A(I) case for factor timing

By CIO Mikkel Petersen, AI Alpha Lab ApS

Factor timing is hard, in both practice and theory

Factors such as value, growth, quality, dividend and momentum (all of them across different regions), plays a key role in most institutional portfolios. There is a strong consensus among both practitioners and academics that timing factors is hard, at best. The reasoning underpinning this conclusion is not the focus of this short paper, but we believe that probabilistic AI models provides an attractive way of incorporating active factor strategies into institutional portfolios.

It's all about probabilities

Trying to predict the future price of a financial asset is of little interest since the estimate will always be surrounded by too much noise to be of much value in itself. What investors should do, is try to predict the probability of a future price. Only then can we begin to make optimal investment decisions under uncertainty in a robust and consistent way.

We have tested our probabilistic AI model within and across all asset classes and one thing is consistent across the board. Robust excess returns come from uncertainty estimation, not return estimation.

Case study

Here we will show the importance of investing through probabilities by running our AI model on a universe of 28 index ETF's across country/region and style (value, growth, momentum, low volatility, size, quality, and dividend) over the period December 2016 – December 2020.

Each month we will form two portfolios:

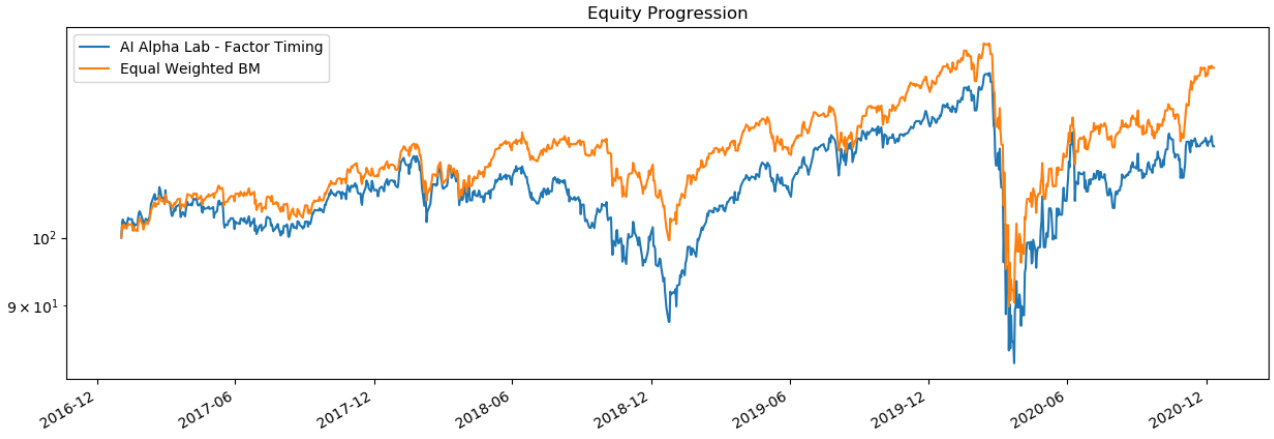
The first portfolio will buy those indices with return predictions for the next month in the top 20 decile of the universe. The resulting portfolio will be equal weighted.

The second portfolio will buy those indices with return predictions for the next month in the top 20 decile of the universe, only if the model uncertainty for a specific index is in the lower 50% of the universe, i.e. the model predictions used must have relative explanatory power. The resulting portfolio will be equal weighted.

The models rebalances monthly with no turnover limit and is always fully invested. A 20 basis-point transaction cost is included on all traded value.

Both portfolios are benchmarked against an equal weighted benchmark of the full universe in USD. **(Note that this is not an attempt at creating a full and robust investment strategy, but merely to highlight the importance of incorporating uncertainty.)**

Below is the test of the strategy, which do not take advantage of the uncertainty feature of our probabilistic AI model.



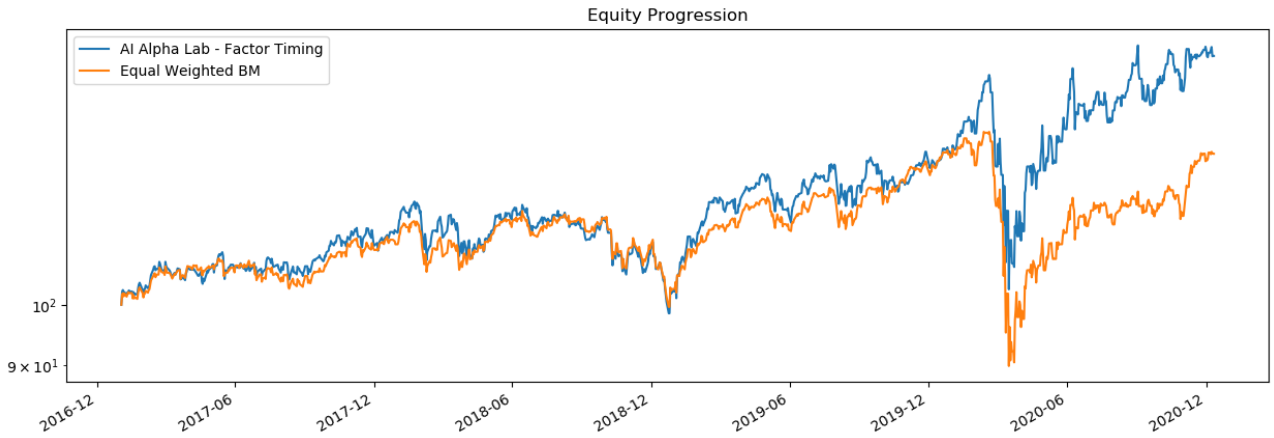
Performance	AI Model	Equal Weighted Universe
Total Return	15,2%	30,2%
YTD	-5,5%	0,5%
1Y	-3,6%	2,4%
3Y (ann.)	2,1%	5,3%
Since Incep. (ann.)	3,7%	6,9%

Risk Metrics	AI Model	Equal Weighted Universe
Calmar Ratio	0,1	0,21
Ann. Volatility	21,0%	18,2%
Sharpe Ratio	0,26	0,43
Sortino Ratio	0,39	0,61

Risk Metrics	AI Model	Equal Weighted Universe
Max Drawdown	-36,3%	-33,6%
Worst Day	-12,3%	-11,9%
Worst Month	-19,1%	-15,9%
Worst Year	-15,2%	-7,5%

It is straightforward to conclude, that our state-of-the-art Bayesian neural network, capable of efficiently searching huge amounts of data for all linear and non-linear causal structures, has limited success in producing significant return estimates.

Below we test the strategy that do take advantage of the uncertainty feature of our probabilistic AI model. Remember that this is an all-else-equal test, so everything else is exactly the same as the above test.



Performance	AI Model	Equal Weighted Universe
Total Return	54,4%	30,2%
YTD	18,9%	0,5%
1Y	21,1%	2,4%
3Y (ann.)	11,2%	5,3%
Since Incep. (ann.)	11,7%	6,9%

Risk Metrics	AI Model	Equal Weighted Universe
Calmar Ratio	0,37	0,21
Ann. Volatility	22,0%	18,2%
Sharpe Ratio	0,57	0,43
Sortino Ratio	0,87	0,61

Risk Metrics	AI Model	Equal Weighted Universe
Max Drawdown	-31,2%	-33,6%
Worst Day	-12,8%	-11,9%
Worst Month	-8,4%	-15,9%
Worst Year	-9,8%	-7,5%

The results of the second test dramatically change simply because we are selective in our use of the return predictions from the model. Very few investors and no economic theory takes model uncertainty into account and we believe this to be a large uncompensated risk in most portfolios today, regardless of asset class or investment style.

We create alpha by knowing that we don't know. Probabilistic AI models does not provide significantly better estimates of future returns than most models applied today. However, combined with an estimate of the models uncertainty about its own estimates, it can improve performance significantly.

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It is emphasized that investment returns shown are simulated and do not represent actual performance of assets during a period. If the simulated strategy had been implemented during the period, the actual returns may have differed significantly from the simulated returns presented. Past performance, whether actual or simulated, is not a reliable indicator of future results and the return on investments may vary as a result of currency fluctuations.

AI Alpha Lab ApS

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