Title of the workshop

SUPTECH WORKSHOP II. AI, Robo Advisory and Market Risk

Venue

National Securities Market Commission (CMNV), C/ Edison, 28006 Madrid (Spain)

Date

December 2, 2019.

Hosting university

Complutense University of Madrid

Regulator/supervisor

National Securities Market Commission (CMNV)

The speakers

1) Javier Arroyo Gallardo
2) Miller Janny Ariza Garzón

Number of participants

17

The main topics:

The two cases presented and discussed are associated with the measurement of sovereign risk in the countries of the European Union in the time window from 2008 to 2018:

Case 1: Convergence and Divergence in European Bond Correlations

Case 2: Sovereign risk zones in Europe during and after the debt crisis

The main topics discussed were:

1) Measurement of sovereign risk

2) Measurement and dynamics of sovereign risk contagion. Dependency profiles.

3) Determinants, dynamics and management of sovereign risk (contagion, political and macroeconomic factors)

The main results

1) The regulator agreed with the use of bond spreads at 10yr or bond CDS spreads at 5yr versus bund, as indicators of sovereign risk and confidence. For the latter, they suggest to interpret them with caution as they postulate a deterioration in their liquidity. However, according to the authors, liquidity is not an issue, since the data correspond to quotes generated by bond market makers (i.e., banks that continuously quote these bonds). Therefore, the correlations that are extracted with the model reflect the parameters of the factor model that these banks use for quoting. In this sense, they show the "correlation sentiment", i.e. the market makers' view of the correlations.
2) The regulator were satisfied on how "contagion" is measured, considering it to be novel and elegant proposals, either with correlation influence in the first case, or through Kendall tau, copulas, and Bayesian statistics in the second. They carry out similar exercises, but mostly with the well-known correlation coefficient.

They value positively the fact that the time structure has been incorporated into the measurement of "contagion" or dependence on the indicators of sovereign risk through:

- Analyzing the dynamics of measurement at various moments in time, incorporating stationary bootstrap methodologies and almost inferential elements, in the first case.
- And through a more robust estimation method that recognizes the structural change of the probabilistic behaviour of the variables and the underlying model, obtaining indicators of contagion for each temporal instant, in the second case.

Concerning the concept of contagion, they believe that there is a lack of clarity about its meaning. It is used as a synonym of terms such as spillover, correlation, convergence, among others. Thus, it demands a more detailed definition, establishing common elements, differences, limitations, and even conceptualizations that contemplate temporary causality.

In the two cases analyzed, they suggest that the number of lags used is very short. In the first case, the correlation is instantaneous. In the second case, a delay is observed, so they suggest the use of longer lags since in the face of many phenomena and variables, the effects may take longer to manifest.

3) Regarding the analysis of the results of case 1, the difficulty of being able to use this type of analysis for preventive purposes is mentioned by the regulators. Each political event is different, and it is difficult to predict its impact. Nevertheless, they consider useful that this tool can validate, describe and explain the dynamics of risk indicators empirically in the face of particular political phenomena.

According to the authors, in general, the proposal presents predictive capacity, since negative correlations are a warning signal, showing, for example, that market makers prepare the settings of their quotation models expecting a worsening of the sovereign credit of the European periphery. The networks, therefore, show the risk perception of the most active market participants (the banks offering the tightest supply and demand spreads). Moreover, as investors act slower than market makers, correlation networks can have some predictive power.

4) The second case is considered more useful by the regulators; they like to have a model that allows them to identify the paths and profiles that establish risk zones based on measures of contagion and some macroeconomic indicators. They point out that, although it is intuitive and almost natural to recognize the debt/GDP and the unemployment rate as determinants, they value having thresholds that determine changes in the state of risk levels over time.

The regulators support one of the conclusions of this second case. They consider that it is not surprising that markets will overreact to crises, which translates into almost instantaneous contagion, while macroeconomic factors take some time to deteriorate. The importance of each of these factors as determinants of risk indicators has differential lagging effects.

New insights and main takeaways

The regulators suggest complementing and comparing the analysis of the first case with the theory of econometric event analysis. And the second case with the theory of models of contagion.

In the first case, they consider that if the segmentation of historical political events is possible, which can subsequently be associated with differential dependency structures, then it would be possible to develop tools that would help to manage sovereign risk.

For events that correspond to countries' positions that are far from orthodox, affecting the convergence criteria and weakening the EU community, it is challenging to establish preventive measures. Although an increase in spreads is expected every time events of this nature occur, the estimate of the impact generated is not trivial. Perhaps, and this should be measured, the aggregation of this type of event, controlled by another series of variables, makes it possible to generate dependency and risk profiles, and why not, impact estimates on the indicators of sovereign risk.

In turn, they consider that there is another series of clearly determining events that have not been analyzed in detail. Such is the case, for example, of the "Whatever it takes" statement issued by the president of the European Central Bank seven years ago, whose position clearly defines a stand as a community that defends and consolidates the Euro as one of the relevant economic forces of the planet. Such statements could be gathered and studied to assess the impact on the bond market, its derivatives and risk indicators.

The regulator has carried out exercises with macroeconomic indicators, obtaining similar dynamics in the segmentation; countries of the core, strong financially and economically, and countries of the periphery, dependent in lag of the countries of the centre and with negative contagion in the short term in front of the events of the countries of the same segment. In this regard, they suggest combining dependency measures and macroeconomic indicators to assess whether segmentations are generated that are not obtained by analyzing each of these components individually.

In the second case, it is recognized that a higher proportion of the macroeconomic policy mix can be used to improve investor confidence, improve indicators, and achieve development and financial stability. The contagion and dependence structure of other markets play an essential role, but a sustainable structural plan mitigates their impact.

They also highlight the weakness of peripheral countries in technological development and innovation indicators (R+D+I), reducing the set of economic alternatives and strategies that promote sustainability, competition and development in these countries, and they, therefore, consider that this component should be taken into account in risk models.

Further remarks

It is important to note that in the regulators there seems to be a reasonable quantitative level, without knowing in detail the methodologies, they understand in general their contributions and results, allowing them to compare with what they do in their daily work, make criticisms of what is presented and propose new elements for future research.

Annex. Event photo