When Macro Cycle met Credit Cycle

Bank of America Merrill Lynch

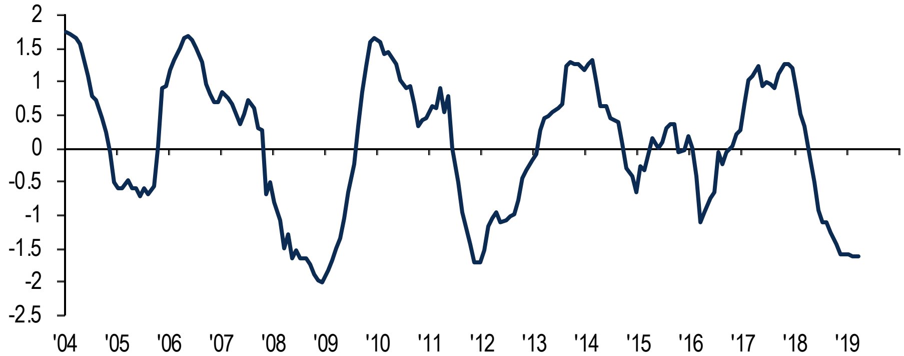
15 March 2019

BofAML Data Analytics

Introducing the European Credit Macro Indicator

We introduce the European Credit Macro Indicator, which is an aggregation of selected macroeconomic data. We assess more than 50 macro data sets to identify those that we think best capture trends in credit markets. From these, we construct an indicator that can be used as a tool to determine whether patterns seen in credit land are consistent with the prevailing macroeconomic backdrop and to identify turning points in macroeconomic trends. We provide details of our methodology and the inputs to our indicator in this report.

Chart 1: Our European Credit Macro Indicator



Source: BofA Merrill Lynch Global Research

The European Credit Macro Indicator is intended to be an indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise relied upon by third parties for any other purpose, without the prior written consent of BofAML Global Research. This European Credit Macro Indicator was not created to act as a benchmark. This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

Key takeaways

According to our backtested analysis, our European Credit Macro Indicator has turned higher over the past month. It has avoided decline for the first time in 16 months. Since November 2017, our indicator would have been in decline mode, in line with a widening trend in spreads. Historically, an improving trend in our indicator is associated with improving spread and excess return trends.

The European Credit Macro Indicator tends to be mean-reverting. According to our backtested analysis, we find that there is a strong negative correlation between our indicator's current level and the change in its level over the following 12 months. The more negative (positive) the current level of our indicator, the larger the rebound (drop) and subsequent improvement (deterioration) over the following 12 months.

In our backtest, a negative reading of our Indicator tended to be associated with positive excess returns and tighter spreads over the next 12 months; both in IG and HY credit.

A higher level for our indicator suggests building tailwinds for Euro spreads. That said, we've noted previously that spreads have tightened dramatically this year – thanks to the central banks' dovishness – and already seem to be pricing in the upturn in the data. At current levels of our indicator, it looks like spreads have overreacted to the macroeconomic picture, in our view.

Refer to important disclosures on page 15 to 17.

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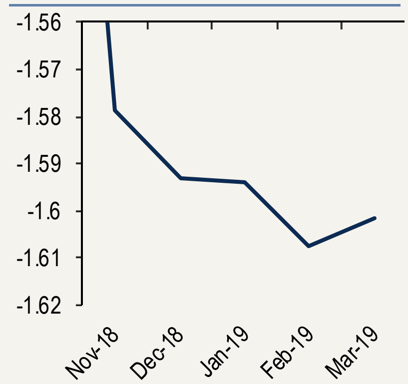
Chart 2: An uptick for our indicator in March



Source: BofA Merrill Lynch Global Research

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The European Credit Market Indicator

The globally synchronised bullish macro backdrop that markets enjoyed in 2017 and the early parts of 2018 is now firmly behind us. Over the past year macro data have been deteriorating rapidly. However, latest prints show a marginal improvement on the data front.

In this note, we introduce the **European Credit Macro Indicator**, which is an aggregation of selected macro data. We assess more than 50 macro data sets to identify those that we think best capture trends in credit markets. From these, we construct an indicator that can be used as a tool to determine whether patterns seen in credit land are consistent with the prevailing macroeconomic backdrop and to identify turning points in macroeconomic trends. We plan to refresh it at least quarterly.

When the Macroeconomic Cycle met the Credit Cycle

We have been highlighting the importance of the macro cycle for the credit market for a while. Our work over the past few months has shown that there is a significant correlation between the trends seen in macro and those across different risk assets.

A slowing macro backdrop is associated with:

- Lower yields and flatter yield curves in the rates space.
- Lower valuations for the equity market and wider spreads for credit instruments.
- Underperformance of higher-beta and cyclical pockets vs. lower-beta or defensive ones.
- Underperformance of financials (and banks in particular) vs. the rest of the market. This is consistent in both the equity and credit markets across cash and synthetics.

An additional tool to help us analyse credit market trends

In this note we review the macroeconomic metrics that we believe are most relevant for credit. From these, we construct our **European Credit Macro Indicator**, which can be used as an additional tool to analyse credit market trends. We assess more than 50 macroeconomic data time series (more details available in the Appendix), such as: OECD Leading Indicators, PMIs, ZEW indices, inflation prints, Ifo and consumer confidence data, lending demand in Europe and many more.

We combine the macro data that are most relevant and exhibit the highest correlation to the credit market.

We identify the macroeconomic data whose 12-month z-scores exhibit the highest correlations to the following metrics: (i) 12-month OAS spread changes for IG and HY bonds and (ii) excess returns over the past 12 months for IG and HY bonds. We then combine their z-scores to create an indicator (average of the z-scores) that exhibits the maximum correlation to credit market trends[1].

In this way, the European Credit Macro Indicator can be a useful guide to validating credit market trends (both in the high-grade and high-yield space).

[1] For every month of the year we download the levels for each of the macro indicators as available at the end of the previous month and correlate to that month's returns. For instance for December 2018 we bring the levels of the macro indicators that are available up to the end of November 2018 and we correlate that to the performance stats in Dec-2018. In simple terms our analysis is based on a one month lead between data and performance.

Methodology

Below is a step-by-step guide to our methodology:

- **We put more than 50 macroeconomic data time series under the microscope in our first sample.** Our goal was to backtest non-market-related time series (thus excluding the prices of market instruments, vols, or any other market-driven valuations). This allows us to focus purely on macroeconomic signals that are relevant for credit markets, rather than trying to explain credit market trends using trends from other risk assets. We want to create a selection of macroeconomic data sets that objectively and independently explain the trends seen in credit.

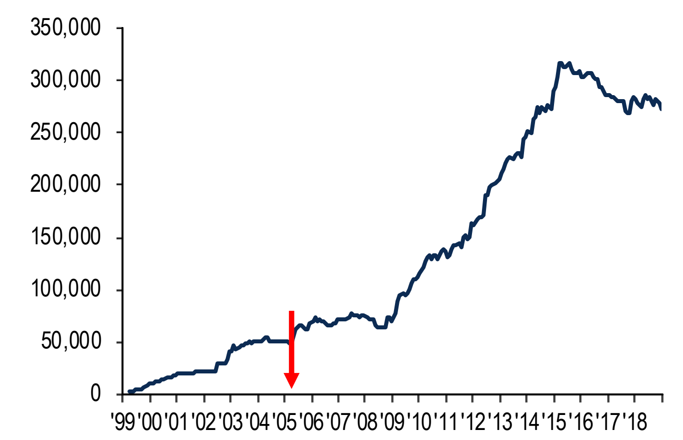
We backtested the following macroeconomic data sets, as we think fundamentally they should be closely related to the European economic cycle and thus should be the starting point for our framework:

  - PMI sub-components from the manufacturing and services indices
  - The ZEW indices for the Eurozone, Germany and France (both the expectations of economic growth and the assessment of current situation)
  - IFO indicators for Germany focusing on Manufacturing (monthly orders, expectations, climate, orders and business assessment)
  - ECB and European Commission data on manufacturing, consumer confidence and demand for loans
  - Money supply indices, surprise indices and inflation metrics.

In table 1 we present those with the highest correlations.

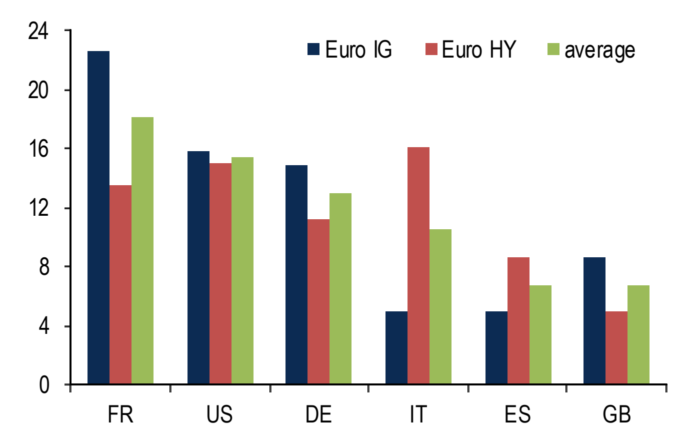
- **In our backtest, in order to select the inputs of our indicator we use data since 2006:** We do so because the market was previously of too small a size for decent analysis of trends. Since mid-2005 the HY bond market has had (consistently) a face value of at least EUR50bn. Thus we start our backtesting from 2006, the first full calendar year that the euro-denominated high-yield market had reached significant size (chart 3).

Chart 3: In May 2005 the Euro high-yield market surpassed the €50bn mark, and it has never since fallen below this



Source: ICE Data Indices, LLC, in million euros

Chart 4: Country weights for the euro-denominated IG and HY corporate bond market



Source: ICE Data Indices, LLC; % of market value; using ER00 and HE00 indices

- We calculate 12-month rolling z-scores for all the macroeconomic data sets and we compute the 12-month rolling spread changes and excess returns. We then calculate correlations between the individual macro data sets and the spread changes and the excess returns of the high-grade and high-yield credit market. We finally calculate the average of the four correlations for every macro indicator we backtested (IG and HY market spread and excess return).

- **The OECD leading indicators suite forms the backbone of our European Credit Macro Indicator.** We opt to use the individual country data rather than the aggregated data for the OECD leading indicators.

  We do so as we want to mirror closely the structure of the credit market, and thus we choose to include the leading indicators from Germany, France, Italy, Spain, the UK, and the US. Note that these are the countries with the highest weights in the corporate bond indices (high-grade and high-yield). We also use the leading indicators for China to capture the trends in the EM space.

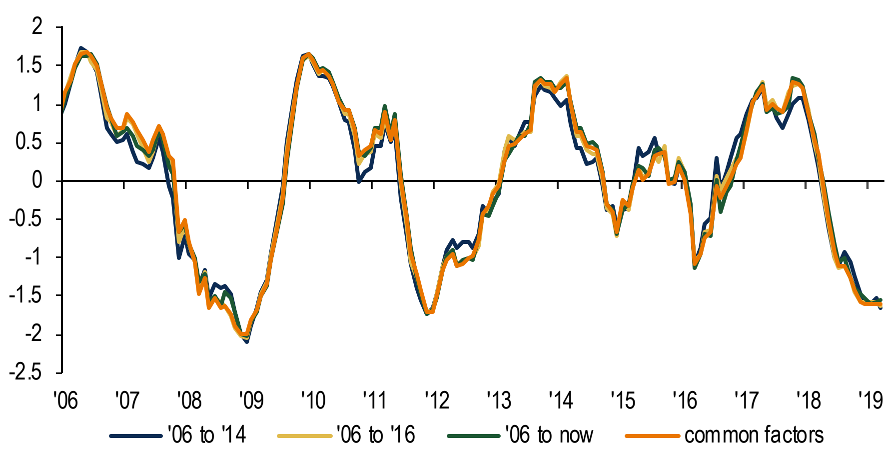
- **From the rest of the macro data sets we reviewed, we test only those that exhibit correlations of more than 50%** (average of the four metrics listed above). In our Appendix we present only those with these more meaningful correlations, and we highlight the ones we ultimately included in our European Credit Macro Indicator.

- We rank (from highest to lowest) the indicators based on the average correlations they exhibit to the credit market. One by one, we then add these macroeconomic data sets (on top of the OECD LIs) to our indicator. We include only those components whose inclusion results in a higher correlation between the group of macro indicators and the credit market.

Overfitting test and how we choose the list of components for our Indicator

Because of the risk of overfitting (the production of an analysis that corresponds too closely or exactly to a particular set of data, and may therefore fail to fit additional data or predict future observations reliably), we employ the following test. We use the above methodology to determine the list of components to use in our indicator based on three different time periods all starting from 2006. The first ends in 2014, the second in 2016 and the third includes all available data up to now.

Chart 5: Testing for different periods – almost identical patterns across all four versions



Source: BofA Merrill Lynch Global Research; This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

In essence, the first version determines which factors we should use based on data up to 2014. Then, based on this predetermined composition of macroeconomic data, we calculate the indicator from 2015 till now. Similarly, for the second version we determine the components for our indicator based on correlations exhibited till 2016 and we then use this predetermined composition to calculate the backtested indicator from 2016 till now. The third version of our indicator is based on the full available sample set.

So effectively in the first two versions we estimate the model (i.e. choose which variables to include based on maximum correlation) based on the two different sample periods (2006 to 2014 or 2006 to 2016), which gives us 4 or 2 more years of data, respectively, beyond the end of the sample on which to test the model out-of-sample. We then test the model out of sample using the same set of variables over the period 2015 to now and 2017 to now. We find an out-of-sample correlation of 74% and 92%, respectively, which is broadly similar to, or higher than, the 81% in-sample correlation from 2006 to 2014 and 78% from 2006 to 2016. This suggests that the model choice of variables is robust also out-of-sample. Additionally, the fact that in all three versions we find a high level of components overlap reassures us as to the model's robustness.

In chart 5 we present the three versions along with the preferred version of our indicator that is based on the overlapping components across the first three versions.

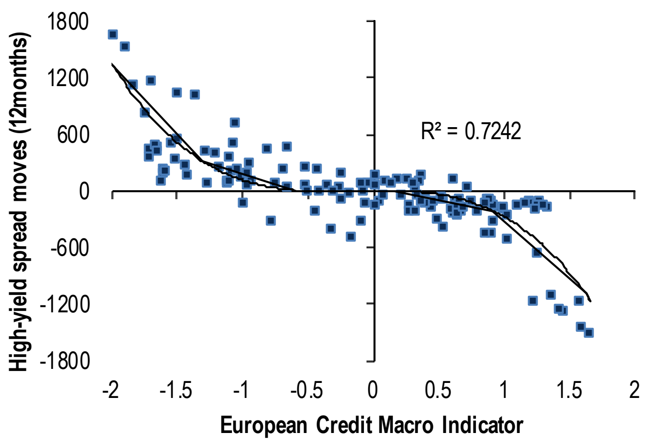
In Table 1 in the Appendix we present the average correlations vs. the four performance metrics, and we highlight which are the components of each version we tested. We also highlight the final list of those components (the overlapping ones across the three testing versions) we are using for the European Credit Macro Indicator.

Backtested results

We find that a blend (equally weighted) of the aforementioned country-specific OECD Leading Indicators, PMIs from Germany and the EZ, along with data from the ECB on loan demand and 3m EPS Revision Ratio from Germany, creates an indicator that is highly correlated to the performance metrics (12m spread change and excess returns for IG and HY corporate bonds).

- We present scatter plots to showcase the correlations of spread changes and 12-month rolling excess returns to our Indicator (chart 6 to 9).
- In charts 20 to 23 we also compare the trends in our European Credit Macro Indicator with the trends seen in the IG and HY bond markets. We present the trends using a z-score analysis.

Chart 6: The European Credit Macro Indicator vs. HY spread moves



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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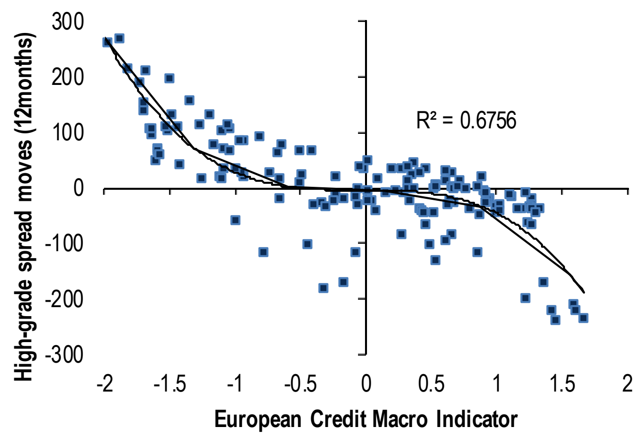
Chart 7: The European Credit Macro Indicator vs. IG spread moves



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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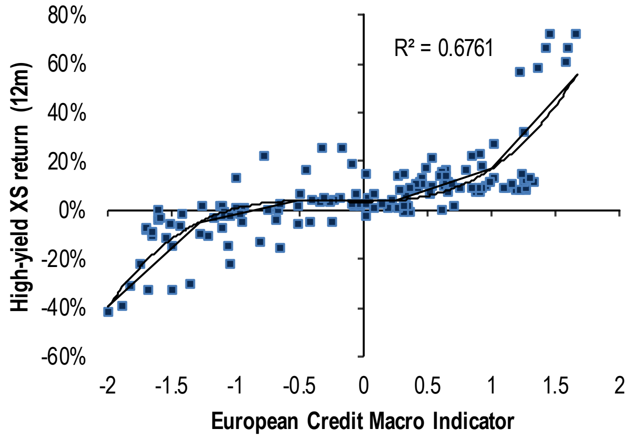
Chart 8: The European Credit Macro Indicator vs. HY XS returns



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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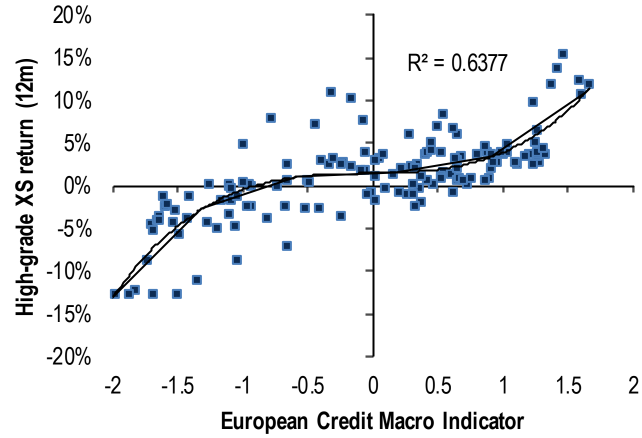
Chart 9: The European Credit Macro Indicator vs. IG XS returns



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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- In Table 1, we present those macro indicators with the highest correlations to those we have tested, and we have indicated those which we ultimately incorporated in our European Credit Macro Indicator methodology.
- In Table 2, we present the correlations vs. the PMI sub-components we backtested.

Backtesting disclaimer

The analysis of our indicator in this report is backtested and does not represent the actual performance of any account or fund.

Backtested performance depicts the hypothetical backtested performance of a particular strategy over the time period indicated. In future periods, market and economic conditions will differ and the same strategy will not necessarily produce the same results.

No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. In fact, there are frequently sharp differences between backtested returns and the actual results realized in the actual management of a portfolio.

Backtested performance results are created by applying an investment strategy or methodology to historical data in an attempt to give an indication as to how a strategy might have performed during a certain period in the past if the product had been in existence during such time.

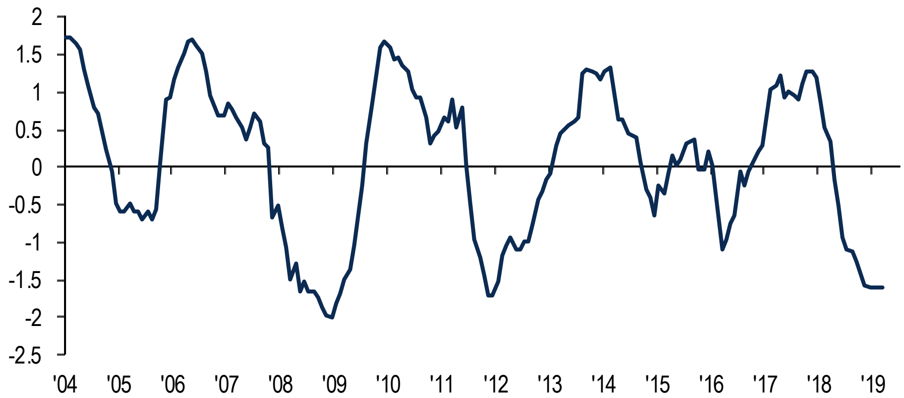
Backtested results have inherent limitations including the fact that they are calculated with the full benefit of hindsight, which allows the security selection methodology to be adjusted to maximize the returns. Further, the results shown do not reflect actual trading or the impact that material economic and market factors might have had on a portfolio manager's decision-making under actual circumstances.

Backtested returns do not reflect advisory fees, trading costs, or other fees or expenses.

The European Credit Macro Indicator

Based on the above methodology, we present – in the chart below – the backtested results of our European Credit Macro Indicator since 2004 when all of the sub-components of our backtesting were available. We plan to use our indicator as another analytical tool to determine whether patterns seen in credit land are consistent with the prevailing macroeconomic backdrop. On a backtested basis, it appears to be a helpful tool to explain credit market trends in Europe, both for high-grade and high-yield markets. Note that a negative (positive) reading reflects deteriorating (improving) trends in macroeconomic indicators.

Chart 10: The European Credit Macro Indicator



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
Note that a negative (positive) reading reflects deteriorating (improving) trends
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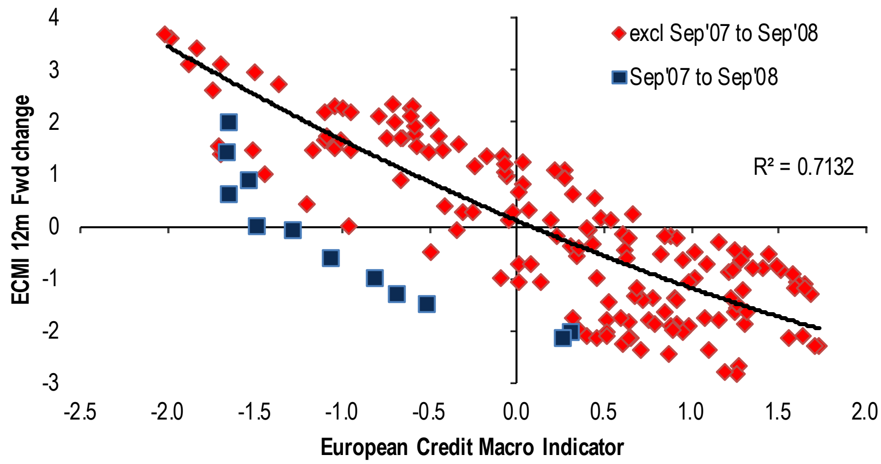
Where to from here?

Our European Credit Macro Indicator has declined very slowly over the past months and actually has turned slightly higher over the past month. This allows us to be cautiously optimistic on the macro backdrop. Macroeconomic data have been deteriorating over the past few months, but the European Credit Macro Indicator has been designed to capture turning points in macroeconomic trends and to normalise for the magnitude of the adjustment. The latest readings, on a backtested basis, illustrate an improving trend (slower deterioration) amid a still-challenging macro backdrop.

Chart 11: Strong negative correlation between the levels of the European Credit Macro Indicator and its level 12m Fwd change



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004
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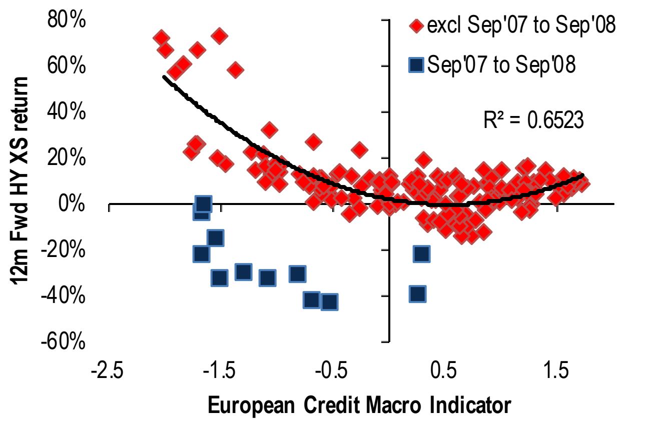
To attempt to demystify the recent developments of our Indicator in our backtest, we look back across market developments in the past when the European Credit Macro Indicator was around current levels.

According to our backtested analysis, we find that:

- **The European Credit Macro Indicator tends to have been mean-reverting.** We find that there was a strong negative correlation between its current level and the level after 12 months (chart 11). A negative (positive) reading suggested a positive (negative) change over the following 12 months, i.e. an improving (deteriorating) macroeconomic trend.

Chart 12: Negative correlation between the current print of the European Credit Macro Indicator and HY market 12m Fwd XS return



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004
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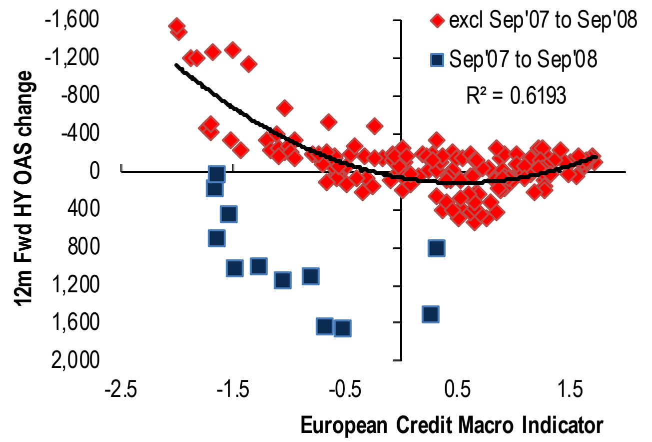
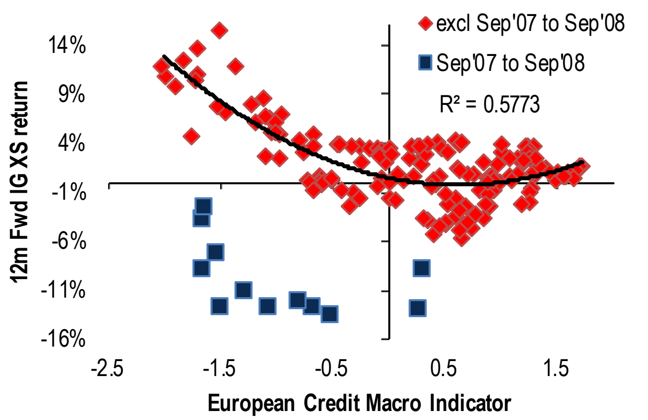
Chart 13: Negative correlation between the current print of the European Credit Macro Indicator and HY market 12m Fwd OAS change



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004
This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

Chart 14: Negative correlation between the current print of the European Credit Macro Indicator and IG market 12m Fwd XS return



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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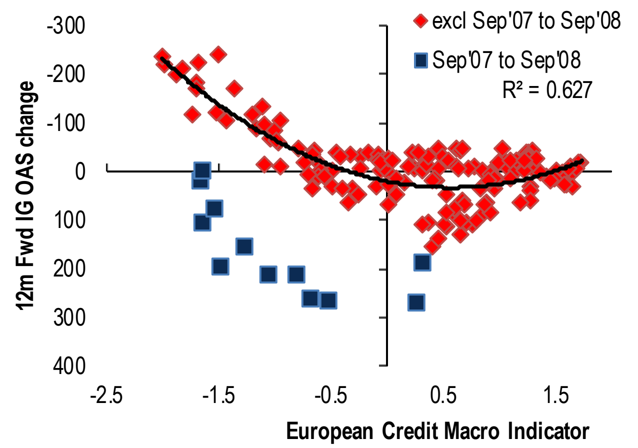
Chart 15: Negative correlation between the current print of the European Credit Macro Indicator and IG market 12m Fwd OAS change



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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- Similarly, we found that the 12-month forward performance was negatively correlated to our European Credit Macro Indicator. A negative reading of our indicator tended to be associated with a positive return over the following 12 months. This was the case for both the IG and HY corporate bond market (chart 12 & 14).

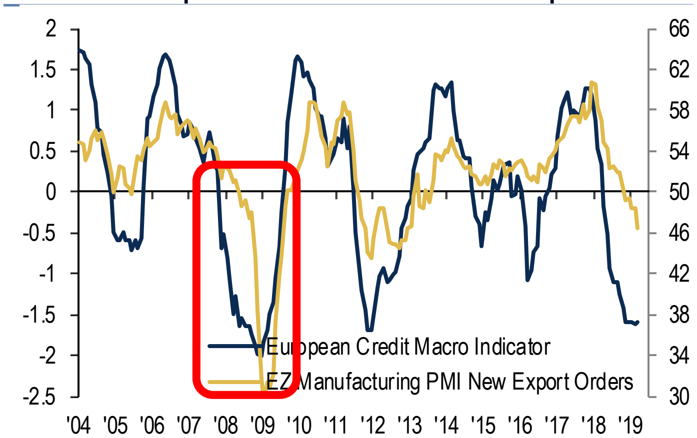
Note, however, that the reverse was not always the case. A positive reading was not always associated with a negative return over the following 12 months, as sometimes the rally was sustained for longer periods.

- Finally, in terms of spread moves, we also found that the 12-month forward spread change was negatively correlated to our European Credit Macro Indicator. A negative reading of our indicator tended to be associated with tighter spreads over the following 12 months. This was the case for both the high-grade and high-yield corporate bond markets (chart 13 & 15).

  Note, however, that the reverse was not always the case. A positive reading was not always associated with wider spreads over the following 12 months, as sometimes the rally was sustained for longer periods.

- The only time the correlations have been less strong in our backtest was during the global financial crisis (GFC), when a negative reading of our indicator was associated with further trend weakness in the macroeconomic environment. This period is presented in the charts with blue dots, vs. red ones for the rest of the observations since 2006.

Chart 16: The European Credit Macro Indicator vs. New Export Orders



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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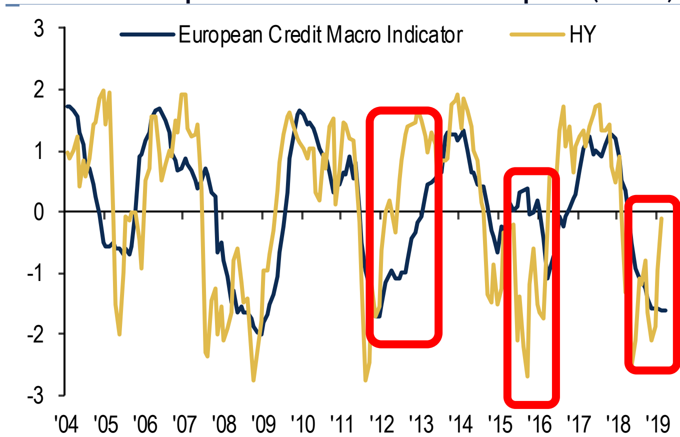
Chart 17: The European Credit Macro Indicator vs. HY spreads (z-score)



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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Could the European Credit Macro Indicator suffer another leg lower?

Historically, our backtest shows that there has been one case when the European Credit Macro Indicator has dipped lower from levels similar to current ones. A move lower from current levels would indicate that the macroeconomic data are taking another sharp leg down. However, in the past this has coincided with a higher level of macroeconomic data (we use the PMIs new export orders to present that, chart 16).

We note, also, that this move occurred during the GFC. Currently at much more depressed levels of macro data, it is difficult to see another sharp leg lower, especially as the indicator failed to take another leg sharp leg down despite weakening trends over the past couple of months.

Risk factors

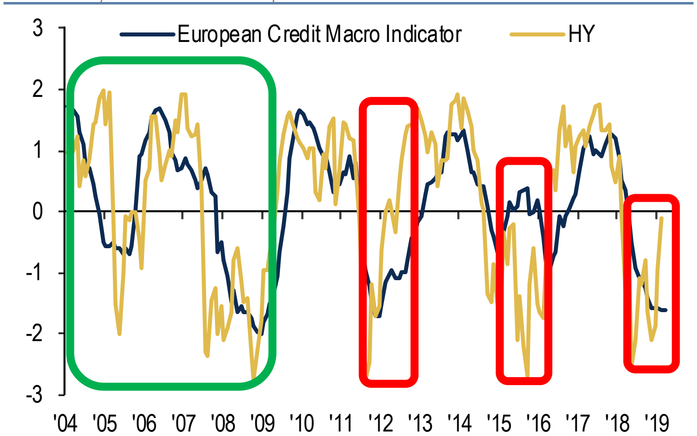
In our backtest, typically an improving trend for the European Credit Macro Indicator has been in line with tighter spreads (chart 6). Rarely have we found cases where spreads have tightened (widen) but our indicator was not in positive (negative) territory.

However, we can identify two time periods over the past few years when data were less correlated to market developments:

- The first was during mid-2012, when spreads moved tighter more quickly than the data would have suggested (first red box in chart 17 and first arrow in chart 19).
- The second case was during the Q2-2015 to Q3-2016 period, when the sovereign QE started in Europe and subsequently the credit bond buying program (CSPP) was announced (second red box in chart 17 and second arrow in chart 19). Despite a moderate improvement in macroeconomic data at the beginning of the period (our Indicator at less than 0.5) there was a moderate widening on the back of a lack of inflation and the bund shock that shook credit markets in the first half of 2015. Subsequently markets rallied in Q1-Q2 2016 as macro data deteriorated.

Chart 18: The European Credit Macro Indicator vs. HY spreads

z-score analysis between our European Credit Macro Indicator and HY OAS



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC
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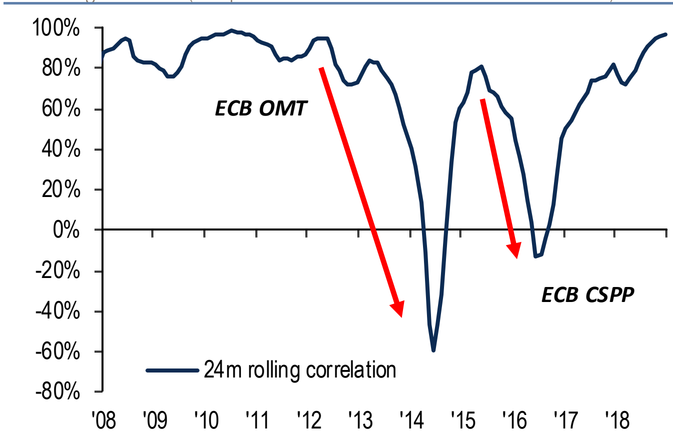
Chart 19: A Central Bank intervention is always behind a decoupling of macro data and market performance

24m rolling correlation (European Credit Macro Indicator vs. 12m HY XS return)



Source: BofA Merrill Lynch Global Research
We use the average of 12m z-scores for Germany, France, Italy, Spain, UK, China and the US

- In both cases, central bank intervention affected the correlations between macro and markets. This time around feels similar (chart 17, third red box). Over the first two months of the year we have seen a fair bit of tightening, which has not been accompanied by better economic data. This reminds us of the spread moves seen in mid-2012 on the back of the “whatever it takes” moment by the ECB. It seems that today we have a similar “synchronised dovishness” among key Central Banks globally, which has allowed markets to rally ahead of fundamentals (i.e. macro data).

We think that spreads have reacted much more than the macroeconomic data would justify. For that reason, we feel that we have seen the majority of the rally, and in order to see tighter spreads from here we need a significant bounce in macroeconomic trends.

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Based on the above and according to chart 18, we can also see that our indicator has strong predictive power during the early years before the GFC. Up until 2009, we see that the moves in the blue line (chart 18) typically precede the trends in the credit market. However and as already stated above, the correlations drop in periods of monetary policy stimulus announcements, where credit markets tend to outperform the trends in macroeconomic data. However, even during these periods the macro and credit trends tend to converge as markets eventually "normalise" back to fundamentals.

Appendix

Table 1: Key macro data we screened to evaluate the most relevant macro data Indicators for our European Credit Macro Indicator

				Correlations using data since 2006						Testing periods								
				12m Spread chg		12m XS return				2006 to 2014			2006 to 2016			2006 to now		
Macroeconomic data	BBG ticker	Current level z-score	Level 1m ago z-score	HY	IG	HY	IG	Average	Included in our indicator?	Period avg correl	tested?	Step-by-step correl	Period avg correl	tested?	Step-by-step correl	Period avg correl	tested?	Step-by-step correl
UK OECD LI	OEGBKLAC	-1.78	-1.93	60.6%	66.4%	61.1%	62.6%	62.7%	yes	71.2%	yes		65.7%	yes		62.7%	yes	
USA OECD LI	OEUSKLAC	-2.12	-2.27	58.7%	60.2%	56.0%	63.0%	59.5%	yes	68.1%	yes		61.5%	yes		59.5%	yes	
Germany OECD LI	OEDEKLAC	-1.66	-1.55	58.9%	51.1%	56.7%	51.6%	54.6%	yes	59.4%	yes		55.3%	yes		54.6%	yes	
China OECD LI	OECNKLAC	-1.03	-1.30	52.4%	51.9%	50.0%	49.2%	50.9%	yes	56.9%	yes		53.8%	yes		50.9%	yes	
Spain OECD LI	OEESKLAC	-1.41	-1.52	49.2%	50.4%	48.5%	46.8%	48.7%	yes	55.1%	yes		49.8%	yes		48.7%	yes	
Italy OECD LI	OEITKLAC	-1.42	-1.55	51.1%	45.8%	49.0%	46.0%	48.0%	yes	60.4%	yes		51.0%	yes		48.0%	yes	
France OECD LI	OEFRKLAC	-1.56	-1.63	46.9%	36.3%	43.9%	36.1%	40.8%	yes	48.2%	yes		40.1%	yes		40.8%	yes	
												70.7%			68.8%			67.4%
Markit Germany Manufacturing PMI Suppliers' Delivery Times	**KXDEMSD**	**-1.90**	**-1.94**	**62.4%**	**63.7%**	**58.9%**	**62.9%**	**62.0%**	**yes**	**70.3%**	**yes**	**76.0%**	**65.7%**	**yes**	**72.3%**	**62.0%**	**yes**	**70.0%**
Markit Eurozone Manufacturing PMI Suppliers' Delivery Times	**KXEZMSD**	**-1.90**	**-1.91**	**62.5%**	**63.2%**	**59.4%**	**62.3%**	**61.9%**	**yes**	**70.9%**	**yes**	**74.0%**	**65.4%**	**yes**	**74.5%**	**61.9%**	**yes**	**71.4%**
Markit Eurozone Manufacturing PMI Employment	KXEZMEI	-1.24	-1.38	61.4%	58.2%	56.8%	58.7%	58.8%		66.4%		75.9%	59.4%		74.4%	58.8%		71.3%
IFO Germany Manufacturing Business Climate	GEIFOMBC	-1.90	-2.01	61.2%	55.0%	58.2%	54.7%	57.3%		60.9%		77.3%	58.5%		74.8%	57.3%		70.8%
Markit Eurozone Services PMI Outstanding Business	KXEZEBW	-0.51	-2.68	57.6%	56.5%	56.8%	55.6%	56.6%		64.2%		77.9%	58.3%		75.6%	56.6%	yes	71.4%
Markit Germany Manufacturing PMI Output	**KXDEMOB**	**-1.73**	**-1.26**	**57.5%**	**58.3%**	**53.7%**	**56.6%**	**56.5%**	**yes**	**63.9%**	**yes**	**78.3%**	**58.1%**	**yes**	**76.4%**	**56.5%**	**yes**	**72.1%**
Markit Eurozone Manufacturing PMI New Export Orders	**KXEZMNE**	**-1.74**	**-1.19**	**57.2%**	**58.4%**	**54.1%**	**56.4%**	**56.5%**	**yes**	**65.6%**	**yes**	**77.4%**	**59.0%**	**yes**	**75.8%**	**56.5%**	**yes**	**72.4%**
Markit Eurozone Services PMI Incoming New Business	KXEZENU	-1.29	-2.37	56.2%	56.1%	54.2%	54.1%	55.2%		62.2%		77.9%	56.7%		76.0%	55.2%		71.9%
Markit/BME Germany Manufacturing PMI New Export Orders	KXDEMNE	-1.87	-1.20	56.1%	56.9%	51.4%	54.6%	54.7%		64.7%	yes	78.0%	57.0%	yes	76.6%	54.7%		72.4%
Markit Eurozone Manufacturing PMI Output	KXEZMOB	-1.54	-1.22	55.1%	56.7%	52.0%	54.5%	54.6%		63.1%		78.3%	56.3%		76.2%	54.6%		72.1%
IFO Germany Manufacturing Monthly Orders	GEIFOMOR	-0.44	-1.91	55.2%	53.9%	51.7%	51.2%	53.0%		58.8%		78.9%	53.9%		76.7%	53.0%		72.0%
Markit Germany Manufacturing PMI Employment	**KXDEMEI**	**-1.25**	**-1.40**	**56.8%**	**50.5%**	**51.6%**	**53.0%**	**53.0%**	**yes**	**57.7%**	**yes**	**79.7%**	**53.1%**	**yes**	**77.2%**	**53.0%**	**yes**	**72.5%**
Germany Manuf Industry Assessment Foreign Orders on Hand	GEMAAFOH	-1.67	-2.12	56.3%	48.7%	52.3%	52.0%	52.3%		56.1%		81.0%	52.7%		76.4%	52.3%		71.7%
ECB Survey Chng in Demand for Loans to Enterprises Last 3M	**EBLS3CL**	**-1.36**	**-1.54**	**50.5%**	**52.4%**	**50.8%**	**53.5%**	**51.8%**	**yes**	**60.1%**	**yes**	**78.6%**	**54.4%**	**yes**	**77.1%**	**51.8%**	**yes**	**73.3%**
Markit Eurozone Manufacturing PMI New Orders	KXEZMNI	-1.74	-1.51	51.9%	54.1%	49.3%	51.4%	51.7%		60.3%	yes	78.3%	52.9%		76.9%	51.7%		73.0%
Markit Eurozone Manufacturing PMI Stocks of Purchases	KXEZMSP	-1.87	-0.02	53.7%	48.6%	52.2%	52.1%	51.7%		57.8%	yes	79.7%	52.3%		77.1%	51.7%	yes	73.3%
EC Manufacturing Confidence Germany Export Order Books	EUI3DE	-1.77	-2.18	55.3%	47.9%	51.3%	51.8%	51.6%		55.6%		80.9%	51.9%		76.2%	51.6%		72.5%
EC Manufacturing Industry Confidence Germany Order Books	EUI2DE	-1.81	-2.12	55.0%	47.6%	51.2%	51.4%	51.3%		54.9%		80.9%	51.6%		76.2%	51.3%		72.5%
IFO Germany Manufacturing Order Assessment	GEIFOMOA	-1.82	-2.12	55.5%	47.3%	51.8%	50.4%	51.2%		55.4%		81.0%	51.7%		76.3%	51.2%		72.5%
Markit Germany Manufacturing PMI New Orders	KXDEMNI	-1.84	-1.69	52.5%	52.7%	48.6%	51.0%	51.2%		59.6%		79.4%	52.8%		77.0%	51.2%		73.2%
IFO Germany Manufacturing Business Assessment	GEIFOMBA	-1.61	-1.54	55.6%	45.0%	51.5%	48.7%	50.2%		53.3%		80.9%	50.6%		76.9%	50.2%		72.4%
IFO Germany Manufacturing Business Expectations	GEIFOMBE	-1.96	-2.19	52.7%	50.9%	49.5%	47.2%	50.1%		53.7%		80.9%	51.0%		77.1%	50.1%		72.8%
BofAML Earning Revision Ratio Germany		**-1.56**	**-1.51**	**51.9%**	**49.1%**	**51.2%**	**47.2%**	**49.8%**	**yes**	**59.7%**	**yes**	**79.5%**	**51.5%**	**yes**	**77.9%**	**49.8%**	**yes**	**73.8%**
ZEW Eurozone Assessment of Current Situation	GRZEEUCU	-1.70	-1.69	53.4%	46.5%	49.8%	48.1%	49.5%		55.5%		80.8%	49.9%		76.6%	49.5%		72.7%
ZEW Germany Assessment of Current Situation	GRZECURR	-2.07	-2.25	53.3%	44.5%	50.4%	46.9%	48.8%		51.5%		80.7%	48.9%			48.8%		
BofAML Earning Revision Ratio EU		-1.83	-1.96	46.9%	51.3%	45.9%	47.7%	47.9%		57.3%	yes	80.8%	49.4%			47.9%		
BofAML Earning Revision Ratio UK		-1.64	-1.86	44.6%	47.2%	43.4%	43.3%	44.6%		56.8%	yes	81.7%	47.4%			44.6%		
BofAML Earning Revision Ratio US		-1.33	-1.38	42.3%	47.5%	40.0%	43.8%	43.4%		48.0%			44.4%			43.4%		
ZEW France Assessment of Current Situation	GRZEFRCU	-1.85	-2.40	49.3%	38.7%	45.4%	40.2%	43.4%		50.8%		81.0%	43.3%			43.4%		
EC Consumer Confidence Indicator EU 27	EUCCEU27	-1.24	-1.97	42.3%	47.8%	39.5%	42.0%	42.9%		48.0%			41.9%			42.9%		
EC Consumer Confidence Indicator Eurozone	EUCCEMU	-1.08	-1.65	43.7%	45.4%	40.2%	40.5%	42.4%		46.6%			41.4%			42.4%		
ECB Survey Expected Chng in Demand for Loans to Enterprises	EBLSECL	-1.67	-2.16	39.6%	44.6%	42.4%	41.2%	42.0%		51.3%		81.1%	45.8%			42.0%		
ISM Manufacturing Report on Business New Orders	NAPMNEWO	-1.23	-0.73	41.2%	41.4%	35.6%	38.5%	39.2%		41.3%			38.2%			39.2%		
ZEW France Expectations of Economic Growth	GRZEFREX	-0.82	-1.11	16.7%	27.4%	17.6%	18.3%	20.0%		17.9%			17.0%			20.0%		
ZEW Germany Expectation of Economic Growth	GRZEWI	0.10	-0.27	14.4%	25.2%	15.0%	16.2%	17.7%		15.3%			15.5%			17.7%		
European Credit Macro Indicator		-1.60	-1.61	76.0%	74.2%	73.0%	73.1%	74.07%		81.7%			77.9%			73.8%		

Source: BofA Merrill Lynch Global Research, ICE Data Indices, LLC, Bloomberg
For the HY bond market we use the HE00 index and for the IG we use the ER00 index

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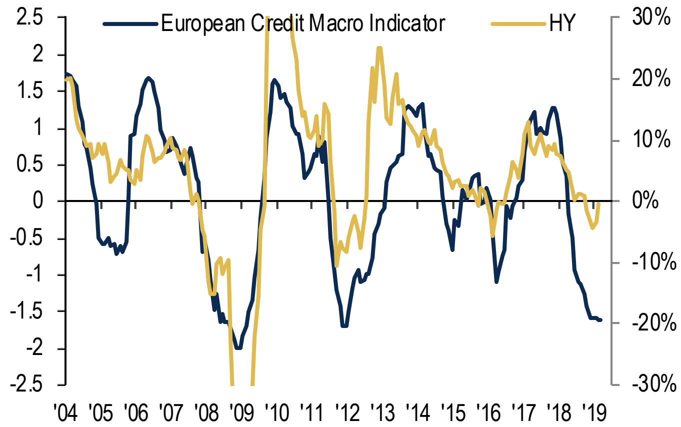
Table 2: Correlations vs. select PMI data

	Eurozone Name	BBG ticker	Average correl	Germany Name	BBG ticker	Average correl
Manufacturing	PMI Index	KXEZMHE	56.5%	PMI Index	KXDEMHE	57.8%
	New Orders	KXEZMNI	51.7%	New orders	KXDEMNI	51.2%
	Output	KXEZMOB	54.6%	Output	KXDEMOB	56.5%
	Employment	KXEZMEI	58.8%	Employment	KXDEMEI	53.0%
	Suppliers' Delivery Times	KXEZMSD	61.9%	Suppliers' Delivery Times	KXDEMSD	62.0%
	Stocks of Purchases	KXEZMSP	51.7%	Stocks of Purchases	KXDEMSP	41.9%
	New Export Orders	KXEZMNE	56.5%	New Export Orders	KXDEMNE	54.7%
Services	Business Activity	KXEZEHE	55.1%	Business Activity	KXDEEHE	47.4%
	Incoming New Business	KXEZENU	55.2%	Incoming New Business	KXDEENU	46.9%
	Outstanding Business	KXEZEBW	56.6%	Outstanding Business	KXDEEBW	42.1%
	Employment	KXEZEEI	46.7%	Employment	KXDEEEI	37.5%
	Input Prices	KXEZEIP	29.9%	Input Prices	KXDEEIP	26.3%
	Prices Charged	KXEZEOP	45.9%	Prices Charged	KXDEEOP	28.3%
	Business Expectations	KXEZEFB	41.3%	Business Expectations	KXDEEFB	38.9%

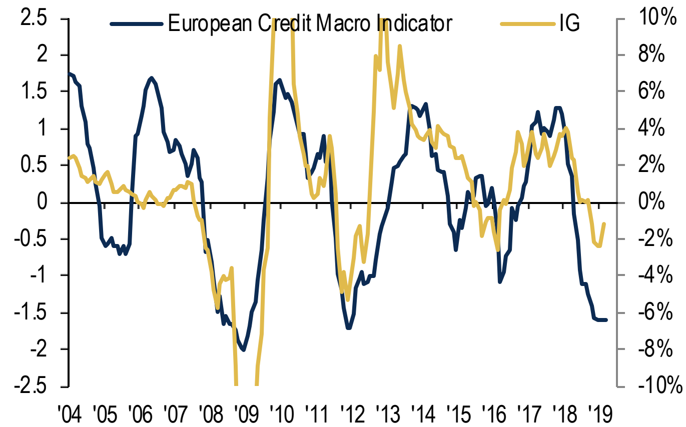
Source: BofA Merrill Lynch Global Research; we opt not to use the aggregated level PMIs (greyed) in our analysis in order to use those of the sub-components that exhibit the highest correlations to the credit market. In that way we improve the correlation of our indicator

Chart 20: The European Credit Macro Indicator vs. HY XS Return (12month)



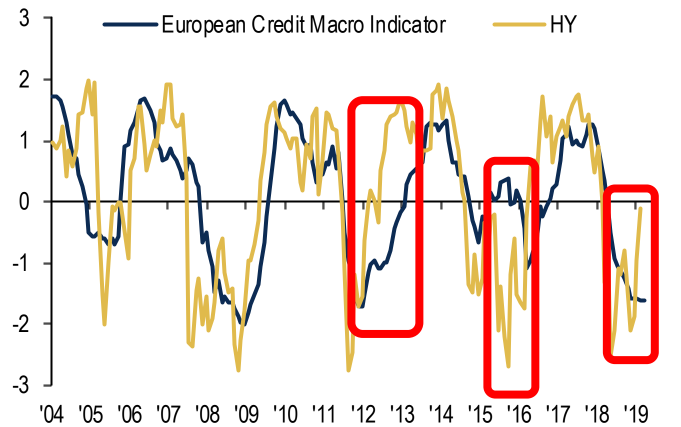
Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004
This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

Chart 21: The European Credit Macro Indicator vs. IG XS Return (12month)



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004
This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

Chart 22: The European Credit Macro Indicator vs. HY OAS (z-score over 12m rolling)



Source: BofA Merrill Lynch Global Research, Bloomberg, ICE Data Indices, LLC; data since 2004, spreads have a reversed z-score.
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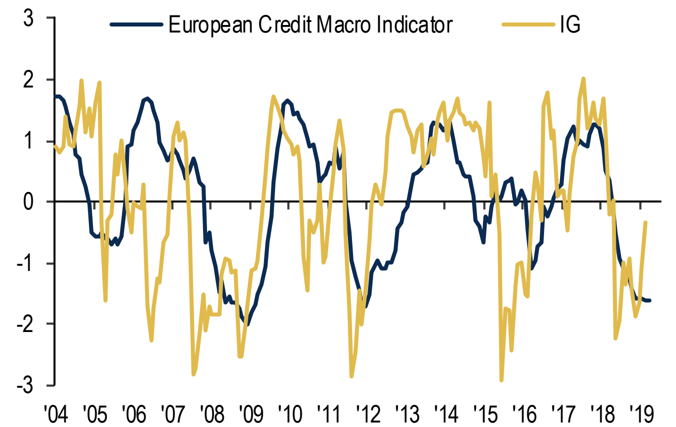
Chart 23: The European Credit Macro Indicator vs. IG OAS (z-score over 12m rolling)



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