

Economic Analysis

Just what the doctor ordered: real-time recession forecasts

Highly predictive financial and economic factors suggest recession risk remains low. However, these indicators are trending towards pre-recession peaks, implying a recession could happen around 2020

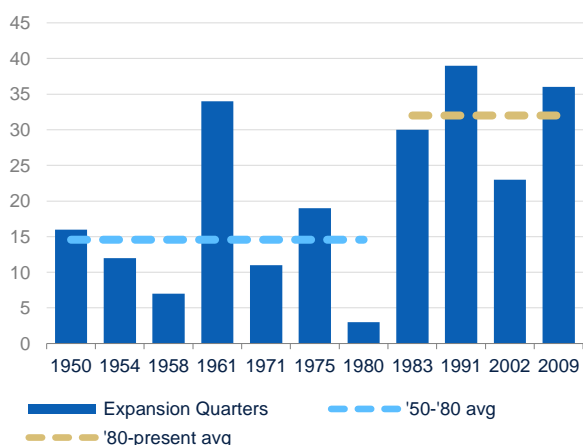
Boyd Nash-Stacey

Despite widespread economic momentum, increasing attention has been paid to the age of the current U.S. expansion amid record-high asset prices, leading a number of pundits to conclude that a recession is around the corner. In fact, there is a sense that the risk of a recession is growing due to the current expansions longevity. While this may have been true in the pre-WWII era, evidence suggests that in the post-WWII period recessions have not been closely associated with their age. As former Fed Chair Yellen put it, "...I think it's a myth that recessions die of old age". In fact, what we have seen over the past 50 years is an aging of U.S. expansion cycles, with the average expansion duration rising from 14 quarters prior to 1980, to 32 quarters thereafter; the current expansion is in its 36th quarter as of September. As a result, a more careful approach to recession predictions is warranted.

There are a number of factors, beyond the age of the current cycle, that are trending close to past business cycle peaks. For example, at 3.9%, the unemployment rate is near historic lows, while both the quits rate— a sign of worker confidence in the labor market— and the job openings rate have reached and surpassed their pre-crisis peaks. Furthermore, household leverage is increasing in parallel with the improving labor market. In fact, personal interest expense is growing at 11.8% year-over-year, up from 2.5% in August 2016, and consumer debt service payments as a share of disposable income stands at its highest level since 2009.

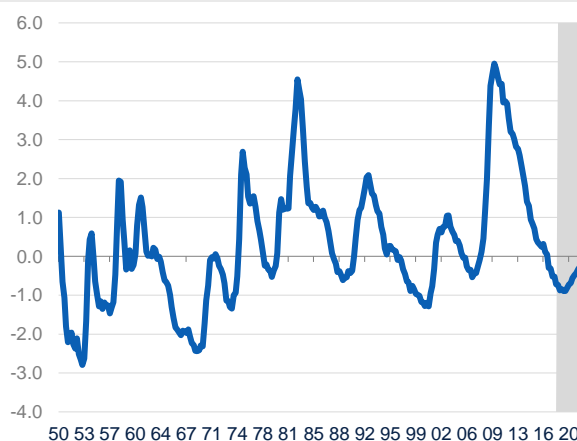
At the firm level, there are also warning signs flashing red. For instance, the ratio of outstanding nonfinancial business debt and loans to GDP is at a record-high of 72%. Moreover, short-term nonfinancial corporate bank liabilities have grown steadily over the past year and a half, following the recovery from commodity slump in 2015-2016. Meanwhile, in the financial sector, despite increased regulatory scrutiny and oversight from the Fed, which has discouraged excessive risk taking and improved the capital positions of large and systemically important financial institutions, net charge offs are rising and consumer debt-levels have surpassed the 2008 peak. Moreover, nonbank lending also continues to rise, reaching 33.5% of GDP as of the 2Q18.

Chart 1. Expansion Cycle Age, **Quarters**



Source: BBVA Research, NBER & BEA

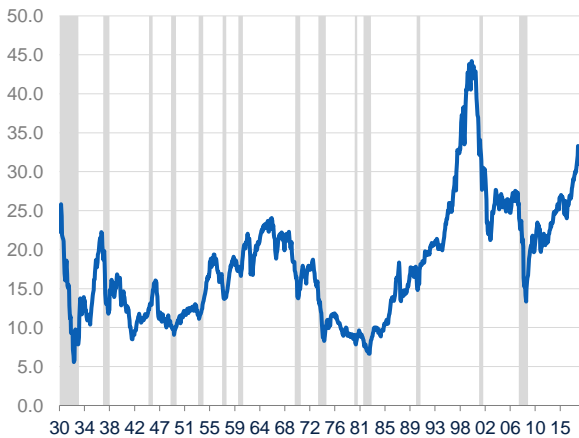
Chart 2. Unemployment Gap*, **pp**



Source: BBVA Research, BLS & CBO

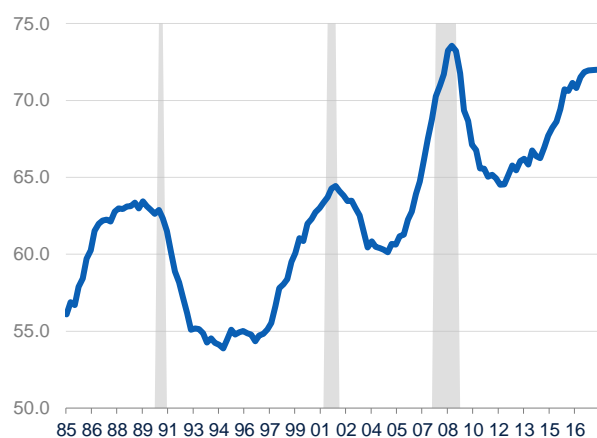
Another source of concern is the potential rise in systemic risks stemming from emerging and financial markets, both of which could be exacerbated as the Federal Reserve continues with its monetary policy normalization plans. The recent plunge in the Turkish lira and Argentinian peso stoked fears that there could be a widespread correction in emerging markets and that this could increase the potential risk of contagion to developed economies.

Chart 3. Shiller Cyclically Adjusted S&P PE Ratio



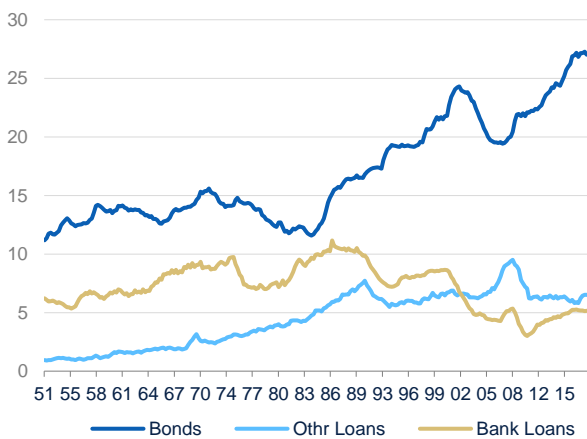
Source: BBVA Research & Robert Shiller

Chart 4. U.S. Nonfinancial Business Debt-to-GDP, %



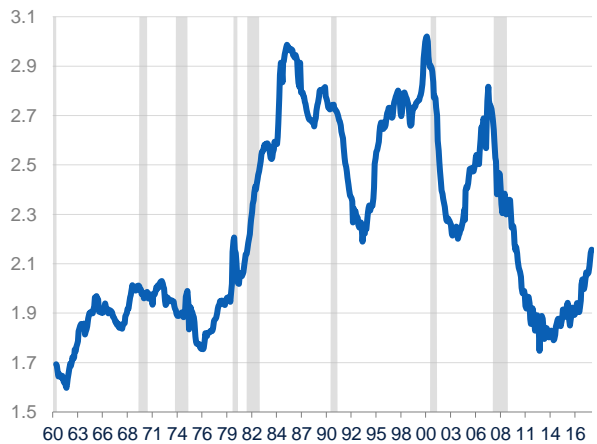
Source: BBVA Research, NBER & Federal Reserve
Shaded=Recession

Chart 5. U.S. Corporate Liabilities as a share of GDP, %



Source: BBVA Research, NBER & Federal Reserve

Chart 6. Personal Interest Expense-to-Disposable Income, %



Source: BBVA Research, NBER & BLS
Shaded=Recession

Moreover, with a fiscal deficit set to surpass 4.5% of GDP in 2019—the largest in a peacetime expansion—there is a meaningful probability that forced fiscal or monetary policy correction will be needed in the future to stem off any demand-side pressures. This adjustment could put the current expansion in jeopardy. Without a meaningful rise in private domestic savings or a reduction in the trade deficit, or both, there is high probability that the U.S. current account will deteriorate further, creating imbalances that will require a substantive correction in the future.

There is also a risk that political tensions, polarization and protectionism could intensify in response to the growing imbalances, which could trigger a negative wave of business and consumer sentiment that in turn could prompt a correction in investment, hiring and spending. Nonetheless, considering that no recession is alike and given that there are many potential factors that could derail the current expansion, it is essential to understand what factors have the highest predictive power when it comes to recessions. This will allow for more accurate and less volatile predictions.

Screening for factors with greatest potential to flatline U.S. economy

To assess the predictive power of nearly 40 economic and financial factors, our methodology borrows from the medical field, specifically a medical diagnostics tool known as the area under Receiver Operating Characteristic (ROC) curve. This tool will help determine how well a given test is at identifying “true positives” (sensitivity) and “true negatives” (specificity). A test statistic close of one would suggest that the indicator is extremely good at predicting future recessions, and at avoiding falsely signaling increased recession risk.¹

Using data since the 1960s, we found that the yield curve was the most effective tool at forecasting future recessions, which is consistent with prevailing empirical evidence. The spread between the 10-yr Treasury bond and six month T-Bills, adjusted for the impact that quantitative easing had on the term-premium, was the highest performing indicator— this includes the more commonly used difference between the 10-year and 2-year Treasuries. In the nonfinancial category, factors that performed relatively well include growth in personal interest expense, unemployment insurance claims, emerging market foreign exchange rates, and consumer delinquencies.²

On the contrary, factors such as policy uncertainty, equity prices, manufacturing employment and nonbank lending were not accurate predictors of recessions. Whereas fiscal and current account imbalances were poor predictors of recessions twelve months ahead. Personal interest expenses as a share of disposable income and bank loans relative to GDP also lacked predictive power when using the full sample.

When the sample period is restricted to 1990 and beyond the predictive power of key factors changes. First, average hourly earnings growth becomes the most accurate predictor. Second, factors more closely associated with modern financial recessions such as equity prices and debt, become much more accurate in terms of their ability to forecasts future recessions. In fact, with a score of 0.87 and 0.84, nonbank loans and personal interest expense as a share of GDP became the second and third best nonfinancial predictors.

Third, despite the increase in the importance of other factors, the yield curve, on balance, remains the most powerful forecasting tool, particularly when considering that not only is there inference from the marginal changes, but also from the fact that yield curve inversions have been an early warning sign for past recessions. Moreover, the yield curve is not subject to revisions and is available at a high frequency.

Diagnosis: high frequency estimates confirm a low probability of recession

To create a recession indicator with predictive power that has the ability to be able to identify recessions well in advance, we estimated weekly recession probabilities, using a mixed frequency methodology with an early warning recession indicator.

Using high frequency data since 1990, we found recession probabilities, ranging from around 0.4% to 30%, based on the financial and nonfinancial factors. The current range of estimates for the probability of recession based on these factors was 0.4% when considering personal interest expense to disposable income to 29.1% based on the S&P 100 composite equity price index. The three indicators that imply the greatest risk of recession are the Russell 3000, initial unemployment insurance claims, and the S&P 100. For the factors that have greater predictive power such as wages, nonbank loans to GDP and the yield curve, the expected probability of recession twelve months ahead was 4%, on average.

The use of high frequency data provides an opportunity to enhance the recession indicator by expanding the quarterly series into a weekly series and adjusting the start date to reflect the actual turning point in the U.S. economy. We accomplish this by adjusting the start date of the recession to match the turning point in initial

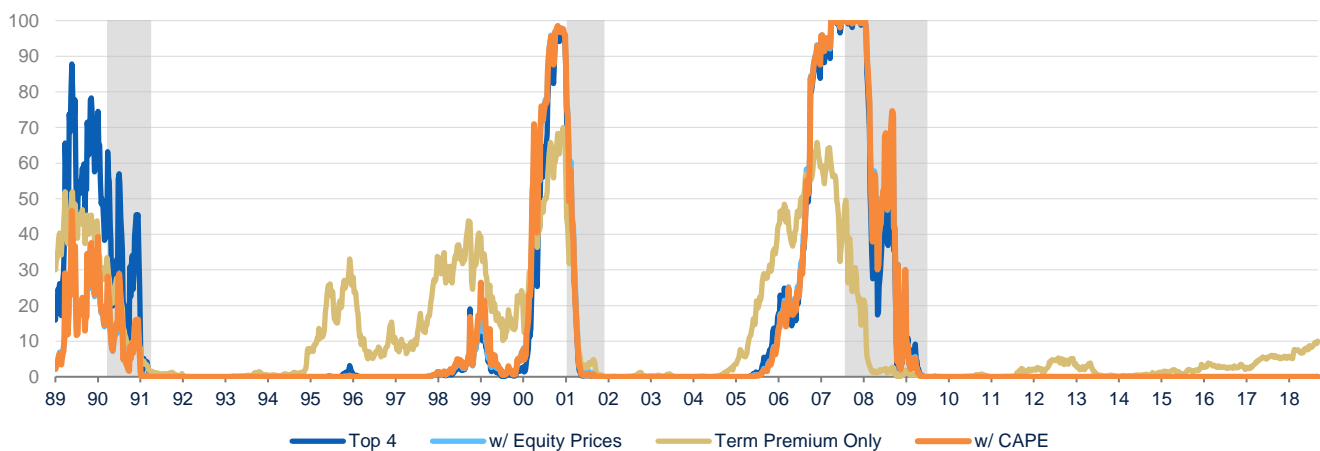
1: https://www.frbsf.org/economic-research/publications/economic-letter/2018/august/information-in-yield-curve-about-future-recessions/?utm_source=mailchimp&utm_medium=email&utm_campaign=economic-letter

2: See Appendix for results

unemployment insurance claims, conditional on there being a recession within the coming months. The results suggest that the probability of recession is higher than traditional metrics with the outcomes ranging from 2% to 38.9%. The indicator underlying the near 40% recession probability is large cap stocks.

Given that there is a high likelihood that more than one factor will trigger the recession, we also estimated a mixed frequency model using the four factors with the highest predictive power: wage growth, ratio of nonbank-loans-GDP, spread between 10-year and 6-month Treasuries adjusted for the compressed term premium, and personal interest expense as a share of GDP. Based on these factors, the current probability of recession is effectively 0%; with equity prices included, the probability remains extremely low— below 1%. Moreover, when using cyclically adjusted price-to-earnings ratio, known as CAPE, the recession probability remains close to 0%.

Chart 7. Probability of Recession in Next 12 Months , %



Source: BBVA Research
Shaded=Recession

Equity prices off the charts, other vitals nearing high end of range

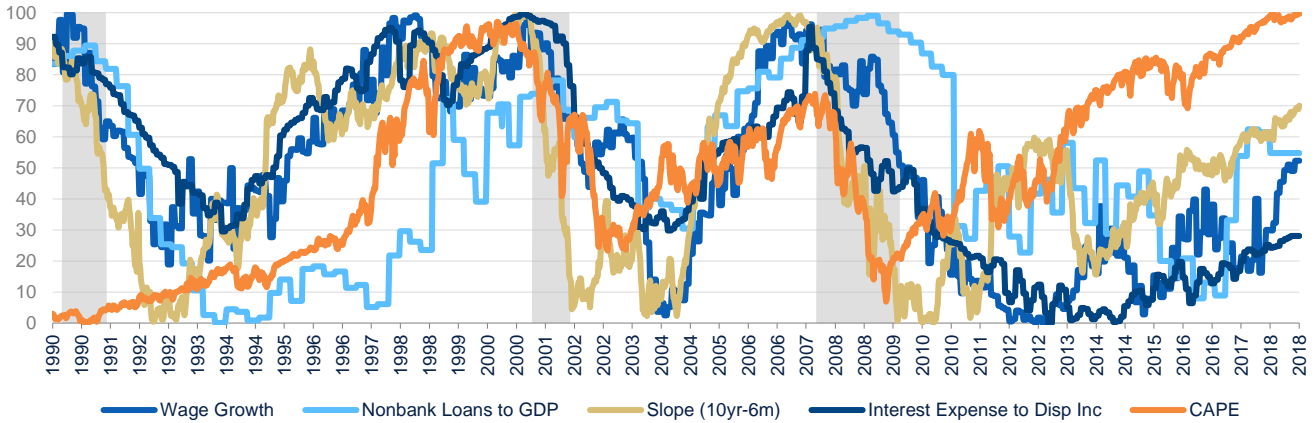
Although equity prices appear rich and continue edging up, the corporate tax changes, low real rate interest rates and solid corporate profits growth will moderate the risk of an equity price correction in the short-term. Furthermore, given that current valuations have not generated an economic correction to date suggests that other factors or even multiple factors may be the impetus for the next cycle.

An analysis of how the marginal impact on the probability of recession changes depending on where an indicator is relative to its own distribution shows that when all of the indicators surpass the 60th percentile, the chances of recession begin to increase exponentially. For example, if wage growth, interest expense as a share of disposable income, the yield curve slope, nonbank lending and the CAPE ratio are all trending close to the 60th percentile, which is the case today (excluding CAPE), the probability of recession would be close to 0%. However, if all the indicators were in the 70th percentile, the probability would rise to 2%, and once they surpass the 80th percentile the probability surges to above 50%.

Based on these results, despite the elevated risk posed by the rich equity valuations, the implied risk of recession based on macroeconomic factors remains low as of September 2018. That said these indicators are close to thresholds in which the outlook can change rapidly. In fact, all of the explanatory factors in this expansion cycle reached their respective nadir in percentiles terms between 2012 and 2016, and have been climbing steadily since. In terms of the duration until these indicators reach their peak, in 2008 it took around four years to move from trough to peak while in the 1990s it took between six and eight years, depending on the indicator. Given that most

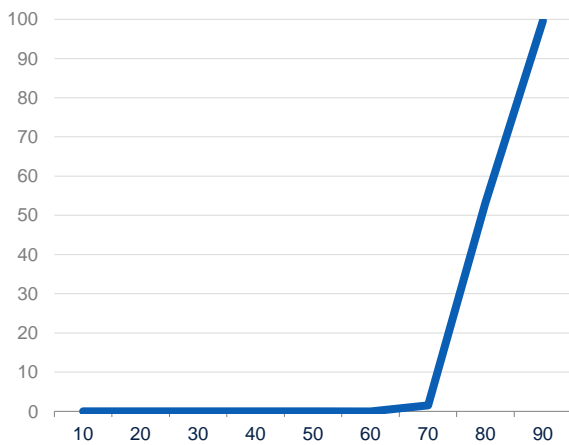
of the indicators are behaving more closely to the 1990s cycle, and assuming that these indicators will follow a similar path, the next turning point appears likely to happen in 2020.

Chart 8. Percentile Rank of Most Predictive Factors, %



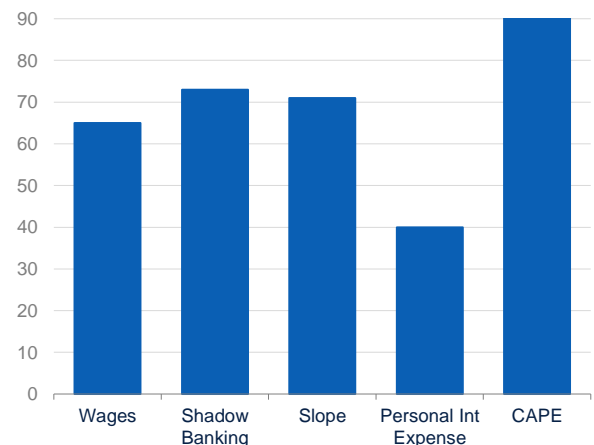
Source: BBVA Research
Shaded=Recession

Chart 9. Joint Probability of Recession*, % by percentile



Source: BBVA Research
*Results based on Probit with top four explanatory factors (Wages, Nonbank lending, slope, personal interest expense) based on the AUC analysis, and CAPE

Chart 10. Current Percentile Rank, % August 31, 2018



Source: BBVA Research

Rationalizing structural changes while avoiding quixotic prescriptions

No matter how much data is analyzed, there could be hidden frictions or systemic risks, which could trigger a financial crisis or a major economic shock. Potential sources of these frictions include trade wars, unsustainable shadow banking leverage or collateralized financial risks, labor market disruptions, geopolitical shocks, natural disasters or cyberattacks.

Considering that most downside risks appear to be linked to financial markets imbalances, the Fed is likely to continue rising interest rates even if inflation is near target, in order to create enough policy space for the next downturn. In addition, with growing imbalances, financial regulators are more likely to use macroprudential tools such as activating the countercyclical capital buffers or limiting bank's ability to take risk in certain asset classes.

However, it is uncertain how effective monetary policy can be to confront the next recession considering the low levels of interest rates and the fact that unorthodox monetary tools such as quantitative easing may not be as effective in the next downturn. Meanwhile, after the recent tax cuts, there will be less room for fiscal policy to respond to the next recession. This would put an unprecedented burden on policymakers at a time when there is less policy flexibility and a lack of willingness to compromise.³

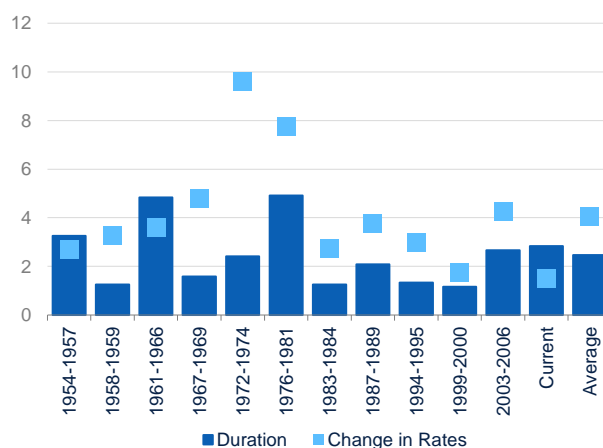
That being said, the structural shifts that the economy has undergone in the past thirty years could encourage longer and less volatile business cycles, particularly with the rise in intangible investment. Traditionally, the Fed imparts the greatest influence on the business cycle through user cost of capital and interest rates. Intangibles, however, are far less sensitive to interest rates changes given their higher than average depreciation rates. Moreover, non-asset-based lending such as intellectual property and software have illiquid or scant markets, and as a result they represent a more difficult segment for traditional finance to lend to. This suggests that the transmission of monetary policy will diminish as the share of intangibles rises. The lower level of debt financing also suggests that investment will be less rate sensitive, implying a less volatile investment cycle.⁴

Chart 11. Intangibles Investment, share of total %



Source: BBVA Research & OECD

Chart 12 Fed Tightening Cycles, years & pp



Source: BBVA Research & FRB

Likewise, the dramatic rise in US oil production has moderated the negative impact that rising oil prices have historically had on consumption and thus GDP. In fact, the boost to private domestic investment could even be large enough to offset the negative shock to consumption, particularly as the spending side of the economy becomes less reliant on traditional sources of energy.

In summary, although some of the best predictors of recession are close to pre-recession thresholds, the influence that monetary and fiscal policies are having on the current business cycle could lead to an unprecedented situation. First, given the low level of inflation, monetary policy is in a position to proceed cautiously and deliberately, leading to a much shallower and more benign tightening cycle. In fact, the current monetary cycle is the longest since the Volker era in the late 1970s and the fourth longest since the 1950s. Meanwhile, the recent fiscal stimulus has the potential to prolong the current cycle and counteract some of the headwinds brought about by the rising interest rate environment. Therefore, the risk of recession within in the next twelve months is for the most part contained.

3: https://www.bbvarresearch.com/wp-content/uploads/2018/09/180905_InflationRegimeChanges.pdf
 4: <https://www.kansascityfed.org/~media/files/publicat/sympos/2018/eberly%20crouzet%20paper.pdf?la=en>

Appendix

Appendix 1. Results From Area Under the Receiver Operating Characteristic (ROC) Analysis

	AUC(1990+)	AUC(2000+)	Current Implied Probability
Wage Growth	0.89	0.92	1%
Nonbank Loans to GDP	0.88	0.84	4%
TP-Adjusted Slope (10-6m)	0.87	0.88	8%
Slope (10-6m)	0.87	0.87	16%
TP-Adjusted Slope (10-3m)	0.86	0.87	8%
Slope (10-3m)	0.86	0.87	15%
TP-Adjusted Slope (10-1yr)	0.85	0.87	10%
Slope (10-1yr)	0.85	0.87	19%
TP-Adjusted Slope (10-1m)	0.85	0.85	12%
Slope (10-1m)	0.84	0.84	20%
Interest Expense to Disposable Income	0.84	0.92	0%
TP-Adjusted Slope (10-2yr)	0.82	0.86	10%
Slope (10-2yr)	0.82	0.86	19%
TP-Adjusted Slope (10-3yr)	0.80	0.85	9%
Slope (10-3yr)	0.79	0.84	18%
Current Account Deficit	0.79	0.75	4%
TP-Adjusted Slope (10-5yr)	0.78	0.85	5%
Slope (10-5yr)	0.77	0.83	17%
Personal Interest Expense Growth	0.72	0.76	15%
S&P 100	0.71	0.68	29%
Russell 3000	0.71	0.35	22%
Manufacturing Employment Growth	0.67	0.38	8%
Unemployment Insurance Claims	0.66	0.67	27%
Real 1-yr Treasury	0.64	0.64	8%
Consumer Delinquencies	0.64	0.66	14%
Real 3m Treasury	0.64	0.73	6%
Real 6m Treasury	0.63	0.74	7%
Policy Uncertainty	0.63	0.71	8%
Real 10yr Treasury	0.60	0.58	13%
Real 1yr Treasury	0.60	0.72	7%
Real 7yr Treasury	0.57	0.61	11%
Real 2yr Treasury	0.55	0.69	8%
Bank Loans to GDP	0.55	0.64	9%
Real 5yr Treasury	0.54	0.63	9%
Real 3yr Treasury	0.52	0.67	8%
Employment Growth	0.46	0.53	9%
Fiscal Deficits	0.45	0.56	9%
Emerge Market Exchange Rates	0.44	0.57	8%

Source: BBVA Research

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