

The issue of contagion and a spillover among stock markets was especially important during the subprime mortgage crisis of 2007-2009 and during the Euro Area sovereign debt crisis in 2010-2013. The stock markets in the CEE-3 countries were hit dramatically by negative tendencies in the global financial markets. As a result of the global financial crisis of 2007-2013, institutional investors withdrew almost all their investments from the emerging markets. Facing bankruptcy, those institutional investors moved to liquidate most of their stocks, bonds and currencies from the CEE-3 and other emerging markets and invested instead in safer assets such as US government bonds or German bonds. As a result, the stock markets in Poland, the Czech Republic and Hungary went under substantial pressure because of the massive capital flight.

The main objective of this research is the analysis of co-movements of stock markets in different phases of the business cycle. It is interesting to compare the strengths of relationships in the tranquil period before the global financial crisis, during the subprime crisis in the US, during the Euro Area sovereign debt crisis and in the period of global economic recovery in the recent years.

In the next part of the research project, I will try to identify potential macroeconomic and political factors that could explain the time-varying nature of the estimated variances and correlation coefficients, contributing to the existing knowledge by further examining this issue for the CEE-3 stock markets.

It is also useful to find directions of spillovers in the group of the CEE-3 countries and identify factors which determine the co-exceedance (an extremely negative situation in both markets from the pair of 2 out of the CEE-3 countries) and the fact that an extremely negative situation in one country is not followed by one in another. The strength of contagion is measured as the fraction of co-exceedance of extreme negative returns that are not explained by the covariates included in the model. Isolated exceedance in the turbulent period (exceedance in one market and lack of exceedance in the other one) means that one of the two stock markets in a transition country is more resistant to global shocks than the other one. It is interesting to check whether and to what extent the difference in macroeconomic fundamentals makes one country less resistant to global shocks. Answering this question is especially important since there was a substantial difference in a state of macroeconomic fundamentals in Poland, the Czech Republic and Hungary during the crisis period. While Hungary was hit hardest by the crisis, faced severe economic and financial problems, had a huge current account deficit, was forced to rise its basic interest rate in order to prevent the depreciation of its currency, Poland, as the only country in the European Union, avoided recession.

In this research project, a contribution of each sector to the whole risk of the stock market (so-called "contribution scheme") will be identified. These calculations will be done for stock markets in the CEE-3 countries and in developed ones. The distributions of contributions across sectors in the CEE-3 countries will be evaluated and compared with developed stock markets.

In this research project the following analyses will be conducted:

- 1) The parameters of the VAR-GARCH-BEKK model will be estimated in order to evaluate linkages between rates of return, shocks and volatilities. Implied volatilities and implied correlation coefficients between shocks will be derived.
- 2) The Diebold-Yilmaz Volatility Spillover Index will be calculated and the methodology proposed by Diebold and Yilmaz (2012) will be used in order to evaluate the strength of the volatility spillover mechanism in different phases of the global financial crisis. Shocks givers and receivers will be identified and the direction of the volatility spillover for each pair of countries will be evaluated.
- 5) Parameters of the model explaining probabilities of co-exceedances and isolated exceedances will be estimated. Results for different pairs out of the CEE-3 countries will be compared.
- 6) Parameters of models explaining the strength of the volatility spillover mechanism and explaining directions of volatility spillovers will be estimated.
- 7) Contributions of different sectors to market risk will be calculated for all the countries under consideration using the Component Expected Shortfall approach. "Contribution schemes" for different countries will be compared, similarities in contribution schemes between countries will be found and the impact of "contribution schemes" on the level of sensitivity to global shocks will be evaluated.