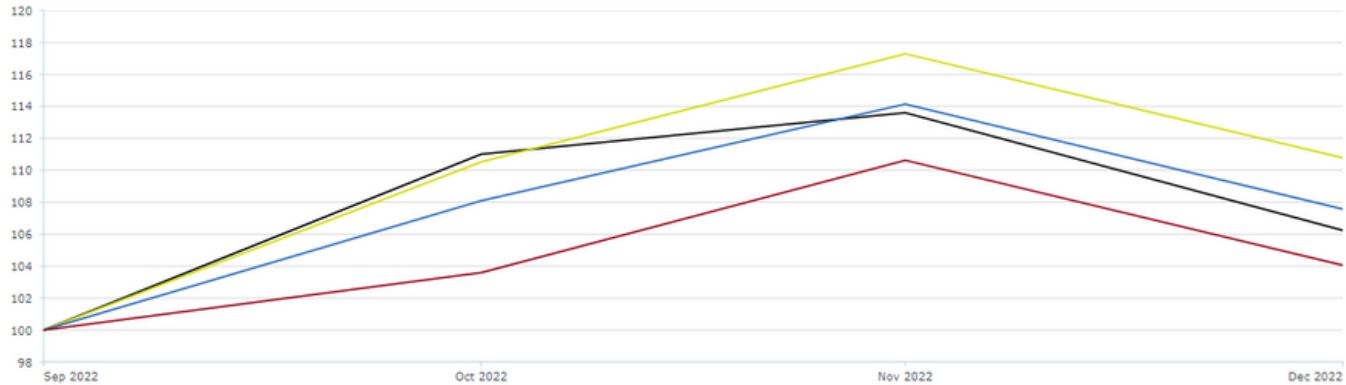


## 4Q22 Quarterly Commentary

**Portfolio Managers:** John O. Barr & Christopher J. Retzler  
**Investment Style:** Mid Cap Growth

### MARKET REVIEW

- Despite the market’s terrible angst and performance in 2022, the major indices were all higher in the second half of 2022. In Q4, the S&P 500 returned 7.56% and the Russell 2000 Growth returned 4.13%.
- As anticipated, the Federal Reserve raised interest rates by 75 bps to 3.75 - 4.00% on November 2nd and by 50 bps to 4.25 – 4.50% on December 14th. The Fed has indicated plans to increase rates by another 25bps in February.<sup>1 2</sup>



	RETURN
■ Needham Growth Institutional	4.06
■ S&P 500	7.56
■ S&P 400	10.78
■ Russell 2000	6.23

Source: Zephyr Informais

### MACRO OBSERVATIONS

- Economic announcements in 4Q22 went largely as expected. Year-over-year inflation dropped below 8.0% - historically a very high level, but below the level of Q3.<sup>3</sup> Unemployment remained very low, below 4.0%, as it has all year. Manufacturing and healthcare were areas of strength in the labor market. Real GDP increased at an annual rate of 3.2% in Q3 after a negative Q2.
- During 4Q22 the dollar was weak. The DXY index, which measures the U.S. dollar versus a basket of foreign currencies, declined by 7.38% during the quarter.<sup>4</sup> Foreign central banks spoke of raising interest rates just as the United States is approaching the end of its rate hike cycle. A weak dollar makes it less expensive for customers in foreign countries to buy goods priced in U.S. dollars.
- We continue to see atrocities from the Russian assault on civilians in Ukraine. Given the conflict does not seem to have an end in sight, countries and regions must shorten supply chains and become self-sufficient in energy and manufacturing.

### IMPACTS ON PORTFOLIO PERFORMANCE

- The Fund’s Institutional (NEEIX) and Retail (NEEGX) classes returned 4.06% and 3.97%, respectively, in 4Q22, underperforming the S&P 500’s 7.56% return.
- The top contributor was long-time holding Super Micro Computer, Inc. (SMCI). Super Micro designs and manufactures servers. It reported very strong Q3 results, sustained by growth from the large internet companies, which operate their own large data centers.

## IMPACTS ON PORTFOLIO PERFORMANCE (cont.)

- PDF Solutions, Inc. (PDFS) was the second-best contributor and is the second largest position in the Fund at 8.02% of net assets. PDF Solutions saw strong orders for its Exensio® big data analytics software. Exensio® helps customers across the electronics manufacturing industry improve manufacturing yield. PDF Solutions is benefitting from the resurgence of activity in building semiconductor manufacturing plants in the United States.
- The Fund's top detractor was Entegris, Inc. (ENTG). Entegris supplies filters, specialty materials, chemicals, and delivery systems used primarily for semiconductor manufacturing. Entegris reported an earnings and guidance shortfall partially due to the United States' federal restrictions on trade with China.
- AXT, Inc. (AXTI) was the second largest detractor. AXT manufactures Gallium Arsenide (GaAs) and Indium Phosphide (InP) wafers used to make compound semiconductors. Electrons move much faster in these semiconductors, which enables applications such as high-speed processing for silicon photonics and facial recognition. AXT's end markets suffered in 3Q22, and the company reported weak earnings and 4Q22 guidance.
- With 14% turnover, the Fund does not rotate into or out of sectors but invests in companies we believe can outperform over the long term.

## PORTFOLIO CHANGES

- The Fund targets investments that we perceive to have significant, unrecognized growth opportunities. COVID-19 hastened the revolutionary development in technology and life sciences; the Fund is a long-term investor in companies that enable research and manufacturing to bring these developments to market.
- The most significant changes to the portfolio were reductions in position sizes. The largest sale was PDF Solutions, where we sold 65,200 shares to end at 338,900. This sale was to manage the position size. The second largest sale was in small-cap company Telos Corporation (TLS). Telos has struggled to execute its new product sales. We sold 140,000 shares to end at 120,000. We reduced about 10 other positions for tax planning and strategic reasons.
- The Fund exited a few of its smaller holdings, including Taiwan Semiconductor Manufacturing Co., Ltd. (TSM). Over the long term, we think TSMC may experience challenges as it builds out manufacturing capacity outside of Taiwan.
- The Fund did not add any new positions in 4Q22 but took advantage of market weakness to add to a few existing positions. The largest addition was to Aspen Aerogels, Inc. (ASPN), which was a very disappointing stock in 2022. The company was selected by General Motors Company (GM), Toyota Motor Corp. (TM), and other electric vehicle makers to provide aerogel insulation to prevent fires in lithium-ion batteries. However, the company needs to build a plant to meet the demand and needed to raise capital to build the plant. We added 35,000 shares in the company's secondary stock offering in November.

## LOOKING AHEAD & OPPORTUNITIES

- We continue to see opportunities in the reshoring of manufacturing in the United States. We recommend reading [The Titanium Economy: How Industrial Technology Can Create a Better, Faster, Stronger America](#) by Asutosh Padhi, Gaurav Batra, and Nick Santhaman of McKinsey & Company.<sup>5</sup> Portfolio holding Clean Harbors, Inc. (CLH) is featured in the book.
- Many of our largest portfolio holdings have made multi-year investments that we believe position them to deliver growth and positive returns over the next few years. We believe if these investments succeed, they could provide a hedge against macroeconomic factors, such as inflation.

[1] <https://www.federalreserve.gov/newsevents/pressreleases/monetary20221102a.htm>

[2] <https://www.federalreserve.gov/newsevents/pressreleases/monetary20221214a.htm>

[3] <https://www.bls.gov/>

[4] <https://www.marketwatch.com/investing/index/dxy>

[5] Padhi, Asutosh, et al. The Titanium Economy How Industrial Technology Can Create a Better, Faster, Stronger America. PublicAffairs, 2022.

	3 MO	YTD	1YR	3YR	5YR	10YR	SINCE INCEPT.
Needham Growth Fund Inst Class**	4.06%	-33.34%	-33.34%	6.72%	9.42%	10.34%	12.42%
After Taxes on Distributions	3.64%	-33.61%	-33.61%	5.54%	7.41%	8.65%	11.00%
After Taxes on Distributions & Redemptions	2.70%	-19.54%	-19.54%	5.41%	7.27%	8.22%	10.63%
Needham Growth Fund Retail Class	3.97%	-33.66%	-33.66%	6.25%	8.90%	9.84%	11.94%
After Taxes on Distributions	3.54%	-33.93%	-33.93%	5.04%	6.86%	8.13%	10.51%
After Taxes on Distributions and Redemptions	2.66%	-19.72%	-19.72%	5.05%	6.86%	7.80%	10.18%
S&P 500 Index	7.56%	-18.11%	-18.11%	7.66%	9.42%	12.56%	9.03%
S&P 400 Index	10.78%	-13.06%	-13.06%	7.23%	6.71%	10.78%	10.89%
Russell 2000 Index	6.23%	-20.44%	-20.44%	3.10%	4.13%	9.01%	7.99%

Average Annual Returns as of December 31, 2022. The Needham Growth Fund inception date is January 1, 1996.

\*\*Performance for any periods prior to the inception date of Institutional Class Shares are based on the historical performance of the Retail Class Shares adjusted to assume the expenses associated with Institutional Class Shares.

The Needham Growth Fund's Gross Expense Ratio is 1.78% for the Retail Class and 1.50% for the Institutional Class. The Needham Growth Fund's Net Expense Ratio is 1.78% for the Retail Class and 1.40% for the Institutional Class. The Net Expense Ratio reflects a contractual agreement by the Fund's investment adviser to waive its fee and/or reimburse the Fund through April 29, 2023 to the extent the Gross Expense Ratio exceeds 1.95% and 1.40% of the average daily net assets of Retail Class Shares and Institutional Class Shares (Expense Cap). The Expense Cap excludes taxes, interest, brokerage, dividends on short positions, fees and expenses of "acquired funds," extraordinary items and shareholder redemption fees but includes the management fee.

[Needham Growth Fund Fact Sheet Link](#) [Prospectus Link](#)

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Investment returns and principal value will fluctuate, and when redeemed, shares may be worth more or less than their original cost. Performance data quoted represents past performance and does not guarantee future results. Current performance may be higher or lower than these results. Performance current to the most recent month-end may be obtained by calling our transfer agent at 1-800-625-7071. Total return figures include reinvestment of all dividends and capital gains.

All three of the Needham Funds have substantial exposure to small and micro capitalized companies. Funds holding smaller capitalized companies are subject to greater price fluctuation than those of larger companies. Portfolio holdings are subject to change. Needham Growth Fund's ownership as a percentage of net assets in the stated securities as of 12/31/22: SMCI: 3.92%, PDFS: 8.02%, ENTG: 5.39%, AXTI: 1.22%, TLS: 0.51%, TSM: 0.00%, ASPN: 3.91%, GM: 0.00%, TM: 0.00% and CLH: 1.13%.

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