PROJECT DESCRIPTION FOR THE GENERAL PUBLIC (by Andrzej Torój, Piotr Dybka)

Macroeconometric measurement of shadow economy: theory, precision, international comparisons

Issues related to tax evasion have long attracted the attention of economists, policymakers and the general public. Deliberate underreporting of the value of earned income by economic agents, known as the shadow economy, deteriorates the condition of the public finance.

Although the shadow economy should be included in the GDP estimates, many statistical offices do not provide such estimates at all, or publish them only at an aggregate level, computed with incomparable methodologies and often with a substantial time lag. This poses a challenge to both academic inference and policymaking. For this reason, economists have been developing methods of shadow economy measurement for years, but it is far from straightforward by the nature of the phenomenon: both unobservable and giving rise to strategic behaviour of survey participants. Taking additionally into account a non-negligible cost of surveys, the macroeconometric approach that consists in searching for patterns in publicly available, regularly published socio-economic data appears to be the most suitable for the current monitoring of the shadow economy size.

The most popular methods in this strand, such as MIMIC-type models, are only capable of indicating trends, but not the level. In our previous research, we have therefore focused on the level identification, developing a hybrid MIMIC-CDA which solved the problem through a fusion of two leading approaches in the literature. We have also determined the impact of the variable selection in the model on the obtained shadow economy estimates for 64 countries, which allowed us to determine the optimal set of shadow economy determinants and to quantify the model uncertainty.

Nevertheless, determining the point estimates from two selected, relatively atheoretical specifications is not sufficient to fully understand the shadow economy phenomenon and meaningfully support the economic policy focused on combating this phenomenon. Therefore, our further research aims to extend the shadow economy measurement methodology in three dimensions, corresponding to the following questions:

1. **What is the impact of particular types of determinants (e.g. institutional and technological factors, complexity of the tax system) of the shadow economy on its level in the analyzed countries?** Thanks to the answer to this question, we can determine what aspects policy-makers dealing with combating the shadow economy in a given country should focus on.
2. **Is it possible to increase the role of economic theory in shadow economy models so as to increase the credibility of measurement?** Our goal is to validate the approaches based on general equilibrium modelling, encountered in the literature, both deterministic (DGE) and stochastic (DSGE) in terms of sensitivity to the identification schemes applied, parameter values and other assumptions. We further intend to propose a new set of assumptions (on how to specify a model, which parameters to calibrate and which variables to mark as observable) to measurement models of DSGE type that are more robust to technical vulnerabilities.
3. **What is the level of precision of the obtained shadow economy estimates?** Analyzing the obtained for the same countries and periods (sometimes also by the same authors) over the years, one can observe very large discrepancies in the measurements of the shadow economy, which emphasizes the importance of the problem of assessing the quality of the estimates and the need for reporting adequate measurement errors. Therefore, we propose using the Bayesian approach as a natural framework to (i) combine theoretical considerations with empirics and (ii) measure the level of uncertainty stemming from multiple sources, in this case: synthesizing the model uncertainty and the statistical uncertainty of parameter estimation into a single confidence interval around point estimates of the shadow economy size.

We expect that the research project will allow for a better understanding of the mechanisms behind the shadow economy, leading to the improvement of economic policy, which the public finance will eventually be able to benefit from.