

## National Sector PMI & Equity Market Returns

### Ideas for PMI™ usage in active investment strategies

In this short paper, we provide thoughts and ideas on how to glean signals from national sector PMI data with a view to utilising these in active equity investment strategies.

Our ideas are rooted in an approach that utilises PMI data in terms of both the *momentum* and the *relative* performance of a sector. This is achieved through a combination of transformations and extensive use of PMI sub-index data.

To illustrate, we apply these ideas to a subset of our German national sector PMI data, following a simple strategy where funds are invested primarily in those sectors with the 'best' momentum. Our results are encouraging and, depending on the combination of sub-index data and weighting schemes deployed, signals from the PMI data are shown to provide a platform for generating excess returns compared to a naïve benchmark strategy.

#### Background

Available for the world's largest developed and emerging economies, *Purchasing Managers' Index™* (PMI™) surveys for the manufacturing, services and construction sectors are widely viewed by economists, policymakers, and financial market participants as key benchmark indicators of economic conditions.

The data are derived from questionnaires sent to senior company decision makers, with respondents asked to state whether variables such as output, orders, prices, and inventories have improved, deteriorated, or stayed the same compared with the previous month.

From the aggregate results of these questionnaires, so-called diffusion indexes are then calculated for each variable (the percentage of positive responses plus half the percentage of neutral responses). These indexes vary between 0 and 100 with levels of 50.0 signalling no change on the previous month. Readings above 50.0 signal an improvement or increase on the previous month. Readings below 50.0 signal a deterioration or decrease on the

previous month. The greater the divergence from 50.0 the greater the rate of change signalled.

Given the extensive global coverage of our national PMIs – over 28,000 companies are polled each month across more than 40 countries – IHS Markit has in recent years created broad sector PMI data for four regions: Global, Europe, Asia, and the US.

However, further interrogation of the datasets has recently led us to develop new sector PMI indices for constituent European, Asian, and emerging market (EM) nations – as well as more granular US sectors.

Derived from IHS Markit's national PMI survey panel data, these sectors are structured according to legacy Markit Sector classifications, a 5-tier structure based on stock market sectors and covering 3 out of 5 tiers (Tiers 2–4).

These datasets can create insight into sector profitability and offer tools for investment strategy and asset allocation by providing monthly indicators of business trends across variables such as output, order books, prices, inventories, and employment for eight major industry groups including:

- Basic Materials
- Consumer Goods
- Consumer Services
- Financials
- Healthcare
- Industrials
- Technology
- Telecommunication Services

A wide range of detailed sectors and subsectors of those groups is also available.

#### National Sector PMI: Estimating Momentum

Rather than take the traditional approach to using the pure diffusion index data to compare sector performance, we consider an alternative approach in understanding relative performance with PMI data.

To achieve this, we look to previous research and subsequently propose a simple scoring system based on z-scores. This works along the following lines.

Assume that we decide to use a single PMI index to score the relative performance of a sector, and that performance is defined as the one-month change in the index. This focus on the one-month change is important – as noted we are departing from our traditional interpretation of the actual PMI values, and instead focusing on transformations that may provide a better sense of relative sector performance from the perspective of *momentum*.

To provide this relative performance of an individual sector  $i$  for a time-period,  $t$ , the change in the index value is compared against the *average* change across all sectors  $i = (1, 2, \dots N)$  during time-period,  $t$ .

Dividing this difference by the standard deviation of all sector changes will subsequently provide a z-score for sector  $i$  as shown in the equation below:

#### Estimating Individual Sector Z-Scores:

$$\text{Score}_{i,t} = \frac{\text{Change}_{i,t} - \text{AverageChange}_t}{\text{StandardDeviation}_t}$$

Repeating this process for  $N$  sectors provides the basis for comparison: those sectors with the higher z-scores will have the strongest momentum and as such could be viewed as having a ‘buy’ signal.

However, rather than using a single index to gauge sector momentum, a range of PMI sub-index data and various transformations to these sub-indices may be preferable.

For instance, a modeller may want to take a view of both short-term data trends – such as changes in order books, current pricing power etc – but also look at slightly longer-term influences on future financial performance such as capacity constraints.

By taking such an approach the modeller is then able to build up a much more rounded, holistic view of sector health and relative momentum than if a single index approach was being used.

#### A Case Study: Germany

Utilising experience with previous research, and thinking carefully about the intuitive barometers of company financial health that could be derived from the PMI dataset, we considered the following sub-indices and data transformations as having potential

for a case study involving our German national sector PMI data and equity market returns:

- Three-monthly change in output prices (pricing power)
- Difference between three-monthly changes in output prices and input costs (margins)
- Three-monthly change in new orders (demand growth)
- Difference between latest backlogs of work index and 12-month average (capacity constraints).
- Difference between latest output charges index and 12-month average (historical pricing power)

For our illustrative purposes the variables outlined above offer us some persuasive combinations to investigate the relationship between PMI signals and stock returns.

Given the range of data that are available, there are many permutations with regards to combinations of transformations and sub-indices that could be deployed – and as such users themselves may find a better combination than we use below (and users are of course encouraged to do so).

Nonetheless, armed with the hypothesis that high z scores should encourage higher returns for a particular sector, we took individual equity data for a set of listed German companies from Refinitiv. From here, we constructed equally weighted market return proxies that broadly matched up with eight of our ‘tier 3’ national PMI sectors for Germany.

And thanks to the length of our PMI time-series for Germany, we were able to test our signals and returns data over a 17-year period stretching from the start of 2004 to the start of 2021.

We also took the view that investors would initiate any changes to their portfolios within a day of receiving PMI data from IHS. Based on historical release dates – that are readily available to users of the data – we were then able to generate a time series of returns for each sub-sector for holding periods of one-, three- and six- months respectively.

Finally, to test our hypothesis that higher z-scores are associated with ‘buy’ signals, we took a simple approach to investment strategy. Namely that for any positive signal for PMI sector(s) – defined as z-

scores > 1 – then our portfolio would be fully tilted towards those sector(s).

The approach is compared against a baseline model of equally weighting a portfolio across all sectors.

## Results

We tried several weighting combinations and found that charges and margins data had strong short-term influences in generating positive excess returns.

Model 1 uses a weighted combination of pricing power (50%), margins (25%), demand growth (15%) and capacity constraints (10%) and following our simple active investment strategy we were typically able to beat our benchmark over one-month and three-month holding periods (see table 1).

Alternatively, a second model used an equal-weighted combination of pricing power, demand growth, capacity constraints and historical pricing power. This model did not perform so well in the very short-term strategy but was able to beat on average the benchmark equal weighted approach over three- and six-month holding periods.

**Table 1: Equal Weighted and Active Strategies (Model 1)**

Holding Period	EW Strategy Return	Active Strategy Returns
One-Month	1.2%	2.0%
Three- Month	3.0%	4.5%
Six-Month	3.3%	3.1%

**Table 2: Equal Weighted and Active Strategies (Model 2)**

Holding Period	EW Strategy Return	Active Strategy Returns
One-Month	1.2%	1.1%
Three- Month	3.0%	3.7%
Six-Month	3.3%	3.7%

## Summary

In this short paper, we presented ideas on how to make the best use of our new national sector PMI data in an equity market context, stressing the importance of utilising various transformations of sub-index data to build up a holistic view of sector performance. A subsequent composite scoring system based on z-scores can then be used to compare relative sector momentum and provide investors with signals for industries that are currently outperforming others.

Applying these ideas to Germany, we were able to generally outperform a benchmark model over a 17-year period with positive changes in sector momentum offering the opportunity to generate excess returns over all holding periods.

These outperformances were, of course, dependent on the weighting and variable combinations employed, and we understand that the approaches are unlikely to be realistically applied in ‘real-world’ investment strategies. Nonetheless, the results highlight the potential of the national sector PMI data in providing positive signals for equity prices and, as such, are worthy of consideration in investor strategy and research.

The new IHS Markit Sector PMI indices are currently available for the constituent European, Asian, and emerging market (EM) nations, plus the US, and trials of the data are available for interested users.

Further information and details can be provided by emailing [economics@ihsmarkit.com](mailto:economics@ihsmarkit.com)

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