RT Trading Group

Business Plan

Ram Ben-David & Todd Pearson

August 2012

Executive Summary

Ram Ben-David and Todd Pearson met and worked together at Breakwater Trading from 2006 through 2010. During that time they successfully developed and deployed a system that generated in excess of $6MM trading revenue.

During the past few months Ben-David and Pearson have completed their investment in the intellectual property and innovated a cutting-edge system, engineered for today's market place.

The system is ready for launch and is expected to generate in excess of $2 million per year. A detailed P/L projection is provided herein.

Principals' Background

Ram Ben-David and Todd Pearson have partnered to found RT Trading. They have a history of turning opportunities into successful ventures. They have been on the cutting edge of new products, methodologies and technologies. Throughout their careers they have created innovative quantitative solutions in the realm systematic trading and lead their implementation.

Ben-David began his career as an experimental particle physicist. He graduated from Yale University with a Ph.D. in Physics. For over 12 years, he has applied his scientific training to develop algorithmic trading strategies at several hedge funds and proprietary trading firms, including Hull Trading (a Goldman Sachs Company), Breakwater Trading and, most recently, Magnetar Capital. As a partner and Director of Financial Engineering at Breakwater Trading, Ram established and led a successful algorithmic trading group.

Pearson started his trading career on the floor of the Chicago Board Options Exchange trading options on index products including the SPX and the Dow Jones Index. Pearson joined Ben-David's group at Breakwater Trading and began development of a highly predictable and very profitable algorithmic trading strategy. The strategy would eventually become the backbone of the first successful algorithmic trading group within Breakwater Trading, leading him to be invited to join the partnership.

When Ben-David was asked to develop and deploy strategies within Breakwater's newly formed trading group, Pearson led and grew the initial group to include an additional trader and two analysts. The two groups combined to generate a large portion of Breakwater's revenue.

Recently, Ben-David and Pearson decided to collaborate and apply a combination of quantitative and machine learning techniques to create a new strategy that is a significant improvement over the original strategies.

Strategy Overview

Market Analysis

International equity index futures exhibit strong couplings during specific times of day. An event in one country induces movement in the local equity index that generates a ripple effect across the global marketplace, creating arbitrage opportunities. These opportunities may be exploited through the use of a pairs trading strategy.

A pairs trading strategy is based on the knowledge that pairs of financial instruments have historically moved together. When a shock or perturbation is introduced to a pair, the coupling between the pair dampens the shock and the pair will revert back to its equilibrium state. Thus, as shocks are introduced to the system, a trading position can be initiated that will profit by a reversion to the equilibrium state.

Implementation

The trading strategy combines quantitative and machine learning techniques to assess fair value and construct a portfolio. The first step estimates the relationship between two index futures. Next, upper and lower divergence thresholds are determined using a proprietary volatility forecast model. Trading positions are initiated when the two futures diverge beyond the pre-determined threshold. The underperforming future is bought long while the relative outperformer is sold short, thus speculating in a future convergence generating an arbitrage profit. The position is closed when the system has either returned to equilibrium or a stop-loss level has been triggered.

Using a machine learning technique, the portfolio is constructed, combining several pairs in order to diversify the portfolio's holdings and smooth out the overall returns.

Risk Controls

Risk is managed by using the following steps:
- restricting the maximum position size in any product to a preset limit across the entire portfolio,
- a stop-loss strategy is implemented for each individual pair and for the entire portfolio,
- the portfolio does not hold positions over night,
- trading products only during times of adequate liquidity,
- diversification through multiple pairs and parameters,
- stress testing entire portfolio,
- rigorous back testing of all pairs using 1.5-3 years of data, depending on data availability,
- all trading is filtered through personal judgment, constantly monitoring news that could fundamentally affect the market conditions.

Simulation Overview
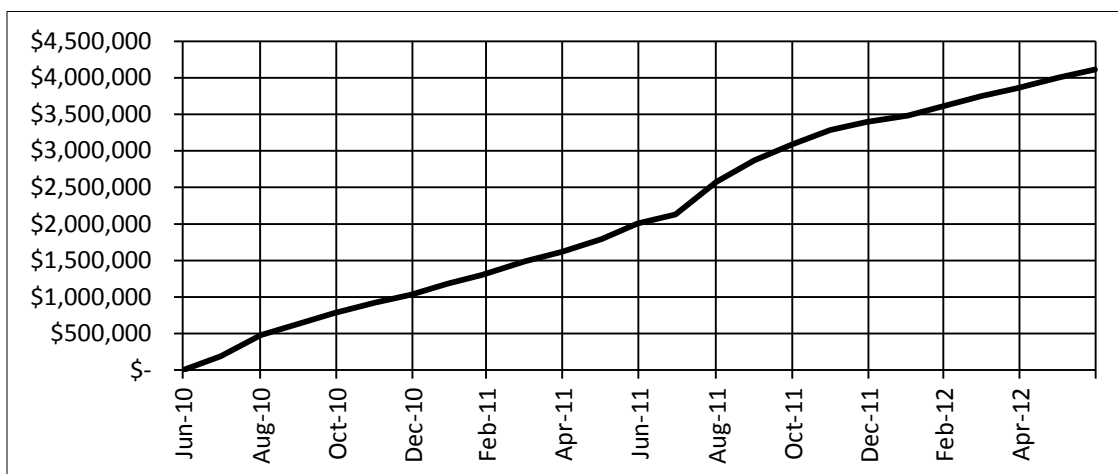
Data and Transaction Costs

One year of in-sample data was used to calibrate and develop the model. The out-of-sample results presented are for the subsequent two years. Fundamental methodologies and assumptions are consistent with those used in the group's previous successful trading algorithms and studies. Our transaction cost assumptions include 5% of a tick slippage per trade. Transaction fees are typical of professional rates. Margins are as reported from the Interactive Brokers' website for initial intraday margin.

Results

The model was applied to the out-of-sample period (7/1/2010 through 6/30/2012). All statistics are net of transaction costs. In Table 1 are the summary statistics and Figure 1 is the cumulative monthly trading revenue net of transaction costs.

Table 1: Portfolio backtest summary statistics (out-of-sample).

Average Annual P/L	$2,056,798	Average Positive Day	$10,074
Peak Margin	$1,101,681	Average Losing Day	($5,530)
Maximum Notional (L+S)	$20,000,000	Average Profit Per Trade	$125
Average Monthly P/L	$171,400	Average Stop Loss Per Trade	$4,000
Standard Deviation of Monthly P/L	$79,971	Average Holding Period	73 minutes
% Months Positive	100%	Largest 1 Day Profit	$71,002
Average Daily P/L	$8,923	Largest Intraday Unrealized Drawdown	($50,000)
Standard Deviation of Daily P/L	$8,882	Largest 1 Day Realized Drawdown	($21,610)
% days Positive	93%	Largest Drawdown	($21,610)
Sharpe Ratio (Monthly)	7.4	Length of Maximum Drawdown	7 Days

Figure 1: Cumulative monthly trading revenue net of transaction costs (out-of-sample).

Management Summary

Competitive Comparison

The team has demonstrated an ability to make quantitative strategies work successfully and is passionate about the exploration and implementation of new strategies and concepts.

The team has extensive experience with the full life cycle of algorithmic trading, including:

- initial research,
- back testing of strategies,
- execution of trades,
- pre and post trade analysis,
- market risk management,
- operational risk management,
- scaling the methodology to other asset classes and time frames.

Our experience has shown that when a group has a common goal and shares ideas, a greater level of success is achieved than through the sum of the parts.

Technology

Through the use of a third party execution platform (CQG) the strategy is capable of being implemented within days. CQG offers the ability for entry and exit signals to be automated, such that the trader is only responsible for tracking positions and making sure that the correct orders (buys and sells) are active.

Areas of Future Growth

Greater scalability and improved performance will be achieved through full automation of the strategy. Adding products, hours of the day and new algorithms will help the group grow in several directions.

The team has previous success in the trading of other products including; energies, fixed income, commodities, equities, and currencies. The team is constantly seeking new analytic techniques to maintain its competitive advantage.

Culture and Personnel

As the group moves forward, it will be important to add team members with a diverse background who value a culture of trust, openness and sharing. We anticipate adding the following positions as needed: developers, traders and quantitative analysts.

Financial Plan

In Table 2 are the projected revenue and expenses of the basic trading group. Revenue is based on simulation results. Bloomberg will be used for data and CQG will be used as the execution platform. The group will be able to replicate an endeavor that previously required significantly more people and technology to implement.

Table 2: Projected basic revenue and expenses

	Month-1	Year-1
Gross Trading Revenue	$195,563	$2,346,750
Commissions and Fees	$24,163	$289,950
Bloomberg	$2,000	$24,000
CQG	$4,036	$48,432
Total Expenses	$6,036	$72,432
Net Income	$165,364	$1,984,368