

Correction (See page 11 for details)

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News Sentiment in China

Using ChinaScope NLP for Trade Timing A-Shares

- Chinese-language sentiment has been another interesting challenge for Natural Language Processing (NLP) researchers and, as we shall see, the rewards are well worth the effort. In this report, we test the ChinaScope News Sentiment factor in standalone backtests as well as looking at optimal techniques for integration of what is essentially a high frequency signal into a more moderate turnover factor model.
- ChinaScope has available daily sentiment scores for the broader A-share market since 2017. Their NLP engine takes care of all the workflow, including tasks such as news sourcing, duplication removal, event tagging, entity detection and sentiment scoring.
- We focus on using the ChinaScope sentiment signal inside a more traditional portfolio setting, i.e., large caps (CSI300) with a monthly rebalance. The results from our standalone tests are strong (a Sharpe > 2 after t-costs) and in line with our English news tests in previous work, as well as compelling results we have seen in academia.
- Turnover of this factor is high (as it is for all sentiment-based strategies), but we think this kind of signal can still enhance most risk premia based portfolio when used to time existing trades.
- Instead of blending sentiment with slower factors in the cross-section (using a Z-score), we suggest using the higher frequency signal to *Trade Time* slower factors (we describe and demonstrate both approaches and backtests inside).

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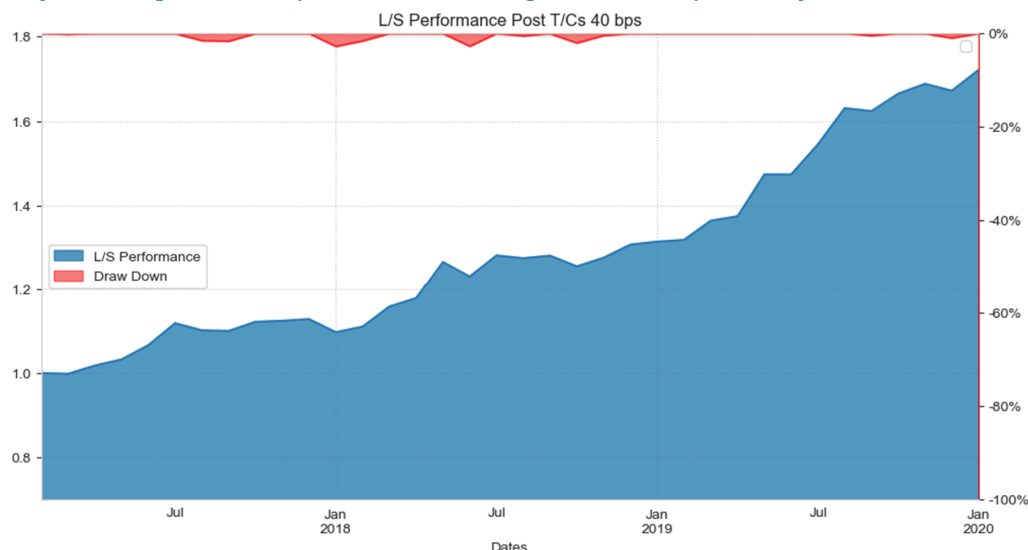
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Monthly backtesting the ChinaScope sentiment factor using deciles with 20bps each way transaction costs



Source: JPM QDS, ChinaScope; CSI300, Deciles, 2 x 20bps transaction costs (each way), average of daily scores at month end by each stock

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Chinese News Sentiment

Natural Language Processing (NLP) is a popular research focus and one subset of this is sentiment classification of the news. Probably the biggest challenge in training any classifier is getting good data. We need large amounts of it and for supervised learning it needs to be labelled and already partitioned into ‘good’ and ‘bad’ sentiment classes.

Our original JPM in 2017 was for English-language news sentiment

In our original report from 2017 (“[NLP for Sentiment Detection](#)”, Smith, 2017) we explored our internal library for sentiment classification using five years of JPM English-language analyst reports (over 250,000 reports in total). We use the analysts’ ratings on their reports (OW, N and UW) to give us a subset of over 75,000 labelled samples for learning the difference between good and bad sentiment in financial writing. Then we applied our best classifier to read English news articles about stocks to put on trades using the sentiment score.

Our trading backtests looked at news feeds with over 100,000 headlines for both long and short stock signals in several global indices (DJI, NASDAQ, HSI, ASX, MSCI UK, and MSCI APEX50). We found our signal produced around 10-20bps L/S per week (6-12% p.a.), annualized Sharpe ranging from 1.5 to 3.0; it worked better in smaller caps with little correlation to traditional sentiment factors derived from earnings momentum or analyst rating changes.

Chinese-language news sentiment is another challenge

One market we were missing was onshore China equities, largely because we were focused on more English-language news. Chinese-language classification using machine learning could use a similar training approach, but of course requires significant investment in collecting, sorting and processing Chinese news flow. This is where ChinaScope comes in.

This report uses the ChinaScope Sentiment factor ‘off the shelf’ as provided by them

In this report, we look at trading China A-shares with a signal processed by ChinaScope. The strong results from our tests (Sharpe > 2 after t-costs) are well in line with English news in our prior work, as well as what we have seen in academia (e.g. Sinha, 2017)¹. Turnover of this signal is high (as it is for all sentiment-based strategies), but we think this kind of signal can still make a big difference to the trade timing in any portfolio.

The benefit with Trade Timing is that it can improve the performance of a traditional factor model without taking on more turnover.

Lastly, news sentiment is relatively uncorrelated with traditional ‘sentiment’ factors or indeed most other risk premia. This makes some sense as news signals are more aligned with events, and we have also thoroughly investigated event signals (‘[Global Corporate Event Analysis](#)’, Hlavaty, 2015) and also found them also uncorrelated to traditional factors. Therefore, we can use the orthogonal news sentiment factor to boost traditional factors using ‘[Trade Timing](#)’ (Smith, 2016), which is an alternative to Z-Score blending – we also show this at the end of this report.

¹ Sinha, S. L. (2017). News vs. Sentiment: Predicting Stock Returns from News Stories. Financial Analysts Journal, Volume 73 Number 3.

ChinaScope Sentiment factor

The ChinaScope [white paper](#) has detailed information about the construction of their signal, their taxonomy for tagging and also entity detection

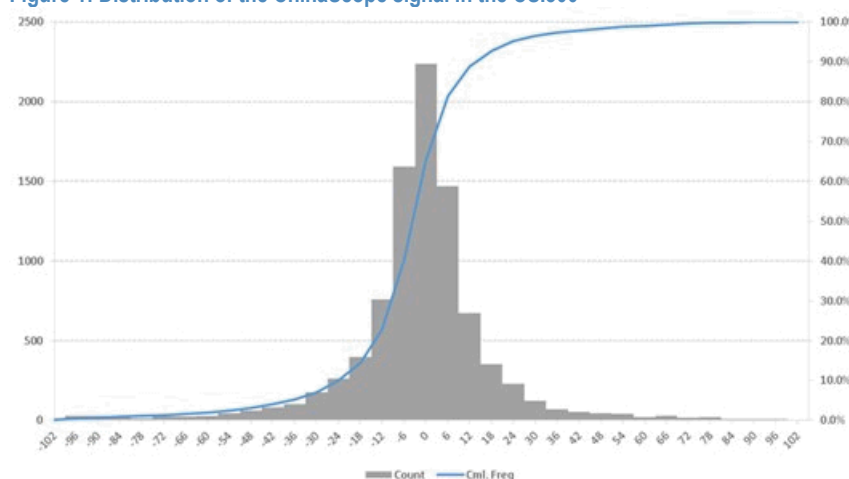
The ChinaScope NLP process handles the end-to-end process: from news sourcing and collection right through to sentiment signal calculation. It covers all parts of the workflow including tasks such as news detection, duplicate removal, event tagging, entity detection and sentiment scoring.

All the news items are scraped at within five-minute intervals, with a time stamp, so the collection is close to real time. The NLP algorithms run on the news comprise of a combined SVM and CNN models and classification training is done using hand-crafted labelling. For more information, please see their detailed [white paper](#).

The raw signal distribution shown below is the average scores for each stock in a month. This is the same construction of the factor that we used in the subsequent backtesting.

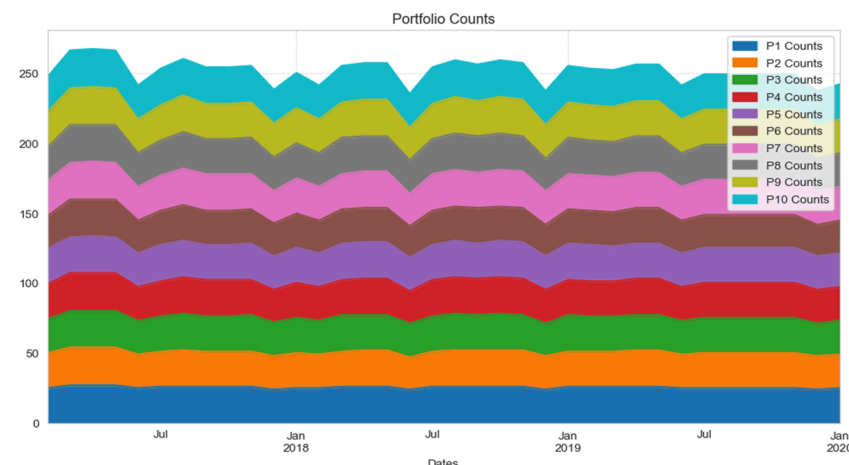
We see the signal range is fairly uniformly distributed from -100 to +100.

Figure 1: Distribution of the ChinaScope signal in the CSI300



Source: JPM QDS, ChinaScope; CSI300

Figure 2: Coverage of the ChinaScope factor in the CSI300 through time



Source: JPM QDS, ChinaScope; CSI300

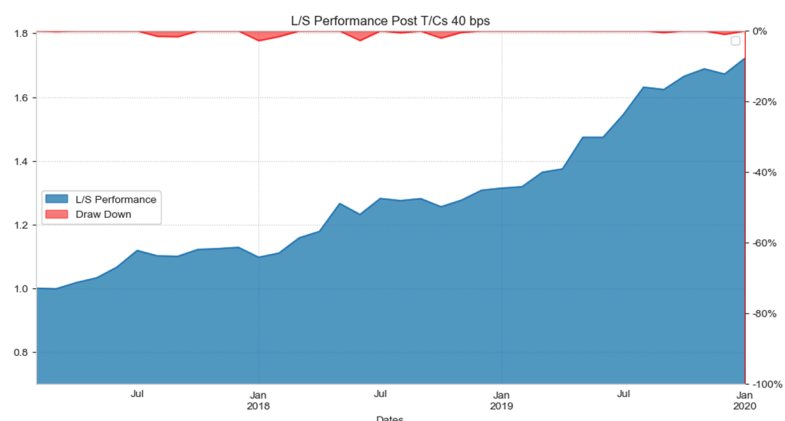
We see good coverage through its history in the CSI300 index of stocks at around 90% of the index

ChinaScope coverage is also available for the broader A-Share index; we focus on the CSI300 for liquidity and t-cost concerns

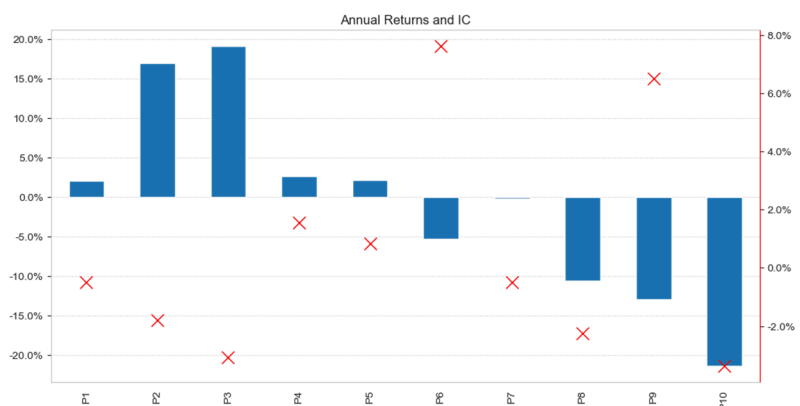
When backtesting a daily signal, there are many choices to form a month-end factor. In all our tests we are using just the over-the-month averages of all news we found for a stock intra-month. This way we had better coverage of the CSI300 as any stock with news in the month was included. Some stocks had more media attention than others in a month, but we did not take this into account.

Figure 3: End of Month backtesting the ChinaScope sentiment factor standalone deciles – 20bps each way transaction costs

ChinaScope Sentiment trades very well at higher conviction; these are decile tests



It is more powerful on the short side i.e. what not to buy; the long side was not as consistent and better used more broadly with less conviction (i.e. terciles)



Very low volatility on the decile tests, even lower if one broadens the portfolios to quintiles or terciles

Turnover is very high as one would expect for news sentiment signals, but these tests are after t-costs

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	20.4%	8.7%	2.34	72%	0.00	2.9	1713%
Long	-2.3%	20.8%	-0.11	44%	1.13	2.9	920%
Short	-24.6%	21.3%	-1.15	31%	1.14	2.9	793%
Bench	-1.2%	17.3%	-0.07	47%	1.00	2.9	0%
P1	2.1%	20.8%	0.10	44%	1.14	2.9	920%
P10	-21.4%	21.4%	-1.00	31%	1.14	2.9	793%

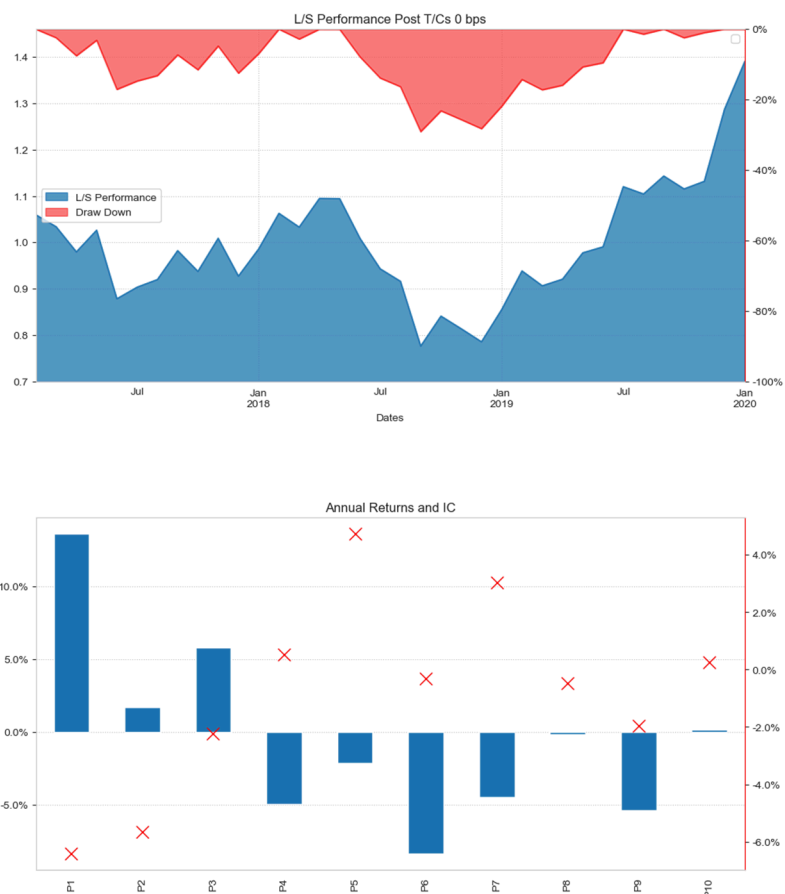
Source: JPM QDS, ChinaScope; CSI300, Deciles, 20bps transaction costs each way, month end average of daily scores by stock

Blending news sentiment with other factors

Take a simple Value portfolio in the CSI300 as proxied by cheap on Price to Book. We can use this as an example of existing factor model. A rather primitive one but it will serve the purpose of demonstrating an existing strategy into which we want to blend the ChinaScope news sentiment signal.

Figure 4: Book / Market long-short deciles – no transaction costs for now

Take a humble value portfolio based on Book / Market; it's rather volatile in the CSI300 but is broadly positive



Reasonable Sharpe of 0.49 and very low turnover of only 3x a year (one way turnover)

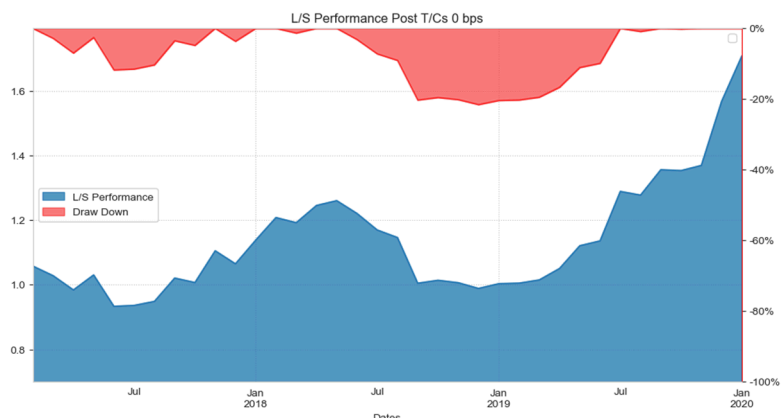
If we added t-costs of 20bps each way to this test, the Sharpe drops to 0.35 (from 0.49)

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	11.9%	24.2%	0.49	56%	0.29	2.9	298%
Long	13.6%	26.0%	0.52	61%	1.09	2.9	160%
Short	0.2%	19.0%	0.01	44%	0.80	2.9	138%
Bench	-0.2%	19.8%	-0.01	44%	1.00	2.9	0%
P1	13.6%	26.0%	0.52	61%	1.09	2.9	160%
P10	0.2%	19.0%	0.01	44%	0.80	2.9	138%

Source: JPM QDS, Factset; CSI300, deciles, no transaction costs.

Next we blend the new ChinaScope Sentiment with P/B using a simple cross-sectional blending of the Z-Scores (equal weight). While not the most sophisticated of approaches, we use this to illustrate what we would expect to happen – it improves the performances nicely. The Sharpe goes from 0.49 to 1.03 before costs but at the expense of turnover (which increases from 298% p.a. to 978% p.a.). The more weight we give the ChinaScope sentiment factor, the more performance *and* turnover increase and vice versa. There is a fairly linear response of the return and turnover to the weighting changes.

Figure 5: P/B blended with ChinaScope Sentiment 50:50– last 3 years



The blended composite a Sharpe of around 1 (no transaction costs)

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	20.1%	19.6%	1.03	61%	0.04	2.9	978%
Long	13.1%	25.8%	0.51	61%	1.10	2.9	274%
Short	-6.9%	22.3%	-0.31	39%	1.06	2.9	705%
Bench	-0.1%	19.7%	0.00	44%	1.00	2.9	0%
P1	13.1%	25.8%	0.51	61%	1.10	2.9	274%
P10	-6.9%	22.3%	-0.31	39%	1.06	2.9	705%

Source: JPM QDS, ChinaScope; CSI300, deciles, no transaction costs, month end average of daily scores by stock

The much higher turnover of course impacts the post transaction cost performance with a reduced Sharpe of 0.69 (down from 1.03).

Figure 6: P/B blended with ChinaScope Sentiment 50:50 – last 3 years with Transaction costs

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	13.4%	19.5%	0.69	56%	0.04	2.9	978%
Long	10.8%	25.8%	0.42	61%	1.10	2.9	274%
Short	-8.6%	22.2%	-0.38	39%	1.06	2.9	705%
Bench	-0.1%	19.7%	0.00	44%	1.00	2.9	0%
P1	13.1%	25.8%	0.51	61%	1.10	2.9	274%
P10	-6.9%	22.3%	-0.31	39%	1.06	2.9	705%

Transaction costs 20 bps each way L/S have significantly impacted the Sharpe because of the high turnover

Source: JPM QDS, ChinaScope; CSI300, deciles, transaction costs of 20bps each way, month end average of daily scores by stock

Use 'Trade Timing' instead of blending

Some quantitative signals have very strong performance profiles but are simply unprofitable due to their high transaction costs – short-term reversion being a classic example. They tend to be characterized by strong robust returns that work well through market cycles, but have high turnover and fast signal decay. Attempts to bring these 'fast burn' factors into a slower composite model (typically done using weighted Z-scores) will usually improve returns, but only at the expense of increased turnover and associated t-costs. The trade-off is often not worth it.

While blending fast with slow factors in the cross-section might not always work, we have found compelling performance improvements by using these fast signals to condition a slower model through time. By exploiting the idea of 'trade timing' we can benefit from dynamically timing the rebalance of each stock in the portfolio – something we had been ignoring in the past. We don't actually change what the slow model wants to buy, but we do relax the fixed rebalance dates and allow this to vary for each stock according to a faster conditioning signal.

We buy *WHAT* the slow burn model wants, but *WHEN* the fast burn model says. Our backtesting seems to indicate higher performance on lower turnover than the slow burn model can achieve on its own.

See our original paper "Trade Timing in Global Equities", 10 May 2016

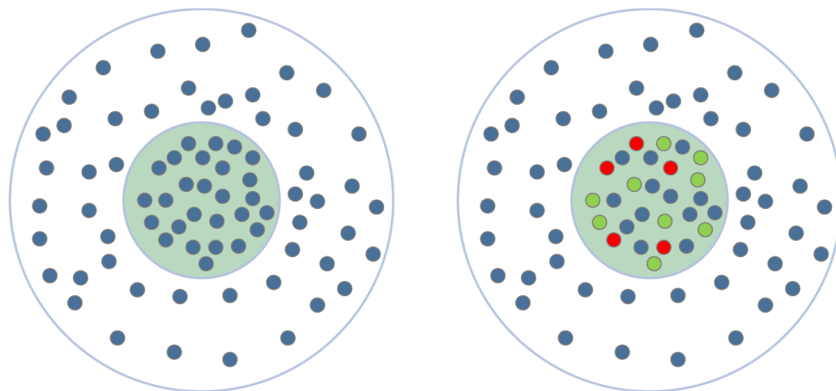
Instead of blending the two signals cross-sectionally (like with a multifactor model) we run them both in parallel. We use the slow burn to decide the potential trade list on the rebalance dates, and then we use the fast burn to decide when to buy these names in between the rebalance dates.

In the diagram below we show the set of cheap stocks as identified by the slow Value strategy inside the inner circle. We keep that list constant between rebalance dates, and then consult a fast conditioning signal (sentiment) to see the most appropriate names to buy right now (the green lit stocks). We can buy them first, and focus on the rest later perhaps as the sentiment signals change to green. At the very least we can avoid the red lit names right now.

Figure 7: The slow strategy target portfolio is inside the inner circle on the left, with green and red light timing indicators from a separate conditioning signal on the right – we prefer to buy the green lights sooner, red lights later (sometimes never).

We buy *WHAT* the slow burn strategy wants, but *WHEN* the fast burn signal says

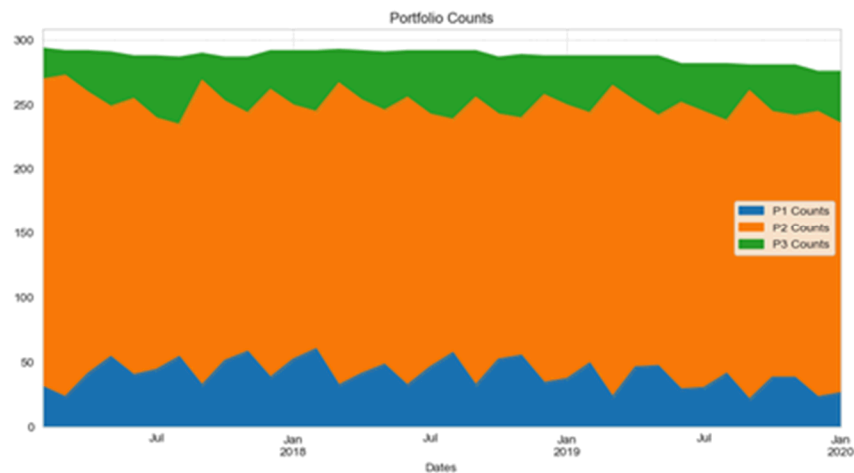
Inside the inner circle is the slow strategy portfolio, but we only trade when they are lit green by the fast burn signal



Source: J.P. Morgan Quantitative and Derivatives Strategy

We would argue rebalancing a Value factor every month is overtrading anyway as the decay on that factor is not that fast. We can slow the factor down by trading less, but boost its performance by conditioning with a faster and orthogonal factor. This staggered buying approach (as green lights present during the rebalance period) gives us a saw-toothed pattern in the holdings as shown below.

Figure 8: Saw-tooth pattern of buying into the long and short sides of a Book/Market factor using the green lights (long side) and red lights (short side) from the ChinaScope Sentiment factor.



Source: J.P. Morgan Quantitative and Derivatives Strategy, ChinaScope, Factset

It's intuitive to see how this might boost the performance of the portfolio. At the very least we are avoiding entering trades that the fast signal knows are poor in the near term. Also, we are buying stocks with more confidence as they exhibit compelling characteristics on both models (but we are still staying true to our core strategy by not deviating outside the slow factor 'buy list').

Using trade timing instead of cross-sectional blending can deliver better performance on a lower turnover

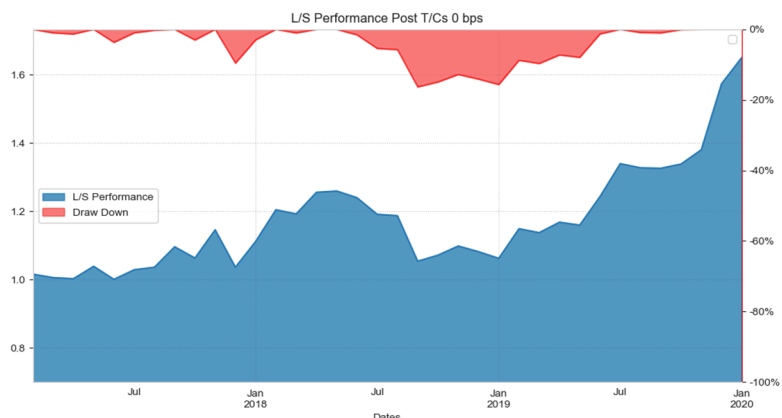
What is less intuitive is that the technique can actually reduce turnover in two ways. The first way is that the time optionality that is being introduced (for free) can actually help avoid wasted round-trip trades from one rebalance to the next (if we change our minds). The second way is that we are more optimally exploiting the signal decay by not trading some signals too often.

Take a multifactor model that includes 1-month, 3-month and 6-month signal horizons. Typically these are cross-sectionally combined using their z-scores. Say we choose to rebalance quarterly as this seems like it will be a good compromise on performance and turnover. In this case, we will be trading the 6-monthly signal too often and the 1-monthly signal not often enough. However if we used trade timing to condition the slower signals with the faster ones at different frequencies, we can choose the optimal rebalance for every factor used with no need to compromise.

We do the inverse on the short side where we look for red lights on sentiment inside a list of expensive Book/Market names

We can use the same approach of Trade Timing a Book to Market factor using ChinaScope Sentiment. We build Value stock lists every 3 months (of 100 names that are cheap and we would like to go long), and trade time this monthly looking for positive sentiment on the ChinaScope signal but only inside those 100 cheap names.

Figure 9: Book to Market trade timed with ChinaScope Sentiment



Trade timing allows us to hit the same Sharpe as cross sectional blending but on lower turnover

The portfolio sizes are about the same as the decile tests at around 20-50 stocks each side

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	18.7%	17.4%	1.08	56%	0.05	2.9	490%
Long	14.2%	22.8%	0.62	58%	1.04	2.9	249%
Short	-5.0%	21.7%	-0.23	39%	0.99	2.9	241%
Bench	2.7%	20.1%	0.13	50%	1.00	2.9	0%
P1	14.2%	22.8%	0.62	58%	1.04	2.9	249%
P3	-5.0%	21.7%	-0.23	39%	0.99	2.9	241%

Source: JPM QDS, ChinaScope; Factset, CSI300, terciles, no transaction costs, month end average of daily scores by stock

We can achieve a similar Sharpe ratio (1.08) as 50:50 blended PB and CS Sentiment composite (1.03), but on much less turnover (490% instead of 978%). Of course after adding transaction costs the Sharpe is much better using the trade timing approach (0.92) than cross sectional z-score averaging (0.69).

Figure 10: P/B trade timed with ChinaScope Sentiment – last 3 years with Transaction costs

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	15.8%	17.3%	0.92	53%	0.05	2.9	490%
Long	13.4%	22.7%	0.59	58%	1.04	2.9	249%
Short	-5.1%	21.7%	-0.24	42%	0.99	2.9	241%
Bench	2.7%	20.1%	0.13	50%	1.00	2.9	0%
P1	14.2%	22.8%	0.62	58%	1.04	2.9	249%
P3	-5.0%	21.7%	-0.23	39%	0.99	2.9	241%

Source: JPM QDS, ChinaScope; Factset, CSI300, terciles, 20bps t-costs each way, monthly average of daily scores by stock

After t-costs, a better Sharpe of 0.92 is possible due to much lower turnover

Alternative we can increase turnover and achieve a higher Sharpe if that's what is needed; we do this by upping the greenlight threshold on the CS Sentiment factor

Being able to achieve higher Sharpe ratios on lower turnover is consistent with our findings in our original report as well.

Summary

The ChinaScope News Sentiment factor is a powerful signal in A-Shares in line with what we observe both on sentiment signal performance from English news tests, and also the generally strong performance quant strategies tend to have when translated into the A-Share market.

In this report we went through the following sequence of key backtests:

ChinaScope STAND ALONE
signal test (20bps t-costs each way)

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	20.4%	8.7%	2.34	72%	0.00	2.9	1713%
Long	-2.3%	20.8%	-0.11	44%	1.13	2.9	920%
Short	-24.6%	21.3%	-1.15	31%	1.14	2.9	793%
Bench	-1.2%	17.3%	-0.07	47%	1.00	2.9	0%
P1	2.1%	20.8%	0.10	44%	1.14	2.9	920%
P10	-21.4%	21.4%	-1.00	31%	1.14	2.9	793%

Book/Market RAW factor in the
CSI300 (20bps t-costs each way)

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	8.4%	24.1%	0.35	56%	0.30	2.9	298%
Long	11.5%	26.0%	0.44	61%	1.09	2.9	160%
Short	0.3%	19.0%	0.02	47%	0.80	2.9	138%
Bench	-0.2%	19.8%	-0.01	44%	1.00	2.9	0%
P1	13.6%	26.0%	0.52	61%	1.09	2.9	160%
P10	0.2%	19.0%	0.01	44%	0.80	2.9	138%

Book/Market and ChinaScope
Sentiment Z-Score COMPOSITE
(50:50) with 20bps each way t-costs

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	13.4%	19.5%	0.69	56%	0.04	2.9	978%
Long	10.8%	25.8%	0.42	61%	1.10	2.9	274%
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P10	-6.9%	22.3%	-0.31	39%	1.06	2.9	705%

Book/Market TRADE TIMED with
ChinaScope Sentiment with
20bps each way t-costs

	Return	Vol	Sharpe	HitRate	Beta	Years	T/O
L/S	15.8%	17.3%	0.92	53%	0.05	2.9	490%
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Source: JPM QDS, ChinaScope; Factset

Clearly the Trade Timed result is superior to cross-sectional z-score blending as we are able to better exploit the different signal decay between Book/Market and News Sentiment.

Disclosures updated on page 1.

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