

## Abstract

*We present some case studies detailing how the short selling ban on stocks of financial companies affects the construction and performance of sample pan-European equity portfolios. While these case studies do not amount to a full-scale empirical investigation, they illustrate the detrimental effects of this ban on a sample of optimal portfolios. Overall, our results suggest that the constraint on short sales of financial companies may increase the risk of the long-short portfolios and, in some cases, may decrease portfolio return. We present some evidence that this effect may be greater for 130-30 portfolios than for unconstrained long-short portfolios.*

In this Research Bulletin, we present some case studies detailing how the short selling ban on stocks of financial companies affects the construction and performance of a sample set of portfolios of European equities. Following recent market turbulence, a number of countries announced short-selling restrictions on certain assets. On September 18, 2008, the UK and US banned short sales of financial stocks. In the following days, Germany, France, the Netherlands and Belgium also barred short sales of financial company stocks, while several other countries banned short sales on any stock.

There is some theoretical rationale that short selling may exacerbate market crashes. For example, Bernardo and Welch (2004) developed a model in which the fear of a financial crisis, instead of a liquidity shock, is the true cause of financial crises. In this framework, implementing constraints that hinder some market participants from front-running other investors can effectively prevent a financial crisis from happening. In the current situation, the ban is arguably trying to remove downward price pressure due to concentrated bets.

Nevertheless, in classical asset pricing and portfolio choice models, short sales play an important role and banning them has a detrimental effect on market efficiency and quality (see for example Jouini and Kallal (2001) or Duffie, Garleanu and Pedersen (2002)). Empirical studies on the topic typically suggest that short sales constraints are an impediment to price discovery. While it can be argued that limiting short sales may be necessary under certain extreme conditions, there is little empirical evidence pointing to any detrimental effect of short selling. In a recent study Bris, Goetzmann and Zhu (2007) find evidence supporting the view that short selling helps efficient price discovery. They also suggest that there is little evidence that short selling constraints prevent or mitigate severe price declines at the individual security level.

Before looking at a set of long-short portfolios, let us illustrate the increases in the forecast levels of risk that have occurred over the last month as estimated by the EUE2-S model. Table 1 compares the forecast risk levels at the end of August 2008 and on October 10, 2008 for the MSCI Europe Index as a whole and the MSCI Europe Index with the Continental and UK banking, financial services and insurance sectors excluded. We see that the increases in risk have been virtually identical for the two portfolios, suggesting that the recent increase in risk levels has not been confined to the financial sector alone. However, even though excluding the financial sectors makes the portfolio less diversified and more concentrated, the overall risk forecast for the portfolio without financial stocks is lower.

**Table 1: Changes in forecast risk levels over the last month**

	30-Aug-08	10-Oct-08	% Chg	30-Aug-08	10-Oct-08	% Chg
	<u>MSCI Europe Index</u>			<u>MSCI Europe ex Financials Index</u>		
Asset selection risk	1.50	1.70	13.33	1.73	1.93	11.56
Common factor risk	18.33	20.24	10.42	17.00	18.80	10.59
Total portfolio risk	18.39	20.31	10.44	17.09	18.90	10.59

Source: MSCI Barra

Our first case study is presented in Table 2. Here we compare the risk forecasts as of October 10, 2008, estimated by the EUE2-S model, for optimal long-short portfolios, tilted towards momentum and value factors, with assets chosen from the constituents of the MSCI Europe Index. The factor tilts are achieved by setting the minimum portfolio exposure to the factor to two standard deviations. Panel A presents the results for unconstrained portfolios, while panel B shows the results of industry neutral portfolios. Three main observations emerge from the analysis. First, we see that short selling restrictions led to an increase in portfolio risk in all cases. Second, this increase in risk appears to be higher for value portfolios compared to momentum portfolios. Third, the increase in risk appears higher for industry neutral portfolios, relative to unconstrained portfolios.

**Table 2: Effect of short sales ban on forecast portfolio risk as of October 10, 2008**

	Shorting allowed	Shorting banned	% Chg	Shorting allowed	Shorting banned	% Chg
<b>Unconstrained portfolio</b>	<u>Momentum strategy</u>			<u>Value strategy</u>		
Asset selection risk	8.02	8.48	5.74	3.66	4.04	10.38
Common factor risk	8.57	8.52	-0.58	2.37	2.63	10.97
Total portfolio risk	11.74	12.02	2.39	4.36	4.82	10.55
<b>Industry neutral portfolio</b>	<u>Momentum strategy</u>			<u>Value strategy</u>		
Asset selection risk	8.18	8.93	9.17	4.5	5.68	26.22
Common factor risk	11.17	11.24	0.63	3.38	3.69	9.17
Total portfolio risk	13.85	14.36	3.68	5.63	6.77	20.25

Source: MSCI Barra

With the unconstrained momentum portfolio, the short selling restriction resulted in an increase in total risk from 11.74% to 12.02%, while the asset selection risk increased from 8.02% to 8.48% (a percentage increase of 2.4% and 5.7% respectively). The results for the industry neutral momentum portfolio were similar, with total risk increasing from 13.85% to 14.36% and asset selection risk rising from 8.18% to 8.93%. The value unconstrained and industry neutral portfolios showed even more striking results. In particular, banning short sales raised the total

risk of the industry neutral value portfolio from 5.63% to 6.77% and raised the asset selection risk from 4.5% to 5.68% (a percentage increase of 20.3% and 26.2% respectively). This illustrates that in the given situation, the short sale ban increased the forecast risk of optimal factor tilt portfolios. We provide some more details about the composition of the optimal portfolios in Appendix 1.

Next, we back test the historical performance of the long-short factor tilt portfolios, with and without a short sale constraint on financial stocks, over the last five years. The results for unconstrained portfolios are shown in Table 3. The risk numbers from the back test mirror the risk forecasts in the previous illustration. However, while we observe that the short sale constraint resulted in a slight increase in risk for the optimum momentum portfolio, we also note that it resulted in a higher return. Taking return into account, the short sale constraint does not appear to detract from the performance of the momentum portfolio. For the value portfolio, the short sale constraint both raised risk and lowered return, reducing the annualized Sharpe ratio from 2.4 to 2.1. It is somewhat counter-intuitive that a ban on short sales raises the realized return of the portfolio in the case of momentum. It appears, however, that this is due to the largely accidental asset selection effect (since we have not specified any criterion on asset selection other than momentum exposure). While originally we suspected that this result may be due to the trending market over the last five years, this effect still seems to hold if we back test over a shorter period since September 2006.

**Table 3: Back testing unconstrained long-short portfolios, September 2003-September 2008, annualized attribution**

		<u>Momentum strategy</u>		<u>Value strategy</u>	
		Shorting allowed	Shorting banned	Shorting allowed	Shorting banned
<b>Unconstrained portfolio</b>					
Asset selection	return	0.84	1.63	0.8	0.69
	risk	5.6	5.67	2.68	2.91
Industry factor	return	-0.99	-0.94	-0.4	-0.4
	risk	2.92	3.02	1.35	1.5
Total	return	12.75	13.66	7.59	7.36
	risk	7.95	7.97	3.21	3.47

Source: MSCI Barra

Our final illustration shows the effect of the short sale constraint on 130-30 portfolios. We consider a portfolio benchmarked to the MSCI Europe Index, where the portfolio manager uses an alpha model based on asset exposure to either momentum or value. Note that unlike the previous case, using an alpha model allows the exposure of the portfolio to the factor to vary through time. The results are shown in Table 4. For the momentum alpha model portfolio, we see that the constraint on short sales slightly reduced the total risk, but significantly reduced the total return, detracting from the overall performance of the portfolio. When using the value alpha model, the short selling restriction on the portfolio reduced the total return as well as increasing risk, again detracting from the overall performance. Overall, there is some evidence that the short sale restrictions may have more impact on 130-30 portfolios than unconstrained long-short portfolios.

**Table 4: Back testing 130-30 portfolios formed using an alpha model, September 2003-September 2008, annualized attribution**

		<u>Momentum strategy</u>		<u>Value strategy</u>	
		Shorting allowed	Shorting banned	Shorting allowed	Shorting banned
Asset selection	return	5.86	0.03	3.94	3.58
	risk	8.32	7.01	5.81	5.95
Industry factor	return	-1.59	-0.94	-3.41	-3.42
	risk	2.85	2.39	3.04	3.08
Total	return	24.63	18.36	15.85	15.47
	risk	17.5	16.8	15.57	15.84

Source: MSCI Barra

While these case studies do not amount to a full-scale empirical investigation of the impact of the short sale ban, they illustrate the detrimental effects of this ban on optimal portfolios. Overall, our results suggest that the constraint on short sales may increase the risk of the long-short portfolios. In the case of the value-tilt portfolio, the five year back test also shows the return is adversely affected. We also find some evidence that short selling constraints may have a more pronounced effect for 130-30 portfolios than unconstrained long-short portfolios. For 130-30 portfolios in our back test, the short sale constraint decreased the return for both value and momentum alpha strategies, while also increasing the risk in the case of the value strategy, detracting from portfolio performance.

### References:

- Antonio E. Bernardo, and Ivo Welch (2004) Liquidity and Financial Market Runs, *Quarterly Journal of Economics*, 119 (1), 135-158
- Arturo Bris, William N. Goetzmann and Ning Zhu (2007) Efficiency and the Bear: Short Sales and Markets Around the World, *Journal of Finance*, 62 (3), 1029-1079.
- Darrell Duffie, Nicholae Garleanu and Lasse Heje Pedersen (2002) Securities Lending, Shorting and Pricing, *Journal of Financial Economics*, 66(2), 307-339.
- Elyes Jouini and Hedi Kallal (2001) Efficient Trading Strategies in the Presence of Market Frictions, *Review of Financial Studies*, 14(2), 343-369.

**Appendix 1: Further details of the composition of optimal portfolios**

In this appendix we provide some further details on the composition of sample optimal portfolios as of October 10, 2008. Table A1 illustrates the number of assets in the analyzed portfolios. This varies significantly between the different examples we examined, however in all cases the momentum tilt results in fewer assets.

**Table A1: Number of assets in long-short portfolios**

	<u>Momentum strategy</u>		<u>Value strategy</u>	
	Shorting allowed	Shorting banned	Shorting allowed	Shorting banned
Unconstrained portfolio	112	101	317	278
Industry neutral portfolio	114	101	249	173

Source: MSCI Barra

Asset specific risk, however, contributes more to the overall risk of the value tilt portfolios, as shown in Table A2.

**Table A2: Asset specific risk as a percentage of overall portfolio risk in long-short portfolios**

	<u>Momentum strategy</u>		<u>Value strategy</u>	
	Shorting allowed	Shorting banned	Shorting allowed	Shorting banned
Unconstrained portfolio	46.73%	49.76%	70.52%	70.17%
Industry neutral portfolio	34.92%	38.73%	63.96%	70.36%

Source: MSCI Barra

Table A3 illustrates the changes in style factor exposures of the long-short portfolios. We see no significant changes in exposures as a result of the imposition of the short sale constraint on financial stocks. In all cases, the exposure to the Foreign Exposure factor decreases slightly, while no other pattern is clearly observable.

**Table A3: Changes in exposures to style factors for long-short portfolios**

	Shorting allowed	Shorting banned	Shorting allowed	Shorting banned
<b>Unconstrained portfolio</b>	<u>Momentum strategy</u>		<u>Value strategy</u>	
Size	-0.02	0.00	0.20	0.21
Momentum	2.00	2.00	-0.18	-0.17
Market Sensitivity	-0.63	-0.57	0.04	0.05
Variability	-0.56	-0.47	-0.07	0.00
Growth	0.40	0.39	0.24	0.16
Leverage	-0.42	-0.41	0.36	0.45
Value	-0.84	-0.78	2.00	2.00
Foreign Exposure	0.26	0.16	0.00	-0.12
Yield Risk Index	0.19	0.24	0.04	0.10
<b>Industry neutral portfolio</b>	<u>Momentum strategy</u>		<u>Value strategy</u>	
Size	-0.02	-0.05	0.22	0.22
Momentum	2.00	2.00	-0.17	-0.22
Market Sensitivity	-0.54	-0.47	-0.08	-0.07
Variability	-0.63	-0.50	-0.17	-0.10
Growth	0.54	0.56	0.28	0.18
Leverage	-0.49	-0.59	0.46	0.49
Value	-0.93	-0.94	2.00	2.00
Foreign Exposure	0.18	-0.02	0.12	0.04
Yield Risk Index	0.25	0.31	0.09	0.19

Source: MSCI Barra

Finally, let us illustrate the top 10 changes in industry exposures for the unconstrained long-short portfolios. For the momentum portfolio, we see in Table A4 that the largest positive swings in industry exposure resulting from the short sale restriction are in the Continental Banking and Continental Financial Services industries. These are counteracted by negative changes in several industry exposures, notably Continental Real Estate, Continental Media, Continental Technology Hardware and UK Insurance. For the value portfolio, as illustrated in Table A5, we see significant positive swings in Continental Banking, Continental Insurance, UK Banking and UK Financial Services, as well as Continental Non-Cyclical Goods. These are counteracted, once again by negative changes in Continental Media and Continental Real Estate, as well as Continental Construction.

**Table A4: Top 10 industry exposure changes for momentum strategy**

<b>Unconstrained portfolio</b>	<u>Momentum strategy</u>	
	Shorting allowed	Shorting banned
Continental Banking	-0.42	5.71
Continental Financial Services	-3.27	0
Continental Real Estate	-6.22	-8.57
Continental Media	1.69	-0.34
Continental Technology Hardware	-5.97	-7.69
Uk Insurance	2.35	1.09
Continental Retail	-4.56	-5.67
Uk Utility	2.15	3.26
Continental Industrial Services	-6.12	-7.21
Continental Non-Cyclical Goods	4.4	5.4
Uk Tobacco	2.04	2.94

Source: MSCI Barra

**Table A5: Top 10 industry exposure changes for value strategy**

<b>Unconstrained portfolio</b>	<u>Value strategy</u>	
	Shorting allowed	Shorting banned
Continental Banking	-6.47	1.34
Continental Non-Cyclical Goods	4.97	7.56
Continental Media	-3.39	-5.64
Continental Construction	-2.94	-5.1
Continental Insurance	4.84	6.82
Continental Textiles	-1.92	-3.87
Uk Banking	-1.47	0.4
Uk Financial Services	-0.51	0.85
Continental Distillers&Brewers	-4.29	-5.62
Continental Travel	-1.47	-2.73
Continental Real Estate	-1.82	-2.95

Source: MSCI Barra

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