303 Capital Partners Questionnaire

for Due Diligence Review

303 Capital Partners Questionnaire for Due Diligence Review

To navigate this document please use the tab-key or point mouse to the beginning of the input field. The size of the field will automatically adjust to the length of your input. Please complete to the best of your ability and return as soon as possible (some questions may not apply to your strategy).

MANAGER INFORMATION

Manager Entity/Team Name:	
Manager Name:	
Address:	███████, Princeton Jct, NJ 08550
Telephone:	
E-mail:	
Name of Primary Contact:	Same as above
Title of Primary Contact:	Same as above
Telephone of Primary Contact:	Same as above
E-mail of Primary Contact:	Same as above

PREVIOUS FIRM

Firm Name:	Tower Research Capital
Position:	Quantitative Trader
Period of Employment:	2009-2011
Accomplishments:	Developed and ran high frequency Spot FX Strategy, Created Alpha Models for FX, Futures and Equities
P&L Return on capital (Please explain all capital usage and leverage assumptions):	Approximately 100K/Day. Average unleveraged return approximately 10 bps. Leverage varies by product type.
Track record owned? (If no, then provide ways to verify):	Track record as part of group, covered by non-disclosure agreement. Personal references are available (Dave Dugan received them).
Reason for leaving:	Resigned to run own book

STRATEGY

Strategy category:	**Statistical Arbitrage, Data Driven.**
Hedging Techniques:	**Broad, Portfolio Sharpe maximizing diversification. Low sector, industry concentration.**
Market Exposure:	**Low percentage exposure per name. Average Beta 20%. Highly liquid names (Average ADV 175MM, min ADV 30MM)**
Asset classes / markets traded:	**US Equities: NASDAQ and other venues.**
Geographical focus:	**Currently US. Can be extended to European and Asian equities.**
Instruments used by percentage:	**200-300 highly liquid Tape A and B securities – under 5% exposure per name.**
Describe the strategy in simple terms:	

	Uses combination of mean reversion and momentum signals. Mean reversion with respect to set of statistical indices resembling multiple RSIs.
Systematic/Discretionary	**Fully systematic, nondiscretionary**
Who developed the strategy:	**Self**
Automated/Manual execution:	**Automated**
Avg/min/max holding period:	**12 hrs/<1hr/20hrs**
Daily/monthly trading volumes:	**Approximate max book size 500MM with 50% daily turnover**
Have you encountered position limit problems?	**Max position is based on 3% of traded volume over signal duration (5 hr average)**

EDGE

Specific Edge:	**Sophisticated and robust statistical analysis for broad security universe. Multi-horizon forecasting. Horizons chosen to eliminate adverse selection, maximize capacity while keeping reasonably high turnover.**
Background/evolution of edge:	**Ideas developed since early 2009 gradually increasing robustness and variation in time scale while retaining model parsimony.**
Factors/experience allowing manager to access edge:	**Extensive background in various mathematical statistics methods, statistical machine learning and econometrics. Development of successful alpha models for other product types. Development of optimal portfolio execution algorithms, market impact analysis from work on the agency side.**
Discuss the persistence of edge:	**Edge exists over hundreds of securities and in timespan of at least 10 years irrespectively of time of the day or other calendar effects. Breadth of trading universe provides resistance to fluke moves in individual securities.**
Method for monitoring ongoing effectiveness of edge:	**Consistency of Sharpe ratio and it's confidence intervals; mean and median returns; number of trades; overall market volumes; return auto-correlation profile – appearance of streaks; return empirical PDF skewness and excess kurtosis.**
When is the strategy most/least effective:	**Most effective during higher market volumes, fewer number of rapid market regime changes. Least effective when volumes are very low and there are frequent market regime changes.**

RISK

Discuss overall risk management approach:	**Proactively, main idea is to reduce return adjusted portfolio risk, while maintaining capacity. Also keeping low single name and industry/sector exposure. Reactively, maintain stop losses and analyze model performance on ongoing basis.**
Proactive risk management:	**Broad, Portfolio Sharpe maximizing diversification balances risk-return tradeoff. Low sector, industry concentration further reduces exposure to risk factors. Low percentage exposure per name reduces sensitivity to major moves in a given name. Highly liquid names (Average ADV 175MM, min ADV 30MM) allows to quickly enter and exit positions.**
Reactive risk management:	**Uses stop losses by name and by portfolio on a given day. On a multi-day horizon, strategy edge monitoring identifies systemic situations when model performance worsens.**
Discuss maximum capital risk per trade, per day, per month:	**Maximum seen drawdown is -4% on a peak-to-trough basis, lowest daily draw down is -1.65%, lowest monthly return seen is -3.6%.**
Trade level risk management methodology:	**Stop losses, model predictive ability monitoring**
Portfolio level risk management methodology:	**Portfolio Sharpe maximization, portfolio stop loss**
Potential regulatory risks:	**None presently. If Congress decides to impose a 50bp transaction fee, that would be an issue.**
Liquidity risks:	**Flash crash type short term liquidity squeeze.**
How can risk management methodologies fail?:	1. **In the event of large shocks even uncorrelated securities become concordant so covariance matrix based risk management will not be adequate. Stop losses will kick in.** 2. **Stop losses may fail if there is a line or hardware failure. Backups should be in place.**

CAPITAL USAGE

Discuss actual capital requirements of strategy:	Once pipes are tested, real trading can start with as low as 2M in capital, trading all instruments to maximize Sharpe. Odd lots can be traded without penalties as long as they are executed on INET. Over the course of 6-8 months the aim will be to reach 100MM in trading capital use. From that point strategy is further scalable to about 500MM in trading capital in US. Later on using Europe and Asia it may be possible to reach 1B in trading capital use.
Address leverage usage, cross-margining, gearing associated with strategy:	Initial leverage factor should be kept artificially lower in 3-4 range as it scales and builds up P&L, leverage may reach 8-10 range. When exposure exceeds 100MM leverage may be scaled down again.
What is the capacity of the current strategy:	500MM

Can additional strategies be added to increase capacity:	Adapting to European and Asian markets may do that.

EXECUTION

Specific prime broker/clearer requirements	Commission under 5 mills is preferred. Rapid ability to borrow for short sales is a big plus.
Specific trading platform and connectivity requirements	Co-location and fast risk checks are preferred. Access to dark pools and all lit venues will be important for scaling up.
Exchange membership requirements:	none
Leverage/margining requirements:	Access to leverage in 6-10 range is preferred.

INVESTMENT RESEARCH

Describe your overall R&D Process	1. Data collection, cleaning, structuring for optimal access
	2. Security universe selection
	3. Model implementation in R – this takes advantage of cutting edge R packages.
	    i. Data preprocessing, identifying data idiosyncrasies and transformations.
	    ii. Hypothesizing about temporal relationships and formulating a model.
	    iii. Model refinements, stability analysis, identifying key model metrics
	    iv. Identifying execution logic for given model.
	    v. Back tests using rolling training window on chosen data subset, finding optimal execution parameters.
	    vi. Confirming resulting execution logic with it's parameters on a separate (left out) data set.
	4. Model implementation in C++.
	    i. Developing the equivalent of the required R numerical methods in C++
	    ii. Matching execution logic and position management between R and C++. This serves as bug proofing for both R and C++ implementation.
	    iii. Developing tick level simulator in C++
	    iv. Implementing API agnostic trading interface "black box". This way simulation and production strategy internals are the same.
	    v. Matching C++ and R simulation results. Fixing

	vi. discrepancies based on finding aggregated differences, subdividing that to find lower level differences and etc until a clear test case exhibiting difference emerges and fixing it.
What are you R&D goals for the next 6, 12, and 24 months:	1. Reduce execution costs on lit venues using known pattern of actual trades and selecting optimal execution logic for those times. 2. Incorporate dark venues and develop their heat maps 3. Apply model to European and Asian markets, including model tweaks incorporating different cost structures and exchange rules.
Describe the flow of an investment idea from inception to trading:	Reading research papers in statistics and econometrics – they highlight some of the market phenomena and methods to identify them. Discussing things that work with other quants on a general and mutually beneficial basis. Synthesizing new ideas and thinking of ways to improve based on those inputs. Testing resulting ideas in R. Also described above under "R&D process"
Describe your back testing of investments:	Described above under "R&D process": using sliding window model generation and testing, cross validation.
Have you published or commissioned any research/academic papers?	Yes: my early research area was in multivariate complex function theory. Lately I focus on combinatorial optimization methods.

PERFORMANCE

Annual P&L Realized:	**19M (first year projected†) based on average trading capital of 50M (due to initial scaling).**
Annual realized return on capital:	**38%† (unleveraged)**
Realized Sharpe ratio:	**5.15†**
Maximum capital drawdown:	**4% †**
How can performance be verified:	
How do you expect this performance to differ going forward:	**2013 volumes appear to be improving along with retail investor sentiment which is positive for the strategy**

†Note: Realized P&L numbers based on live strategies at Tower are based on a different trade horizon and therefore not relevant for the current strategy. Presented numbers are based on extensive back test, while the model itself is proven in live trading – on a different time horizon.