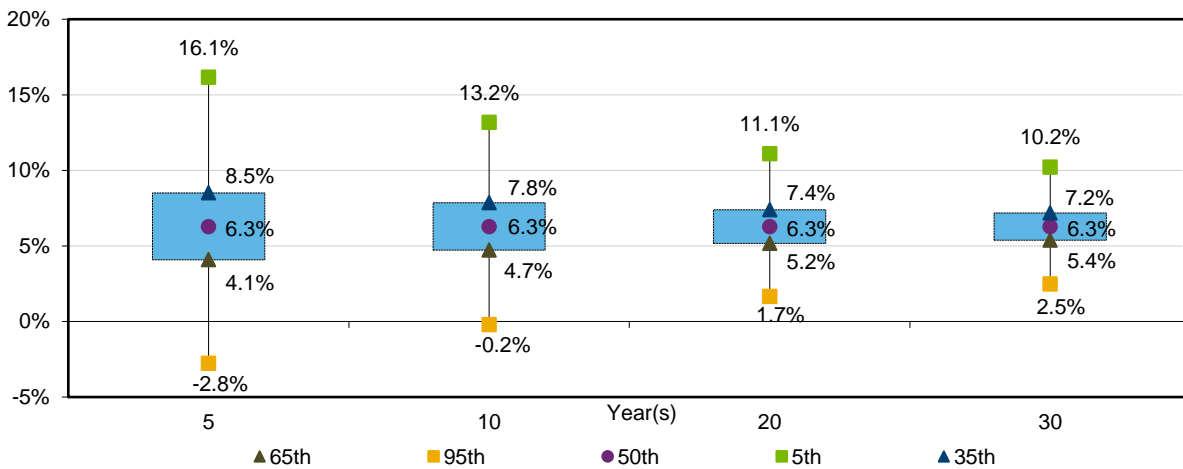


Table 2-18. Probability of Achieving a 7% Rate of Return over Various Time Periods

Probability of Achieving a 7% Rate of Return			
5-Years	10-Years	20-Years	30-Years
45%	43%	40%	38%

Conclusion:

Ultimately, the asset allocation of an investment program should be derived through the asset-liability process. We also evaluated the portfolios:

1. Asset Allocation relative to peers
2. Ability to produce the actuarially assumed rate of return

Asset Allocation relative to peers

The Plan’s asset allocation is not materially different than that of other public fund peers. In review of the asset classes utilized by the System, Aon found that they are similar to those commonly utilized in the institutional investor market (i.e., public funds, corporate defined benefit

plans, endowments, and foundations).

Ability to produce the actuarially assumed rate of return

Using Aon's 30-year capital market assumptions we expect the portfolio to earn 6.3% over time, with a 38% probability of achieving 7% over 30-years. These projections were created using Aon's 12/31/2021 capital market assumptions. Given the rise in interest rates experienced in 2022, our forward-looking expected returns are likely slightly higher.

- **Staffing resource considerations**

Background:

Staffing levels of a fund should be commensurate with the structural complexity and needs of the investment program. The number and proficiency of staff required to oversee an institutional investment program is a function of many variables. Some critical factors include:

1. The complexity of the investment program, including:
 - a. The number of investment mandates
 - b. The use of active versus passive management
 - c. The inclusion and level of sophistication of alternative asset classes
 - d. Direct vs fund of fund investment exposure
 - e. Whether internal asset management is utilized
2. The level of non-investment related administrative functions performed by staff
3. The number of investment meetings held per period
4. The use and reliance on external service providers, including the level of due diligence and selection performed by third-party vendors (i.e., investment consultants) versus those performed by staff
5. The use of software to evaluate compliance and risk levels

If the factors above are adjusted, positively or negatively, the level of staff required to implement and oversee an investment program can be materially impacted. The structure of the organization should match the goals and policies adopted by the Board. For example – If the Board believes better net of fee risk adjusted returns can be achieved by allowing staff to identify active investment strategies, then using passive investments strictly because of staffing constraints may not be viewed as prudent.

Conclusion:

Under the current implementation structure LACERS Investment Staff is not directly managing the assets of the investment program (i.e., they are not buying and selling individual stocks and bonds). However, they play the primary role, in consultation with the Board's consultants, in the selection of third-party investment firms who will manage the assets of the Fund. Staff plays a meaningful role in the selection of third-party vendors (i.e., the general consultant, asset class consultants, custodian, etc.). They also play a major role in the day-to-day operations of the Fund as well as creating the materials for meetings with the Board.

It is critically important for minimizing operational risk and consistent with good governance that the level of investment staff is commensurate with the complexities of the investment program. Their scope of work should reflect the goals of the Board and be consistent with the Board’s view on what implementation structure will enhance investment results. We believe that LACERS would benefit from undertaking an evaluation of the level and type of staffing resources needed to effectively and efficiently run the investment program.

Based on our interviews with Staff, there is a perception that the development of mandated reporting requirements has created the need for additional resources. These mandated reporting requirements include:

- Diversity, Equity, and Inclusion (DEI) reporting
- Environmental, Social, and Governance (ESG) investment mandate requirements
- Responding to questions received from stakeholders

Overall, we found that LACERS currently employs an investment staff of skilled professionals. Although our assessment is limited primarily to empirical information obtained during the interview process and documents produced by investment staff, we found the LACERS investment staff to be knowledgeable, insightful, candid, and well equipped to implement the current investment mandate.

In addition to having the skill set, we believe they also have the conventional resources that they need to implement the LACERS Investment Policy under the current governance structure. Finally, we believe the level of autonomy held by Staff is conducive to the efficient implementation of the investment policy, this does not, however, reduce the need for good governance and prudent oversight of the process.

- ***Comparison of LACERS’ investment performance for the overall plans, as well as that of each underlying asset class, against the Total Fund and asset class benchmarks, as well as peers***

Conclusion:

The table below outlines the investment performance for the overall Plan and each asset class relative to the applicable benchmark and peer group.

Table 2-19. Portfolio Investment Results Relative to the Applicable Benchmark and Peer Group

As of 9/30/2021	1-Year	3-Years	5-Years	10-Years	20-Years
Total Fund	23.3%	11.0%	10.7%	10.5%	8.1%
<i>Policy Benchmark</i>	<i>20.0</i>	<i>11.1</i>	<i>10.9</i>	<i>10.5</i>	<i>8.0</i>
<i>IM – All Public Fund</i>	<i>19.8</i>	<i>10.7</i>	<i>10.4</i>	<i>9.8</i>	<i>7.1</i>
U.S. Equity.	33.0%	15.2%	16.4%	16.5%	10.0%

<i>U.S. Equity Blend</i>	31.9	16.0	16.9	16.6	9.9
<i>IM – All Public Funds U.S. Equity</i>	33.1	15.0	16.2	16.2	10.0
<i>Non-U.S. Equity</i>	28.5%	10.0%	10.5%	9.1%	8.0%
<i>MSCI ACWI ex-US</i>	23.9	8.0	8.9	7.5	7.2
<i>IM – All Public Funds Non-U.S. Equity</i>	27.2	10.3	10.7	9.2	8.3
<i>Core Fixed Income</i>	0.1%	6.0%	3.4%	--	--
<i>Core F.I. Blend</i>	-0.9	5.4	2.9	--	--
<i>IM – All Public Funds U.S.> Fixed Income</i>	1.7	6.1	4.0	4.0	5.0
<i>Credit Opportunities</i>	6.8%	5.4%	5.0%	--	--
<i>Custom Index</i>	7.8	6.2	5.4	--	--
<i>Real Assets</i>	11.9%	6.4%	5.6%	7.3%	5.1%
<i>Custom Index</i>	11.7	8.3	7.9	7.3	--
<i>Public Real Assets</i>	14.8%	8.4%	5.1%	--	--
<i>Custom Index</i>	20.7	7.6	4.8	--	--
<i>Private Equity</i>	56.8%	21.7%	19.3%	14.8%	12.1%
<i>Custom Index</i>	35.7	19.4	20.3	20.1	13.7

- ***Appropriateness of the benchmarks and universe comparisons used by LACERS and their suitability at the Total Fund level, for each asset class, and for the individual managers***

Background:

Benchmarks are used to measure the performance of the Total Fund, asset classes, and individual managers over various time periods and across methodologies to determine the effectiveness of implementation of an investment program. The table below outlines the CFA Institutes “SAMURAI” characteristics which are often used to evaluate benchmarks:

Table 2-20. Characteristics of an Appropriate Benchmark

Specified in Advance
<ul style="list-style-type: none"> • Specified prior to the start of an evaluation period
Appropriate
<ul style="list-style-type: none"> • Consistent with the investment
Measurable
<ul style="list-style-type: none"> • Return is readily calculable on a frequent basis
Unambiguous
<ul style="list-style-type: none"> • Identity and weight of securities are clearly defined
Reflective of Current Investment Opinions
<ul style="list-style-type: none"> • Knowledge of the securities or factor exposures
Accountable
<ul style="list-style-type: none"> • Manager accepts accountability for the benchmark
Investable
<ul style="list-style-type: none"> • It is possible to invest in the benchmark

Unlike public market asset classes, benchmarking for private market asset classes provides unique challenges and benchmarking concerns within private market asset classes are shared by institutional investors across plan types and asset sizes. Issues that are unique to private market asset classes include but not limited to:

- The benchmarks do not meet standard benchmark requirements (CFA Institute “SAMURAI” characteristics)
- Un-investability of the fund universe in the benchmark composite
- Limited ability to invest in smaller and potentially better performing funds
- Determining the “Correct” level of premium over the benchmark is not knowable ex-ante
- Short term investment results are largely driven by longer dated investment decisions
- Maintaining the Policy Target makes pacing potentially uneven
- Incentive compensation for private equity teams is more difficult than most other asset classes

Conclusion:

Aon reviewed the benchmarks and universes used throughout the investment consultant’s quarterly investment performance reports and have found that they adequately represent the Plan, asset class, and investment manager in which they are compared against.

The below table outlines the Plan benchmark as of September 30th, 2021

Table 2-21. LACERS Total Fund Policy Benchmark

Benchmark	Policy Weight
Russell 3000 Index	24%
MSCI ACWI ex-U.S.A	29%
Bloomberg U.S. Aggregate Index	19%
Credit Opportunities Blended Benchmark ¹	5%
Real Assets Policy Benchmark ²	10%
Private Equity Blended Benchmark ³	12%
91 Day T-Bills	1%

¹65% Bloomberg U.S. High Yield 2% Issuer Cap / 35% JPM EMBI Global Diversified

²60% Bloomberg U.S. TIPS / 20% Bloomberg Commodity Index / 10% Alerian MLP / 10% FTSE NAREIT All Equity REIT

³Russell 3000 Index + 300bps

The table on the next page evaluates each component of the Plan benchmark relative to the CFA Institute “SAMURAI” characteristics outlined on the previous page.

Table 2-22. LACERS Asset Class Benchmark Evaluation

Asset Class	Equity			Core Fixed Income	Credit		Real Asset				Cash
	Domestic Equity	Intrnational Equity	Private Equity		High Yield	Emerging Market Debt	U.S. TIPS	Commodity	MLP	REIT	
Sub -Asset Class	Domestic Equity	Intrnational Equity	Private Equity	Core Fixed Income	High Yield	Emerging Market Debt	U.S. TIPS	Commodity	MLP	REIT	Cash
Benchmark	Russell 3000 Index	MSCI ACWI ex-U.S.A	Private Equity Blended Benchmark ³	Bloomberg U.S. Aggregate Index	Bloomberg U.S. High Yield 2% Issuer Cap	JPM EMBI Global Diversified	Bloomberg U.S. TIPS	Bloomberg Commodity Index	Alerian MLP	FTSE NAREIT All Equity REIT	91 Day T-Bills
Long-Term Target	24%	29%	12%	19%	3%	2%	6%	2%	1%	1%	1.0%
Specified in Advance											
Appropriate											
Measurable											
Unambiguous											
Reflective											
Accountable											
Investable											
Overall View											
Aon Comments	None	None	Consider adding regional divers.	None	None	None	None	None	None	None	None
Benchmark for Consideration	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current	Current




	Property of the benchmark is valid
	Property of the benchmark is nuanced
	Property of the benchmark is not valid

Table 2-23. LACERS Policy Benchmark and Universe by Asset Class and Strategy

Public Markets	Benchmark	Universe
U.S. Equity	Russell 3000 Index	IM Public DB > \$1B US Equity

Rhumblin Advisors Russell 2000	Russell 2000 Index	eV US Small Cap
Rhumblin Advisors Russell 2000 Value	Russell 2000 Value Index	eV US SMID Cap Value
EAM Investors	Russell 2000 Growth Index	eV US Small Cap Growth
Principal Global Investors	Russell MidCap Index	eV US Mid Cap
Rhumblin Advisors S&P 500	S&P 500 Index	eV US Large Cap
Copeland Capital Management	Russell 2000 Index	eV US Small Cap
Granahan Investment Management	Russell 2000 Growth Index	eV US Small Cap Growth
Segall, Bryant & Hamill	Russell 2000 Value Index	eV US Small Cap Value
Non-U.S. Equity	MSCI ACWI ex-U.S.A	IM Public DB > \$1B Non-US Equity
Barrow Hanley	MSCI EAFE Value	eV EAFE Value
Lazard Asset Management	MSCI EAFE	eV All EAFE
MFS Institutional Advisors	MSCI World ex-USA Growth	eV EAFE All Cap Growth
Oberweis Asset Mgmt.	MSCI EAFE Small Cap	eV EAGE Small Cap
SSGA World ex-US IMI	MSCI World ex-USA IMI	eV EAFE Core Equity
State Street EAFE SC	MSCI EAFE Small Cap	eV EAFE Small Cap
Axiom Emerging Markets	MSCI Emerging Markets	eV Emg. Mkts. Equity
DFA Emerging Markets	MSCI Emerging Markets Value	eV Emg. Mkts. Equity
State Street Emerging Markets	MSCI Emerging Markets	eV Emg. Mkts. Equity
Wasatch Global Investors	MSCI Emerging Markets SC	eV Emg. Mkts. Small Cap
Core Fixed Income	Bloomberg U.S. Aggregate Index	IM Public DB > \$1B US Fixed Income
Loomis Sayles & Co Core FI	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income
SSGA U.S. Aggregate Bond	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income
Baird Advisors Core FI	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income
Garcia Hamilton & Associates	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income
JPM Investment Management	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income
Income Research & Management	Bloomberg U.S. Aggregate Index	eV US Core Fixed Income

Based on our experience with the benchmarks and universes being utilized by the Plan's investment consultant, we are comfortable with their continued use.

- ***Performance attribution analysis at the Total Fund level***

Conclusion:

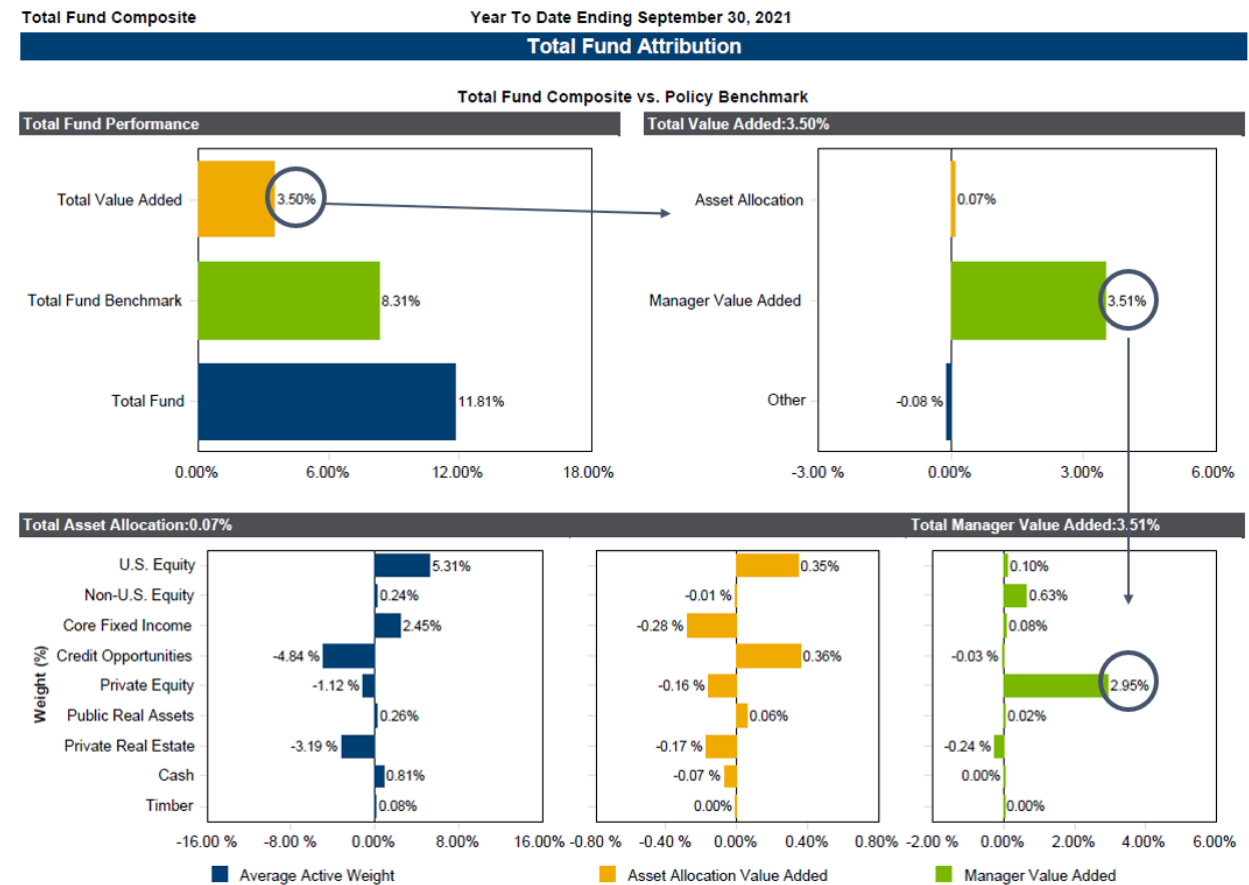
Please see our performance attribution analysis at the Total Fund level as well as at the asset class level in Appendix E. The below charts provide an overview of what is provided in the appendix and how to appropriately interpret the analysis.

Total Fund:

The Chart below provides an attribution analysis at the Total Fund level for YTD 2021. The top
Final Management Audit Report of the Los Angeles City Employees' Retirement System | Fiduciary Services Practice
Aon Investments USA Inc.

left of the chart provides the returns of the Total Fund and the Policy Benchmark as well as the relative difference. The top right chart breakouts out the relative return difference drivers by differences in asset allocation drifts from policy, manager value add difference driven by success or failure of active management (and structure decisions) within the underlying asset classes, and Other which typically represents the impact of cash flows during the period. The green bars in the bottom right chart present the breakout of the “Manager Value Added” category by asset class.

Chart 2-21. LACERS Total Fund Performance Attribution



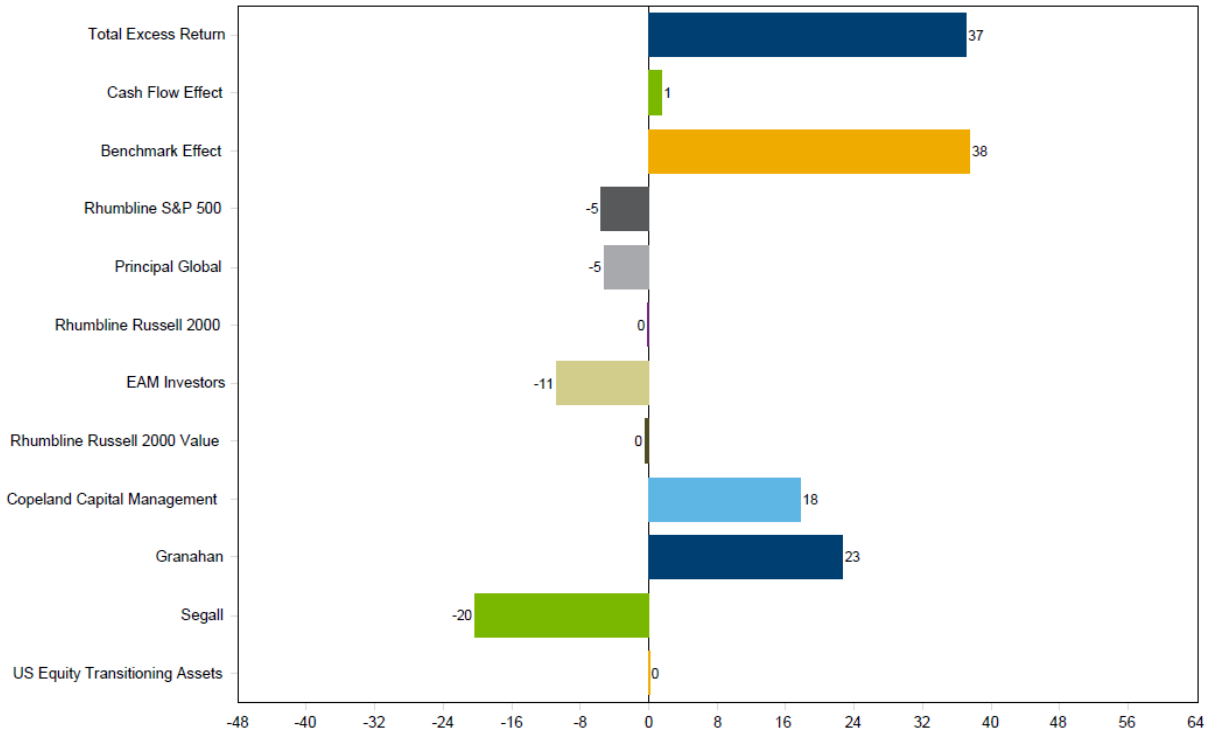
Asset Class:

The chart below provides an overview of asset class attribution. The top line item represents the relative return between the asset class and benchmark which is then broken into two separate categories. The first being the effect cash flows had on the asset class’s return and then the effect differences in the asset class benchmark relative to the underlying manager benchmarks had on relative results. The underlying strategies are also provided and the figures shown represent their total contribution to absolute results.

Chart 2-22. LACERS Asset Class (U.S. Equity) Performance Attribution

Asset Class Attribution

Year To Date

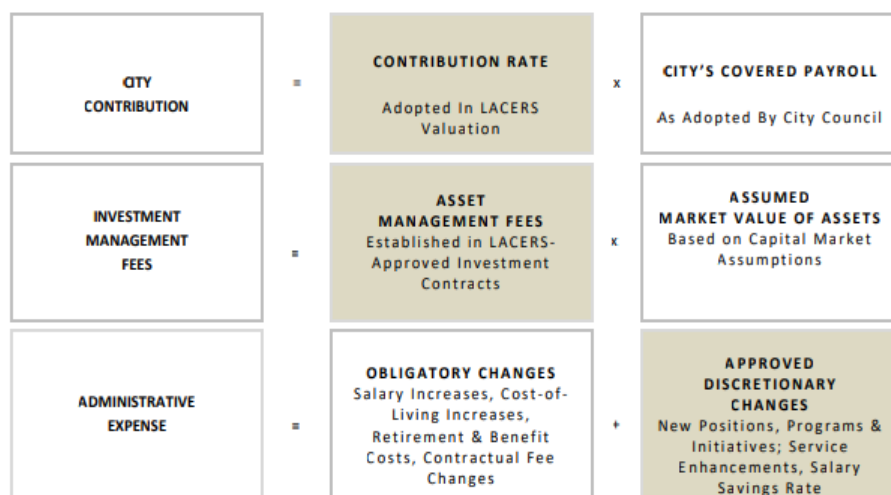


III. Economy and Efficiency of Administration/Management of the System

- **Operating budget process**

We observe that the Board has a clearly defined and thorough process in place for consideration of its budget. The annual budget is comprised of an administrative expense budget, health care fund budget, investment management fees and expenses budget, and the City’s contribution. The budget takes into consideration the Board’s strategic plan and annual business plans. Chart III-1. below sets forth the components of the proposed budget.

Chart III-1. LACERS Budget Components



Source: LACERS May 26, 2020 Proposed Budget

We find the LACERS *Annual Proposed Budget* process to be in line with best practices in terms of background, detail, justifications, and transparency.

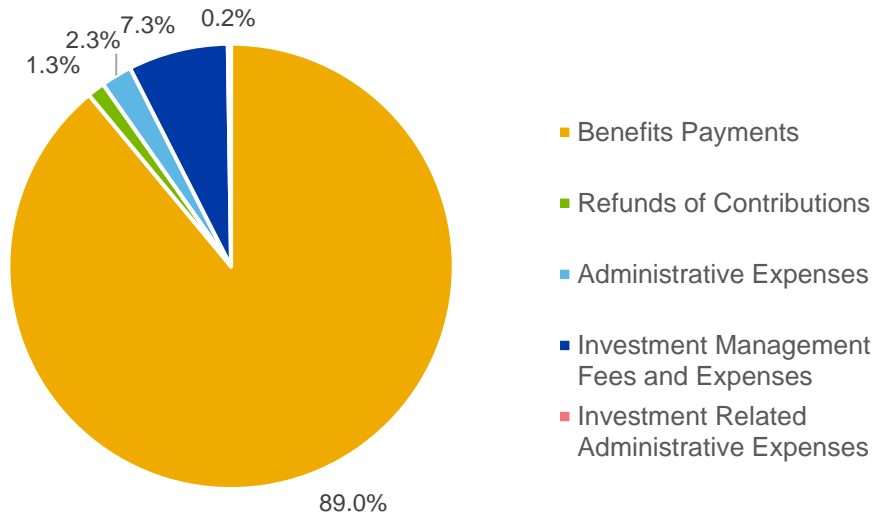
Our interviews confirmed that LACERS Board and Staff are conscientious of properly budgeting and managing costs in a prudent manner.

- **Broad drivers of costs**

The total costs of LACERS’ expenses include pensions and benefits, administration, and investment management. When looking at the total expenditures, administrative and investment management expenses make up a small portion of the total. The LACERS 2021 Annual Report reflects that administrative expenses represent 2.3 percent of the total expense. Investment management expense represents 7.3 percent and investment related administrative expense represents 0.2 percent. The remaining 90.3 percent of total expense was made up of pension

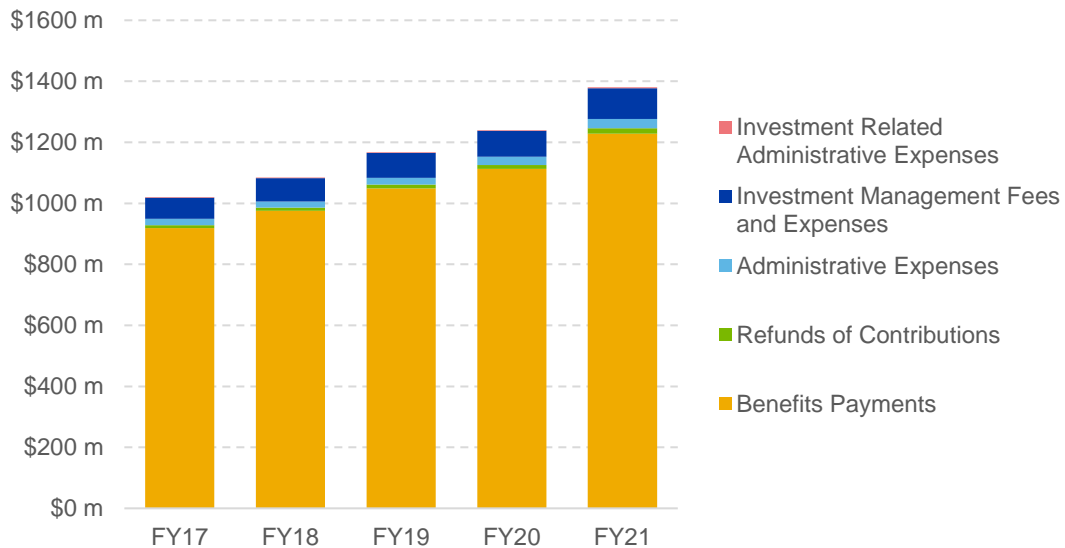
and health benefit expenses and refunds of contributions, as depicted in Chart III-2 below created from the 2021 Annual Report:

Chart III-2. 2020-21 Actual Expenditures



The following Chart III-3. depicts a breakdown of total expenditures over a five-year period. Relative to benefits payments, other expenses have remained small.

Chart III-3. Five-Year Total Expenditures History



We observe the broad drivers of costs, including pension and health benefits expenses, investment management expenses and administrative expenses, are consistent with what we see represented in other public fund’s expenses.

- **Expenses over the scope period: administrative and investment management**

A. Administrative expenses

Chart III-4. below shows budgeted administrative expense, actual administrative expense and number of employees over the scope period. Administrative expense includes personnel services, professional services, information technology, investment related administrative expenses, leases and other related expenses. Generally, administrative expense increased over the scope period.

Chart III-4. Administrative Expense Budgeted vs Actual

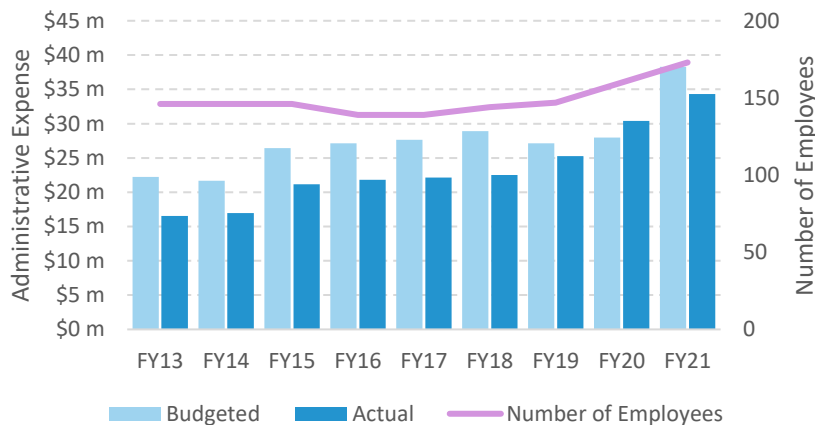


Chart III-5. below table below displays the percentage increase or decrease in actual and budgeted administrative expense compared to the previous year. The largest increase in actual administrative expense of 25% occurred in FY 2015. This increase in FY 2015 was primarily driven by the beginning of required employer contributions shared by LACERS for its employees' retirement and postemployment health care benefit. FY 2021 saw a 37% increase in administrative budget that was primarily driven by personnel services expenses, but the actual administrative expense only increased by 13%.

Chart III-5. Administrative Expense YoY Change Budgeted vs Actual

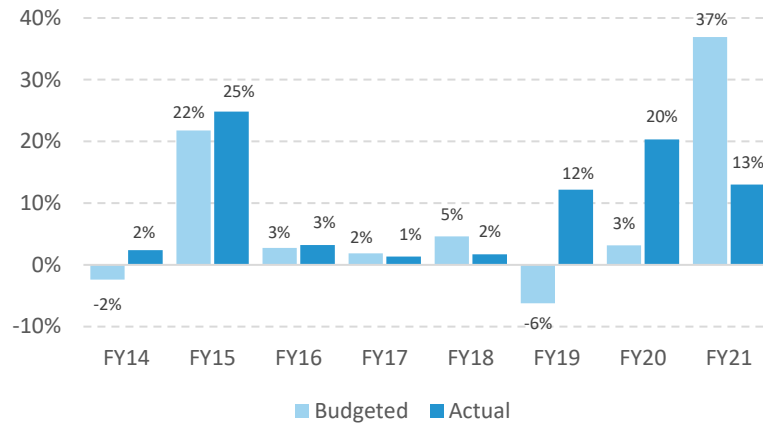
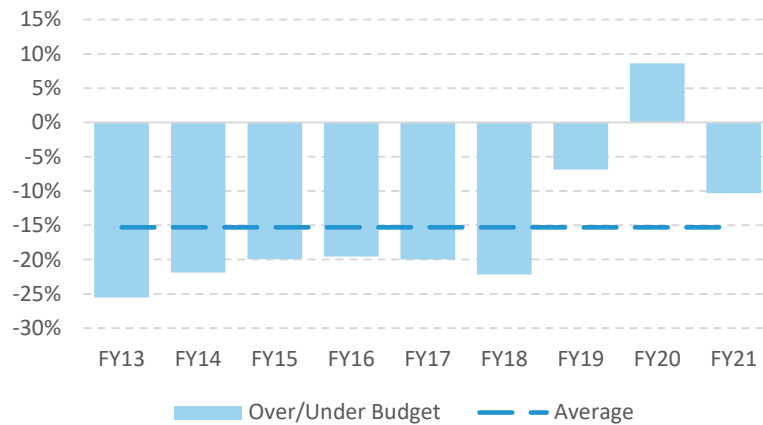


Chart III-6. below displays the percentage that actual administrative expense was over or under the budgeted administrative expense. Actual administrative expense was below budgeted administrative expense by an average of 15.3% from FY 2013 to FY 2020. Actual administrative expense remained under budget every year except FY 2020. In FY 2020, actual administrative expense exceeded budgeted administrative expense by 8.6%. This overage was primarily due to building operating expenses related to the new LACERS headquarter building, an increase in professional services expense related to self-funded dental plan administrative fees and a depreciation and amortization expense that was not included in the budgeted administrative expense.

Chart III-6. Administrative Expense Percentage Over/Under Budget



B. Investment expenses

Chart III-7. compares budgeted investment management expense, actual investment management expense and assets under management. Investment management expense includes investment management fees and consulting fees for all asset classes. Generally, actual and budgeted investment management expenses have increased over the scope period as assets under management have increased.

Chart III-7. Investment Management Expense Budgeted vs Actual

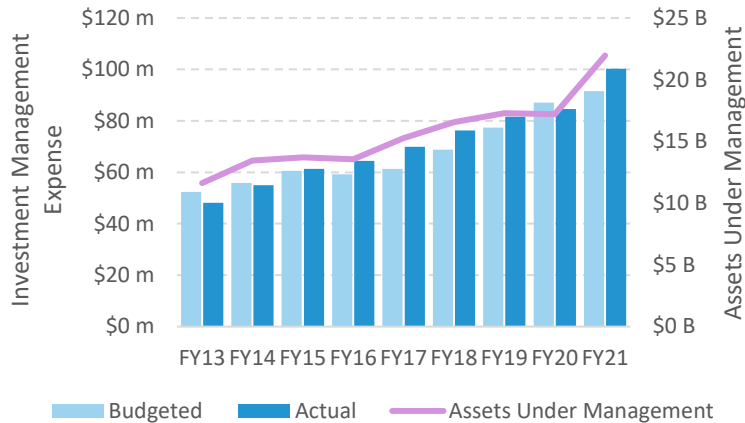


Chart III-8. below exhibits the percentage that budgeted and actual investment management expenses changed from the previous year. FY 2014 through FY 2017 experienced larger increases in actual investment management expense than budgeted investment management expense. FY 2018 through FY 2020 experienced larger increases in budgeted investment management expense than actual investment management expense.

Chart III-8. Investment Management Expense YoY Change Budgeted vs Actual

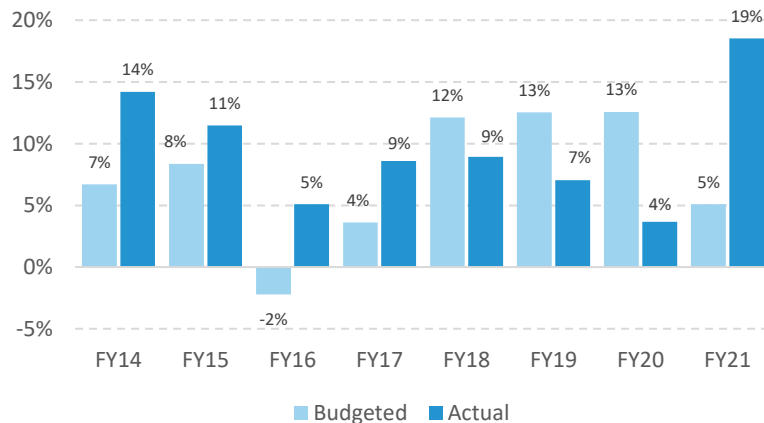
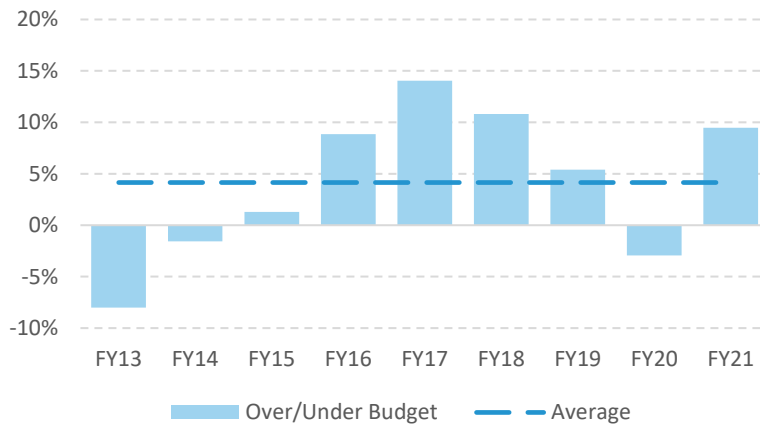


Chart III-9. below shows the percentage that actual investment management expense over or under budgeted investment management expense. Actual investment management expense was over budget by an average of 4.2% over the scope period. In FY 2017 investment management expense was 14.1% over budget.

Chart III-9. Investment Management Expense Over/Under Budget



Sources: FY 2013-FY 2021 Annual Comprehensive Financial Reports, FY 2013-FY 2021 Proposed Budget and Personnel Resolutions

Conclusion:

Generally, the administrative expense budget has increased minimally over the scope period and actual expenses have been under budget with the exception of FY 2020 with justifiable drivers for that year. The investment management budget and actual expenses have increased due to increased asset size.

- ***Expenses compared to peers***

LACERS uses CEM Benchmarking analysis to compare various aspects of its administration to peers, including pension administration costs. Comparison to peers is an exercise in prudence. The California Constitution and the City Charter require the LACERS Board to discharge its duties with the care, skill, prudence and diligence under the then prevailing circumstances that a prudent person acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims. This language mirrors ERISA and contemplates comparison to prudent trustees at peer pension systems. The standard does not require that fiduciaries act in the same manner as peers. Rather, it requires that decision-making by fiduciaries be informed by the actions of comparable fiduciaries – like entities with like aims.

We reviewed the CEM Benchmarking study completed in 2018. The 2018 study benchmarked LACERS pension administrative costs and service levels. CEM identified 13 LACERS peers for purposes of the study. Benchmarked against those 13 peers, LACERS total pension administration costs per member were only slightly above the peer average. LACERS total pension administrative costs per member were below the peer average when compared to

California pension systems. When reviewing total administrative costs compared to asset size (in basis points), LACERS was below the peer average.

Based on the 2018 CEM Benchmarking study, we observed that the number of LACERS administrative staff appear somewhat higher than the peer average. CEM reported that LACERS used 64% more full-time employees to serve members than peers. This was due to the complexity of the benefits and transaction volume necessary in providing services to the LACERS membership. LACERS reported that their staffing levels have only grown strategically where necessary. Furthermore, our interviews confirmed that the LACERS' staffing size is commensurate with the proper administration and management of the System, and that a few more additional staff would be able to fully support the specialized services such as service purchase, cybersecurity, benefit administration and investments, as assets have grown and there are more specialized services.

Table III-1. LACERS Staffing Turnover Rates

	Authorized Positions	Turnover
FY 2014	139	17
FY 2015	139	21
FY 2016	139	24
FY 2017	139	23
FY 2018	144	28
FY 2019	147	21
FY 2020	160	25
FY 2021	173	14
FY 2022	177	11

In reviewing turnover rates, we found them to be relatively stable over the scope period.

- ***Opportunities for Cost Sharing***

- A. Current cost sharing arrangements**

We observed that LACERS has instituted some cost sharing with the Los Angeles Fire and Police Pensions (LAFPP) and Water and Power Employees' Retirement Plan (WPERP).

Current cost sharing arrangements: The main area of cost sharing amongst the Systems is for the City Attorneys' Office legal representation amongst the Systems. The April 13, 2015 Letter Agreement between the Systems reflects the method and manner of this cost sharing arrangement. Shared costs include salaries incurred by City Attorney clerical staff, hours worked by City Attorney staff in joint support of the three Systems, and compensatory time

taken by City Attorney staff. Each System is responsible for its portion of shared costs, which is calculated based on a percentage of salary per work order to the total salary. The salary-based percentage is also applied to the cost sharing of non-salary expenses. Effective July 1, 2014, LACERS is the central billing agency for the non-salary City attorney expenses. The non-salary expenses include office space lease, office furniture and equipment, parking, dues, subscriptions, publications, travel expenses, training, copy machine rental, office supplies and computer equipment. LAFPP and WPERP reimburse LACERS based upon the percentage of City Attorney staff time used by each System.

Currently the City Attorney Public Pensions General Counsel Division's primary office is housed in the LACERS location, with satellite offices at LAFPP. WPERP reimburses its pro-rata share of the primary office lease expense incurred by LACERS but is not responsible for reimbursing LAFPP for the satellite office lease expenses.

The Systems reconvene as necessary to review and discuss any changes to the City Attorney cost sharing arrangement.

LAFPP and LACERS also contract with the same real estate consultant. For investments made in the same commingled fund, the real estate consultant negotiates on behalf of both systems, which reduces each System's respective management fee for the commitment.

Finally, the three Systems share outside legal counsel expenses covering the review and drafting of investment fund documents when making the same investments.

B. Potential cost sharing opportunity:

A potential cost sharing opportunity could be explored through a group purchase of management liability insurance. By joining as a group through one broker, the Systems could contact the markets as a group, rather than individually, and obtain cheaper insurance rates. The management liability insurance could include primary and excess fiduciary liability, directors and officers liability, employment practices liability, cyber and crime, as determined by each System. Each System would obtain its own policy with their own limits and the Systems would not pool or share risk. This arrangement has successfully been utilized by other retirement systems and has resulted in cost savings for each system that was part of the group.

Recommendation III.1.:

High Priority

Medium Priority

Low Priority
X

- Explore additional cost sharing arrangements LAFPP and WPERP regarding management liability insurance.

- ***Interagency integrity of data***

LACERS receives payroll data from the City regarding contributions. It is our understanding that there is a slight misalignment regarding the format in which the payroll data is reported. However, LACERS has processes in place to convert the data into a format that they can run through their pension system, and a new City payroll system scheduled for 2023 should rectify the misalignment.

IV. Governance

- **Board Governance Manual/Policies**

Background:

“Governance” refers to the method by which an entity is directed and controlled. A good governance structure clearly defines the roles of the different parties that participate in the decision-making process and includes the way issues are identified, options are analyzed, and decisions are evaluated and ultimately by whom they are made. Key elements of a solid governance framework include transparency and accountability, prudent documentation, specificity regarding any delegation and oversight, and effective leadership. Consequently, organizations that exercise “good governance” have clear and concise documentation of roles and responsibilities, effective and efficient reporting lines, and clarity concerning what authority has been retained by a board and what has been delegated. Studies have shown that “good governance” adds tangible and intangible value to an organization.²

For many public pension funds, the enabling statute sets forth high-level duties of the board, the executive director/general manager, and the chief investment officer (“CIO”). Most public pension funds further document the roles, responsibilities and reporting lines by adopting bylaws, charters, written delegations of authority, organizational charts, position descriptions, and policies and procedures (e.g., the investment policy statement, governance manual, etc.).

Having clearly defined roles and responsibilities is a recognized best practice, as it facilitates a board’s ability to fulfill its fiduciary duty, mitigate risk, and help the organization to run more effectively and efficiently. It is important that the documentation be in line with statutory authority, be unambiguous, succinct, consistent, and periodically reviewed to ensure relevance.

We find that many systems compile their internal policies and references to relevant statutes, regulations, and other documents into a governance manual in order to create one central place where the rules and principles governing the system are compiled. Such a governance manual helps ensure that all trustees, staff, stakeholders, and other interested parties receive complete and consistent information to understand their respective roles, as well as the governing structure of the system. In general, the purpose of a governance manual is to set forth in writing the operating guidelines a board has for itself. It codifies the way things work and provides continuity when trustees change. It documents the structure, manner, and process by which a board exercises its authority and control. It helps boards meet their fiduciary responsibilities.

² “Good Governance Adds Value”, a study published by Rotman International Journal of Pension Management, found that better governed pension funds outperformed poorly governed funds by 2.4% per annum during the 4-year period ending 12/2003. A similar study for the period 1993-1996 found a 1% annual good governance performance dividend. Capelle, Ronald, Lunn, Hubert and Ambachtsheer, Keith, “The Pension Governance Deficit: Still with Us” (October 2008), Rotman International Journal of Pension Management, Vol. 1, 2008.

Conclusion:

LACERS has adhered to best practices by adopting a board governance manual. The LACERS Board Governance Manual sets forth LACERS' mission and vision, statement of purpose, applicable laws, ethical obligations, duties and responsibilities of the Board and the General Manager, expectations of Board members, Board procedures, Board administrative policies and Board investment policies. We find the LACERS Board Governance Manual is a thorough and essential document with clear delineation of roles and responsibilities and serves as an important source demonstrating the sound governance structure exercised by LACERS.

Further, LACERS follows best practice in transparency by posting the Board Governance Manual on its public website, and we commend LACERS for doing so.

In looking at the policies contained in the Board Governance Manual and adopted by the System, we focused on policies compared to industry standards. We compared LACERS' policies to the policies we would expect to find at a public fund that has operating policies consistent with best practices. In our comparison, we observed that LACERS has most of the policies we would expect to find.

Additionally, like a number of cutting-edge public pension systems, LACERS has adopted a policy addressing environmental, social, and governance (ESG) issues. LACERS Geopolitical Risk Investment Policy sets forth the Board's awareness that ESG issues may have an impact on investment returns, and in such instances, these issues should be examined. The Geopolitical Risk Policy makes it clear, however, that any actions taken must be consistent with the Board's fiduciary duties, which we find to be appropriate from a fiduciary and governance perspective.

The chart below compares the LACERS policies to our best practice policies list on the following page.

Table III-2. Best Practices Policy List	Policy Exists
1. Reference to governing laws and charters	√
2. Ethics policy	√
3. Conflicts of interest and disclosure policy	√
4. Board meeting protocol	√
5. Delegation policy	Written Delegations of Authority
a. Responsibilities of the Board	√
b. Responsibilities of the Executive Director/General Manager	√
6. Investment policy. Examples of key provisions	√
a. Investment goals and objectives	√
b. Identification of Roles and Responsibilities	√
c. Asset Allocation	√
d. Asset class guidelines and benchmarks	
e. Rebalancing policy	√
f. Monitoring and reporting	√
g. Securities litigation policy	√
h. Proxy policy	√
i. Insider trading policy	Reference
j. Personal trading policy	
k. Placement agent policy	√
7. Budget approval policy	Reference
8. Legislative policy	√
9. Customer service policy	Reference
10. Communication policy	√
11. Procurement policy	√
12. Audit policy	√
13. Board member education policy	√
14. Board travel policy, including approval process	√
15. Staff compensation policy	
16. Strategic planning and implementation policy	√
17. Succession planning policy	
18. Risk management policy	
19. Whistleblower policy	Reference
20. Disaster recovery/Business continuity policy	√
21. Cybersecurity policy	Information Security Policy
22. Board self-evaluation policy	
23. Executive Director/General Manager evaluation policy	√
24. Service provider evaluation policy	
a. Investment consultant	
b. Legal counsel	
c. Actuary	
25. Reporting and monitoring policy	
26. List of routine reports provided to the Board	

27. Board Operating Policy and Procedures	√
a. Benefits Administration	√
b. Benefits Processing	√
c. Benefits hearing	√
28. Funding Policy	√
Schedule of Policy Review Frequency and Amendments	√

Recommendation IV.1.:

High Priority	Medium Priority	Low Priority X
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- We recommend that LACERS consider adoption of the best practice policies that have not been adopted listed above. Furthermore, LACERS should consider adding references to existing policies that are not contained in the Board Governance Manual itself.
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- ***Monitoring and reporting***

Background:

In order to adequately fulfill their fiduciary responsibilities, it is essential that board members devote adequate time to monitoring compliance with the policies and procedures they have adopted. In order to assess compliance, suitable reporting is essential. The U.S. Supreme Court has stated that fiduciaries have a continuing duty-separate and apart from the duty to exercise prudence-to appropriately monitor. *Tibble v. Edison International*, 135 S.Ct. 1823 (2015), *Hughes v. Northwestern Univ.*, 595 U.S. __2022.

Through our interviews, it is clear that the Board and Staff are mindful of the board’s oversight role and have adopted many prudent ways to enable the Board to exercise this role. To further enable the Board’s oversight role, we recommend the adoption of a Reporting and Monitoring Policy that sets forth the Board’s expectation of regular reporting, and a schedule of routine reports provided to the Board. We also recommend that LACERS do a Reporting and Monitoring verification process on an annual basis to ensure that the regular reporting has been completed. Many other public pension systems use these methods, such as sister system LAFPP.

Recommendation IV.2.:**High Priority****Medium Priority****Low Priority**

X

- Adopt a Reporting and Monitoring Policy and conduct an annual Reporting and Monitoring verification report to the Board.
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- ***Board Education and Travel Policy***

Background:

To keep abreast of current issues and industry changes, the best practice is to provide thorough orientation and on-going training for trustees. Some boards have adopted education policies, which we believe is a prudent practice. An education policy sets forth the timeframes for orientation and continuing educational requirements, the essential educational topics to be covered, internal educational programs, recommended external conference opportunities, and an evaluation process for board input on training, and materials for self-study.

Many retirement systems have a required minimum of annual continuing education that board members must complete. According to a 2019 completed by the National Association of State Retirement Administrators (NASRA), out of 25 participating systems, 19 reported that they have a requirement to receive continuing education. 16 of those systems require a specified number of hours ranging from 2-18 hours annually. Most systems require that the education be related to fiduciary responsibility, ethics, investment issues, actuarial concepts, and open meeting requirements.

Conclusion:

LACERS has adopted a Board Education and Travel Policy (Policy). The Policy contains many of the expected elements of a prudent board educational policy. Additionally, the training topics listed therein comport with what we expect to see, including training on fiduciary duties, ethics, governance, actuarial principals, plan design, and investment and asset allocation. The Policy requires board members to complete a Board Member Evaluation Educational Form after attendance at an outside conference. The appendix to the Policy also provides a schedule of approved educational seminars.

The LACERS Board Education and Travel Policy has a minimum of 24 hours of board education that is required within the first two years for new board members, and for every subsequent two-

year period. We believe requiring a minimum number of educational hours is consistent with best practice.

The Board Education and Travel Policy requires a quarterly travel expenditure report, monthly report on conferences attended by Board members, and an annual travel activity summary. LACERS practices transparency by posting these reports, which comports with the governance element of transparency.

It is also LACERS' practice to have the City Attorney review board member travel requests for potential conflicts of interest.

- ***Independence of the System-Frequency of board meetings/Staff hiring and compensation***

Background:

The National Conference of Commissioners on Uniform Laws approved and recommended the Uniform Prudent Investor Act (UPIA) to all states August 4, 1994, and the Uniform Management of Public Employees Retirement Systems Act (UMPERSA) on August 1, 1997. These two uniform laws effectively incorporate the major principles of fiduciary duty. The concepts set forth in the uniform laws are often considered "best practice" and therefore have been used as models by public pension funds and investment boards to modernize fiduciary and investment standards.

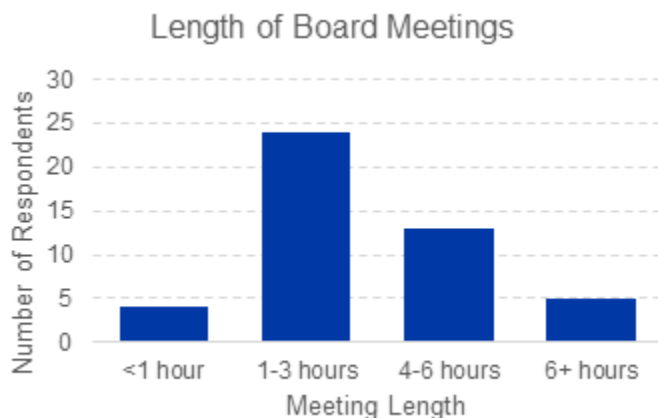
It is important for governing fiduciaries in charge of the administration and management of retirement system assets be independent-whether a sole fiduciary or board of trustees. UMPERSA specifies that the governing fiduciaries must have a level of independence that is sufficient to allow them to perform their duties effectively and efficiently. Governing fiduciaries are subject to extensive and stringent fiduciary standards such as the duty of loyalty. Independence permits the governing fiduciaries to perform their duties in the face of pressure of others who are not subject to the same obligations.

- ***Frequency and length of board meetings***

Background:

We have seen a growing trend for public pension system boards to reduce the number of annual board meetings. The National Association of State Retirement Administrators (NASRA) conducted a 2019 survey on the frequency and length of board and committee meetings. Forty-eight systems in thirty-seven different states responded to the survey. Of the responses, 14 systems reported that their governing boards meet monthly, 7 meet bi-monthly, and 17 meet quarterly. Others meet between 5-10 times per calendar year. The typical length of board meetings is as follows:

Chart III-10. NASRA Survey-Typical Length of Public Pension Funds Board Meetings (2019)



Conclusion:

Pursuant to City Charter Section 503(b), the LACERS Board is required to meet at least twice per month. This is atypical of current practices and trends. Additionally, meeting so often requires a significant amount of Board and Staff expenditure of time and resources. This can also result in a lag in keeping board meeting minutes up to date. Through our interviews, the Board members did not necessarily see a need to meet less often. Board members do not want to see longer board meeting days as a result of cutting back on meeting twice per month. We also recognize that any changes would require an amendment to the City Charter. However, we believe LACERS should have its own ability to independently decide on the frequency and timing of its board meetings.

Recommendation IV.3:

High Priority	Medium Priority X	Low Priority
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- We recommend that the City consider changing the City Charter to permit LACERS independence to determine the frequency and timing of LACERS board meetings.

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- ***Staff hiring and compensation***

Background:

Historically, public pension funds have been hindered in their ability to recruit and retain qualified talent, particularly professional and investment staff, because they did not have independent authority or were subject to civil service requirements. Many public pension funds

have been granted authority by their respective legislatures to have independence over the recruitment, hiring, and compensation of the fund's staff. Currently, LACERS is subject to the City's classifications of positions and salary structure. Through our interviews we learned that at times the classifications do not adequately cover the job being performed at the retirement system. Not having an independent salary compensation structure could cause problems with professional and investment staff being underpaid according to market, which can directly affect recruiting and retention efforts.

The Department of Labor, in reviewing the duty to defray reasonable expenses of administering a pension system, has stated that reasonable expenses are those that are appropriate and helpful to the plan. DOL recognizes that in order for the plan to be properly managed and to fulfill responsibilities of administering the plan, trustees can ensure that they have adequate resources and staff necessary to meet the needs of the plan. This could be hindered if a system does not have proper independence in this area. Having independence in this area is in line with the independence principles noted by UMPERSA and best practices.

Recommendation IV.4.:

High Priority X	Medium Priority	Low Priority
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- We recommend that the City amend the City Charter to give LACERS independent authority regarding LACERS staff hiring and compensation.

- ***Delegation***

A trustee has a duty personally to perform the responsibilities of the trusteeship **except as a prudent person of comparable skill might delegate those responsibilities to others**. In deciding whether, to whom and in what manner to delegate fiduciary authority in the administration of a trust, and thereafter, in supervising or monitoring agents, the trustee has a **duty to exercise fiduciary discretion and to act as a prudent person of comparable skill would act in similar circumstances**. Section 80 of the Third Restatement of Trusts. (Emphasis added.)

Trustees are not only allowed to delegate certain tasks, but they are expected and encouraged to do so. *Donovan v. Cunningham*, 716 F.2d 1455, 1467 (5th Cir. 1983). Trustees cannot reasonably be expected to fulfill every function the retirement system is responsible for performing, particularly in the area of investments given the size and complexity of public pension fund assets. Additionally, most public pension fund trustees are part-time, not compensated and many do not have financial and investment expertise. It is considered prudent given these constraints to prudently delegate to professionals who have the requisite knowledge and experience.

This is particularly important given the complexity of today's environment in which institutional investors operate. Best practice is an oversight model that enables board members to focus on the policy issues that demand their attention, trending away from board management of the minutiae. Prudent delegation is critical to the long-term success of retirement systems and can allow board members to focus on matters of policy that require their attention and is an important trait of an effective, efficient board.

Public retirement boards can delegate but they cannot abdicate their responsibilities. They can delegate duties to qualified agents; however, if the board elects to delegate duties, it must utilize reasonable care, skill and caution in selecting and monitoring the agents and establishing the scope and limits of the agent's authority. Prudent delegation assists in mitigating fiduciary liability. Best practices are to make clear delegations in writing after undertaking a prudent process to determine if the agent is truly an expert in the type of work being delegated. When considering whether a delegation is proper, consideration is to be given to "all factors that are relevant to analyzing where the fact and manner of delegation can reasonably be expected to contribute to the sound, efficient administration of the trust." Section 80, Comment e, of the Third Restatement of Trusts. As stated in *Donovan v. Cunningham*- "[t]he test of prudence is one of conduct and not a test of the result of the performance of an investment. The focus of the inquiry is how the fiduciary acted in his selection of the investment and not whether his investment succeeded or failed." 716 F.2d 1455 (5th Cir. 1983). In our opinion, echoed by other industry experts, we find delegation when prudently done is a best practice.

The decision to delegate is a governance decision and is ultimately within the discretion of the LACERS Board to decide whether, and in what manner, to delegate functions to Staff or to third parties. There are two areas that we identified where the Board could consider delegation of its authority: one, the disability hearing process, and two, the selection of investment managers. Based upon our empirical knowledge, many public pension fund boards have delegated in these two areas. These delegations have resulted in the need for less board preparation and board meeting time and made the processes more efficient. We recognize the LACERS Board has delegated "discretion in a box" to its consultant regarding making private equity commitments up to a maximum of \$150 million for new and existing managers without board approval. The Board could consider additional delegation regarding investments, and regarding disability approvals. This would cut down board meeting time as well. Through our interviews with Board members, however, the majority reported that they felt their role is a vital one in both of these areas and did not seem inclined to delegate additional investment discretion or disability approval discretion. We do encourage the Board to consider any other areas that could be delegated that permits them to continue to focus on policy, and charge Staff with implementation. For any delegations, the Board can exercise its prudent oversight and monitoring and ensure their delegation is being properly executed according to the terms of the delegation.

V. Progress toward Recommendations made in the Prior Management Audit

The last management audit of LACERS was completed in 2013 by P2E Consulting. P2E Consulting made a total of 41 Recommendations. We confirmed that the LACERS Board promptly and thoroughly considered every Recommendation.

Of the 41 Recommendations, LACERS reports that it has completed 33 Recommendations, considered and recommended status quo on 6 Recommendations, and noted 1 Recommendation as unknown.

We reviewed each recommendation, documentation and questioned the Board and Staff regarding implementation. Our review confirms that LACERS has completed 32 of the Recommendations.

Regarding Recommendation #25-Aon agrees in part. Recommendation #25 provides that LACERS establish a Monitoring and Reporting Policy, Strategic/Business Planning Policy, and a GM Performance Evaluation Policy. LACERS has adopted the Strategic Planning Policy and GM Performance Evaluation Policy but has not adopted a Monitoring and Reporting Policy. We discuss this and make a recommendation in the Governance section of this Report.

Recommendation #21 recommended that the Board consider delegating the entire investment selection process to Staff, subject to Board-approved parameters, selection criteria, and relevant internal controls. There has been some delegation to Staff relative to private equity. We discuss delegation of selection of investment managers above in our Governance section of this Report.

Recommendation #15 recommended that LACERS should propose to the City Council that the City Charter be amended to grant the Board full authority to administer the System subject to fiduciary standards relative to the System's own independence, including staff compensation and hiring policy, and setting the number and timing of board meetings. LACERS reported that the Recommendation is better directed to the City. We discussed our recommendations more fully above under the Governance section of this Report.

Our full comments are listed in the Status of Prior Recommendations Matrix chart below. We have highlighted the Recommendations where we renew all or part of the original Recommendation.

Reco Number	Recommendation	LACERS Status/Aon Comments
Interim 1	Comprehensive review of active management program; ensure LACERS has taken all relevant factors into consideration.	Completed Aon: Agree
Interim 2	Emerging Manager Fund of Funds Program: terminate or revise Program or revise the Emerging Manager Policy.	Completed Aon: Agree
Interim 3	Update Section V.C. of Investment Policy Statement to reflect the more stringent requirements contained in Section IV of the Manager Search and Selection Policy.	Completed Aon: Agree
Final	The City should consider the matter of consolidation or combination of its pension systems. One aspect of its consideration of the matter should be a comprehensive study to determine an estimate of the potential savings and form the basis for further action.	Unknown - Recommendation was addressed to the Mayor and Council. Aon: Agree
Final 1	LACERS should supplement Monte Carlo simulation with scenario analysis. This would allow it to examine the performance of its asset mix policy under a limited number of specific economic scenarios, so as to better understand the risk of lower than anticipated investment returns under adverse capital market condition. It would also enable LACERS to better communicate the risks of the System to the City. The added costs associated with scenario analysis would be minimal.	Completed Aon: Agree
Final 2	The Board should devote more time and effort to reviewing the investment assumptions before the asset/liability study is conducted (in the same ways that it reviews actuarial assumptions prior to the actuarial valuation) to satisfy itself that the assumptions, particularly with respect to the expected returns on asset classes, are realistic, that they reflect the current valuation in capital markets, and that they are a reasonable expectation of investment performance over the period of the study.	Completed Aon: Agree
Final 3	LACERS should explore with its investment consultant the feasibility of using alternative methodologies, other than mean-variance optimization, for determining allocations to private market assets.	Completed Aon: Agree
Final 4	LACERS should not invest in any asset class (or sub- asset class) without analyzing the potential implications of any such investment on the expected risk and return of the Fund. More specifically, LACERS should not invest in the real asset sub- asset classes that were recently approved until those sub-asset classes are modeled to determine the impact they may have on total portfolio.	Completed Aon: Agree

Reco Number	Recommendation	LACERS Status/Aon Comments
Final 5	The Board should establish maximum-minimum asset allocation ranges as part of the transition plan to guide the rebalancing of the actual allocation if it were to drift too far away from the quarterly target mix.	Completed Aon: Agree
Final 6	LACERS should establish a separate rebalancing policy with comprehensive guidelines and procedures with respect to the rebalancing process. (a) LACERS should examine the feasibility of rebalancing the asset allocation of the System, not just when the allocation exceeds the maximum-minimum ranges, but on an ongoing basis by directing contributions towards portfolios which are under-weighted (i.e. below their target allocations but still within the approved range) and withdrawals from portfolios which are over-weighted with proper allowance for the liquidity issues surrounding private market assets. Purchases and sales of securities in order to rebalance should only be undertaken when the asset allocation exceeds the approved ranges. While we were informed by staff that they consider cash flow in the rebalancing process, this should be more clearly specified in its investment policy. (b) LACERS should explore the use of overly strategies based on market index futures contracts as an alternative and/or a supplement to cash flows and asset purchases and sales for rebalancing.	Completed Aon: Agree
Final 7	The Board should require that the quarterly reports provided by the general investment consultant, real estate consultant, and private equity consultant provide the necessary information to allow the Board to monitor compliance with portfolio diversification requirements contained in LACERS investment guidelines.	Completed – Quarterly reports are now being submitted by the general investment consultant, real estate consultant and private equity consultant. Aon: Agree
Final 8	The Board should require investment consultants to submit a compliance report (quarterly or at least annually) that verifies the Systems’ compliance with the various provisions and guidelines of its investment policies.	Completed - this has been implemented by requiring the public markets investment managers that manage separate accounts to submit compliance statements annually within 45 days of calendar year end. Aon: Agree with the implemented process
Final 9	LACERS should consider stratified rates by Service Range provided by the actuary for retiree medical and dental coverage and continue to monitor the 50% election assumption for deferred vested members.	Completed Aon: Agree

Final 10	LACERS should reexamine the data on marital status at retirement and age difference between spouses because it is a more significant factor in an OPEB valuation.	Completed Aon: Agree
Final 11	LACERS should add more automation, if cost beneficial, in the application process to reduce the amount of work, time, and effort spent scanning applications, and ensure applications are complete. An automated system would ensure that all applications are legible and complete before submission, and automatically generate an electronic file, that would likely be easily searchable.	Completed - implemented when our PGOLD or retirement system application was upgraded in 2018 Aon: Agree
Final 12	LACERS should establish relationships with area physicians and become more proactive in getting medical records. Specifically, if cost-biennial, creating a mechanism to accept these applications electronically will eliminate delay that may be present with faxing or mailing this information, and allow the Disability Department to keep track of medical records in real time.	Completed - Status Quo approved by the Board Aon: Agree that the area physicians are not under contract with LACERS so it is not possible to require they submit their medical reports electronically. However, LACERS does require their own evaluators to submit their medical reports through a secure, electronic portal.
Final 13	LACERS should organize scanned data into additional sub-categories if cost beneficial, to help increase utility.	Completed Aon: Agree
Final 14	LACERS should consider ways to expedite the few retirement cases exceeding 90 days.	Completed – LACERS has always been ensuring cases do not exceed the promised processing time of 60 days from the time the application requirements have been completed. If it exceeded 60 days mostly its because there are issues beyond the control of LACERS. Aon: Agree, and note the “few” retirement cases were a total of three
Final 15	In accordance with industry best practice and published standards LACERS should propose to the City Council that the City Charter be amended to grant the Board full authority to administer the System subject to fiduciary standards. Such authority would include but not limited to: (a) Appointment of the General Manager; (b) Selection of legal counsel (internal or external); (c) staff compensation and hiring policy(at a minimum, the authority to allocate and reallocate positions without going through the City Personnel Department); and (d) Setting the number and timing of board meetings.	Completed - Status Quo approved by the Board Aon: Agree the Board did discuss the recommendation, but Board determined the recommendation should be directed to the City rather than to LACERS.

Final 16	LACERS should propose a Charter amendment to stipulate that an appointed Board member may only be removed for cause (except at end of term) and, if removed, that the reason is publicly disclosed.	Completed -Status Quo approved based on discussions with Mayor's Office Aon: Agree discussions regarding the recommendation were held.
Final 17	LACERS should establish separate comprehensive charters for the Board, the Board Chair, and the GM, as opposed to having their roles and responsibilities documented in various governance and investment policies. The use of charters (or terms of reference) was a typical practice among Cortex Peer Group.	Completed - Status Quo approved by the Board Aon: Agree that the roles and responsibilities of the Board, the Board Chair and the GM are outlined in the current Board Manual.
Final 18	LACERS should establish a charter for Internal Audit position that describes the roles and responsibilities of the position, and the internal auditor's reporting relationship with the Board and the General Manager.	Completed Aon: Agree
Final 19	LACERS should remove the Investment Committee Charter from the Governance Manual, as well as various references to the committee found throughout the Governance Manual, as the committee was disbanded in 2011.	Completed Aon: Agree
Final 20	LACERS should consider instituting a consistent format and content for each committee charter, such as general statement as to the role of the committee, committee composition, frequency of meetings, as well as the specific duties and responsibilities of the committee.	Completed Aon: Agree
Final 21	As LACERS investment programs get larger and more sophisticated over time, the Board should consider delegating the entire investment selection process to management subject to Board-approved parameters, selection criteria, and relevant internal controls. (Acknowledges Board has moved in this direction)	Completed - Status Quo approved by the Board The authority to make investments has not been fully delegated to staff. For Private equity, staff and consultant have limited discretion. Private equity does not need to be approved by the Board as long as the commitments are made within certain guideline amounts (up to \$50 mil for new funds and up to \$100 mil for follow on funds); the Board receives a notification report after staff and consultant make the commitment. Any potential commitment that exceeds the guideline amounts would need to be approved by the Board. For all other areas of the portfolio (public equity, fixed income, credit opportunities, private real estate and public real assets), the Board has to approve any investment. Aon: May renew recommendation

Final 22	The Board should establish a separate Audit Committee, and in preparing a charter for the committee, should consider the sample charters prepared by the Association of Public Pension Fund Auditors (APPFA) and the American Institute of Certified Public Accountants (AICPA).	Completed Aon: Agree
Final 23	The Board should consider eliminating the Strategic Planning Committee.	Completed Aon: Agree
Final 24	LACERS should establish a formal frequency for the periodic review of governance policies. Industry standards in this regard range from every 3 to 5 years. The policy review frequency should be documented (this could be done in the Statement of Governance Principles or in each policy). Ideally, all governance policies should indicate the date the policy was first approved, and last reviewed and/or amended.	Completed Aon: Agree, for policies where it is not specifically outlined within the policy, all policies are to be reviewed every five years, pursuant to the Policy and Procedure Management Policy.
Final 25	Establish other governance policies: Monitoring and Reporting Policy; Strategic/Business Planning Policy; and GM Performance Evaluation Policy.	Completed a GM performance evaluation policy is already in place. A strategic planning policy has been implemented since 2018. Aon: Agree in part, although there is not a separate Monitoring and Reporting Policy-we may recommend its adoption
Final 26	LACERS should review and update Investment Policy Statement and other investment policies and include the latest versions in its Governance Manual.	Completed. The Board adopted the Revised Investment Policy Statement on October 24, 2017 Aon: Agree
Final 27	LACERS should add the Board Communications Policy to the Board's Governance Manual.	Completed Aon: Agree
Final 28	LACERS should update the Commitment of a Board Member document, which references committees and sub-committees that no longer exist (e.g. Audit and Risk Control Committee, Private Investment Committee, etc.).	Completed Aon: Agree
Final 29	LACERS should reorganize Governance Manual so that ethics-related policies are all contained in the same section of the Manual to assist Board Members to maintain familiarity with them	Completed Aon: Agree
Final 30	LACERS should amend its Governance Manual so that it includes a comprehensive list of all applicable ethics legislation, for easy reference by Board Members and staff.	Completed Aon: Agree

Final 31	LACERS should establish an annual attestation to be completed by Board members in which they affirm they have reviewed and are familiar with LACERS governance and ethics policies (possibly extend to staff).	Completed - Status Quo approved by the Board Aon: Agree. LACERS reports that it has periodic governance and ethics training, all Board members and Executive Staff file Statements of Economic Interest which affirms they understand governance and ethics, and LACERS has several policies that address ethical issues.
Final 32	LACERS should work with City's Ethics Commission and City Attorney to ensure at least annual in-person fiduciary and ethics training.	Completed Aon: Agree
Final 33	LACERS should develop an education needs assessment process for the Board, which would serve as input into Board or Trustee education plan.	Completed Aon: Agree
Final 34	LACERS should establish consistent accessibility to the meeting minutes of all its Board committees.	Completed Aon: Agree
Final 35	LACERS should consider conducting fund attribution on a regular basis.	Completed Aon: Agree
Final 36	The Board should reaffirm or remove policies concerning proposed legislation and periodic evaluation of Board's performance.	Completed Aon: Agree
Final 37	The City and LACERS should formalize communication process regarding long-term strategic and financial planning.	Completed-Strategic planning in place Aon: Agree

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ATTN: Aon Investments Compliance Officer
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Appendix A—Recommendations Matrix

Number	LACERS Management Audit	Page Number
	I. Actuarial Methods, Assumptions, Funding and Innovative Strategies	
I.1.	LACERS should review whether securities lending and agent oversight could result in opportunity cost savings/revenue enhancements or additional risk mitigation benefits.	31
	II. Investment Performance/Asset Allocation	
II.1.	Aon recommends creating a formal procedure to ensure governance processes articulated in the policy are completed on the mandated cycle.	37
II.2.	Aon recommends all federal, state, and local legal requirements be explicitly stated together within the IPS.	43
II.3.	Aon recommends adding language to the IPS that states all modifications to the document are to be reviewed by the applicable consultant as well as fiduciary counsel prior to being presented to the Board.	57
II.4.	Consider including a memo from the applicable consultant and fiduciary counsel for all amendments of the IPS. The memo would articulate and document their agreement or disagreement with the proposed changes.	56
II.5.	Consider the creation of a compliance calendar to facilitate the oversight of compliance with the governance items articulated within the IPS.	59
II.6.	Consider including policy targets and ranges within the IPS.	61
	III. Economy and Efficiency of Administration/Management of the System	
III.1.	Explore additional cost sharing arrangements with LAFPP and WPERP regarding management liability insurance.	87
	IV. Governance	
IV.1.	We recommend that LACERS consider adoption of the best practices policies that have not been adopted. Furthermore, LACERS should consider adding references to existing policies that are not contained in the Board Governance Manual itself.	92
IV.2.	Adopt a Reporting and Monitoring Policy and conduct an annual Reporting and Monitoring verification report to the Board.	93
IV.3.	We recommend that the City consider changing the City Charter to grant LACERS independence to determine the frequency and timing of LACERS board meetings.	95

IV.4.	We recommend that the City amend the City Charter to give LACERS independent authority regarding LACERS staff hiring and compensation.	96
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Red= high priority **Blue=medium priority**, **Green=lower priority**



Appendix B—List of Interviewees

LACERS Board of Commissioners:

- Annie Chao
- Elizabeth Lee
- Sandra Lee
- Cynthia Ruiz, President
- Nilza Serrano
- Sung Won Sohn, Vice President
- Michael Wilkinson

LACERS Staff:

- Edwin Avanesian, Senior Benefits Analyst
- Todd Bouey, Assistant General Manager, Executive Officer
- Anya Freedman, Legal Counsel – City Attorney’s Office
- Karen Freire, Division Manager, Health, Wellness, Buyback
- Bryan Fujita, Investment Officer III, Public Markets
- Neil Guglielmo, General Manager
- Rodney June, CIO
- Wilkin Ly, Investment Officer III, Private Markets
- Rahoof Oyewole, Departmental Chief Accountant
- Alex Rabrenovich, Health Benefits Administration Division
- Melani Rejuso, Interim Departmental Audit Manager
- Ferralyn Sneed, Acting Chief Benefit Analyst, Retirement Services Division
- Dale Wong-Nguyen, Assistant General Manager, Members Benefits and Services

External Actuary:

- Paul Angelo, External Actuary, Segal
- Andy Yeung, External Actuary, Segal



Appendix C—Summary of Documents Requested and Received

LACERS Management Audit Initial Document Request

Item Number	Document Description	Document Received	Date Received	Comments
1	General Information			
A	Statutes and Constitutional provisions applicable to the System	Yes		
B	Administrative rules applicable to the System	Yes		
C	Board meeting minutes from January 2013 to present	Yes		
D	Annual Reports for each year during the review period	Yes		
E	The last Management Audit	Yes		
F	Organizational Chart	Yes		
2	Administration/Management of the System			
	<ul style="list-style-type: none"> ➤ Administrative Expenses ➤ Active and Passive Management ➤ Operational Policies & Practices 			
A	Overall operating budgets for each fiscal year 2013 to present	Yes		
B	Written description of the budget approval process or the Budget Approval Process Policy	Yes		
C	Total administrative expenses for each fiscal year 2013 to present, and the definition of what items are considered as administrative expenses and what is not	Yes		
D	Summary of Board and staff travel expenses for each fiscal year 2013 to present, allocated by category	Yes		
E	Description of any current cost sharing arrangements	Yes		
F	Progress reports on implementation status of prior management audit recommendations for cost sharing	Yes		
G	Any studies of administrative expenses of comparable funds	Yes		

Item Number	Document Description	Document Received	Date Received	Comments
	(e.g., Internal studies, CEM, or comparable studies			
H	Past studies or reports on the System's investment program provided to the Board (e.g., Internal studies, CEM, or comparable studies	Yes		
I	Any analysis of active/passive management performed during the review period	Yes		
J	Listing of all investment managers from fiscal year 2013 to present, a description of each manager's style, the fee schedule and actual fees charged by each manager, and each manager's returns by year during the review period	Yes		
K	Annual fees for investment consultants, custodian bank, and securities lending agents for each fiscal year 2013 to present, broken down by category	Yes		
L	Policies related to the operations of the System	Yes		
M	Any management letters issued during the review period	Yes		
N	Description of the process(es) used to verify policy compliance	Yes		
O	Risk Management Policy	Yes		
P	Business Continuity Plan	Yes		
Q	Any written delegations of authority and/or the accountability matrix reflecting what authority has been retained and what has been delegated and to whom	Yes		
R	System's Policy Manual	Yes		
3	Asset Allocation & Investment Performance			
	<ul style="list-style-type: none"> ➤ Actuarial Methods ➤ Investment Activities ➤ Asset Allocation 			
A	Investment Policy Statement	Yes		
B	Any documentation of processes and procedures regarding the adoption, monitoring, and updating	Yes		

Item Number	Document Description	Document Received	Date Received	Comments
	the Investment Policy Statement beyond what is stated in the IPS			
C	Annual actuarial valuation reports for fiscal years 2013 to present used to determine funding into the System	Yes		
D	Each actuarial experience study performed during fiscal years 2013 to present	Yes		
E	Each actuarial audit report performed during fiscal years 2013 to present	Yes		
F	Each Asset allocation study performed during the Review Period	Yes		
G	Each asset-liabilities study performed during the Review Period and the data provided at the time of such studies	Yes		In F zip files
H	Capital market assumptions used by investment consultant during the Review Period	Yes		In F zip files
I	Description of the process used for setting and modifying the asset allocation	Yes		In F zip files
J	Listing of each asset allocation adopted by the Board during the Review Period and a statement of why it was changed	Yes		
K	Any rebalancing processes and procedures beyond those stated in the IPS, who has responsibility for rebalancing, sample notifications to the Board and, a statement regarding controls to ensure compliance with rebalancing requirements	Yes		
L	Quarterly investment performance reports since January 2013 prepared by the investment consultant	Yes		L, M, N are same doc
M	Total fund benchmark composition since January 2013	Yes		L, M, N are same doc
N	Benchmarks for each asset class and investment manager, noting whether the benchmark was changed during the Review Period and if so, why	Yes		L, M, N are same doc
O	Description of process used for return calculations	Yes		
P	Manager selection and monitoring policies/procedures	Yes		

Item Number	Document Description	Document Received	Date Received	Comments
Q	Portfolio structure review documentation from 2013 to present	Yes		
R	Total fund monthly benchmark composite returns from fiscal year 2013 to present	Yes		R, S, T are same spreadsheet
S	Asset class monthly return and market value since 2013.	Yes		R, S, T are same spreadsheet
T	Monthly return and market value of individual investment managers utilized since 2013 (public asset class investments)	Yes		R, S, T are same spreadsheet
U	Each report during fiscal years 2013 to present detailing the impact of the early separation incentive program	Yes		
4	Comparative Metrics/Innovative Strategies <ul style="list-style-type: none"> ➤ <i>Past performance & trajectory</i> ➤ <i>Plan design/sustainability</i> ➤ <i>Performance & organizational metrics and practices</i> ➤ <i>Interagency data</i> Many of the documents related to this section have been requested in earlier sections.			
A	Any funding policies	Yes		
B	System financial projections of assets and liabilities provided to the Board during the period July 1, 2013 to present, including any proposals or presentations addressing financial planning and their resolution	Yes		
C	Listing of interagency data received by the system, including payroll data used to calculate pension benefits and pension liability	Yes		
D	Policies, procedures, and controls regarding interagency data	Yes		
E	Governance Policies (which were not part of the Policy Manual requested)	Yes		
F	Board member names, terms, and contact information	Yes		
G	Applicable metrics used for benefit and health care administration	Yes		
H	Any studies or analysis related to the costs of benefit and health care administration	Yes		
I	Any analysis depicting health subsidy growth	Yes		

Item Number	Document Description	Document Received	Date Received	Comments
J	Data presented to the Board during the Review Period regarding health care benefits and costs, projected benefits growth, and health subsidy growth	Yes		
K	Policies and procedures and data considered by the Board regarding any early separation incentive program engaged in during the Review Period	Yes		



Appendix D—Debating Active vs. Passive

Debating Active vs. Passive

The research is more nuanced than often acknowledged April
2018

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Key Points

- The active versus passive management debate is both nuanced and rich. There are good reasons why this is a hotly-debated topic, and reasonable people fall on both ends of the spectrum. It is unfortunate that often this debate is summarized with half-truths and sound bites.
- This paper summarizes and clarifies our views on the debate on active versus passive, shining light on the multi-faceted issues to provide institutional investors with an actionable way forward. Our views are not rigid or ideological: they are based on research, the details of which are contained in several other papers cited throughout this piece. We believe some investors are well-suited for active management, while others are likely to perform best with passive or factor-based investments. Suitability will vary based on both investor circumstance and asset class.
- While we acknowledge the average active manager is likely to underperform after fees, we also believe that actively managed, long-only public equities are likely to add value for skilled investors willing to employ broad, high-conviction mandates (such as unconstrained global equities) and stick with them over the long-term. However, these characteristics are challenging to maintain, so most of the world's investors are better off investing equities passively or using low-cost factor-based strategies.
- Active management in fixed income has higher odds of success than equities, especially for broad, multi-sector mandates. Investors may be able to achieve some of the same returns as active management simply by using customized blends of the broad market. Passive mandates may make sense for those needing a high level of simplicity or liquidity.
- Beyond public equities and fixed income, each strategy has its own unique considerations. The details of other strategies are beyond the scope of this paper.

Introduction

The debate about active versus passive management is an incredibly polarizing topic, with many well informed experts passionately holding views on opposite extremes. Why is this? We believe much of the public narrative on this topic is one-sided or incomplete. Depending on their perspectives (or financial incentives), people often focus on only one side of the debate and ignore the other. Some people have grown so dogmatic that they fail to listen to valid points from the other side. With all the varying research and statements made by professionals, what should investors believe?

The statements people make are often half-truths, in that they are valid perspectives, but not the complete story. They can mislead people at the same time as inform them. Both sides of this debate tell such half-truths.

We seek to bring order to this debate by laying out the research on both sides, and describing how we develop recommendations for our clients. We do not see a one-size-fits-all solution. Some investors are well positioned to be successful with certain types of active management, while others are likely to perform best with passive. Hopefully, this paper will help investors understand what is most appropriate for their portfolios.

The Half-Truths

It is worth pointing out the half-truths told on each side of the debate before we dive into the research.

The half-truths from proponents of active management: They trot out three-year performance track records for their products, boasting as if this is a long enough time to demonstrate skill (it isn't). Even where products have substantial histories of value-added results, they commonly downplay the reality that there can be protracted periods of underperformance even when ultimately successful. They don't talk about the products that performed poorly, lulling investors to forget about that possibility. They remind investors how much the investors "need" extra returns to meet their objectives, with less emphasis on how difficult it may be to earn those extra returns with active management.

The half-truths from proponents of passive management: They focus on research about the difficulty of success in active management without giving sufficient consideration to the research on characteristics of managers who tend to perform well or factors associated with outperformance. They demand unreasonably high batting averages for active managers to "prove" they have skill, otherwise dismissing outperformance as luck. They cite research on the poor net-of-fee performance of mutual funds marketed to retail investors, without acknowledging that large institutional investors can access similar strategies for much lower fees. They also cite research in one asset class and use it to draw conclusions about other asset classes. And they encourage people to infer that poor performance of the average investor implies that no investor should expect to do well.

There are even some half-truths promoted by both sides. One way we've seen this done is by citing recent experience of active managers in a particular asset class to draw long-term conclusions, though the recent results may have been driven by market cyclicity. Many active managers hold out-of-benchmark securities, which can cause headwinds and tailwinds for the average active manager. For example, when U.S. large cap is the best performing asset class, we expect most active managers in that strategy to underperform more than usual because there will be headwinds from out-of-benchmark securities, such as smaller-cap and non-U.S. stocks. Active management returns can be cyclical, and a focus on 1, 3, and even 5 year historical results isn't sufficient to form forward-looking expectations.

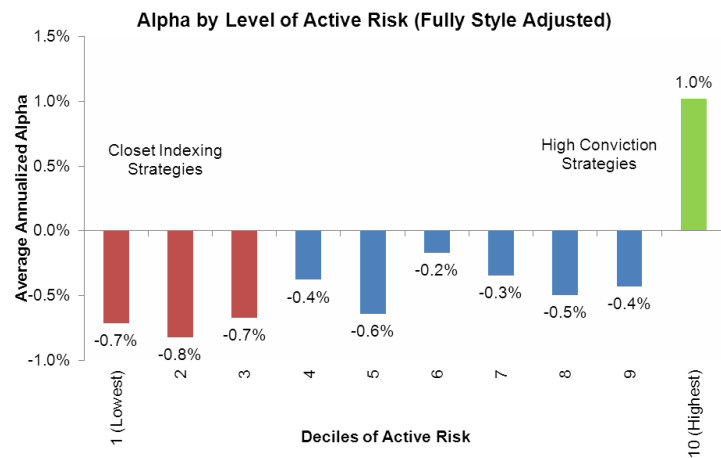
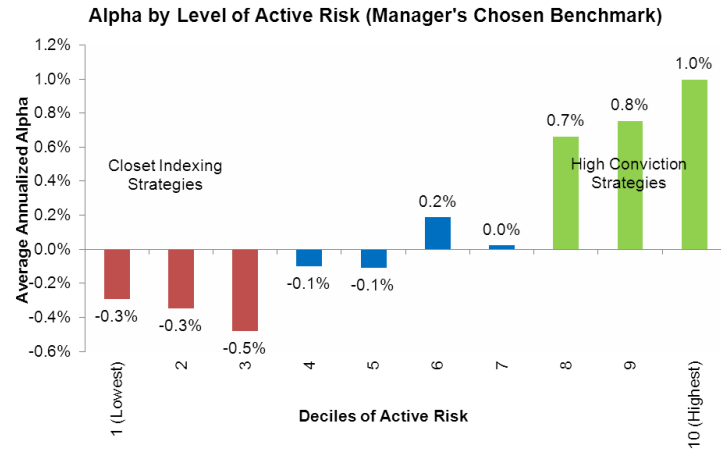
We will paint a more balanced, complete picture for both public, long-only equities and fixed income.

Equities: The Theory

Active management in equities is difficult. The average active manager in public equities has underperformed net of fees over the long-term across nearly every equity market. The proportion of public equity managers underperforming is especially high for mutual funds, which tend to have much higher fees than similar institutional products. However, there are some characteristics of active managers that have outperformed, which we think may be good indicators of expected future performance:

1. High conviction managers are those that tend to be significantly different from their benchmarks. Our own research, "Conviction in Equity Investing" [Sebastian and Attaluri 2014], shows that products in the three highest deciles of tracking error relative to the benchmark tended to outperform their chosen benchmark (net of fees). To slice the data a different way, this study also style-adjusted each product's benchmarks to account for persistent biases to factors such as value and small cap. This reduced the measured outperformance, but the products most different from their benchmarks still tended to outperform by an average of 1.0% (net of fees). That is, among the investment products taking the most active risk, where winners win big and losers lose big, the average manager came out ahead. The following exhibits show some of the key results from this study.

Exhibit 1



While this study shows that the average high conviction product has outperformed, the study also looked at how reliable historical performance was at assessing skill. It uses historical returns to determine the proportion of managers that fall into each of three categories:

- Unskilled: Statistically significant evidence that alpha net of fees is negative
- Insufficient evidence of net alpha different from 0: Historical net alpha was too noisy to assess whether the manager was skilled or unskilled with statistical significance based
- Skilled: Statistically significant evidence that alpha net of fees is positive

Notably, 2% fell into the top category and 82% of products fell into the middle category. That is, though high conviction products outperformed on average, historical performance alone is usually insufficient to assess a manager's skill. Our own manager research process considers many factors other than the manager's level of active risk and historical excess returns.

2. Certain risk factors have outperformed in the long run. This has received more attention the past few years with the proliferation of strategies in the "smart beta" space, which is also known as "factor

investing” or “rules-based investing.” Specifically, low volatility, value, quality, and momentum are factors that have demonstrated persistent outperformance [Yesildag and Carvounes 2017, Sebastian and Attaluri 2016]. Active managers who exploit such factors may have the wind at their backs. Research suggests that factor performance drives about 80% of the active performance of the typical active manager [Bender et al 2014]. Rules-based strategies (“smart beta”) may be able to access these risk premiums at a lower fee level than traditional active management, while a truly active investment manager may be able to add additional returns by rotating across factors and selecting individual securities.

Equities: The Practice

The prior section shows why we believe it is possible to identify active investment managers in advance that are likely to outperform a capitalization-weighted index. However, in practice, implementing such a strategy is very difficult for two main reasons. First, many investors are uncomfortable with high-conviction managers that have the best odds of success because they experience more ups and downs. Second, many investors destroy value by using short-term performance (three years or fewer) to make decisions about hiring and firing managers. We believe that investors are not well-suited for active management in equities whenever either of these characteristics apply. As a result, we believe such investors should stick with passively managed equities or low-fee, factor-based strategies.

The Ups and Downs of Holding High-Conviction Portfolios

While a high-conviction active manager may be expected to outperform over the long-term, there will probably be large performance swings, as well as a possibility of extended underperformance. Many investors may find it difficult to ride through such performance without terminating the manager.

In a series of white papers titled “Death, Taxes, and Short-Term Underperformance” [2013], the Brandes Institute reviewed the 10-year performance history of managers in four different asset classes, focusing on those in the top decile for the full period, to understand how they performed over shorter periods.¹ For investors holding managers for the full 10-year period, these would have been the best ones to have. However, many have had poor performance over shorter periods. A summary of some of this experience for these top-decile managers is illustrated in the following table:

Asset Class	Average Annualized Excess Returns/ Shortfall in Worst 3-Year Period	Percentage of Managers Below Average in at Least One 3-Year Period	Percentage in Worst Quintile in at Least One 3-Year Period
U.S. Equities	-8.30%	81%	40%
International Equities	-5.45%	100%	67%
Emerging Market Equities	-2.49%	67%	33%
Fixed Income	-11.64%	76%	29%

¹ The 10-year periods in these studies end on 6/30/2009 for U.S. equities, 6/30/2014 for international equities, 6/30/2013 for emerging market equities, and 12/31/2014 for fixed income.

Even if we could guarantee that our manager research process could pick the managers that would perform in the top decile over a decade—which we can’t—investors would still experience poor performance over periods of three years (and longer). Those who fire managers after three years of underperformance would likely have too much portfolio turnover and poor performance. Investors should be prepared for the reality of bumpy performance, even for good managers with strong prospects for long-term performance.

Mandate Structure

Grinold and Kahn [2011] articulated that expected alpha from active management can be thought of as needing two factors: breadth and skill. Breadth can be thought of as the range of independent, diversifying investment opportunities from which the manager can choose. Broad mandates give investment managers more opportunities to add value. Our own research about active equity mandates is consistent with this concept: broad, global equity mandates are more likely to perform well than combining multiple regional style boxes (growth/value, large/mid/small cap) that approximately mimic the overall market before fees [Ennis 2001 and EnnisKnupp 2003].

Using Past Performance to Guide Decisions on Hiring and Firing Managers

Many investors focus too much on short-term performance, driving them to make costly mistakes in hiring and firing decisions. Some research illustrating the impact of this phenomenon includes:

- Goyal and Wahal [2008] reviewed the performance of investment managers before and after termination and hiring events. Although the managers that were hired usually had stronger historical track records than those that were terminated, performance after the hiring and firing events were statistically indistinguishable. On average, the fired managers slightly beat the ones hired over the subsequent periods.
- Cornell, Hsu, and Nanigian [2017] analyzed the theoretical impact of using only three-year excess returns to hire and fire managers. They found that a contrarian strategy of hiring the losers outperformed a typical strategy of hiring winners by 2.28%. That is, there is mean-reversion in manager performance, so investors making decisions based on three-year outperformance are likely to destroy value.

These findings suggest that investors seem to be hiring and firing managers at the wrong times. Other studies with similar results include Kinnel [2013] and Hsu, Myers, and Whitby [2016]. In effect, investor behavior has been to sell low and buy high. It is not sufficient for investors to be able to identify active managers expected to outperform; investors must avoid hiring and firing at the wrong times, which can be difficult to do because it often requires hiring and retaining those with poor short-term performance. We have encouraged investors to abandon short-term performance triggers commonly used in “watch lists” (Friedman and Pawlisch [2016]). Having a willingness to invest as a contrarian requires a rare temperament, but is important to be successful with active management.

Applications to Specific Situations

We believe that actively managed equities are likely to add value for skilled investors willing to use high-conviction managers and not over-emphasize short-term performance. However, these characteristics are rare, so most of the world’s investors are better off investing equities passively or using low-cost factor-based strategies. We apply these views to several specific situations:

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Defined contribution plans: Fiduciaries for defined contribution plans are making decisions that affect other people's money, and thus can be subject to a high level of external pressure, including risk of litigation. This makes it difficult for some defined contribution plans to use high-conviction active equity strategies as stand-alone options. As a result, the headwinds for successful active management may be higher in defined contribution plans. For plan sponsors where this is a concern, one way to address it is to eliminate traditional active management from equities in their core lineup, only using passive management. A less dramatic way is by primarily using active equity managers in multi-manager portfolios such as target date funds and white-labeled core options, where multiple mandates can be blended to reduce potential for significant underperformance. We are seeing such approaches becoming more common.

Investment committees with turnover: Investors need to remember why they hired each manager and how they expect them to perform in various markets over different time periods. This is especially important for high-conviction managers, whose performance can have large swings. Institutional memory can be short when committees turn over frequently, and committee members may be less knowledgeable about, or patient with underperformance from investment managers they did not select. For investment committees with significant turnover, we suggest three possible options to manage this risk:

- Develop a written set of investment beliefs, including the role and expectation for each manager. When a high-conviction equity manager is experiencing bumpy performance, this could be resurfaced to remind the committee that it was aware such an experience was likely, and help them keep a steady hand.
- Use an Outsourced Chief Investment Officer (OCIO) model for active investing to delegate responsibilities to an outside party. In this approach, the OCIO monitors performance of smaller positions in multiple active managers, and the committee will be less focused on hiring and firing decisions for individual managers.
- Invest equities passively or with factor-based strategies.

Investors with external pressures: Most institutional investors have external pressures. For example, it is common to be reviewed by a Board, and Chief Investment Officers may have career risk associated with their investment decisions. Public pension plans are often subject to scrutiny from taxpayers, legislators, and the media. These influences can be both good and bad; most notably, it often makes it difficult for investors to be different from the norm. We have seen some investors hire (what we believe are) good investment managers, experience short-term underperformance, then be pressured to terminate the managers. "Know thyself" is key; investors should only pursue strategies that they can implement successfully.

Defined benefit plans with de-risking glide paths: Many defined benefit plans in the private sector have de-risking glide paths in place, where they are scheduled to sell equities as funded status increases. As a result, the time horizon for their equity portfolio is uncertain—possibly less than a full market cycle. The timeline for both the alpha and beta in the equity portfolio may not be long enough to be confident in strong performance. We view glide paths as a phased way to reduce all forms of risk from the equity portfolio. While it may be reasonable for plan sponsors to reduce active risk from the equity portfolio at the same speed that the equity beta is reduced, we more often find that many plan sponsors are better served by the simplicity of passive management for this shrinking portion of their portfolio.

Investors with high return needs: It is tempting to say that investors needing high returns should use active management. It is critical to start by asking whether the investor is likely to add value with active

management—active management used poorly is worse than passive management. Is the investor well-suited for high-conviction active management, including being comfortable with significant active risk? If not, passive management or low-fee factor-based investments may be preferable, and the investor may need to find another way to address its return needs.

Fixed Income: The Theory

Fixed income differs from equity in that the fixed income markets have many participants motivated beyond fundamental value. Market demand is driven by factors such as liquidity needs, liability characteristics, regulatory requirements, and central banks and taxes; market supply is affected by monetary and fiscal objectives. As a result, the fixed income market can experience severe deviations from fundamental value for prolonged periods.

Many fixed income investors tend to have highly customized mandates and engage primarily in certain sectors and durations of the fixed income markets, as illustrated in Exhibit 3.

Exhibit 3

		SECTOR		
		TREASURY/GOV'T RELATED	SECURITIZED	CORPORATE BONDS
DURATION	LONG	Corporate Pensions Investors Needing Liquidity Central Banks		Corporate Pensions Insurance Companies
	INTERMEDIATE	Investors Needing Liquidity Central Banks Money		Insurance Companies
	SHORT	Market Funds Stable Value Funds Investors Needing Liquidity Central Banks Collateral Holders	Stable Value Funds	Stable Value Funds

The collective actions of these various market participants will impact prices even though their motivations are not exclusively based on total return. For example, when one of these investor types is stressed—requiring any systematic changes to the amounts or types of fixed income needed—it puts disproportionate pressure on the specific segments of the fixed income market they operate in, which can create sustained deviations from fair values. As a result, passively investing in a broad market-weighted benchmark is rarely optimal, and not simply because the largest constituents of the index are also the most in debt. Investors can do better than simply acting as passive price-takers of broad market-weighted fixed income benchmarks, largely driven by the collective forces of investors with unique characteristics that cause them to act on factors other than pricing fundamentals. Segmentation in fixed income is different from, or at least more extreme than, that of equity markets.

Aon research looked at the empirical performance of active fixed income managers to see if they were able to exploit these market dynamics to create excess returns [Friedman and Zink 2015]. Exhibit 4 shows the results of this analysis, based on slicing the data three ways:

- **Core vs. Core Plus mandates** – Both are typically benchmarked against the Bloomberg Barclays U.S. Aggregate Bond Index, with Core Plus being less constrained, having greater ability to rotate where they see opportunity.
- **Gross vs. net of fees** – Net-of-fee returns is most practical because it reflects what investors get, but gross-of-fee performance is informative about whether investment managers are skilled.
- **Compared to the Bloomberg Barclays U.S. Aggregate Index (“Agg”) vs. a custom benchmark** – The Aggregate is the managers’ chosen benchmark, whereas the custom benchmarks reflect structural biases of the manager such as persistent underweighting of government bonds or exposures to high yield. This gives us insight into true skill versus style.

Exhibit 4: Average Excess Returns for Fixed Income Managers (2000-2014)

	Gross of fees	Net of Fees
Core, relative to the Agg	0.37%	0.04%
Core, relative to custom benchmarks	0.23%	-0.09%
Core Plus, relative to the Agg	0.97%	0.41%
Core Plus, relative to custom benchmarks	0.58%	0.02%

The average investment manager has added value with its investment decisions, as evidenced by positive excess returns gross of fees. Unfortunately, much of this is eaten up by fees, and the remainder is due to style, not skill.² (Style biases can benefit investors, but can also be attained passively with a customized blending of different indices.) However, relative to equities, we see these results as more encouraging for active management, because the average active manager in fixed income doesn’t underperform passive. In the very least, we can say that active management in fixed income is not an uphill battle. Investors may be wise to consider active management if they believe they can identify above-average managers or negotiate below-average fees.

Fixed Income: The Practice

While the average active manager in fixed income has a greater tailwind than the average active manager in equities, generating excess returns is still challenging and requires taking risk. One of the most difficult aspects of active management in fixed income is knowing what you’re getting. In order to add value, active managers need flexibility to invest different from the benchmark; however, less constrained strategies increase the odds of being surprised by performance. In the extreme, we saw some investment committees in 2008 surprised at how poorly their Core Plus mandates performed due to significant exposure to high yield. In many cases, this was the investment committee’s fault—their managers may have been well-known to invest in high yield. Nevertheless, turnover on investment committees increases the likelihood of people feeling surprised if a similar market event recurs.

Applications to Specific Situations

We believe that actively managed fixed income is likely to add value for skilled investors or strong fee-negotiators willing to employ loosely-constrained or unconstrained strategies. However, active

² Exhibit 4 compares the performance of active managers relative to benchmarks, not relative to passive implementation. Passive investment managers will likely underperform the benchmark by their fees. As a result, the value-added by active managers may be greater than the amount shown in this exhibit.

management is more complex and less liquid, so investors looking for simplicity or liquidity may be better served by investing passively. We apply these views to several specific situations:

Defined contribution plans: Many participants in defined contribution plans are looking for, and likely benefit from simple investments that reliably track the benchmark. As a result, we typically recommend including a passive fixed income option in the core lineup for defined contribution plans. Other participants may be more comfortable taking active risk, and if the plan sponsor believes they can find skilled active managers at an attractive price relative to their expected performance, we believe it may be reasonable to include in the core lineup as well as multi-manager options such as target date funds.

Defined benefit plans with discount rates based on corporate bond yields: Many defined benefit plans are required to discount their liabilities with a yield curve using corporate bond yields. It can be difficult for a passive fixed income portfolio to keep up with the liabilities, as the bond portfolio is exposed to the risk of defaults and downgrades, but the liabilities are not. This performance drag, by itself, is not a sufficient reason to invest actively; the investor must also believe they can identify an active manager that is likely to be able to outperform the passive option. We are optimistic about the ability for active long duration managers with government/credit and credit benchmarks to add value, as several of the inefficiencies in the fixed income market apply to long duration—in particular, the demands of liability hedgers such as pensions and insurance companies can be irregular and driven by factors other than market fundamentals.

Investors who are particularly fee-sensitive: All investors should be fee-sensitive, as fees erode performance and net-of-fee performance is what truly matters. Some investors, however, are sensitive to fees beyond what can be justified by this. For example, they may be exposed to external pressures or committee turnover making it difficult to hold active strategies through periods of underperformance if fees exceed a certain level. In such situations, investors may consider passive fixed income portfolios that blend sectors of the Aggregate in a customized way, persistently underweighting government bonds, and possibly varying the level of underweight based on market conditions. Such a strategy can achieve a significant part of the returns from active managers while paying fee levels for passive management.

Other Asset Classes

While this paper has focused on public equities and high quality U.S. fixed income, there are many other asset classes, each with unique characteristics.

- Private real estate cannot be implemented passively.
- Passive high yield bond strategies exist, but structural factors in the market have prevented them from tracking the indices well.
- Commodity portfolios using futures have exhibited some inefficiencies because the indexers are required to roll their futures contracts in predictable ways.
- Hedge funds are inherently active strategies, though there have been some creative attempts to replicate their return patterns.

Each of these strategies could be the subject of their own papers. We encourage investors to consider the merits of these strategies separate from their views on equities and high quality bonds. For example, it may be reasonable for an investor to passively invest in public equities and high quality bonds, but be

active in private real estate and high yield bonds. A well-researched, thoughtfully considered approach should focus on the unique characteristics of each asset class.

Conclusion

The debate on active vs. passive management has been ongoing for decades, and we expect it to continue for the foreseeable future. It is unfortunate that some of the deep research in this area is often reduced to half-truths and sound bites. This paper does not seek closure on the debate or even add new research to it, but to shine light on the multi-faceted issues and provide institutional investors with an actionable way forward. While the debate will persist in academic papers and conferences, each investor must make practical decisions about what is right for their situation. They should understand both their beliefs and their situation; what is appropriate for one portfolio may not be appropriate for another.

In public equities, we believe investors who are well-suited to invest in high-conviction mandates that are significantly different from the benchmark may be good candidates for active management; most investors, however, are better candidates for traditional passive management or low-fee factor-based strategies. In fixed income, there is a stronger case for active management, but investors needing simplicity or liquidity should focus on passive strategies. While investors should regularly reassess their strategies to be consistent with their circumstances and beliefs, whatever path they choose, it should be intended for the long haul.

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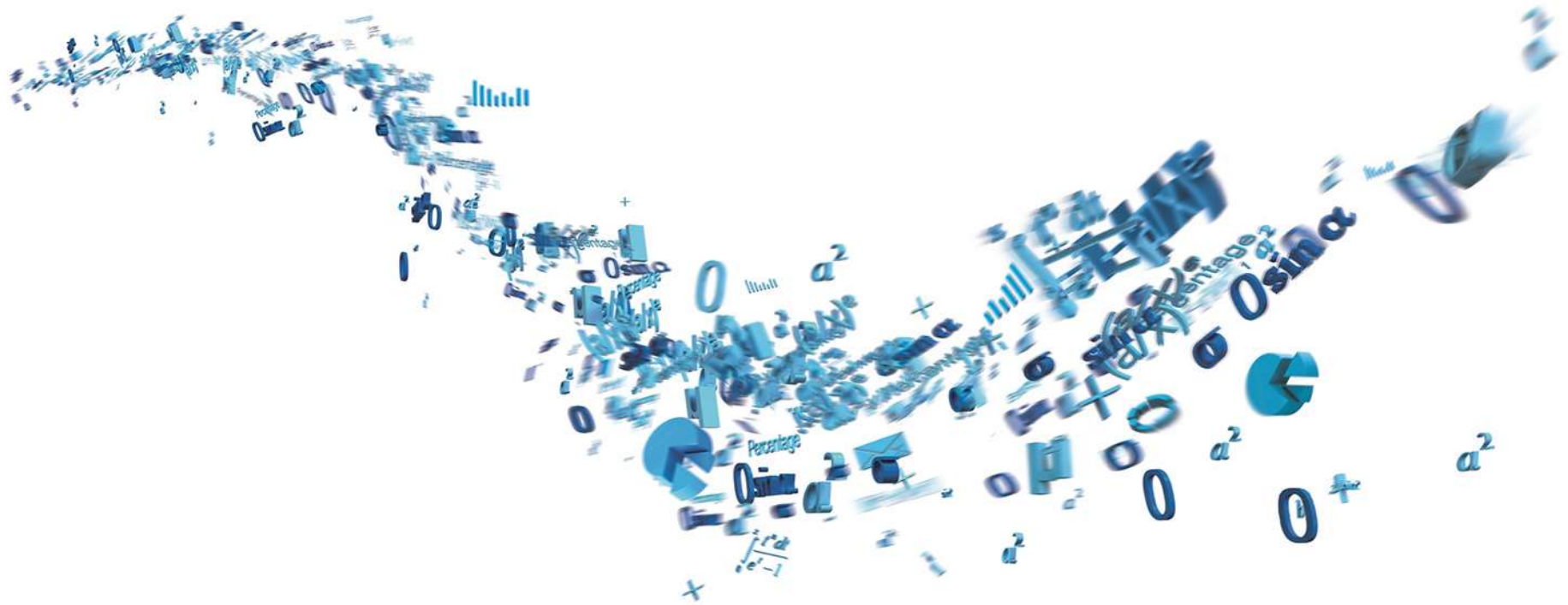
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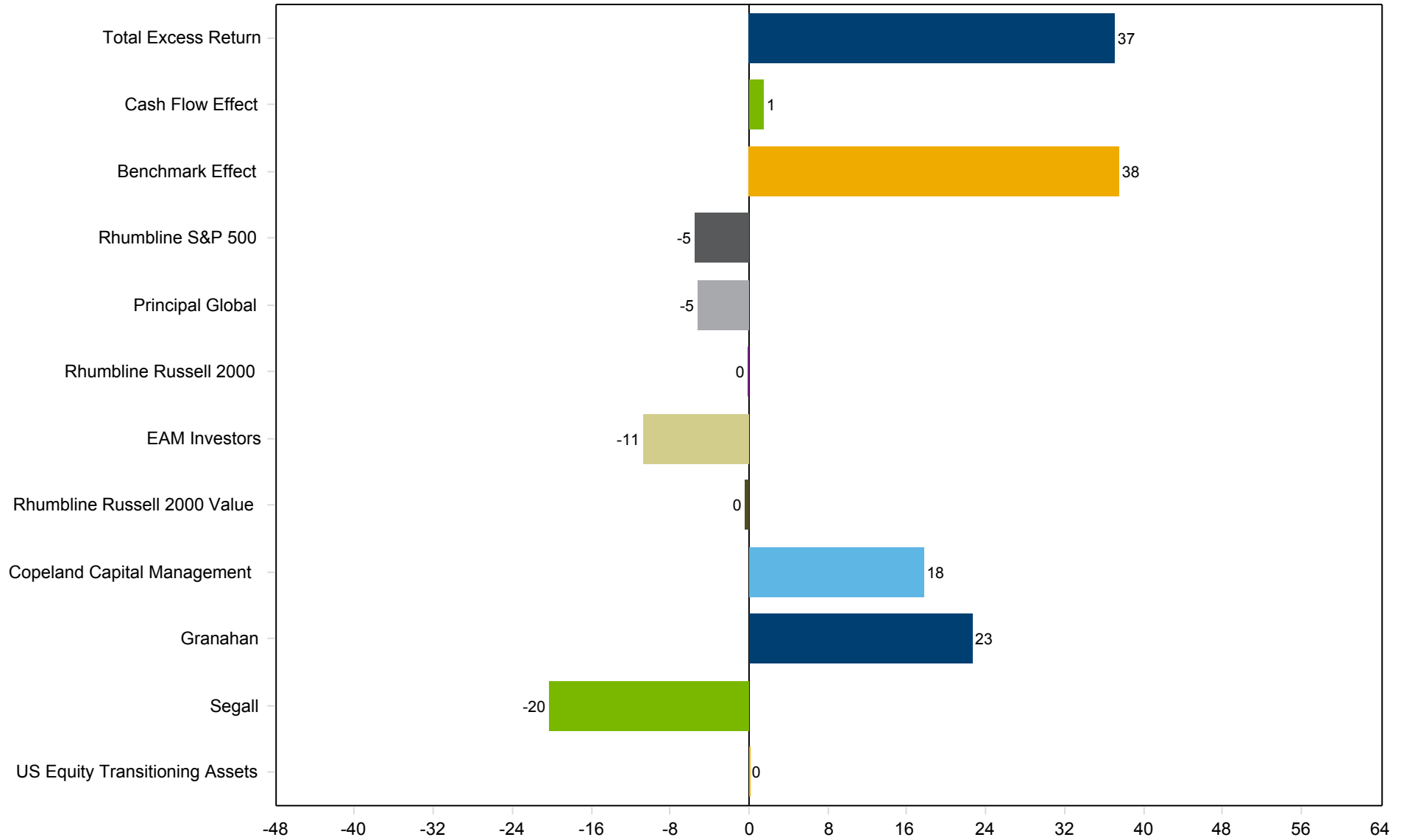
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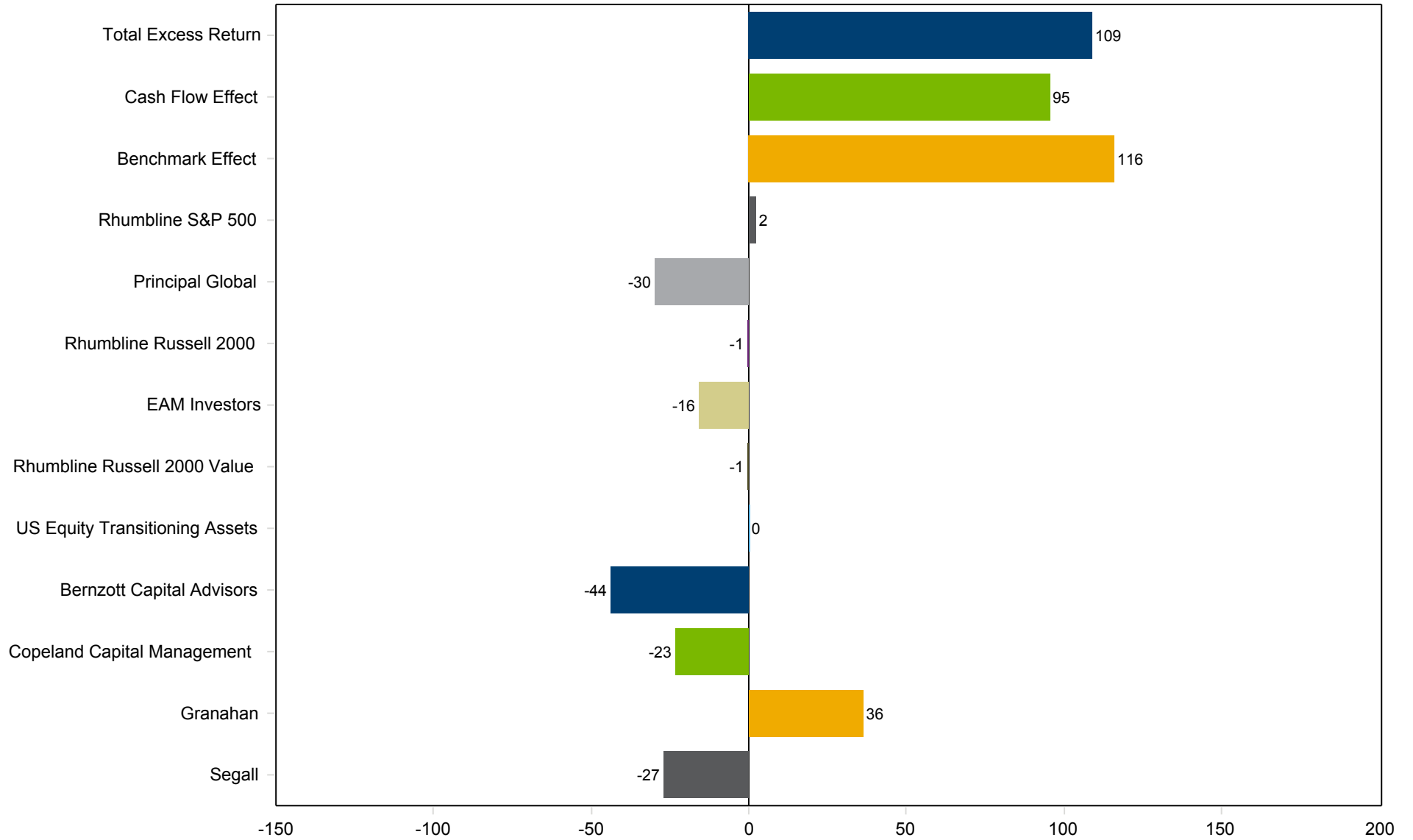
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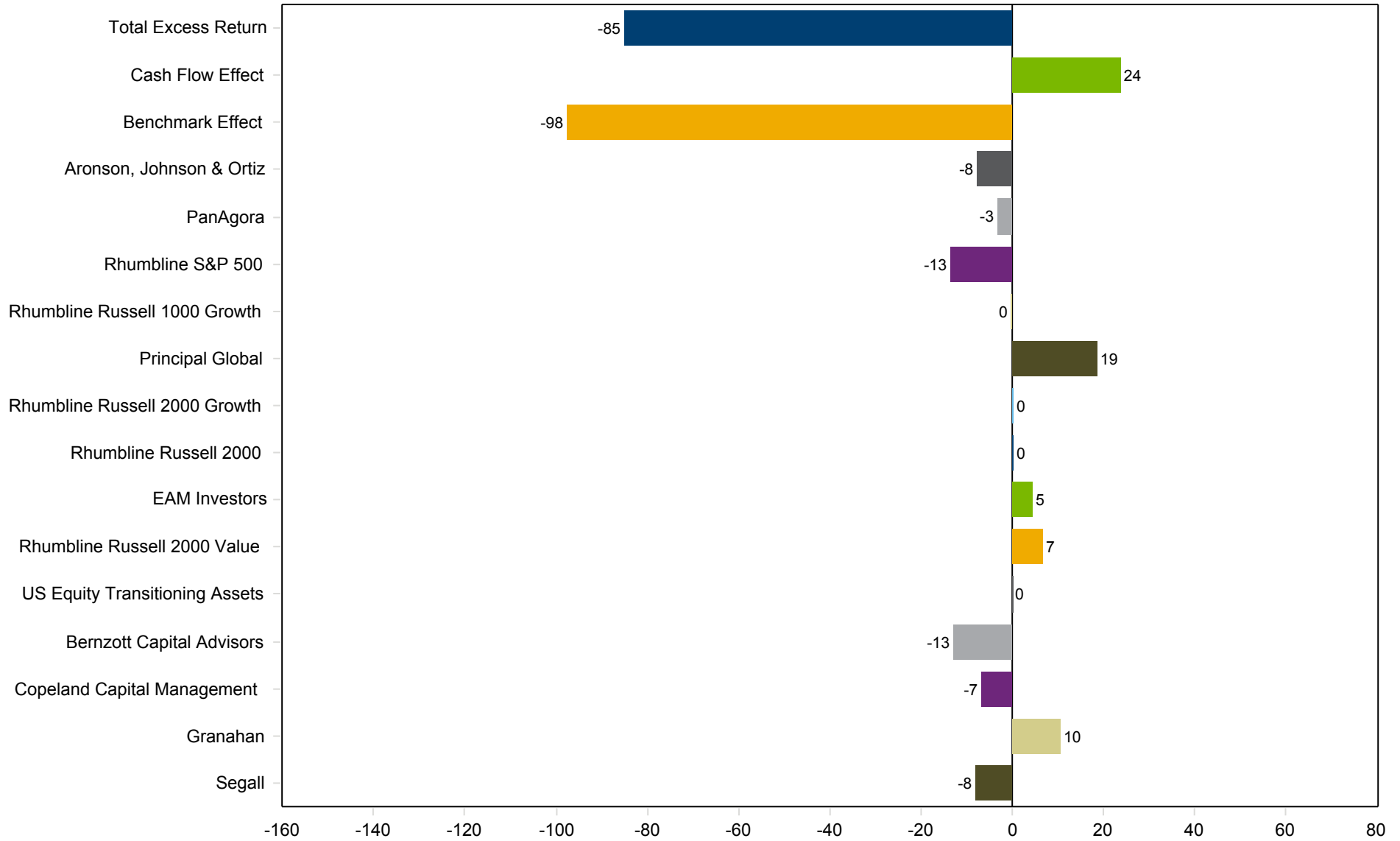
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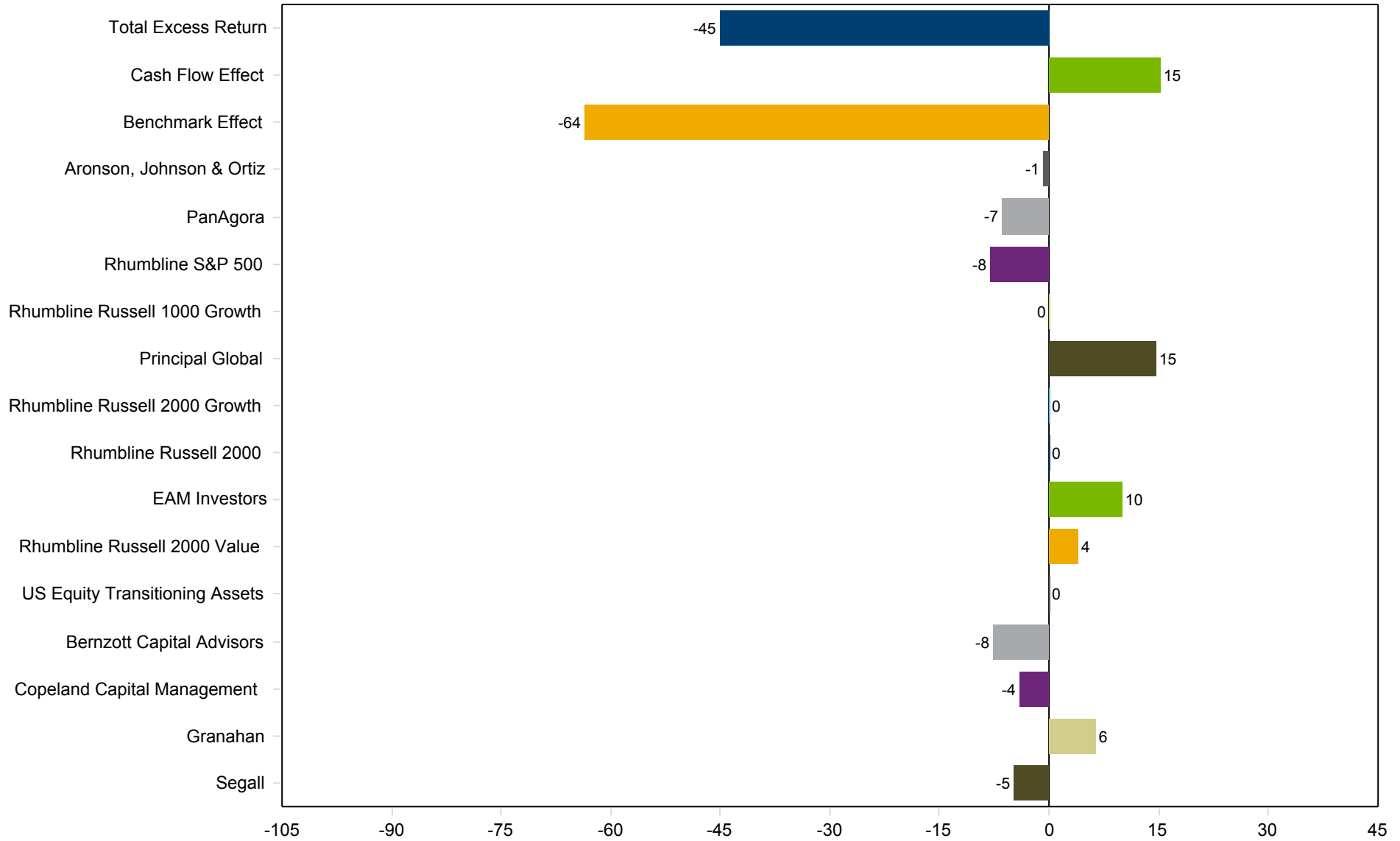
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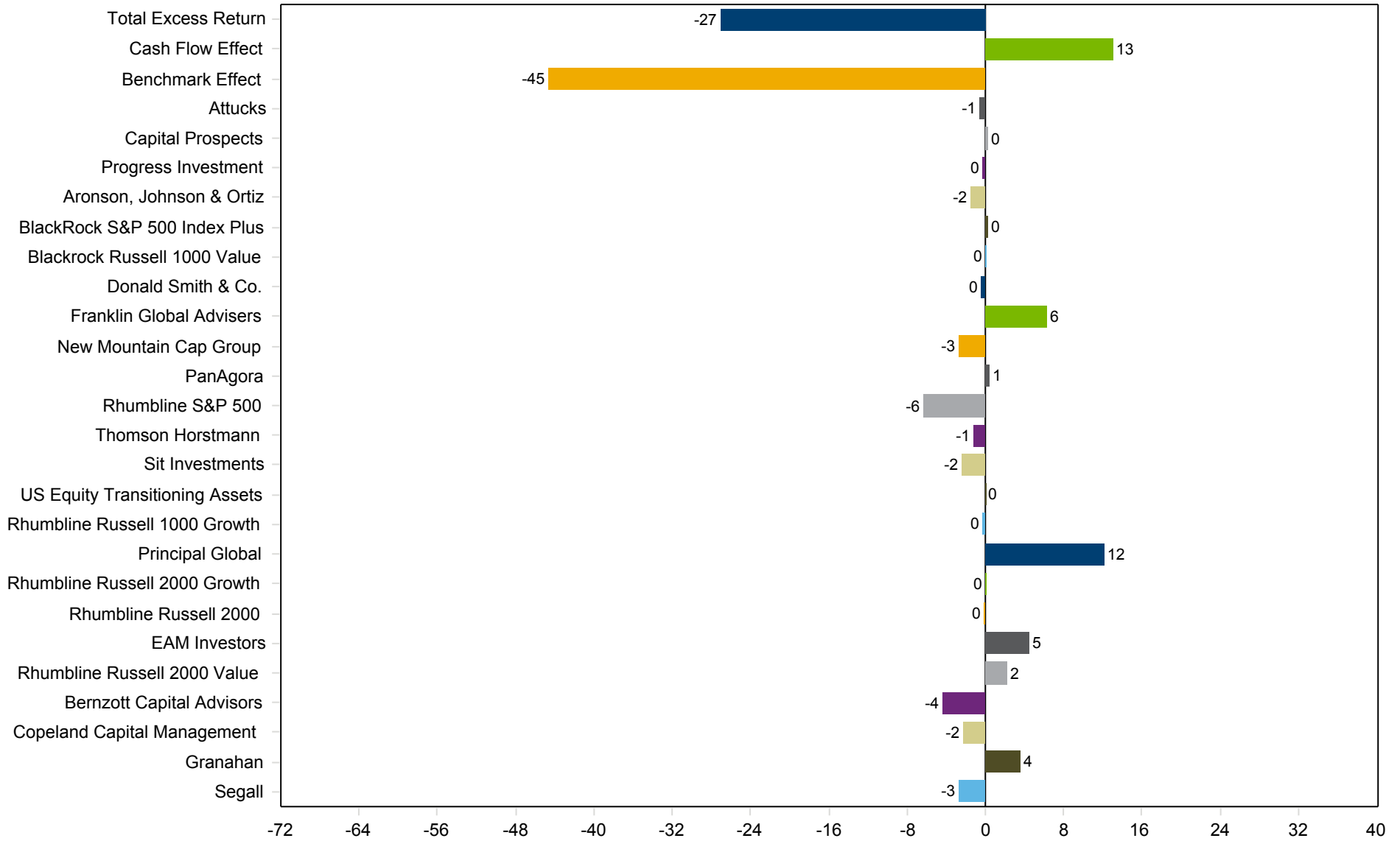
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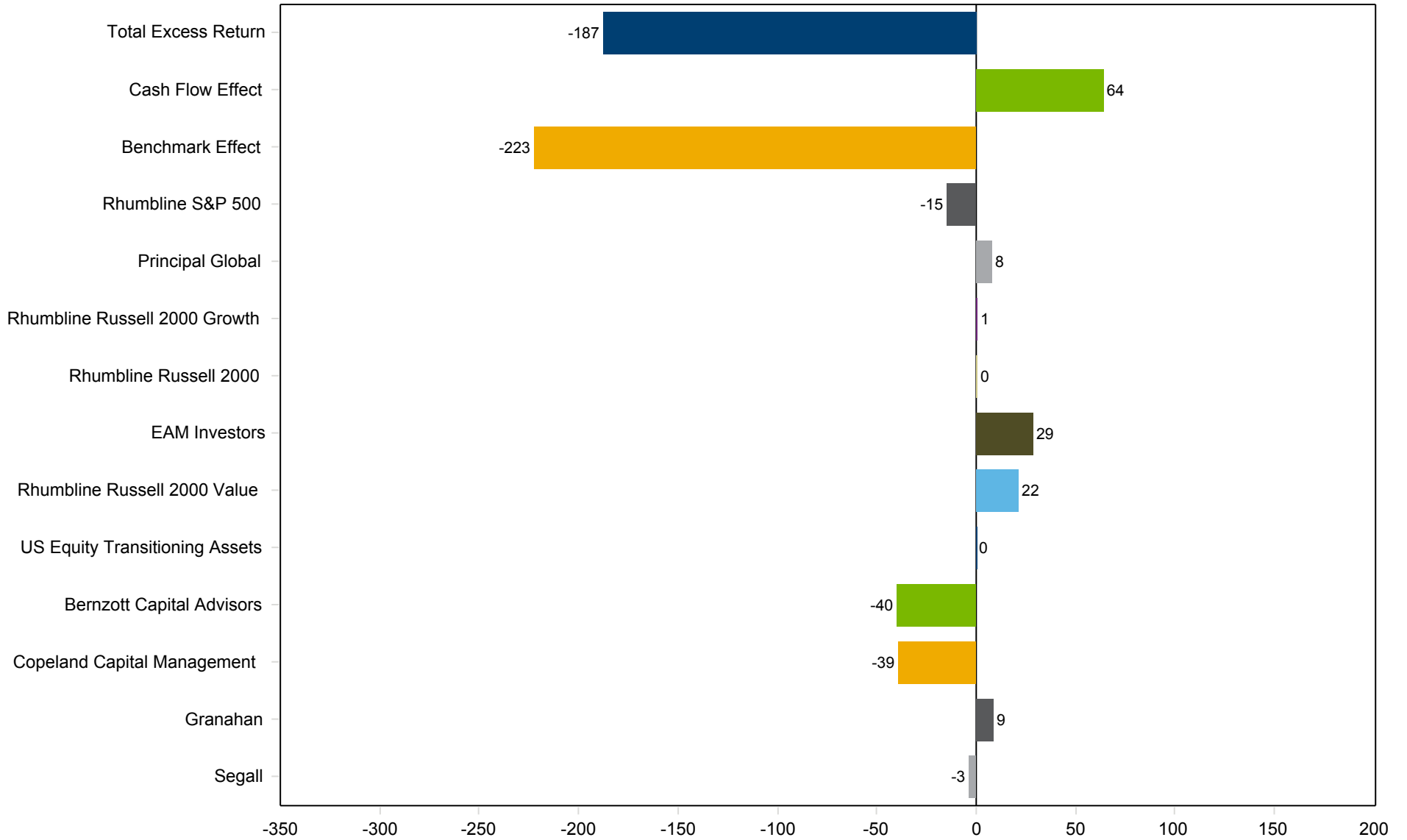
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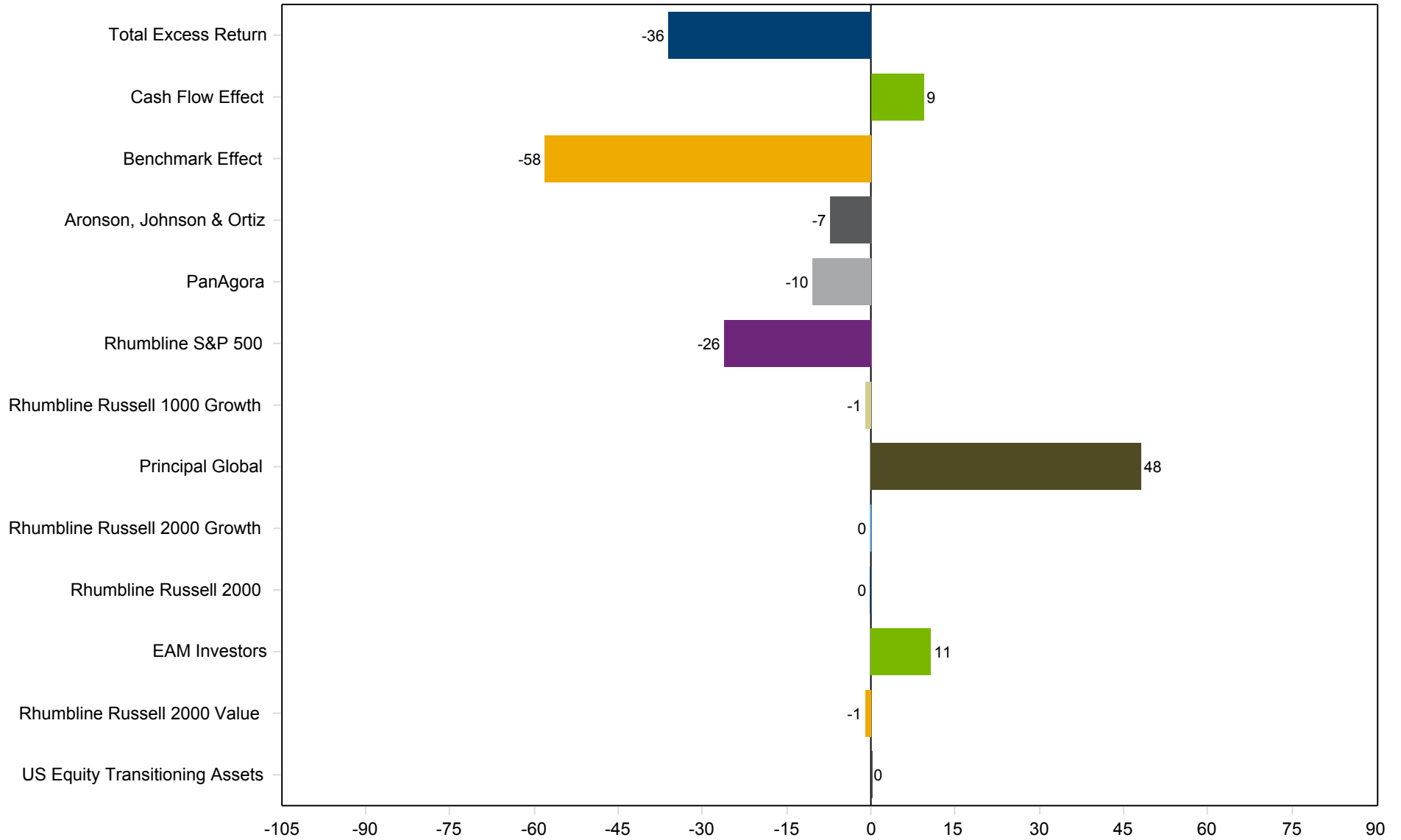
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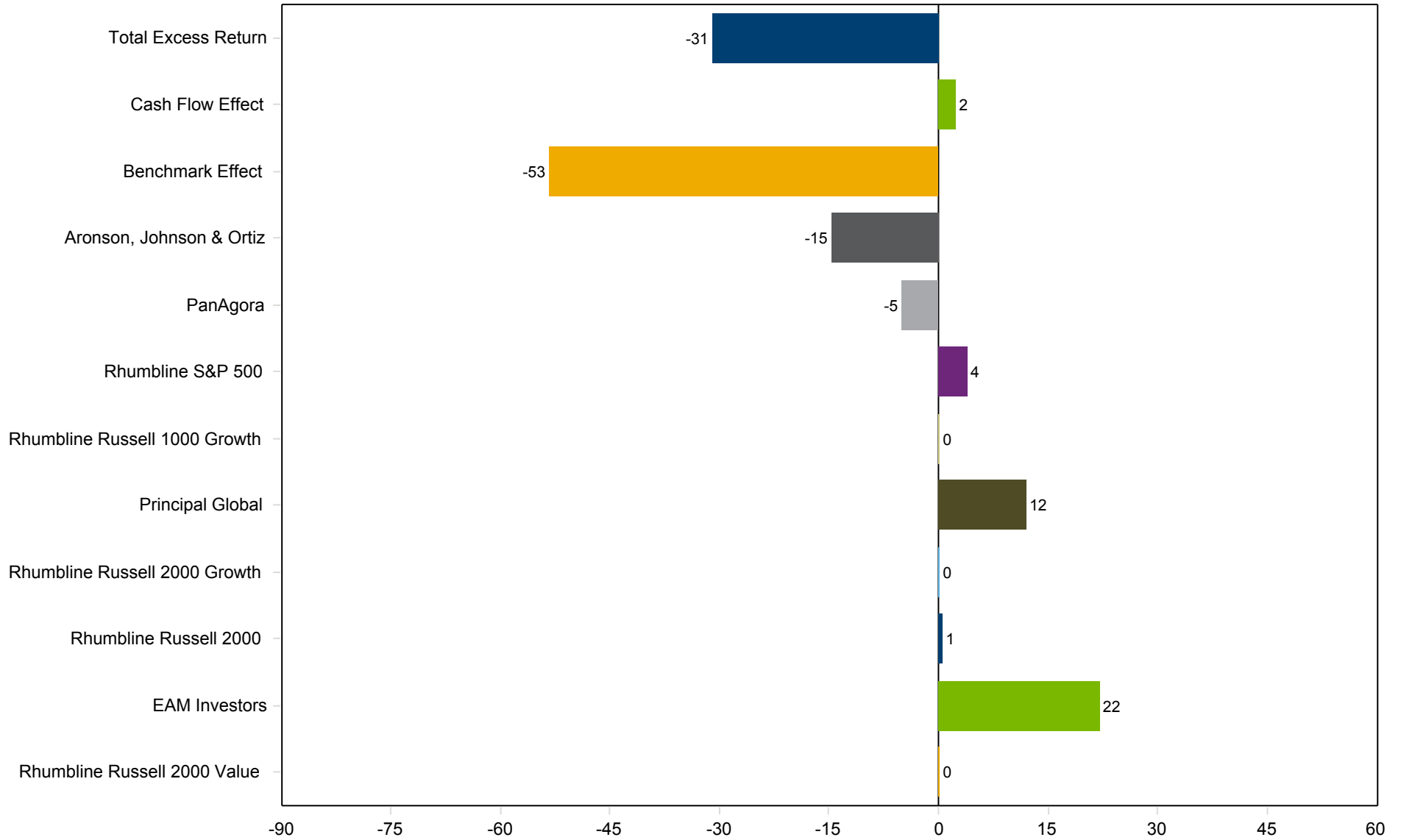
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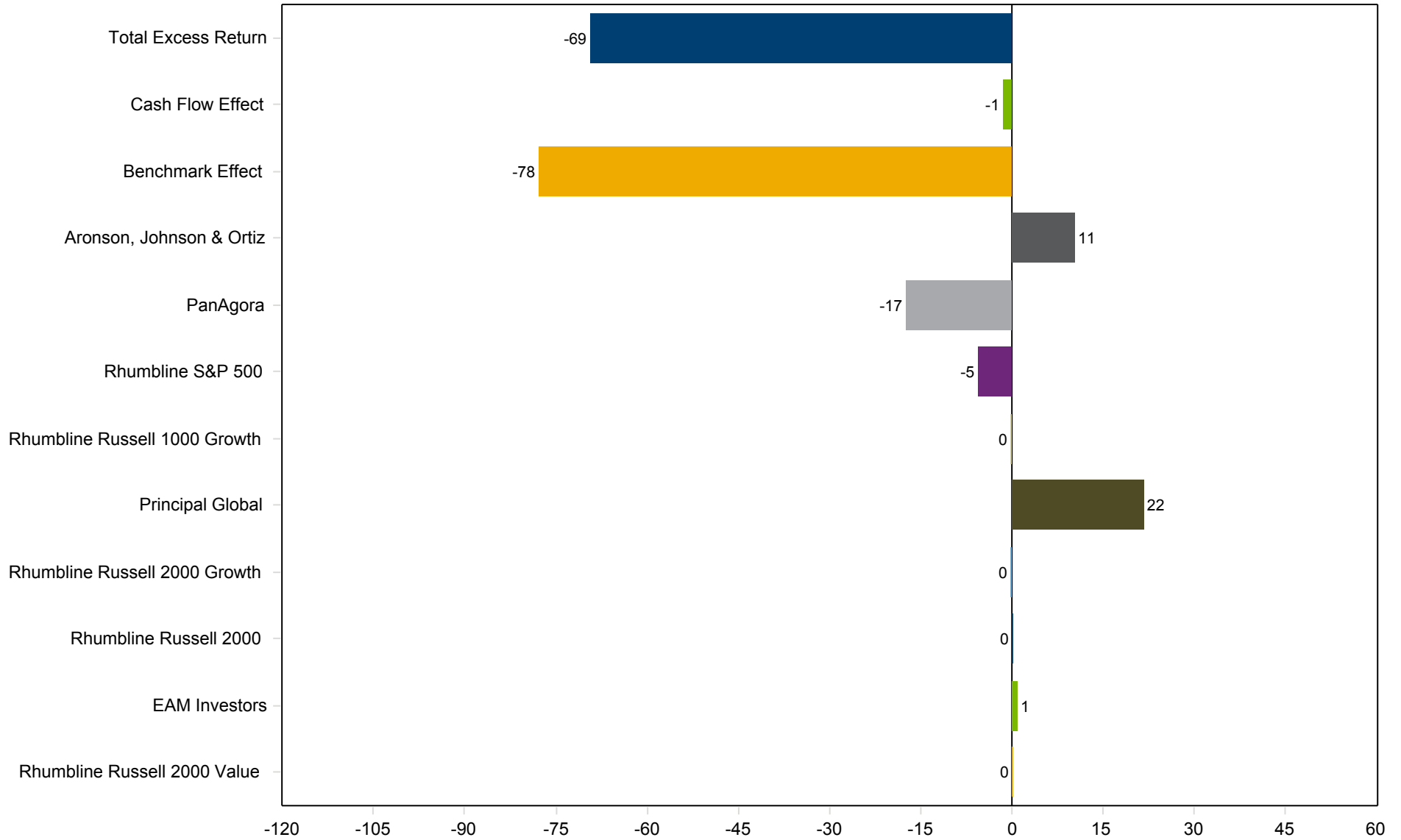
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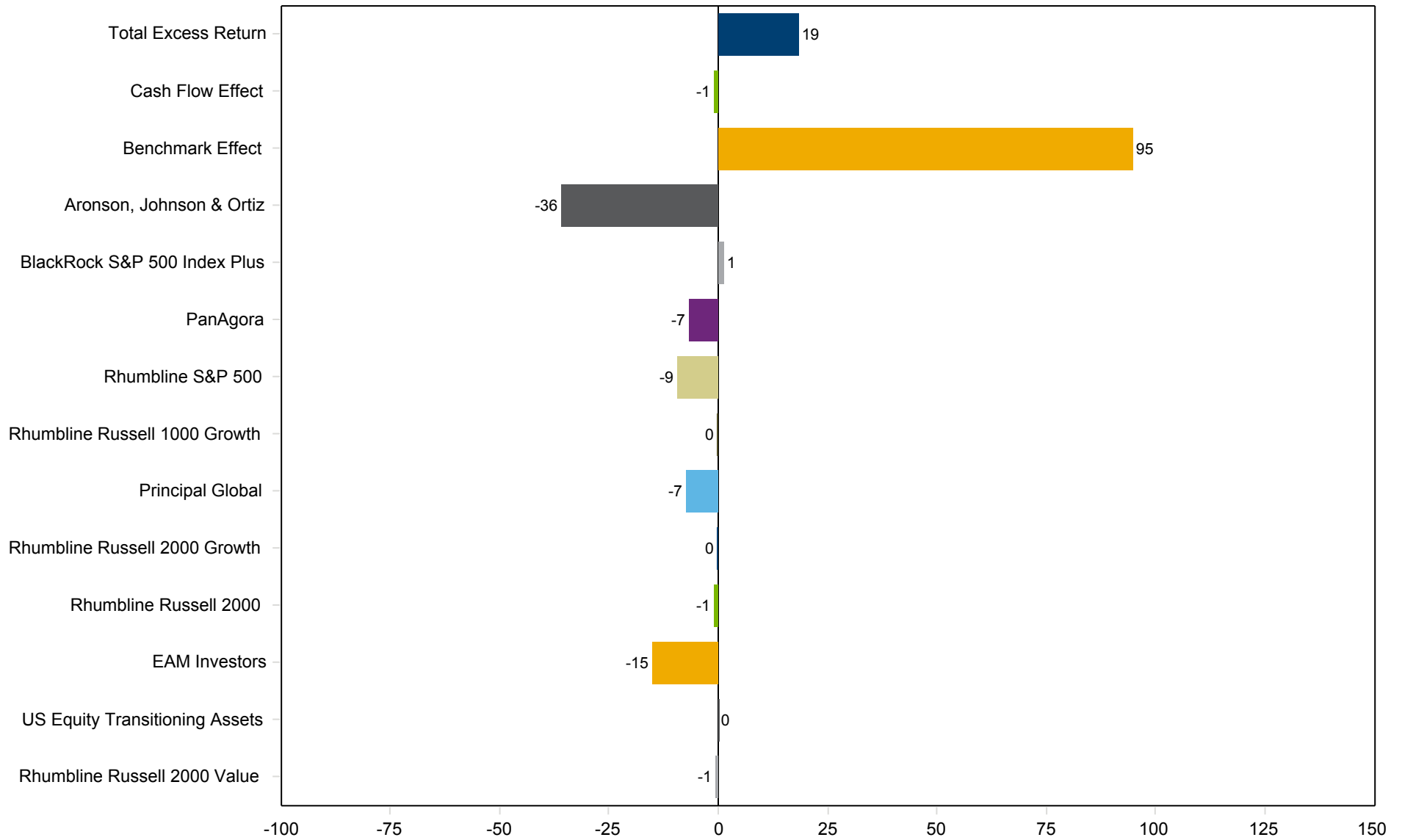
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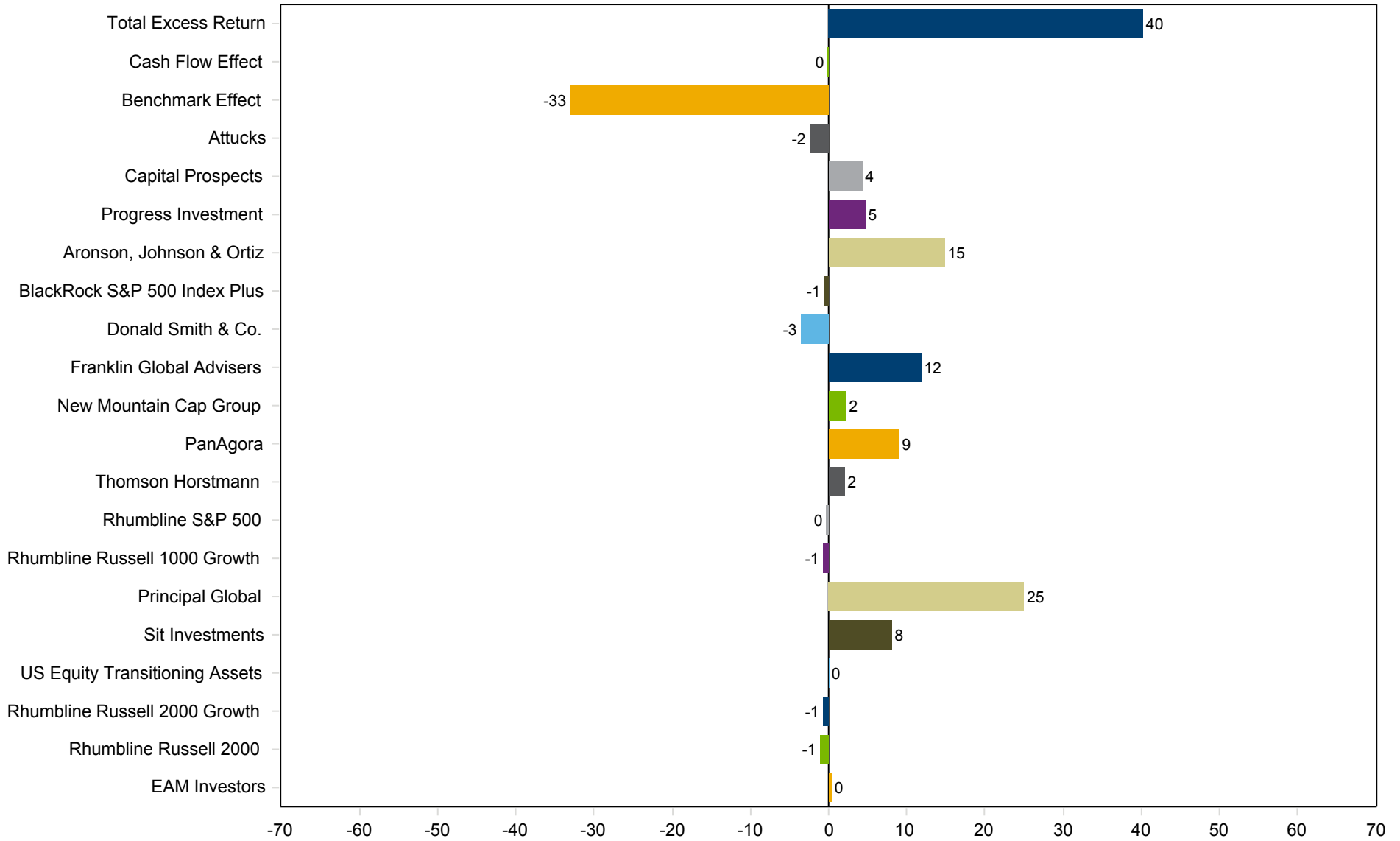
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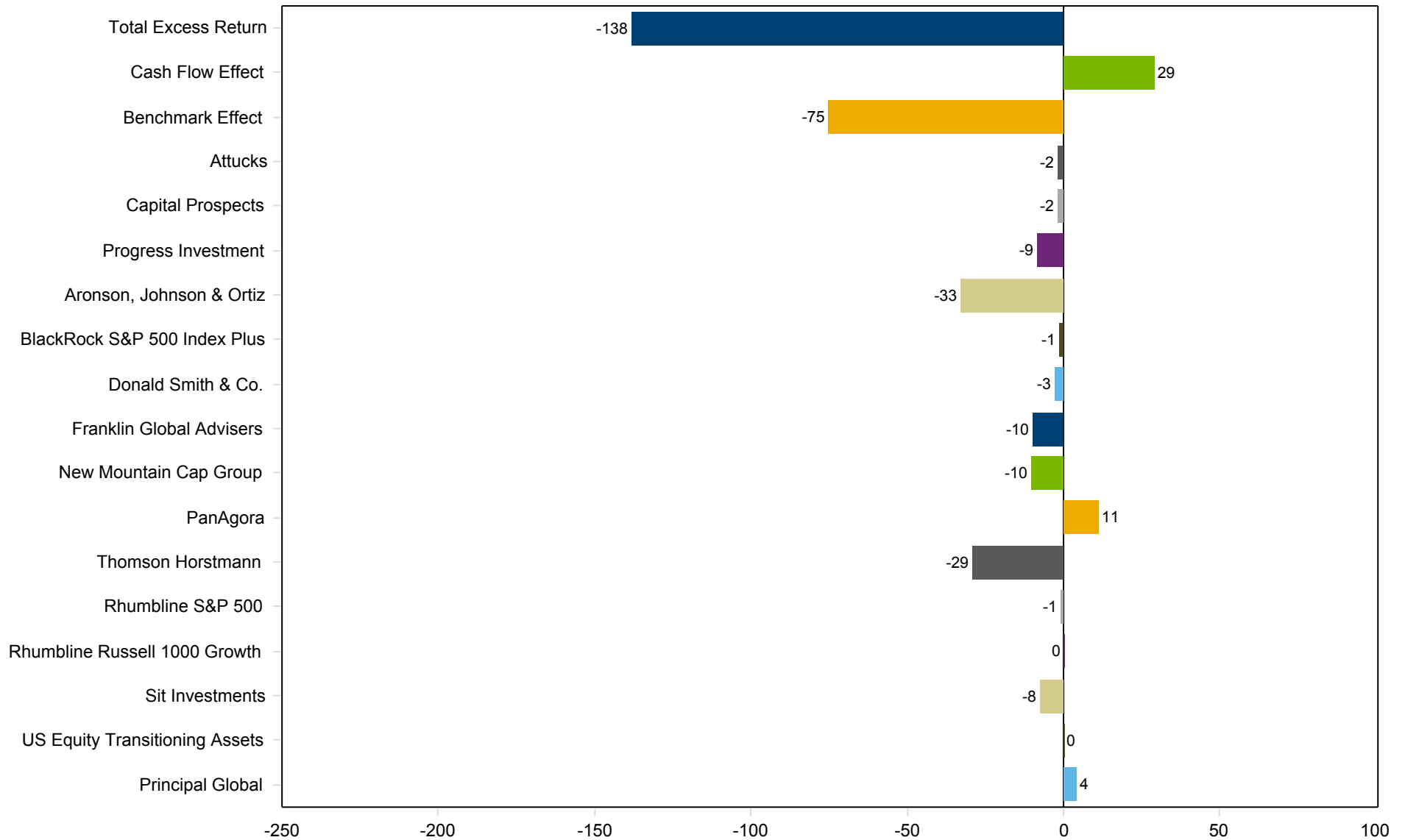
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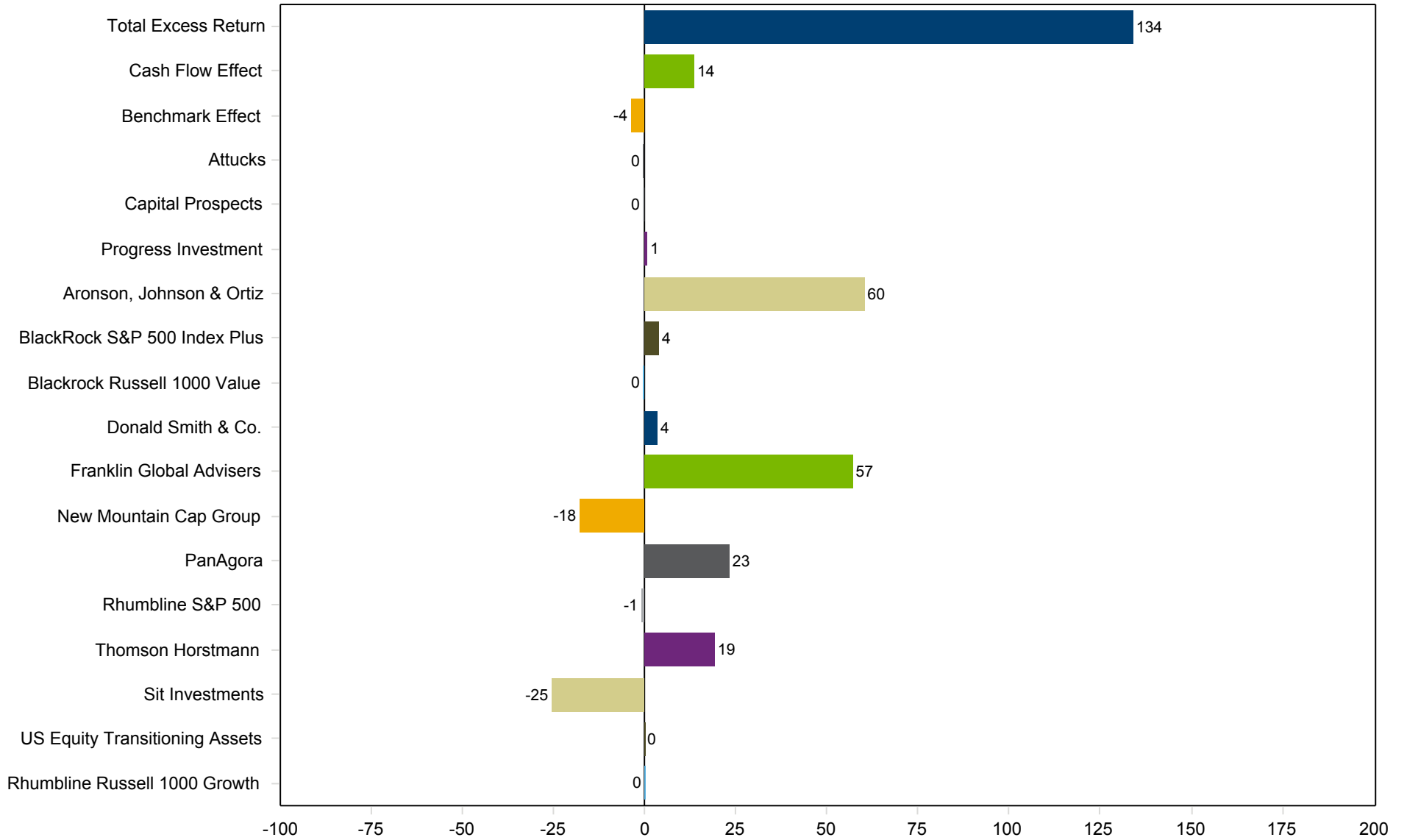
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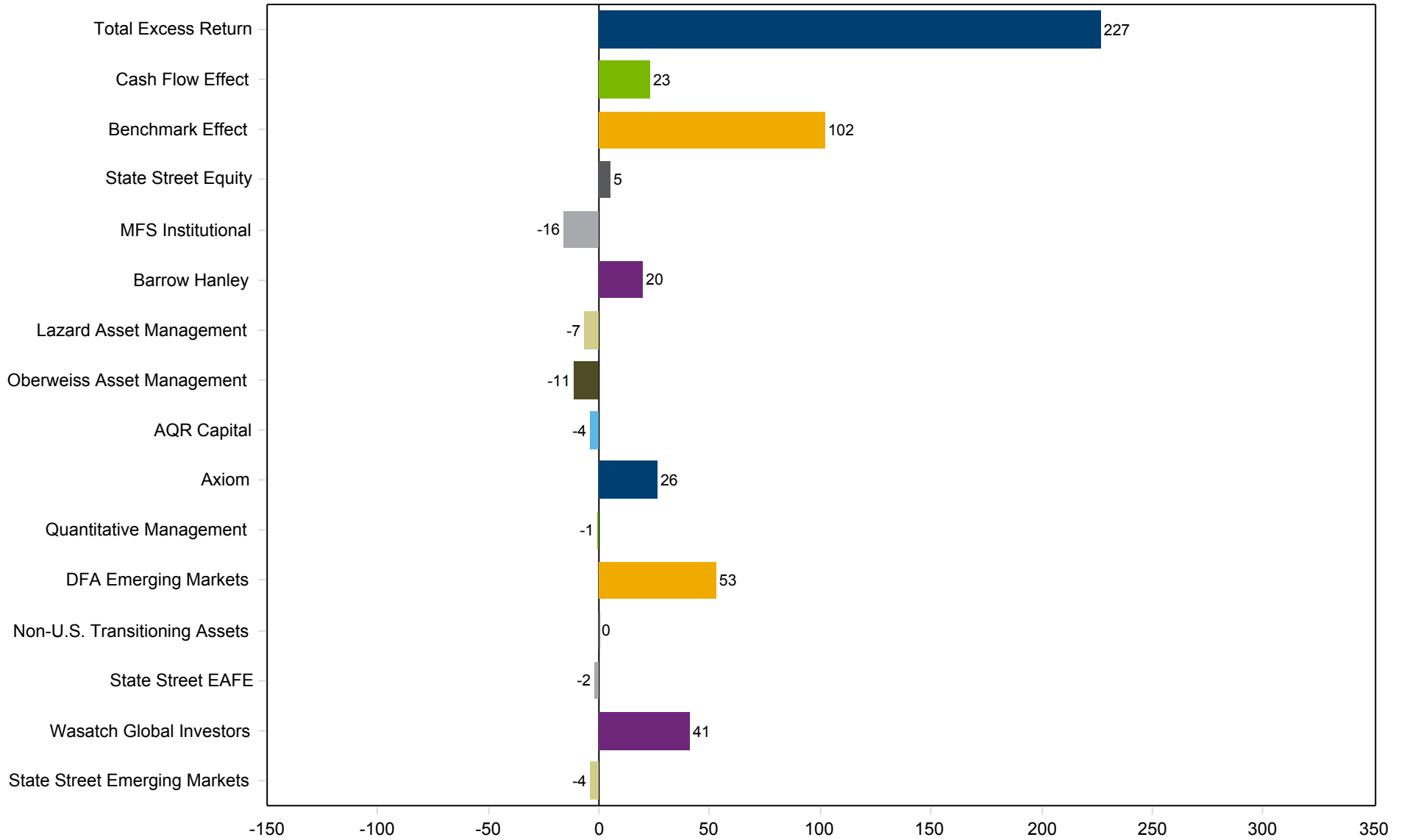
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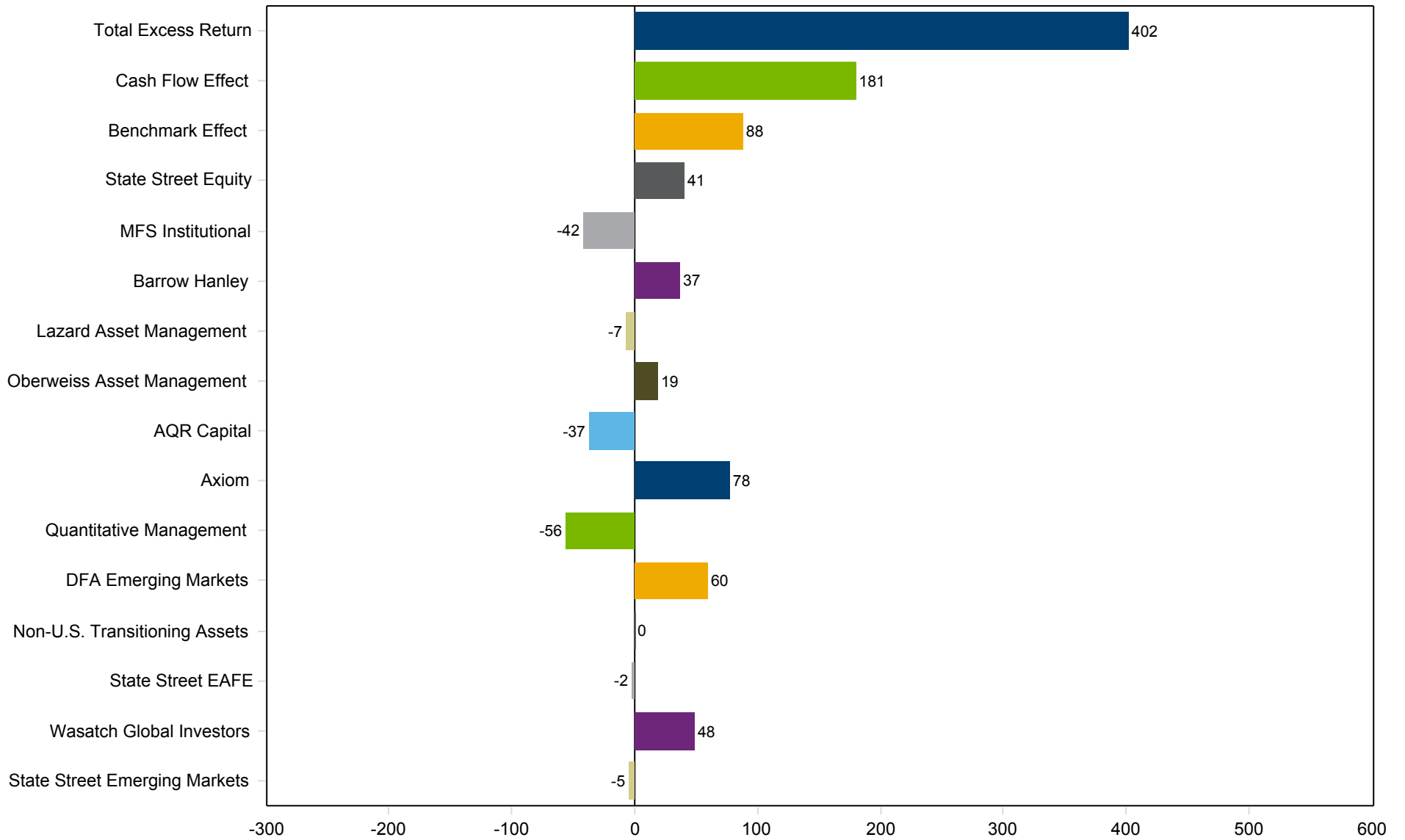
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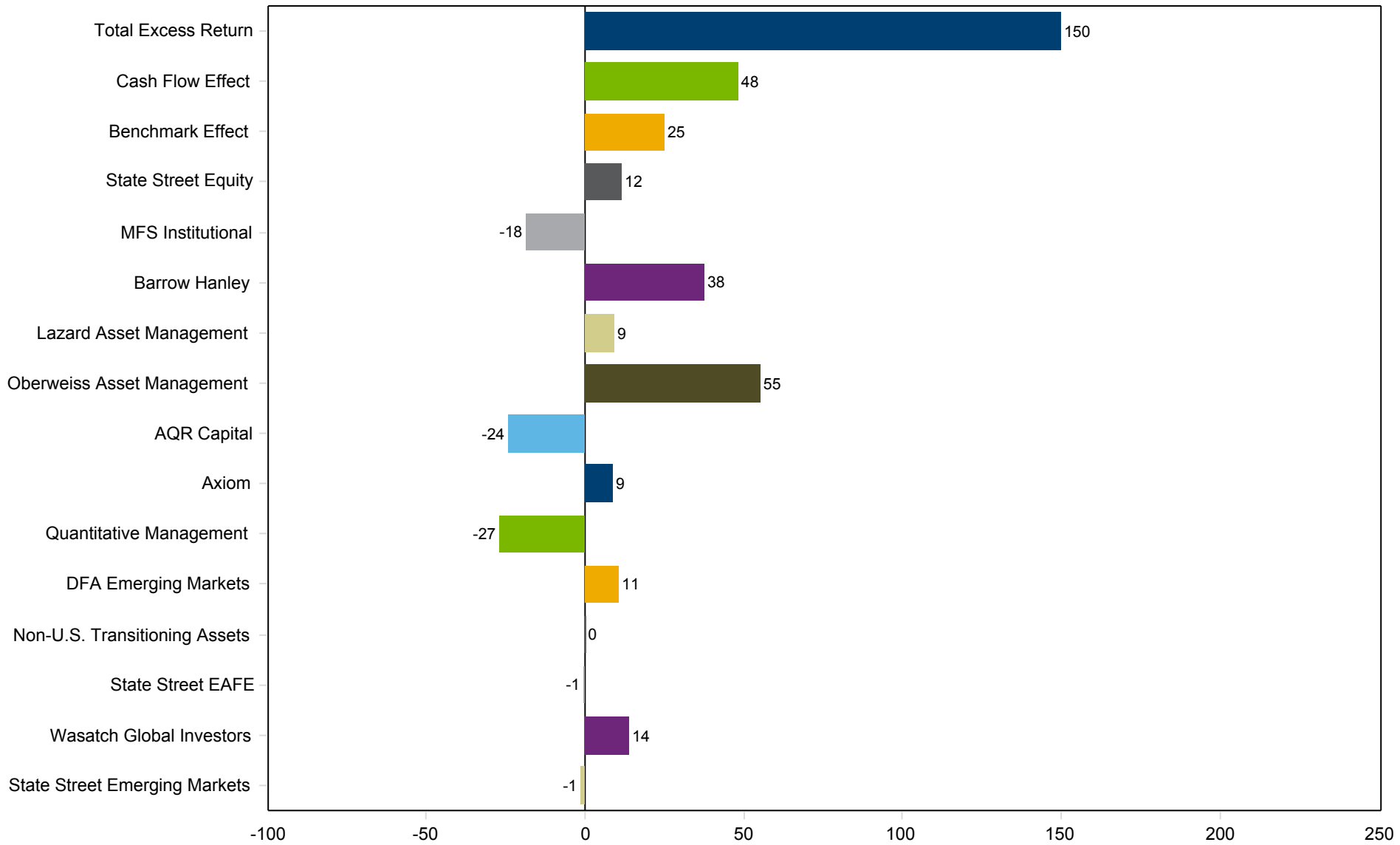
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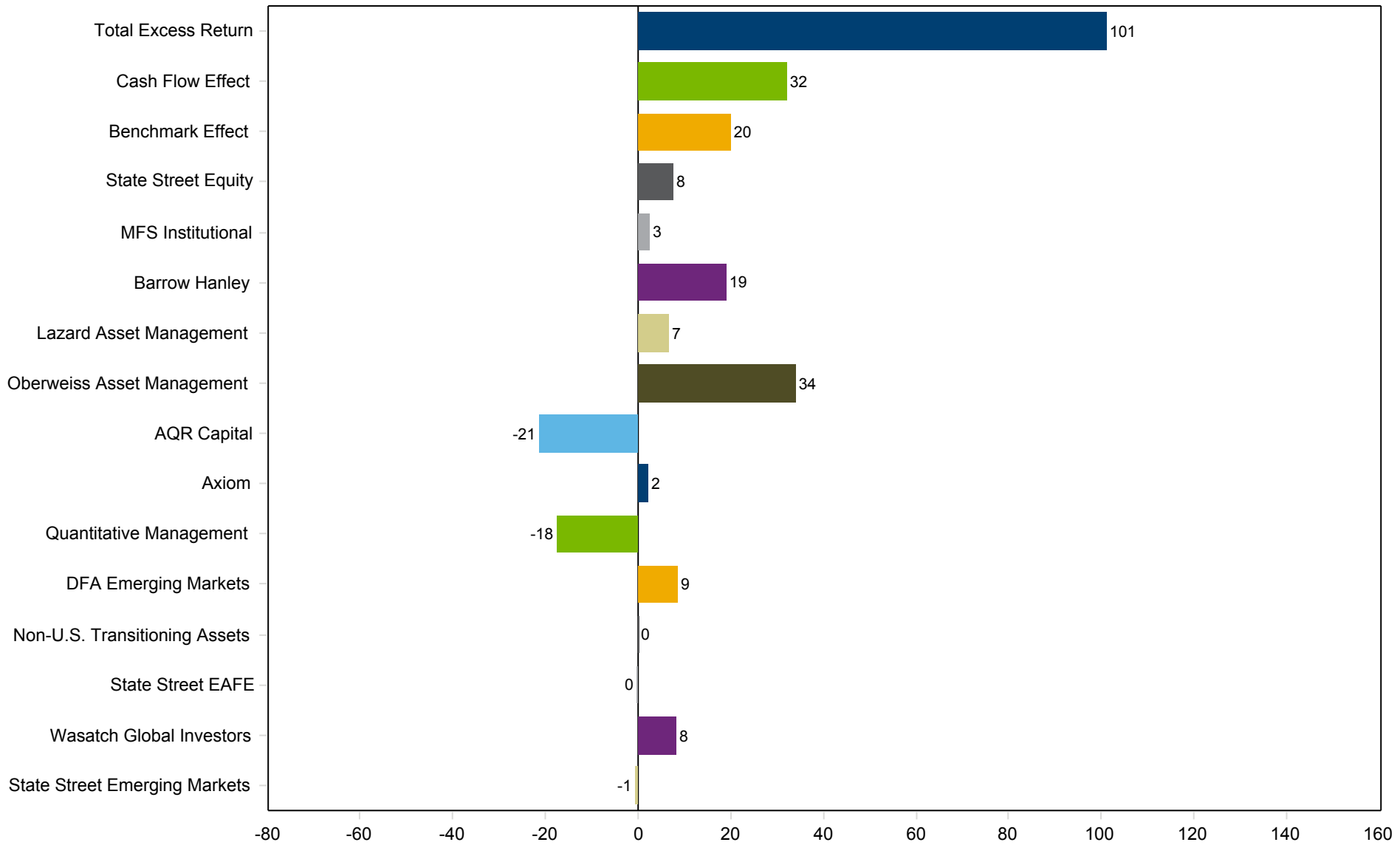
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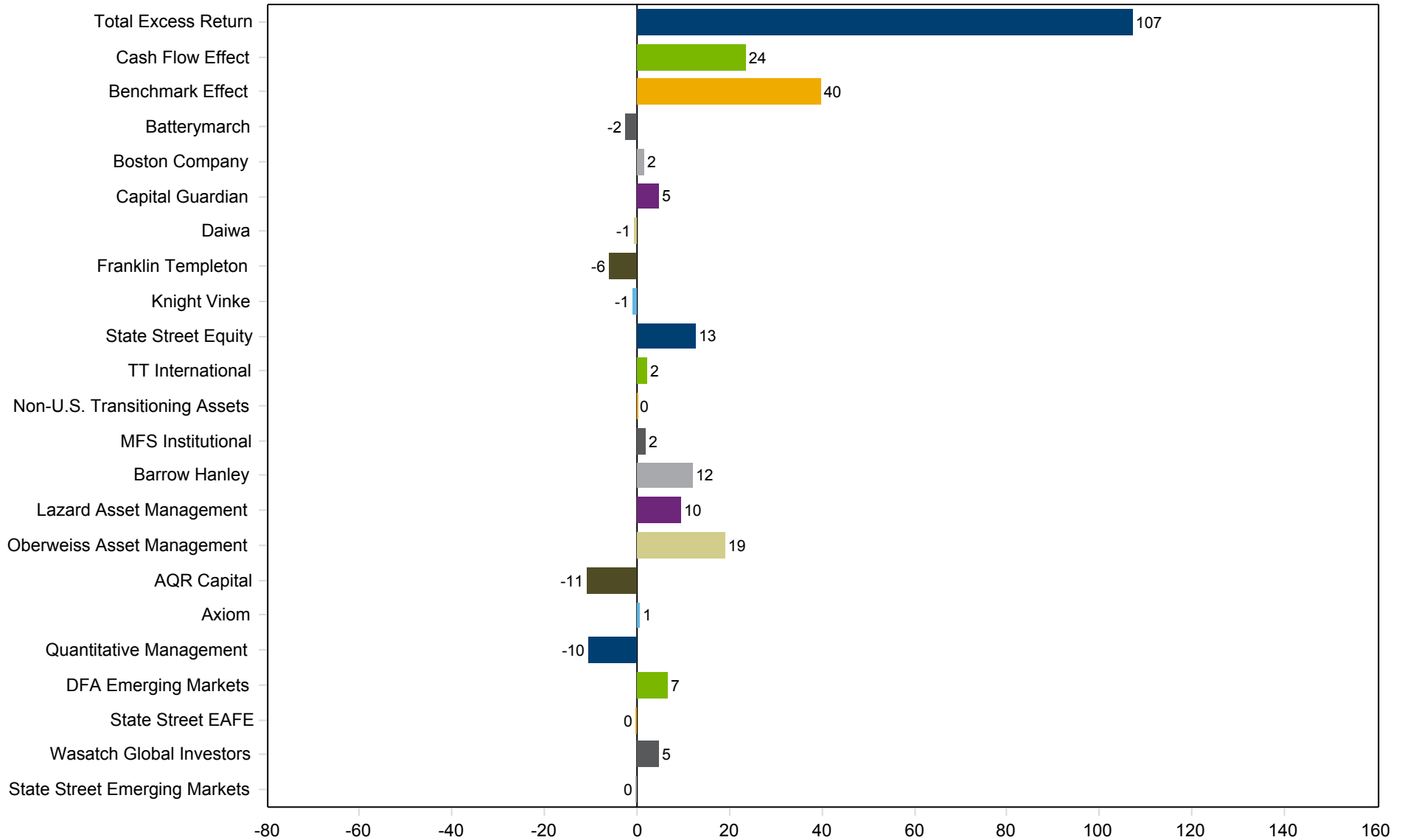
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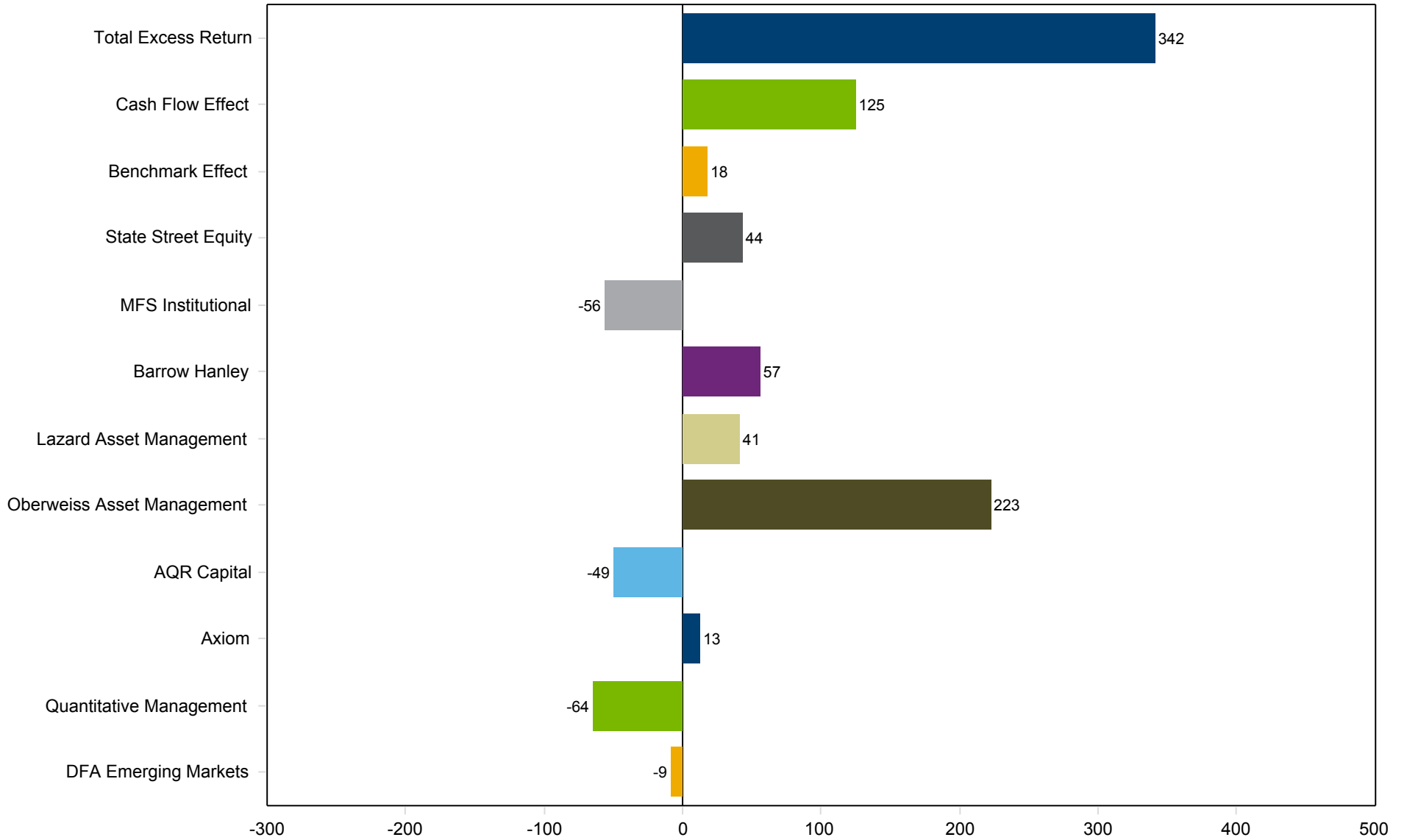
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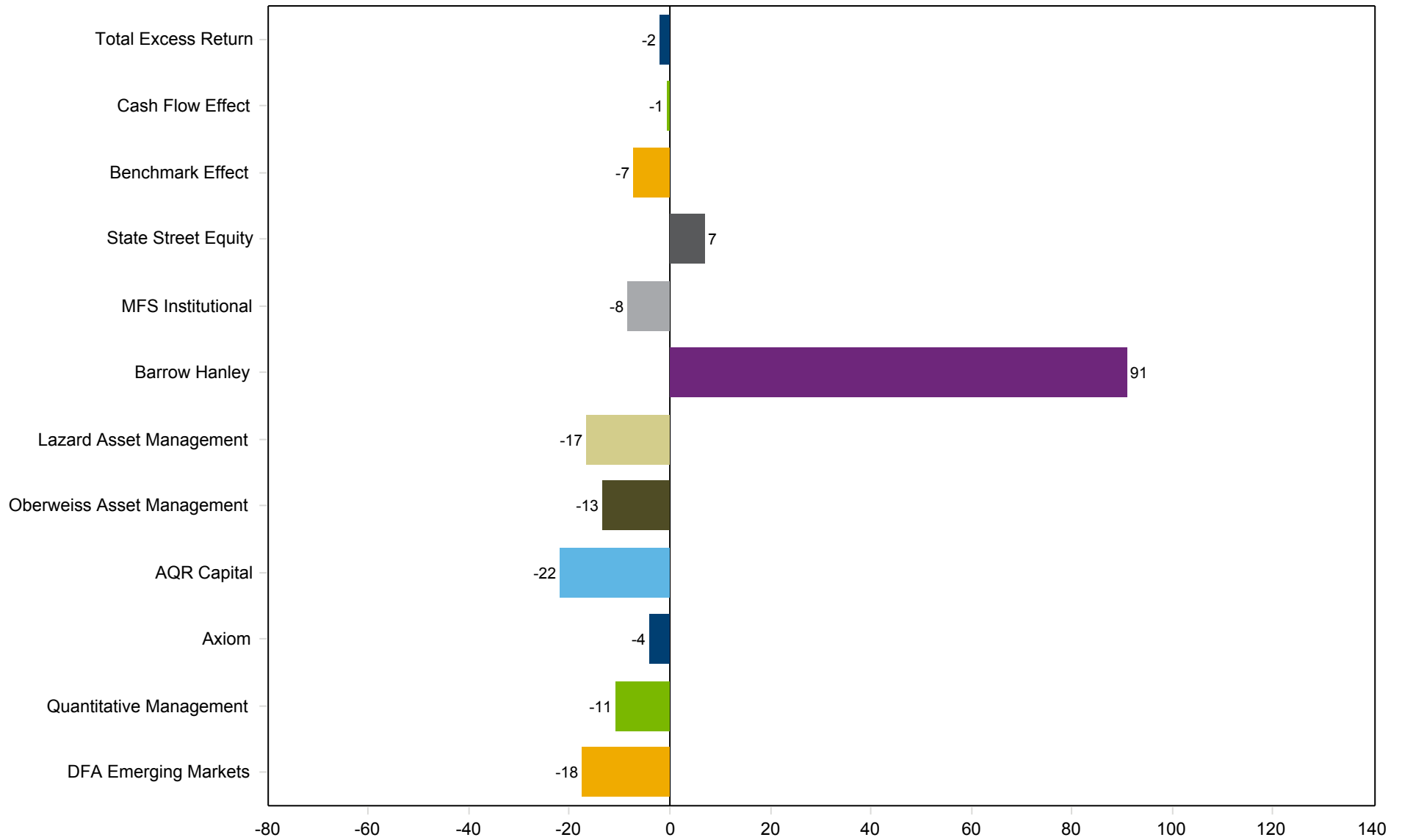
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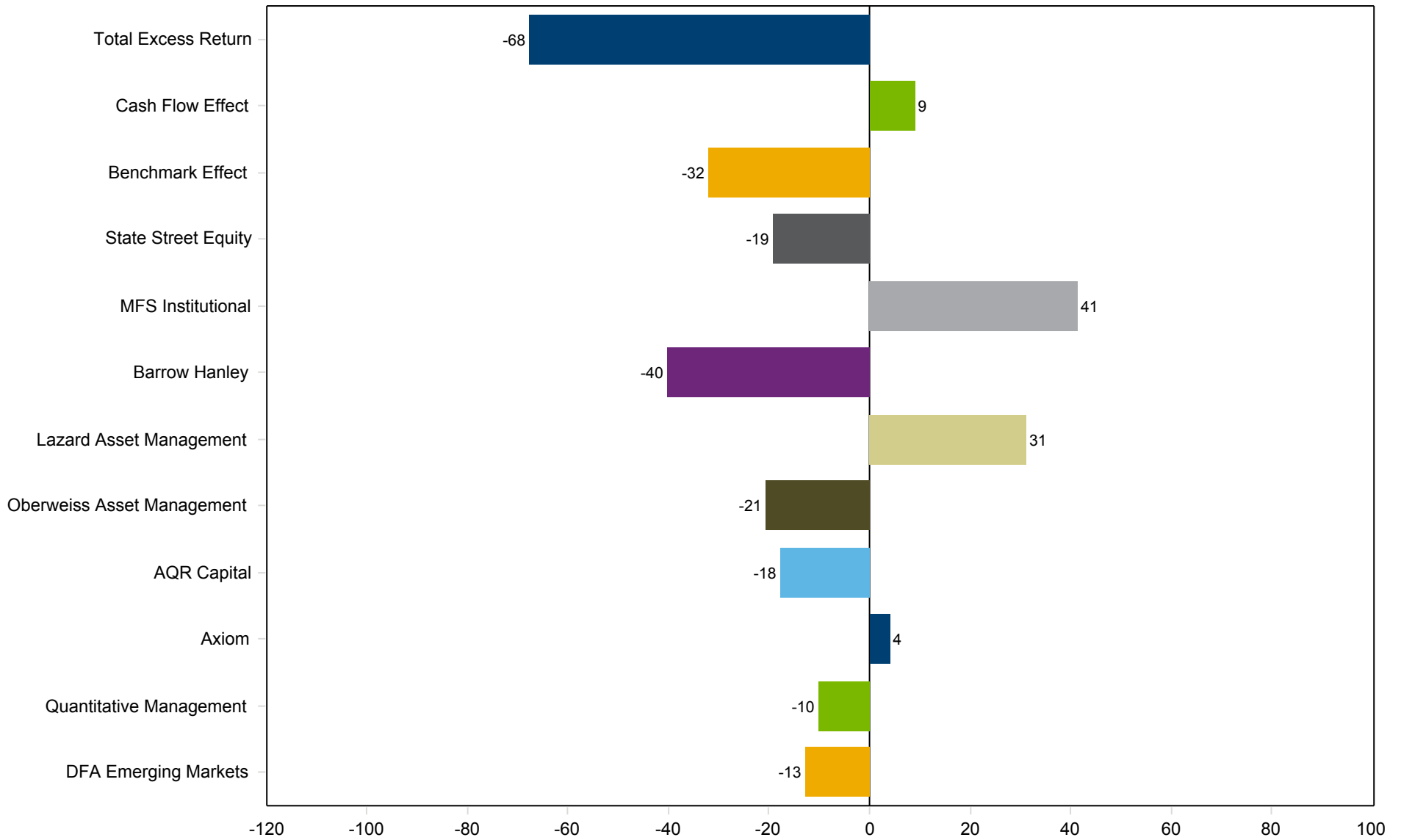
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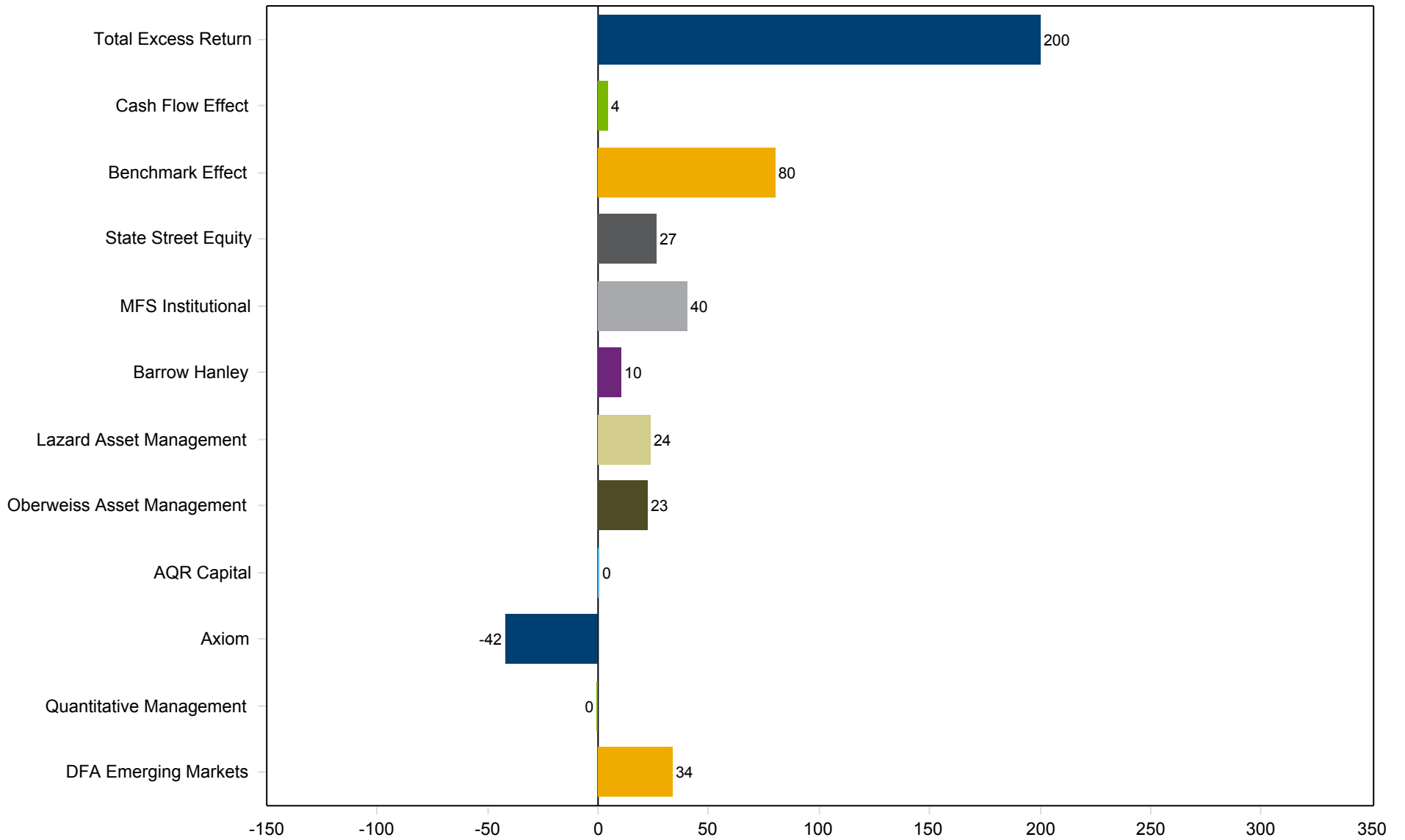
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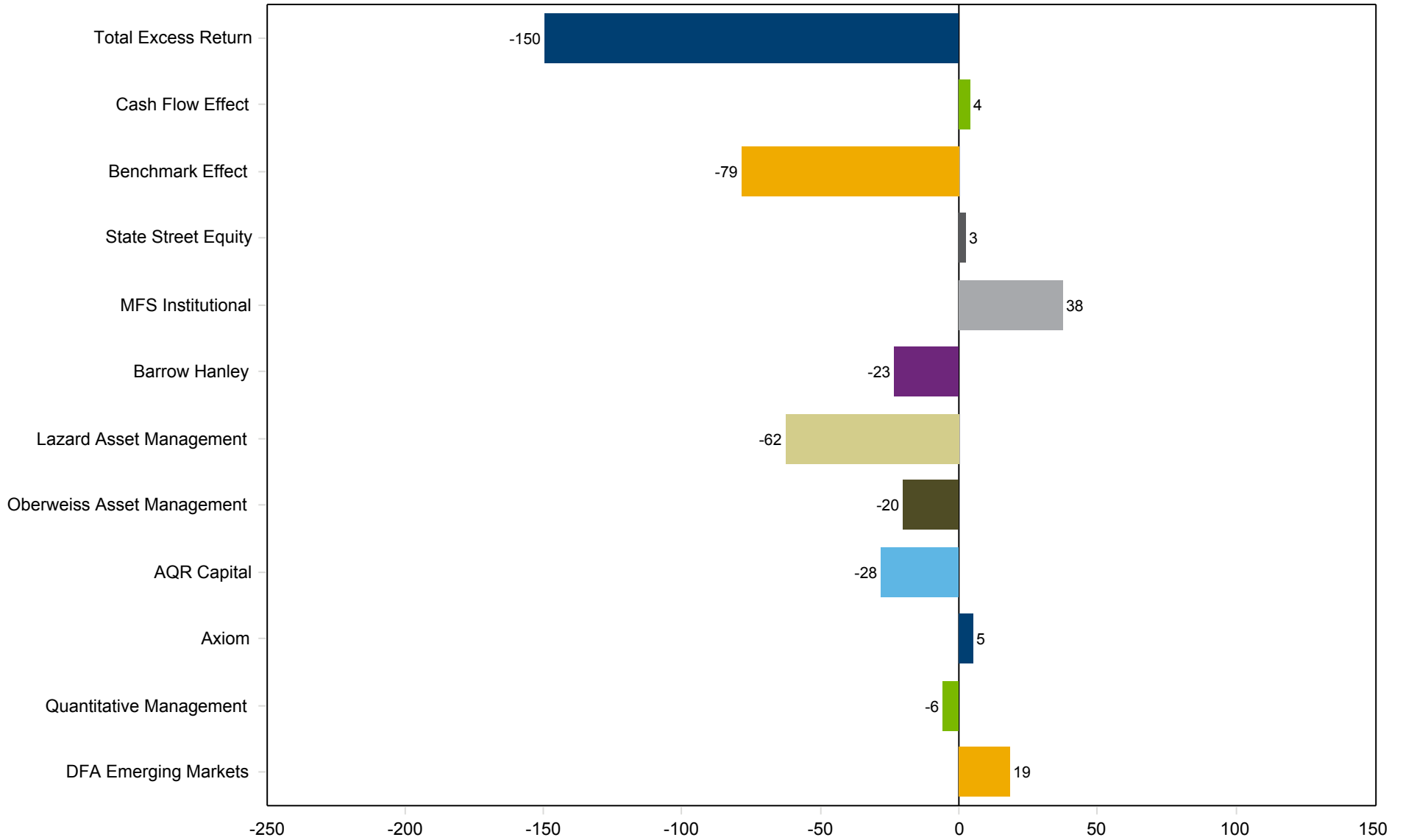
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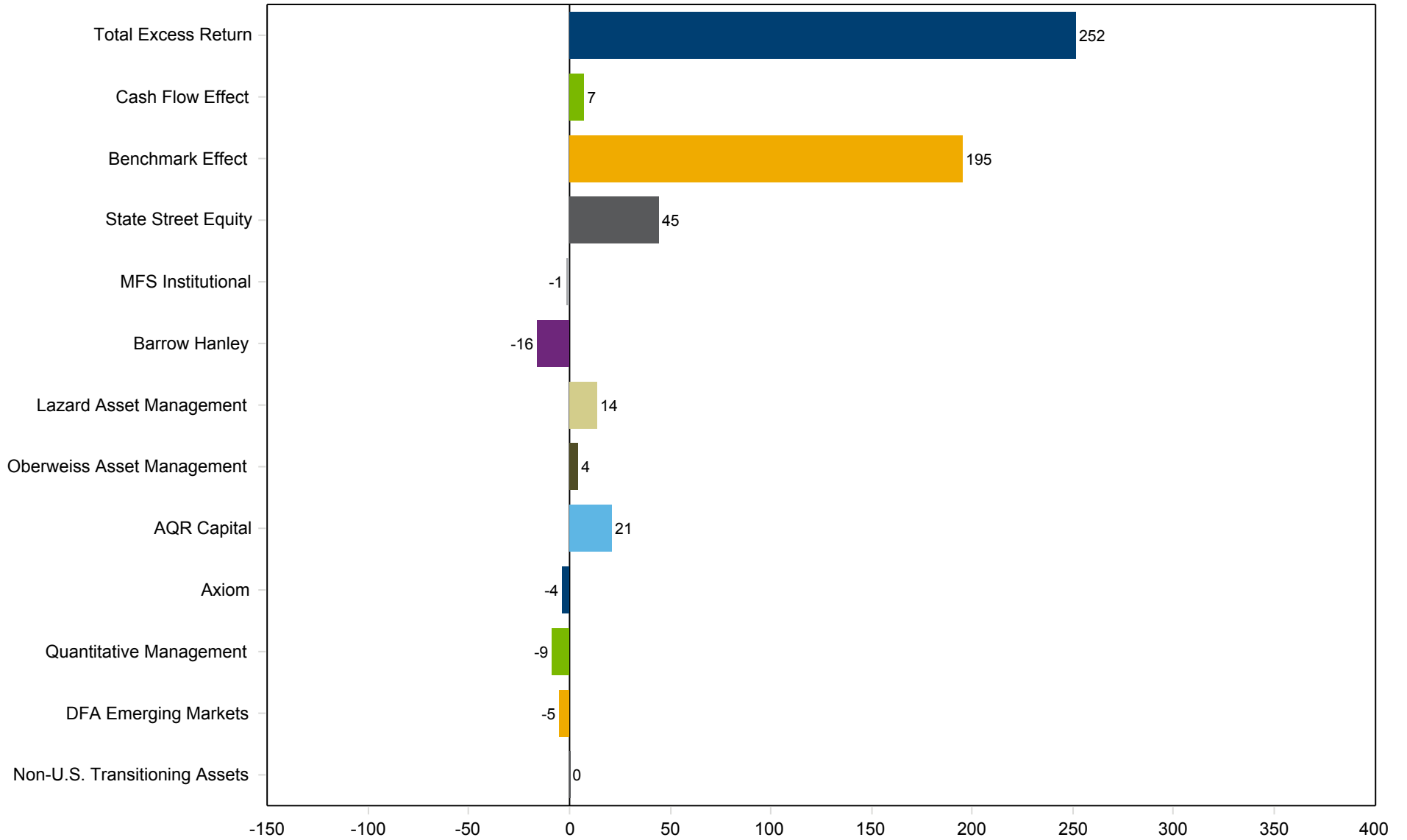
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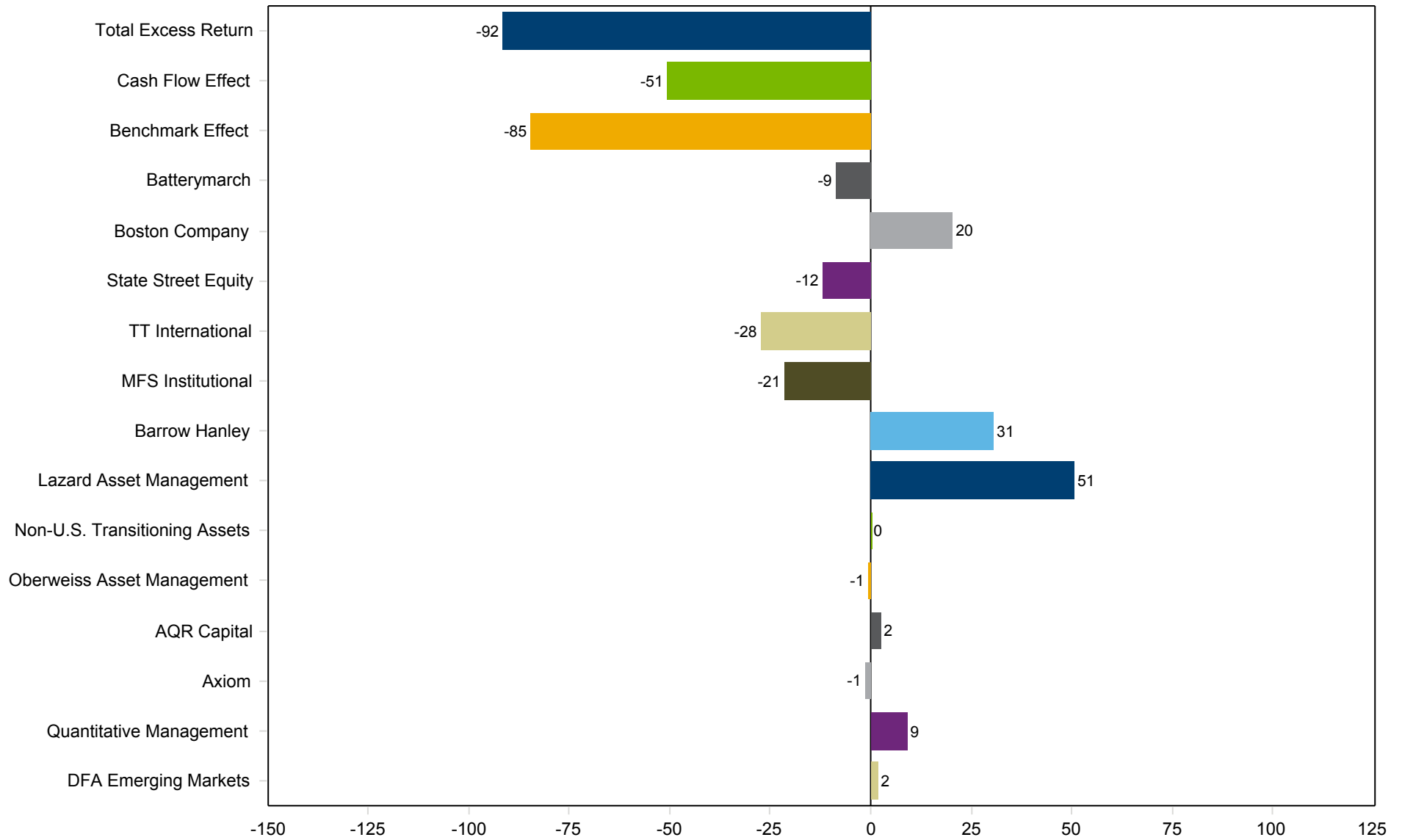
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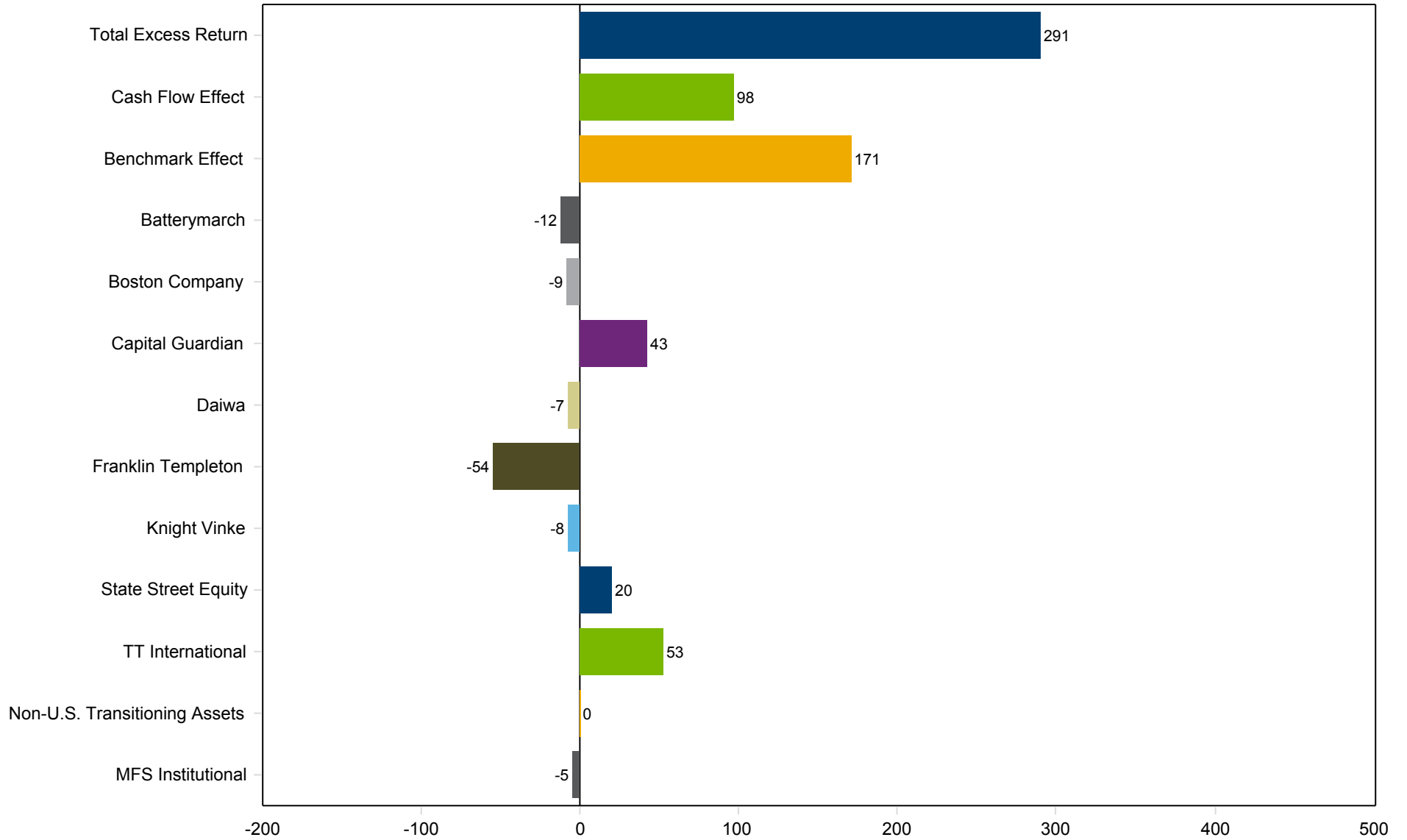
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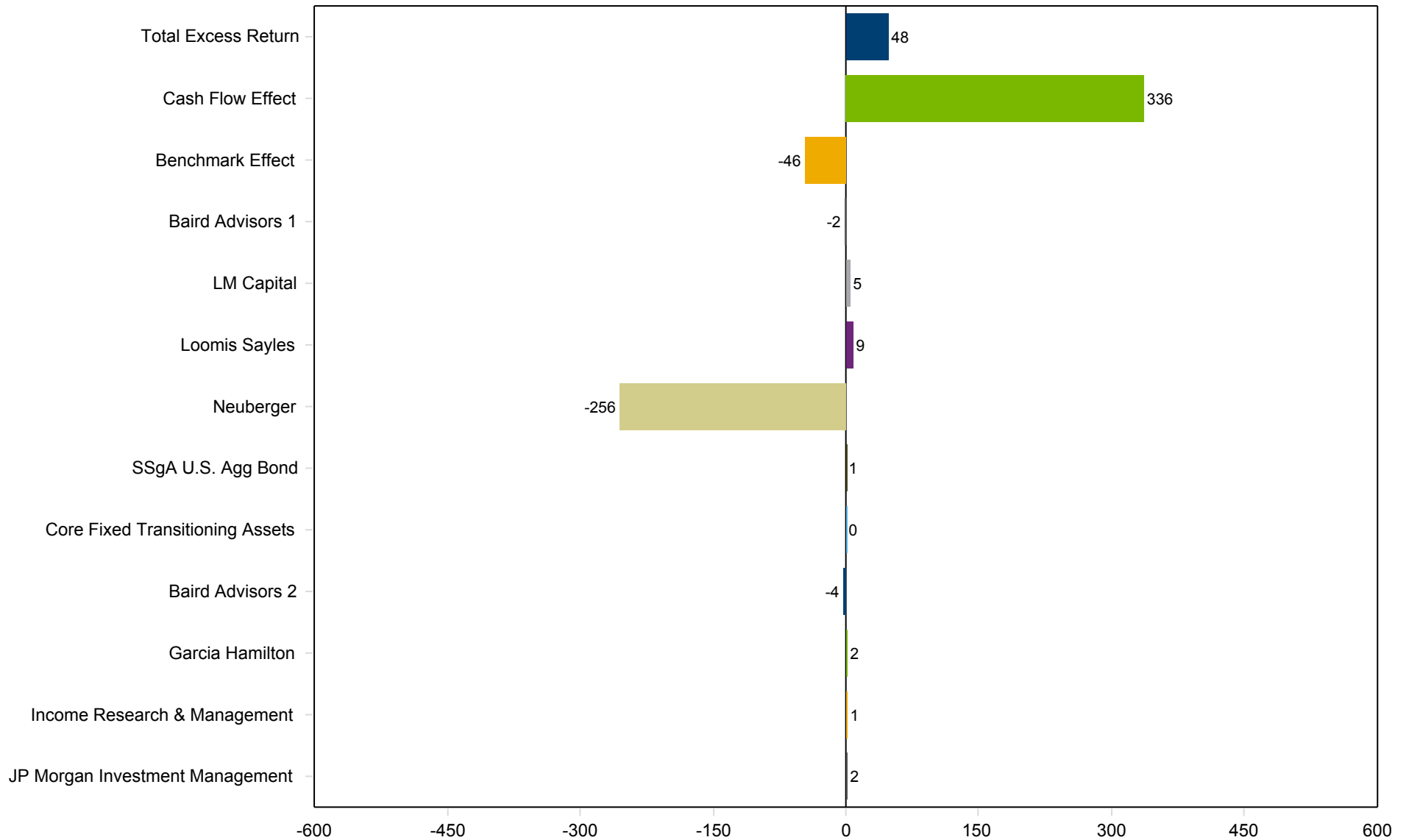
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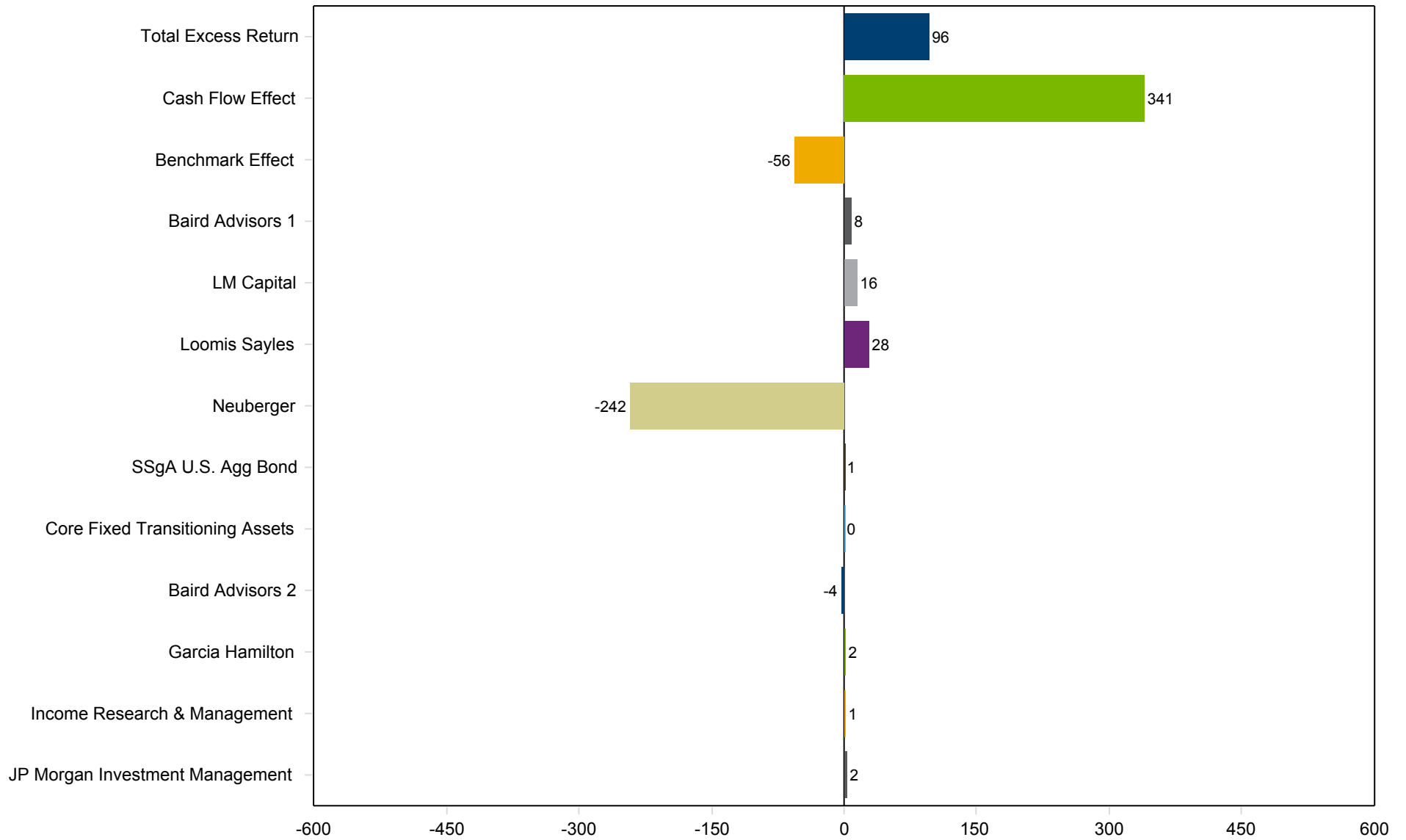
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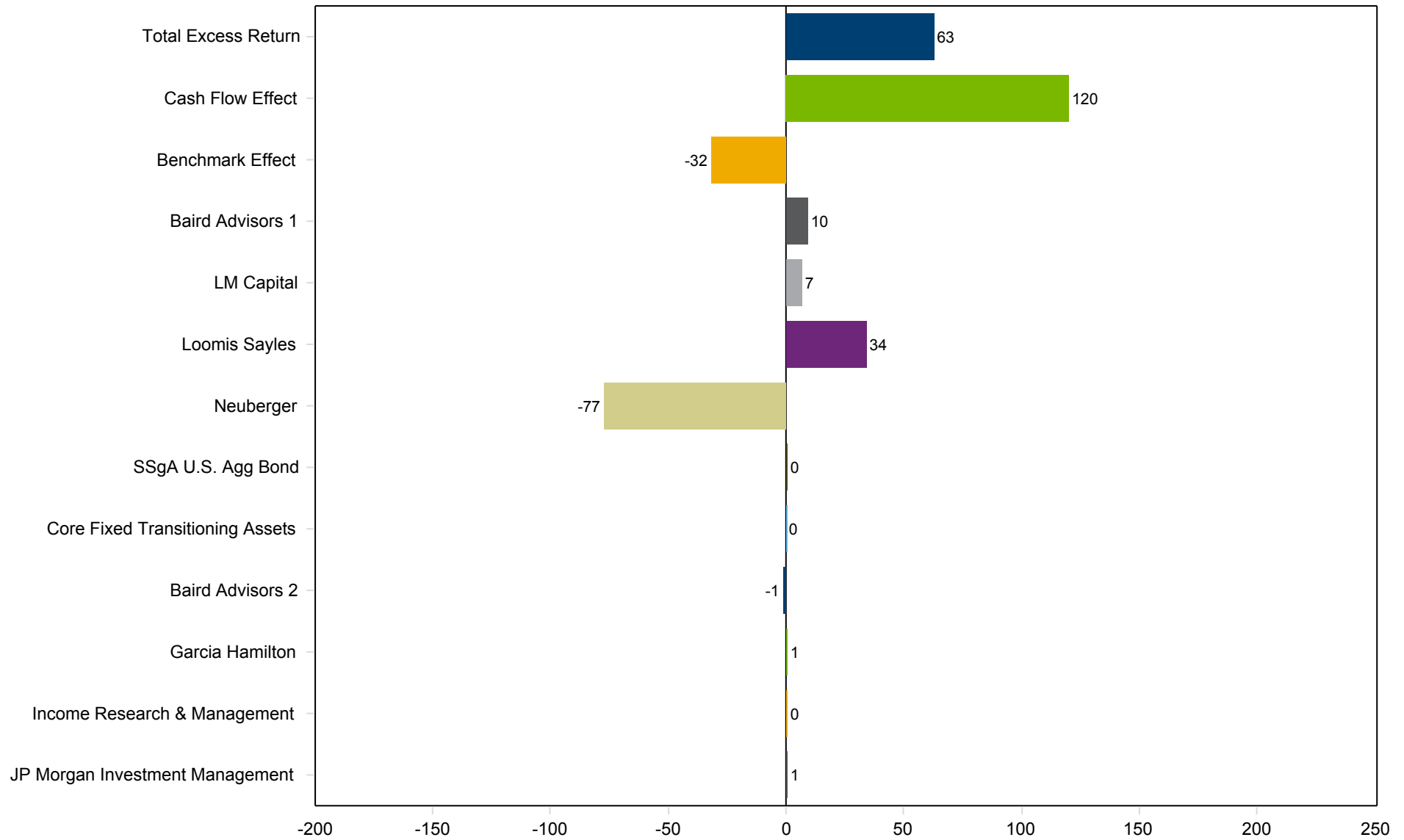
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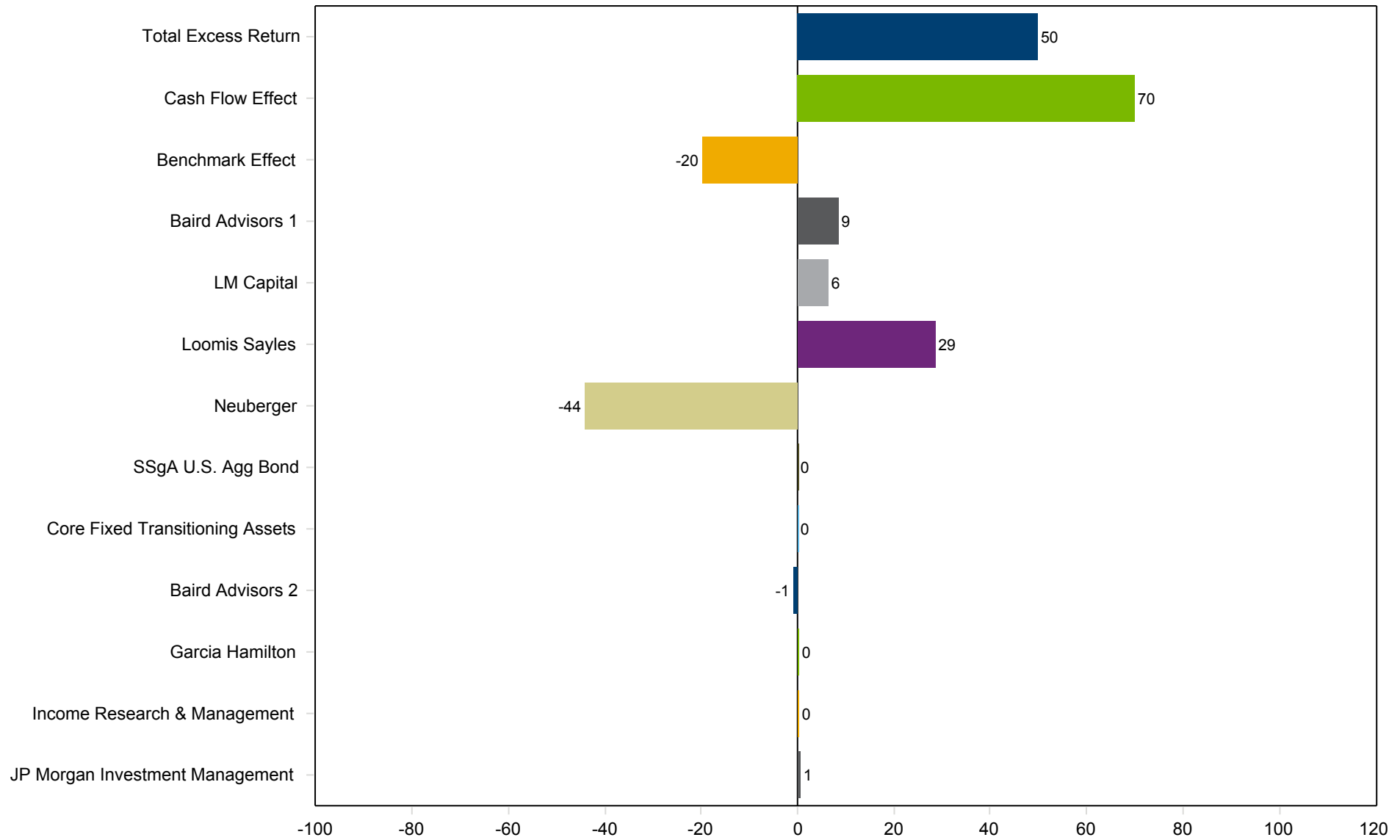
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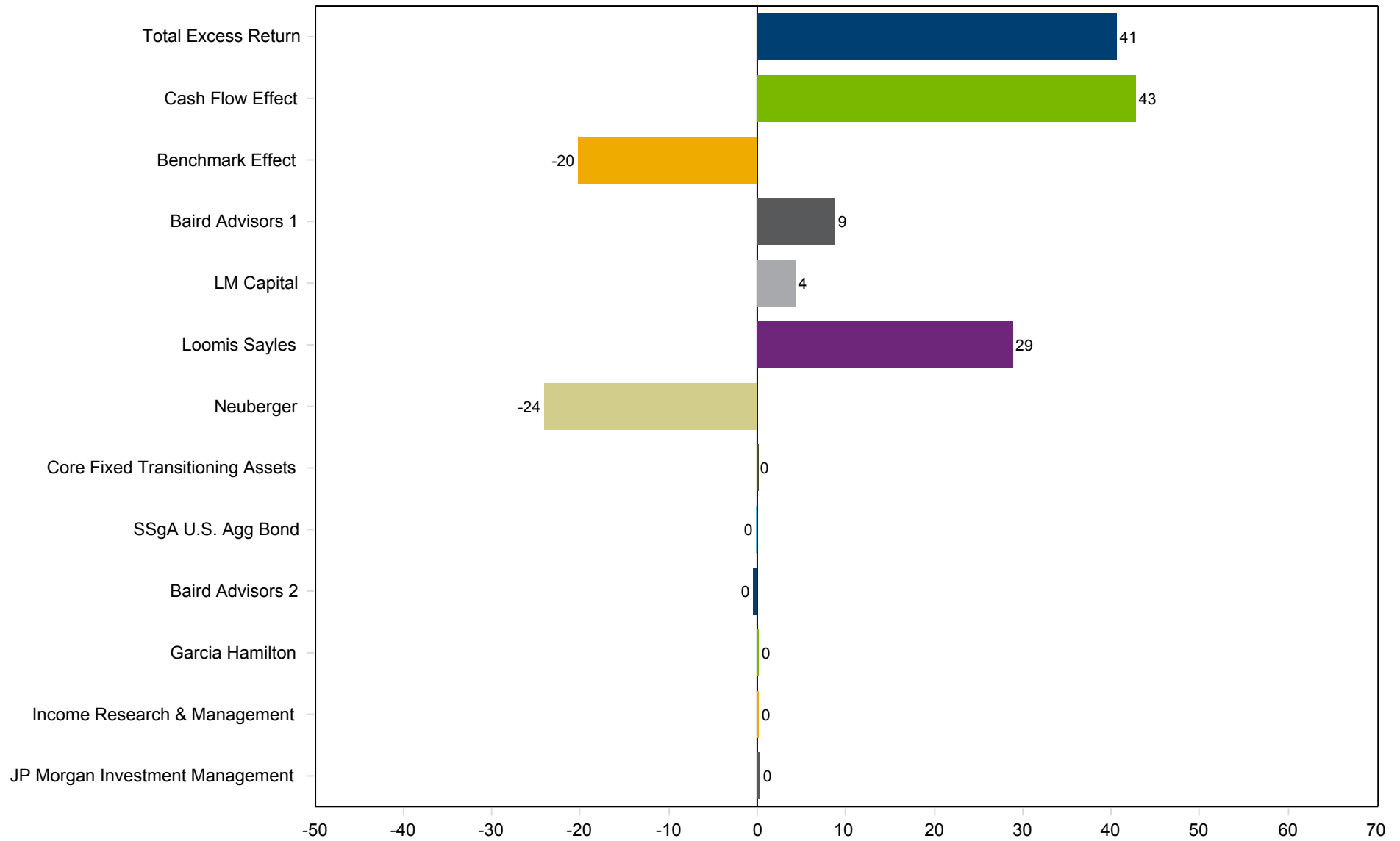
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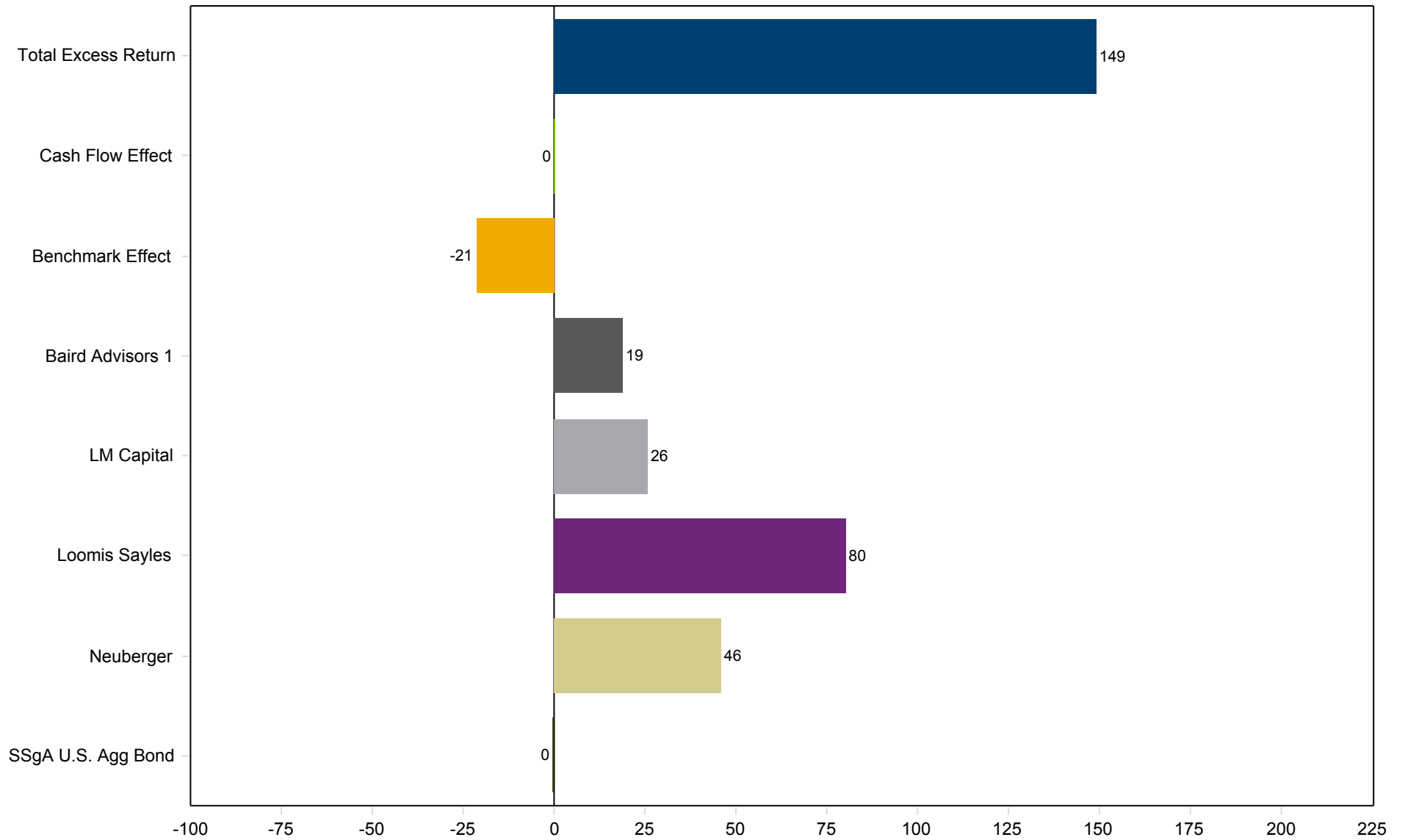
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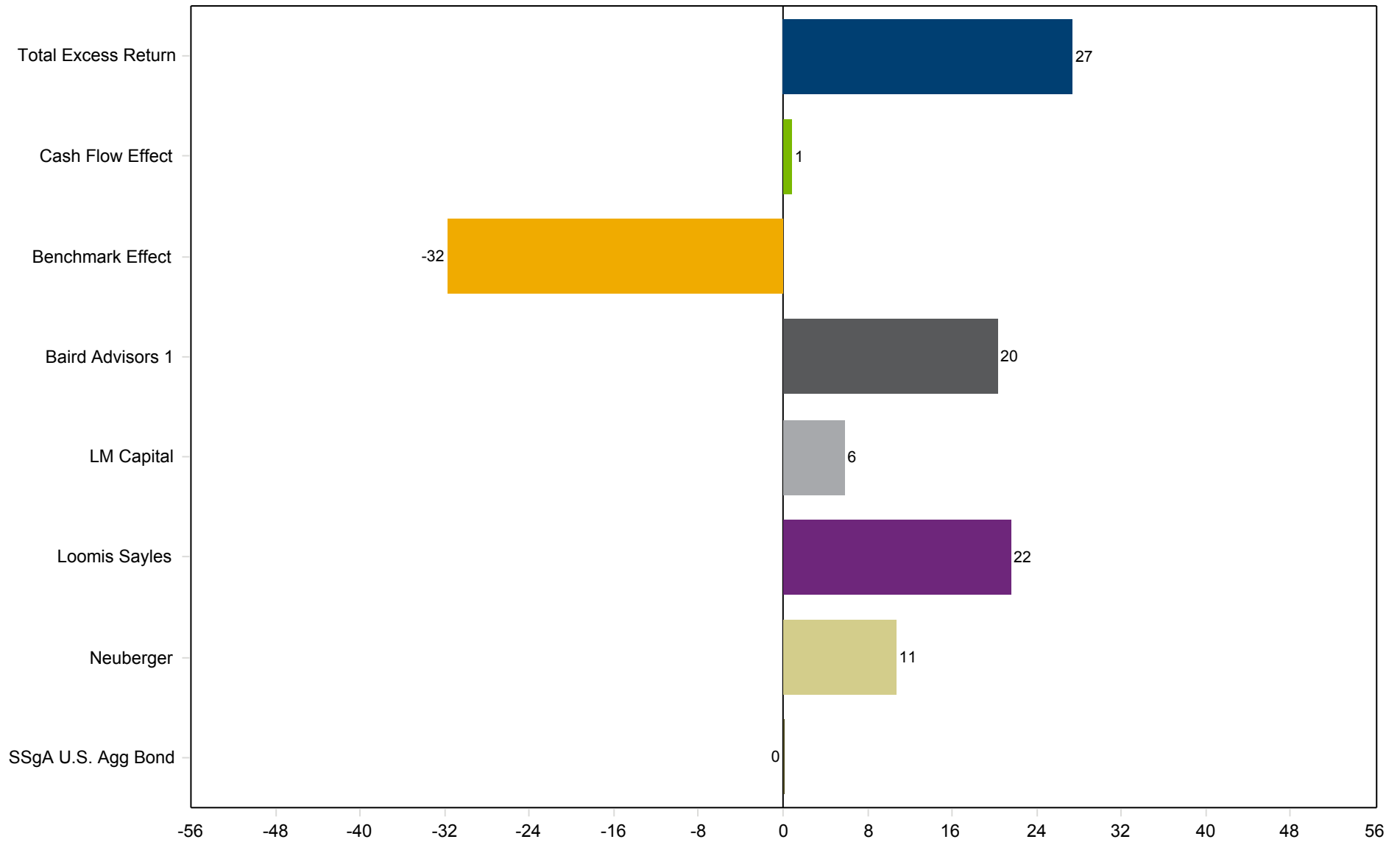
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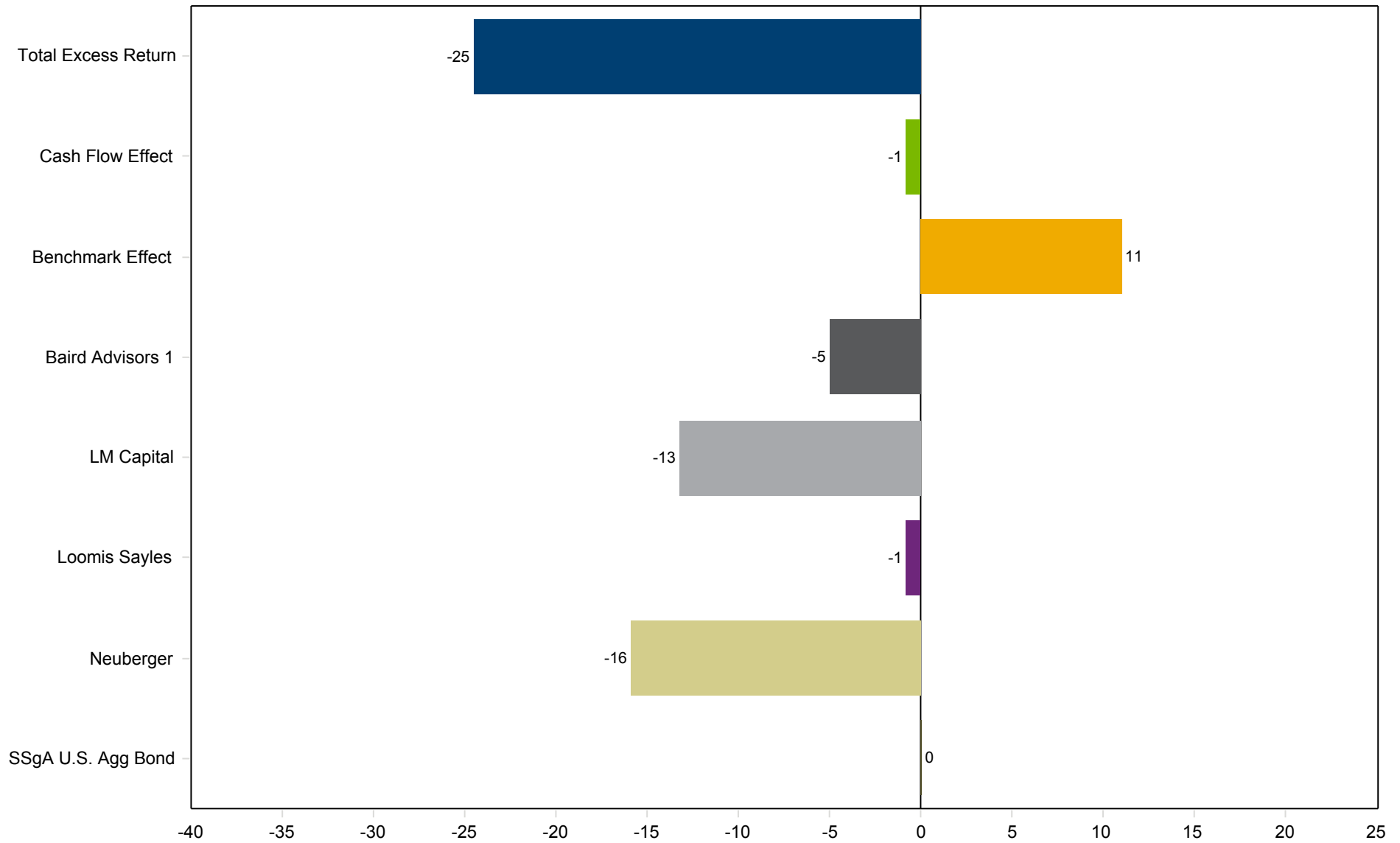
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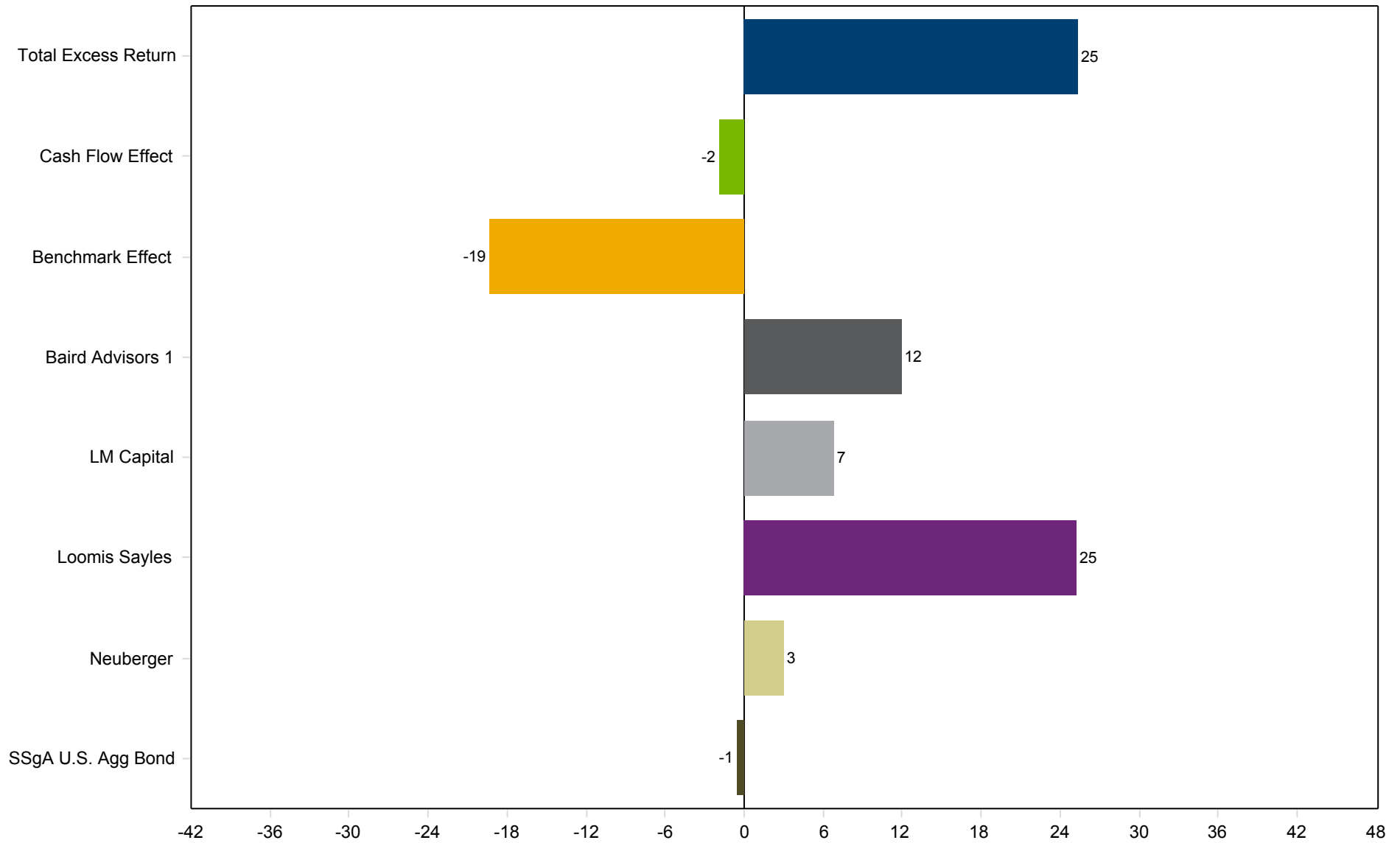
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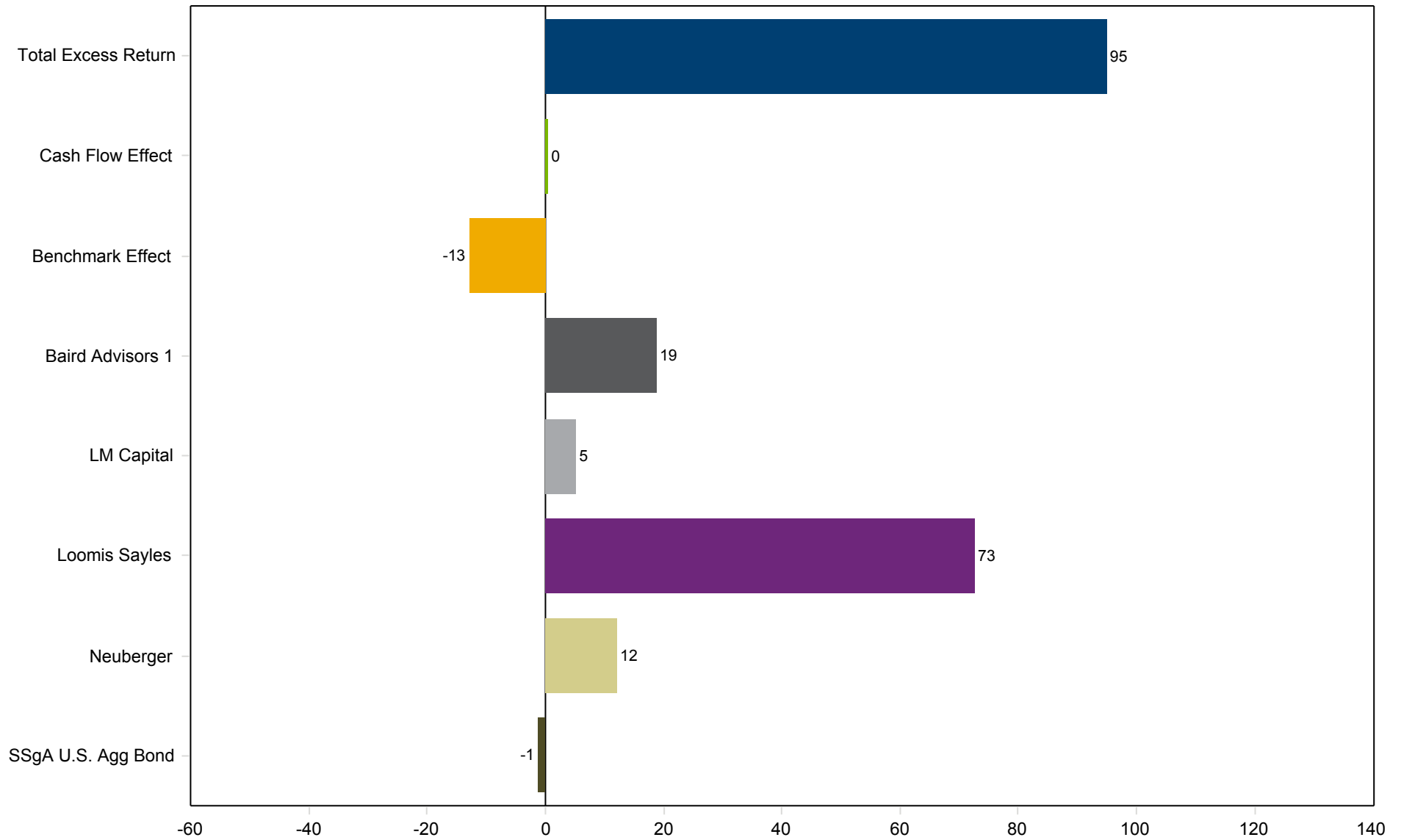
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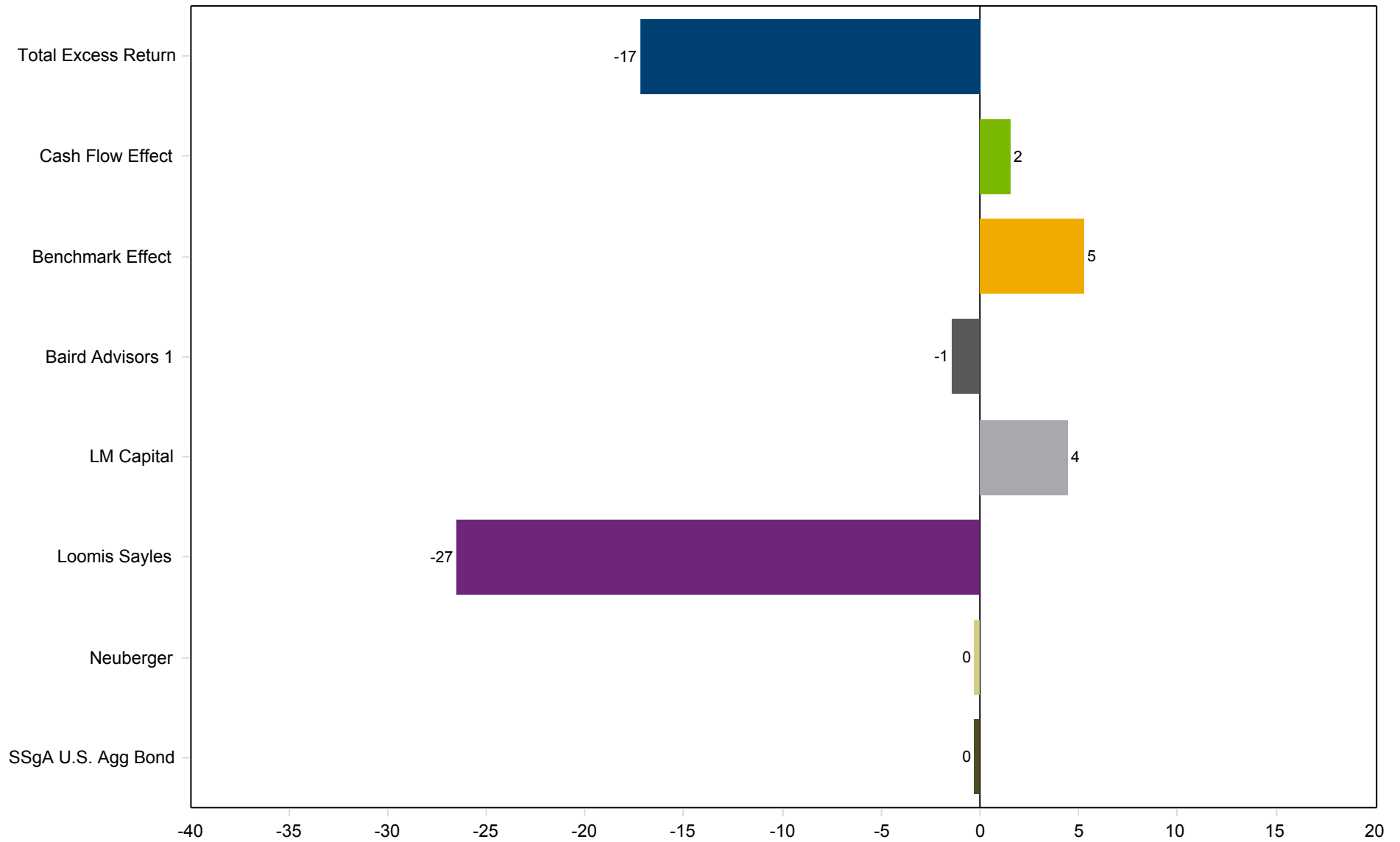
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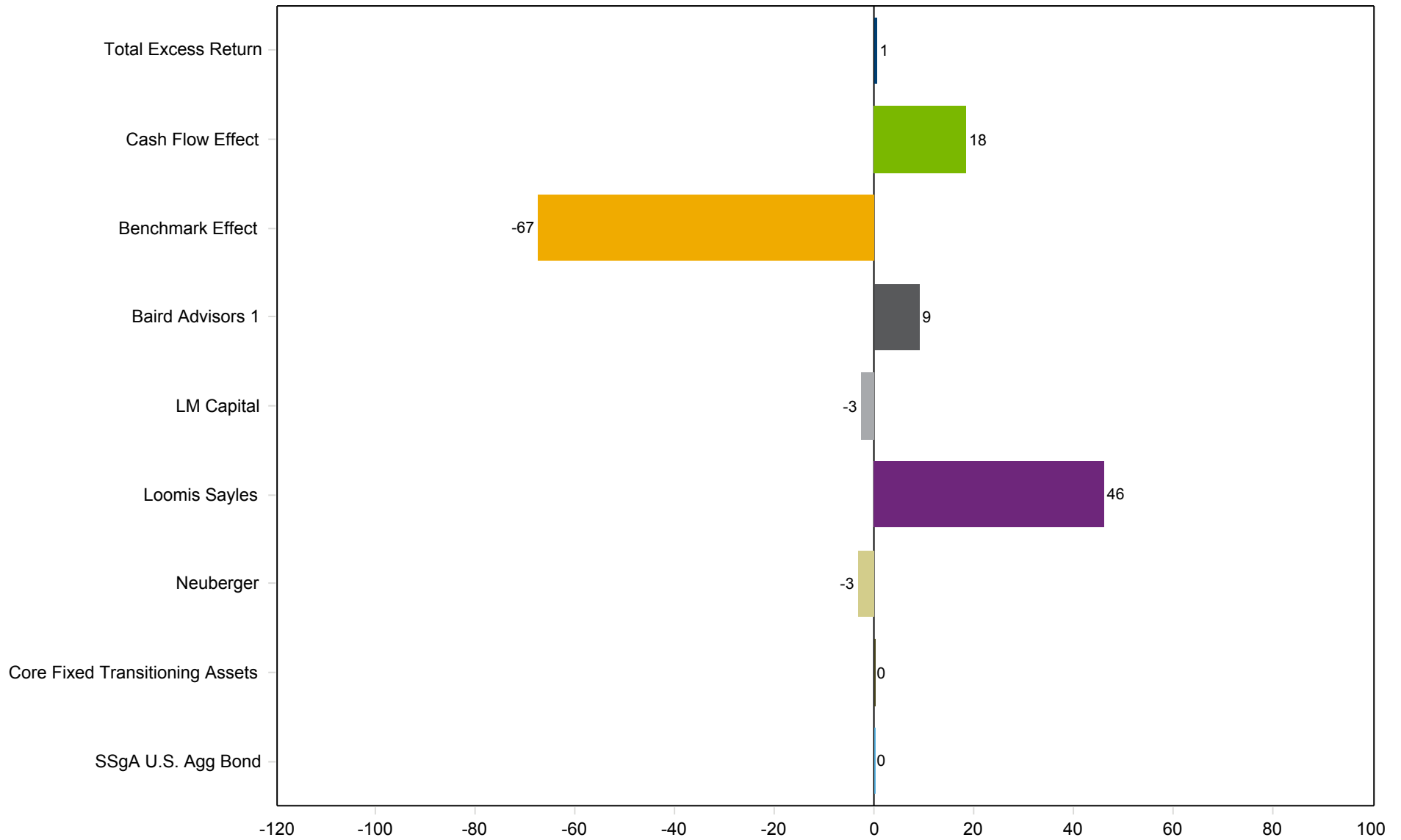
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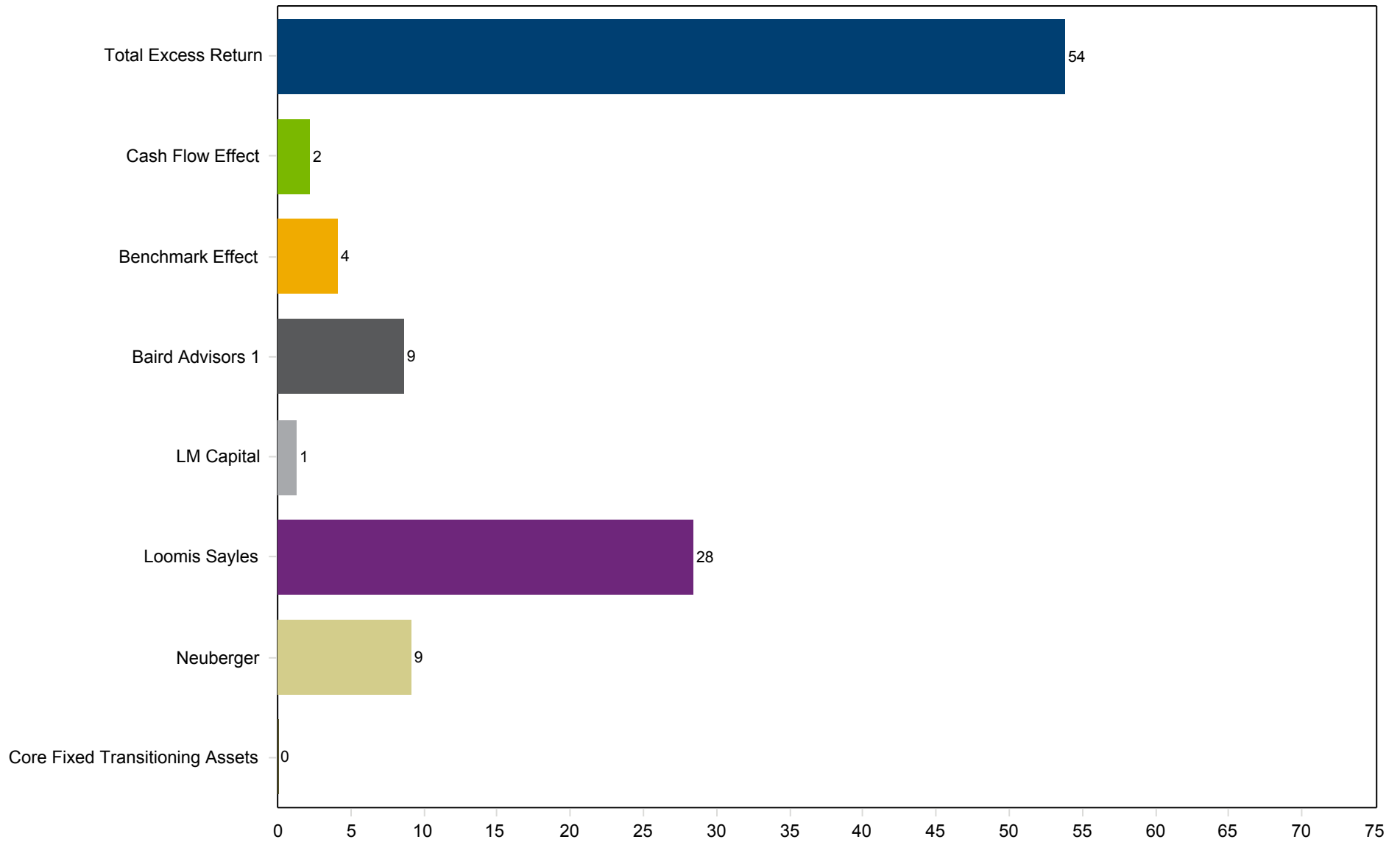
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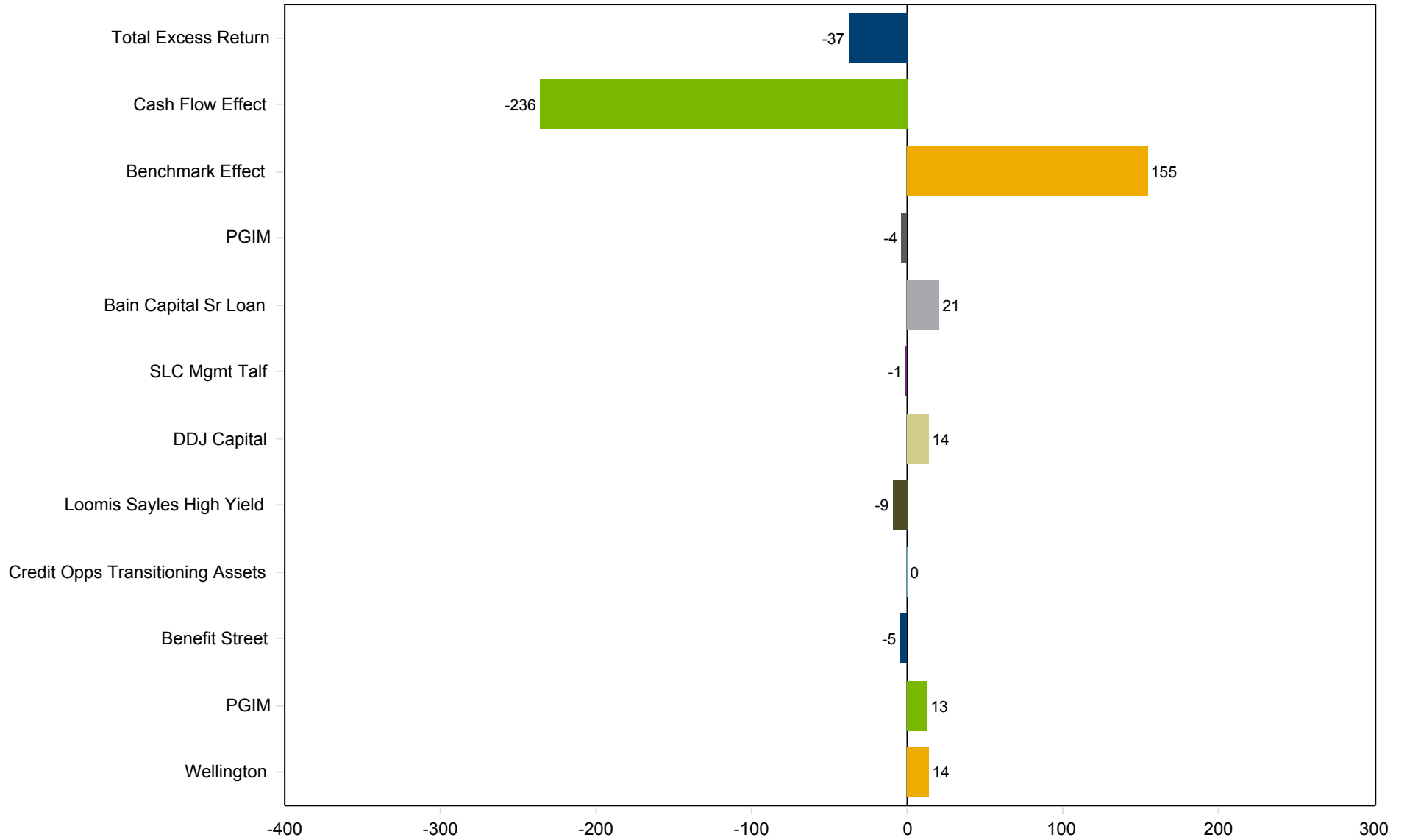
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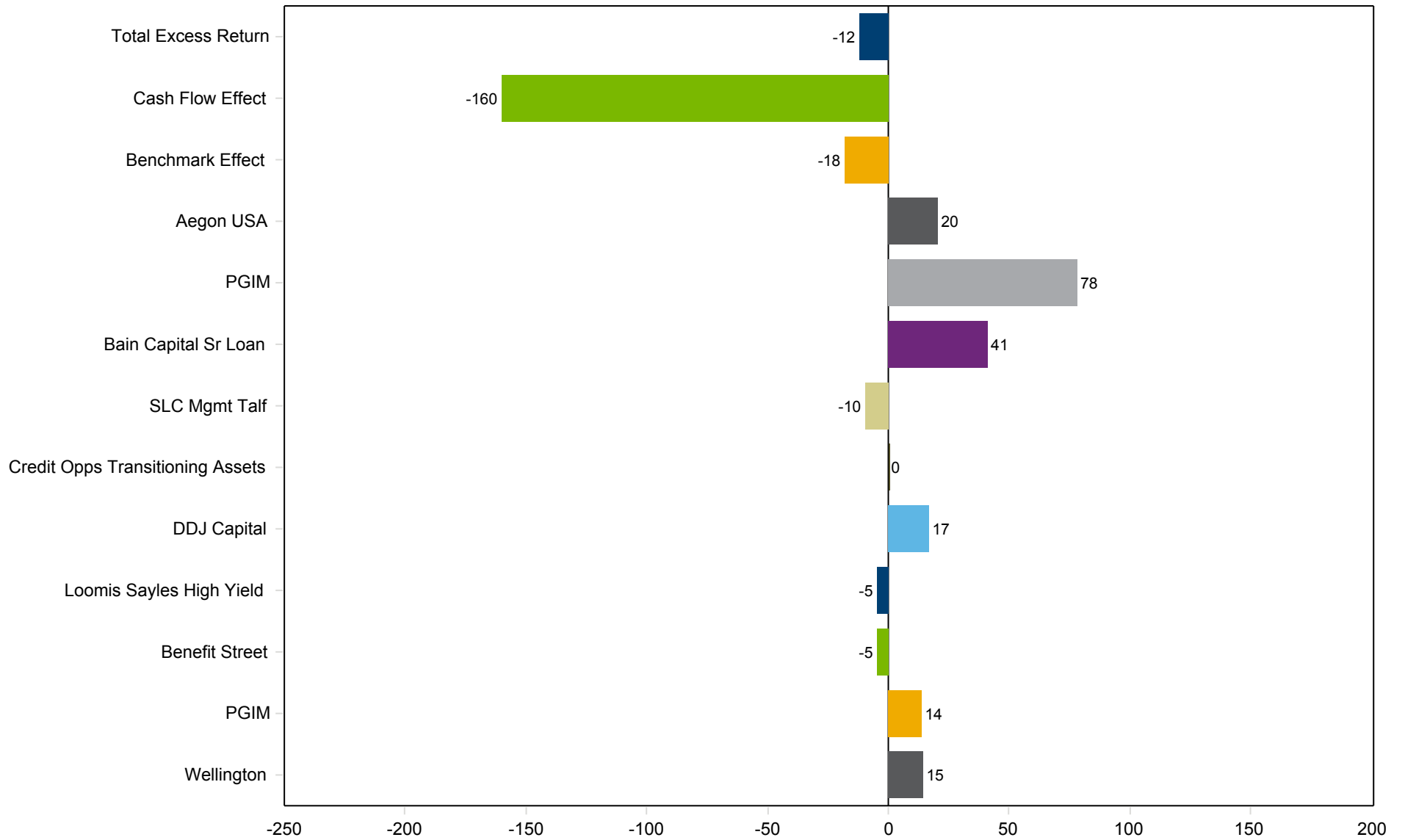
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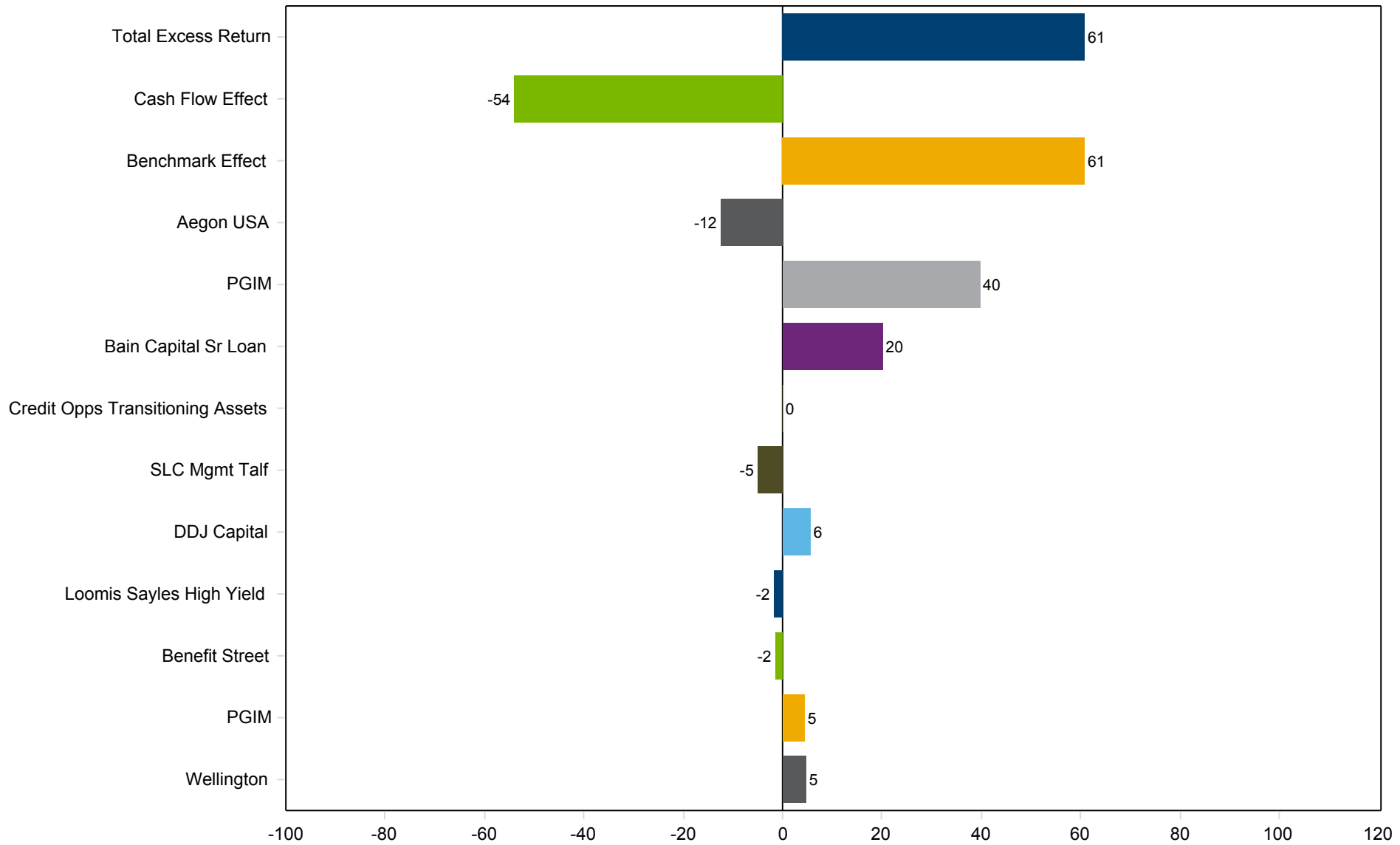
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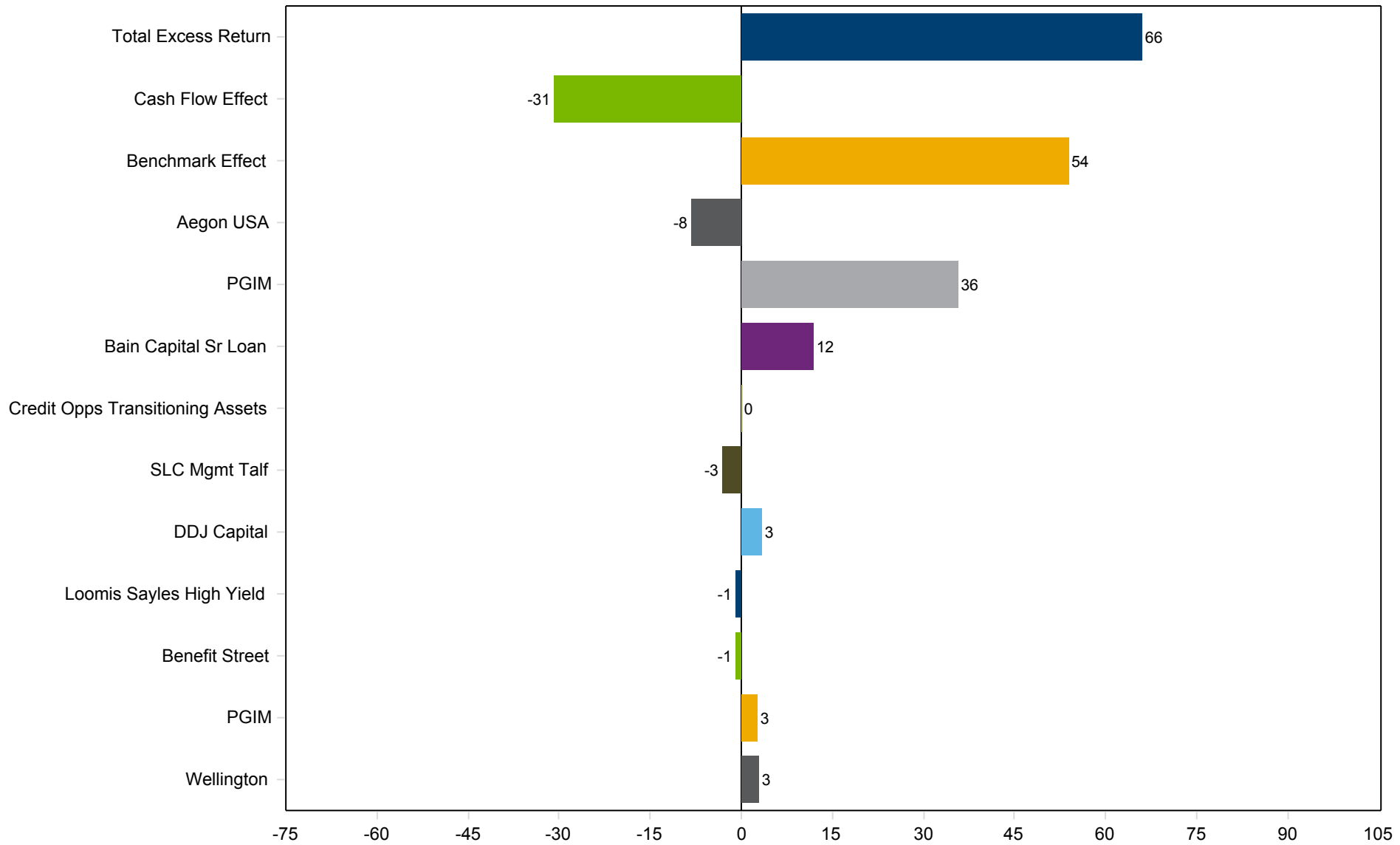
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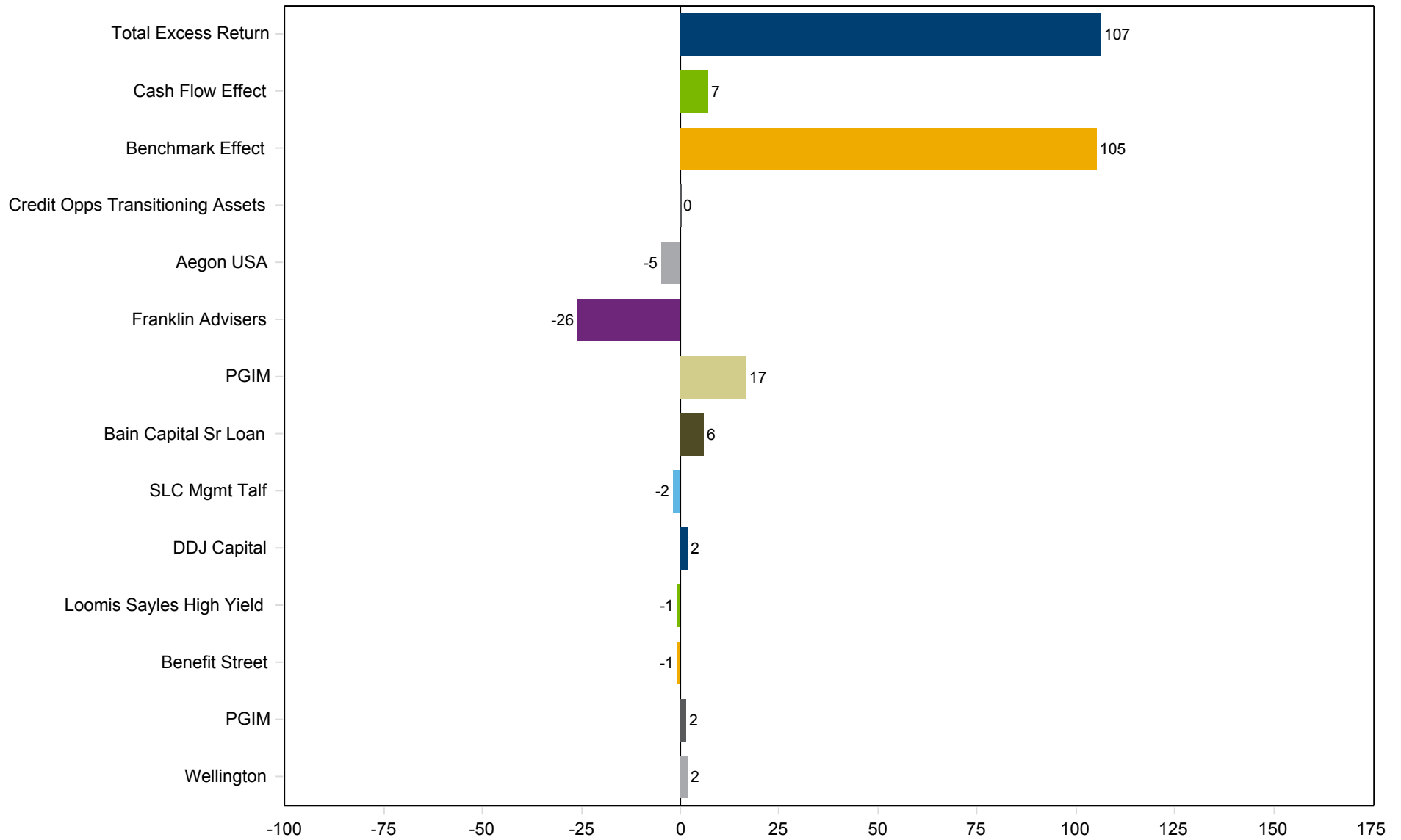
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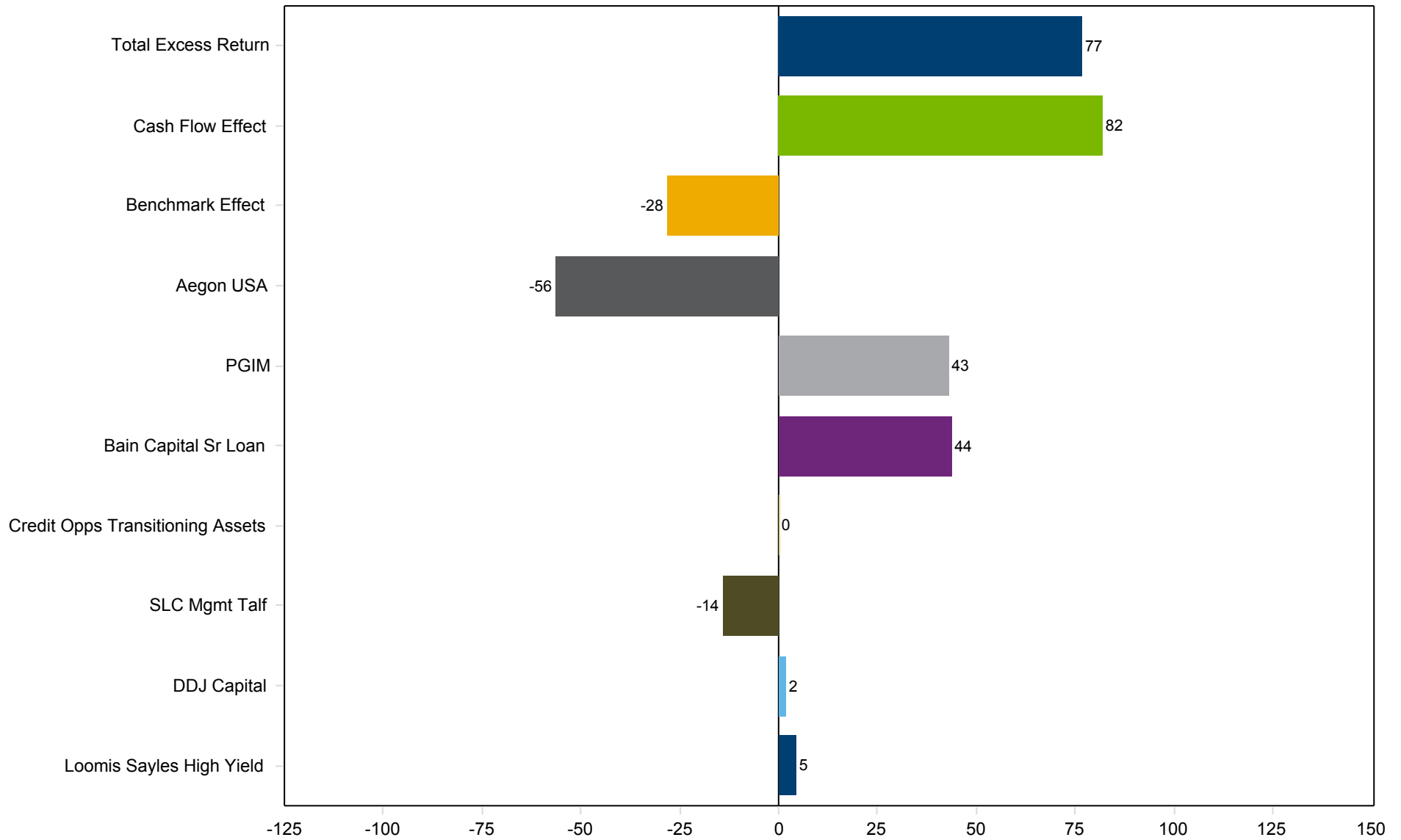
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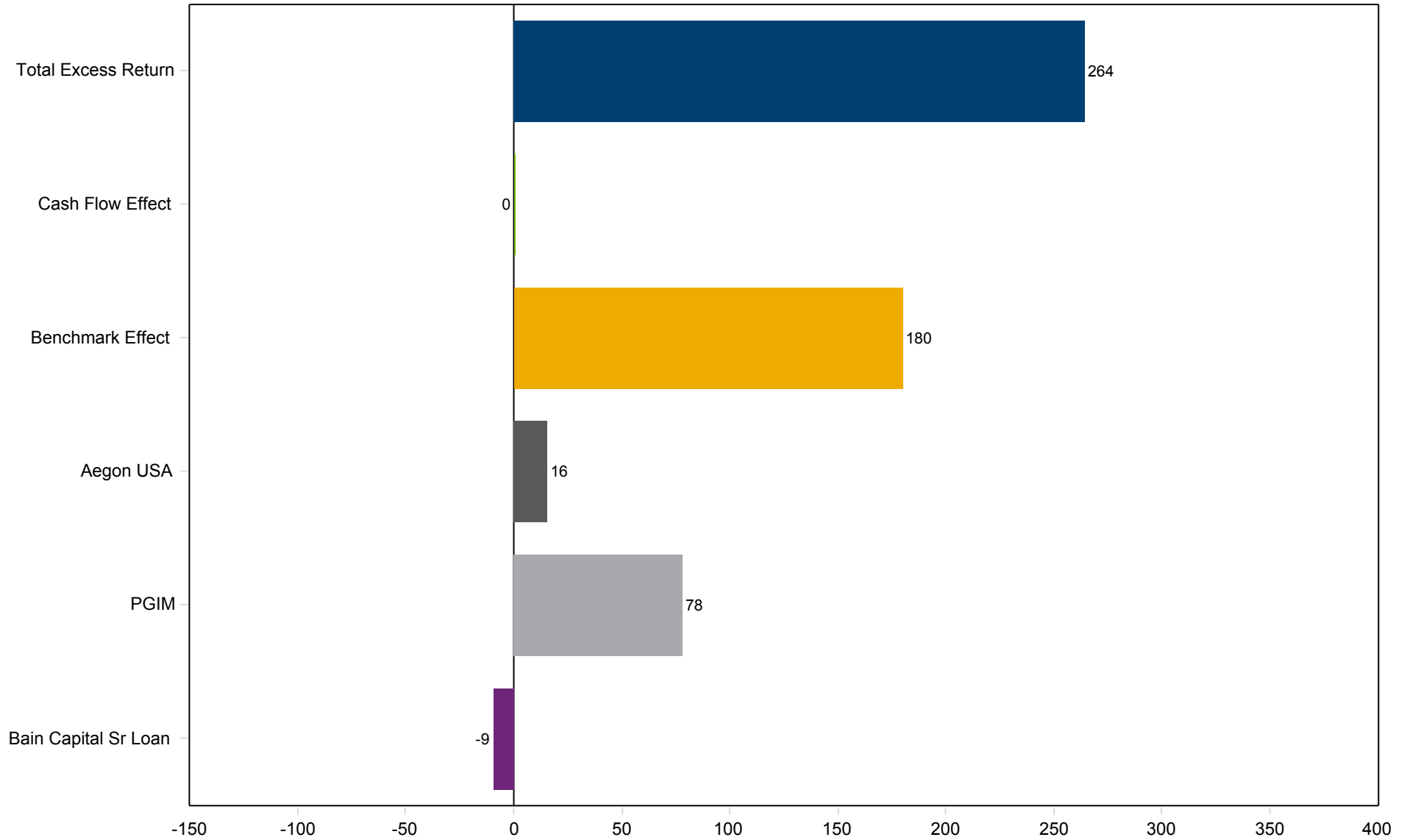
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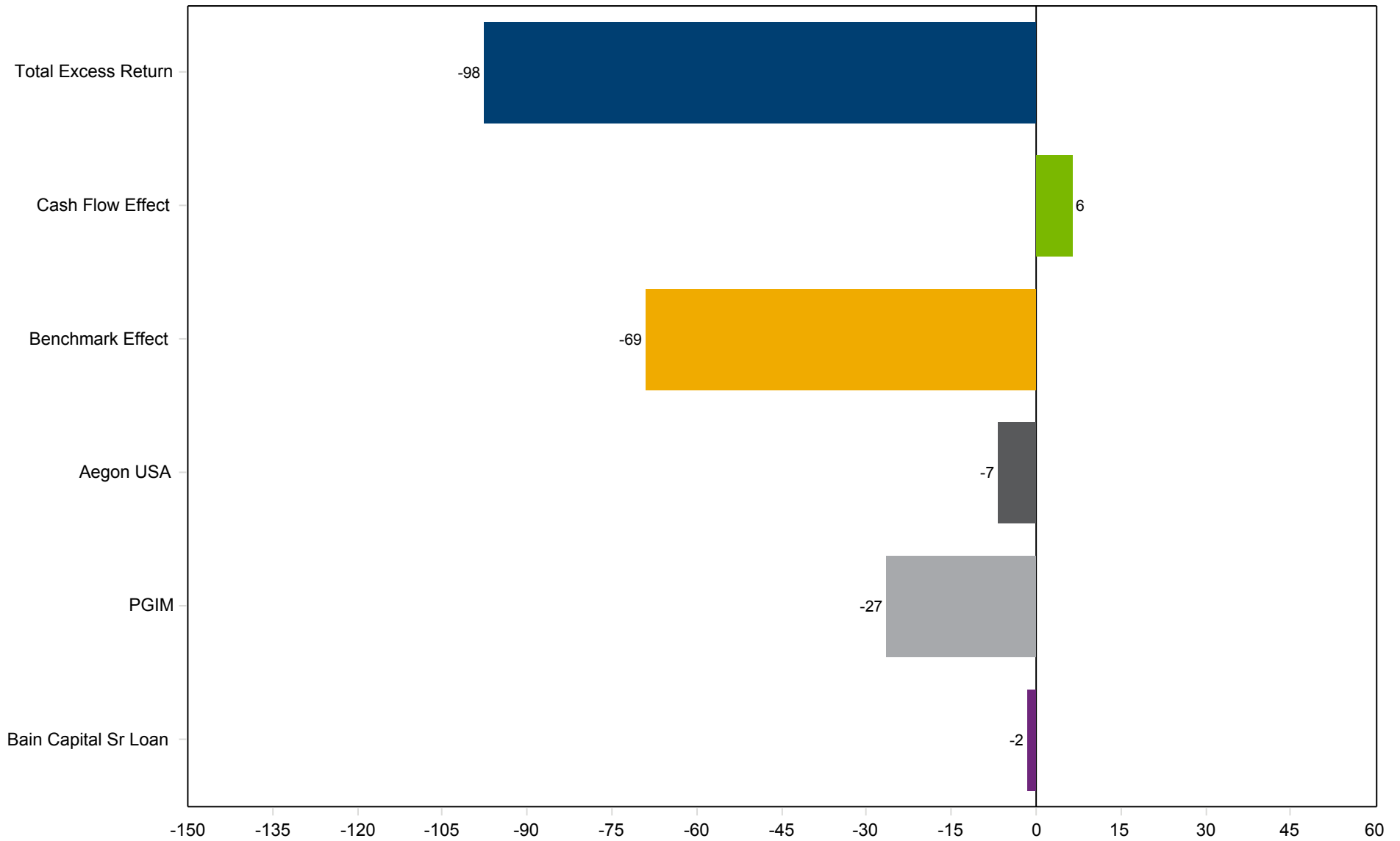
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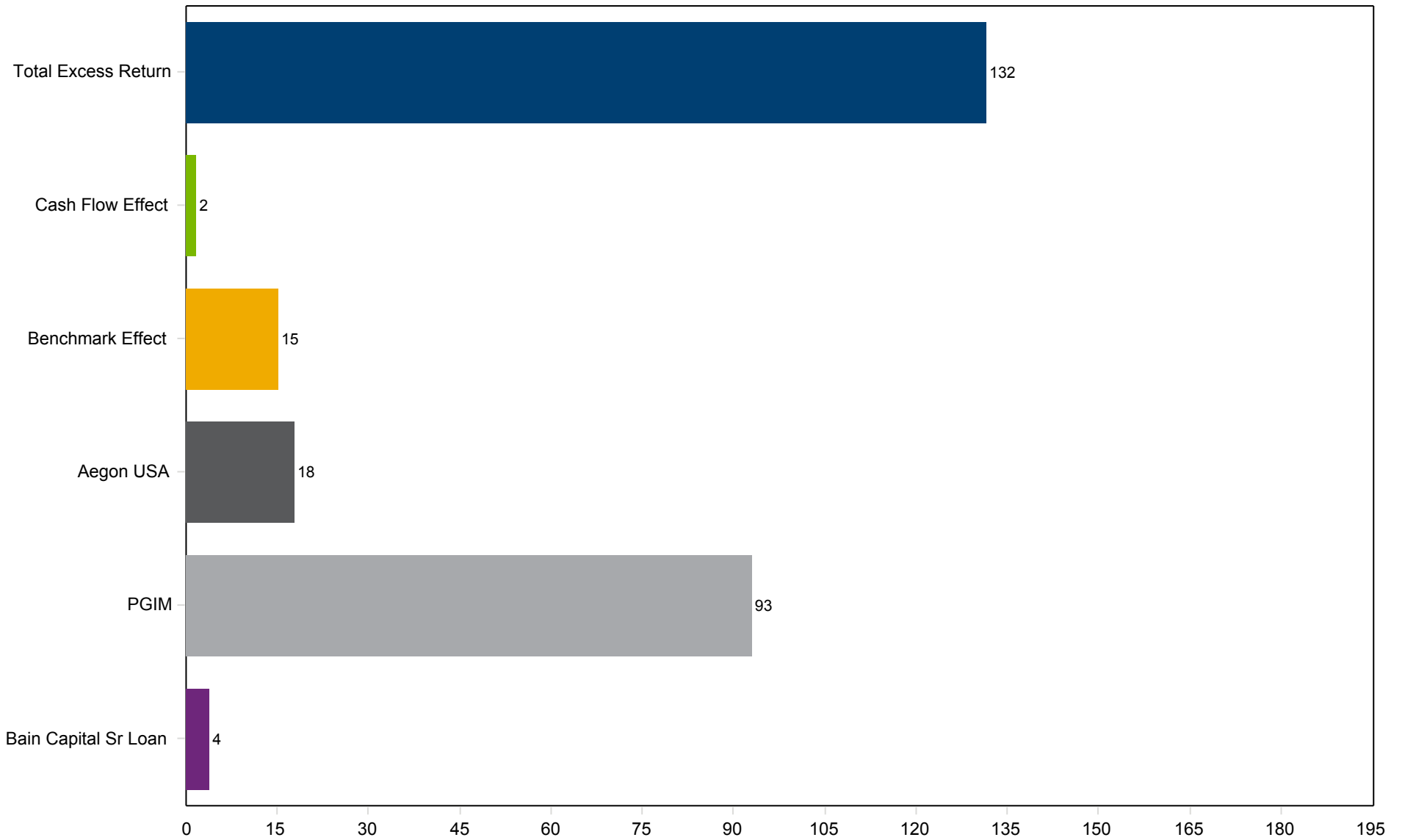
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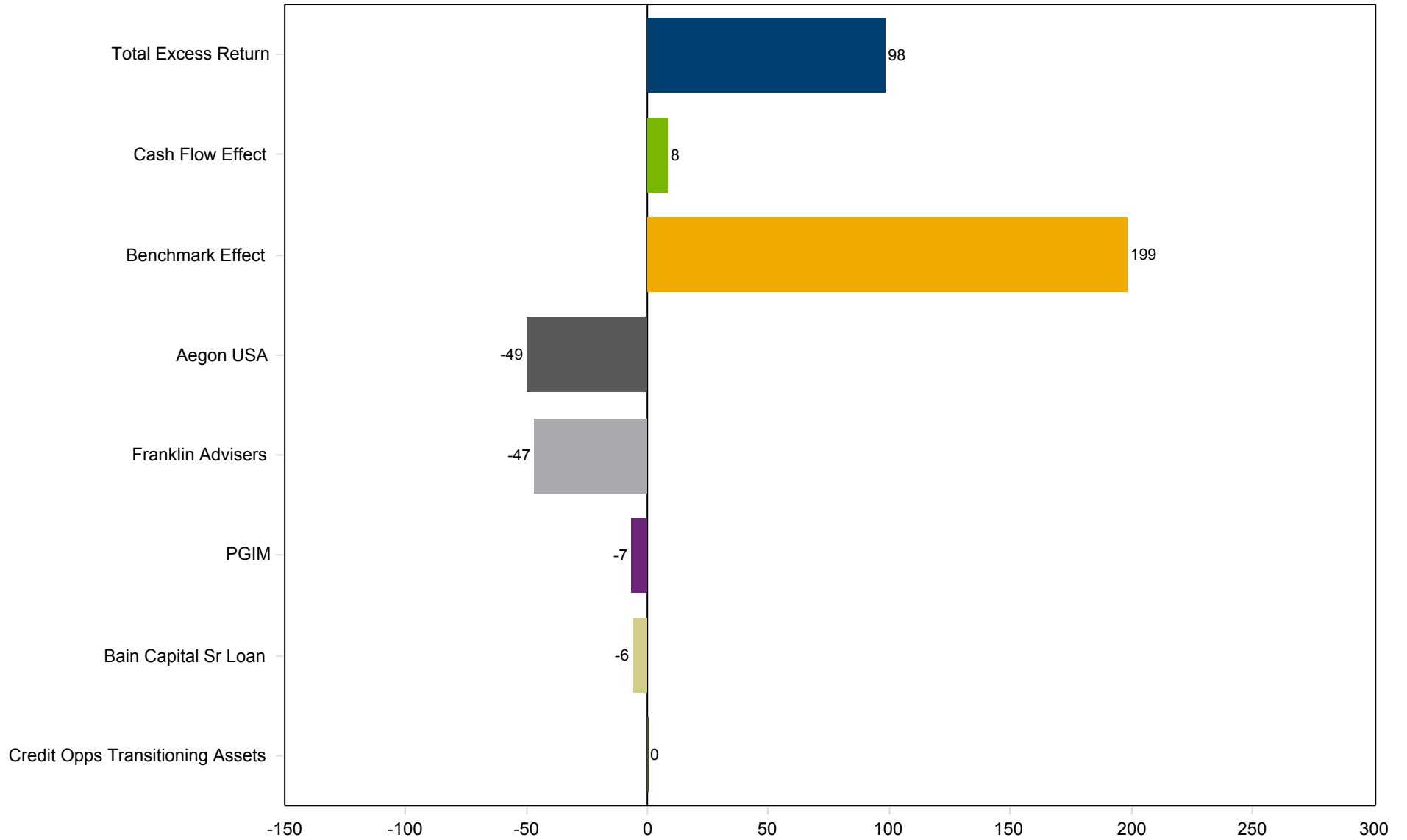
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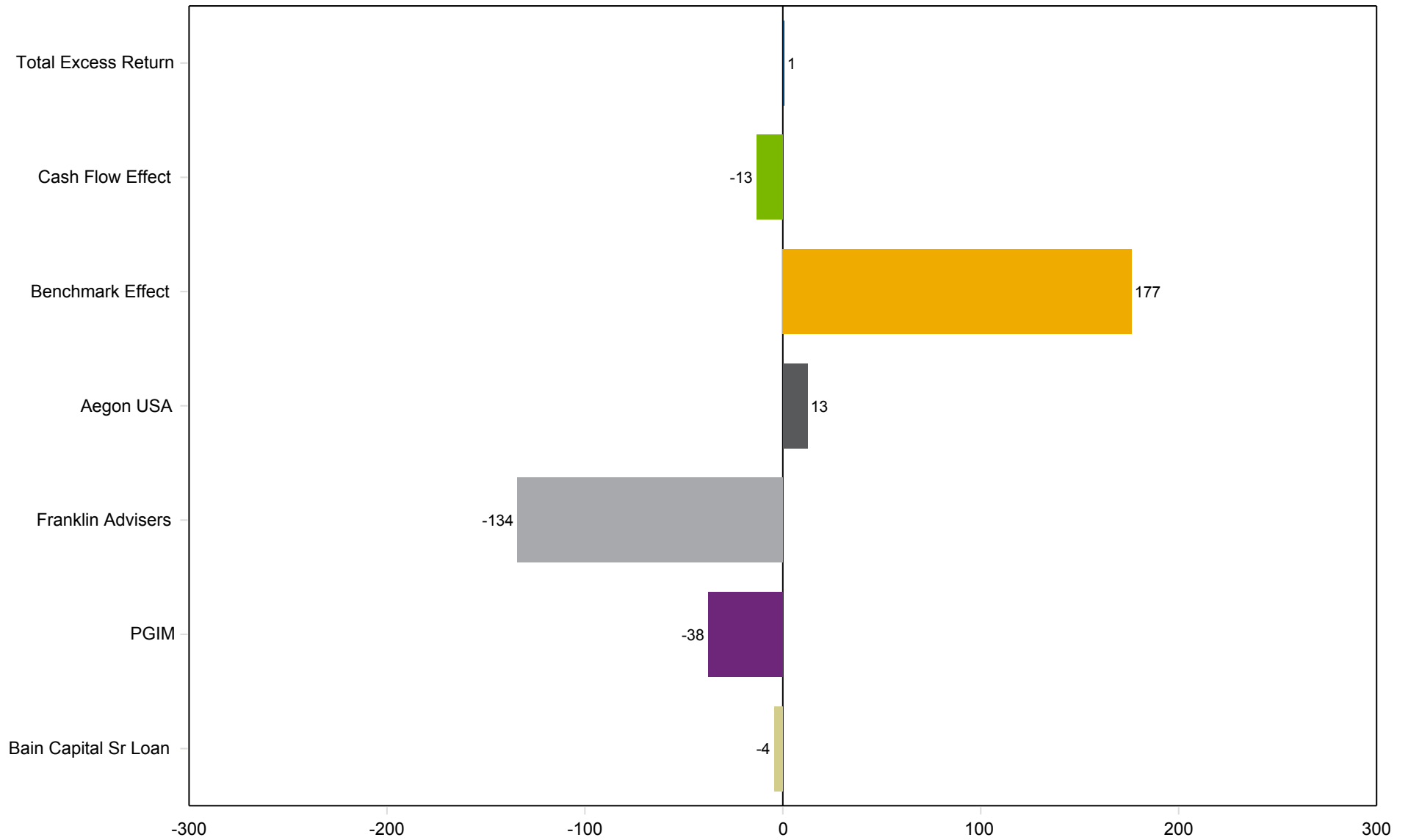
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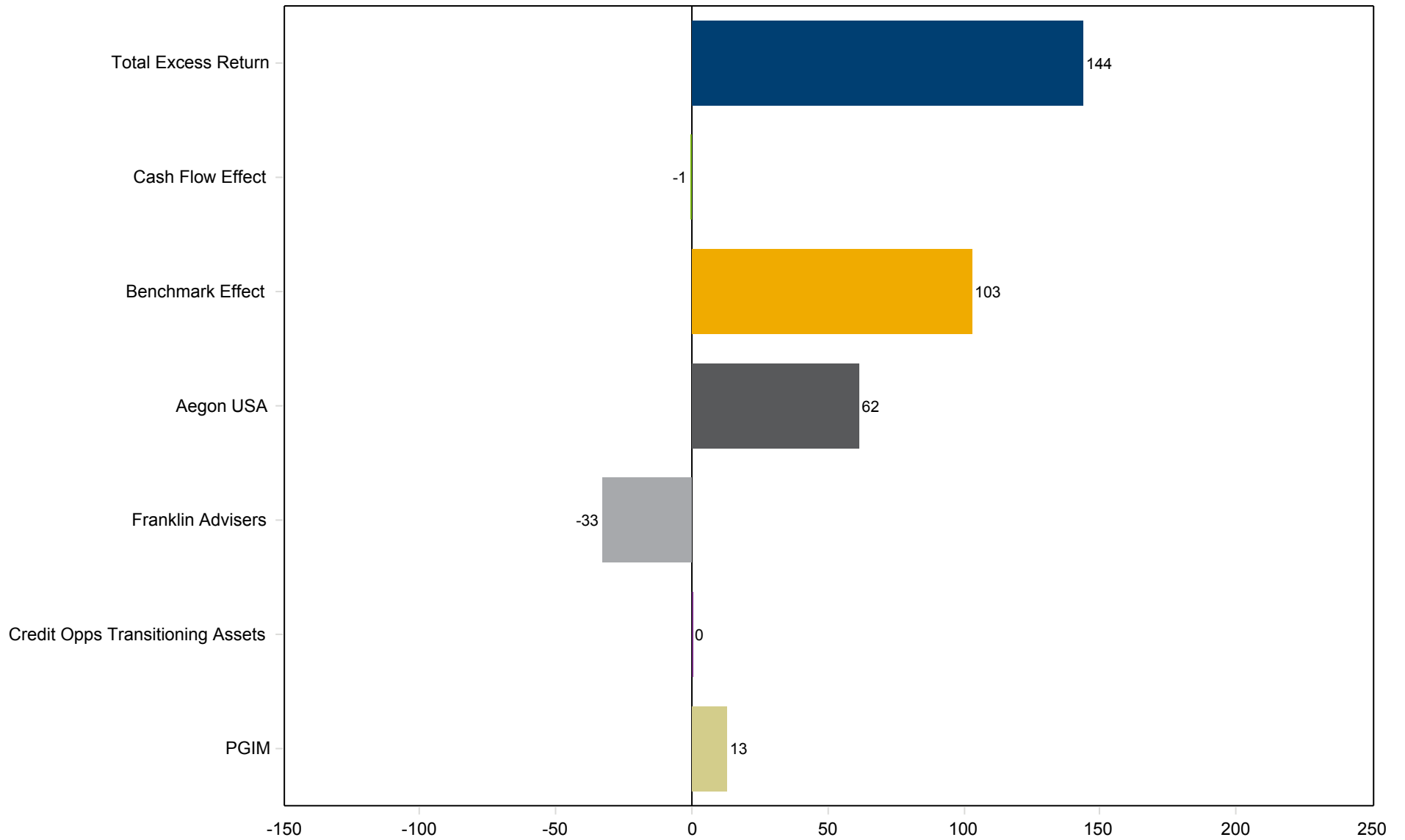
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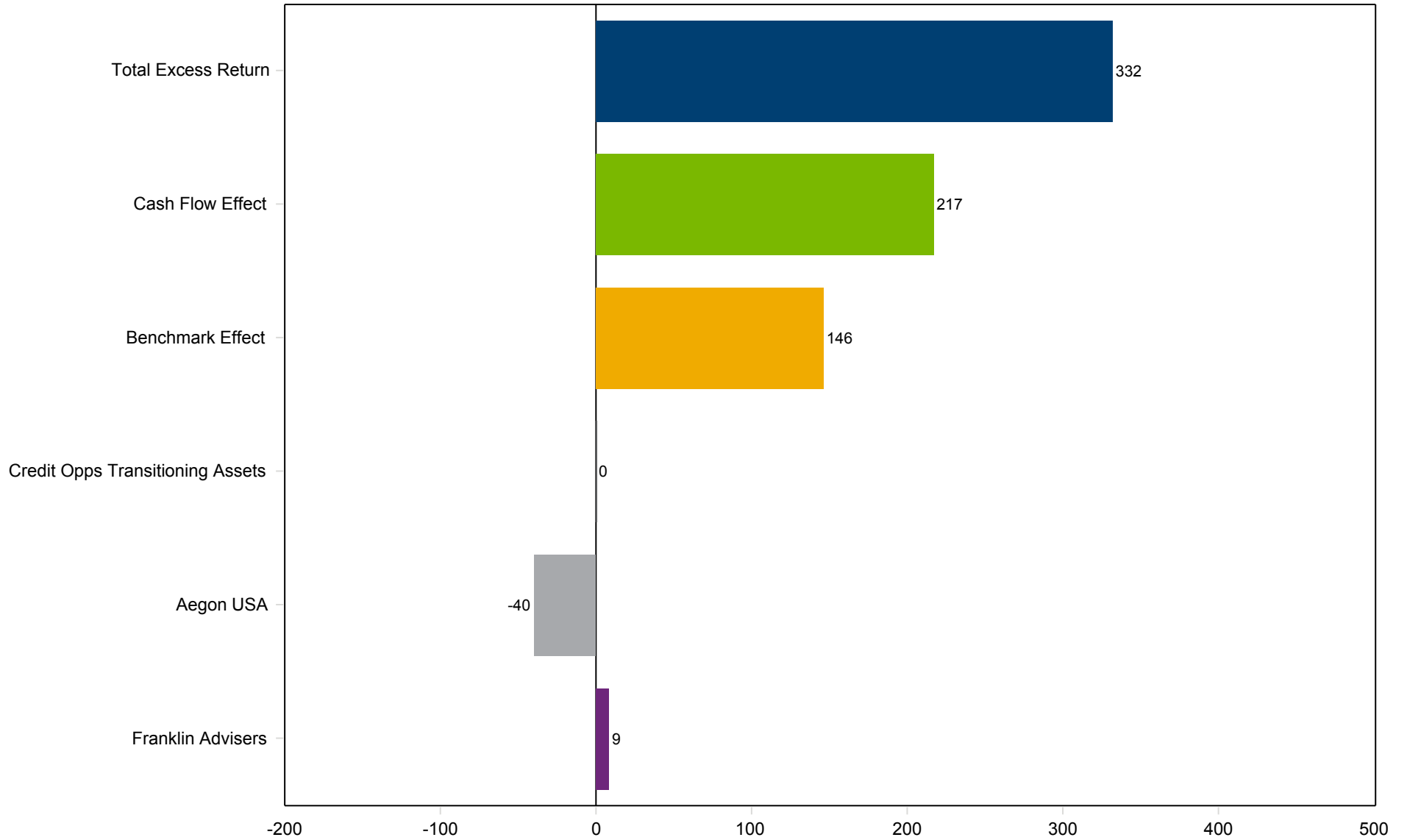
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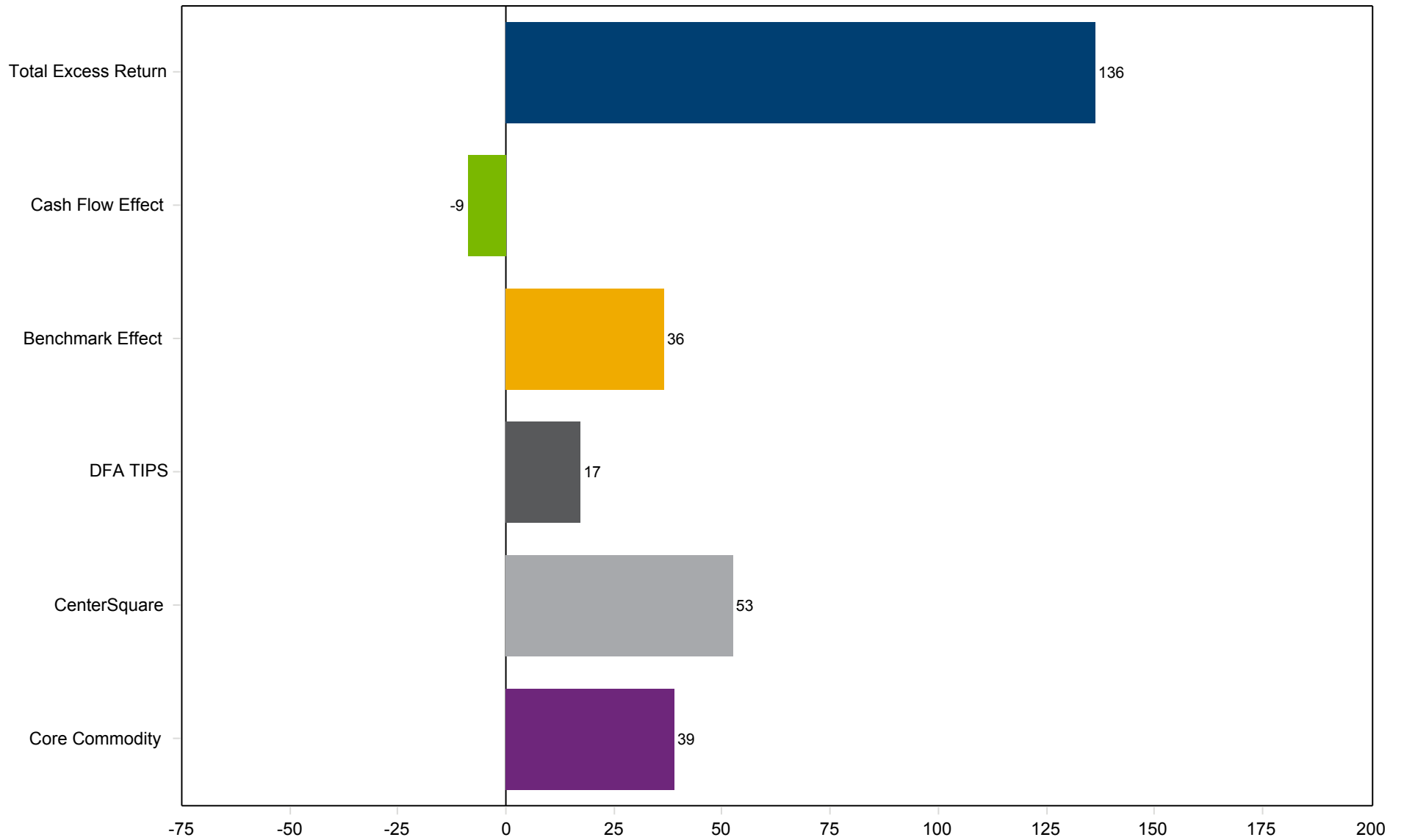
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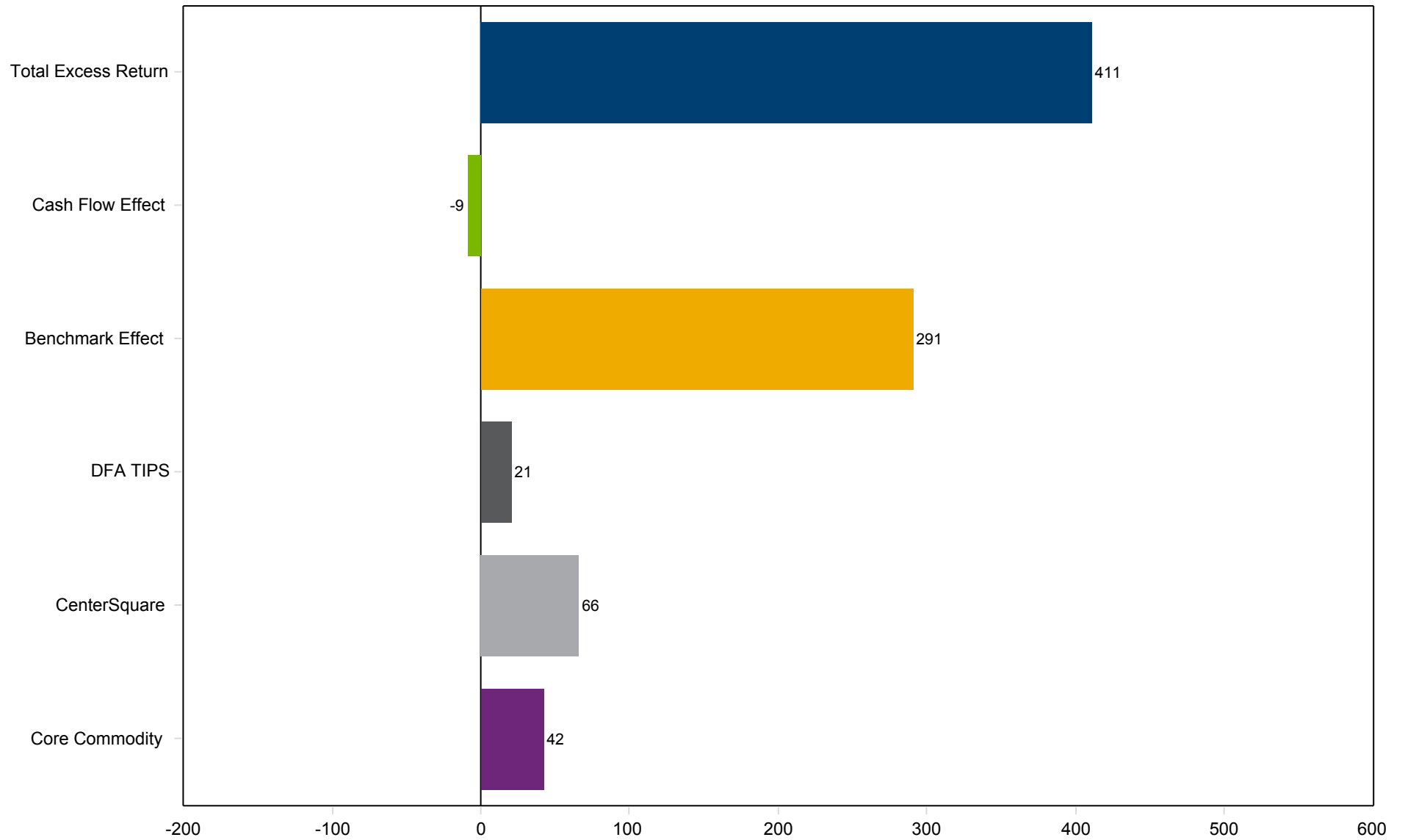
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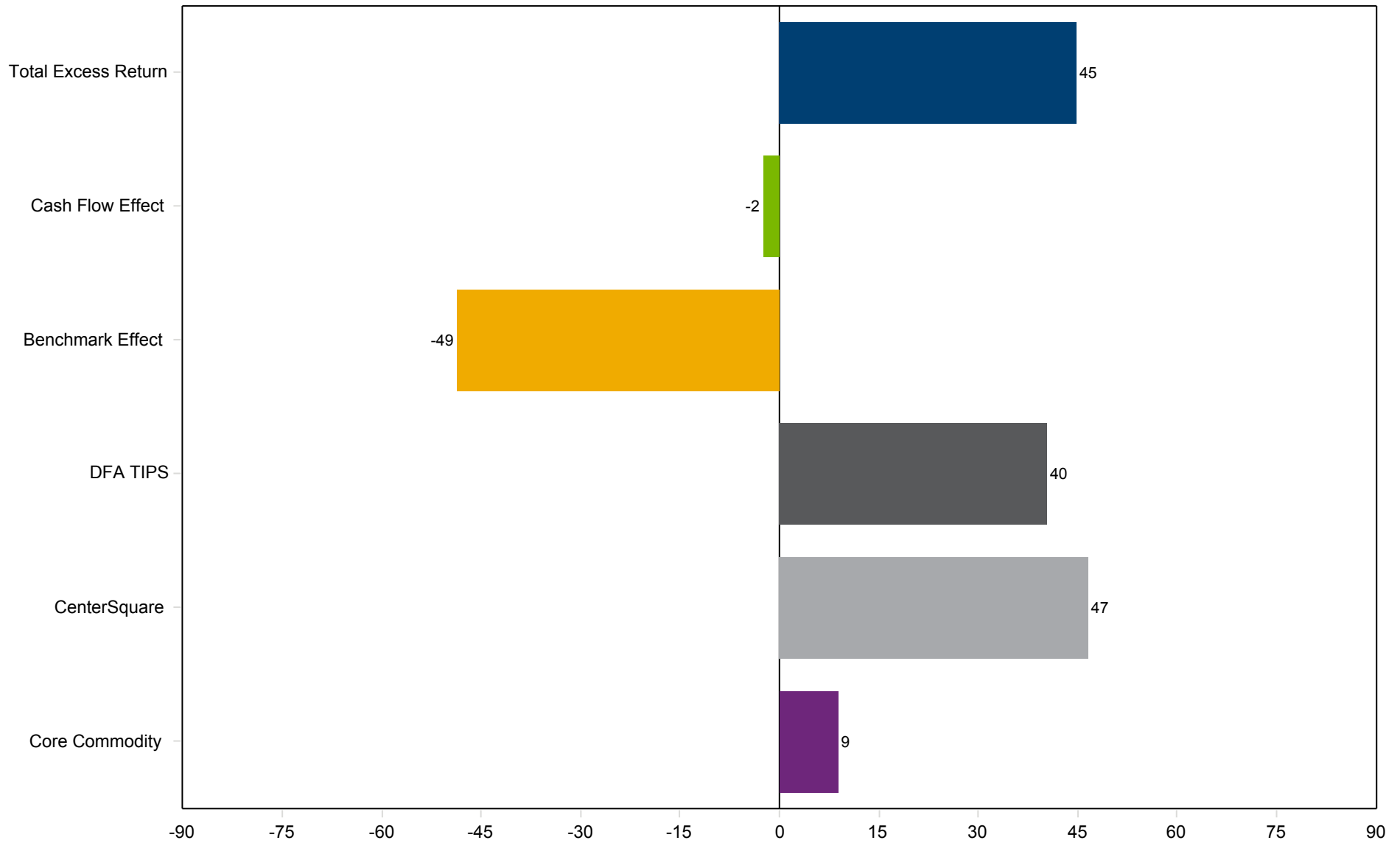
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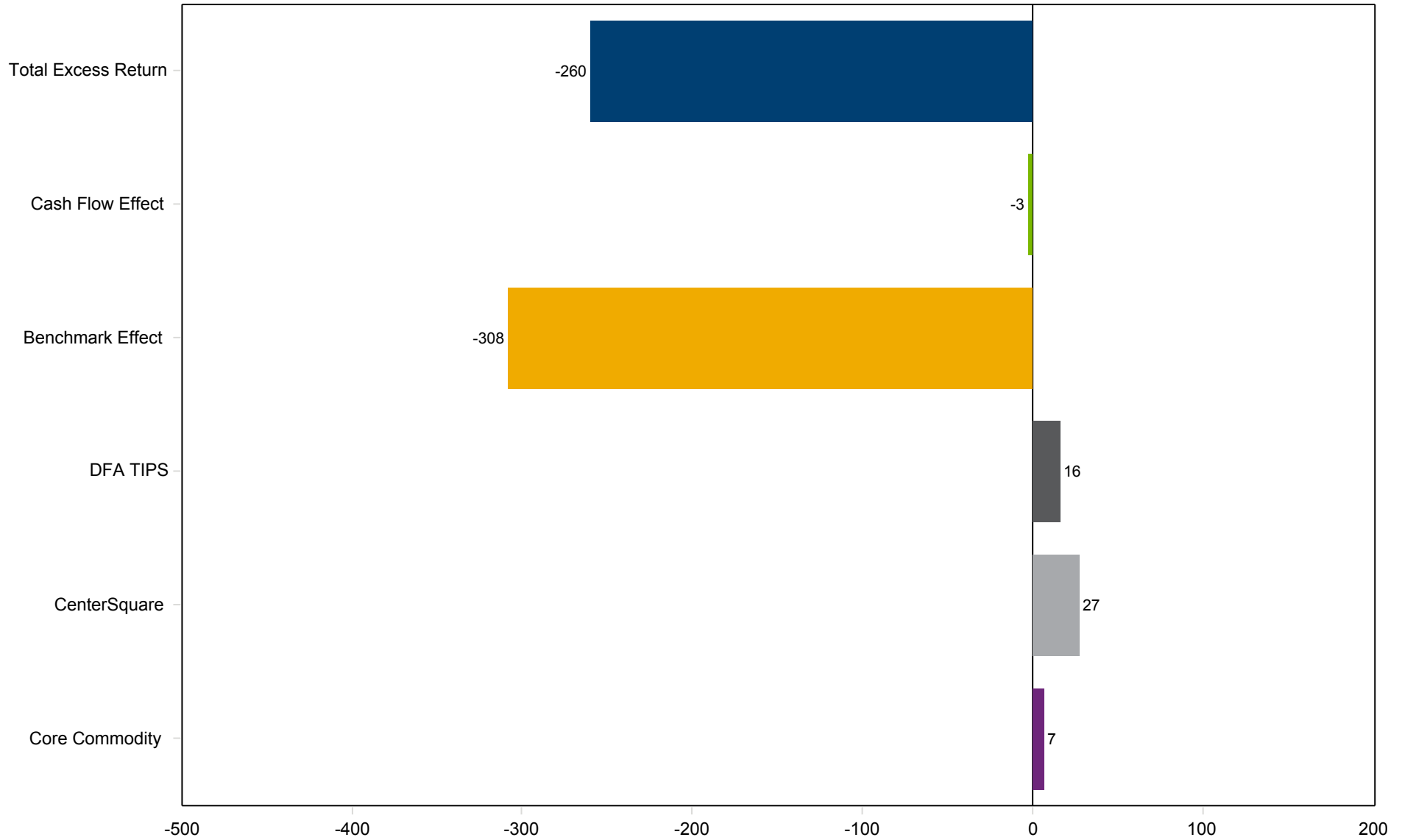
Asset Class Attribution

3 Years



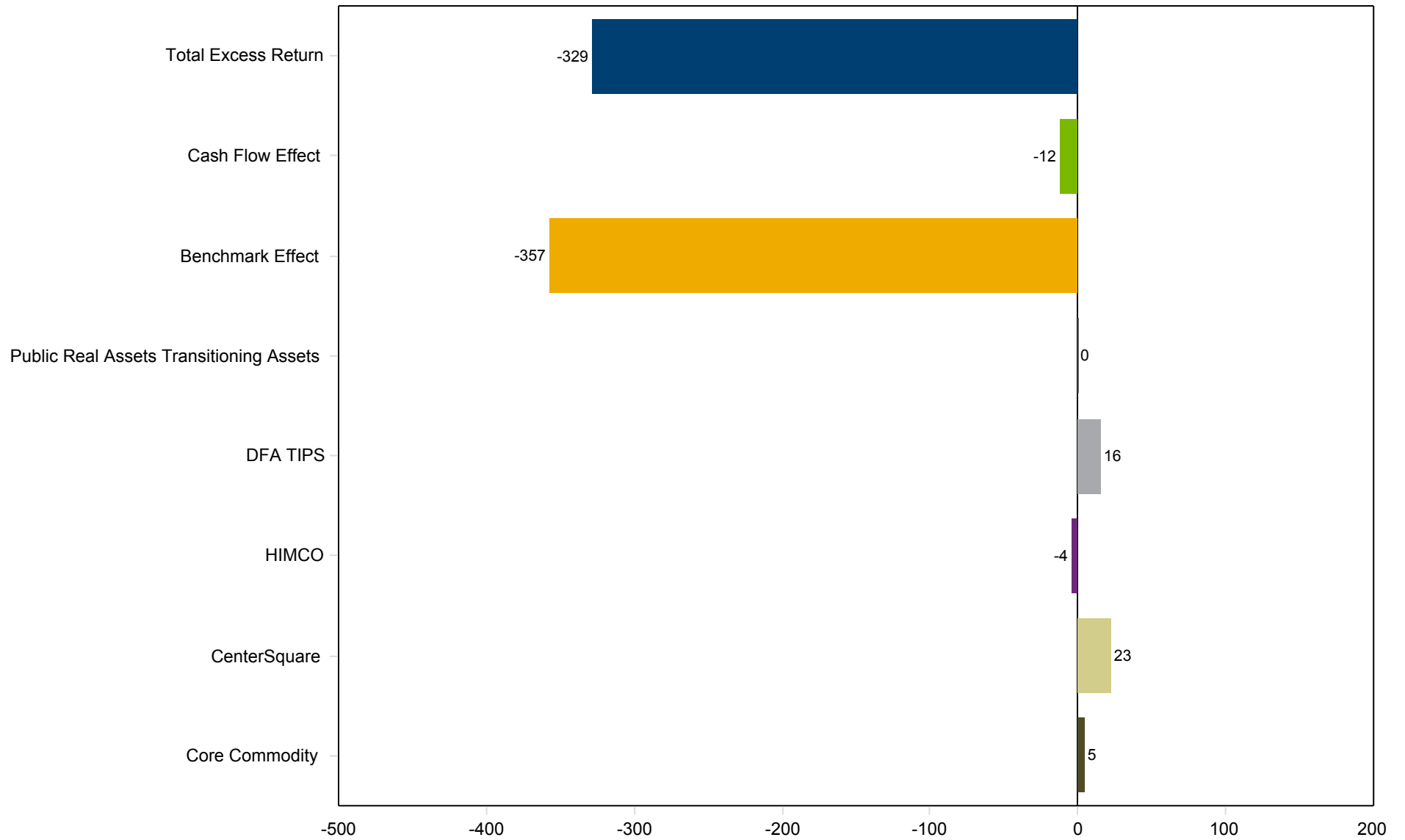
Asset Class Attribution

5 Years



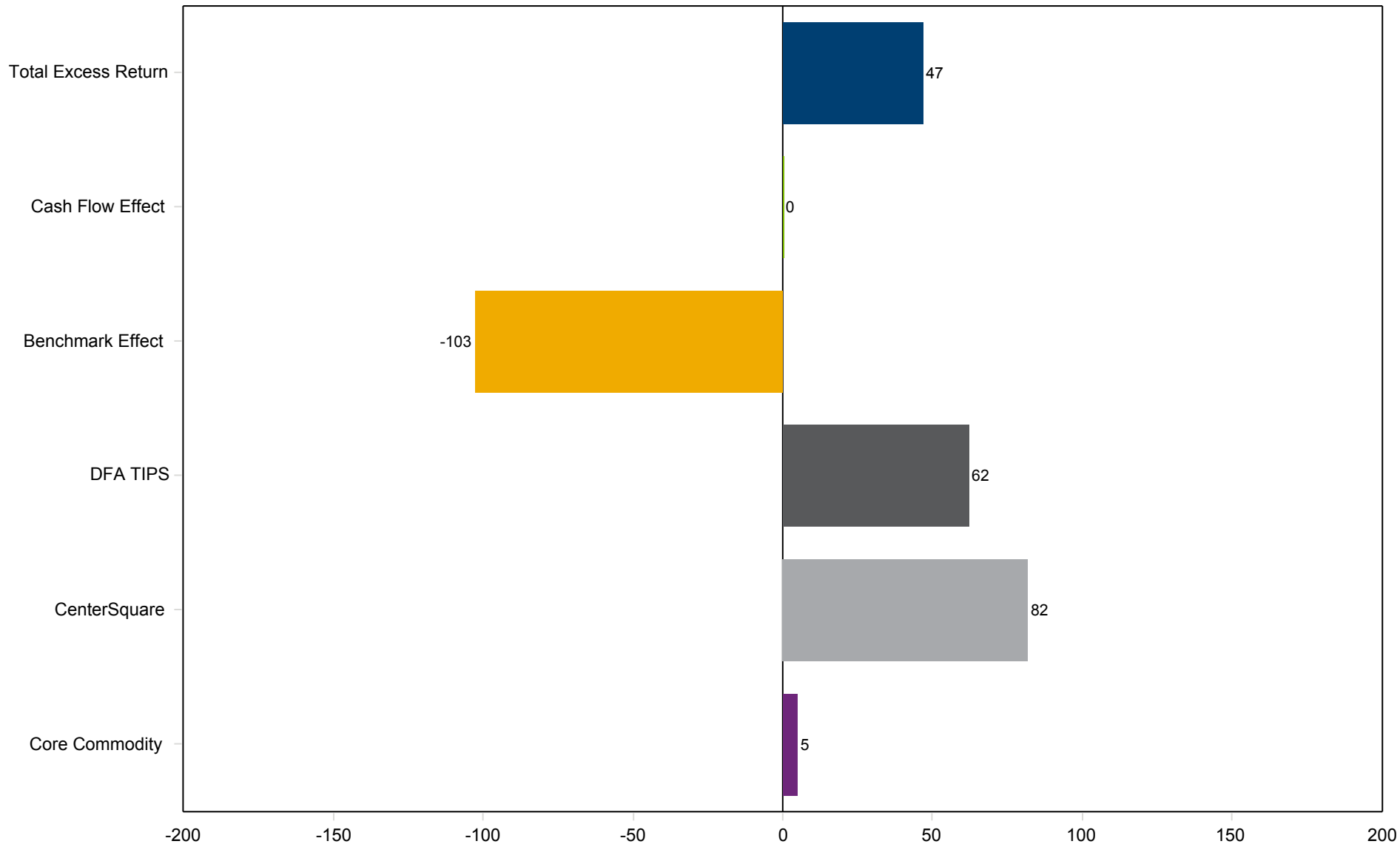
Asset Class Attribution

August 1, 2014 To September 30, 2021



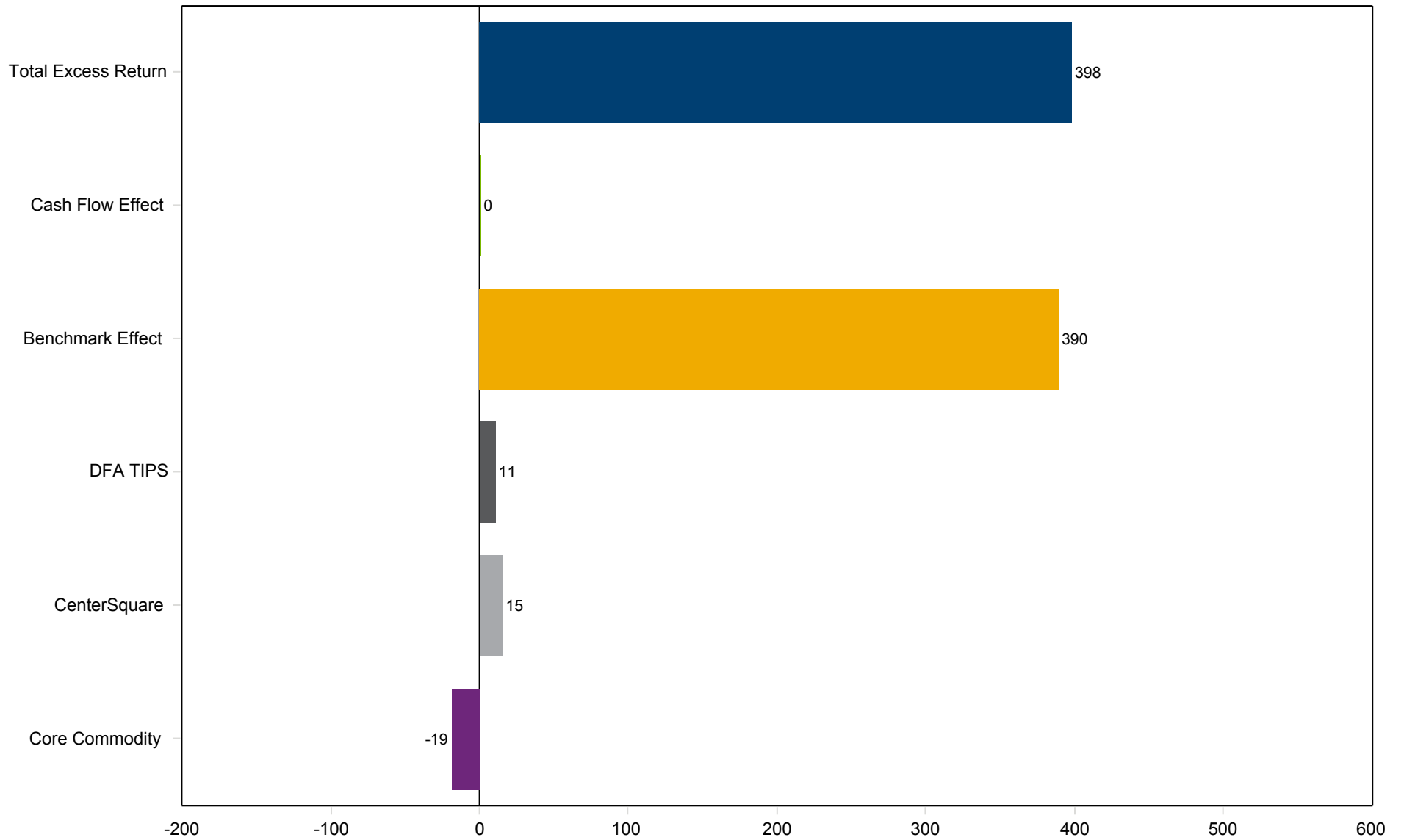
Asset Class Attribution

1 Calendar Year Before



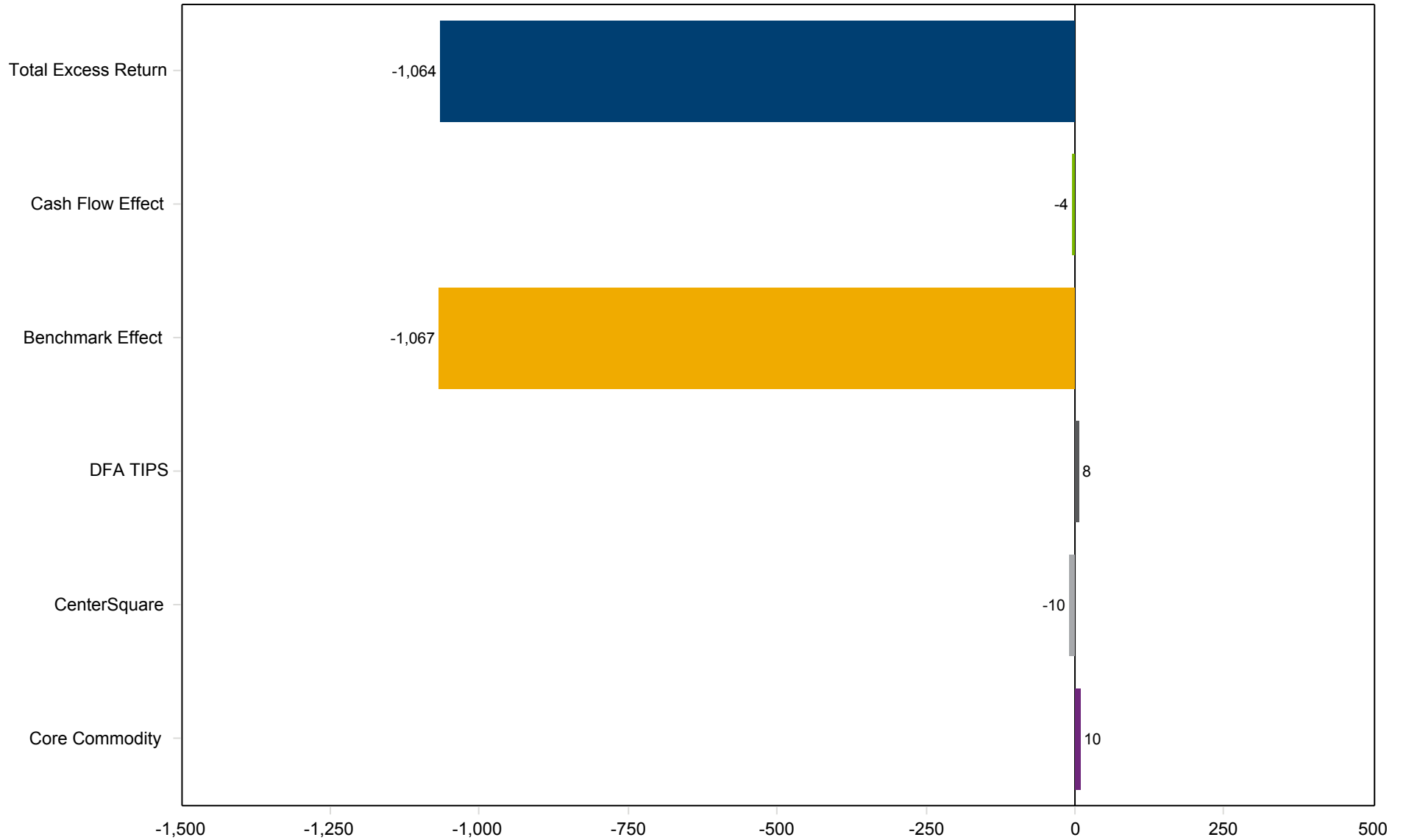
Asset Class Attribution

2 Calendar Year Before



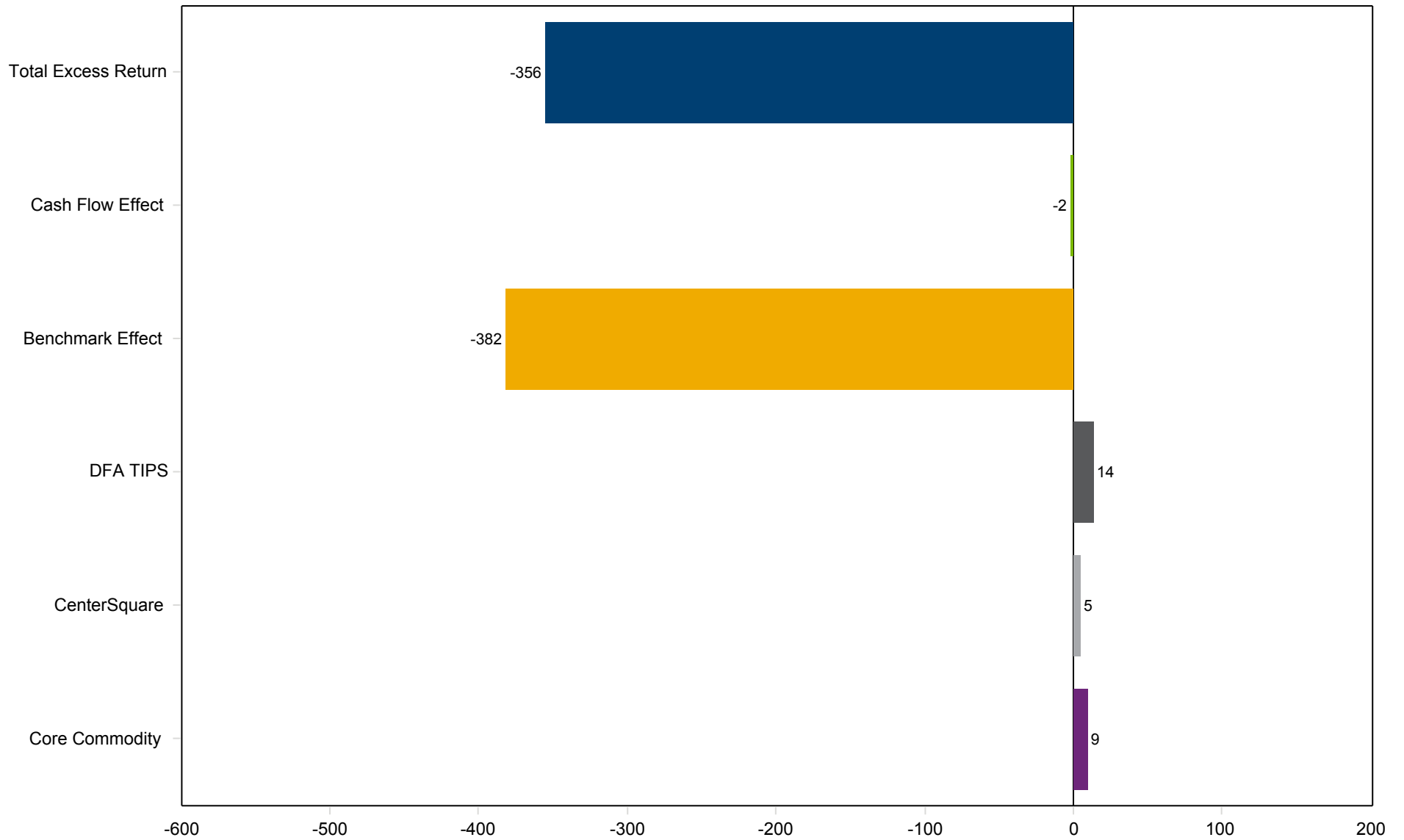
Asset Class Attribution

3 Calendar Year Before



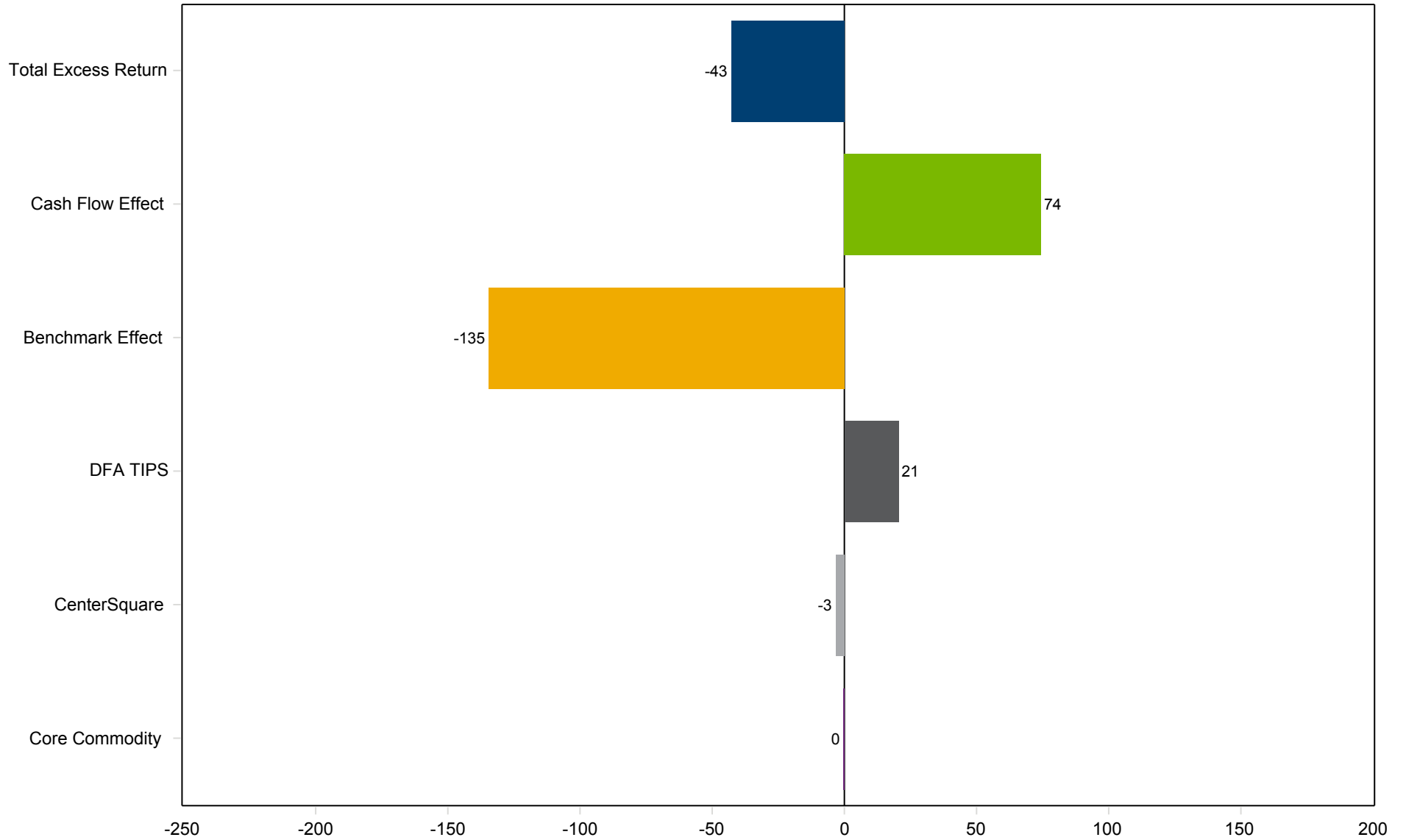
Asset Class Attribution

4 Calendar Year Before



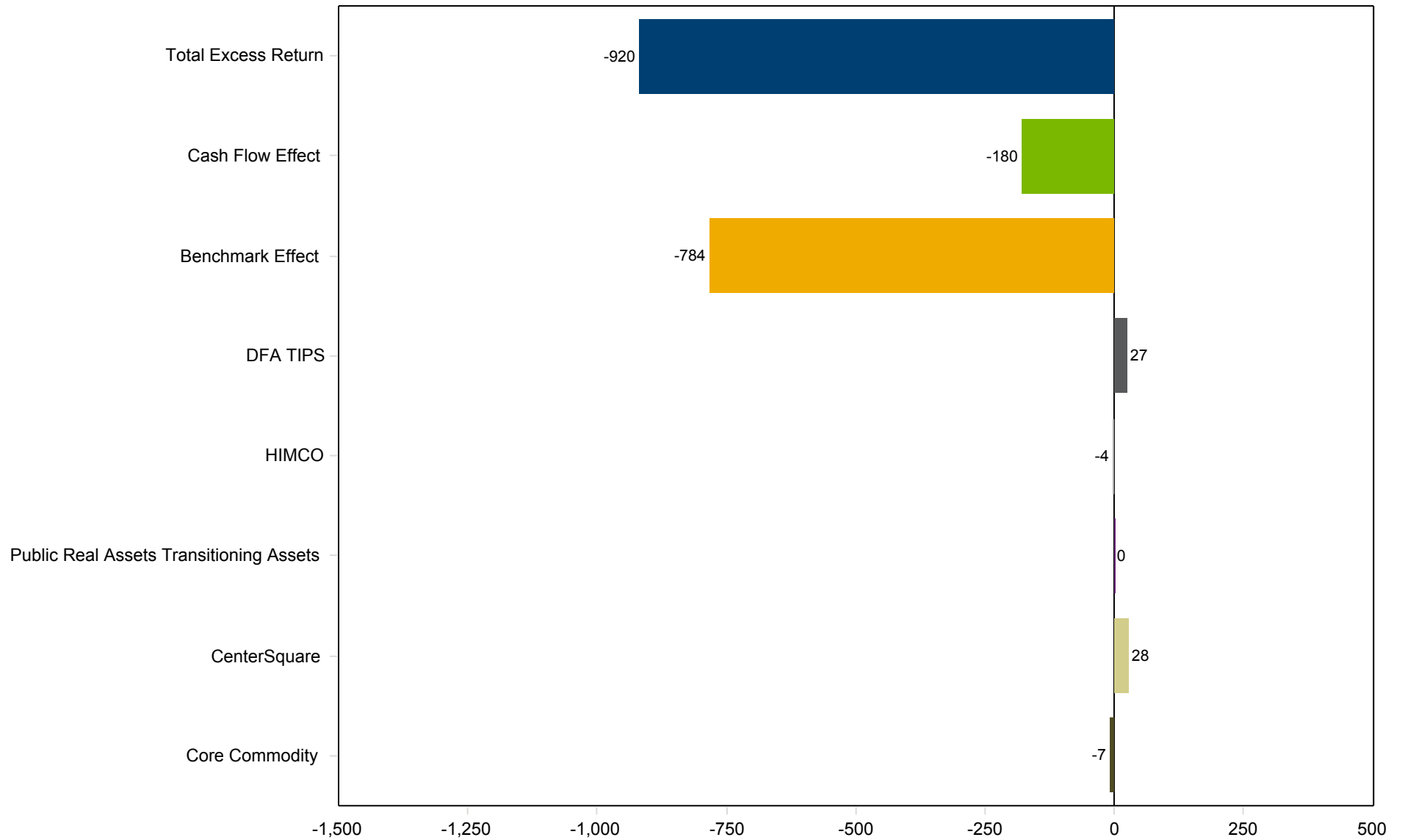
Asset Class Attribution

5 Calendar Year Before



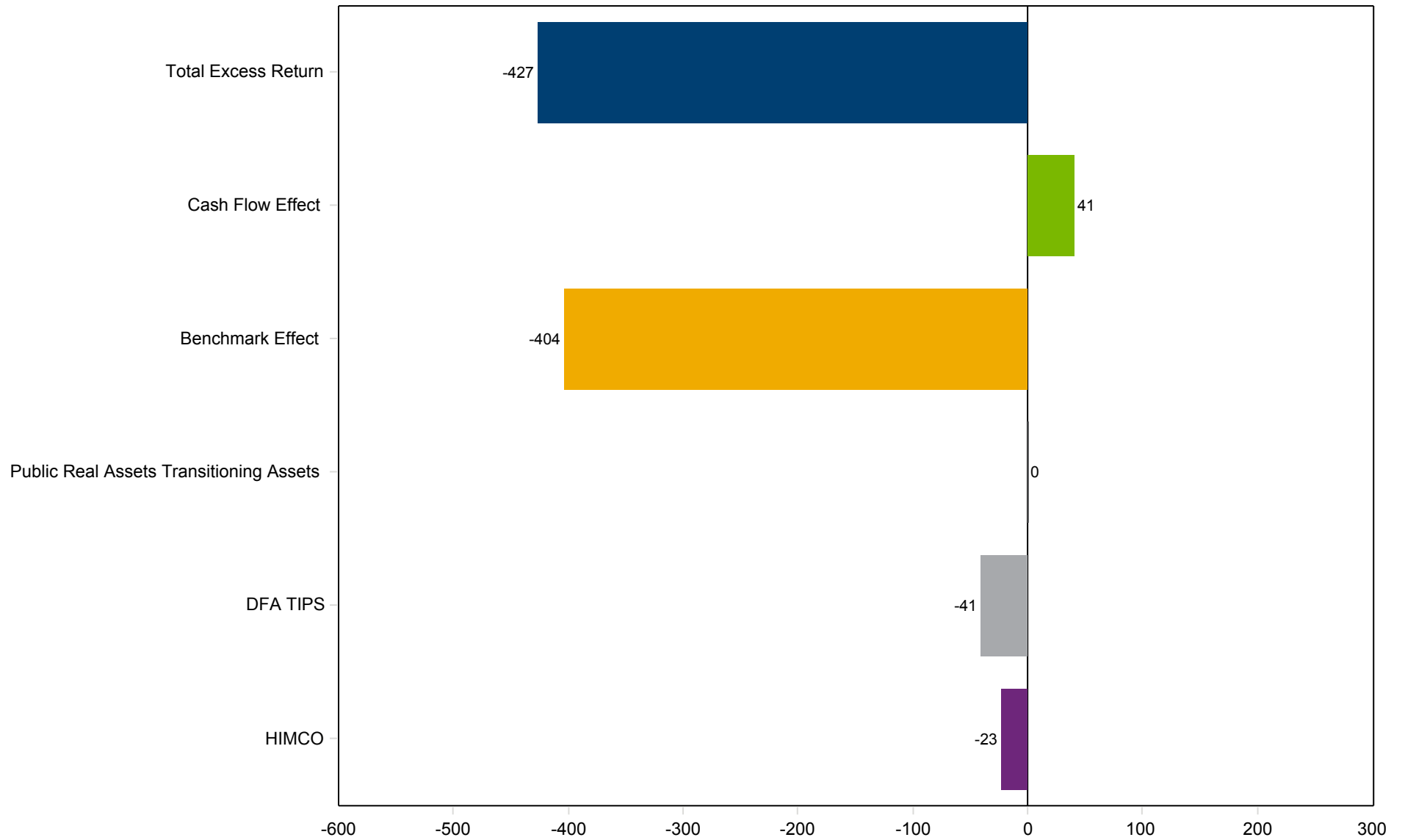
Asset Class Attribution

6 Calendar Year Before



Asset Class Attribution

August 1, 2014 To December 31, 2014

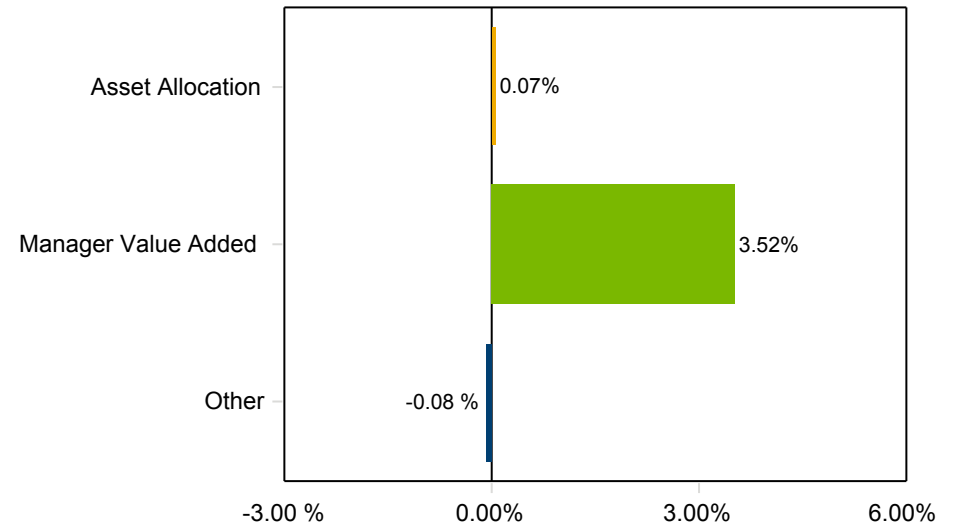
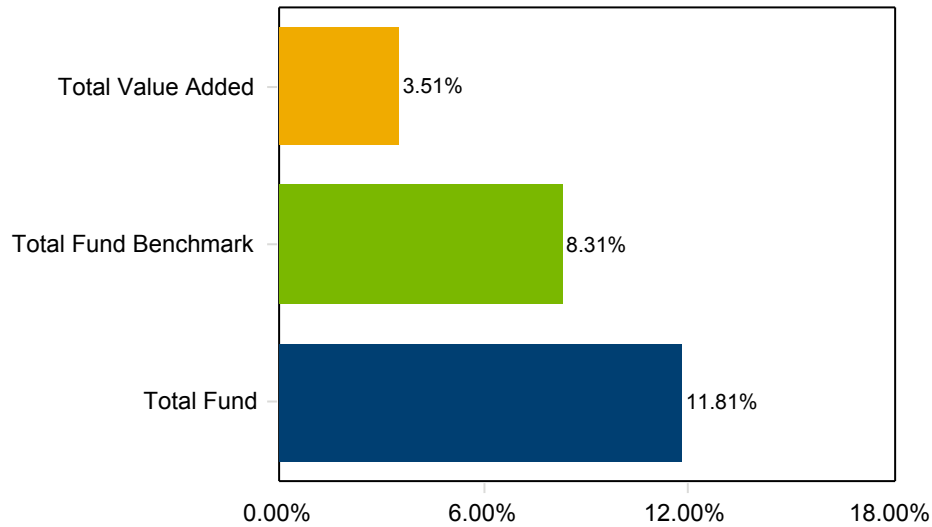


Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

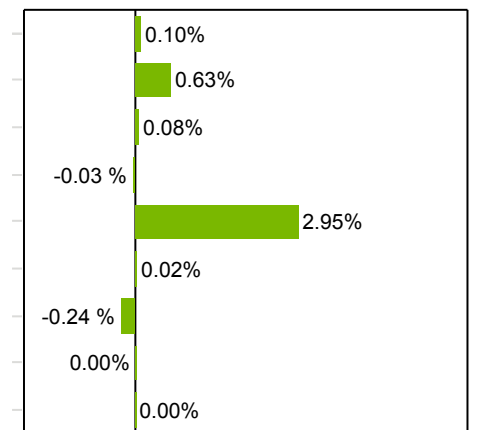
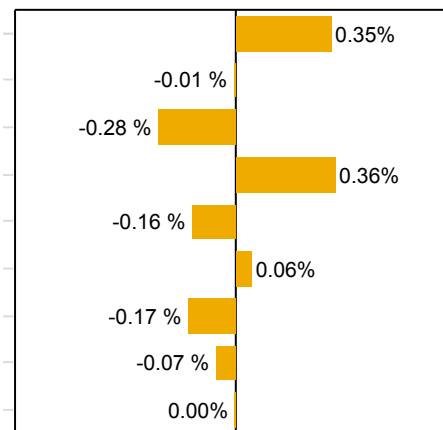
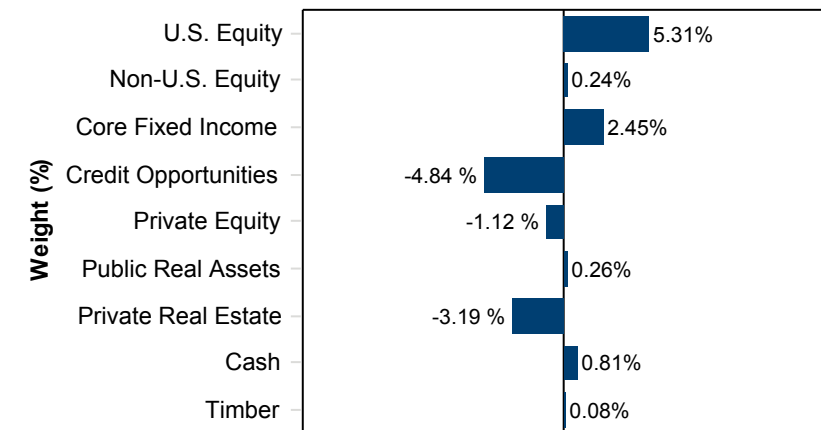
Total Fund Performance

Total Value Added: 3.51%



Total Asset Allocation: 0.07%

Total Manager Value Added: 3.52%



Average Active Weight

Asset Allocation Value Added

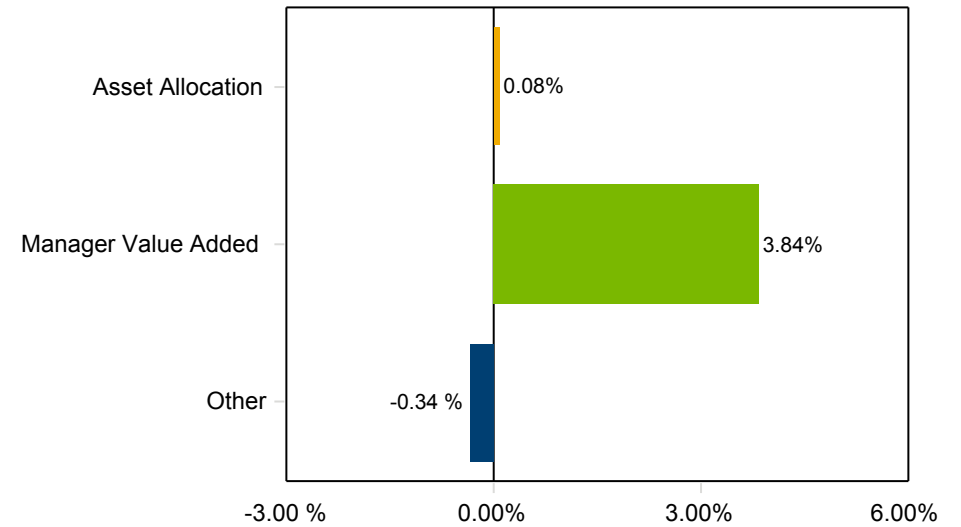
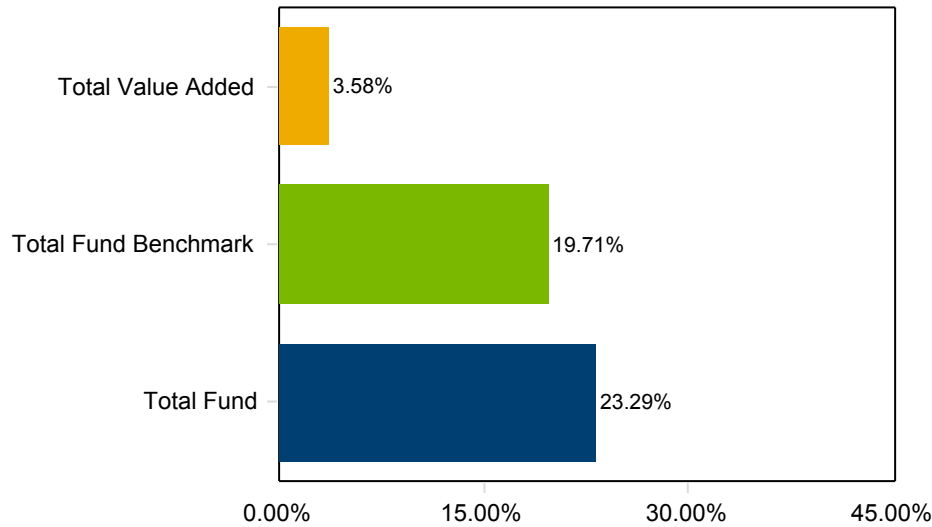
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

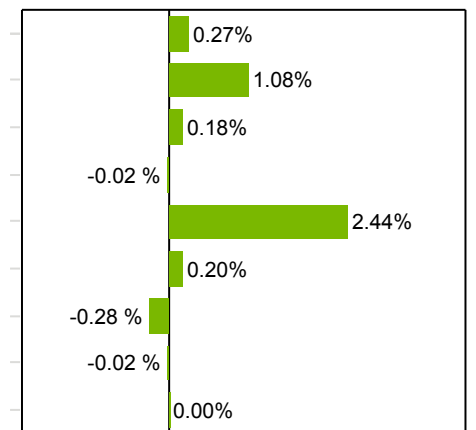
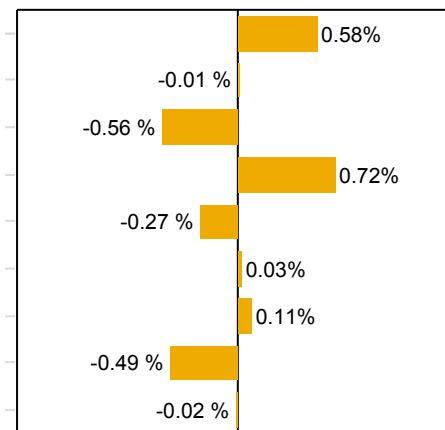
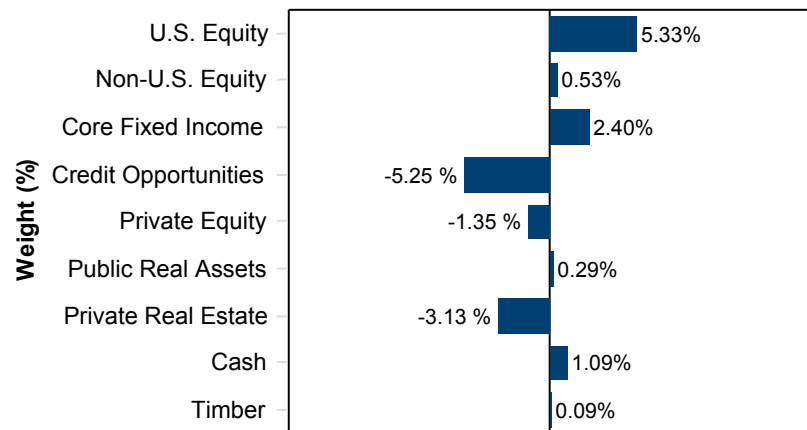
Total Fund Performance

Total Value Added: 3.58%



Total Asset Allocation: 0.08%

Total Manager Value Added: 3.84%



■ Average Active Weight

■ Asset Allocation Value Added

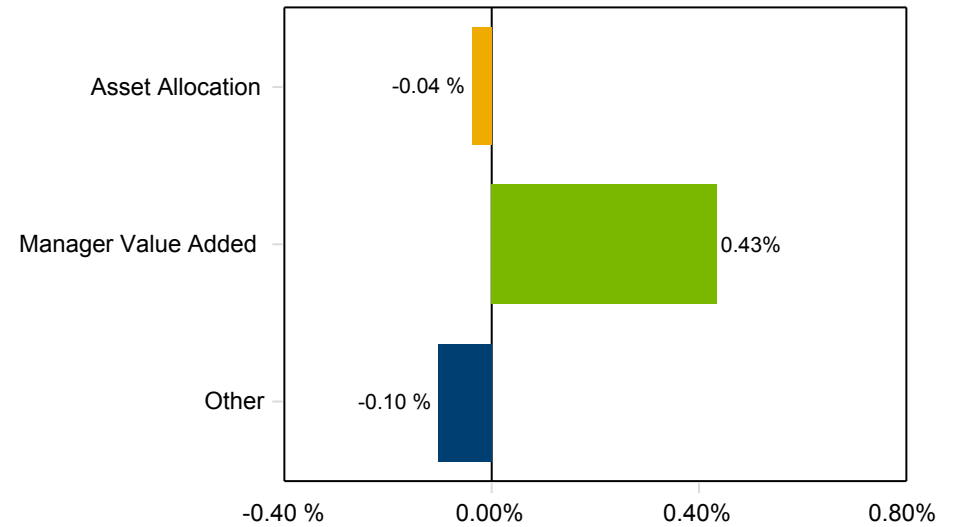
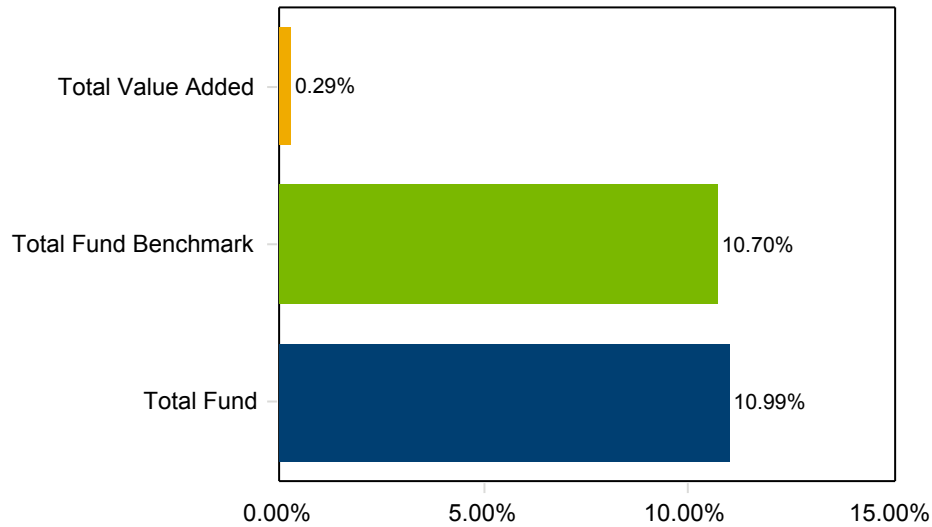
■ Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

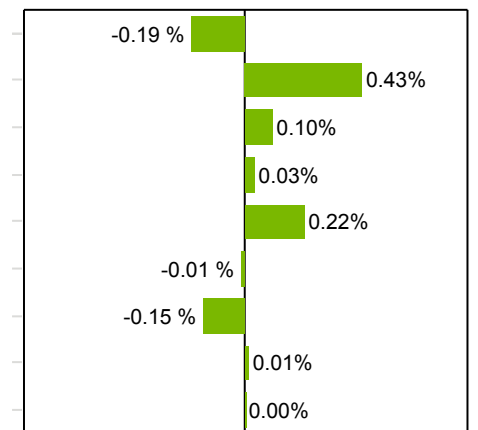
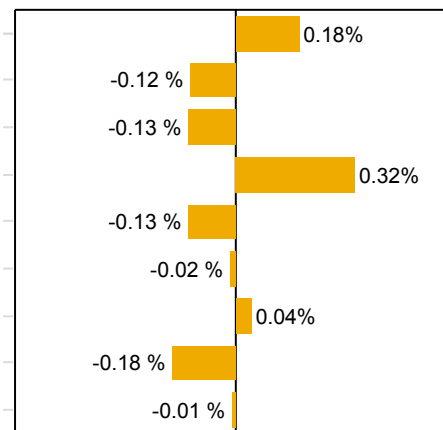
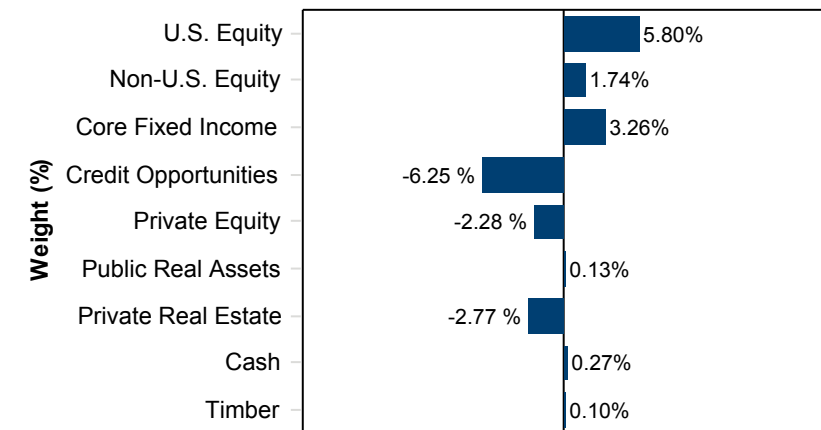
Total Fund Performance

Total Value Added: 0.29%



Total Asset Allocation: -0.04%

Total Manager Value Added: 0.43%



■ Average Active Weight

■ Asset Allocation Value Added

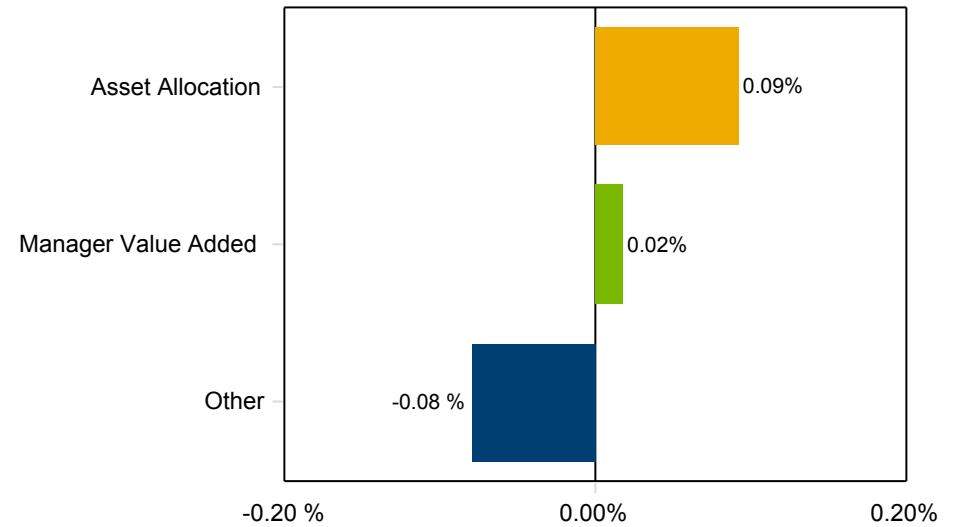
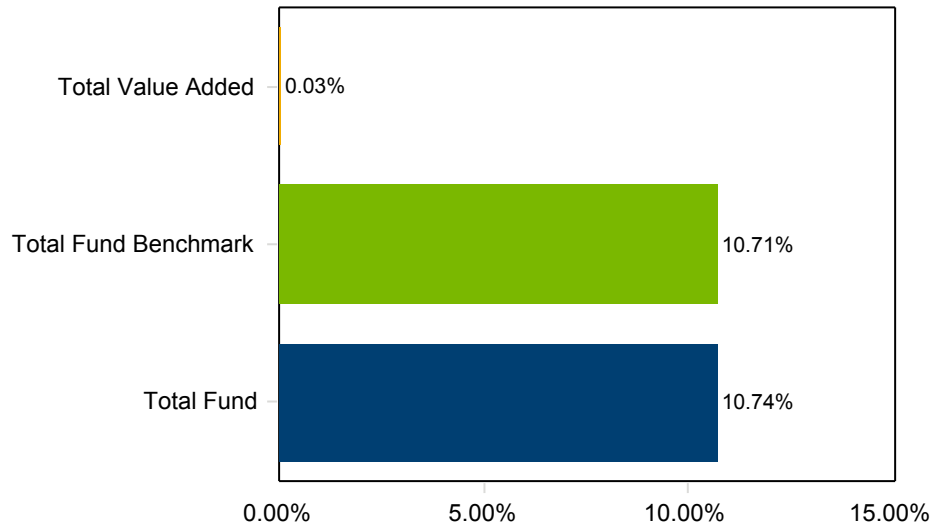
■ Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

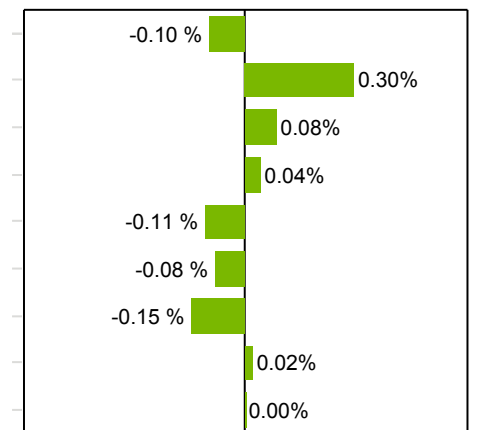
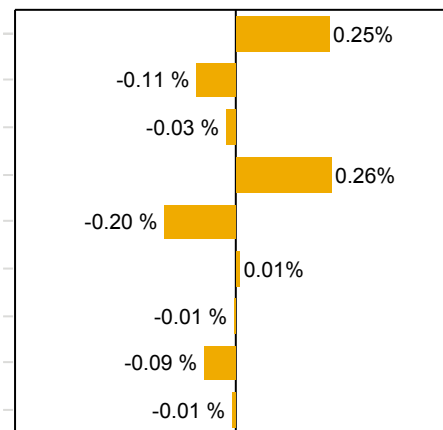
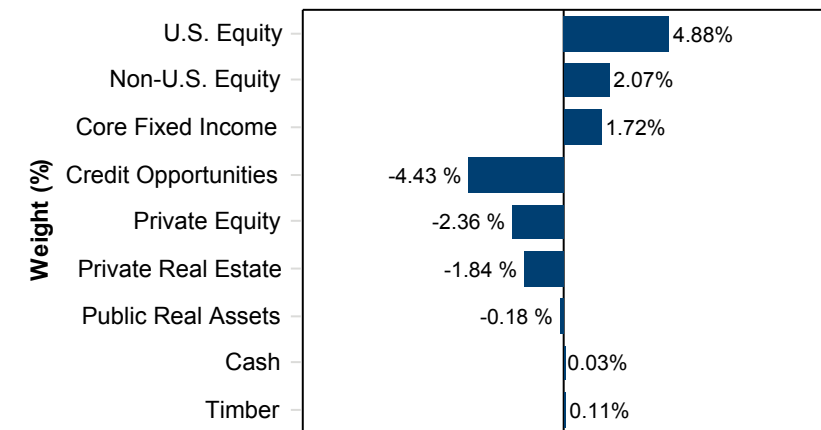
Total Fund Performance

Total Value Added:0.03%



Total Asset Allocation:0.09%

Total Manager Value Added:0.02%



Average Active Weight

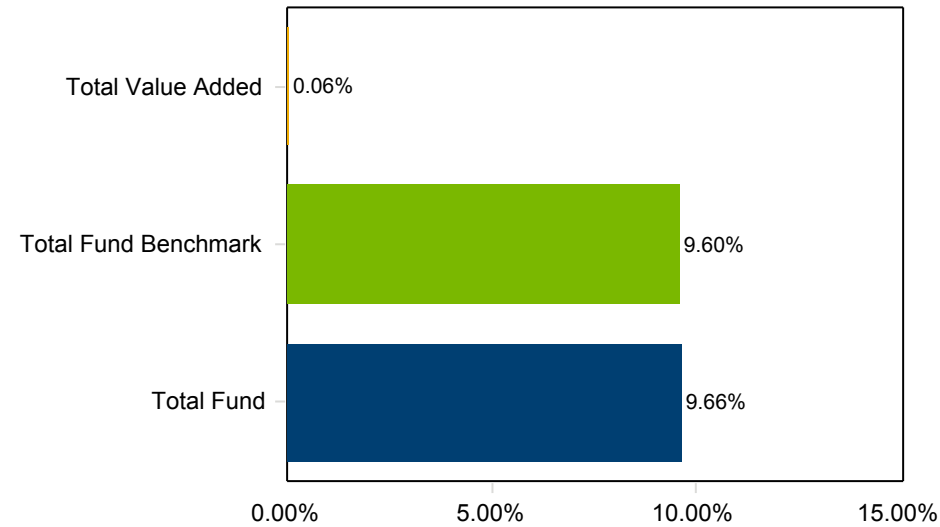
Asset Allocation Value Added

Manager Value Added

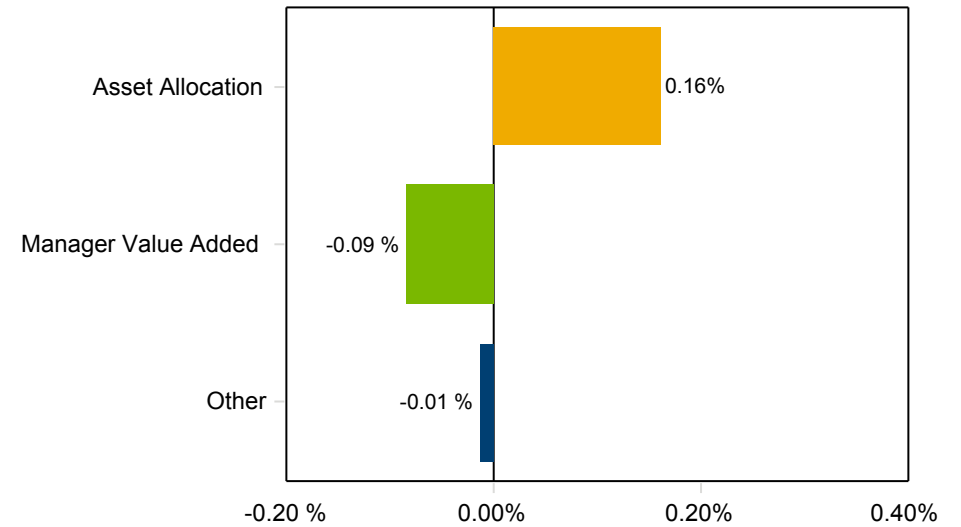
Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

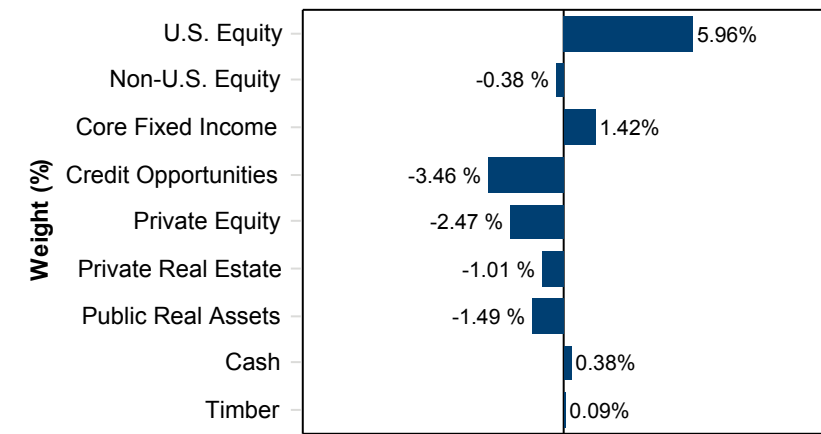
Total Fund Performance



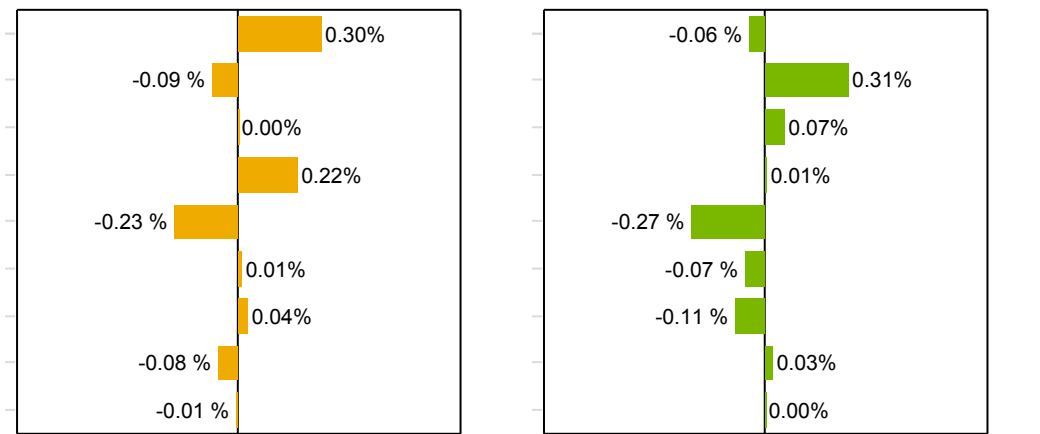
Total Value Added:0.06%



Total Asset Allocation:0.16%



Total Manager Value Added:-0.09%



Average Active Weight

Asset Allocation Value Added

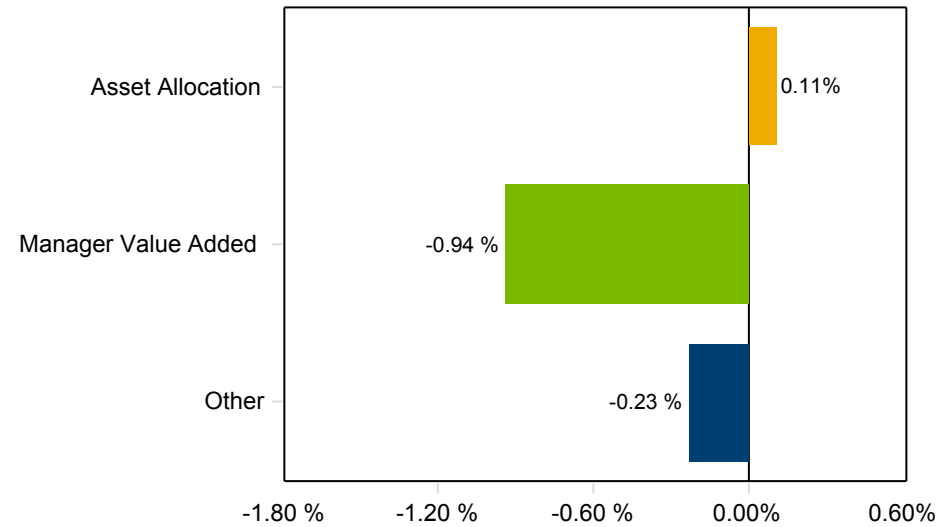
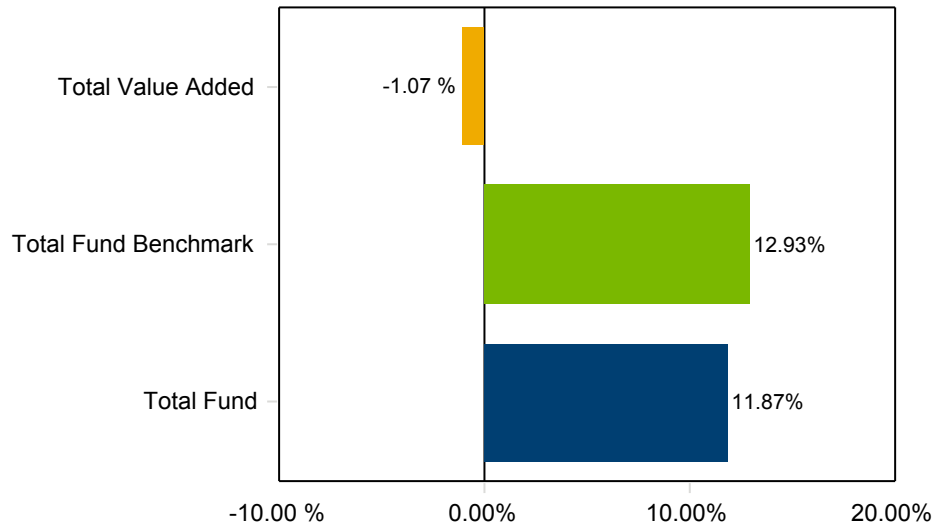
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

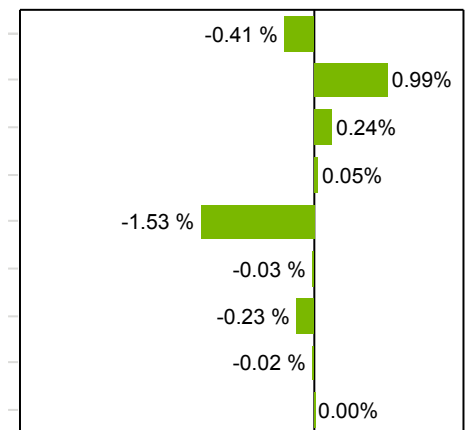
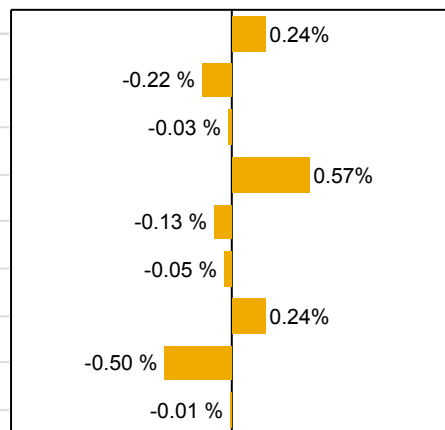
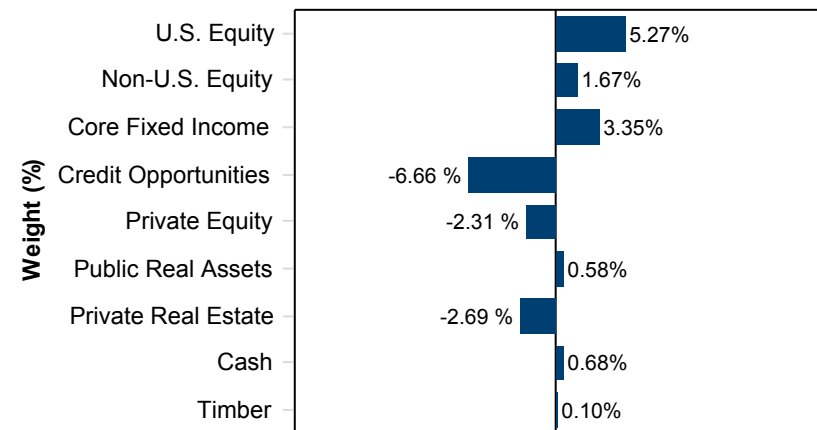
Total Fund Performance

Total Value Added:-1.07 %



Total Asset Allocation:0.11%

Total Manager Value Added:-0.94 %



Average Active Weight

Asset Allocation Value Added

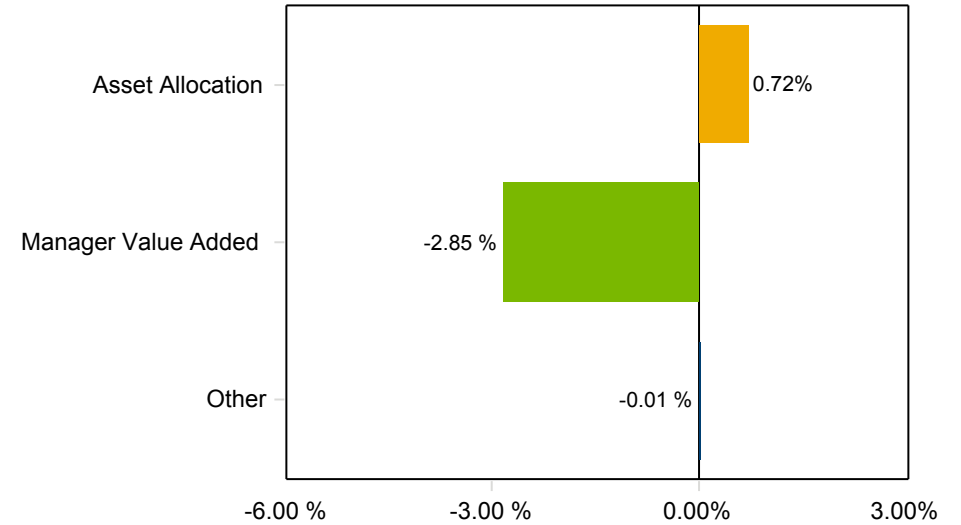
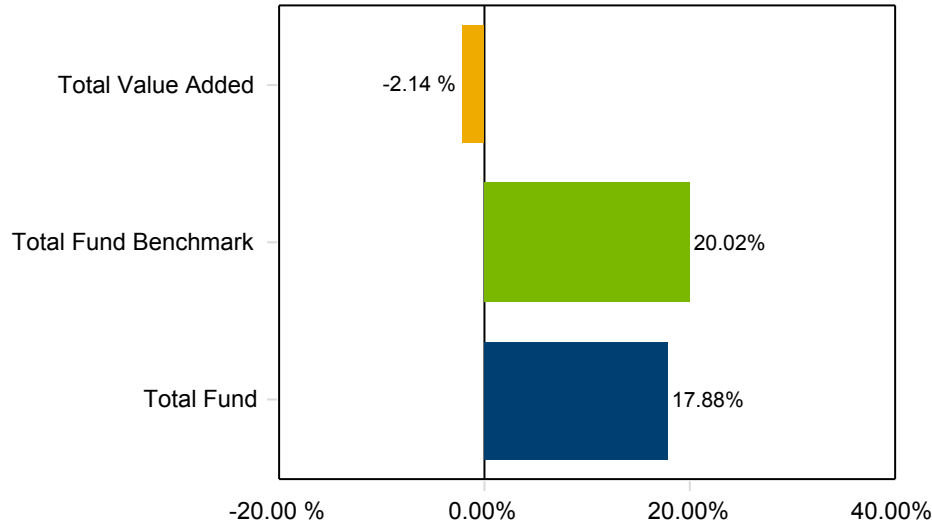
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

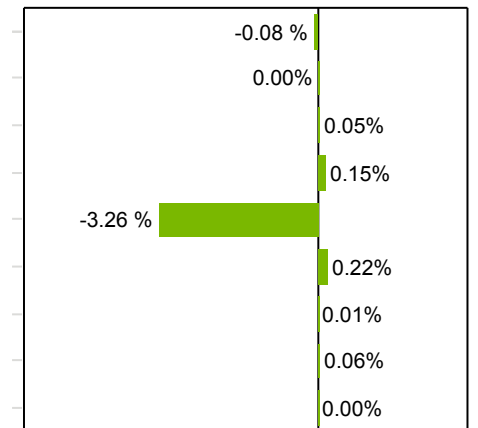
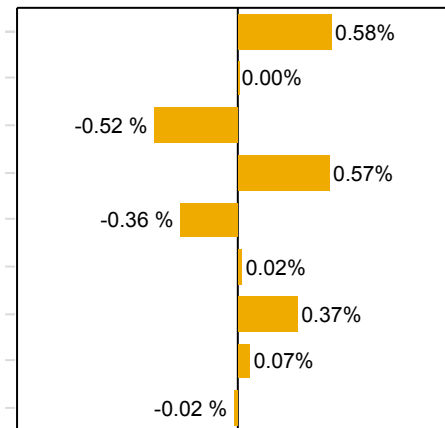
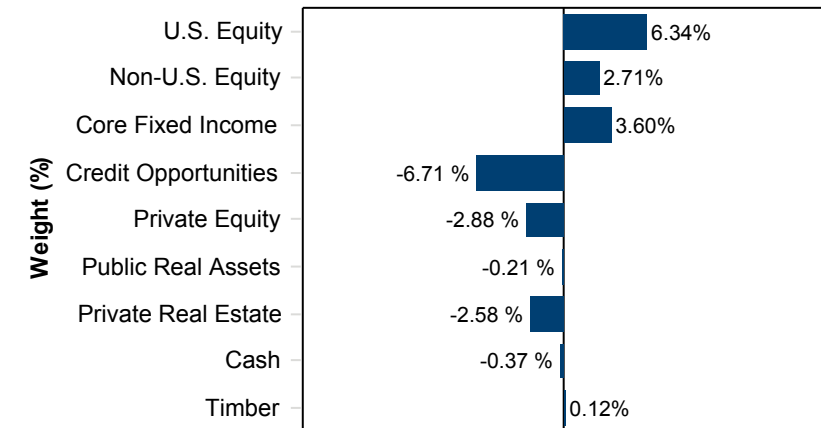
Total Fund Performance

Total Value Added: -2.14 %



Total Asset Allocation: 0.72%

Total Manager Value Added: -2.85 %



Average Active Weight

Asset Allocation Value Added

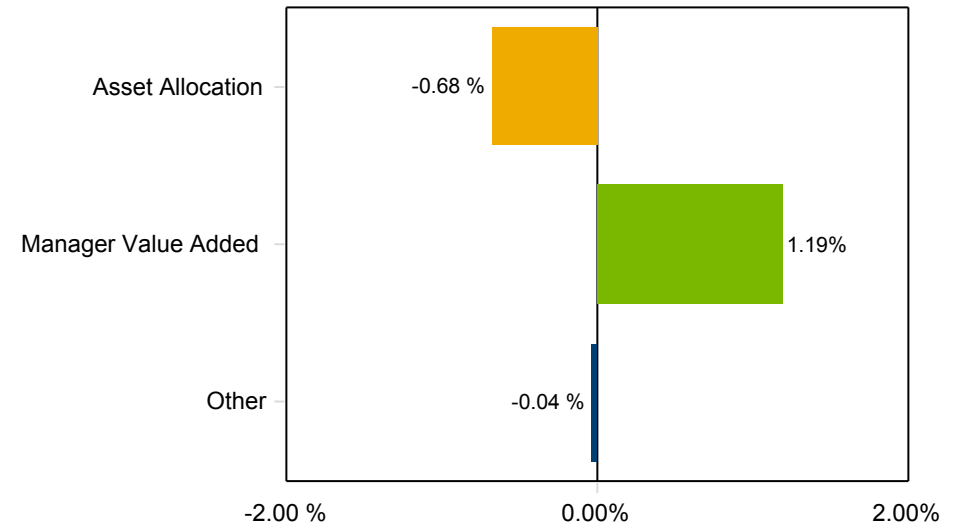
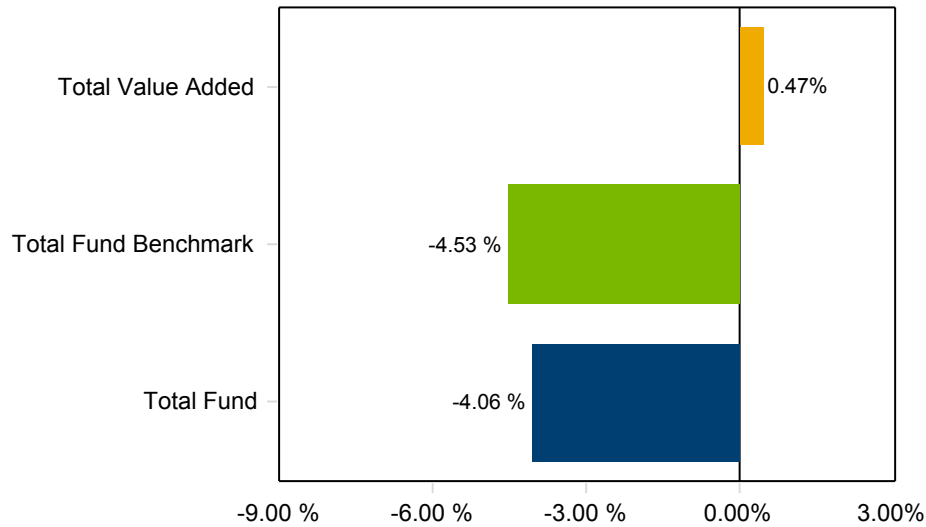
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

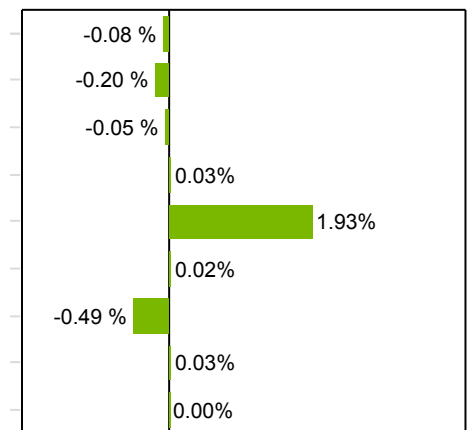
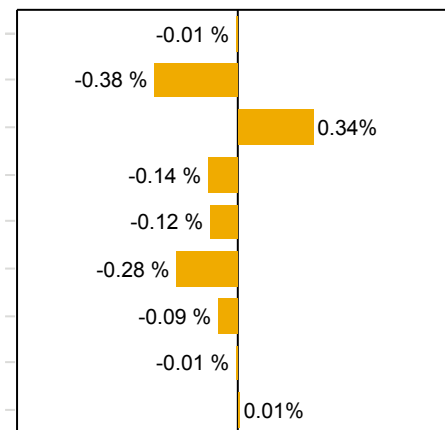
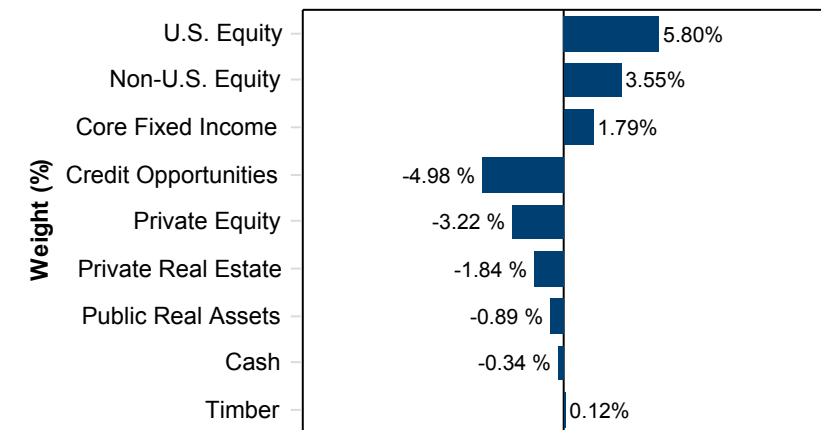
Total Fund Performance

Total Value Added: 0.47%



Total Asset Allocation: -0.68%

Total Manager Value Added: 1.19%



■ Average Active Weight

■ Asset Allocation Value Added

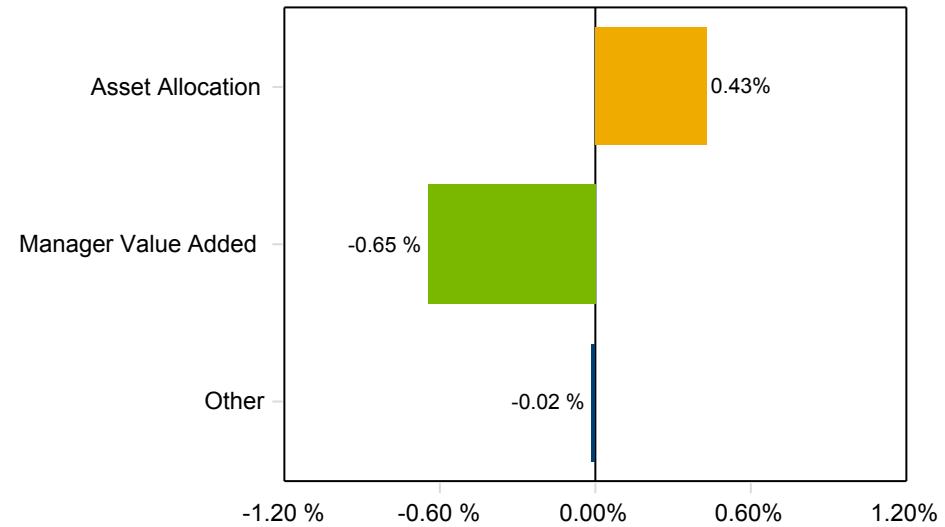
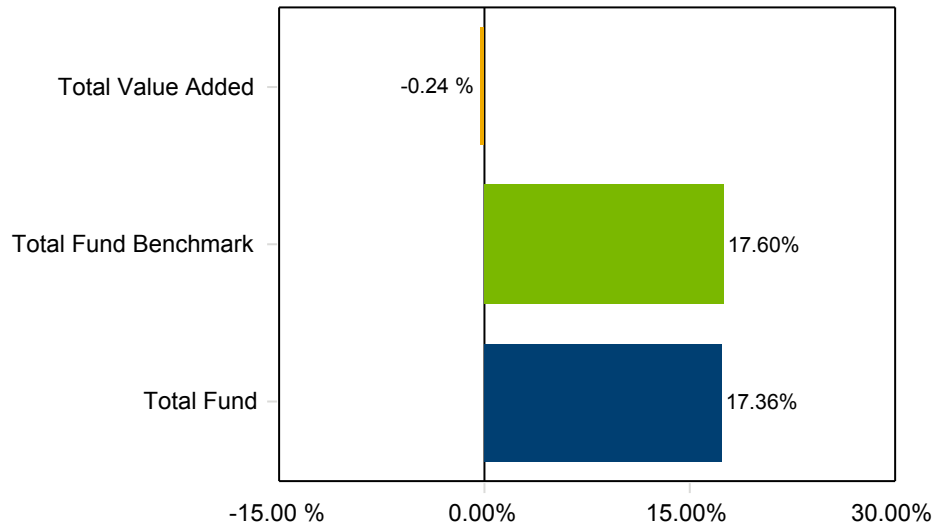
■ Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

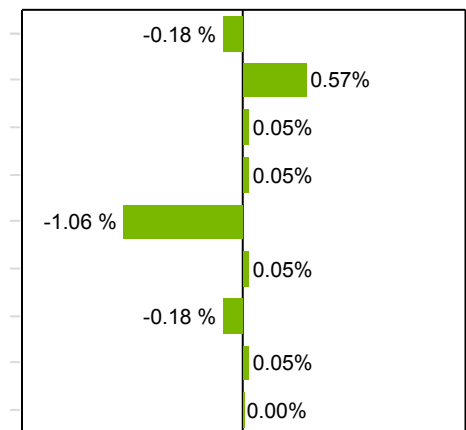
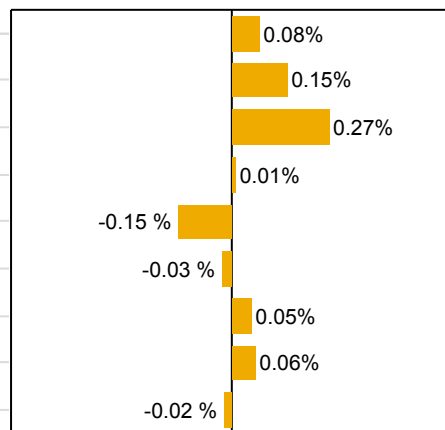
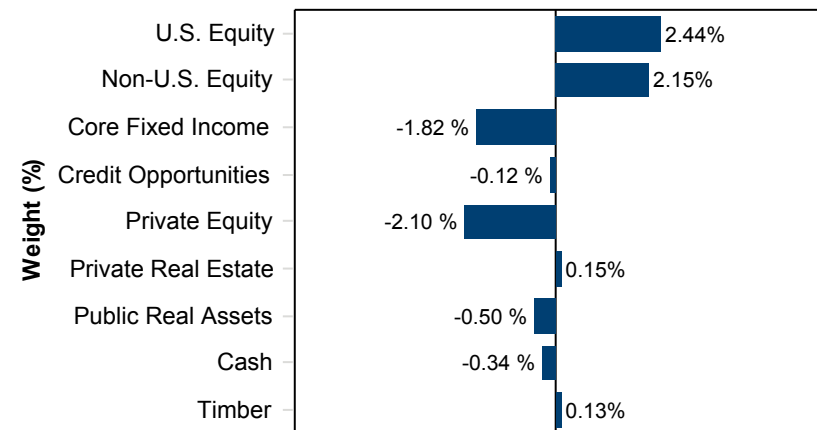
Total Fund Performance

Total Value Added: -0.24 %



Total Asset Allocation: 0.43%

Total Manager Value Added: -0.65 %



Average Active Weight

Asset Allocation Value Added

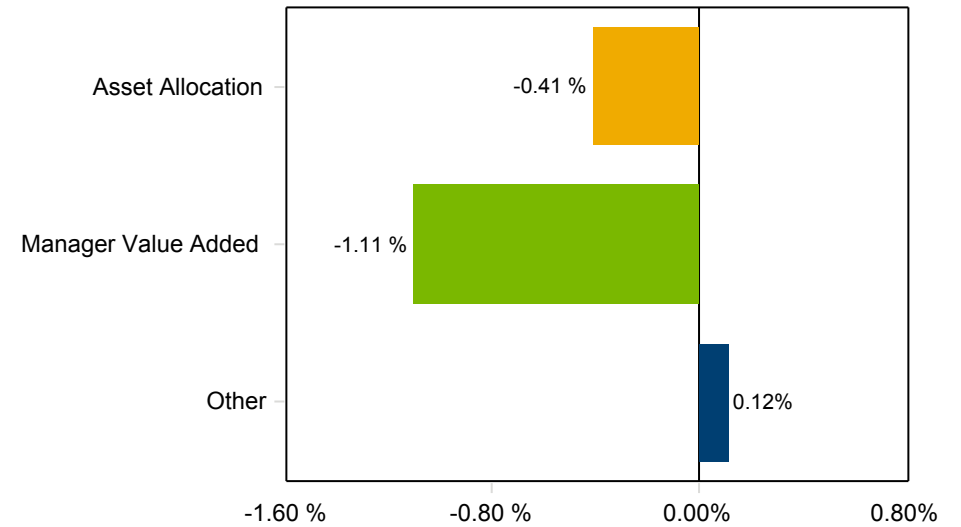
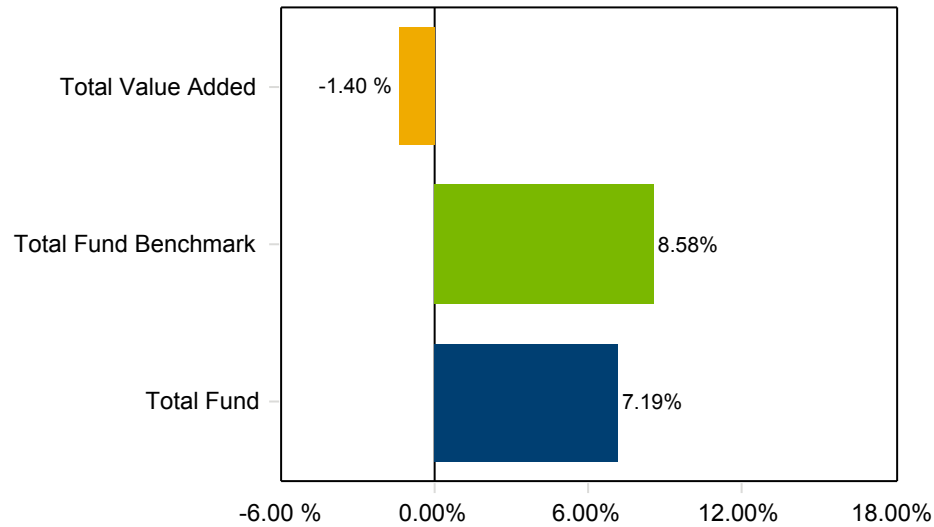
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

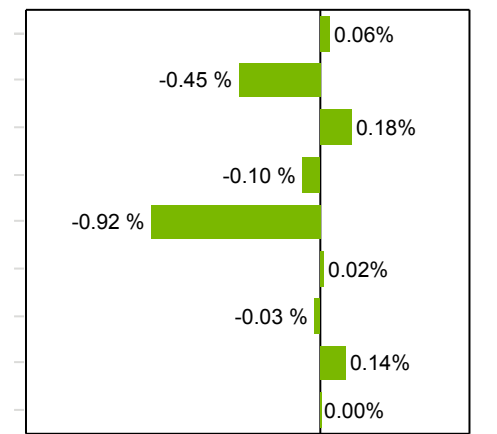
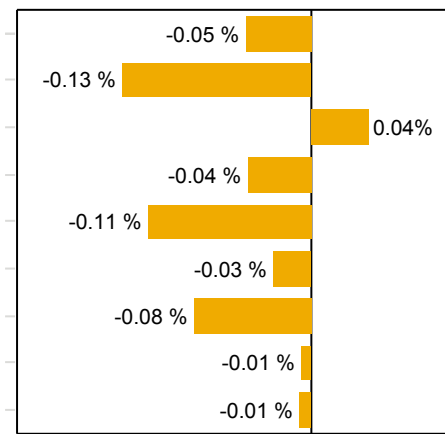
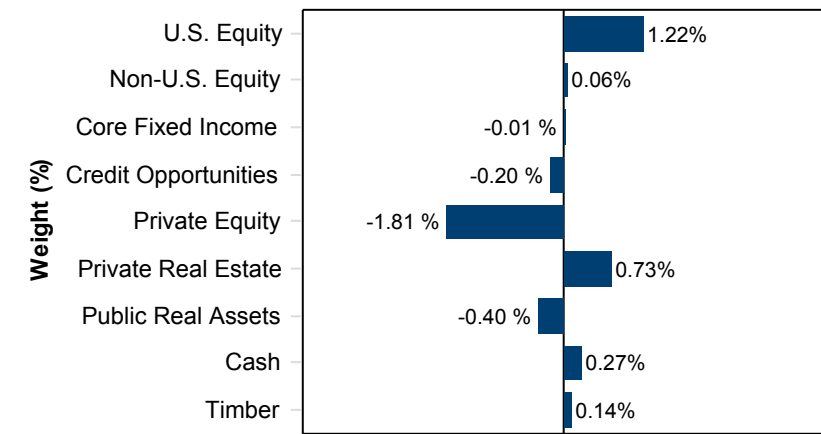
Total Fund Performance

Total Value Added:-1.40 %



Total Asset Allocation:-0.41 %

Total Manager Value Added:-1.11 %



Average Active Weight

Asset Allocation Value Added

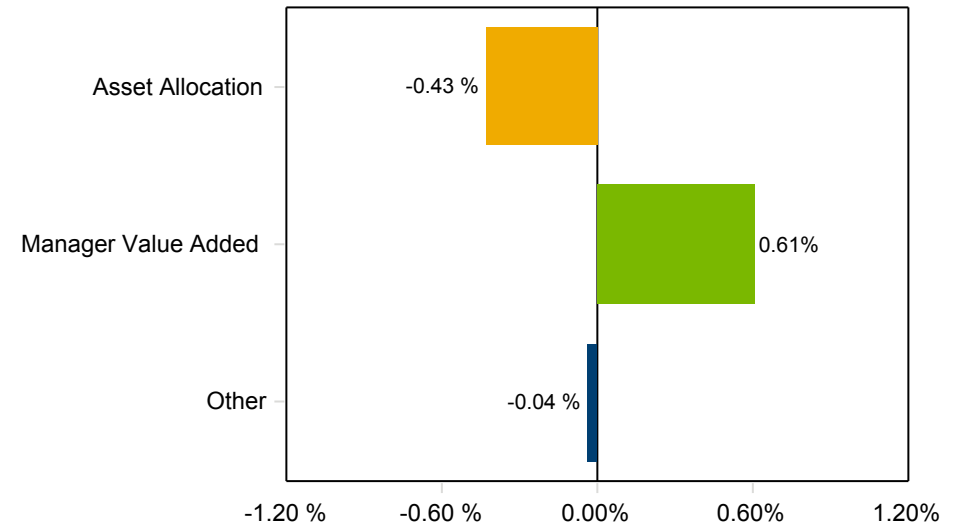
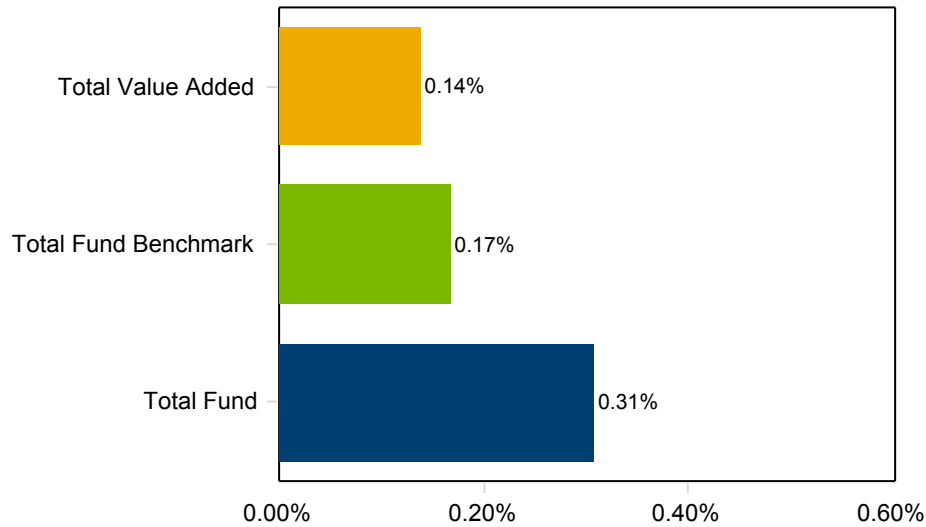
Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

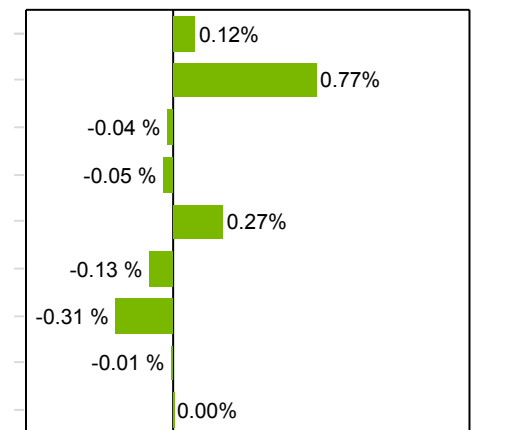
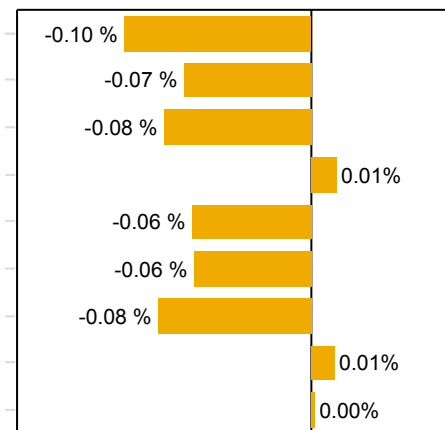
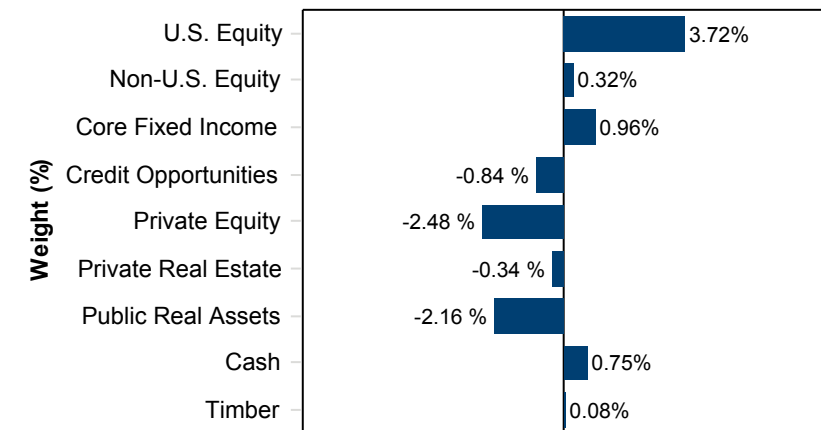
Total Fund Performance

Total Value Added: 0.14%



Total Asset Allocation: -0.43%

Total Manager Value Added: 0.61%



■ Average Active Weight

■ Asset Allocation Value Added

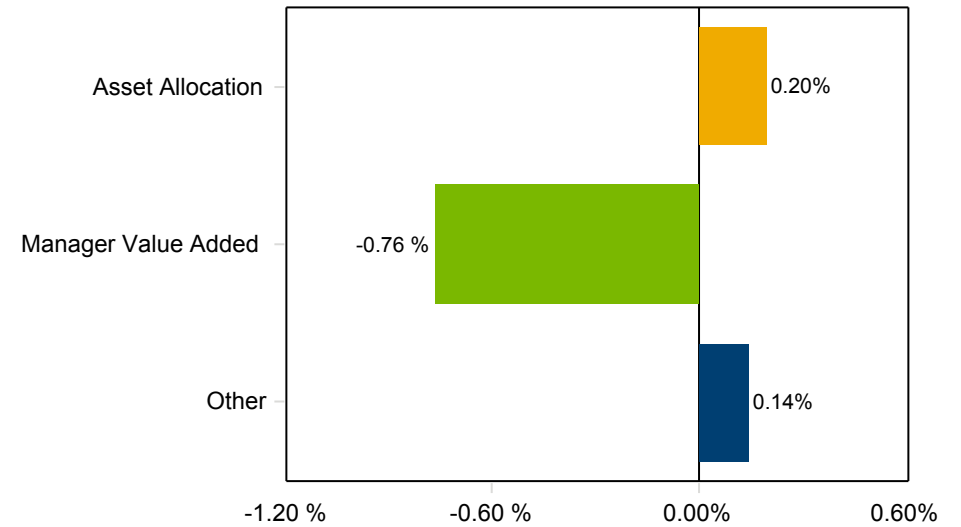
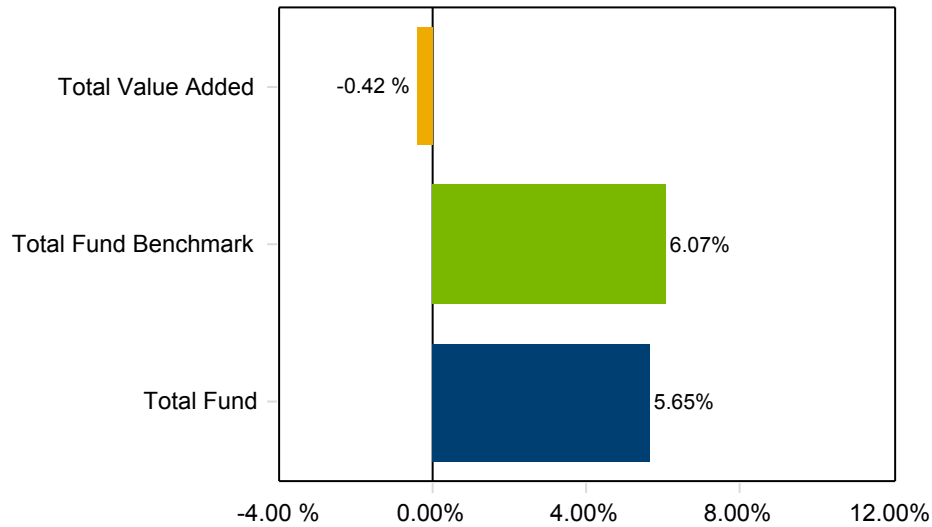
■ Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

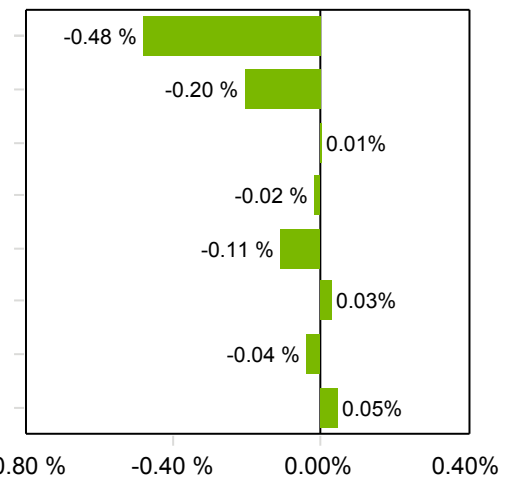
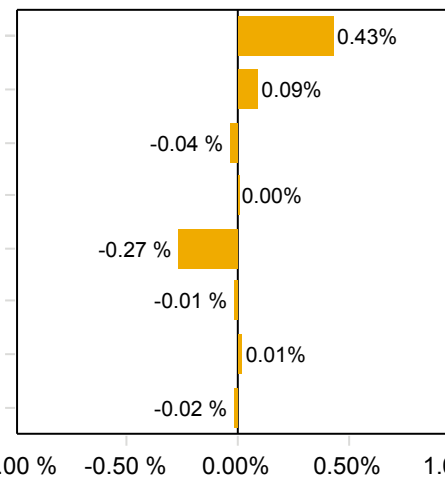
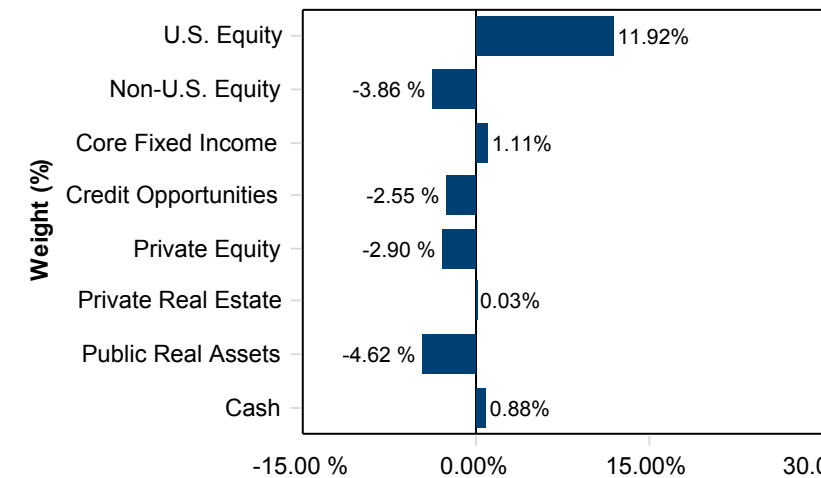
Total Fund Performance

Total Value Added: -0.42 %



Total Asset Allocation: 0.20%

Total Manager Value Added: -0.76 %



■ Average Active Weight

■ Asset Allocation Value Added

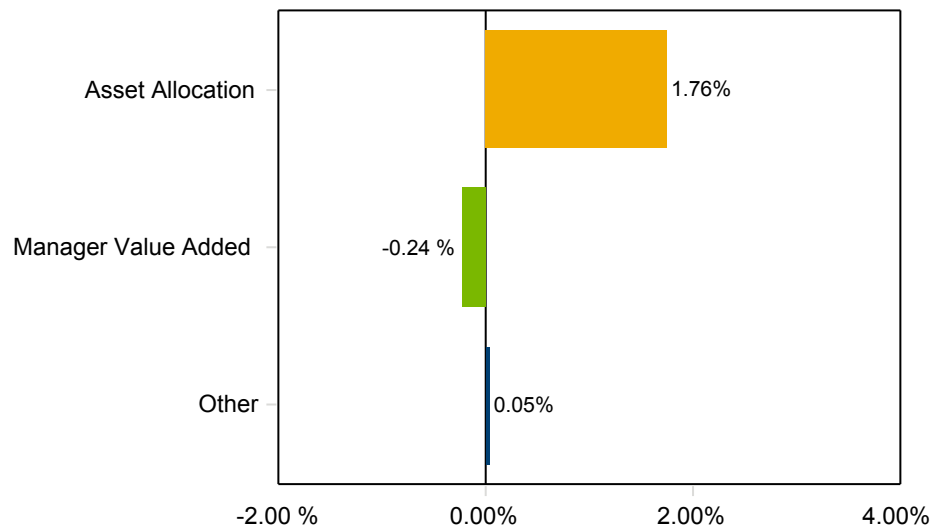
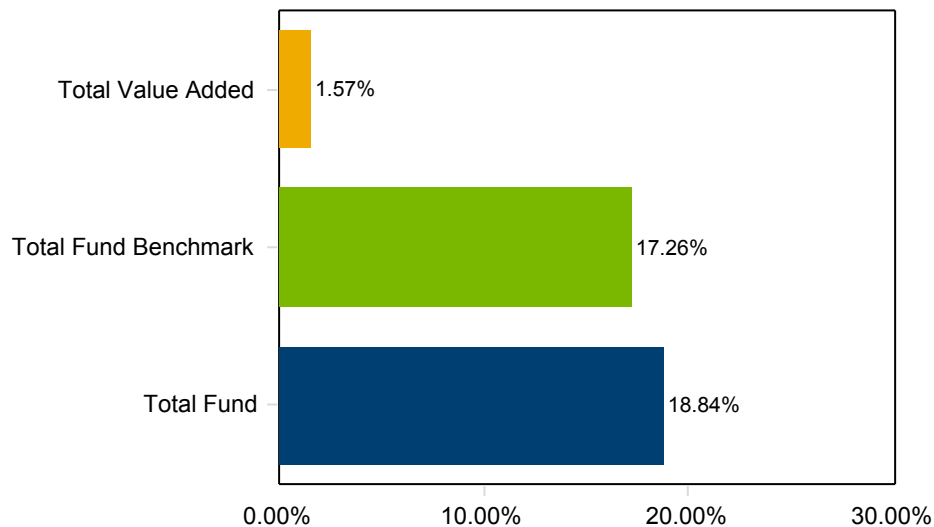
■ Manager Value Added

Total Fund Attribution

Total Fund Composite vs. Policy Benchmark

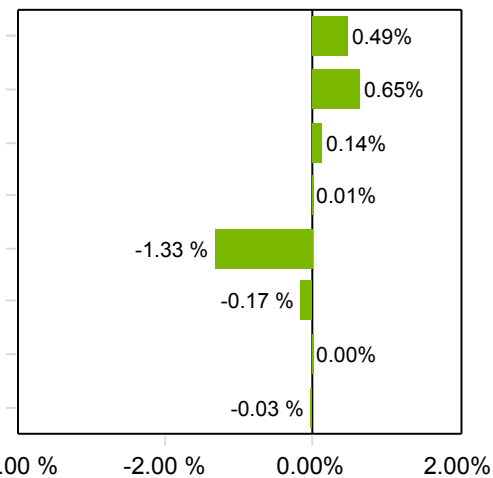
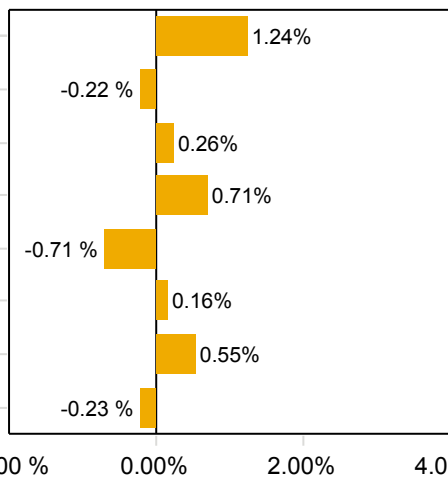
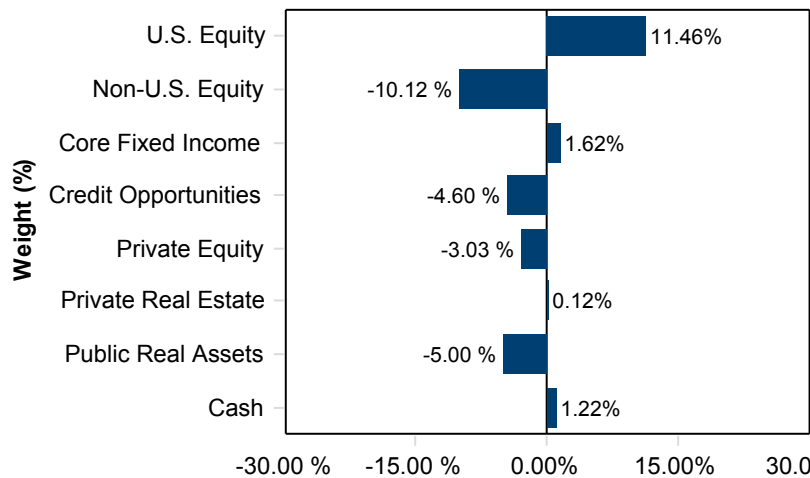
Total Fund Performance

Total Value Added: 1.57%



Total Asset Allocation: 1.76%

Total Manager Value Added: -0.24%



■ Average Active Weight

■ Asset Allocation Value Added

■ Manager Value Added

Disclaimer

Past performance is not necessarily indicative of future results.

Unless otherwise noted, performance returns presented reflect the respective fund's performance as indicated. Returns may be presented on a before-fees basis (gross) or after-fees basis (net). After-fee performance is net of each respective sub-advisors' investment management fees and include the reinvestment of dividends and interest as indicated on the notes page within this report or on the asset allocation and performance summary pages. Actual returns may be reduced by Aon Investments' investment advisory fees or other trust payable expenses you may incur as a client. Aon Investments' advisory fees are described in Form ADV Part 2A. Portfolio performance, characteristics and volatility also may differ from the benchmark(s) shown.

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