

Fund Overview

The Celernus Absolute Growth Fund aims to provide long term growth of capital with below average volatility. The fund seeks to actively protect capital and manage risk. Equity selection combines a value-orientation with a robust quantitative framework. Net equity and currency exposure are dynamically managed to further mitigate risk.

Manager

Celernus Investment Partners Inc.

AUM

27.50 million

Minimum investment

\$25,000

Advisory fee

0.85%

Performance fee

20%

High water mark

Yes

Subscriptions

Weekly

Redemptions

Weekly

Prime Broker

National Bank Correspondent Network (NBCN)

Auditor

BDO Canada LLP

Administrator

Convexus Managed Services

Lawyer

WeirFoulds LLP

FundSERV code

CIP100A

Eligible accounts

RSP, RESP, TFSA, cash

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CELERNUS ABSOLUTE GROWTH FUND

Quarterly Report – Q2 2014

In Argument of Actuarial Automation <or> You're Not as Smart as You Think You Are

In the summer of 1996, Hans Ohlin was a 50 old chief of coronary care at the University of Lund Hospital in Sweden. On this particular day, he sat down in his office with a stack of 2,240 electrocardiograms (EKGs.)

The EKG is a very common diagnostic test performed more than 50 million times a year in the United States. It measures the low voltage electrical impulses that travel through the heart with each beat which are then reflected in waves on the EKG output. The theory is that, in the event of a heart attack, a portion of the heart dies, requiring electrical impulses to alter their course to travel around the dead tissue. This results in a change in the waves on the EKG printout. Sometimes the changes are very clear. Other times they are more subtle. An experienced cardiologist can often diagnose a heart attack from an EKG printout at a glance. Other times, the results are ambiguous or, 'non-specific.' But the implications are far reaching. The benefits of rapid identification of acute myocardial infarction (a heart attack) are material - allowing proper therapy to preserve long-term cardiac function. However, a heart attack that is not diagnosed in a timely manner may significantly reduce the prognosis for the patient. Interpretation of an EKG is a high consequence undertaking.

This accounts for the hefty stack of EKGs collected by Dr. Ohlin. His task was to analyse and separate the printouts into two piles. The first pile represented situations in which he thought the patient was experiencing a heart attack at the time of the EKG recording. The other pile represented situations in which no heart attack was diagnosed.

Dr. Ohlin was not the only participant in this experiment. There was another. It was a computer. The experiment was led by a medical colleague of Dr. Ohlin's named Lars Edenbrandt. Edenbrandt was an expert in artificial intelligence who had spent the previous five years perfecting a machine learning algorithm to interpret electrocardiograms and deliver a diagnosis. The computer was fed more than 10,000 EKGs with details as

to which ones represented heart attacks and which ones did not. Over time, the machine became expert at assessing the data.

The same 2,240 electrocardiogram printouts that were given to Dr. Ohlin were also inputted into Edenbrandt's algorithm. Dr. Ohlin had the benefit of interpreting as many as 10,000 EKGs a year for many years. The computer had learned from about 10,000 EKGs. The results of the study were published in the fall of 1997. Of the 2,240 EKGs, exactly 1,120 represented incidences of a heart attack. Dr. Ohlin correctly identified 620 of those incidences. The algorithm correctly identified 738. The algorithm bettered one of the best cardiologists around by 20%.

In his book entitled *'Complications - A Surgeon's Notes on an Imperfect Science'*, author Atul Gawande told the story above from a particular philosophical perch. His view is that western medicine is dominated by a single imperative - 'the quest for machinelike perfection in the delivery of care.' Errors are unacceptable. They occur, but they are nonetheless unacceptable.

Gawande identifies that the keys to improving perfection are 1. Routinization; and 2. Repetition. Survival rates following heart surgery, vascular surgery and other operations are directly related to the number of procedures the surgeon has performed. To illustrate, the author proceeded to discuss a relatively simple procedure: hernia repair.

A hernia is a weakening of the abdominal wall that allows the contents of the abdomen to bulge through. In most hospitals, the process of fixing it by pushing the bulge back where it belongs and repairing the abdominal wall takes about ninety minutes and costs about \$4,000. In 10-15% of cases, the operation eventually fails and the hernia returns.

There is a small medical centre just outside of Toronto called the Shouldice Hospital. Hernia operations are what they do. That's it. The dozen or so surgeons at Shouldice perform hernia operations and nothing else. Each surgeon will repair between six hundred and eight hundred hernias a year. This is more than most general surgeons do in a career. As such, the statistics stated above don't apply at Shouldice. The operation typically takes 30 to 45 minutes. The cost is half of what it is elsewhere. The percentage of cases in which the operation fails and the hernia returns is a fairly staggering 1%. Many would argue that Shouldice is the best place in the world to have a hernia repaired.

Why is Shouldice so much better? Of course, their staff are expert. Atul Gawande calls upon Harvard pediatric surgeon Lucian Leape for further insight. Leape has made a study of medical error. He notes that:

A defining trait of experts is that they move more and more problem-solving into an automatic mode.

Gawande notes that, with repetition, a lot of mental functioning becomes automatic and effortless, like when you drive a car to work. Novel situations require conscious workaround solutions that are slower to develop, more difficult to execute and more prone to error. A surgeon for whom most situations have automatic solutions operates at a significant advantage.

Gawande further identifies that:

If the Swedish EKG study argues that there are situations in which machines should replace physicians, the Shouldice example suggests that physicians should be trained to act more like machines.

Personally, I have always found the study of medical error and improvement fascinating and more importantly, much of what I learn appears readily applicable to performance improvement in many fields, including the allocation of capital to risky assets.

The concept of automating investment process is one that has always resonated with me. There is now an overwhelming amount of data to suggest that, in many situations, simple quant models materially outperform human (expert) judgments. James Montier, a strategist at Grantham, Mayo, Van Otterloo and a well-known behaviourist in the investment community has cited many a study regarding the superiority of quantitative results over expert opinion.

Over the years he has collated a terrific collection of references that document the study of actuarial vs. clinical decision-making.

For instance, the following study centres on the diagnosis of whether someone is neurotic or psychotic. A patient suffering from psychosis has lost touch with the external world. A patient suffering from neurosis is in touch with the external world but suffering from internal emotional distress. Proper diagnosis is of high consequence because the treatment for each condition is very different.

The test to distinguish between the two conditions is the Minnesota Multiphase Personality Inventory (MMPI.) The test consists of about 600 statements with which the patient must either agree or disagree. While there have been many updates to the test, results serve to capture aspects of human psychopathology that are recognizable and meaningfully elevated relative to various norm groups studied.

In 1968 a simple statistical formula derived from 1000 patient's MMPI test responses was developed by psychologist Lewis Goldberg to predict diagnosis of psychosis versus neurosis. When applied out of sample, his model was about 70% accurate. Goldberg then gave MMPI scores to clinical psychologists and asked them to diagnose the patient. With the help of the model, the best psychologist was correct 67% of the time. The worst psychologist was correct about 55% of the time. The average psychologist was correct in their

diagnosis roughly 62% of the time. All psychologists underperformed the simple quantitative model.

In 1981, Leli and Filskov studied progressive brain dysfunction and derived a rules-based algorithm based on standard tests of intellectual functioning. The model correctly identified 83% of new, out of sample, cases. Groups of experienced clinicians correctly identified 58% of new cases while inexperienced clinicians identified 63% (yes, the inexperienced clinicians did better than the experienced ones.) This was without the benefit of the quantitative model. When incorporating the model, experienced clinicians were correct in their assessment 75% of the time while inexperienced clinicians identified 68% correctly. In this particular case, the use of the quantitative tool improved clinician performance, however, performance of the quantitative tool on a stand-alone basis remained superior.

In 2000, Grove, Zale, Lebow, Snitz and Nelson considered a whopping 136 studies of simple quant models versus human judgment. The situations ranged from criminal recidivism to occupational choice to the diagnosis of heart attacks. Of these studies, 64 favoured the quantitative model, 64 showed the same result between the quant model and human judgment and eight found in favour of human judgement. (Of these eight models, it was found that the humans had more information than the quant model.) When the overall results of the study were aggregated, the average 'expert' in their field was

correct in their assessment 66.5%. The quantitative model was correct 73% of the time. Paul Meehl, one of the key advocates for statistical vs. clinical approaches to decision-making stated:

There is no controversy in social science which shows such a large body of qualitatively diverse studies coming out so uniformly in the same direction as this one... predicting everything from the outcomes of football games to the diagnosis of liver disease and when you can hardly come up with a half a dozen studies showing even a weak tendency in favour of the clinician, it is time to draw a practical conclusion.

At Celernus Investment Partners, our approach to the allocation of risky assets is decidedly quantitative. Similar to those surgeons tasked with repairing broken hernias at the Shouldice facility in Toronto, we continuously seek to render our process better through improved routine as well as repetition. Improvement of routine requires a not-insignificant element of introspection... and humility.

One of the key pushbacks to a quantitative approach to investment management is that an operator who is truly skilled ought to be able to add some measure of qualitative improvement to a quantitative model. In other words, surely an expert fund manager should be able to use quantitative analysis as an input, but still maintain the flexibility to override the model when deemed appropriate, otherwise what good is he? Mountains of

data suggest that the results of this avenue of thought are inferior. Evidence clearly illustrates that quantitative models typically provide a performance ceiling from which our qualitative decisions only detract. So, as we consider our investment process at Celernus, it is likely fair to say that we could be even more quantitative than we already are!

However, a quantitative approach to investment management is of little use without a terrific quantitative model. Ours is a terrific model.

Our top down economic analysis informs the net long position of our equity fund. The dynamics of employment data, economic activity and financial conditions are all unambiguously consistent with an equity bull market. This does not mean that valuation worries or an exogenous political event will not

result in some level of equity market selloff. However, on a months-to-years basis, the data on which we are focused remains constructive for equity markets.

The principles of our equity selection process remain consistent. Historical data has clearly illustrated that lower-multiple stocks in the presence of a fundamental catalyst (which we define quantitatively) have produced superior returns, as a group, over a market cycle.

In terms of providing a couple snippets of near-term colour, we would argue that valuation has become more of a challenge in 2014. In the aggregate, we do not believe there is material scope for multiple expansion for U.S. indices and there is likely more scope for multiple contraction. As such, further upside to equity markets will likely need to be driven by

actual earnings growth and continued positive earnings prospects.

While we believe that there is little reason for a wide-spread asset allocation shift from equities to fixed income or cash, we do recognize that the mid-to-late summer time period has historically proven challenging for equity markets. With implied volatilities at extremely low levels, challenging valuations and asset allocators at their cottages (reducing the bid to equity indices), we appear slightly more vulnerable to a downside correction. All in the context of a secular bull market.



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