Inflation is one of the core macroeconomic variables. It is determined by spectrum of factors, both internal and external for the economy. Inflationary processes are sensitive to both supply-side and demand-side shocks as well as instabilities occurring in the financial markets (e.g. the COVID-19 pandemic, disturbances in the oil markets).

Understanding how prices respond to disruptions is of key importance for any small open economy, in particular exposed for structural changes. Poland is an example of such country. The coronavirus pandemic resulted in supply and demand shocks influencing significantly many economies and leading to disruption of economic mechanisms. It means that modelling inflation in the period of COVID-19 pandemic should take into account the size of instabilities in different periods. The growing global economic integration increases the exposition of the Polish economy on global shocks.

The main empirical aim of the project is to analyse relationships among economic categories in Poland during the years 1999-2021 with the special emphasis on the changing role of oil and oil refining products prices. Proper quantification of these phenomena calls for appropriate development of cointegrated VAR models with structural changes and nonlinear long-run relationships. These methods enable modelling (macroeconomic) time series generated by nonstationary stochastic processes. However, appropriate modelling of economic relationships in different periods (e.g. tranquil period, global financial crisis, COVID-19 pandemic) requires the use of methodology taking into account structural breaks which are a relatively common problem, especially in empirical studies on transforming economies.

The oil sector turned out to be particularly affected due to a sharp fall in demand for crude oil and oil refining products followed by a significant drop of crude oil prices at the global markets. As a result, inflation dropped in 2020. Due to fiscal and monetary stimulus packages in 2021 the situation is reversed. Crude oil prices have returned to pre-pandemic levels, causing an increase of input costs and consequently cost-push inflation. It shall be stressed that such profound economic changes usually have taken long periods of time, whereas now they are abrupt. Moreover, these shocks are affecting many sectors of the economies and different economies simultaneously. Therefore, they will very likely last long in economic systems.

Summarising, there are three main effects of the project. Firstly, inflation model, which allows for structural breaks and nonlinearity. Secondly, the project entail the development of econometric methods, i.e. cointegrated vector autoregressive model (CVAR) with nonlinear asymmetric adjustments and structural breaks. The additional effects concern the codes in Matlab for estimating and testing the expanded CVAR models.