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#### Quantitative robustness, tailor-made to your portfolio

# BLACK-LITTERMAN IN YOUR POCKET\_

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## . key points

 Quantitative investing has historically been difficult to implement because of either tiresome inputs or unrealistic outputs.

 SILEX has created tools to overcome both: our SPARK platform builds robust optimisation from simple, intuitive market views.

 Combining the Allocator and the Inspector, SPARK allows to implement tactical views through funds, a handy solution to real-life wealth managers' problems.

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## . not easy to go quant

When we ask investors whether they would be willing to introduce quantitative tools into their investment processes, they usually embrace them enthusiastically. It is now consensus that quantitative approaches bring robustness, diversification, risk management and discipline to investment decisions, generally leading to better outcomes.

Still, a relatively small number of them actually manage to make the transition. Rather, they stick with previous frameworks, generally implying a strategic reference allocation as well as tactical deviations. Unfortunately, such approaches are vulnerable to emotional biases, evolving volatility regimes and changing correlation patterns.

Two key reasons make the implementation of quantamental processes non-trivial in real life. First, the simplest optimisation methods yield unrealistic outputs. Mean-variance methods, such as Markowitz optimisations, tend to result in highly concentrated portfolios that saturate assets with the highest Sharpe ratios. This implies extreme sensitivity to the inputs, which by nature are uncertain and in turn, limited robustness when those inputs change. Investors typically need to overcome these drawbacks by imposing a large number of constraints on the optimisation, resulting in a high degree of discretion and judgment. Unfortunately, this is exactly what quantitative methods are trying to minimise.

The second important shortcoming to Markowitz methods is the necessity of coming up with numerical tactical views. Mean-variance optimisation requires to form convictions on every asset in the investable universe and express them in the form of a precise number that will be used as an expected return. Unfortunately, this approach is a poor match to how market convictions are usually formed: investors tend to have incomplete views, most often expressed in relative terms, and marred by uncertainty.

## . optimising portfolios with SPARK Allocator

At SILEX, we believe that quantamental investing is the future and should be available to everyone. The ability to combine expert human convictions with quantitative tools brings invaluable benefits to portfolio construction and, ultimately, performance.

But quantamental investing can only be widely used if made simple. Our SPARK platform brings together a set of tools that allows investors to harvest the benefits of robust portfolio optimisation with a high degree of customisation.

SPARK Allocator makes portfolio optimisation unprecedently easy. The tool follows the Black-Litterman approach, a widely used optimisation method that overcomes many of Markowitz' issues. Initially introduced in the early 1990s, the approach uses Bayesian calculus that "blends" equilibrium expected returns derived from the strategic portfolio with an investor's tactical views about the market. In other words, **Black-Litterman optimisation brings quantitative rigour to the intuitive process of overweighting or underweighting asset classes in a discretionary manner.** 

Computational experience has shown that portfolios constructed through this method are more stable and better diversified than those constructed from the conventional mean-variance approach. This is because tactical views are considered for what they really are: incomplete, uncertain, relative bets. The **BL** optimisation is mixing long-term equilibrium returns that are implicit in the strategic reference portfolio with tactical views that can be expressed as simple relative views with various degrees of conviction.

Approach	Investment process	Typical way of expressing views	Advantages	Drawbacks
Discretionary allocation	Tactical deviations from a strategic allocation	"I overweight European equities by 5% compared to my benchmark"	<ul> <li>Simplest way of expressing convictions</li> <li>Limited effort on investment process</li> </ul>	<ul> <li>Emotional bias</li> <li>Weak risk management</li> <li>Sub-optimal diversification</li> </ul>
Markowitz optimisation	Mean variance optimisation based on tactical expected returns	"I expect European equities to rise 8% over 12 months"	<ul> <li>Rigorous incorporation of risk and correlation</li> <li>Intuitive portfolio allocation</li> </ul>	<ul> <li>Tedious expression of tactical views</li> <li>Highly concentrated portfolios</li> <li>Strong reliance on inputs</li> </ul>
Black-Litterman optimisation	Optimisation blending equilibrium returns and tactical views	"I believe European equities may outperform global equities over 12 months"	<ul> <li>Flexible expression of tactical views</li> <li>Diversified, optimised portfolio</li> <li>Incorporation of uncertainty</li> </ul>	<ul> <li>Less intuitive portfolio allocation when many constraints are added</li> </ul>

## . tailor made implementation with the Inspector

Another key issue faced by investors is that their tactical views, once put together into an optimal portfolio, often cannot be implemented in real life. This is because they allocate through external funds that do not necessarily reflect their own views.

SPARK's Inspector is a tool that analyses the historical price of any fund and uses statistical methods to replicate its behaviour as a vector of sensitivities to macro asset classes. It allows for example to determine how much a global equity fund has historically been exposed to Europe or to the Value factor.

With that input from the Inspector, the Allocator can make informed decisions as to which funds to select and in what proportion in an allocation, according to each investor's tactical views. The combination of these tools allows a very high degree of customisation: investors can select bespoke investment universe, inform their personal views on the market in a highly flexible manner, and obtain the optimal portfolio tailor-made to their specific risk parameters.



## . Black-Litterman Optimisation by SILEX

## . example 1\_ LET'S TRY CAPITAL

Let's take a real-life example with a fictious wealth manager called LETS TRY CAPITAL. They have built a strategic cross-asset allocation reflecting a balanced risk profile with a base currency in euros. The strategic portfolio looks as follows (**Step 1**, Exhibit 1): 20% in government debt, 34% in credit and 46% in equities.

LETS TRY CAPITAL currently have a set of tactical views on parts of their investment universe (**Step 2**) and would like to implement these views in a robust manner (Exhibit 2).

#### Exhibit 1: Strategic portfolio (Step 1)



We first extract implied expected returns embedded in the strategic portfolio by reverse-engineering the Markowitz optimisation (Step 3). Then, using a proprietary formula using each asset's idiosyncratic risk, the tactical ratings and implied expected returns, we compute tactical expected returns (Step 4).

#### Exhibit 2: Tactical market views (Step 3)

	Group 1	View	Group 2	Rating
Absolute bets	EUR credit	will perform		++
	Global govies	will perform		
Relative	US Equity	will outperform	EM Equity	+
bets	EUR Equity	will outperform	Global equity	+
				Source: SILEX

Finally, we use our Black-Litterman framework to blend both the strategic returns and the tactical returns to end up with final blended expected returns (Step 5).

#### Exhibit 3: Strategic expected returns (Step 3) vs. Blended expected returns (Step 5)



This process yields some intuitive results. The positive tactical view on European credit increases expected returns on the asset class, but also on other assets that are correlated to it, such as US credit. In equities, the expected returns in Emerging Markets is reduced relative to US equities but remains positive.

Finally, we run a portfolio optimisation using our blended expected returns and a target volatility of 8% annualised (Step 6). The process delivers a new allocation that properly considers market views and sizes each tactical bet in a robust manner, taking into account risk and correlations.

#### Exhibit 4: Strategic allocation (Step 1) vs. Tactical allocation (Step 6)



## . example 2\_ Tactical views using funds

Now let's say that LETS TRY CAPITAL does not build allocations using indices or ETFs but using external funds. As an illustration, their balanced portfolio in euros is currently built in the following way, using funds from Pictet, Credit Suisse and Blackrock among others (Step 1, Exhibit A).



## The tactical views have not changed (**Step 2**) but we now face a problem: the funds in our portfolio are not perfect matches for the asset classes on which we express market views.

For that reason, SILEX has created the Inspector, a tool that uses machine learning through an Adaptive Elastic Net approach, to map the behaviour of any asset onto a set of explaining variables. Using the Fund Inspector, we calculate the sensitivities of each of the funds to the strategic asset classes (Exhibit B).





Source: SILEX

This operation gives us a complete picture of the true exposure of each fund to selected risk factors and to 'pure' asset classes. We learn for example that the Lombard Odier European Equity fund has a roughly 10% exposure to US equities. The GemEquity Emerging fund is significantly correlated to US credit, while the Robeco fixed income fund is biased towards the US compared to Europe.

This extra step allows us to now implement tactical views expressed at the asset class level in our portfolio of funds. Like in our first example, we are able to calculate the strategic expected returns (Step 3) and blended expected returns (Step 5) for each fund (Exhibit C).

#### Exhibit C: Strategic expected returns (Step 3) vs. Blended expected returns (Step 5)



Source: SILEX

We can see here that expected returns for each fund have adapted to sensitivities identified by the Inspector: the GemEquity fund has significant exposure to European equities, such that its blended expected return has been reduced less than Emerging Markets equities in our first example.

With these blended expected returns as inputs, we can now run the portfolio optimisation with the same 8% target volatility. We end up with a new, robust fund allocation reflecting tactical views (Exhibit D).

#### Exhibit D: Strategic allocation (Step 1) vs. Tactical allocation (Step 6)



To conclude, the SPARK platform provides a way to combine i) robust portfolio construction, ii) simple and intuitive inputs and iii) a high degree of customisation through single assets or funds. It makes quantamental investing accessible to all investors, putting Black-Litterman literally in your pocket.



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