

**What's New at Arrowstreet?**

With the start of September, we hope you all enjoyed the summer. In this issue of the Journal, we've highlighted two topical research pieces. As volatility creeps back into the market, the first article looks at the historical and current volatility of the equity markets. The second article discusses the design and implementation of our new currency model.

**Q2 2006 Review:**

**Investment Performance:** The second quarter of '06 was disappointing as the inflation concerns and changes in market leadership led to underperformance across all strategies. In particular, Global Financials and an overweight to French Industrials hurt the portfolios.

**Business Growth:** During the second quarter, assets under management grew to \$14.4b. We funded three new Global Equity mandates, including our first Global Small Cap account.

**Other:** We continue to add resources to our investment professional staff and as such we're pleased to announce the following additions to the investment staff: Zach Carter has joined as an Associate Portfolio Manager having recently graduated from Oberlin College. Alex Merlis, CFA has joined our Research Team after two years as an analyst at Citadel Investment Group and prior to that as an analyst at StarMine. Greg Ingolia joined the Research Team having recently graduated from Harvard and Sam Thompson, Ph.D., who has been consulting with Arrowstreet for a year, has joined the Research Team. A more detailed biography of Sam is on page three.

We are interested in your views and encourage your feedback. Please e-mail your thoughts to us at:

**info@arrowstreetcapital.com**

**Volatility: It's Baaaack**

**By John Y. Campbell, Ph.D. Arrowstreet Capital, L.P**

Recent market movements have reminded investors that equities are risky assets. One popular measure of risk, the VIX (the implied volatility of the S&P 500 index calculated from options prices), was 11-12% in April and peaked at 23% in June before falling back to 15-16% this summer. Many investors are asking themselves whether they are seeing the end of the relatively benign market conditions of the last couple of years, and a return to a more volatile environment.

To understand recent developments, it is important to consider them in historical context. During the last 50 years, equity market volatility has varied around a stable long-run average. There are slow movements that may last several years, for example high volatility in the mid-1970's, late 1980's, and the period around the turn of the millennium, combined with occasional upward spikes. The last couple of years have seen below-average volatility, and even today volatility is close to its average rather than at extreme levels. If one were to forecast volatility using only these historical data, without any structural knowledge of the economy, one would predict that volatility is likely to remain close to its long-run historical average. There is no reason to expect a return

to the unusually quiet conditions of 2004-05, but also no reason to expect a surge in volatility to the unusually high levels of 1998-2002. The state of the US economy in 2006 suggests that we should expect slightly higher volatility than the long-run average. Although the business cycle has moderated in recent decades, perhaps because of improved monetary policy and corporate inventory control, investors are unusually uncertain about the stance of monetary policy as they become accustomed to Ben Bernanke as the new Fed chairman. In addition, stock prices are more sensitive to changes in expected growth rates or discount rates at times when stock prices are high relative to dividends and earnings. This effect helps to explain the high volatility of prices in the late 1990's at the end of the technology boom. Today, market valuations are not comparable to those of the late 1990's, but they are high enough to create some vulnerability to changing expectations about the macroeconomy.

**Active Currency Management**

**By Samuel Thompson, Ph.D. Arrowstreet Capital, L.P.**

Since our inception, Arrowstreet Capital has focused narrowly on managing active equities. Thus, when our equity decisions result in incidental currency decisions, we neutralize those currency decisions by using offsetting forward currency contracts. When an investment is made in a (developed) foreign country, the active position is hedged with an off-setting forward transaction. As the active weights drift, the currency hedge is rebalanced. The one exception to this rule has been in the emerging markets. Because of the illiquidity, or complete absence, of emerging markets currency forward instruments, positions in the emerging markets are not hedged but are rather taken on a dollar basis.

We are now convinced that the currency decisions taken in our emerging markets product are a small but diversifying source of alpha in the active portfolio. This has led us to believe we can improve the portfolio results for our developed markets strategies and as such, later this fall, Arrowstreet will begin to take active currency positions in those accounts. These positions initially will be limited and tightly circumscribed to the active equity exposures. This document briefly describes the currency model we have developed and the steps we plan to take to implement it.

**For a complete version of this article, please visit:  
[http://www.arrowstreetcapital.com/research\\_whitepaper.htm](http://www.arrowstreetcapital.com/research_whitepaper.htm)**

## June 2006 Investment Outlook Global/International Equity Strategy

### Developed Market Performance: 2nd Quarter 2006

The second quarter was a challenge for our Global/International Equity Strategy, as a rapid change in market leadership led to underperformance across all strategies. In general, our active basket selection was the largest detractor from performance.

Our overweight position in Dutch Financials, motivated by positive momentum characteristics, was a negative contributor to the portfolio as the basket trailed the broader index substantially. Our holding in Aegon N.V., the second largest Dutch insurer, was the largest detractor as sliding markets caused a reduction in the firm's investment gains, causing shares to fall 10%. Despite the setback, we believe Aegon is positioned to outperform competitors as it introduces a new plan of retirement products in the U.S. and it expands to rapidly growing markets, including China. The portfolio also received a negative contribution from the French Industrials basket, particularly from airplane manufacturer EADS. Although EADS has delivered a record number of aircraft thus far in 2006, their main competitor, Boeing, has seen sales of their 787 aircraft outpace EADS' comparable A350 by a factor of three.

A bearish climate in Europe triggered by the European Central Banks decision to hike interest rate to slow economic inflation and stymie inflation led to declines in many European markets. Our overweight position in the Netherlands was a negative contributor to the portfolio.

Our country level decisions were more successful in the United Kingdom where, despite remaining underweight the broad U.K. market, we were propelled by overweight positions in the Energy and Telecom sectors. Our positions in these sectors were largely driven by positive country level earnings yield.

### Developed Market Outlook

Developed country stock markets were unable to sustain the gains they had seen in early 2006 as global markets fell in the second quarter. Federal Reserve Chairman Ben Bernanke continued the streak of interest rate increases in the U.S. as the previous rate hikes have failed to yield the desired effects. The Fed looks to combat inflation and slow a U.S. economy that grew at a rate of 4.8% in the first quarter, well above the central bank committee's prediction of 3.5%. The European Central Bank is following suit and tightening access to credit in response to the growing energy costs. Soaring energy costs and the rate hikes have led to slowed economic growth across Europe, including the United Kingdom where the Bank of England lowered its growth forecast for next year. Increased rates

in Europe are warranted as ECB officials have seen retail sales climb, manufacturing activity reach its highest levels of the decade and business confidence rise to a five year high. Japanese companies have increased capital spending as the Bank of Japan has continued to deplete excess reserves in preparation for an expected rate increase as early as July.

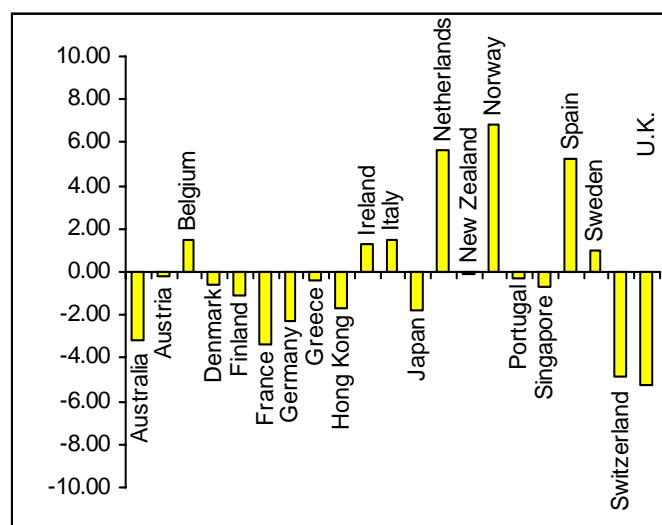
Global inflation reached a 10-year high in the second quarter and the prospect of further interest rate increases had far reaching effects on the world equity markets. Sixteen central banks had raised rates in 2006, with the number expected to climb to 21 before year end. Markets dropped as nervous investors waited to see if economies would be able to maintain their rapid rates of expansion while avoiding inflation.

Specific opportunities that we believe will offer attractive return potential include:

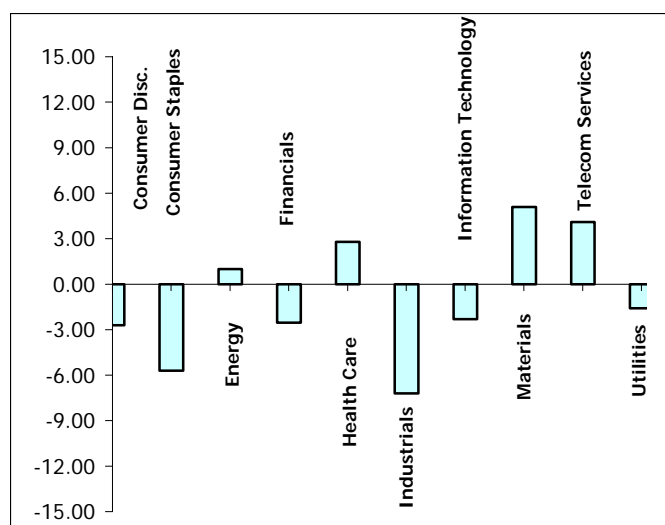
\* Aiful (Japanese Financial) – Despite recent set backs for the company in the Japanese marketplace, we believe Aiful is oversold and represents a bottom-up buying opportunity, mostly driven by valuation signals. While our models would normally prefer to see more in the way of supporting catalyst signals (e.g., Analyst Estimate Revisions or Momentum), the valuation discounts in this case, on multiple dimensions, are sufficiently compelling to justify the possibility of buying in too early.

\* BT Group (U.K. Non Cyclical Services) – In contrast with Aiful as almost a pure value play, BT Group offers a wide ranging combination of attractive attributes on virtually every dimension of our forecasting model. Not only does it the stock offer cheap valuation on both a direct (e.g., Stock Enterprise Value Free Cash Flow and Return on Invested Capital) and indirect basis (Basket Earnings and Dividend Yield, Country Trailing and Forward Looking Earning Yield and Sector Dividend Yield), but it is in the early stages of being recognized as undervalued by other investors. This last observation is supported by Stock Level Starmine Analyst Estimate Revisions as well as a recent run up in both the stock and global sector's price.

April 2006 Active Country Weights (%)



June 2006 Active Sector Weights (%)



## June 2006 Investment Outlook Emerging Markets Equity Strategy

### Emerging Market Performance: 2<sup>nd</sup> Quarter 2005

The second quarter proved to be challenging for our Emerging Market Equity Strategy. In general, we added value from our active basket selection but lost value from intra-basket stock selection.

Specifically, over-weights in Pakistan (Materials and Telecommunication Services) and Turkey (Materials) lost value as investors sold off riskier assets reacting to the concern of global inflation and hire interest rates. On the positive side, positions in Taiwanese Financials such as Cathay Financial and other banks and insurers benefited from a government plan to allow more overseas investment and a proposed plan to lift a three-year freeze on expansion that may engender consolidation within the industry

### Emerging Market Outlook

Emerging equities finished the quarter down -4.27% in USD terms, falling sharply from highs reached in early May. At one point in mid-June, the MSCI Emerging Markets Index had declined over -24% from its high-water mark, rebounding later in the month to recover some of its losses. For comparison, the MSCI World Index of developed countries fell -0.51% in Q2 2006. Market volatility has markedly increased, with the 100-day annualised price volatility of the MSCI Emerging Market Index measuring over 23% as of quarter-end, relative to its average of approximately 13.6% during Q1 2006. The major force influencing the downward trend during the quarter was the action of several countries to raise interest rates to counter inflationary pressures engendered by rising commodity prices and previously strong economic growth.<sup>[1]</sup>

During the latter portion of the second quarter, emerging market investors withdrew money from the asset class. According to Emerging Portfolio Fund Research, emerging-market stock funds experienced net outflows of approximately USD \$15.4 billion during the 5-week period following the MSCI Emerging Markets Index's record high in early May.<sup>[2]</sup>

Most central banks around the globe pursued a tightening monetary policy in order to contain inflation, with the U.S. Federal Reserve, the European Central Bank, and the central banks of China, India, Malaysia, South Africa, South Korea, Thailand, and Turkey all raising interest rates during the

second quarter. These moves prompted investors to sell equities and riskier assets, which led to sharp price declines, especially among emerging market equities.<sup>[3]</sup> Rising inflation in Turkey sent that country's equity market spiraling downward during the second quarter. The rate of inflation rose to nearly double the government's 5% target. Turkish stocks declined -29.47% in USD terms in Q2.<sup>[4]</sup>

Commodities continued to enjoy their protracted bull market, with oil reaching its highest level ever in April. This further boosted the returns of oil-producing countries (e.g. Russia) and oil companies (e.g. OAO Lukoil, CNOOC) alike, helping them to out-perform the broad index during the second quarter.<sup>[5]</sup>

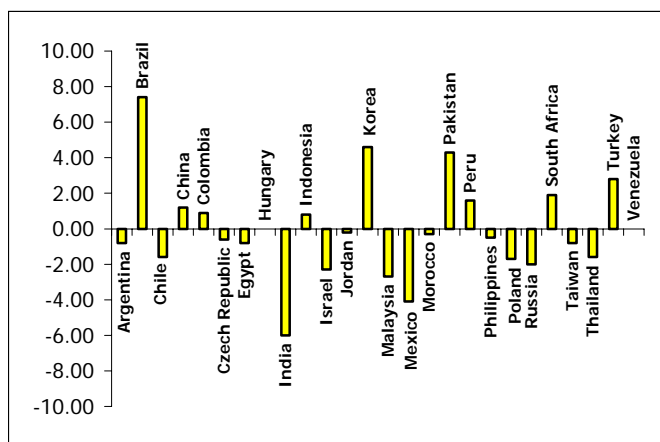
### Specific opportunities that we believe will offer attractive return potential include the following:

**Braskem (Brazilian Materials):** This basket offers an attractive yield compared to its peers as well as positive momentum scores compared to the broader universe. Within the basket there are some attractive candidates, such as chemical-maker Braskem, which is undervalued compared to other companies in this group as measured by its enterprise-level free cash flow yield and book yield. Braskem's excess long and short-term momentum has been poor, and as such, we believe it is due for a price reversal.

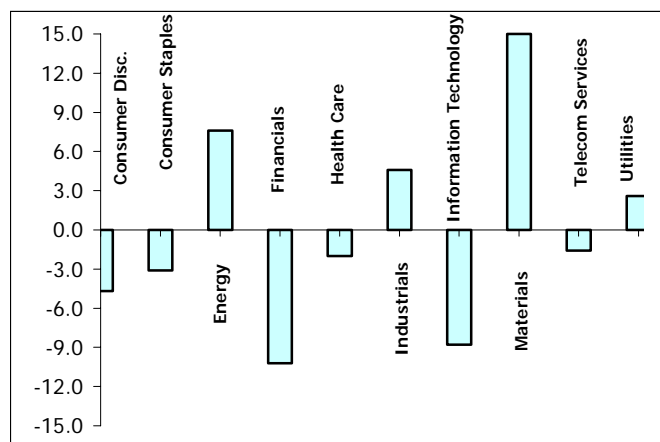
**Pakistani Materials:** (e.g. Engro Chemical, Fauji Fertilizer Co, ICI Pakistan, Lucky Cement) This basket continues to offer a strong dividend yield relative to the broader universe, and we believe the recent sell-off in Pakistan has been an over-reaction as earnings and fundamentals remain intact. The country-level earnings yield for Pakistan is quite attractive, and its analyst earnings revision score is undergoing an upward trend.

[1] Source: "Emerging-Market Stocks Climb: CNOOC, Lukoil Pace Gain" Darren Boey and Janice Kew, Bloomberg News, June 29, 2006.

June 2006 Active Country Weights (%)



June 2006 Active Sector Weights (%)



### Employee Profiles — Samuel Thompson, Ph.D., Manager Research

Prior to joining Arrowstreet Capital on a full-time basis, Sam held a position as an Associate Professor of Economics at Harvard University. Sam has published and has forthcoming articles in top finance and economics journals, such as the *Journal of Financial Economics*, the *Journal of Econometrics*, and *Econometric Theory*. His research has focused on the intersection between finance, statistics, and computational methods. Much of this research is relevant for Arrowstreet Capital's quantitative processes. Sam graduated from the University of California at Berkeley with a Ph.D. in Economics and a M.A. in Statistics in 2000. He received a B.A. in Economics from Yale University in 1995. In his spare time: I like to play with my 13 month old daughter, Alice, then write academic papers when she goes to sleep. He resides in Cambridge, MA.

