# T con Zero - Forty-second issue:

October 2020

## Value at Risk and Work in Progress

Corporate bond yields are at lower levels than in the past. Is there a danger that they reflect too-optimistic expectations and may expose investors to unexpected risks? To answer, better adopt different approaches and different perspectives.

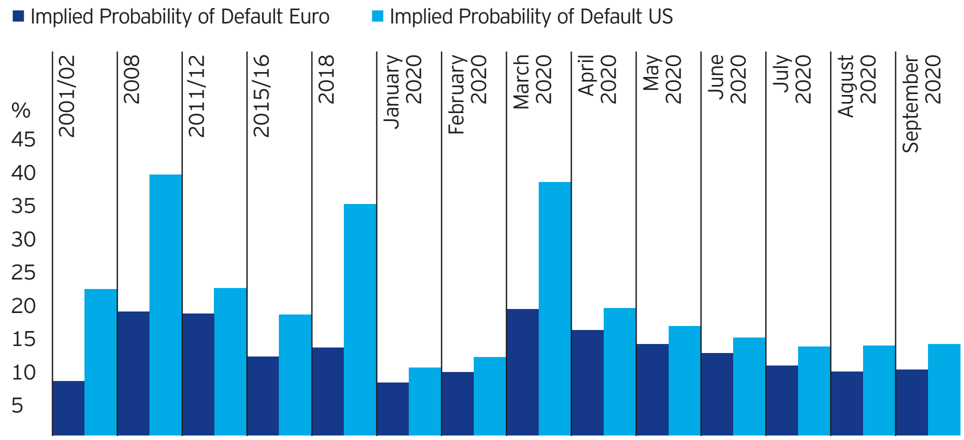
*It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.* This famous quote, dubiously attributed to the brilliant Mark Twain[1], should warn us against one of the main risks of our time and of the investment business: The fact that we have learned to estimate risk with increasingly sophisticated systems does not mean that its measurement is certain, nor that we can be sure that we can control it or avoid it.

It sounds simple, but it's a hard lesson to learn. On the other hand, measuring risk, to try to manage it the best we can, is a necessary activity for those involved in investing - anywhere. And in particular when dealing with bonds, which today offer increasingly compressed returns, it is essential to assess whether the risk/return profile of an investment opportunity is attractive or not, or suitable for customers.

Let's take corporate bonds as an important example. When their returns were more generous, some observers just looked at them. And in a world of declining sovereign returns, this was enough to attract some investors to the asset class. Then they moved to spreads. When spreads began to appear compressed, I personally tried to estimate the probabilities of default-implied spreads. In practice, over a certain period of time, I calculated the probability of default for the bonds that are part of a risky index that would make me indifferent - that is, at the end of the period would give me the same return – compared to the investment in a government bond, considered a "risk-free" asset. The higher the implied probability of default, in historical perspective, the higher the degree of skepticism embedded in valuations and prices. Today, it is still at a level close to the times of acute financial distress (compare right and left side of **chart 1).**

**Chart 1: 5-year default probability implied in investment grade corporate spreads**

Euro and US IG: 5Y probability of default implied in spreads




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 30, 2020

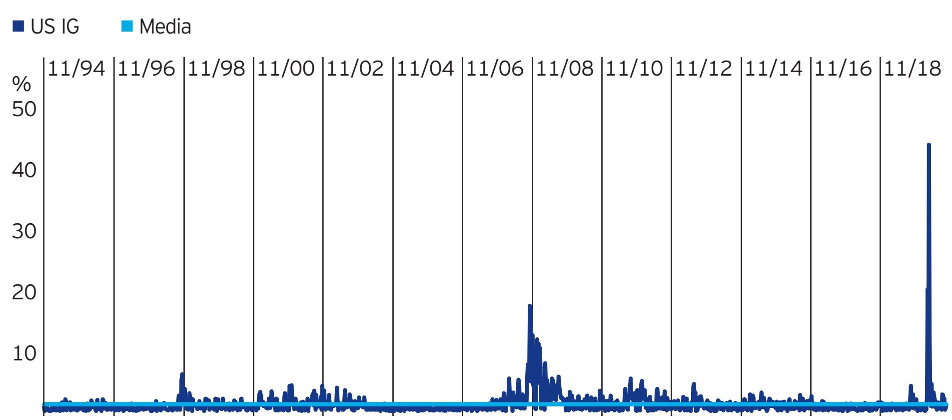
Then this analysis was enriched by the Value at Risk, known by its acronym, VaR. In short, it is a risk-estimation methodology that tells us how much we could lose over a certain time horizon with a certain level of confidence - in a statistical sense. The easiest way to think of VaR is with a positive spin. For example, a portfolio that has a VaR of -2% with a 99% confidence level over one week is a portfolio that in 99% of the weeks, statistically should return -2% or better (and conversely only in 1% of the weeks, the most unfavorable ones, should return losses of -2% or worse).

The VaR is based on a number of assumptions that do not always occur. That is why, in some circumstances, investors have suffered far greater losses than VaR proposed. An obvious example was the Great Financial Crisis, but it was not the only one. We can talk about "black swans", but it is also - perhaps above all - a paradigm for observing the world that has not been conforming to reality. It is a fascinating subject, but this is not the right time to get into it. VaR has limitations, which have emerged especially in the case of the most volatile financial assets, such as equities. Nevertheless, it is a very useful instrument, and it can complement other information we have about more relatively stable financial assets, such as bonds.

The VaR for US investment grade bonds, for example, showed a possibility of losses early in the pandemic correction, which had never occurred before, not even in the Great Financial Crisis of 2008 (**chart 2**, VaR over one week, 99% confidence level). For the riskier high yield universe, however, the peaks observed in March - April 2020 are just below those of 2008 (**chart 3**). The closer to zero the possibility of losses estimated by VaR, the lower the implied level of concern investors display.

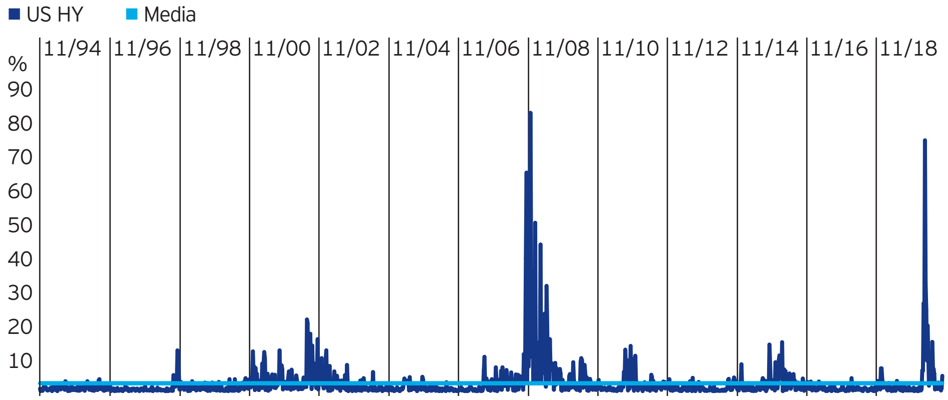
**Chart 2: Value at Risk (VaR) for ICE BofA ML Corporate Investment Grade USA Index, one week, 99%**

Value at Risk (one week, 99%) US investment grade




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

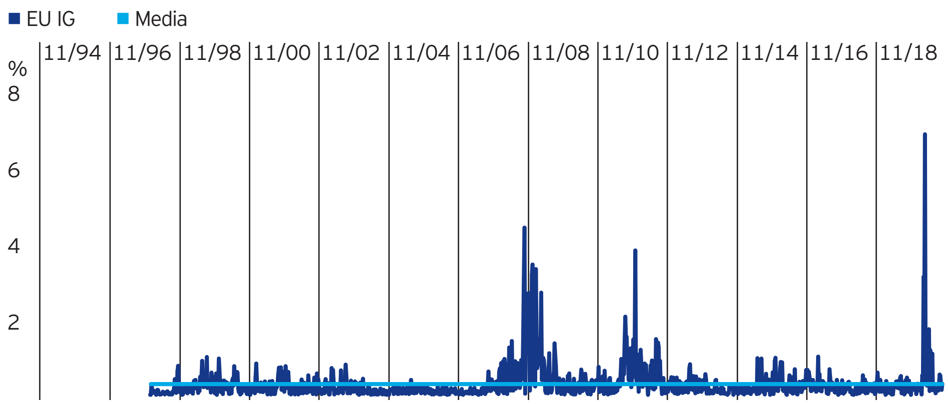
**Chart 3: Value at Risk (VaR) for ICE BofA ML Corporate High Yield USA Index**
Value at Risk (one week, 99%) US high yield




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

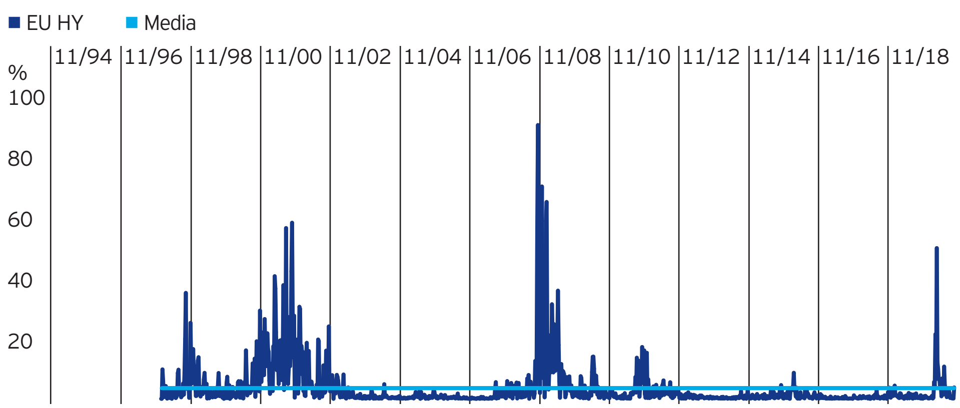
In the Euro area, the picture is similar.

**Chart 4: Value at Risk (VaR) for ICE BofA ML Corporate Investment Grade Euro Index**
Value at Risk (one week, 99%) Euro investment grade




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

**Chart 5: Value at Risk (VaR) for the ICE BofA ML Corporate High Yield Euro Index**
Value at Risk (one week, 99%) Euro high yield

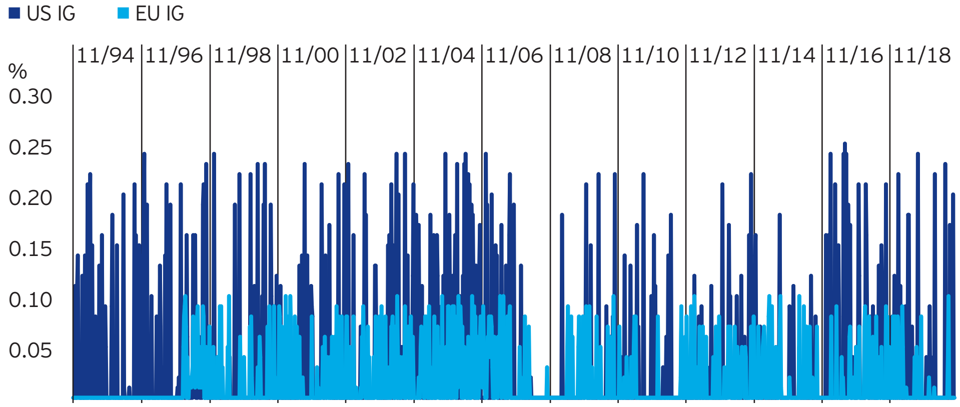



Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

If we focus on the current situation, we note that the VaR is close to zero, but still within a range in which it has historically traded most of the time over the last 26 years for corporate bonds, both investment grade (**Chart 6**) and high yield (**Chart 7**). The two charts are a zoom-in of the previous ones with a filter, and they show how long the VaR has been under a threshold one could deem "reasonably low": 0.25% for the investment grade US and 0.10% for the Euro area, and 1% for the high yield on both sides of the Atlantic. To frame these values, consider that the historical average of the VaR was 1.08% for US investment grade and 0.28% for the Euro investment grade, while for US high yield it was 2.29% and 3.49% for Euro high yield.

**Chart 6: Periods with VaR below 0.25%/0.10% for corporate investment grade**

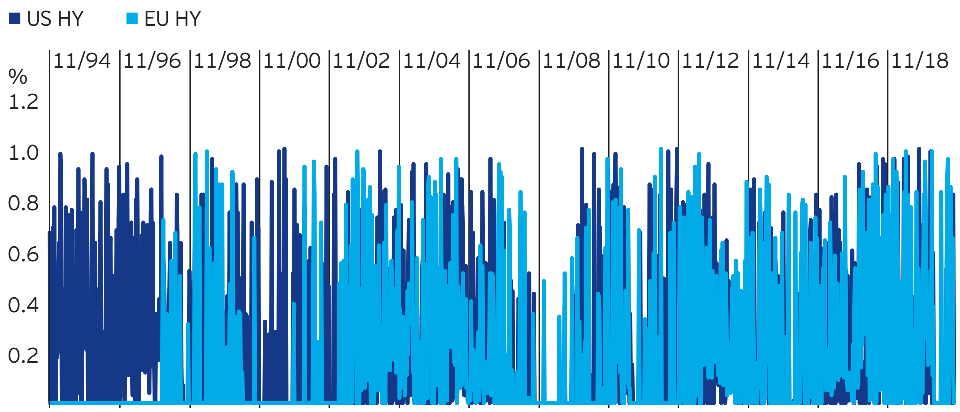
VaR of US/Euro corporate investment grade (one week, 99%) below 0.25%/0.10%, 1994-2020




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

**Chart 7: Periods with VaR below 1% for high yield corporate**

VaR of corporate Euro and US high yield (one week, 99%) below 1%, 1994-2020




Source: ICE Bofa ML, Bloomberg, author analysis. Data as at Sept. 25, 2020

This set of charts shows how the corporate bond world, despite rather compressed returns and more expensive valuations than in the past, is not discounting a level of optimism that we can consider excessive beyond doubt. It is a useful bit of information, because excess pessimism usually offers good buying opportunities, and vice versa excessive optimism, the opportunity to lighten positions. I can be proven wrong, but in my opinion, corporate bonds do not expose investors to a significant risk of excess optimism and complacency.

The methodologies to analyze markets and measure risks are constantly evolving. Hopefully we can learn from mistakes and improve and enrich our analytical tools. It is, in short, work in progress: a building site always open. We have the great advantage of not starting from scratch. We must be careful not to disperse it by confusing accurate, statistically-based, risk estimates with certainties.

**Notes and references**

1: It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so.
For attribution information: https://quoteinvestigator.com/2018/11/18/know-trouble/

2: For the calculation of the Value at Risk (VaR) we have adopted the standard formula:
$\text{VaR} = | MV \cdot Z\alpha \cdot \delta \cdot \sigma |$

where $\delta$ is the coefficient that describes the sensitivity of the change in the market value of a position with respect to the underlying risk factor, with standard deviation $\sigma$. In our case MV (Market Value) is the value of the spread between YTW Corporate and Government Performance, $Z\alpha$ is the value of the normal distribution (-2.33 for 99% -1.64% for 95%). The sensitivity coefficient is the modified duration to worst of the considered corporate index and the standard deviation is calculated on the index's weekly total return. Thanks to Daniel Zanin for his support in the analysis and calculations.

**Luca Tobagi,** CFA
Investment Strategist
Product Director

Luca Tobagi is the Investment Strategist for Italy and the Product Director of the Invesco Multi-Management Team in Paris. He is responsible for elaborating investment, strategy and market views to support the Italian business and for discussing economic and market trends with the local media, and for representing the activities of the Multi-Management Team to Italian Clients and contributing to manage the Team's investment products – as well as representing the other Invesco investment teams in front of clients.
He joined Invesco in May 2016.

Mr. Tobagi earned a major in Economics cum laude from the Luigi Bocconi University in Milano. He is a CFA charterholder since 2002.

## Important information

This article is intended only for Professional Clients and Financial Advisers in Continental Europe (as defined below); for Qualified Investors in Switzerland, Turkey and Russia; for Qualified Clients/Sophisticated Investors in Israel, for Professional Clients in Dubai, Ireland, the Isle of Man, Jersey and Guernsey, and the UK; for Institutional Investors in Australia and the US; for professional investors in Hong Kong, for Institutional Investors and/or Accredited Investors in Singapore, for certain specific sovereign wealth funds and/or Qualified Domestic Institutional Investors approved by local regulators only in the People's Republic of China, for certain specific Qualified Institutions and/or Sophisticated Investors only in Taiwan, for Qualified Professional Investors in Korea, for certain specific institutional investors in Brunei, for Qualified Institutional Investors and/or certain specific institutional investors in Thailand, for certain specific institutional investors in Indonesia and for qualified buyers in Philippines for informational purposes only.; for Qualified Institutional Investors, pension funds and distributing companies in Japan. The document is intended only for accredited investors as defined under National Instrument 45-106 in Canada. It is not intended for and should not be distributed to, or relied upon, by the public or retail investors. By accepting this document, you consent to communicate with us in English, unless you inform us otherwise.

This article is marketing material and is not intended as a recommendation to invest in any particular asset class, security or strategy. Regulatory requirements that require impartiality of investment/investment strategy recommendations are therefore not applicable nor are any prohibitions to trade before video. The information provided is for illustrative purposes only, it should not be relied upon as recommendations to buy or sell securities. For the distribution of this document, Continental Europe is defined as Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Slovenia, Slovakia, Spain and Sweden.

All articles mentioned in this article are written, unless otherwise stated, by Invesco professionals. The opinions expressed are those of the author or Invesco, are based upon current market conditions and are subject to change without notice. This article does not form part of any prospectus. This article contains general information only and does not take into account individual objectives, taxation position or financial needs. Nor does this constitute a recommendation of the suitability of any investment strategy for a particular investor. Neither Invesco Ltd. nor any of its member companies guarantee the return of capital, distribution of income or the performance of any fund or strategy. Past performance is not a guide to future returns.

This article is not an invitation to subscribe for shares in a fund nor is it to be construed as an offer to buy or sell any financial instruments. As with all investments, there are associated inherent risks. This article is by way of information only. This document has been prepared only for those persons to whom Invesco has provided it. It should not be relied upon by anyone else and you may only reproduce, circulate and use this document (or any part of it) with the consent of Invesco. Asset management services are provided by Invesco in accordance with appropriate local legislation and regulations. Certain products mentioned are available via other affiliated entities. Not all products are available in all jurisdictions.

**Israel:**
This document may not be reproduced or used for any other purpose, nor be furnished to any other person other than those to whom copies have been sent. Nothing in this document should be considered investment advice or investment marketing as defined in the Regulation of Investment Advice, Investment Marketing and Portfolio Management Law, 1995 ("the Investment Advice Law"). Investors are encouraged to seek competent investment advice from a locally licensed investment advisor prior to making any investment. Neither Invesco Ltd. nor its subsidiaries are licensed under the Investment Advice Law, nor does it carry the insurance as required of a licensee thereunder.

This article is issued:
- in **Australia** by Invesco Australia Limited (ABN 48 001 693 232), Level 26, 333 Collins Street, Melbourne, Victoria, 3000, Australia which holds an Australian Financial Services Licence number 239916.
- This document has been prepared only for those persons to whom Invesco has provided it. It should not be relied upon by anyone else. Information contained in this document may not have been prepared or tailored for an Australian audience and does not constitute an offer of a financial product in Australia. You may only reproduce, circulate and use this document (or any part of it) with the consent of Invesco.
- You should note that this information:
  - may contain references to dollar amounts which are not Australian dollars;
  - may contain financial information which is not prepared in accordance with Australian law or practices;
  - may not address risks associated with investment in foreign currency denominated investments; and
  - does not address Australian tax issues.
- in **Austria** and **Germany** by Invesco Asset Management Deutschland GmbH, An der Welle 5, 60322 Frankfurt am Main, Germany.
- in **Belgium, Denmark, Finland, France, Greece, Italy, Luxembourg, Netherlands, Norway, Spain** and **Sweden** by Invesco Management S.A., President Building, 37A Avenue JF Kennedy, L-1855 Luxembourg, regulated by the Commission de Surveillance du Secteur Financier, Luxembourg.
- in **Canada** by Invesco Canada Ltd., 5140 Yonge Street, Suite 800, Toronto, Ontario, M2N 6X7.
- in **Dubai, Jersey, Guernsey, Ireland, the Isle of Man, Israel** and the **UK** by Invesco Asset Management Limited, Perpetual Park, Perpetual Park Drive, Henley-on-Thames, Oxfordshire, RG9 1HH, United Kingdom. Authorised and regulated by the Financial Conduct Authority.
- in **Hong Kong** by INVESCO HONG KONG LIMITED 景順投資管理有限公司, 41/F, Champion Tower, Three Garden Road, Central, Hong Kong.
- in **Japan** by Invesco Asset Management (Japan) Limited, Roppongi Hills Mori Tower 14F, 6-10-1 Roppongi, Minato-ku, Tokyo 106-6114; Registration Number: The Director-General of Kanto Local Finance Bureau (*Kin–sho*) 306; Member of the Investment Trusts Association, Japan and the Japan Investment Advisers Association.
- in **Singapore** by Invesco Asset Management Singapore Ltd, 9 Raffles Place, #18-01 Republic Plaza, Singapore 048619.
- in **Switzerland** by Invesco Asset Management (Schweiz) AG, Talacker 34, 8001 Zurich, Switzerland.
- in **Taiwan** by Invesco Taiwan Limited, 22F, No.1, Songzhi Road, Taipei 11047, Taiwan (0800-045-066). **Invesco Taiwan Limited is operated and managed independently.**
- in the **US** by Invesco Advisers, Inc., Two Peachtree Pointe, 1555 Peachtree Street, N.E., Suite 1800, Atlanta, GA 30309.

Data as at 30 September 2020, unless otherwise stated.

**www.invesco.com**