

# How to control the hidden costs of systematic investing

Whitepaper

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Any backtest is only as good as the information put into it. And yet when it comes to trading costs it is often assumed that an approximation is accurate enough to account for real world trading frictions. In reality, the impact of trading costs can be similar in magnitude, or even outweigh, the systematic premia they aim to capture. Additionally, trading costs assume greater significance in a low-return environment as they effectively represent a greater proportion of potential return available.

When the hidden costs of a strategy are underestimated or inaccurately incorporated into a backtest, they will only show up once their often significant impact on the bottom line has become apparent. Accurate and granular accounting of costs tailored to the particular instrument and the size traded avoids this situation. In order to construct robust investment strategies, it is essential that asset managers accurately incorporate all trading costs including commissions, slippage, bid-ask spreads and market impact into their backtesting process.

#### Explicit and implicit components

The overall cost of a systematic trading strategy comprises explicit and implicit components. The explicit component is typically known in advance of trading such as agency commissions and fees. Implicit costs are less observable, harder to estimate and can be of a higher magnitude than the explicit costs.

Implicit costs can be characterised as containing three parts<sup>01</sup>:

#### Implicit cost = Instant impact + Temporary impact + Permanent impact

- Instant impact: Cost incurred immediately, such as crossing the bid/offer spread or incurring slippage
- Temporary impact: Adverse market price movement
- during the execution of the trade
- Permanent impact: Difference in market price before and after trade

The temporary and permanent impacts are sometimes grouped together as market impact. The remainder of this paper focuses primarily on instant impact, the effect this impact can have on the total return of a systematic strategy and potential ways to mitigate it.

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<sup>o1</sup> Source: Rashkovich, Vlad, and Arun Verma. "Trade cost: Handicapping on PAR." The Journal of Trading 7.4 (2012): 47-54.

#### **Example Backtests**

Consider the following backtests of typical systematic strategies comparing hypothetical performance with, and without costs<sup>02</sup>.

#### 1. FX Short-term Value Strategy

This FX systematic strategy holds a long-short basket of FX futures and adjust its positions on the back of short-term fundamental signals. In effect, the strategy rebalances weekly with positions in the basket completely reversing from one rebalance to another. The higher rebalancing frequency has the advantage of increased reactivity but the sheer number of trades creates an annualised cost of 1.5% loss in returns. On a cumulative basis over a decade, the strategy's total return net of costs (1.6% total) ends up a tiny fraction of its hypothetical gross return with zero costs (17.1% total).



This realistic estimation of trading costs suggests improvements to the strategy, be it running scenarios for lower turnover versions or including selection penalties for currencies with wider spreads and higher volatilities. Furthermore, backtests of systematic strategies within the FX markets typically use a cutoff point at New York close, which in real-life is a less liquid fixing time<sup>03</sup>. A robust FX backtesting process would instead allow testing for performance across multiple execution time cuts.

#### 2. Global Tactical Asset Allocation Strategy (GTAA)

The GTAA strategy analyzes short-term performance across different liquid markets/asset classes and allocates to the instruments that have outperformed on a risk-adjusted basis. The strategy employs daily rebalancing based on a mean variance optimisation. This strategy demonstrates an even more extreme example of the impact of transaction costs on the total return. By properly accounting for costs, a convincing backtest becomes a clear loss-making proposition. Though the strategy invests in highly liquid instruments with transaction costs of low single digit basis points, the fast reversal of daily positions erodes up to 6.2% a year (from the no-cost backtest annualised return of 3.9%) and 62% cumulatively over a decade.

A robust FX backtesting process would allow testing for performance across multiple execution time cuts.

- <sup>02</sup> The Net of TC backtests include both transaction costs and market impact costs
- <sup>03</sup> Source: Ranaldo and de Magistris. "Trading Volume, Illiquidity and Commonalities in FX Markets"

The GTAA strategy was improved (as shown in Fig 3) using more thoughtful construction: 1) by slowing the rebalancing through employing a threshold and 2) by increasing the lookback window in the return estimation for the meanvariance optimisation. The longer lookback window smooths the signal and reduces the wild swings in its position weights, thereby making a substantial difference to trading costs (0.5% annualised difference between a no-cost backtest vs including costs).







#### 3. Further Examples

Below are further examples that illustrate the impact of trading costs (including transaction costs and market impact) for a range of systematic strategies across asset classes.

	Annualised Return		Annualised Volume		Sharpe Ratio	
	Gross	Net of TC	Gross	Net of TC	Gross	Net of TC
Commodity Trend	1.21%	0.96%	2.64%	2.64%	0.46	0.36
Commodity Carry	3.78%	2.40%	2.86%	2.88%	1.32	0.83
Equity Trend	1.08%	0.95%	3.96%	3.96%	0.27	0.24
FX Carry	1.44%	1.09%	7.32%	7.33%	0.20	0.15
Developed Markets FX Trend	1.33%	1.18%	4.00%	4.00%	0.33	0.30
FRB STIR Carry	1.63%	1.22%	0.84%	0.84%	1.94	1.45
Rates Trend	3.60%	3.34%	3.97%	3.97%	0.91	0.84
FX Value	1.64%	0.16%	3.86%	3.87%	0.42	0.04















## Using SigTech for more realistic strategy construction

As seen in the case of the GTAA strategy, thoughtful design of systematic strategies can help control transaction costs. Estimating this cost depends on several variables, especially as costs can vary across trades depending on size, trade type, instrument characteristics, and venues. In order to have a better grasp of what proportion of hypothetical returns are accessible, portfolio managers need a more granular and accurate view of the costs of strategies down to individual orders. The ability to incorporate the key attributes of individual trades such as bid-ask spread, volatility, volume and the forecasted market impact into the backtest is critical to understand the projected cost of the strategy. Modelling for trading costs is also valuable for strategies in production to determine the slippage between the backtest model assumptions and the live production environment as well as developing a better understanding of its causes.

#### Previously, portfolio managers had to individually, and correctly, incorporate the relevant costs into their research and backtesting process. Now, technology can provide the required level of detail and accuracy through out-of-the-box transaction cost functionality which can be calibrated as per the user's needs and integrated with proprietary TCA models and data. A well-designed platform that facilitates easy and accurate construction of backtests that factor in real trading costs can have a significant effect on the bottom line.

To find out more about how SigTech is assisting market leading asset managers, hedge funds and others, please visit sigtech.com or email hello@sigtech.com

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The ability to incorporate the key attributes of individual trades such as bid-ask spread, volatility, volume and the forecasted market impact into the backtest is critical

### About SigTech

SigTech eliminates the expensive upfront costs of infrastructure build out and data onboarding The SigTech platform offers realistic and accurate backtesting that takes a holistic view of trading costs into account. Features of the platform include:

- incorporating fixed commissions, fixed/percentage-based spread costs and market impact
- the flexibility to specify costs based on specific instrument and trade type
- the ability to scale market impact non-linearly by trade sizes and participation rates
- calibration of parameters to include proprietary estimates of trade costs based on client's in-house trade information
- the flexibility to integrate proprietary transaction cost models
- feedback loop from execution
- multiple timestamps for certain markets allowing for granular specification of
- trade size depending on time of day or VWAP
- modelling of stop-loss strategies
- time-variant parameter specification to account for scenarios of market-stress/crowding

Unlike in-house solutions, SigTech eliminates the expensive upfront costs of infrastructure build out and data onboarding so clients can focus on investing from day one.

As the only plug and play trading platform of its kind for quant multi-asset research and investment, SigTech reduces time to market allowing users to focus on alpha generation. Infrastructure build-out and data management are rapid. Strategy development and backtesting are also streamlined to maximise the speed of strategy implementation in both research and production environments.

The first end-to-end platform of its kind, SigTech allows users to focus on signal detection and backtesting, significantly reducing the time and cost of investment strategy implementation and deployment.

By using SigTech, clients avoid the substantial costs and delay of building and deploying an in-house technology equivalent:

- Oliver Wyman business consultants estimate that it would cost \$15-20 million to build a similar platform in-house, and ca. \$2.5m a year in running costs to maintain.
- The same report found that a company with no pre-existing quant trading system would take 50 weeks to build a platform in-house, compared to just eight weeks using SigTech.

To book a live demonstration of our platform, please contact hello@sigtech.com

<sup>&</sup>lt;sup>01</sup> Source: Rashkovich, Vlad, and Arun Verma. "Trade cost: Handicapping on PAR." The Journal of Trading 7.4 (2012): 47-54.

### **Powering Signals**

SigTech offers quant technologies in a SaaS platform to hedge funds, asset managers and asset owners so they can focus on beating the market.

SigTech specializes in macro strategies and cross asset allocation, using operationallyready datasets across a wide range of financial instruments. Our platform ingests, cleans and validates financial data, and provides the tools to research, build, and deploy customized strategies – giving users an edge in alpha generation.

#### Disclaimer

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