COMPILED ON: JUNE 04, 2009

RussellResearch

PanAgora Asset Management, Inc.

DYNAMIC SMALL CAP CORE

Equity | US | Small Capitalization | Market Oriented

CONTENTS

Russell Investments

PanAgora Asset Management, Inc.

PRODUCT: DYNAMIC SMALL CAP CORE

ASSET CLASS	GEOGRAPHIC EMPHASIS	STYLE	SUBSTYLE
Equity	US	Small Capitalization	Market Oriented

OVERALL EVALUATION

① ② ❸ ④
Retain

We recommend that clients retain this manager.

Updated By: Doug Porter
Target Excess Return: 175 to 175 bp
Target Tracking Error: 300 to 300 bp
Time Period: Four Years
Russell-Assigned Benchmark: Russell 2000 Index

DISCUSSION

Clients should note that this product is closed.

INVESTMENT STAFF ① ② ③ ❹ ⑤

Eric Sorenson, PanAgora's President and CEO, is a knowledgeable and skilled quantitative investor, and experienced at building quantitative teams and products. The Director of the Dynamic Equity team, Ron Hua, and portfolio manager Sanjoy Ghosh are dedicated investment professionals committed to high quality quantitative research, model development, and implementation. Ron and Sanjoy are supported in their research by analysts Francis Smith and Jane Zhao. George Mussalli and his Stock Selector team also contribute to the research effort, which Russell views favorably. The firm has demonstrated a strong willingness to critically evaluate its own processes with an eye towards constant improvement.

ORGANIZATIONAL ENVIRONMENT ① ② ❸ ④ ⑤

Ron Hua, Sanjoy Ghosh, and Francis Smith moved from Putnam and were integrated into PanAgora in July 2004. On February 1, 2007, Marsh & McLennan announced the sale of Putnam Investments (Putnam) to Great-West Lifeco Inc., a subsidiary of the Canadian conglomerate Power Financial Corporation (Power).

A new compensation plan has been finalized allowing key professionals (including Eric Sorensen, Ron Hua, and Eddie Qian) to own up to 20% of PanAgora equity. This equity plan lowers the risk of departure of key professionals. The new compensation plan also ties the bonuses of other employees to the performance of PanAgora, which is an improvement over the previous structure. Further, changes to the board of directors of PanAgora allow for greater input of PanAgora professionals and a greater degree of independence from Putnam Investments, PanAgora's parent company. We view these changes positively.

LOW ① ② ③ ④ ⑤ HIGH

Russell Investments

PANAGORA ASSET MANAGEMENT, INC.

SECURITY SELECTION ① ② ❸ ④ ⑤

PanAgora's use of valuation, fundamental quality, and earnings momentum factors is conceptually appealing. While these factors are used by many peers, PanAgora is distinct in its approach by applying non-linear conditioning to several of the sub-factors. The firm does rely on the Barra risk model to a large degree. However, the process is distinguished by assigning a unique model to each stock based on its specific risk characteristics. PanAgora is making large changes to its model and, at this point in time, there is little clarity as to how it is going to affect stock selection.

RESEARCH ① ② ③ ④ ❺

PanAgora's ongoing research effort compares favorably to most quantitative firms. The investment team is at the cutting edge of academic research and benefits from a network of contacts across academia. While Ron and Sanjoy are supported in their in-house research by Francis Smith and Jane Zhao, the research process is collaborative in nature and ideas are exchanged and enhanced across the firm. The firm also has well established theories that drive the research effort.

ASSET ALLOCATION ① ② ③ ④ ⑤

PanAgora manages its portfolios in a fully invested manner. Therefore, Russell is not assigning a rank to this category.

SELL DECISION ① ② ③ ❹ ⑤

The systematic nature of the process enforces an objective sell discipline. The sell decisions are primarily dictated by the model with little manual override. Sells and trims are determined by either a decline in the excess return potential of an existing holding or high alpha potential of a new purchase candidate.

PORTFOLIO CONSTRUCTION ① ② ❸ ④ ⑤

Russell believes the tight portfolio construction rules that were implemented at the end of 2007 limit tracking error and ultimately, excess return potential. The changes were made as a part of an ongoing project to improve implementation. Once PanAgora has resolved the issue, they expect to relax constraints.

IMPLEMENTATION ① ② ❸ ④ ⑤

The product has been closed at a reasonable asset base. Coupled with the systematic, quantitative process, PanAgora offers rapid implementation of the firm's investment insights.

PanAgora has increased the venues and methods in which it trades and, timeliness metrics help determine the most appropriate execution strategy. Russell believes the changes will help control transaction costs, market impact, and PanAgora's anonymity, but it is too early to confidently measure the extent of improvements.

LOW ① ② ③ ④ ⑤ HIGH

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LOW 1 2 3 4 5 HIGH

PanAgora Asset Management, Inc.

PRODUCT: DYNAMIC SMALL CAP CORE

ASSET CLASS	GEOGRAPHIC EMPHASIS	STYLE	SUBSTYLE
Equity	US	Small Capitalization	Market Oriented

Team based structure.

DECISION MAKING STRUCTURE

Ronald Hua is the lead portfolio manager for the Dynamic Small Cap products. Sanjoy Ghosh is the other portfolio manager and works closely with Ron. Altogether, the investment team has the day to day responsibility for this product.

Portfolios are also monitored closely by the Investment Committee which meets monthly and/or more often as needed. The Investment Committee, which includes some of the firm's senior investment professionals, oversees research and helps with dissemination of research ideas through firm.

PanAgora believes that it can generate excess returns in the small cap segment of the market by utilizing its distinct quantitative process.

DISTINGUISHING BELIEFS/PRINCIPLES

PanAgora believes that small cap markets are inefficient and that a disciplined application of quantitative techniques and traditional investment theory can result in a more consistent exploitation of market inefficiencies. Combining contextual alpha models, non-linear conditioning, and calendar timing, PanAgora seeks to maximize risk-adjusted returns. PanAgora's investment philosophy has three components:

1) ***Valuation***: PanAgora believes that purchasing reasonably priced stocks provides the firm with more opportunities to obtain price appreciation.

2) ***Fundamentals***: PanAgora purchases companies in good lines of business that are well run by evaluating fundamentals such as earnings quality, operating efficiency and management.

3) ***Market Sentiment***: While valuation and fundamentals are the heart of the investment philosophy, PanAgora effectively incorporates market sentiment.

Most value is added in contextual modeling where each stock is modeled based on its unique risk return characteristics.

SECURITY SELECTION PROCESS

The Dynamic Equity team uses a proprietary contextual model to perform bottom-up stock selection. The team evaluates stocks based on valuation, fundamentals and sentiment. The stock selection universe includes securities in the benchmark and other out-of-benchmark securities that fall within the $100 million to $3 billion market cap range.

PanAgora follows a bottom-up approach to investing. The Dynamic Equity strategy integrates multiple sources of excess return (alpha) within multi-factor models to develop individual return forecasts for nearly 3,000 securities.

Ongoing research to

RESEARCH

The team conducts cutting edge research for the benefit of the dynamic *enhance the forecasting ability of the models.*

strategies. This team is also thought of as the internal think tank for PanAgora, as many of the research findings are applied across other strategies within the firm.

All research is the joint effort of portfolio managers and analysts within each investment group. The portfolio managers supply investment knowledge to ensure that research is relevant to the market and is rational from a fundamental and economic perspective, while the analysts supply rigorous statistical analysis and testing.

As a means of supplementing the managers' research responsibilities, quantitative research analysts within each investment group help develop or improve upon quantitatively structured products.

The research focuses on improving existing product models and developing new forecasting models. PanAgora builds proprietary forecasting models based on economic fundamentals, financial innovations, and advanced econometrics.

The investment team simulates the model's performance out of sample to help ensure consistent and significant outperformance. Performance attribution is conducted and analyzed for exceptional periods of over and underperformance.

The investment team scrutinizes the validity of the factors and methods used in the enhanced model to ensure their stability and consistency. At a basic level, this involves regular re-estimation of relationships to incorporate the influence of new data. At another level, this requires monitoring the models regularly for signs of permanent structural change. As markets change, so should the strategies used to exploit their inefficiencies.

The information gleaned by the equity research analysts in conjunction with the portfolio management team is generally used to improve quantitative models and ultimately, the investment results. Research on new factors is constantly occurring. The investment team continually looks at the process and examines new ways in which to measure existing return drivers. It continues to search for new factors that drive return.

The investment team evaluates every relationship for inclusion in the investment process based on investment theory or intuition, rather than solely by empirical results.

After an exploitable relationship has been discovered, research teams undertake substantial diagnostic testing - starting with a statistically significant t-test in order to evaluate the adequacy of the theory being researched.

PanAgora's portfolios typically hold a minimal

ASSET ALLOCATION

PanAgora's portfolios typically hold a minimal amount of cash. The firm

PANAGORA ASSET MANAGEMENT, INC.

amount of cash.

believes in maintaining a fully invested posture with minimal cash balances for transaction purposes only. From time to time, the portfolios will hold futures and exchange traded funds to equitize cash inflows until PanAgora can be fully invested into equity positions. These periods are short and their length is directly related liquidity considerations in purchasing small cap securities.

Bottom up stock selection within the risk control guidelines.

SECTOR/INDUSTRY WEIGHTINGS

Portfolios are the result of an optimization using a risk model. Because the investment process is bottom-up, sector weights are a residual of the stock selection process. To ensure that the bets are intentional PanAgora closely monitors the risk exposures and maintain:

~ Sector bets at +/- 6% relative to the benchmark,

~ Stock weights at +/- 2% relative to the benchmark,

~ No individual risk factor contributes more that 30% of the tracking error.

Stocks are sold on deterioration in the alpha signal, for risk control purposes, and to make way for better opportunities.

SELL DECISIONS

Securities are sold or trimmed for a number of reasons including:

Alpha deterioration – As a security's alpha declines it may no longer represent an attractive investment opportunity.

Risk management – Securities may be sold if their marginal contribution to tracking error becomes too large. Even if a security exhibits a large, positive alpha signal, a security may be sold if its overall contribution to risk becomes disproportionate. PanAgora carefully monitors active positions to ensure that portfolios remain well diversified in terms of both alpha and security specific exposures.

More attractive opportunities - Even if a security's alpha or risk-profile does not change, other securities may become more attractive in terms of contribution to alpha or in their ability to reduce risk through diversification.

The amount of a position that is to be sold is determined by using the optimization platform. Constraints will be added to the optimization if a risk position exceeds 30% contribution to tracking error.

Attempt to best utilize alpha signals while maintaining reasonable risk exposures.

PORTFOLIO CONSTRUCTION

PanAgora builds portfolios using a risk model to optimize various combinations of securities that emerge from its stock selection process. The firm believes this approach allows the firm to maximize the exposure to alpha while maintaining reasonable levels of risk. Because the investment process is bottom-up, sector weights are a residual of the stock selection process. To ensure that PanAgora is taking bets where there exists an information and skill, the majority of risk versus the benchmark represents stock-specific risk.

Within PanAgora's guidelines the optimizer determines that weights of the securities in the portfolio. PanAgora feels that these ranges are constraining enough to maintain adequate risk control while still allowing the freedom to best utilize the alpha signal.

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Portfolios are managed using a team based approach, with all investment decisions requiring a team consensus before being implemented uniformly across all accounts subject to client guidelines. Therefore, dispersion among accounts tends to be very low.

Cash portfolios are invested as soon as possible with transaction costs being a main consideration. If transaction costs are high for immediate execution of all cash, a portion of the cash will be invested while the remainder will be equitized until it can be fully invested.

The optimization used includes liquidity considerations and therefore each recommended trade is executable immediately and without scaling over time necessary.

Typical annual portfolio turnover is approximately 100%.

Scott Baum is responsible for trading.

TRADING

Once PanAgora has determined the necessary trades for the portfolios, the firm selects the brokers offering the best executions. PanAgora aggregate the trades for a particular security and place the order with the broker. The execution comes back with an average price, which is then allocated to each portfolio. In this way, every portfolio - big or small - receives the same execution price.

Using crossing networks, PanAgora’s trades are matched with those of other institutional investors who are taking the opposite side of the transaction. Execution takes place at the midpoint between the bid and asked price for the security.

To achieve “best execution” PanAgora systematically monitors trading costs in order to identify superior trading tactics. The firm monitors trading costs through the use of both internal and external reports. Each team of portfolio managers is responsible for all trading. Portfolio managers review all executed trades with an eye toward controlling trading costs. PanAgora not only examines explicit trading costs, such as commissions charged by brokers, but also implicit costs, such as the bid/ask spread, market impact, and opportunity cost.

PanAgora monitors trading costs through the use of both internal and external reports. As stated, each team of portfolio managers is responsible for all trading. Portfolio managers review all executed trades with an eye toward controlling trading costs. The firm not only examines explicit trading costs, such as commissions charged by brokers, but also implicit costs, such as the bid/ask spread, market impact, and opportunity cost.

In addition, PanAgora utilizes a variety of bidding strategies designed to get the best execution from its brokers, including the use of non-traditional trading methods. PanAgora’s broker selection policy is to find the best broker for each market regardless of the location of the brokerage entity. PanAgora will normally ask for agency bids but will consider principal bids given certain market conditions. While principal bids are typically higher, they are sometimes worth the premium to be certain of the execution price.

All firms provide post-trade analytics to PanAgora. PanAgora compares the execution price to a number of references including the volume-weighted average price (VWAP), the average of the daily high, low, open, and close, and the previous day's close. The uniform way of comparison across all markets is used to estimate the market impact of trades. Only those firms which have shown superior past performance are invited to bid on trading programs. Finally, prior to selecting a brokerage firm for a trade, numerous qualified firms are canvassed to provide a bid on commission costs. Typically the trade will go the lowest bidding firm.

PanAgora's trade allocation policy is to allocate transactions among client accounts in a timely manner and in a basis that is fair and equitable to all clients, according to the following guidelines:

- Within each investment group trade orders for the same security will be aggregated and executed as a block order, where possible. The portfolio manager will, prior to execution, designate each account to which the order relates and the number of shares to be allocated to each account. Such information will be recorded on all internal "trade tickets" and maintained by PanAgora in accordance with recordkeeping requirements.
- For block orders executed at various prices, the broker will calculate the average price of the trade and the portfolio manager will allocate the order pro-rata across all accounts.
- For futures trades executed at various prices for more than one account with the same broker, the broker will calculate the average price of the trade and the portfolio manager will allocate the order pro-rata across all accounts.
- In some circumstances where there are insufficient shares to satisfy all orders, exceptions to the pro-rata basis for allocation may be made to minimize client costs. However, in no circumstances will exceptions be made to favor one account over another.
- For separate trade orders in the same security, the portfolio manager will attempt to direct the trading in a manner that is fair and equitable to the accounts. (Such a situation may occur when trading the same security with different brokers.)

In circumstances where a portfolio manager is trading for a proprietary account and a client account, the client account shall have priority for acquisition or sale of the particular security.

Stocks are ranked on the combination of valuation, fundamental and momentum factors.

VALUATION METHODOLOGY

The valuation component of the model utilizes multiple measures that can be broadly grouped into liquidity based and going concern based factors. The weight of the valuation component varies due to the use of the contextual model. The data required is primarily from company financial statements and is provided by firms such as Compustat.

PanAgora Asset Management, Inc.

PRODUCTS REVIEWED

PRODUCT	ASSET CLASS	GEOGRAPHIC EMPHASIS	STYLE	SUBSTYLE
Dynamic Small Cap Core	Equity	US	Small Capitalization	Market Oriented
Dynamic Small Cap Growth	Equity	US	Small Capitalization	Growth
Dynamic Small Cap Value	Equity	US	Small Capitalization	Value
Dynamic Small/Mid Cap Core	Equity	US	Small Capitalization	Market Oriented
Dynamic US Small/MidCap Core Ext Alpha 120/20	Equity	US	Small Capitalization	Market Oriented

MANAGER UPDATE

On February 10, 2008, Doug Porter (author) and Fawad Razzaque of Russell Investments met with Ron Hua, Sanjoy Gosh, Jane Zhao, George Mussalli, and Rob Job of PanAgora Asset Management (PanAgora) in its Boston offices to review the Dynamic Small Cap Core and Dynamic Small/Mid Cap Core products. As a result of the meeting, Russell is downgrading the rank on both products from a formal 'hire' to a 'retain' rank.

Our decision to downgrade the product at this time is based primarily on two issues. Following the very disappointing performance results of 2007, PanAgora undertook several initiatives to enhance its quantitative model and improve its implementation process. Russell monitored these developments very closely and we believed the firm was taking positive steps towards improving the investment process. Upon review, changes to the implementation process, while an improvement, have not met PanAgora's own expectations.

Secondly, following the results of changes made to implementation, PanAgora has subsequently decided to more aggressively modify its stock selection process. Specifically, the firm has decided to separate the scoring process into distinct long term and short term models. This change to the process has the potential to improve stock selection, but it has been Russell's experience that undertakings of this magnitude ultimately prove to be more complicated than the manager expects and often take a considerable amount of time to be fully incorporated. In addition, Russell does not have clarity on its effect to the overall portfolio characteristics.

Performance

For the year ended December 31, 2008, the Dynamic Small Cap Core product returned -36.4%, underperforming the Russell 2000® Index by approximately 260 basis points. These results rank in the second quartile of the Small Cap Core manager universe. Over the same time period the Small/Mid Cap Core product underperformed the Russell 2500™ Index by approximately 10 basis points and placed in the third quartile versus peers.

The market environment for active managers in 2008 was especially difficult as a majority of managers underperformed the passive benchmark. As a result, PanAgora benefited from its low active risk profile. Results are below Russell's expectation for PanAgora because even as its stock selection factors were rewarded in 2008, actual results trailed due to continued slippage between the model and actual portfolios.

Please contact Doug Porter at (253) 439-2506 or dporter@russell.com if you would like to discuss this manager in more detail.

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