MEASURING UNOBSERVED ECONOMY THROUGH ELECTRICITY DEMAND

[Amedeo Argentiero, University of Perugia, Department of Economics, (+39) 075-5855293, amedeo.argentiero@unipg.it]
[Simona Bigerna, University of Perugia, Department of Economics, (+39) 075-5855298, simona.bigerna@unipg.it]
[Carlo Andrea Bollino, University of Perugia, Department of Economics, (+39) 075-5855421, carloandrea.bollino@unipg.it]
[Maria Chiara D'Errico, University of Perugia, Department of Economics, (+39) 075-5855057, mariachiara.derrico@unipg.it]
[Silvia Micheli, University of Perugia, Department of Economics, (+39) 075-5855208, silvia.micheli@unipg.it]
[Paolo Polinori, University of Perugia, Department of Economics, (+39) 075-5855002, paolo.polinori@unipg.it]

Overview

Recent research on unobserved economy highlights that the phenomenon is increasing worldwide, thus having important implications for macroeconomic policy. Obtaining information about countries' magnitude of the unobserved economy is crucial for making effective economic policy decisions. Our paper measures the size and development of unobserved economy in Italy using the electricity consumption method. We apply this method to a panel of 103 Italian provinces (NUTS-3 level) for the years 2004-2012. Empirical results show an increasing trend of the size of the unobserved economy, it still has an important weight on the official gross domestic product in Italy.

Methods

The electricity consumption approach uses electric-power consumption as physical indicator of overall economic activity (official + unofficial); electricity consumption to GDP elasticity is usually close to one and this means that the growth of total electricity consumption is an indicator for growth of overall GDP. The estimation strategy is based on a fixed effect panel model, whose fixed effects are the provinces, after deriving the optimal energy demand under the perfect competition hypothesis from a standard Cobb-Douglas production function. As for currency demand approach (see e.g. Cagan, 1958; Tanzi, 1983; Schneider and Enste, 2000; Ardizzi et al., 2014), electricity consumption is built as a function of variables linked to the official economy and determinants of unobserved economy. By setting to zero the coefficients of the determinants of unobserved economy, a measure of **regular** electricity demand is obtained. By setting to zero the coefficients of the determinants of official economy, a measure of **irregular** electricity demand is obtained. The corresponding GDPs (regular and irregular) are derived through the Cobb-Douglas production function from which electricity demand has been previously derived.

Results

The determinants of regular and irregular energy demand are both significant and with the expected signs. By introducing the determinants of the unobserved economy in a standard energy demand function, the prediction gets closer to the empirical value.

Conclusions

According to the electricity demand approach, the share of unobserved economy in Italy is around 30%, consistently with Ardizzi et al. (2014) and Argentiero and Bollino (2015), but higher than ISTAT estimates. In order to improve our results, we aim at undertaking a further robustness analysis by using other econometric estimators and splitting unobserved economy into underground and criminal components.

References

Ardizzi, G., Petraglia, C., Piacenza, M., & Turati, G. (2014). Measuring the Underground Economy with the Currency Demand Approach: A Reinterpretation of the Methodology, With an Application to I taly. *Review of Income and Wealth*, *60*(4), 747-772.

Argentiero, A., & Bollino, C. A. (2015). Uncovering unobserved economy: A general equilibrium characterization. *Metroeconomica*, *66*(2), 306-338.

Cagan, P. (1958). The demand for currency relative to the total money supply. *Journal of political economy*, *66*(4), 303-328.

Schneider, F., & Enste, D. H. (2000). Shadow economies: size, causes, and consequences. *Journal of economic literature*, *38*(1), 77-114.

Tanzi, V. (1983). The underground economy in the United States: annual estimates, 1930-80. *Staff Papers*, *30*(2), 283-305.