Using EMIR data for macroprudential analysis

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Brief Description

G20 leaders pledged at the Pittsburgh summit in September 2009 to reform OTC derivatives markets to improve their transparency, prevent market abuse and reduce systemic risks.

The European response to this commitment is the European Market Infrastructure Regulation (EMIR) that entered into force in 2012.

EMIR imposes several requirements on entities that enter derivative contracts, such as the implementation of risk management standards, clearing of certain classes of derivatives through central counterparties (CCPs) and extensive reporting obligation.

In line with EMIR, daily, granular information on derivative contracts has to be reported to dedicated trade repositories (TRs), which are then obliged to share relevant subsets of this information with more than 100 authorities in the EU, including the ECB.

Since the beginning of the reporting obligation in 2014, the EMIR data have proven instrumental in carrying out various ECB tasks.
However, users still face challenges that prevent them from fully exploiting the dataset, due to the mixed data quality of the information reported, the complexity of underlying contracts, and the quickly evolving derivative product landscape.

While the robustness of EMIR reporting has improved significantly since its inception in 2014, thanks to the combined efforts of regulators, TRs and market participants, reporting errors are still a material barrier for analysts working with these data.
In large-scale datasets such as EMIR conventional data quality approaches are not applicable.

Data science techniques instead can provide the tools to develop algorithms for detecting data quality issues and addressing them in a timely manner.

In this spirit, the ECB has designed and implemented a solution to automatically detect, log, and interpret the developments in granular datasets, with a direct application to EMIR.

On top of that, we developed a set of in-depth cleaning procedures, specific for EMIR data, aimed at producing a ready-to-use dataset for systemic risk identification.
Thanks to this cleaned dataset, the ECB is able to analyse euro area derivatives markets, identify risks to financial stability and draw relevant policy conclusions.

For instance, during the 2020 Covid-19 market turmoil, information on margins reported in EMIR has proved fundamental to understand the liquidity stress derivatives' users were facing and how it was spilling-over to other entities .

More recently, EMIR data was used to closely follow the developments in the energy derivatives markets and gauge the risks that prolonged high volatility in these markets could pose to financial stability.

This paper describes the data science tools and techniques that are used at the ECB to ensure that the granular EMIR information can be used in an efficient way to conduct systemic risk analysis.

It also presents some key examples of how EMIR data has been used in the broader context of macroprudential analysis, using the abovementioned solutions.

The examples provided demonstrate the need for further work on the application of data science tools to granular largescale datasets of financial data.

The application of such techniques would lead to a more efficient and widespread use of these precious sources of information among regulators.

Abstract

G20 leaders pledged at the Pittsburgh summit in September 2009 to reform OTC derivatives markets to improve their transparency, prevent market abuse and reduce systemic risks. The European response to this commitment is the European Market Infrastructure Regulation (EMIR) that entered into force in 2012. EMIR imposes several requirements on entities that enter derivative contracts, such as the implementation of risk management standards, clearing of certain classes of derivatives through central counterparties (CCPs) and extensive reporting obligation.
In line with EMIR, daily, granular information on derivative contracts has to be reported to dedicated trade repositories (TRs), which are then obliged to share relevant subsets of this information with more than 100 authorities in the EU, including the ECB. Since the beginning of the reporting obligation in 2014, the EMIR data have proven instrumental in carrying out various ECB tasks.
However, users still face challenges that prevent them from fully exploiting the dataset, due to the mixed data quality of the information reported, the complexity of underlying contracts, and the quickly evolving derivative product landscape. While the robustness of EMIR reporting has improved significantly since its inception in 2014, thanks to the combined efforts of regulators, TRs and market participants, reporting errors are still a material barrier for analysts working with these data.
In large-scale datasets such as EMIR conventional data quality approaches are not applicable. Data science techniques instead can provide the tools to develop algorithms for detecting data quality issues and addressing them in a timely manner. In this spirit, the ECB has designed and implemented a solution to automatically detect, log, and interpret the developments in granular datasets, with a direct application to EMIR. On top of that, we developed a set of in-depth cleaning procedures, specific for EMIR data, aimed at producing a ready-to-use dataset for systemic risk identification.
Thanks to this cleaned dataset, the ECB is able to analyse euro area derivatives markets, identify risks to financial stability and draw relevant policy conclusions. For instance, during the 2020 Covid-19 market turmoil, information on margins reported in EMIR has proved fundamental to understand the liquidity stress derivatives' users were facing and how it was spilling-over to other entities . More recently, EMIR data was used to closely follow the developments in the energy derivatives markets and gauge the risks that prolonged high volatility in these markets could pose to financial stability.
This paper describes the data science tools and techniques that are used at the ECB to ensure that the granular EMIR information can be used in an efficient way to conduct systemic risk analysis. It also presents some key examples of how EMIR data has been used in the broader context of macroprudential analysis, using the abovementioned solutions. The examples provided demonstrate the need for further work on the application of data science tools to granular largescale datasets of financial data. The application of such techniques would lead to a more efficient and widespread use of these precious sources of information among regulators.