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WHY LONG SHORT IS THE NEW LONG

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The market sentiment and dynamics have changed dramatically in recent months and investors need to reassess how to maximise their returns (alpha) by improving the efficiency of their portfolios in a lower return environment.

Improving the efficiency of a portfolio means investors can extract significantly more return from the portfolio for the same level of risk. In volatile markets this can be a useful tool that allows investors to reduce their risk by reducing their allocation to an asset class without reducing their return expectations.

Of all the typical constraints imposed on a portfolio, a long-only or a no-shorts constraint creates the most inefficiency in the portfolio.

In a bull market these inefficiencies do not draw much investor attention but when the market returns revert to more normal levels the need to extract as much alpha from a manager as possible will become more important.

Shorting strategies have received some negative press recently. An example is an article in The Sydney Morning Herald on 29 March 2008 titled 'Collapse could reveal a sordid tale of short selling super'. However, shorting strategies can be a very efficient tool in improving the risk/return characteristics of investor's portfolios.

Though short selling strategies are quite well established in the institutional market in Australia, they are not yet widely used by the retail investors in Australia.

This paper discusses the theoretical foundations and practical implementation of how portfolio managers can improve portfolio efficiency through the use of short selling. It will also address the question of risk that is normally associated with short selling.

Theoretical background

Richard Grinold and Ronald Kahn introduced the fundamental law of active management in 'Active Portfolio Management'[1]. It states that the information ratio of a portfolio (IR) can be expressed by the following formula:

IR = IC * N^.5

Where:

IR = Excess return achieved (alpha) / Risk taken (tracking error, TE)

IC = Manager's skill ie their ability to forecast returns for individual stocks. It is measured as the correlation between the forecast returns for the stocks and the subsequent actual realised returns on these stocks. The correlation may be weighted by the square root of market capitalisation or by liquidity of the stock to reflect more accurately the opportunity set available to the manager.

N = Breadth of the portfolio or number of independent bets in the portfolio.

This work by Grinold and Kahn was extended by Clarke, Silva, and Thorley in their 2002 paper 'Portfolio Constraints and the Fundamental law of active management'[2] by introducing what they called the transfer coefficient (TC).

IR =TC x IC * N^.5 (Equation 1)

Where:

TC = The ability of the manager to transfer his or her stock forecasts into effective portfolio weights. It is measured as the correlation between the manager's forecast alphas and implied alphas of the stocks in the portfolio. Implied alphas for a stock are proportional to its marginal contribution to the risk of the portfolio. Implied alphas are a standard output from any of the equity risk models.

In the absence of any portfolio constraints, portfolio TC should be equal to one or 100% which means the portfolio manager's views are entirely reflected in the portfolio. As one starts to introduce constraints on portfolio construction, one starts to introduce inefficiencies in the portfolio. For example, a manager bullish on energy stocks can't buy as many energy stocks as they would like due to portfolio sector constraints.

Since IR = Alpha / Tracking error, Equation (1) can be written as

Alpha = TE * TC * IC * N^.5 (Equation 2)

Ingredients for alpha

Equation (2) provides an excellent theoretical framework for thinking about how an investor or portfolio manager can add alpha to their portfolio.

To increase the alpha (left hand side of the equation) of the portfolio, an investor could increase any of the terms on the right hand side of the equation (the tracking error, transfer coefficient, information coefficient or the breadth).

In other words, an investor could obtain higher alpha by:

1. taking more risk (TE)
2. increasing the portfolio efficiency (TC)
3. hiring a manager with more skill (IC)
4. having bets in the portfolio that are more diversified.

Assuming that the investor's risk tolerance (TE) is given and the investable universe or the benchmark is given (N), the only way to increase portfolio alpha is by increasing either IC or TC. A 10% increase in either TC or IC would achieve the same outcome in terms of alpha.

It is widely known that higher ICs are hard to come by. Generally an IC between 0.06 and 0.1 is considered a very good IC. This roughly means that on average, portfolio managers will get between 56% and 60% of their stock calls right. This is a humbling thought as a chimp tossing a coin will get 50% of their calls right!

Transfer coefficient on the other hand is easier to boost, especially if the existing portfolio is being run inefficiently.

How inefficient is the long-only constraint?

In their Fall 2004 paper 'Toward More Information-Efficient Portfolios'[3] Clarke, De Silva and Sapra use an empirical analysis to illustrate the extent of efficiency loss due to various portfolio constraints. They did this by constructing a series of optimised portfolios with ex-ante tracking error of 4.0% relative to the S&P500 Index.

The following table has been reproduced from this paper. It shows the effect on portfolio efficiency if certain portfolio constraints are removed.

		Constraints removed				
	All constraints	**Industry**	**Sector**	**Position limit**	**Market cap**	**Long-only**
Transfer coefficient (TC)	0.332	0.347	0.346	0.298	0.471	0.678
% change in TC		8%	8%	-7%	46%	108%

Source: Clarke, De Silva & Sapra

As one can observe, the greatest improvement in efficiency comes from the elimination of the long-only constraint. Improving the TC by 100% will result in 100% improvement in alpha for the same level of risk. It is relatively easy to increase the TC, whereas one will be struggling to achieve the same outcome for IC.

Australian context

To get some idea of how inefficient long-only constraints were in the Australian context, it was decided to look at the data for two months. One of the months picked was an up-month and the other a down-month. The up-month was September 2007 when the market was up around 5%. The down-month was January 2008 when the market was down 11%.

For these two months, actual excess returns for stocks were used. Returns were normalised before being fed into a portfolio optimiser. The optimisations were run with varying degree of allowable short selling, starting with no short selling (long-only) to 5%, 10%, 15% and 20% of short selling.

Other portfolio optimisation parameters were as follows:

- 3% tracking error was chosen as it is typical of an active manager in Australia
- the maximum number of stocks was 100
- position limits were starting at 5% for the rank 1 stock and then linearly reducing to 0.5%

- the universe was the S&P/ASX300
- transaction costs were ignored.

The Clarke, De Silva and Sapra study was repeated for the Australian market with one exception, actual realised returns were used, thereby forcing the IC to be 1 by design. This was done to isolate the effects of ICs so that the behaviour of the TCs could be examined.

The results are presented in the following tables.

September 2007

Portfolio	Tracking error	Efficiency (TC)	% change in efficiency
Long-only	3	75.64%	
5% short	3	83.42%	10.29%
10% short	3	86.46%	14.30%
15% short	3	88.38%	16.84%
20% short	3	90.36%	19.46%

Source: Perpetual using Clarke, De Silva & Sapra study

January 2008

Portfolio	Tracking Error	Efficiency (TC)	% change in efficiency
Long-only	3	81.23%	
5% short	3	92.48%	13.85%
10% short	3	94.83%	16.74%
15% short	3	96.09%	18.29%
20% short	3	97.08%	19.51%

Source: Perpetual using Clarke, De Silva & Sapra study

The improvement in efficiency (TC) is not as dramatic as in the Clarke, de Silva and Sapra study. This is because a highly contrived alpha set (perfect foresight) was used. The tracking error at 3% was also slightly less than the one used in the study.

Nevertheless the improvement in portfolio efficiency is still significant when one considers the fact that a 20% improvement in efficiency translates directly into 20% better alpha.

Two other points are worth making here.

First, a dramatic improvement in the efficiency results from relaxing the long-only constraint by even by a little bit, say 5%.

Second, the improvement in efficiency is not linear. While 5% short selling results in 14% improvement in efficiency (TC), 20% short selling results in an improvement of only 20%. This is due to the structure of the Australian sharemarket. Top 20 stocks in S&P/ASX300 make up 61% of the index while the top 50 stocks make up 79% of the index. Ability to short smaller market cap stocks is what gives the portfolio efficiency (TC) its biggest boost. Currently BHP is 13% of the Index. A

portfolio manager can take a large enough active bet in BHP by simply not being in BHP. There is no need for him or her to further short sell BHP.

So, at least in the Australian market one need not go much beyond 20% short selling to get almost full benefits of improved portfolio efficiency.

Case study

In 2002, a study was carried out to look at a unique implementation of long-short strategy.

The purpose of the study was to see if an existing long-only portfolio with a long term history and track record would have benefited from a **superimposed** long-short strategy.

The long-only portfolio was Perpetual's Australian Share Fund (ASF), which has been running for more than 20 years. The study period was from August 1997 to August 2002.

Methodology

1. On a monthly basis, starting at the end of August 1997, an equity risk model was used to derive implied alphas from the ASF for each stock in the universe (ASX300). Implied alphas were used because unlike a quant manager a traditional equity manager does not forecast alphas for their stocks.
2. These implied alphas were fed into an optimiser to create a portfolio of short securities that was 20% of the ASF by value.
3. The proceeds from this short portfolio were deemed to have been reinvested in the ASF
4. The result was a share portfolio named SHARE-PLUS, which was a combination of 120% ASF and 20% short portfolio.
5. The constraints on the short portfolio optimisation were:
    - the universe was the ASX200 for liquidity purposes
    - a maximum of 60 stocks in the short portfolio
    - position limits were -5% for the largest stock in the universe down to -0.5% in the smallest stock in a linear fashion
    - a stock held in ASF could not be short sold
    - a net GICS sector underweight limit (combined with long portfolio) of -2%
    - a trading limit of no more than 3 days of daily trading volume
    - a monthly turnover constraint of 8%.

The process was repeated for each month from August 1997 to August 2002 and the results of the back test are presented in the following table.

Back testing of long-only vs long-short portfolio - August 1997 – August 2002

	Long only	Long short	Change
Benchmark return pa	7.41%	7.41%	
Portfolio return pa	12.05%	17.55%	
Active return pa	4.64%	10.14%	
Active risk (TE)	4.29%	6.17%	
Information ratio (IR)	1.08	1.64	51.9%
Absolute risk (risk of losing money or beta risk)	12.13%	12.26%	1.07%

Source: Perpetual

As can be seen from the table, there was a 52% improvement in the information ratio (IR) and hence in the portfolio efficiency (TC).

Even though the tracking error was allowed to go up from 4.29% to 6.17%, the absolute risk of two portfolios, ie the risk of losing money or beta risk, was almost identical.

Based on the results of this back test, SHARE-PLUS was implemented in the year 2003 and now has close to five years of track record.

The actual implementation of SHARE-PLUS is not exactly the same as in the back test, but the short portfolio created using back test methodology is still used as the benchmark. In other words the portfolio manager has discretion in managing the short portfolio but he is still measured against the benchmark created as per the back test methodology.

Some implementation considerations for short selling strategies

Risks

Due to the deep in the money call option nature, risks in the short position are skewed.

Profits on short positions are limited to the value of the stock but theoretically losses are unlimited. For example, if one buys a stock for $10, then the most one can lose is $10. However if one shorts the same stock for $10, losses could be unlimited as the stock could rise to $100 or even higher.

For example Fortescue Metals Group (FMG) was trading around 60 cents (adjusted for corporate actions) at the beginning of 2006. If one bought the stock at 60 cents, the most one could lose was 60 cents. However, if the stock was sold short at that time one would have lost $12.40 in June 2008 when the stock peaked at $13.15. The maximum reward for short selling stock at 60 cents was 60 cents with the potential loss of $12.40. This is a risk-to-reward ratio of 20 to one.

This risk can be managed by having stringent risk control on short positions through stop loss mechanisms both at the stock level and also at the portfolio level. This risk can also be mitigated by spreading the short portfolio over a number of stocks so that the average short position per stock is

around 0.5%. This way, even if the stock price went up by 100% the damage to the portfolio would be 0.5%, a painful but not fatal experience.

Stock availability for short selling

In Australia, most if not all short positions are implemented by borrowing stock from a prime broker. A prime broker is a broker who has an inventory of stocks which he holds on behalf of his domestic and overseas clients. These clients allow the prime broker to loan out the stock on their behalf to earn a commission of typically 0.5%. Stock lending is usually secured with 100%+ cash or other liquid assets.

Sometimes the stocks that the portfolio manager wants to short may not be available for borrowing, especially around corporate actions. In this situation it is a common practice to ascertain the availability of stock from the prime broker before running the optimisation. If a certain stock can't be borrowed then one can modify the universe of short stocks to cater for this.

This risk can be reduced to some extent by having borrowing arrangements with more than one prime broker.

Franking credits

If one is short a stock over ex dividend date then one is expected to make up the dividend to the lender by a cash payment. For stock borrowed from domestic lenders these dividends have to be grossed up by franking credits resulting in a higher borrowing cost.

What about the recent negative press?

The recent events surrounding Opes Prime and some other stockbroking firms have resulted in bad press for the stock lending industry.

The difficulties of these stockbrokers had very little to do with the legitimate investment strategy of borrowing and short selling the stock and everything to do with mismanagement.

Senator Nick Sherry recently endorsed the practice of stock lending as a valid investment strategy. On 21 July 2008, The Australian Financial Review carried an article titled 'Sherry speaks up for short selling'. It wrote that 'Corporate Governance Minister Nick Sherry has defended the role short selling plays in facilitating an efficient market'.

Other bad press that long-short funds receive from time to time is when a hedge fund comes undone. The long-short strategies discussed here are perceived as hedge funds and get bundled with hedge funds when bad press is being doled out.

This is unfortunate, as we see the long-short strategy as a legitimate investment strategy that should be at the core of all portfolios.

Conclusion

To get better returns from your portfolio, an investor can either look for a better manager (higher IC) or extract more value from the same manager by increasing the portfolio efficiency (TC). By relaxing the long-only constraint, one can expect a substantial improvement in portfolio efficiency (TC). This

translates, one for one, into better alpha for investors' portfolio. It is a lot easier to increase the efficiency of the portfolio than to find a manager with better skill (IC). Not running a portfolio at their maximum possible efficiency is like driving a six speed car in second gear. Short selling a stock is a valid investment strategy. The short positions are inherently more risky than long positions but these risks can be managed by spreading short portfolio over a number of stocks and implementing stringent stop loss mechanism both at stock level and portfolio level. Even a modest amount of short selling can have dramatic impact on the portfolio efficiency.

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