Can You Arb the StatArbers?



There are losses among statarbers

The recent news cycles have given more than enough information on losses in most asset classes. Virtually all instruments are suffering, even gold.

Statarber are suffering as well. It is not only a bit hush-hush, but also surprising, since statistical portfolios are by definition long/short and not exposed to general direction of the market. You will find mentions of those loses in these few articles and headlines though:

- Bridgewater's Dalio says his flagship fund lost money amid market turmoil (March 15th)
- <u>Steve Cohen's Cubist falls 22% in March</u> (March 19th)
- Englander's Millennium to shut some 'trading pods' as coronavirus bites (March 19th)
- Hedge fund Schonfeld hit as investors slash risk (March 19th)
- <u>Glitchy coronavirus markets cause quant funds to misfire</u> (March 25th)

Statistical arbitrage is not the only culprit in the biggest funds' recent underperformance. The basis trade for instance had turned costly to many big shops, until the Fed basically saved them by <u>buying treasuries</u> aggressively.

Under the cover of discretion most, if not all, the statarbers are wondering why their performance is suddenly lousy. This article tries to show some light on this structural effect.

Factors - Definition

Difficult to talk about statistical arbitrage, without mentioning factors. The definition first: factors are mathematical constructs explaining cross-sectional returns of assets. The best way to understand what this expression means is probably to transpose the "Nutritional Facts" concept.

All processed food in the US has a Nutrition Facts label, which explains the content of the food in various groups of elements.

The label on the left is typical of what you find on your pack of cookies. The main ingredients (sugar, flour, butter, conservatives...) are indicated at the bottom, but each cookie is also described by its content of

Nutrition Facts													
Serving Size 1 Cookie (19g) Servings Per Container 10													
Amount Per Serving													
Calories 90	Са	ories fron	n Fat 30										
		% Da	aily Value*										
Total Fat 3.5g			5%										
Saturated Fat 2	1g		5 %										
Trans Fat 0g													
Cholesterol 5mg 2%													
Sodium 25mg 1%													
Total Carbohydrate 13g 4%													
Dietary Fiber 1g 4%													
Sugars 9g													
Protein 1g													
Vitamin A 2%		Vitamin (2.0%										
	•	Vitamin C	. 0%										
Calcium 2%	•	Iron 2%											
*Percent Daily Values calorie diet. Your daily lower depending on yo	are b value our ca	ased on a 2, s may be hig lorie needs:	000 gher or										
Calo Total Fat Less Saturated Fat Less Sodium Less Total Carbohydrate Dietary Fiber Calories per gram: Fat 9 • Carboh	than than than than than	2,000 65g 20g 300mg 2,400mg 300g 25g te 4 • Prot	80g 25g 300mg 2,400mg 375g 30g ein 4										

INGREDIENTS: SUGAR, ENRICHED FLOUR (WHEAT FLOUR, MALTED BARLEY FLOUR, NIACIN, IRON, THIAMINE MONONITRATE, RIBOFLAVIN, FOLIC ACID), ALMONDS, BUTTER (CREAM), NATURAL FLAVORS, BROWN RICE SYRUP, SALT, CINNAMON.

Contains Wheat, Almonds, Milk.

- Energy (90 calories),
- Fats (saturated and trans fats),
- Cholesterol and salt (sodium),
- Carbohydrates (fibers, sugars),
- Proteins,
- Vitamins.

Why describe the content with these groups? Why using those groups of nutritional facts and not others? There is a rational behind this grouping methodology:

• <u>The families are different</u>: can you compare vitamins to proteins?

• <u>The families contain many sub-ingredients</u>: there are 20+ different vitamins. Sugars come in many shapes, but we all know the main forms (fructose, starch, alcohol...)

• <u>but the sub-ingredients of each family have similar properties</u>. The fructose in your donut and the corn syrup in your drink will have a similar effect on your weight as the starch in your French fries. These very different molecules are different forms of sugar, and your body will process and store them in the same way under your skin. Subingredients of a same family behave similarly.

• <u>Any food can be decomposed into and be fairly well explained</u> <u>by these groups</u>; it's the quantities that are changing. There is fat in a slice of cake and none in a can of pineapple. Both contain energy.

• <u>The groups explain food well</u>: If you have enough of those families and they are different enough, you can analyze most dish.

Financial factors are the same concept. They are the families, which explain asset returns. Here are two examples:

• Because banks lend the cash deposited by individuals, they make more profits when the rates are high. As result, their stock price is sensitive to interest rates. Utilities (train companies, water distributors) have well-known long-term cash-flows. What change the present value of these

cash-flows is the discounting rate. Buying a bank or a utility company makes your portfolio sensitive to interest rates. You are implicitly trading bonds when you buy either of.

• Liquefied natural gas, airplane fuel and the stock price of Exxon are correlated, because these three commodities are sensitive to the price of the oil barrel. Implicitly, when you buy an Exxon share, you are also buying a small fraction of an oil barrel. The fractions of oil barrel that you buy for these three last assets are different. Unlike food content, they can also be negative (an airline stock will go down when oil barrel goes up).

The returns of all assets, and stocks in particular, can be explained in large parts by the changes of a small number of these financial factors. Rates and commodity prices are two factors.

In 1993, Eugene Fama and Kenneth French documented the influence of size and Book-to-Price in the descriptive performance of stocks. <u>Size</u> (large vs small) and <u>Value</u> are the two factors implicit in the paper. <u>Growth</u> is the opposite of Value. Their seminal paper¹ has given rise to the Small-vs-Big and Value-vs-Growth classification shown by most mutual funds nowadays.

Since then, hundreds of other factors have been discovered and documented by academic papers.



Some of the most powerful factors are:

- <u>Momentum</u>: An asset that goes up has a tendency to keep going up, as either information disseminates, or as institutional buyers need time to build a position due to liquidity constraints. This factor is surprisingly one of the strongest. Momentum can be calculated over various periods from hours to months, and there is a wide range of meaning to this factor.
- <u>Reversal</u>: the opposite of the above. Some stocks have the tendency to oscillate around the 'fair-value' indicated by the recent past.
- <u>Low volatility</u>: stocks which are less volatile perform better. An explanation is that companies about to endure a price shock (think of mortgage companies before 2008) have difficult-to-assess fundamentals. Their price become volatile while the new consensus emerges.
- <u>Quality</u>: measured by return on assets, quick ratio, dividend coverage ratio... Companies with solid and consistent cash-flows tend to behave similarly.
- <u>Analyst revision</u>: firms who disappoints on earnings call, tend to disappoint repeatedly.
- <u>Capital intensivity</u>: a mix of buy-backs, capex, total yield...
- <u>Earnings Quality</u>: consistency of earnings over time, dispersion of earnings-per-shares, stability of margins and FCFs...
- <u>Financial leverage</u>
- Profitability
- <u>Cyclicality...</u>

¹ Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33 (1993) 3-56.

The reality is that, although the 'factor zoo' contains hundreds of animals, many are quite similar. Like brown bears behave in many ways like polar bears, price-to-book behaves very much like price-to-sales. As a result, you can reduce the hundreds of demonstrated factors down to a dozen 'true' factors, which were the ones indicated above. The mathematics behind this factor (de)construction is actually a bit complex; it is not the purpose of this article.

One last thing. You can trade these factors. Let say you rank each of the 3,000 most liquid US stocks by their oil content. If you take the top 20% as your long portfolio, sell the bottom 20% as your short portfolio, and weight all those stocks so that they have no exposure to momentum, value/growth, etc, you end-up with a long-sort basket which perfectly mimics "Oil", independently of any other factor. Why not simply buy the barrel? Because not everybody can trade commodities (pure equity mandate for instance) and also because some of these factors have no physical equivalent (where do you buy "quality"?).

In a similar way you can construct baskets that track any of these factors. The performance of these baskets is actually an index which you can use as a reference for further mathematical study or for further trading.

Factors - Use

One of the principal use of factors is to eliminate risks in a portfolio, by a process called 'factor neutralization'. Let's take the example of quadrophobia as an example of strategy to apply the process to.

In the united states, any company listed on a major stock exchange must publish quarterly financial information. The form in which this information is to be disclosed is highly codified, so that investors can easily understand and compare investments.

One of the rules requires that earnings-pershares must be computed to the second digit (the cent). Now, when your company generates about \$3.50 of quarterly revenues, whether the number is \$3.54 or \$3.55 doesn't make much of a difference. When your stock has a much larger number of shares to its total earning on the other hand, a \$0.24 EPS and \$0.25 EPS make quite a difference. The profitability is different by \$0.01/\$0.24 = ~4%. It is therefore tempting to 'round up' the true number of \$0.244 into \$0.250 rather than \$0.240.

The rules actually prevent this. If the third digit is 0-4, the EPS must be rounded down. If the third digit is 5-9, the EPS must be rounded up.

Needless to say, there are cheaters, who will massage corporate earnings until the third digit reaches 5, or who will simply ignore the rule.

The effect is statistically significant and has been sufficiently well documented for the SEC to start a formal investigation².



² https://www.cnbc.com/2018/06/22/sec-investigates-whether-companies-round-up-earnings.html

0,0%

As a statarber, you can recalculate the earnings of the firm over many quarters and see if they have a tendency to round-up. If it is the case, you have demonstrated that the firm's management is of dubious quality, and it is well known that shares of dubious management underperform over the long-term (think of Enron). You can therefore take this quadrophobia as a signal to construct a portfolio.

The effect is modest and the extra performance could be drowned in the noise. To turn this idea into an independent and valuable strategy, you need to reduce this unwanted noise. You do that by eliminating factors that have no effect on the probable honesty of the management (prices of commodities, interest rates, cyclicality, momentum, low-vol, value...).

Eliminating exposure to the unwanted factors is called 'factor neutralization'. Mathematically speaking, you simply measure the part of your performance that matches the long/short index of the factor and you subtract an equivalent size of the factor portfolio previously constructed³.

Factor normalization can typically reduce the noise of a portfolio by 20-40% and can therefore increase the risk-adjusted performance (Sharpe) by a similar factor. Factor neutralization is an ubiquitous technique in statistical arbitrage.

Alternatively, you can play on these factors and construct a portfolio that will produce these exposures on purpose, albeit in the quantities you want. Various investment firms do this:

- A common hedge fund strategy is 'factor rotation', like there are 'sector rotations'.
- Factors have momentum too. If a factor performs well, it will surely keep on performing for some time. Investing in the well-performing factors tends to do well.
- Institutional investors can buy exposure from dedicated providers. The factors are then often called 'risk premia' and may have documented sources of extra performance (you get a performance premium for trading illiquid assets like private equity).
- There are now ETFs which deliver these risk factors / premia in liquid, listed and therefore opento-all formats.

So when should you increase or decrease your factor loadings? It depends on the context.

- A discretionary portfolio manager who has a long/short of 20x20 different instruments tend to take a lot of unwanted factor exposure. It often makes sense to reduce those unwanted risks.
- Many asset institutional managers use this technique, to analyze or reduce the firm's risk. There
 are off-the-shelf 'factor model' software⁴ which handle this efficiently.
- But not all statarber use these techniques, or at least not all the time. Here are the arguments against:
 - Why eliminating factors you know about, while your book is loaded with factors you don't anything know about?
 - Factor neutralization reduce noise and improve Sharpe, but they also tend to reduce performance.
 - \circ $\;$ What is your fund's objective? Absolute performance for the investors or low-risk? 5

³ You 'project' the returns of your portfolio onto the factor index and you remove this projection.

⁴ Barra, RiskMetrics, Factset...

⁵ Financial incentives have an influence on this decision. Some funds are more 'management fee collectors' than 'performance creators'...

Factors – Recent performance

Factor performance tend to be slowly changing. Some are cyclical, but well-performing in the long term (value!). The last few weeks have been all but normal. We have actually seen some impressive changes in performance.

Here are the February performance results published by QuantZ, a New York firm specialized in providing quality factor information⁶, on an almost continuous basis. The returns of their Enhanced Smart Betas (ESBs) over February are⁷:



⁷ The ESBs are grouped in two main families – risk on and risk off (defensive)

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⁶ Since factors have 'flexible' definitions and here are hundreds of possible metrics, advanced techniques can be applied to find truly representative factors. This is QuantZ's unique expertise; they construct enhance composites from 600+ naïve factors.

More recent performance is available through a heat map. As of March 19th, they indicate the following returns for their sets of factors (columns 'Spread', over day, month or year)

	DTD Long	DTD Short	DTD Spread	MTD Long	MTD Short	MTD Spread	YTD Long	YTD Short	YTD Spread
DV	-1.51%	-0.3%	-1.21%	-35.76%	-23.2%	-14.75%	-47.02%	-23.08%	-29.82%
RV	-0.22%	1.04%	-1.26%	-37.76%	-33.07%	-5.99%	-50.1%	-37.75%	-18.99%
Profit	-3.8%	-1.61%	-2.19%	-24.25%	-40.59%	23.05%	-32.15%	-52.22%	36.56%
Leverage	-4.33%	-0.16%	-4.17%	-27.46%	-35.55%	11.12%	-33.85%	-41.93%	12.24%
Size	-2.58%	-4.74%	2.16%	-33.23%	-25.41%	-10.09%	-42.74%	-32.56%	-14.83%
CSU	-4.21%	-2.05%	-2.16%	-33.01%	-37.84%	6.74%	-41.36%	-47.31%	10.06%
Efficiency	-2.67%	-1.17%	-1.5%	-38.72%	-26.42%	-15.32%	-48.56%	-31.17%	-24.02%
Growth	-1.35%	-1.23%	-0.12%	-35.65%	-35.07%	-0.25%	-42.87%	-45.73%	5.7%
EQ	-3.06%	-2.68%	-0.37%	-33.48%	-35.08%	2.41%	-42.37%	-43.45%	1.86%
Reversals	1.45%	-6.37%	7.82%	-39.02%	-25.48%	-16.62%	-48.64%	-33.8%	-20.91%
ART	-3.82%	-2.1%	-1.72%	-37.53%	-37.73%	0.64%	-44.93%	-48.9%	7.74%
Risk	-3.95%	1.79%	-5.74%	-17.47%	-45.79%	39.22%	-22.08%	-55.46%	58.16%
EnMOM	-3.48%	-3.71%	0.24%	-29.92%	-31.9%	3.54%	-37.27%	-42.61%	9.65%
ARS	-3.24%	-1.36%	-1.88%	-29.93%	-37.44%	9.55%	-37.1%	-46.86%	15.53%
SIRF	-3.27%	-4.1%	0.84%	-30.31%	-30.62%	1.02%	-39.23%	-37.47%	-2.32%
Stability	-4.66%	-1.62%	-3.04%	-28.87%	-40.78%	17.52%	-39.16%	-54.45%	29.96%
PMOM	-2.59%	-2.09%	-0.5%	-32.01%	-33.03%	1.57%	-39.51%	-45.19%	10.02%
Dividends	-2.34%	-3.75%	1.41%	-37.67%	-31.8%	-7.59%	-47.47%	-41.84%	-8.79%

It shows a high disparity of returns!

Defensive factors (low vol, capital structure, earnings quality, leverage, profitability, stability, dividends, analyst revision, analyst ratings & targets, enhanced momentum) have actually very well performed, especially against the S&P. Risk (Low-vol) is notably up 94% since the start of this year, while profitability and stability are respectively up 53% and 35%^{8,9}.

⁸ As of March 20th.

⁹ Building long/short neutral factors can be done in various ways: dollar-neutral, beta-neutral, risk-parity optimized...

Interestingly enough, the correlations of these factors have declined. Here is the long-term (20Y) correlation matrix:

					lends		iency	of the	Nr.	139°	es.			5315				int
	pas.	ps-	EN	04 .	ONNIC	\$0	efficient	ENMO	Grow	eve.	PHO.	Profile	\$	Reve	pist	SIRY	SILE	9:30.
ARS	1.0	0.83	0.15	-0.35	0.1	-0.22	-0.1	0.64	0.52	0.25	0.71	0.45	-0.04	-0.42	0.47	-0.29	-0.31	0.29
ART	0.83	1.0	0.09	-0.35	-0.02	-0.25	-0.14	0.69	0.55	0.25	0.76	0.38	-0.08	-0.29	0.41	-0.18	-0.18	0.24
CSU	0.15	0.09	1.0	0.72	0.72	0.47	0.84	-0.06	0.42	0.69	0.02	0.75	0.85	-0.18	0.78	-0.77	-0.35	0.82
DV	-0.35	-0.35	0.72	1.0	0.53	0.5	0.88	-0.49	0.08	0.36	-0.46	0.33	0.8	0.16	0.37	-0.46	-0.06	0.51
Dividends	0.1	-0.02	0.72	0.53	1.0	0.42	0.61	-0.13	0.31	0.46	-0.03	0.59	0.64	-0.18	0.71	-0.7	-0.43	0.64
EO	-0.22	-0.25	0.47	0.5	0.42	1.0	0.54	-0.14	-0.14	0.16	-0.12	0.14	0.33	0.05	0.2	-0.34	-0.03	0.29
Efficiency	-0.1	-0.14	0.84	0.88	0.61	0.54	1.0	-0.23	0.21	0.47	-0.17	0.49	0.85	-0.04	0.56	-0.58	-0.13	0.62
EnMOM	0.64	0.69	-0.06	-0.49	-0.13	-0.14	-0.23	1.0	0.29	0.11	0.93	0.17	-0.17	-0.27	0.22	-0.0	-0.11	0.05
Growth	0.52	0.55	0.42	0.08	0.31	-0.14	0.21	0.29	1.0	0.58	0.39	0.67	0.42	-0.22	0.57	-0.34	-0.23	0.39
Leverage	0.25	0.25	0.69	0.36	0.46	0.16	0.47	0.11	0.58	1.0	0.19	0.86	0.7	-0.26	0.73	-0.53	-0.35	0.62
PMOM	0.71	0.76	0.02	-0.46	-0.03	-0.12	-0.17	0.93	0.39	0.19	1.0	0.28	-0.11	-0.41	0.33	-0.11	-0.21	0.14
Profit	0.45	0.38	0.75	0.33	0.59	0.14	0.49	0.17	0.67	0.86	0.28	1.0	0.67	-0.28	0.85	-0.65	-0.49	0.73
RV	-0.04	-0.08	0.85	0.8	0.64	0.33	0.85	-0.17	0.42	0.7	-0.11	0.67	1.0	-0.08	0.64	-0.61	-0.27	0.66
Reversals	-0.42	-0.29	-0.18	0.16	-0.18	0.05	-0.04	-0.27	-0.22	-0.26	-0.41	-0.28	-0.08	1.0	-0.36	0.28	0.33	-0.29
Risk	0.47	0.41	0.78	0.37	0.71	0.2	0.56	0.22	0.57	0.73	0.33	0.85	0.64	-0.36	1.0	-0.79	-0.52	0.81
SIRF	-0.29	-0.18	-0.77	-0.46	-0.7	-0.34	-0.58	-0.0	-0.34	-0.53	-0.11	-0.65	-0.61	0.28	-0.79	1.0	0.44	-0.79
Size	-0.31	-0.18	-0.35	-0.06	-0.43	-0.03	-0.13	-0.11	-0.23	-0.35	-0.21	-0.49	-0.27	0.33	-0.52	0.44	1.0	-0.38
Stability	0.29	0.24	0.82	0.51	0.64	0.29	0.62	0.05	0.39	0.62	0.14	0.73	0.66	-0.29	0.81	-0.79	-0.38	1.0

and a short-dated one:

					ends		onct	an an	N.	2000	4.			5315				Hill
	pass -	129	SU	04	ONIO	\$9	Efficit	EUM	Grow .	ever	84NO1	Profit	\$	Reve.	aust	SPA	Sile	9230
ADS	10	038	019	-0.2	-0.06	-0.04	-0.08	017	0.21	016	0.35	019	-0.09	-0.26	016	0.06	-0.18	0.09
AND	0.38	1.0	-0.01	-0.23	-0.07	-0.04	-0.11	0.36	0.1	0.01	0.52	0.01	-0.2	-0.17	0.21	0.12	-0.05	0.02
CSU	0.19	-0.01	1.0	0.07	0.13	0.2	0.11	0.03	0.23	0.35	0.09	0.33	0.45	-0.08	0.12	0.17	-0.09	0.27
DV	-0.2	-0.23	0.07	1.0	0.04	0.05	0.64	-0.12	-0.09	-0.11	-0.23	-0.2	0.43	0.14	-0.21	0.04	0.28	0.31
Dividends	-0.06	-0.07	0.13	0.04	1.0	0.03	0.04	0.01	-0.08	0.09	-0.01	0.24	0.45	-0.02	0.27	0.15	-0.14	0.09
Dividends	-0.04	-0.04	0.15	0.05	0.03	1.0	.0.09	0.07	-0.03	.0.09	0.01	.0.17	0.03	-0.02	-0.0	0.15	-0.01	-0.05
EQ	-0.04	-0.04	0.11	0.05	0.05	0.09	-0.08	0.07	-0.03	-0.09	0.14	-0.17	0.05	-0.02	0.12	0.03	-0.01	-0.05
Efficiency	-0.08	-0.11	0.11	0.04	0.04	-0.08	1.0	-0.07	-0.05	-0.15	-0.14	-0.10	0.55	0.09	-0.12	-0.05	0.29	0.4
EnMOM	0.17	0.36	0.03	-0.12	0.01	0.07	-0.07	1.0	0.06	0.06	0.85	0.08	-0.15	0.23	0.33	0.19	-0.1	0.14
Growth	0.21	0.1	0.23	-0.09	-0.08	-0.03	-0.03	0.06	1.0	0.24	0.12	0.25	0.26	-0.03	0.02	0.07	-0.11	-0.05
Leverage	0.16	0.01	0.35	-0.11	0.09	-0.09	-0.15	0.06	0.24	1.0	0.08	0.64	0.26	0.01	0.18	0.14	-0.14	0.26
PMOM	0.35	0.52	0.09	-0.23	-0.01	0.1	-0.14	0.85	0.12	0.08	1.0	0.13	-0.2	-0.07	0.3	0.18	-0.15	0.14
Profit	0.19	0.01	0.33	-0.2	0.24	-0.17	-0.16	0.08	0.25	0.64	0.13	1.0	0.33	-0.03	0.26	0.15	-0.34	0.13
RV	-0.09	-0.2	0.45	0.43	0.3	0.03	0.33	-0.15	0.26	0.26	-0.2	0.33	1.0	0.1	-0.01	0.14	-0.0	0.19
Reversals	-0.26	-0.17	-0.08	0.14	-0.02	-0.02	0.09	0.23	-0.03	0.01	-0.07	-0.03	0.1	1.0	-0.11	-0.04	0.03	-0.04
Risk	0.16	0.21	0.12	-0.21	0.27	-0.0	-0.12	0.33	0.02	0.18	0.3	0.26	-0.01	-0.11	1.0	0.27	-0.28	0.2
SIRF	0.06	0.12	0.17	0.04	0.15	0.05	-0.03	0.19	0.07	0.14	0.18	0.15	0.14	-0.04	0.27	1.0	-0.16	0.12
Size	-0.18	-0.05	-0.09	0.28	-0.14	-0.01	0.29	-0.1	-0.11	-0.14	-0.15	-0.34	-0.0	0.03	-0.28	-0.16	1.0	0.12
Stability	0.09	0.02	0.27	0.31	0.09	-0.05	0.4	0.14	-0.05	0.26	0.14	0.13	0.19	-0.04	0.2	0.12	0.12	1.0

While assets tend to correlate in a market crash (all the stocks move up and down instead of going their own way), we can clearly see the recent factor de-correlation. There is a dispersion of factor returns.

So, if statarbers had not factor-neutralized their portfolios and were losing money, it is very likely that they simply were exposed to the factors which have underperformed during the recent weeks.

The underperformance / liquidation death trap

Based on the numbers and analysis above, performances among statarbers should *disperse* rather than all go down as the rumors indicate. We only know of the eye-catching losses for now, so it is too early to confirm this dispersion, but another influence as to be taken into account. It's the *herding effect* and its drawback in liquidation times.

For those old enough to remember, 2004/2005 saw a convertible bond crash. Like their name indicates, convertible bonds are corporate debentures with an attached call on the issuer's stock (given to the investor), as well as an eventual put for cash (kept by the issuer).

They are multi-asset and illiquid by nature.

- Like bonds, they have an interest rate sensitivity, as well as a credit exposure (to the issuer's quality).
- Like option-derivatives, they are sensitive to the (long-term) value and implied volatility of the issuer's stock.
- Since it is impossible to borrow and short CBs, most CB funds and hedge funds are naturally long these instruments in large sizes.

In 2004, several funds started to liquidate their CB portfolios. These liquidations depressed the value of convertible bonds. As CB prices went down, other funds started to show unpleasant return numbers, pushing other investors to stop their losses and redeem. Those new liquidations further pushed prices down, which attracted more redemptions and liquidations, etc, etc. In fine, the *death spiral* of underperformance and liquidation continued until some convertibles traded below their bond floor value.

We are probably seeing this in the statistical arbitrage space now; it won't be the first time. Since statarber are all pursuing returns, they all share common sources of returns. Unless portfolio managers and CIO are effectively able to restrict themselves to very atypical signal (difficult to find, less size...), they share common signals and exposures with every other. When a first fund is liquidated, it will impact stock prices in such a way that the performance of other firms is also impacted¹⁰. If the initial portfolio is large or if others follow, the overall impact can be substantial.

So, was there an initial liquidation? Definitely.

- 1. Firms like Bridgewater and AQR offer <u>risk-parity</u> investments. When the risk of a strategy, fund or group of funds increases (as in 'volatility' increase), the fund automatically de-allocates assets from the strategy/fund(s) towards less risky assets (bonds or cash). It is estimated that risk-parity funds have unwound 400 billion of equities in the first days and weeks of the crisis. That notional is way enough to impact statarb performance, even if a fraction of these assets were in statarb.
- 2. Some hedge funds are <u>highly leveraged</u> (Millennium, Citadel). To avoid the large losses that accompany such leverage, they have strict procedures to cut losses extremely quickly. Millennium was the first to announce they had 'eliminated 15-20 of their trading pods' in the first days of the crisis. In the firm's view, if there is a rush to the door, they will be the first one to get there. They will therefore drastically cut exposure if a PM starts losing money. It wouldn't be surprising that

¹⁰ Statarbers are the first to know when a fund is liquidated. Their performance suddenly goes South.

some of these liquidated pods were statarbers. By the nature of their high leverage, these books are large enough for the others in the market to feel the impact on performances.

- 3. There is another critical issue here, due to the sell-off that impacted every asset class. Let's say you are an asset manager, with strategies running from private equity, credit default swaps and or municipal bonds, real estate all very illiquid assets. Suddenly, the market conditions worsen. You start to receive calls for cash from your primebrokers, the exchanges, your custodians, or redemptions from clients. You have to follow these, and you need to find money very quickly. As a result, you are often forced to liquidate positions simply because they are liquid.
 - Bonds are structurally illiquid, especially in stress times.
 - Discretionary equity portfolio managers have large concentrated positions, which would take days to unwind in normal times.
 - Statistical arbitragers and quant-equity firms, on the other hand, have highly diversified portfolios (1,000 x 1,000), which can be liquidated in a matter of days, if not intraday.
 - Consequently, statarbers and quant-equity funds are allocators' piggy banks. That is a known fact, that all these professionals complain about.
 - There's no doubt that when all asset classes lost 20%, 30% or more, some statistical portfolios were liquidated just to generate cash.
- 4. To create a long/short portfolio, you need to borrow stocks for your short leg. In times of crisis, authorities restrict the borrowing and short selling of assets to reduce sales, and investors in general either short more shares or liquidate their longs (pools of borrow). If you are a long/short PM and your borrow becomes difficult or impossible, you have no other possibility but to close your book entirely. There were definitely repo squeezes in the last few weeks. It is unlikely to think that they did not push some PMs towards book reductions or liquidations.
- 5. This last effect is accentuated by the fact that statarber gains a larger part of their performance from small stocks, which have smaller market caps and are naturally more difficult to find that the blue-chip shares. When borrow becomes difficult, these mid-to-small shares becomes extremely difficult to borrow, forcing the PMs into liquidation even faster.
- 6. Last but not least, it may make sense to liquidate. Many statistical strategies have been developed and tested over long periods of time. They are constructed to perform during 'quiet' periods. Volatile periods are untested territories for many of those strategies. It is often wise to deleverage strategies that you are less confident about.

Conclusion

Statarbers have supposedly all lost ground in the recent weeks. Surprisingly, some factors had strong underperformance, but some have performed really well. We 'should' see some good performance coming from the statistical arbitrage space as a whole.

Right now, we are only seeing and hearing of the eye-catching losses. Either some good news will come up, or we have entered a death trap of liquidations/underperformance. That cycle has very likely started anyway.

Was it possible to arb the statarbers?



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Background Experience - After his European and US education, Mr. de Quillacq traded derivatives for two decades, from vanillas to exotics, both proprietary and client-facing, at top-tier banks in the square mile and on Wall Street. As a portfolio manager, he researched and managed investment strategies, delivered both in hedge fund and in structured note formats. He initiated the distribution of investment strategies through derivatives, an activity now called 'portable alpha' and 'smart beta'. For the following five years, Mr. de Quillacq ran due diligence on investments strategies and selected senior investment personnel for some of the world's most famous and most demanding hedge

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