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## Revisiting the relationship between unemployment rates and shadow economy. A Toda-Yamamoto approach for the case of Romania

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### Abstract

Shadow economy(SE) is a controversial topic that has aroused the interest of the specialists from the 60's, when the phenomenon took a great extent. Formed in the literature under various names, the shadow economy exists in a more or less extent in all countries, regardless of their level of development, enjoying an enduring existence, although as area of research is a new "young" area.

The paper aims to investigate the relationship between the size of the shadow economy (SE) and the registered and ILO unemployment rates for the case of Romanian data using Toda-Yamamoto approach for quarterly data covering the period 2000-2010.

The size of the Romanian shadow economy based on the currency demand approach was estimated using multivariate cointegration and vector error correction models (VECM) in order to investigate whether a long-run equilibrium relationship exists between currency demand and its determinants.

In order to investigate the relationship between the unemployment rates and the size of the shadow economy for the case of Romania we use an innovative econometric methodology to study the direction of causality between the two variables, namely Toda and Yamamoto (1995).

According to Giles and Tedds(2002), two opposing forces determine the relationship between unemployment and the informal economy. On the one hand, an increase in the unemployment rate may involve a decrease in the informal economy because it is positively related to the growth rate of GDP and eventually negatively correlated with unemployment (Okun's law). On the other hand, increase in unemployment leads to an increase in people working in the informal economy because they have more time for such activities.

Dell'Anno and Solomon (2007) stated that there is a positive relationship in the short-run between unemployment rate and U.S. shadow economy for the period 1970-2004. Using SVAR analysis, they investigate the response of the shadow economy to an aggregate supply shock (impact of the shadow economy to a temporary shock in unemployment). The empirical results show that in the short-run, a positive aggregate supply shock causes the shadow economy to rise by about 8% above the baseline.

According to the Toda-Yamamoto causality test results, there is strong evidence of causality running from the registered and

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ILO unemployment rates to the shadow economy when a sufficiently high lag order is selected.

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## 1. Introduction

The relationship between the shadow economy (SE) and the level of unemployment is one of major interest. People work in the shadow economy because of the increased cost that firms in the formal sector have to pay to hire a worker. The increased cost comes from the tax burden and government regulations on economic activities. In discussing the growth of the shadow economy, the empirical evidence suggests two important factors: (a) reduction in official working hours, (b) the influence of the unemployment rate (UR).

Enste(2003) points out that the reduction of the number of working hours below worker's preferences raises the quantity of hours worked in the shadow economy. Early retirement also increases the quantity of hours worked in the shadow economy.

In Italy, Bertola and Garibaldi(2003) present the case that an increase in payroll taxation can have effect on the supply of labour and the size of the shadow economy. An increase in tax and social security burdens not only reduces official employment but tends to increase the shadow labour force. This is because an increase in payroll tax can influence the decision to participate in official employment.

Also, Boeri and Garibaldi(2002) show a strong positive correlation between average unemployment rate and average shadow employment across 20 Italian regions during the period 1995-1999.

Dell'Anno and Solomon(2007) find a positive relationship between unemployment rate and shadow economy using a SVAR analysis, showing that a positive aggregate supply shock will cause an increase in the shadow economy by about 8% above the baseline.

The paper analyzes the causal relationship between shadow economy and unemployment rates using Toda-Yamamoto approach.

## 2. Data and methodology

### 2.1. Data issues

The data used in the research covers the period 2000:Q1- 2010Q2. The variables used are as follows: the size of the Romanian shadow economy expressed as % of official GDP (SE) obtained by currency demand approach; ILO unemployment rate (ILO\_UR) and registered unemployment rate (R\_UR). The unemployment rates were seasonally by means of tramo seats method. The main source of the data for unemployment rates is the National Institute of Statistics (Tempo database) and the National Bank of Romania.

### 2.2. Methodology

The size of Romanian shadow economy was estimated using one of the most commonly used indirect methods proposed by Cagan and Tanzi's that assumes that shadow (or hidden) transactions are undertaken in the form of cash payments, so as to leave no observable traces for the authorities. An increase in the size of the shadow economy will therefore increase the demand for currency. To isolate the resulting „excess” demand for currency, an equation for currency demand is econometrically estimated over time:

$$C_0 = A \cdot (1 + \Theta)^\alpha \cdot Y_0^\beta \cdot \exp(-\gamma i) \quad (1)$$

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