Market implied recession probability

Sumedh Deorukhkar / Cristina Varela Donoso

Summary

– We develop a methodology to estimate the probability of recession implied in a variety of financial market variables across equity, fixed income, FX and volatility indices for the US and the Euro Area (EA) using a logistic (Logit) regression model.

– The objective is to ascertain the implicit recession probability signaled by individual financial variables rather than develop a single predictive model. This methodology favors the "cleanliness" of individual signals to understand the market narrative, which asset is stressed and which is not, over a joint model that would provide a single number but obscure which part of the market is reacting.

– Approximating this probability using daily data of market variables makes it timely and, as many other financial markets based measures, it often leads real data in anticipating recession events, as our results show. That said, these variables also produce false positives and thus warrant caution.

– Market-implied recession risk spiked repeatedly since the late 1970s, in most cases, either leading, or coinciding with the start of the officially marked recession periods.

– There are false positives, when recession is averted despite the signal given by financial market variables. Such cases typically don´t last much and occur when monetary, fiscal, regulatory or even verbal interventions help alleviate recession risks.

– There is no single asset class that consistently anticipates recession risks as each recession is unique, characterized by the nature of the economic cycle, type of shock, paired with potential indebtedness and/or over-valuations across markets.

– Recession risks are elevated when market variables demonstrate high levels of implied recession probability for a persistent period, usually in excess of three weeks.

– However, in the US, we find that S&P500 and High Yield spreads are most relevant in recession prediction performance, while in the Euro Area, High Yield spreads and the Italian-German sovereign yield spread are main signals to anticipate a recession.

– Assessing the April 2nd 2025 "Liberation Day" tariff shock, we find that in the US, implied recession probability surged sharply above 40% across assets, reaching a maximum of 80-100% in VIX and S&P 500, 50-65% in HY and bond volatility, and 40-50% in

Investment Grade spread and Brent. After a tariff pause was announced, recession probability fell sharply below 20%. In the EA, equity volatility depicted 80% plus recession probability while it was limited to less than 20% for the rest of the financial market variables.

– The latest implied recession probability levels depicted by financial market variables in both the US and the Euro Area as of late January 2026 stand at less than 20%, which is substantially lower than the 40% probability that we see as a conservative threshold level for concern, and thus a long way off from the peaks reached during the April 2nd 2025 liberation day tariff shock or during past recessions. However, a notable exception is Gold, whose recent rapid price surge is aligned with an implied recession probability of near 40%. Nonetheless, at the current juncture, this jump needs to be seen mainly in the context of global policy uncertainty, led by geopolitical tensions, trade protectionism, and shifting economic policies and is thus less indicative of an explicit recession risk, at least at the current juncture.

Introduction

On April 2nd 2025, US President Trump's 'Liberation Day' reciprocal tariff announcement triggered a stock market crash, a surge in volatility and rapid deterioration across credit markets. The shock fueled market talk of an imminent US recession. In less than a week, Trump announced a pause in the tariff escalation, triggering a relief rally. Since then, not only have markets recovered lost ground, but have reached new highs. This event, and many such since the 1970s are instances when interventions, actions or policy turn-arounds by policymakers or authorities have helped avert heightened recession risks from playing out into actual occurrences of recessions. In several others, however, the absence of decisive policy actions to contain a buildup of systemic risks, policy missteps or external extraordinary shocks have culminated into painful recessions.

Against this backdrop, we believe it is important to identify the early warning signals embedded in financial markets, as these can help policymakers take decisions that mitigate potential adverse effects. Indeed, although financial market prices often tend to overreact, their behavior is, by nature, closely linked to the economic cycle. For instance, equity prices reflect expectations for corporate earnings, bond yields capture not only monetary policy and inflation expectations but also the inflation and real risk premiums, and credit spreads indicate firms' perceived ability to service their debt. Additionally, Brent crude prices are closely associated with factors that impact the global energy demand-supply mix, whereas gold and the US dollar typically move in line with shifts in risk aversion.

In this report, we estimate the probability of recession implied in a variety of financial market variables across equity, fixed income, FX and volatility indices for the US and the Euro Area (EA) using a logistic (Logit) regression model. The objective is to ascertain the implicit recession probability signaled by individual financial variables rather than develop a single predictive model. This methodology favors the "cleanliness" of individual signals to understand the market narrative, which asset is stressed and which is not, over a joint model that would

provide a single number but obscure which part of the market is reacting. Approximating this probability using daily data of financial market variables has the advantage that they are real time and often lead real data in anticipating recession events, as our results show, while official recessions are often marked Ex-Post. That said, these variables also produce false positives and thus warrant caution.

The model

The workhorse models for such recession prediction analysis are discrete choice models. We prefer the Logit model over Probit for the ease of interpretation and computational efficiency and its robustness to outliers given fatter tails.   There are several papers that establish the econometric framework (Logit/Probit models) used in our methodology (See Literature Review in Annex III). Of note, is the seminal paper by Estrella and Mishkin (1996) that uses a probit model with financial variables, specifically the US yield curve and US equity indices, to predict recession probability. The ECB too has undertaken a similar study to forecast recession probabilities for the United States, Germany and Japan (Fornari et al, 2010). Meanwhile, the paper by Ng, E. C. Y. (2012) explicitly compares Logit vs. Probit models, supporting our preference for Logit.

We use daily data across different asset classes and recession indicators given by Fred[1] in the case of the USA, and CEPR[2] in the case of Europe. The sample varies depending on the financial variable, ranging from the late 1960s for Gold and the S&P500, mid 1970s for the USD, Brent and bond markets, early 1990s for HY and IG spreads and late 1990s for VIX. The samples are understandably shorter, ie. from the 1990s for the Euro Area variables. The treatment of the data is done so as to ensure that we capture short duration movements in variables while filtering the noise and at the same time acknowledging the non-linear relationship between the recession probability and exogenous variables. Thus, the predictor variables transformation process includes a weekly change or returns, a centered moving average, z-score normalization and are used in a bivariate regression analysis in quadratic terms. The model undergoes robustness tests by cross checking coefficient results under different sample periods. Furthermore, the goodness of fit is verified for different variable transformations especially in terms of the lag durations and the window for calculating differences/returns.

Separately, we run an alternative, more involved model, which includes an interaction term, where a proxy for Ex-Post central bank intervention by the Fed and the ECB aimed to serve as a backstop against adverse macro-financial shocks, is interacted with the financial variable in question to ascertain whether the model achieves a better fit and prediction power. This interaction term is a policy backstop, and is an orthogonal shock derived from a previous sign-restricted SVAR analysis[3] focusing on financial market variables in the US and Euro Area.

We find that such an alternative model does not materially change the results as financial

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[1] https://fred.stlouisfed.org/series/USREC

[2] https://eabcn.org/dbc/peaksandtroughs/chronology-euro-area-business-cycles

[3] Global-asset-price-dynamics-and-global-macro-financial-conditions-index

markets are very quick to react to any Ex-Post policy intervention, in effect making the use of such control less effective in terms of model results. Also, the daily series for such a shock has been available since 2007 and hence limits our ability to test it for previous recession. We thus stick to the more direct bi-variate model and present our results (See Appendix I for detailed methodology).

Updated model results

Our latest update of the model shows that as of January 29th 2026, for the US, recession probability priced in by S&P 500 and the VIX have held low at a comfortable level of 9% and 11% respectively while that implied by credit spreads on the High Yield and Investment Grade Bonds as well as MOVE held steady at subdued levels of around 7% (See Table 1). For the Euro Area, implied recession probability priced in Euro Stoxx as well as Europe VIX is close to historical minimum probability levels of 13% and 15% respectively and at 11% for Italian-Bund 10 year sovereign yield spread and at 13% for 10 year Bund volatility (See Table 2). Overall, the current implied recession probability levels depicted by financial market variables in both the US and the Euro Area stand substantially lower than the 40% probability that we see as a conservative threshold level for concern, and thus a long way off from the peaks reached during the April 2nd liberation day tariff shock or during past recessions. However, a notable exception is Gold, whose recent price surge warrants caution as it signals an implied recession probability of near 40% (See Figure 1). For now, this jump needs to be seen mainly in the context of global policy uncertainty, led by geopolitical tensions, trade protectionism, and shifting economic policies and is thus less indicative of an explicit recession risk . Looking back, past episodes of strong recession signals from gold prices, when its implicit recession probability surpassed 80%, include the episodes of early 1970s Bretton Woods collapse, the stagflation era and oil crisis of mid 1970s, the great inflation and Volcker shock of 1980s, the Long Term Capital Management (LTCM) crisis of 1998, and the 2008 Global Financial Crisis (See Figure 1). These episodes were all marked by a spike in systemic risk, waning confidence in the US dollar and risk of spiraling inflation.

All said, the strength of the financial markets is surprising. Despite geopolitical, trade, and fiscal risks, global stocks and credit are reaching new highs, breeding complacency. While the market's current resilience can be explained by solid business fundamentals, favorable monetary expectations, and technological appeal, ignoring systemic risks can be dangerous. The events in April 2025 demonstrated how fragile this stability can be. An unexpected political announcement was enough to trigger alarms and unleash a chain reaction in financial assets.

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TABLE 1: USA SNAPSHOT OF IMPLIED RECESSION PROBABILITY ACROSS FINANCIAL VARIABLES

Financial Variables	Latest Probability (Jan 29, 2026)	Historical Minimum Probability	April Liberation Day Tariffs (April 2, 2025 to April 9, 2025)		Median of Past Recessions		
			Max (%)	Days > 40%	Max (%)	Days > 40%	Starting Day > 40%
VIX	9	8	99	7	98	19	138
S&P 500	11	10	87	6	96	19	-11
HY Spread	7	5	55	3	100	40	-80
IG Spread	7	6	45	2	100	33	31
MOVE	7	7	69	5	88	10	10
Brent	9	6	52	2	100	41	90

Note: Historical Minimum Probability signifies the historical floor for recession probability implied by each financial market variable. Days > 40% signifies the number of days when the variable depicts recession probability above 40% during the recession period. Starting Day > 40% signifies the number of days before or after the announcement of the recession that the variable depicted recession probability above 40%. Here the negative number indicates days before the official announcement, zero indicates on the day of the announcement, and positive number indicates days after the announcement. Source: BBVA Research; HY Spread == High Yield Spread, IG Spread == Investment Grade Spread; MOVE = Merill Lynch Bond Options Volatility Estimate

TABLE 2: EURO AREA SNAPSHOT OF IMPLIED RECESSION PROBABILITY ACROSS FINANCIAL VARIABLES

Financial Variables	Latest Probability (Jan 29, 2026)	Historical Minimum Probability	April Liberation Day Tariffs (April 2, 2025 to April 9, 2025)		Median of Past Recessions		
			Max (%)	Days > 40%	Max (%)	Days > 40%	Starting Day > 40%
EUR VIX	14	13	87	11	100	23	36
SXXE	15	15	14	3	98	20	148
HY Spread	12	12	13	3	100	41	36
ITA Spread	11	10	12	0	97	19	0
Bund Vol	13	13	20	0	63	8	161
2Y	15	14	16	0	58	6	34

Note: Historical Minimum Probability signifies the historical floor for recession probability implied by each financial market variable.Days > 40% signifies the number of days when the variable depicts recession probability above 40% during the recession period.Starting Day > 40% signifies the number of days before or after the announcement of the recession that the variable depicted recession probability above 40%. Here the negative number indicates days before the official announcement, zero indicates on the day of the announcement, and the positive number indicates days after the announcement. Source: BBVA Research and Haver Data; ITA spread == 10 year Italy - 10 year Bund Spread; HY Spread == European High Yield Spread; Ger Bund Vol == German 10 year bond options volatility; 2Y == German 2 year bund yield; SXXE = Euro Stoxx 50

US : Key findings during recession periods and false positives

Market-implied recession risk has repeatedly surged above 40% since the late 1970s (Figure 1.) Importantly, these spikes have often either preceded or occurred simultaneously with the official onset of recessions. This contrast highlights a key feature of financial markets: market prices adjust in real time, while official recession declarations are made ex-post, sometimes months after the downturn has already begun.

That said, not every markets' implied recession signal has translated into an actual recession. False positives do occur. These tend to be short-lived episodes in which sharp increases in recession probability are quickly reversed. They typically reflect moments when monetary, fiscal, regulatory, or even verbal policy interventions successfully stabilize risk sentiment and help avert a contraction (see blue text in the Figure 1 and Appendix II for details on the US false positives). However, recession risk becomes more meaningful when market indicators show persistently elevated probabilities, usually for longer than two to three weeks. Sustained stress across multiple asset classes tends to capture more fundamental macroeconomic vulnerabilities rather than temporary dislocations.

It is also essential to note that no single asset class consistently anticipates recessions. Each downturn has its own characteristics—whether driven by the economic cycle, specific shocks, excessive leverage, or market over-valuation—which means different indicators become relevant at different points in time. Even so, in the United States, two variables stand out for their relative predictive power: the S&P 500 and high-yield credit spreads. Historically, these have shown some of the strongest links to recession dynamics, particularly when movements in equities and credit unfold together over a sustained period.

FIGURE 1. US RECESSION PROBABILITY GREATER THAN 40% IMPLIED IN SELECTED ASSET PRICES
(PROBABILITY; 1 == 100%)
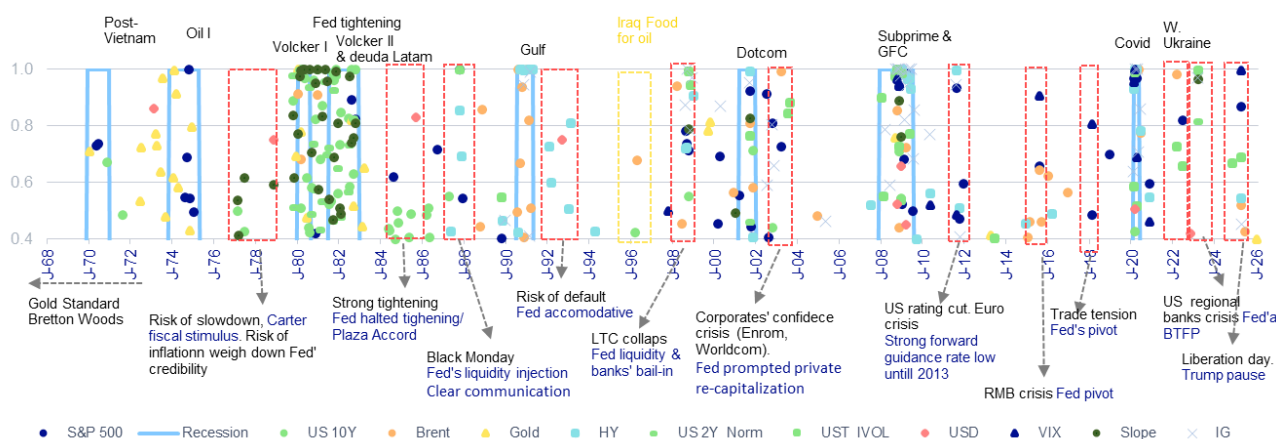
Blue boxes are the "official" recessions marked by the National Bureau of Economic Research (NBER). Red dashed boxes mark false positive episodes, where the implicit recession probability is high but a recession does not materialize. Black text in the graph indicates the factors that boosted recession probability, and blue text are measures that prevented the recession from materializing.

Source: BBVA Research; HY == High Yield Spread, IG == Investment Grade Spread; UST_IVOL = Merill Lynch Bond Options Volatility Estimate; US 2Y_Norm = US 2 year treasury yield normalized; Slope = 10Yr UST yield Minues 2Yr UST yield

Implicit probabilities during recession periods in the US

The 1970 recession emerged amid the unraveling of the Bretton Woods system, rising inflation, and weakening policy credibility, conditions that naturally made gold, equities, and 10-year yield volatility effective early indicators as they reflected uncertainty about monetary stability and future growth. The 1974 downturn, in contrast, was driven by the first major oil shock - OPEC imposed an oil embargo on the United States and other Western countries during the Yom Kippur War - and a surge in inflation that forced tighter financial conditions, and it is therefore intuitive that gold, the U.S. dollar, and equities signaled elevated recession risk ahead of time, with each capturing a different facet of the inflation and demand shock (See Figure 1).

By 1977, markets again priced a high recession probability, as the yield-curve slope, bond yields, and the US dollar all pointed to a looming slowdown. However, recession was ultimately avoided thanks to the sizable fiscal stimulus introduced under the Carter administration. This response, though, eroded the Federal Reserve's credibility in controlling inflation, setting the stage for the back-to-back **Volcker I and Volcker II recessions in 1980 and 1981**, both induced by the aggressive tightening required to restore that credibility—hence rates markets served as the primary recession signal during this phase (See Figure 1).

Later, the **1991 recession associated with the Gulf War** was notably anticipated by a widening of corporate credit spreads, both for investment-grade and high-yield issuers, as markets priced rising default risk and tightening financial conditions; at the same time, oil prices also acted as a leading indicator, reflecting the sharp geopolitical shock and its expected impact on growth and inflation (See Figure 1).

It becomes particularly relevant to focus on the recession signals implied by asset prices during the downturns that unfolded after the year 2000. In the years that followed, global financial markets had reached a much higher level of sophistication, with deeper liquidity, more complex instruments, and faster information transmission. This new landscape shaped the way recessions were priced and anticipated, especially during episodes such as the bursting of the dot-com bubble, the Global Financial Crisis, and the Covid shock. In each of these cases, the interaction between equity valuations, credit spreads, rates volatility, and cross-asset risk premia offered a far more nuanced, and often quicker, reflection of recession risk than in the previous decades.

The **2001 dot-com recession** was set in motion when the technology bubble burst in March 2000, wiping out unrealistic valuations across the sector. This downturn, already under way, was then deeply aggravated by the 9/11 terrorist attacks, which struck at the heart of the U.S. business and financial system and pushed the economy into a far more severe shock. As the crisis unfolded, thousands of tech startups collapsed in the aftermath of the TMT (Technology, Media, Telecom) bubble bursting, and the unprecedented attack on U.S. soil triggered a sudden wave of fear and uncertainty. Investment decisions were postponed, consumption faltered, and the economy contracted from March to November 2001.

Well before the recession was officially declared, several leading indicators flashed warning signs (See Figure 2). The sharp decline in the S&P 500 and the widening of investment-grade (IG) credit spreads following the TMT crash signaled recession probabilities above 80% almost a year in advance. After 9/11, these signals intensified dramatically. Treasury market volatility surged toward 80% (Figure 3), and recession odds inferred from the IG, HY, and equity markets spiked to 100%. While the S&P 500 and IG spreads were the clearest indicators of the March 2000 bubble burst, IG and HY spreads became even more informative after the attacks, reflecting the abrupt disruptions in Treasury trading, international payments, clearing systems, and domestic demand.

Meanwhile, **the Global Financial Crisis (GFC) of 2008–09** was fundamentally rooted in the U.S. housing bubble, with its earliest warning signs appearing as early as July 2007, when two Bear Stearns hedge funds heavily exposed to subprime mortgages collapsed. Market stress escalated in March 2008 as Bear Stearns itself failed and was sold to J.P. Morgan Chase and Co. for just $2 a share, a stark signal of the system's fragility. The situation reached its breaking point in September 2008 with the bankruptcy of Lehman Brothers, an event that pushed the crisis to its most acute phase and intensified global panic. What followed was a chain reaction of increasingly severe shocks. The unwinding of the subprime mortgage market led to extreme volatility, a widespread freeze in liquidity, and a rapid deterioration of asset quality, alongside collapsing market prices and a massive flight toward safe-haven securities.

Throughout this period, financial indicators provided clear and escalating warnings (See Figures 4 and 5). In July 2007, high-yield (HY) credit spreads jumped above 50%, marking the first broad repricing of risk. By February 2008, the MOVE index—capturing U.S. Treasury volatility—spiked toward 90%, signaling deep stress in fixed-income markets. Further surges came in March and July 2008, when investment-grade (IG) spreads climbed above 60%, reflecting growing concern over even high-quality credits. After September 2008, virtually all major indicators priced in a 100% probability of severe distress, underscoring the system-wide collapse following Lehman's failure.

The case of **the COVID-19 crisis** is particularly interesting, as it differs markedly from previous recessions by being both unexpected and truly global in nature. The COVID-19 recession, an exogenous and highly unexpected shock, unfolded with extraordinary speed, lasting roughly 90 days between February and May 2020. Its onset delivered an abrupt and synchronized global shutdown, producing severe economic damage and exceptionally limited visibility regarding the duration and depth of the crisis.

Financial markets reacted immediately (See Figures 6 & 7). Volatility surged to unprecedented levels, and several asset classes rapidly priced in recession probabilities above 40% for an entire month. Notably, Brent crude and investment-grade credit spreads remained above that threshold for two consecutive months, at times reaching implied probabilities close to 100%. Among these indicators, IG credit spreads proved the most informative, as they captured the acute stress on corporate balance sheets generated by the collapse in demand and the widespread disruption to global supply chains.

FIGURE 2. 2001 DOT-COM CRISIS
(RECESSION PROBABILITY %)
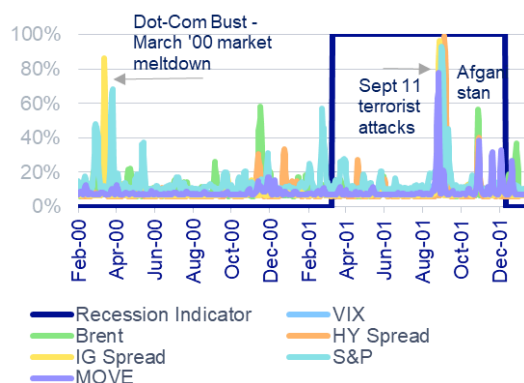
Source: BBVA Research; HY Spread == High Yield Spread, IG Spread == Investment Grade Spread; MOVE = Merill Lynch Bond Options Volatility Estimate

FIGURE 3. 2001 DOT-COM CRISIS
(ANALYTICAL TABLE %)

Variable	Brent	HY	IG	S&P 500	MOVE
Average probability	10	10	9	14	10
Maximum probability	99	99	95	92	76
Minimum probability	6	6	6	10	7
Days > 40% probability	14	7	11	22	4
Starting day when > 40%	174	175	-364	-351	166

Source: BBVA Research; HY Spread == High Yield Spread, IG Spread == Investment Grade Spread; MOVE = Merill Lynch Bond Options Volatility Estimate

FIGURE 4. GLOBAL FINANCIAL CRISIS
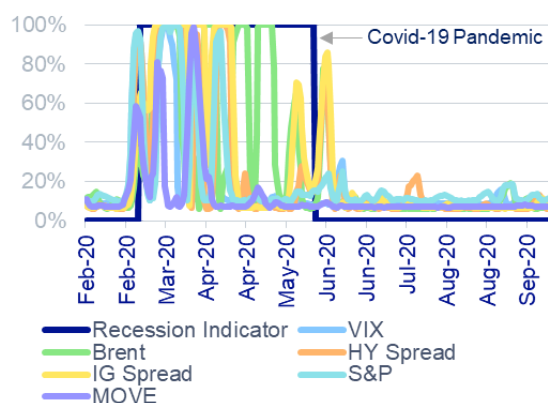### (RECESSION PROBABILITY %)
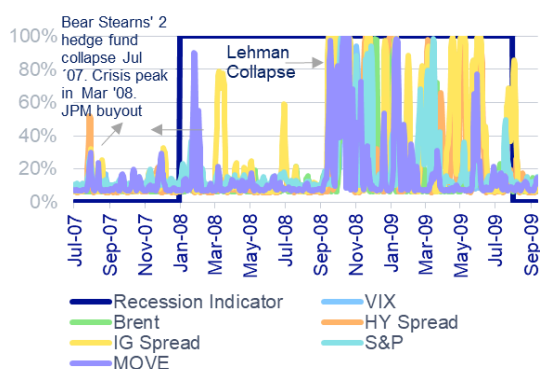
Source: BBVA Research

FIGURE 5. GLOBAL FINANCIAL CRISIS
(ANALYTICAL TABLE %)

Variable	VIX	Brent	HY	IG	S&P 500	MOVE
Average probability	12	13	25	33	20	18
Maximum probability	96	100	100	100	100	100
Minimum probability	8	6	6	6	10	7
Days > 40% probability	18	33	108	108	68	66
Starting day when > 40%	279	277	-158	-158	275	23

Source: BBVA Research

FIGURE 6. COVID 19 PANDEMIC
(RECESSION PROBABILITY %)

Source: BBVA Research; HY Spread == High Yield
Spread, IG Spread == Investment Grade Spread; MOVE =
Merill Lynch Bond Options Volatility Estimate

FIGURE 7. COVID 19 PANDEMIC
(ANALYTICAL TABLE %)

Variable	VIX	Brent	HY	IG	S&P 500	MOVE
Average probability	26	55	43	56	35	21
Maximum probability	100	100	100	100	100	99
Minimum probability	8	6	6	7	10	7
Days > 40% probability	20	49	37	53	29	14
Starting day when > 40%	-4	6	-2	-3	-4	-4

Source: BBVA Research;HY Spread == High Yield Spread, IG Spread
== Investment Grade Spread; MOVE = Merill Lynch Bond Options
Volatility Estimate

# False positives episodes for the US

We examine the cases in which the model of market-implied recession probability generates false positives in the case of the US. This typically occurs when authorities intervene proactively in response to a shock, and when the underlying economy is relatively solid. Without such a decisive intervention, there is a significant risk of the occurrence of a recession (See Annex II).

A common denominator we have identified in these episodes is that the spikes in implied recession probability tend to be short-lived, in most cases less than 10 days, reflecting the high effectiveness of policy measures in containing financial stress before it propagates more broadly. Moreover, we find that as in the case of recession episodes there is no single asset class that consistently leads to the increase in recession risk during such episodes of false positives.

Examining specific false positive episodes for the US, market reaction to the **2003 Iraq invasion and concurrent corporate scandals** (See Figure 8) was dominated by supply-side fears. At that time, the geopolitical uncertainty surrounding the conflict combined with lingering fragilities from the corporate scandals of the early 2000s (such as Enron and WorldCom) created a powerful shock to risk sentiment. Brent crude emerged as the primary recession signal, reaching a 99% implied probability, remaining above the 40% threshold for nine days, the longest persistence in the sample. Meanwhile, the S&P 500 peaked at 73% implied probability, staying above 40% only for three days. Recession probabilities declined markedly once the military operation commenced and geopolitical uncertainty subsided. Concurrently, the Federal Reserve maintained a highly accommodative policy stance, while regulatory reforms enacted in 2002 to strengthen corporate disclosure—most notably the Sarbanes–Oxley Act—and the supervisory pressure for balance-sheet repair across the banking sector contributed to a stabilization of financial conditions.
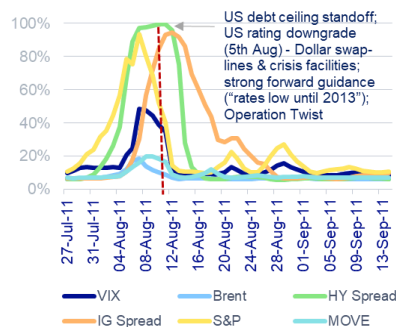
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Another interesting episode was the **loss of the U.S. sovereign's AAA credit rating in the summer of 2011** (See Figure 9), which occurred alongside rising fears of a double-dip recession. This event triggered a sharp spike in market-implied recession probabilities. Suddenly, the world's quintessential safe asset was stripped of its highest credit grade at the very moment Europe was undergoing a severe crisis of confidence in the euro and in its sovereign debt markets. Credit spreads—across High Yield and Investment Grade—and U.S. equities all indicated recession probabilities close to 100% for roughly nine days on average. What ultimately restored confidence and prevented a recession was the Federal Reserve's forceful verbal intervention, announcing that interest rates would remain exceptionally low for an extended period through 2013, combined with the coordinated action of major central banks to provide ample U.S. dollar liquidity.

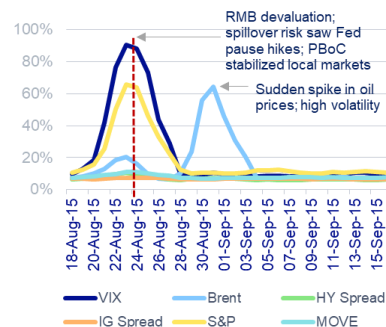**FIGURE 8. IRAQ WAR 2003**
(RECESSION PROBABILITY %)

FIGURE 9. US RATING DOWNGRADE
(RECESSION PROBABILITY %)

FIGURE 10: RMB DEVALUATION
(RECESSION PROBABILITY %)
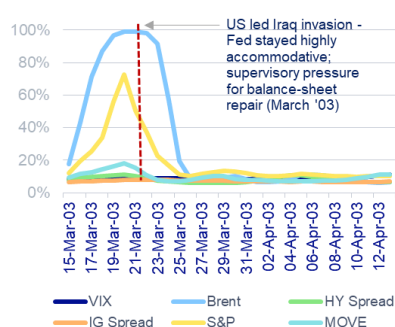
	Brent	HY	IG	S&P 500
Max prob	99	11	8	73
Days > 40%	6	0	0	3

	VIX	HY	IG	S&P 500
Max prob	49	99	95	93
Days > 40%	3	9	11	9

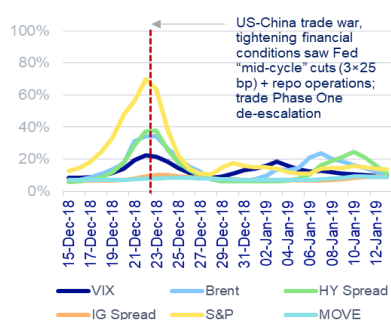|	VIX	HY	IG	S&P 500
Max prob	91	11	7	66
Days > 40%	6	0	0	4

Source: BBVA Research and Haver Data; HY Spread == High Yield Spread, IG Spread == Investment Grade Spread; MOVE = Merill Lynch Bond Options Volatility Estimate

It is also noteworthy that the model assigns a high level of implied recession probability to U.S. sovereign bond volatility and to investment-grade credit spreads in March 2023 (See Figure 12), coinciding with the **regional banking crisis and, in particular, the collapse of Silicon Valley Bank (SVB).** This episode arose from a combination of fundamental risk-management failures among regional banks, especially those highly exposed to the technology-startup ecosystem, which had expanded rapidly on the back of volatile and largely uninsured deposits while allocating a substantial share of their assets to long-duration U.S. Treasury securities. The Federal Reserve's rapid tightening cycle subsequently eroded both the market value of these portfolios and the stability of the deposit base, as higher-yielding alternatives such as Treasury bills drew liquidity away from the banking system and funding conditions deteriorated across the startup sector. In this context, the authorities' decision to guarantee all deposits and introduce the Bank Term Funding Program (BTFP) mitigated the risk of contagion from the financial sector to the real economy and in turn averted a potential recession.

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Finally, a comparison of trade shocks (See Figure 11 & 13) reveals that the **April 2025 global 'Liberation Day' tariff episode** was significantly more disruptive than the **2018 U.S.-China tensions**. Unlike 2018, where a Fed pivot eased risks, the 2025 scenario involved widespread asset deterioration while the Fed was constrained by inflation. A key distinction between the two episodes is that the number of assets signaling recession risk was significantly larger in April 2025 than in December 2018. This reflects the far more disruptive nature of the 2025 shock, as tariffs were announced by the Trump administration against all countries, both allies and non-allies, raising fears of highly disruptive retaliatory measures. What ultimately stabilized markets in the latest shock was the decision to delay the implementation of the tariffs, the Tariff pause.
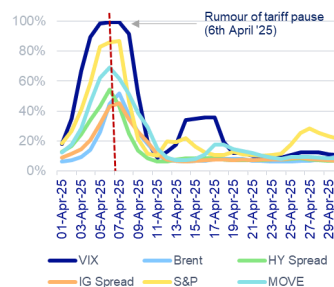
FIGURE 11: US-CHINA TRADE WAR (RECESSION PROBABILITY %)

FIGURE 12: SVB CRISIS (RECESSION PROBABILITY %)
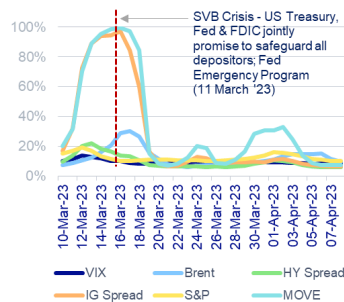
FIGURE 13: RECIPROCAL TARIFFS (RECESSION PROBABILITY %)

	VIX	HY	IG	S&P 500
Max prob	22	38	10	70
Days > 40%	0	0	0	4

	VIX	HY	IG	S&P 500
Max prob	14	22	97	19
Days > 40%	0	0	7	0

|	VIX	HY	IG	S&P 500
Max prob	99	55	45	87
Days > 40%	7	3	2	6

Source: BBVA Research and Haver Data; HY Spread == High Yield Spread, IG Spread == Investment Grade Spread; MOVE = Merill Lynch Bond Options Volatility Estimate

Euro Area: Key findings during recession periods and false positives

In the case of the Euro Area (EA), past recessions were preceded by sharp and sustained surge in market-implied recession probability, which rose above 80% and remained above that level for anywhere from one week to slightly more than a month. The European asset prices' implied recession probabilities across events since 1990 are depicted in Figure 14, where the EA official recession dates, as identified by the CEPR (blue bands), have either coincided with or been preceded by sharp increases in market-implied recession probabilities across a wide range of asset classes. However, like in the US, in the EA there are periods of false positives, marked by the red-dashed lines.

We have found out that the most informative recession indicators in the EA tend to be the 2-year German bond yield, 10-year German bond volatility, high-yield credit spreads, and equity volatility, all of which react swiftly when macroeconomic conditions deteriorate. Moreover, the Italian–German yield spread has repeatedly served as a reliable gauge of spillover and fragmentation risk—most prominently during the 1992–93 European Exchange Rate Mechanism (ERM) crisis and again through the 2011 sovereign-debt crisis, as widening spreads often signal stress transmission within the Monetary Union. Nonetheless, some periods of elevated recession risk in Europe also reflect spillovers from U.S. financial shocks, underscoring the high degree of global integration.

FIGURE 14. EURO AREA RECESSION PROBABILITY GREATER THAN 40% IMPLIED IN SELECTED ASSET PRICES (PROBABILITY; 1 == 100%)
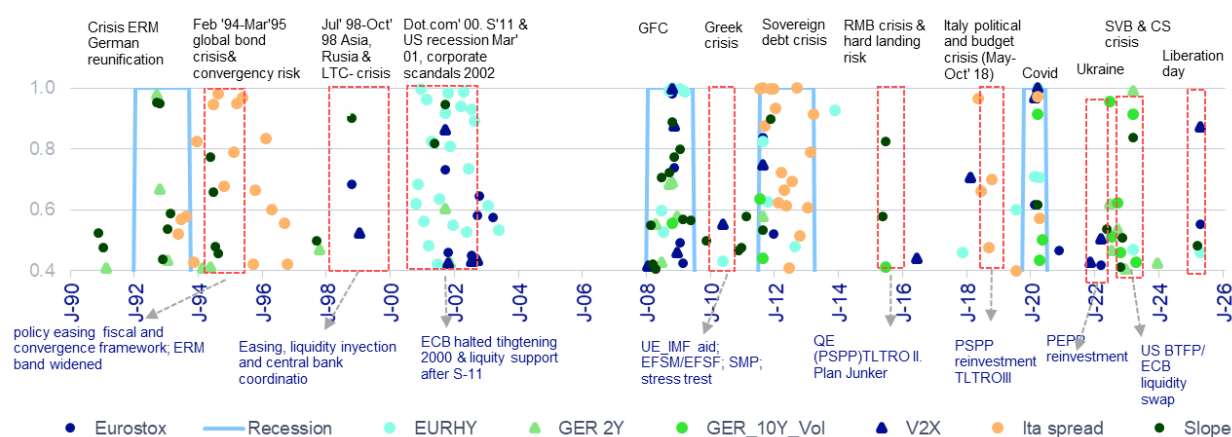
Blue boxes are the "official" recessions marked by the Center for Economic Policy Research (CEPR). Red dashed boxes mark false positive episodes, where the implicit recession probability is high but a recession does not materialize. Black text in the graph indicates the factors that boosted recession probability, and blue text are measures that prevented the recession from materializing.

Source: BBVA Research; BBVA Research and Haver Data; Ita spread == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

One of the most striking examples in the chart is the April 2025 Liberation-Day episode, when European equity volatility briefly implied a 90% probability of recession, while other indicators, including equities, the yield-curve slope, and high-yield credit, rose into the 50%–60% range.

At present, by contrast, market-implied recession probability in the euro area remains relatively low at around 15%, suggesting a more moderate macro risk profile compared with previous episodes of synchronized financial stress.

Implicit probabilities during recession periods in the Euro Area

The Global Financial Crisis (GFC) in 2008 led to a recession in Europe. The GFC, rooted in the U.S. real estate bubble, quickly spilled into Europe as many financial institutions were heavily exposed to U.S. subprime mortgages, having sought higher-yielding assets amid an extended low-rate environment. The impact was severe: the interbank and corporate lending froze, household credit collapsed, and GDP contracted by 4.5% in 2009 while unemployment surged.

Early signs of stress appeared as soon as August 2007 (See Figure 15 & 16), when both high-yield credit and the 2-year yield provided a modest early warning about six months before the recession, coinciding with the collapse of Germany's IKB and later its takeover by KfW, at which point recession probability climbed above 50%. Following Lehman's collapse, high-yield spreads and equity markets signaled persistently high recession probabilities from September 2008 through March 2009. Overall, we find that during this episode, the 2-year yield and high-yield credit spreads served as the most effective early warning indicators of recession risk.

During the EA sovereign debt crisis the Italian-German sovereign yield spread was the market's main recession probability signal (See Figure 16 & 17). The recession that stretched from late 2011 to mid-2013 was triggered by the EA sovereign-debt crisis, a result of the negative feedback loop between the sovereign risk and the banking sector. During this episode, the Italian sovereign spread emerged as the leading recession signal, reaching an implied probability of 100% within a week of the recession's onset and remaining elevated for more than three months. High-yield credit spreads and Bund volatility also provided strong and timely indications of rising recession risk.

The EA also entered a **recession between 4Q19 and 2Q20**, initially driven by escalating U.S.–China trade tensions, weakening global demand from China, and a marked deceleration in exports. Additional sources of strain—including Brexit uncertainty, new environmental regulations on vehicle emissions, and Italy's budget crisis—created a broader backdrop of vulnerability that was ultimately **deepened by the arrival of the COVID-19** shock. The impact was felt most acutely through a global industrial and manufacturing downturn, a sharp deterioration in business confidence, and a pullback in investment, with Germany being particularly affected; once the pandemic struck, economic activity came to an abrupt standstill.

In terms of market signals (See Figures 19 & 20), high-yield credit spreads implied a 60% probability of recession roughly four months before the downturn, while the Italian sovereign spread also provided an early warning with probabilities around 40%. The COVID-19 shock itself was characterized by an exceptionally broad and sudden rise in recession probability

across nearly all indicators, with Eurostoxx volatility, high-yield spreads, and Euro Stoxx equities collectively signaling recession risks in the 70% to 100% range.

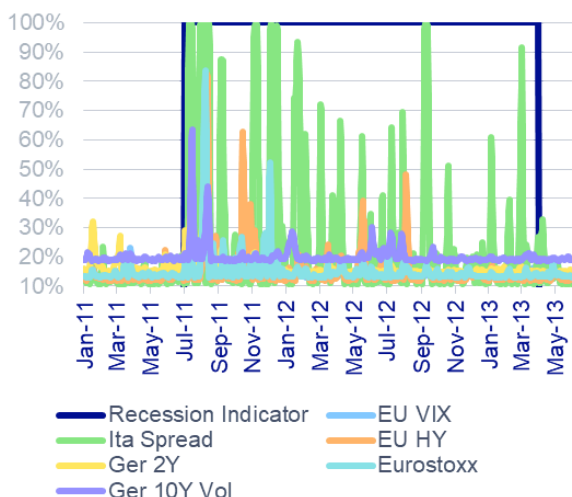## FIGURE 15. GFC (RECESSION PROBABILITY %)
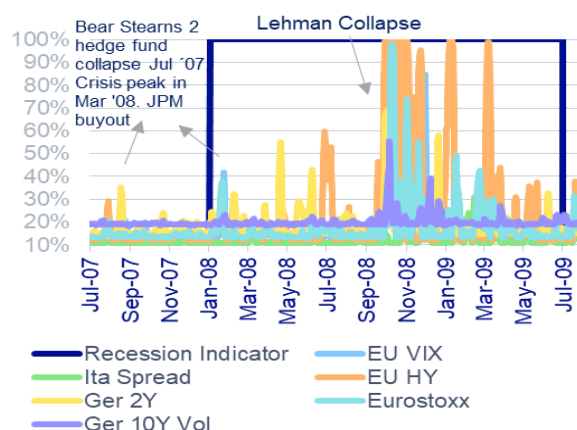
Source: BBVA Research; BBVA Research and Haver Data; Ita spread == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

FIGURE 16. GFC TABLE (RECESSION PROBABILITY (%)

Variable	EU VIX	ITA	EU HY	Ger 2Y	Euro Stoxx	Ger 10Yr Vol
Average probability	18	12	26	20	19	20
Maximum probability	100	34	100	69	98	55
Minimum probability	13	11	12	15	13	19
Days > 40% probability	23	0	86	19	22	4
Starting day when > 40%	22	0	175	108	279	275

Source: BBVA Research; BBVA Research and Haver Data; Ita spread == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

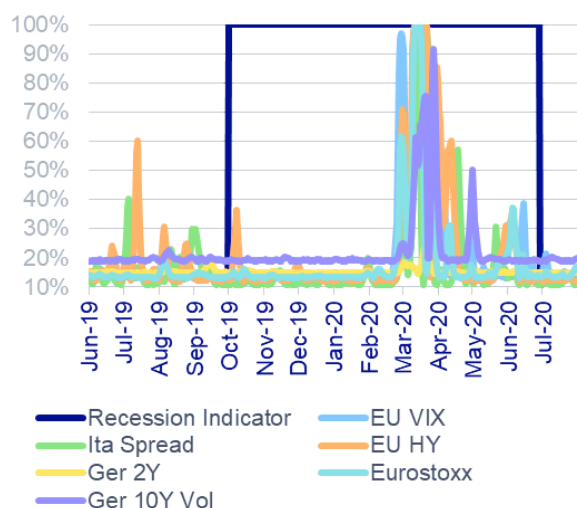## FIGURE 17: EU SOVEREIGN DEBT CRISIS (2011) (RECESSION PROBABILITY %)

Source: BBVA Research; BBVA Research and Haver Data; Ita spread == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

FIGURE 18: EU SOVEREIGN DEBT CRISIS TABLE (RECESSION PROBABILITY %)

Variable	EUVIX	ITA	EU HY	Ger 2Y	Euro Stoxx	Ger 10Yr Vol
Average probability	15	28	16	16	16	21
Maximum probability	75	100	83	58	84	63
Minimum probability	13	11	12	15	13	19
Days > 40% probability	6	119	15	6	11	8
Starting day when > 40%	36	7	36	34	33	12

Source: BBVA Research; BBVA Research and Haver Data; Ita spread == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

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FIGURE 19: PANDEMIC
(RECESSION PROBABILITY %)

Source: BBVA Research; BBVA Research and Haver
Data; Ita spread == 10 year Italy - 10 year Bund Spread;
EU HY == European High Yield; Ger 10Y Vol == German
10 year bond options volatility; Ger 2Y == German 2 year
bund yield

FIGURE 20: PANDEMIC TABLE
(RECESSION PROBABILITY %)

Variable	EU VIX	ITA	EU HY	Ger 2Y	Euro Stoxx	Ger 10Yr Vol
Average probability	21	17	23	15	19	23
Maximum probability	100	97	100	25	100	92
Minimum probability	13	11	12	15	13	19
Days > 40% probability	26	19	41	0	20	21
Starting day when > 40%	147	-88	-81	0	148	161

Source: BBVA Research; BBVA Research and Haver Data; ITA ==
10 year Italy - 10 year Bund Spread; EU HY == European High
Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger
2Y == German 2 year bund yield

False positives episodes for the Euro Area

When we examine the periods in which the model produced false positives for the Euro Area, a clear pattern emerges: these episodes are consistently accompanied by forceful and timely interventions by the ECB or by fiscal and regulatory authorities (See Annex II).

This dynamic is visible even in earlier episodes, such as **the 1994–1995 bond-market shock**, when the Euro Area, still in the process of monetary integration, was hit first by a global bond selloff triggered by the Federal Reserve's unexpectedly aggressive tightening cycle and, subsequently, by renewed doubts about the credibility of the Maastricht convergence process. The abrupt rise in global yields spilled over into European markets and, combined with concerns about the fiscal sustainability and exchange-rate stability of several prospective EMU members, pushed the Italian–German sovereign yield spread to levels consistent with an implied recession probability close to 100%, while the yield-curve slope in core countries signaled recession risks near 80% (See Figure 14). The correction came only after coordinated policy actions: European finance ministers and central banks reaffirmed their commitment to Maastricht criteria; the Central Bank of Italy intervened to stabilize the lira; the Bundesbank adopted a more measured policy stance; and G7 statements helped calm global bond markets. Together, these steps narrowed sovereign spreads, normalized yield curves, and sharply reduced market-implied recession probabilities.

A similar pattern reappeared during **2018–2019**, a period marked by a difficult global backdrop: the escalation of the U.S.–China trade war, the collapse of global trade, a deep industrial

downturn in Germany, fiscal tensions in Italy, and the prolonged uncertainty surrounding Brexit. Complicating matters, the ECB had begun tapering its quantitative easing program in 2018. Throughout this period, markets displayed short-lived recession signals across several asset classes: the VIX implied recession probabilities above 70% in January 2018; the Italian–German spread priced nearly 100% recession risk in May and again in October; and Euro Area high-yield spreads rose meaningfully during the 2019 phase of the trade war (See Figure 21). Yet none of these signals translated into an actual recession, as recession risk was repeatedly offset by ECB communication and policy actions, including strong forward guidance, renewed commitments to reinvestments under the Asset Purchase Program (APP), and ultimately the announcement of Targeted Long Term Refinancing Operations (TLTRO III), designed to preserve the bank-lending channel amid rising fragmentation.
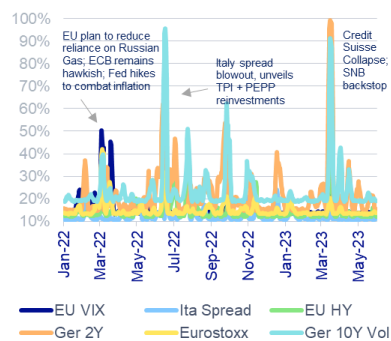
This pattern was again visible in **2022**, when European equity volatility, the 2-year yield, and Bund volatility each signaled elevated recession probabilities at different points (See Figure 22). The macro environment was extraordinarily complex: Russia's invasion of Ukraine sent natural gas prices to unprecedented levels, sharply raising production costs in Europe—particularly for energy-intensive industries—and fueling fears of supply rationing. At the same time, the end of ECB quantitative easing and the rapid normalization of interest rates raised concerns about renewed fragmentation. To contain the crisis, European governments deployed large fiscal packages, including energy-support schemes and corporate relief measures; the EU launched REPowerEU to stabilise and diversify energy supply; and the ECB introduced the Transmission Protection Instrument (TPI) to prevent unwarranted sovereign spread widening. These interventions helped stabilize financial conditions, protect the integrity of the monetary union, and prevent recession risks from materializing.

Finally, the **April 2025 global 'Liberation Day' tariff shock episode** (See Figure 23) fueled a pickup in implied recession risk probability, particularly across equity markets and corresponding volatility index, as seen in Euro Stoxx and EU VIX, but also in the EU High Yield spread. In contrast, bond markets' probability was little changed. Nevertheless, these peaks were short lived, less than 4 days at a stretch, although it is worth mentioning the two peaks seen in the case of EU VIX as, on April 17th, ECB's rate cut was accompanied by a cautious rhetoric over the Eurozone economy and concerns over deepening structural damage to European exports and investments even without a tariff pause. Further fueling to jump were spillovers from US VIX fueled by tech jitters and renewed geopolitical tensions amid new US sanctions targeting Iranian oil exports. The EU VIX recession probability subsidized over the course of the week following growth supportive reassurance by ECB officials and robust earnings results from European firms towards the end of April.
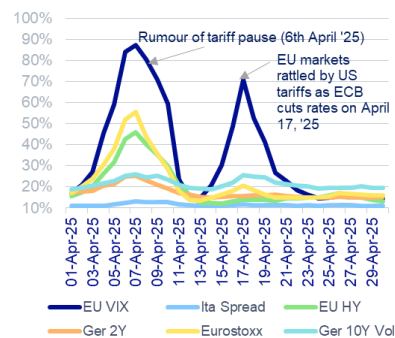
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FIGURE 21: TRADE WAR, ITALY BUDGET CRISIS (RECESSION PROBABILITY %)

	EU VIX	ITA	EU HY	Euro Stoxx
Max prob	71	97	19	22
Days > 40%	8	21	0	0
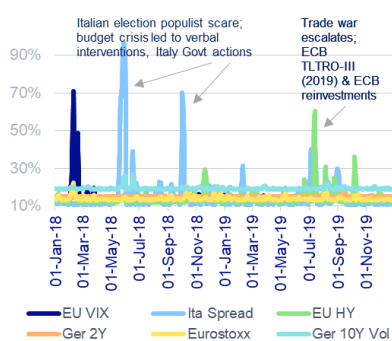
FIGURE 22: UKRAINE WAR, SVB & CREDIT SUISSE CRISIS (RECESSION PROBABILITY %)

	EU VIX	ITA	EU HY	Euro Stoxx
Max prob	50	38	47	42
Days > 40%	6	0	3	2

FIGURE 23: RECIPROCAL TARIFF (RECESSION PROBABILITY %)

	EU VIX	ITA	EU HY	Euro Stoxx
Max prob	87	13	46	55
Days > 40%	11	0	3	3

Source: BBVA Research and Haver Data; ITA == 10 year Italy - 10 year Bund Spread; EU HY == European High Yield; Ger 10Y Vol == German 10 year bond options volatility; Ger 2Y == German 2 year bund yield

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Annex I: Methodology

Variables

Daily time series data since availability:

- **Dependent:** a binary recession indicator, where 1 signifies a recession period and 0 signifies a non-recession period.
    - US recession period given by the NBER.
    - Euro Area recession period given by CEPR.
- **Predictor variables used to estimate implied recession:**
    - **Equity markets:** S&P 500, MSCI World Index, Euro Stoxx 50, Euro Stoxx 350
    - **Bond markets:** High Yield and IG Spreads for the US & Euro Area, US 10yr UST yield, US 2 yr UST yield, US 10-2 UST yield spread, German 2 yr & 10 yr bond yield, Italy 10 yr bond yield, Euribor, Italy CDS spread,Italy-Bund 10 Yr yield spread
    - **Market volatility:** VIX, MOVE, Euro Area VIX, German 10 yr bund volatility
    - **Commodities:** Brent Crude Oil, Gold
    - **Currency markets:** US Dollar Index, USD-JPY carry return, EURUSD, EURJPY
- **Predictor variable transformation:**
    - We transform each daily indicator into a new variable that captures its momentum and volatility and captures non-linearity in the relationship, which improves the model fit.
        - **Measure of change:** For "special" indicators (S&P 500, Brent), calculate a 7 day return. For all other indicators, calculate 7-day difference
        - **Normalization:** Z-score normalization to standardize the variables.
        - **Moving mean:** To reduce noise and capture the underlying trend, calculate a 7-day centered moving mean that includes 3 past days, the current day, and 3 future days.
        - **Squaring for non-linearity:** Capturing the non-linear relationship between the recession probability and exogenous variables.

Methodology

The recession probability is modeled using a logistic regression on a smoothed, squared volatility signal derived from daily economic indicators. Let X_t be the raw indicator value at time t. We first compute the transformed series x'_t using a lag L (where L=7 for weekly changes for standard difference indicators or returns for financial return indicators:

$$x'_t = \begin{cases} X_t - X_{t-L} \\ \frac{X_t}{X_{t-L}} - 1 \end{cases}$$

Let z_t denote the standardized series for normalized analysis,

$$z_t = \frac{x'_t - \mu}{\sigma}$$

or simply $z_t = x'_t$ for non-normalized analysis. The final predictor variable, v_t, captures the magnitude of the signal by squaring a centered 7-day moving average:

$$v_t = \left(\frac{1}{7}\sum_{j=-3}^{3} z_{t+j}\right)^2$$

The probability of a recession,

$$\pi_t = P(Y_t = 1|v_t)$$

is estimated via a logit model where parameters β_0 (Intercept) and β_1 (Coefficient) are obtained using Maximum Likelihood Estimation and validated via 10-fold cross-validation:

$$\pi_t = \frac{1}{1 + \exp\left[-(\beta_0 + \beta_1 v_t)\right]}$$

- Iterative Modeling: For each indicator, a complete, independent analysis is performed given the objective of the analysis : The implicit recession probability given the by each financial variable separately rather than a model that best predicts a recession

- Model Validation (K-Fold Cross-Validation): Instead of a simple train/test split, the script uses a more robust 10-Fold Cross-Validation.

  - The dataset is randomly divided into 10 equal-sized "folds".

  - The model is trained 10 times. In each iteration, it trains on 9 of the folds and makes predictions on the 1 remaining "hold-out" fold.

  - This process is repeated until every fold has been used as the test set once.

  - The resulting predictions form a complete, out-of-sample set of predictions for the entire dataset, which is used for plotting and evaluation.

- Reporting: After the cross-validation, a final model is trained on all the data to generate stable summary statistics (coefficients, p-values, R-squared).

- Best fit: Alternative lags and differences/returns periods are tested to select the best fit.

- Robustness checks:

  - For both, the US and EA, we test for robustness of the results of the base model using:

    a. Different sample sizes - data post 2007 vs. data post 1987 vs. data post 1963

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Robustness Checks

FIGURE 1. US RECESSION PROBABILITY IMPLIED BY S&P 500 USING DIFFERENT SAMPLE PERIODS
(PROBABILITY; 1 == 100%)
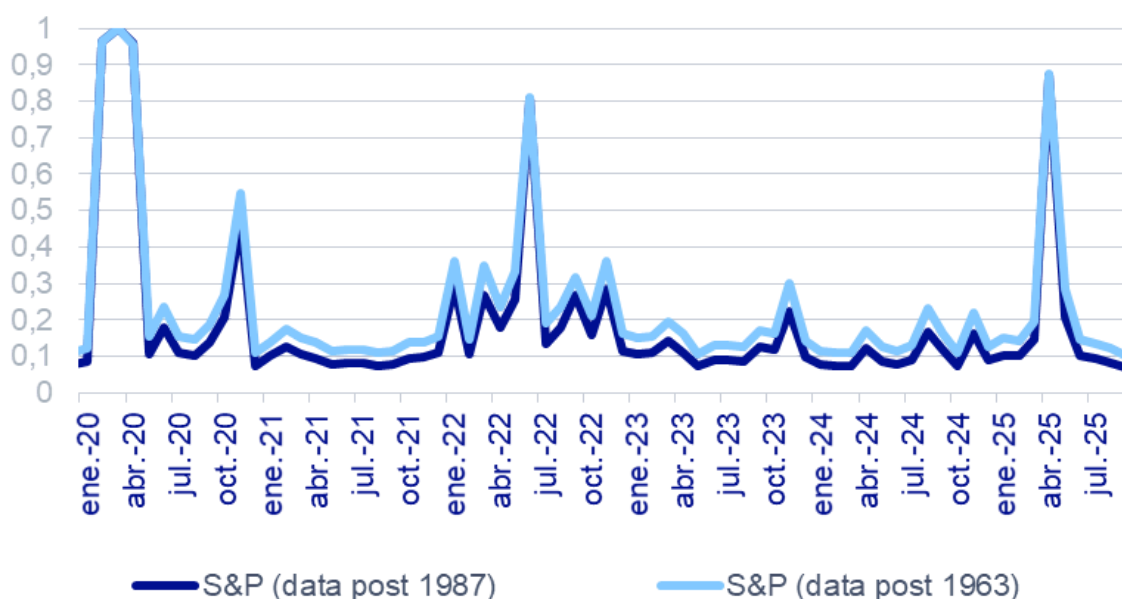
Source: BBVA Research

Alternate Methodology

— Logit model with backstop interaction: The bivariate Logit model is altered to include a control variable calculated as the interaction between the main predictor variable (financial market variable) and the daily mean of orthogonal shocks (derived from a sign-restricted SVAR model (link)). This new shock variable serves as a proxy for the extent of monetary policy intervention during times of extreme stress. The interaction term thus reflects the extent to which an Ex-Post monetary policy intervention during times of extreme stress reduces the probability of recession implied in financial market variables.

The model introduces a "Backstop" variable, denoted as B_t, which interacts with the volatility signal.

The recession probability

$$\pi_t = P(Y_t = 1 | v_t, B_t)$$

is estimated using a logistic regression with two covariates: the volatility signal v_t and the interaction term (v_t times B_t). The specification is:

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$$\ln\left(\frac{\pi_t}{1-\pi_t}\right) = \beta_0 + \beta_1 v_t + \beta_2(v_t \times B_t) + \epsilon_t$$

The predicted probability is therefore:

$$\hat{\pi}_t = \frac{1}{1 + \exp\left[-(\hat{\beta}_0 + \hat{\beta}_1 v_t + \hat{\beta}_2 v_t B_t)\right]}$$

Where parameters β_0 (Intercept), β_1 (Coefficient 1) and β_2 (Interaction coefficient) are estimated via Maximum Likelihood Estimation (MLE) and validated using 10-fold cross-validation.

— Iterative Modeling: For each indicator, a complete, independent analysis is performed given the objective of the analysis: The implicit recession probability given by each financial variable separately rather than a model that best predicts a recession.

— Comparing results without vs. with backstop,

  — We find limited evidence of model improvement from inclusion of the interaction term.

  — Market variables are quick to price in the impact of any ex-post policy intervention.

 — We thus present the results from the simpler model, without backstop interaction term.

FIGURE 2. BACKSTOP INTERACTION TERM (Z-SCORE)

Source: BBVA Research
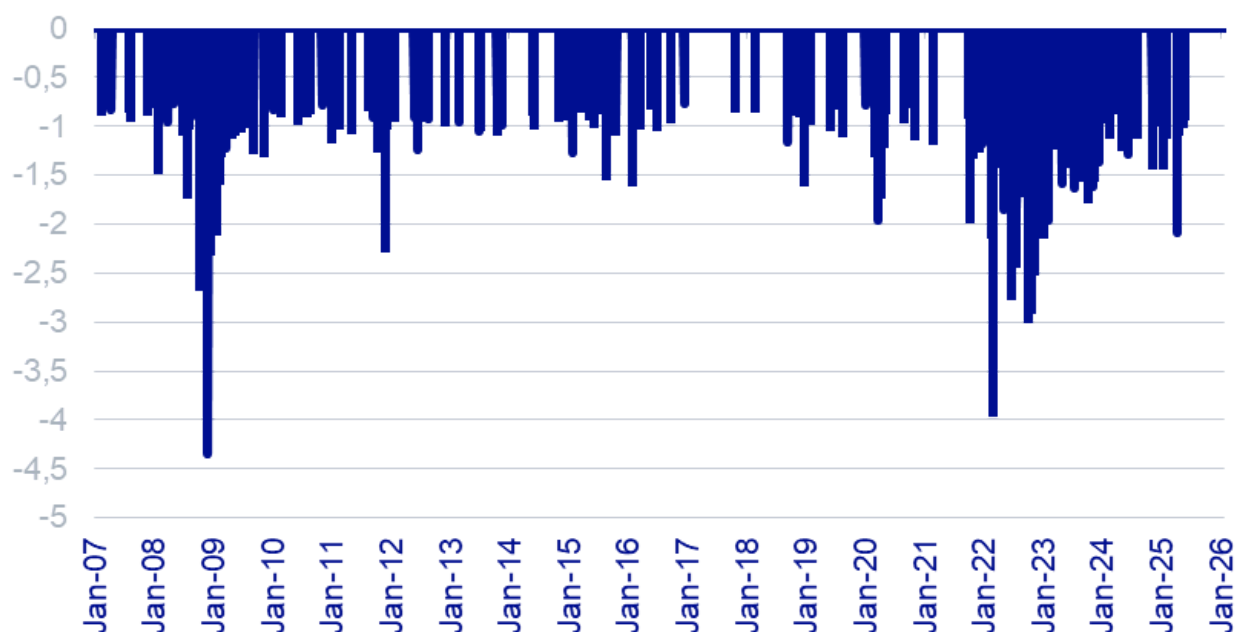
Comparing results across models

— Logit model with backstop interaction vs. without backstop:

FIGURE 3. RECESSION PROBABILITY IMPLIED BY S&P 500 ACROSS TWO MODELS
(PROBABILITY; 1 == 100%)

S&P 500 (with backstop)   S&P 500 (without backstop)
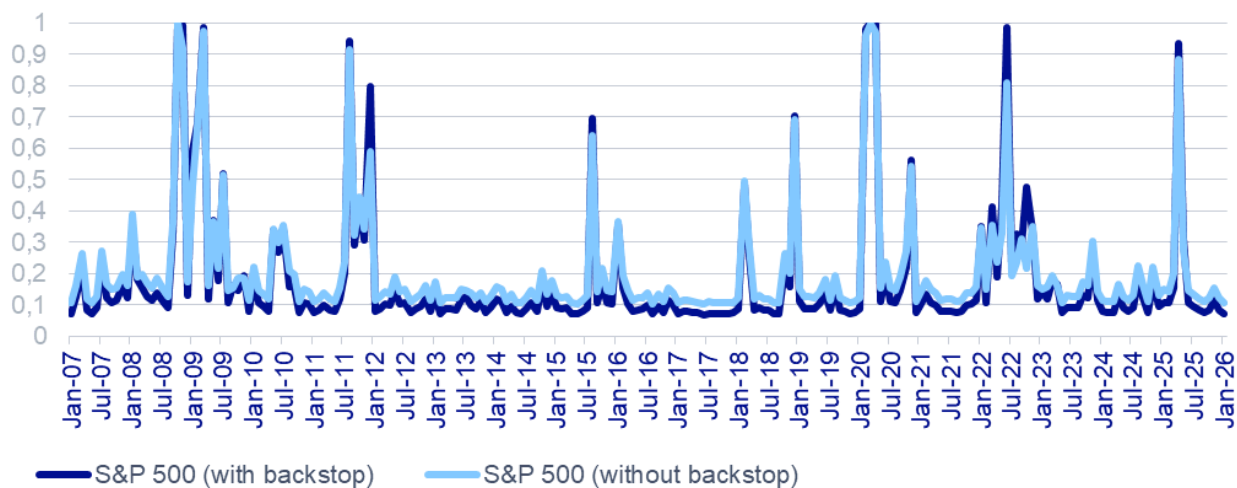
Source: BBVA Research

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Annex II: False positives

US - false alarms & policy responses

Date	Trigger that raised recession risk	Policy action that averted recession
1977–78	Growth slowdown, high inflation post energy shock	Fiscal stimulus (Carter admin) to support demand
May 1985	Tightening cycle through 1984 left financial conditions restrictive; Strong USD and softer growth raised recession risk.	Fed halted tightening: discount rate cut approved May 17, 1985 (effective May 20) from 8.0% to 7.5%, signaling a policy pivot. September Plaza Accord
Oct-1987	Market crash ("Black Monday") , dysfunction	Fed injected liquidity and readiness to backstop
1994–95	Rapid Fed hikes ("bond massacre") tightened financial conditions	Fed halted tightening → soft landing in 1995
1997–98	Asian/Russian crises; LTCM near-failure	Fed rate cuts + coordinated private bail-in of LTCM
2002	Corporate scandals (Enron/WorldCom) widened credit spreads, raised "double-dip" fears	Sarbanes-Oxley (SOX) strengthen corporate-governance reform + continued Fed accommodation; 2003 tax cuts supported growth
2003	Geopolitical shock around Iraq and lingering corporate-credit stress	Fed stayed highly accommodative; supervisory pressure for balance-sheet repair
2009–10	Post-GFC "double-dip" fears during deleveraging	Supervisory stress tests and prompted private recapitalization; QE ongoing
2011–12	Euro-area debt crisis + US debt-ceiling standoff/S&P Ratings downgrade	Dollar swap-lines & crisis facilities; strong forward guidance ("rates low until 2013"); Operation Twist
2013	"Taper tantrum" (rates spiked; EM stress)	Fed delayed taper and sharpened guidance
2015–16	RMB devaluation and capital outflows; oil price collapse; global growth scare	Fed slowed/paused hikes (long pause after Dec-2015); PBoC/China stabilization; other CBs eased → US avoided recession
2018–19	US–China trade war; curve inversion; tightening financial conditions	Fed "mid-cycle" cuts (3×25 bp) + repo operations; trade Phase One de-escalation
Mar-2023	Regional-bank turmoil (SVB/Signature); deposit flight	Systemic-risk exception, deposit backstops, BTFP (Loans to Banks) facility
Apr-2025	US tariff ("Liberation Day") & Chinese retaliation raised growth risk	Pause/postponement in tariff implementation ("Trump pause")

Source: BBVA Research

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Euro Area - false alarms & policy responses

Date	Trigger that raised recession risk	Policy action that averted recession
1994–95	Global 'bond massacre' from rate hikes; ERM/periphery tensions; euro-convergence jitters	Subsequent normalization of rates; convergence progress & fiscal discipline; FX stabilization in Europe
1997–98	Asia–Russia crisis and LTCM → credit stress and global volatility	Central bank cuts & coordination; liquidity provision; transition to the euro anchored expectations
2000	Start of the dot-com bust; ECB tightening until Oct-2000; oil rising; IT capex/inventories at peaks	Lower EU exposure to tech; intra-EU demand still solid; ECB halted hikes and provided liquidity; fiscal stabilizers
2010	Sovereign crisis (Greece 1.0); debt sustainability doubts; banking strains; fragmentation risk	EU-IMF package for Greece; creation of EFSM/EFSF; ECB SMP + extraordinary liquidity; USD swap lines with the Fed; bank stress tests; German export upcycle
2015-16	China hard-landing fears; commodity slump; limits to monetary policy	ECB QE (PSPP), TLTRO-II, CSPP, forward guidance; Juncker investment plan
2018-19	Italian budget crisis; trade war; auto sector slump (WLTP)	EU-Italy agreement; TLTRO-III (2019) & ECB portfolio reinvestments; Fed dovish pivot; stimulus in China
2022	War in Ukraine; gas shock; rationing risk; financial fragmentation	Large fiscal packages; REPowerEU & gas storage/LNG; ECB TPI + PEPP reinvestments; mild 2022/23 winter

Source: BBVA Research

Annex III: Literature Review

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