The Smart Beta Mirage…

the tendency of deteriorating performance of factor-/smart beta strategies, indices, funds, or ETF´s after their launch can be largely explained by a few crucial points:

- fluctuation in economic drivers
- unreliable datasets
- methodical problems
- simplified portfolio construction leading to unintended risks

In a recently published working paper by Huang, Song and Xiang entitled "**The Smart Beta Mirage**" (available on SSRN), the authors "**document and explain sharp performance deterioration**" of factor indexes and ETf´s on these indexes after their release or launch. According to their analysis, "**data mining" explains much of this deterioration**. The buzzword "data mining" is a depreciative summary of all data-based activities, which seem to lack academic standards or economic foundations. But the devil is in the details. Most investors are aware of the first point, as this drives the performance – or as with all risk premia – the difference between the implied and realized risk premium. But investors often underestimate the fact, that **more or less all research papers ever written** about factor investing **and most of all smart beta indices** are negatively affected by all other points.

Alpha Centauri started to develop and to invest into factor- based strategies at the end of 2009/beginning of 2010 in long only- and market neutral (index future short) settings. After promising two years, performance started to deteriorate and in a rigorous analytic effort we found the following:

1. Fluctuation in economic drivers

The paper mentioned above states, that **deterioration in performance "… cannot be attributed to …. factor return fluctuations".**

As with all risk premia -traditional or alternative- the drivers of risk and return can be explained **by fundamental** (cash flow/discount rates), **behavioural** (momentum, sentiment, over-/underreaction etc.) **or institutional** (hedging, risk management etc.) **sources**. With this in mind, we delved into all liquid asset classes to work out the (majority of) drivers, tried to explain them economically and understand, how the payoff-profile -or the factor return fluctuations- should look like in different environments. We concluded (among other findings), that

- **Risk premia are paid for accepting tail risk and not for volatility**
  As they exhibit asymmetric payoffs, a lot of research results might be false as concluded by Harvey because of normal distribution assumption and linear methodologies

- **Alternative risk and factor premia can be in drawdown for longer than most investors believe**
  That´s simply because of the fact, that the economic environment which drives the performance of a single factor can persist for longer

- **There are only a few 'true factors" that matter**
  Most factors discovered in academic papers are small variants of already discovered factors. But as more or less all researchers validate their findings against the well-known Fama-/French- and Carhardt- (Momentum) factors, it shouldn´t come as surprize, that a lot of new findings pass the statistical hurdles

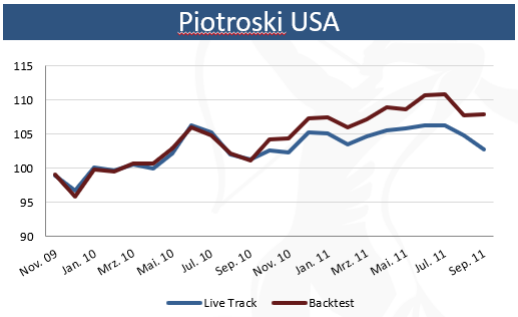
- **"Design matters"**
  That means that a research- and development process should be concentrated on the replication of the economic drivers of risk and return regardless of recent performance per se

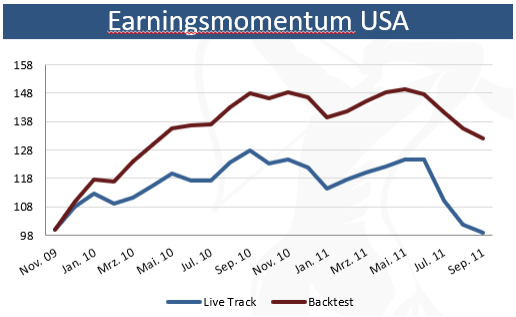
Conclusion:

The "fluctuation in economic drivers" can be substantial over time as the underperformance of value since the beginning of 2018 shows. But the conclusion of the paper mentioned above that the weak performance of many factors is beyond what can be justified economically, assumes, that one has something like a "perfect factor" as a benchmark. Cochrane´s well-known "factor zoo" seems to be a result of misconception of risk premia in many cases and even Prof. C. Harvey´s proposals to raise the bars in statistical hurdle rates won´t change that.

2. Unreliable datasets

Overall, it´s quite unusual to run extensions of a former backtests after "going live" of strategies or indices as **most quant developers and investors believe, the live track is the natural extension of the former backtest**. Unfortunately, that´s not the case. When we extended the former backtests in 2012 and compared the results with live performances, **we found astonishing differences across our strategies – in some cases of more than 20%.**



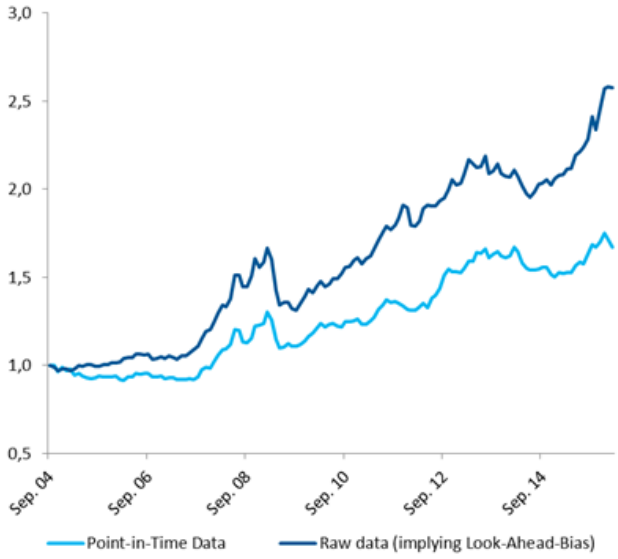


One might assume, that the difference has been a problem of data availability – so a question of "when data are known". Typically, developers of quantitative strategies solve the problem by lagging data by a few months to make sure, that the data were known at the time of use within a backtest. But this hasn´t been the problem at all because we already used lagged datasets. **The basic problem of all fundamental datasets is not about "when data are known" but "what data are known".** As with economic time series, **company data are prone to revisions.** More or less **all database providers** – even those, whose databases are recognized as "gold standards"- **systematically overwrite the datasets with the latest available data which leads to dramatic effects on backtest results first and realized performance later**. That wouldn´t be a problem, if revisions are small, but the reality looks quite different as the following table with EBIT-revisions for well-known companies shows:

Name	Period	First entry	Latest entry	Min. Value	Max. Value	Latest Value	Diff. max.	Diff. latest	% diff. max	diff. % latest
Microsoft	2016A001	19.07.2016	03.08.2018	21.292.000.000	27.188.000.000	**27.188.000.000**	5.896.000.000	5.896.000.000	22%	22%
Microsoft	2017A001	20.07.2017	01.08.2019	22.632.000.000	31.622.000.000	**29.331.000.000**	8.990.000.000	6.699.000.000	28%	21%
General Electric	2012A001	18.01.2013	01.12.2015	15.371.000.000	18.924.000.000	**15.371.000.000**	3.553.000.000	3.553.000.000	19%	19%
General Electric	2013A001	17.01.2014	26.02.2016	11.584.000.000	19.463.000.000	**11.584.000.000**	7.879.000.000	7.879.000.000	40%	40%
General Motors	2015A001	03.02.2016	06.02.2018	5.013.000.000	8.228.000.000	**7.854.000.000**	3.215.000.000	2.841.000.000	39%	35%
General Motors	2015Q004	03.02.2016	07.02.2017	1.729.000.000	2.865.000.000	**2.865.000.000**	1.136.000.000	1.136.000.000	40%	40%
IBM	2014Q001	16.04.2014	28.04.2015	2.960.000.000	4.000.000.000	**4.000.000.000**	1.040.000.000	1.040.000.000	26%	26%
IBM	2016Q001	18.04.2016	25.04.2017	1.434.000.000	2.390.000.000	**2.390.000.000**	956.000.000	956.000.000	40%	40%

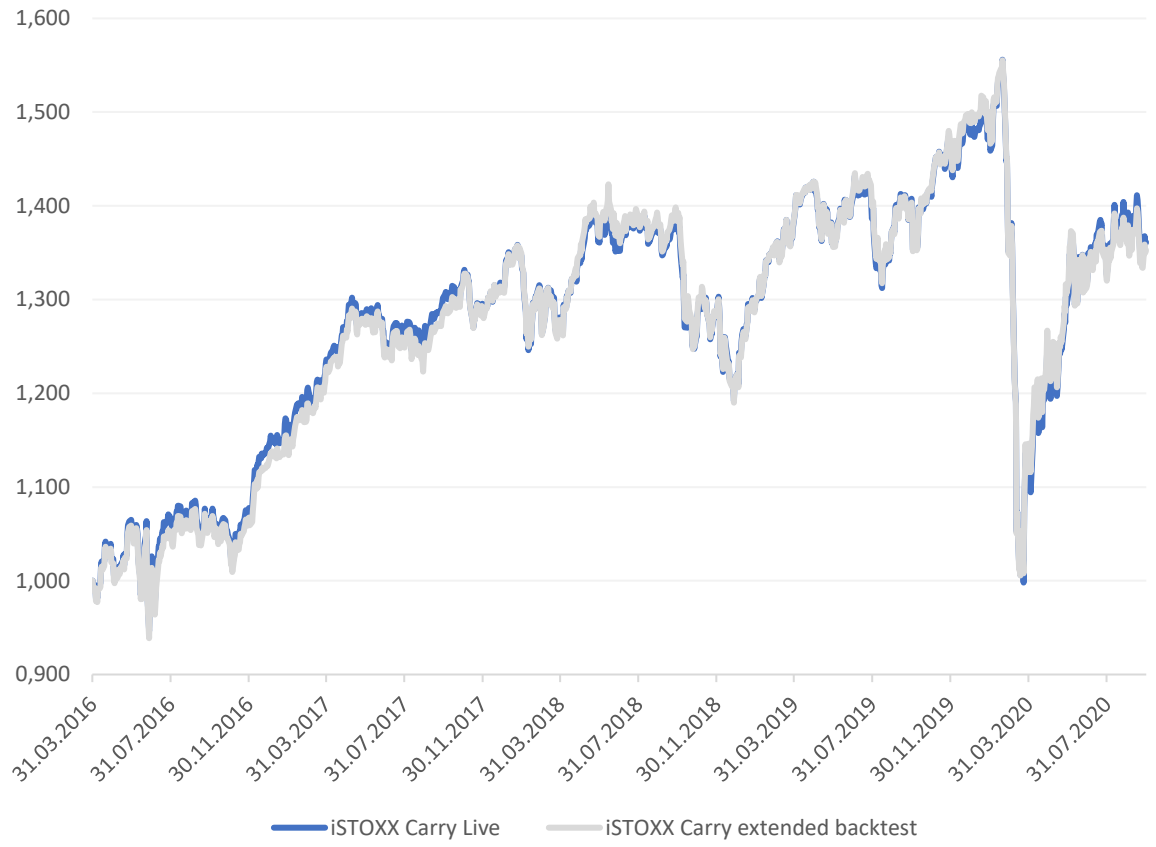
The only strategy, where no difference (apart from transaction costs and implementation lags) among our strategies occurred, was related to Dividend Yield. The simple reason: there are no revisions in already paid dividends.

Beyond the fact of data revisions per se, **it´s astonishing to see, that the time difference between the first and the final entry into a database can be up to two years**. That means, that developers must lag their data (if reported figures are used) by two years to make sure, that the correct numbers are figured into a backtest. To visualize the problem with respect to outcomes, we ran a backtest on two different databases from well-known and renowned providers using the same setup.



The graph on the left tells the story in one simple picture for the setup of today´s iSTOXX Carry factor index.

Comparing the results from our early strategies with those of today shows the progress we´ve made over time in understanding and developing risk- and factor premia. The following graph shows the performance of the iSTOXX Europe Carry factor again since going live at the end of March 2016.



The remaining difference of 0,6 % (15 Bps p.a) can largely be explained by an implementation lag of a few days between creation and implementation of the monthly index portfolio.

Conclusion:

Most academic research papers as well as most institutional design processes of factor- and risk premia exhibit serious flaws with respect to data. The only way to mitigate the problem is to use “point in time - databases”. But as more or less no academic researcher (even the well-known), no index provider or any investment bank is using those datasets as a basis for their papers or factor indexes, the results after “going live” shouldn´t come as a surprize. In this sense, we agree with C. Harvey´s conclusion, mentioned above. who states with respect to many factors: “Surely, many of them are false”

3. Methodical problems

It is common practice in finance since the early days of Markowitz to use volatility or other metrics derived under the assumption of normal distribution as a measure for risk as well as correlation and beta as measures for co-movement. On the other hand, Black/Scholes/Merton´s option and finance theory states, that liabilities are "contingent claims" on cash flows of a company:

*"Since almost **all corporate liabilities can be viewed as combinations of options**, the formula and the analysis that led to it are also applicable to corporate liabilities such as common stock, corporate bonds, and warrants"…*

In addition, Roll/Pukthuanthong explain the position of an equity investor with *"The equity claimant is long the firm's real assets, short its debt instruments, **and long an option to default** and deliver the real assets to the bondholders".* **And as options don´t display normal distributed payoff profiles, volatility and linear relationships expressed via correlation and beta should be viewed with a dose of scepticism.**

The optionality is daily business in credit management as a corporate bond is viewed as a combination of a risk-free bond and a short put with a basis price on the book value of a company. Simple accounting arithmetic reveals, that equities then must be a long call with a basis price on the book value of a company. Combined, these options are a beta-1 position on the assets of a company-otherwise the value of liabilities wouldn´t equal the value of assets.

And as factors are extractions from a universe with non-normal distributed returns, they exhibit asymmetric or option-like payoff profiles themselves. In a nutshell – all single factors can be localized on the balance sheet of the market (-portfolio) or are a combination of different payoff profiles in case of momentum.

Conclusion:

In most of all academic papers, new factor findings are validated by regressions on the Fama/French 3-or 5- factor setup in combination with the momentum factor of Carhardt**. Non-linear analytics would reveal that many factors are small deviations from already existing factors, leaving Cochrane´s "factor zoo" with many empty cages.**

4. Simplified portfolio construction and unintended risks

According to Occam´s razor or Einstein´s famous expression ***"Everything should be made as simple as possible, but not simpler".*** But in our view most factor designs in academic papers and smart beta indices seem to be even "simpler". The problem arising from this portfolio construction techniques are **"unintended risks"** in form of sector exposures or credit risk as well as country, currency, and commodity risk in regional or global aggregates. **In many factor indices, these risk factors are the main driver of the factor portfolio and not the target factor premia.**

As mentioned above**, a well-designed factor- or risk premia should replicate the associated risk premium as pure as possible-** independent from the recent or medium-term performance, as factor returns can be negative for sometimes long timeframes – as their counterparts in traditional world.

In a working paper entitled "Compensated and Uncompensated Risks in Global Factor Investing" (Ehsani, Hunstad, Mehta, 2020), the authors state that *"Global equity risk factors that are constructed by sorting stocks on firm characteristics associated with expected returns contain embedded region and sector exposures.* ***We show that these positions lead to uncompensated volatility****.* ***Hedging out both region and sector exposures simultaneously increases the Sharpe ratio of the typical global factor by 50%.*** *Hedged factors, individually or in a model, always subsume their non-hedged counterparts."*

Their findings are similar to those in *"Pure Factor Portfolios and Multivariate Regression Analysis" (Clarke, da Silva, Thorley, 2020),* in which the authors find **that pure factor portfolios exhibit slightly different market relative returns, lower volatility and smaller return correlations.**

For us, the only way to deal with unintended bets is using a PCA-based risk model. Fundamental factor models are not suitable from our point of view, because of the fact, that they exhibit a phenomenon called "factor alignment problem" and which can lead to serious problems in factor or risk premia portfolios.

Conclusion:

Most of all factor products today exhibit "unintended risk factors", which can be a substantial drag on performance over time, because a lot of them are simply "unpaid" – like sector exposures -in the long run.

Summary

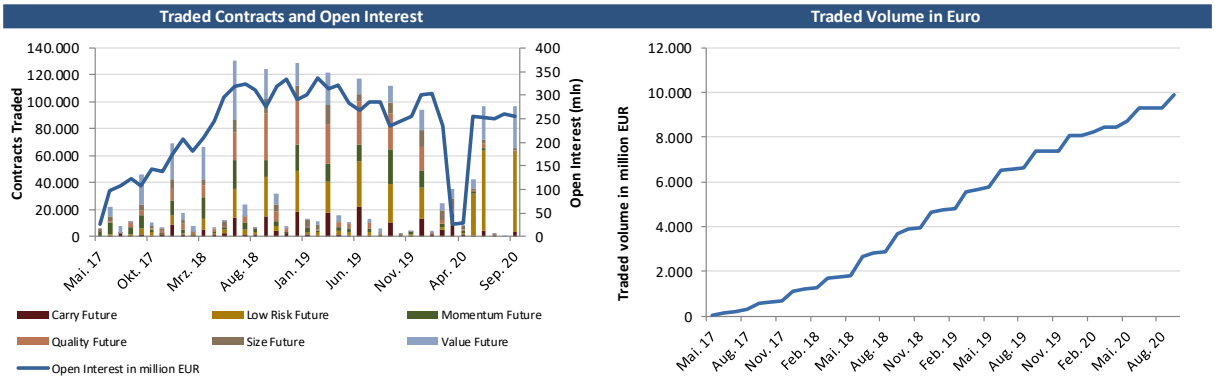
To keep "The Smart Beta Mirage" small, investors are well advised to be careful when evaluating factor and risk premia products. Especially an orientation on "three-year track records" is one of several sure ways to disappointment and underperformance. A better way might be to have a look at the question, **if a premium (- index or strategy) is able to track its economic drivers "as pure as possible" - as we have done it with the iSTOXX factor indices-** and to decide, if this source of risk will be rewarded with a premium over the investment horizon in question.

Factor Performance

Carry (+2,7%) and Momentum (+1,6%) led the performance table during the last three months, followed by Low Risk and Quality. Size and Value underperformed the overall market. Defensive sectors continued to outperform in an overall sideways moving market, which is still heavily influenced by the COVID 19 – pandemic.

EUREX Futures

Open interest remained stable in the third quarter at above 250mln. The graphs show development in traded contracts, open interest, and overall traded volumes since introduction in May 2017. The traded volume is close to 10 bln Euros now.



Alpha Centauri Indexing - Data as of 30.09.2020

Description:

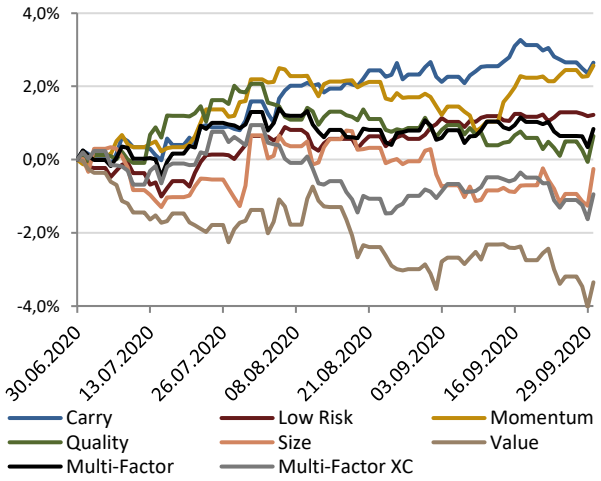
The iSTOXX Europe Single Factor index family developed by STOXX in collaboration with Alpha Centauri offers investors a unique and very innovative way to target and capture premia.
It consists of six single factors that aim to capture well-known risk premia and one multi-factor that aims at simultaneously capturing premia from the aggregate of all single factors rather than from just one source of risk alone.
All indices are constructed to maximize the exposure to their particular factor and minimize unwanted risks.
While constructing the final indices the FIS APT risk model is used to measure and restrict risk.

For more information go to **www.alpha-centauri.com** or **www.stoxx.com**

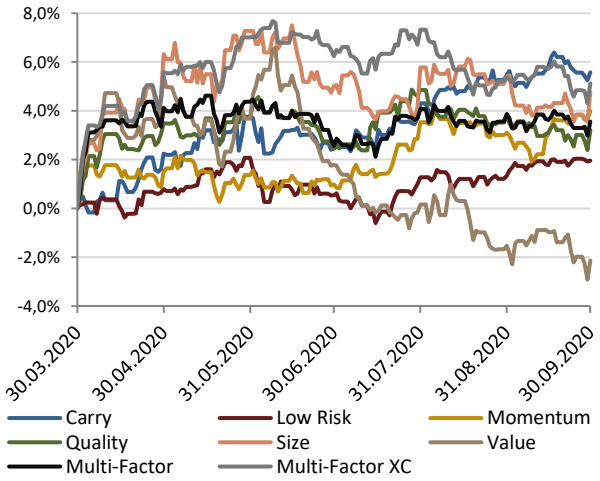
Performance and Volatility Breakdown

Name	Ticker	Return 3 Months	Return 6 Months	Return 12 Months	Return Live (1.4.)	Vola pa	Vola pa Live (1.4.)
Carry	ISECFER Index	3,3%	21,7%	-3,7%	34,5%	17,5%	17,0%
Low Risk	ISERRER Index	1,9%	18,1%	-6,9%	28,6%	16,5%	16,1%
Momentum	ISEMFER Index	3,2%	20,1%	-4,7%	22,4%	17,2%	16,7%
Quality	ISEQFER Index	1,3%	19,3%	-7,0%	19,6%	17,2%	16,6%
Size	ISEZFER Index	0,4%	20,8%	-7,9%	16,8%	16,9%	16,4%
Value	ISEVFER Index	-2,7%	14,0%	-22,6%	-6,5%	18,7%	18,2%
Multi-Factor	ISEXFER Index	1,5%	19,7%	-8,7%	12,9%	16,5%	16,0%
Multi-Factor XC	ISEXFCR Index	-0,3%	21,2%	-9,4%	15,1%	16,7%	16,2%
Benchmark	SXXR Index	0,6%	16,1%	-6,1%	22,8%	17,6%	17,1%

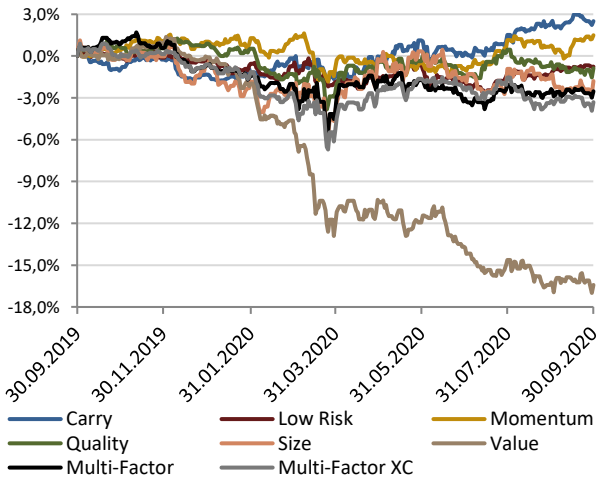
Excess Return 3 Months



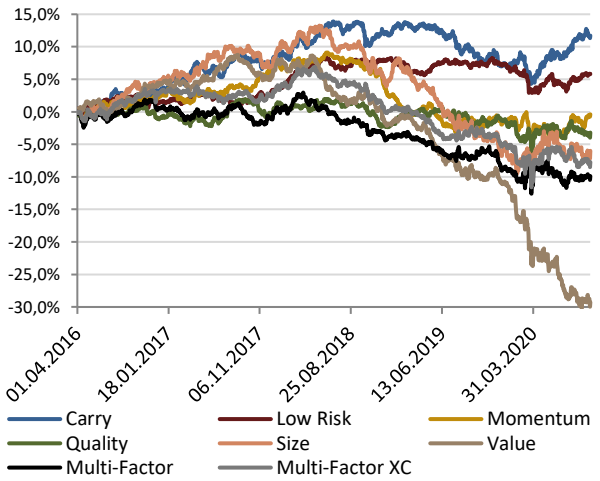
Excess Return 6 Months



Excess Return 12 Months



Excess Return since going Live (1.4.2016)



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