**SOME ALTERNATIVE ESTIMATES OF UNDERGROUND ECONOMIES IN 12 NEW EU MEMBER STATES**

Claudio Quintano (*) and Paolo Mazzocchi (**)

**Abstract**

This paper looks over alternative estimates of Non-Observed Economy (NOE) in 12 new European Union *Candidate* Countries (CCs) during the transition period by exploring the reliability of the Gross Domestic Product (GDP) figures. In the last years the kindness about NOE had a remarkable development and the Authors analyze several methodologies applied in many Countries performing the Eurostat (2005) *Pilot Projects on the Exhaustiveness (*PPE); afterwards, within the different methods of measuring the shadow economy, the Authors examine the relationship between some economic aggregates for estimating the size and growth of the unrecorder sector using the *Latent Variable Method*, in order to validate the official data, if available, to quantify the NOE phenomenon.

Empirical results obtained using this different estimation method reveal not the same convergence than the National Statistical Office' experiences, which include varying degrees of lack of coverage due the type of the underground economic activities.

**JEL Classifications**: **O17, E26, H26**

## 1. Introduction

The phenomenon of the *Non-Observed Economy (*NOE*),* in the sense of the groups of activities that not are directly being observed and measured (the following activities are included: *underground production*; *informal activities* -including those undertaken by *households for their own final use*; *illegal activities* and the related *statistical* estimation problems), has attracted considerable concern from policymakers and economists, but to obtain uncontroversial estimates of its size has proven a difficult and challenging task.

The complete coverage of economic production is important in order to ensure good quality in National Accounts (NA) and exhaustive estimates of the Gross Domestic Product (GDP).

Moving from the most outstanding publications concerning the NOE this paper suggests the following *conceptual background***:**

- The three surveys (in 1993, 2002, 2006) of United Nation Economic Commission for Europe (UNECE, 2008a) on Country practices in measuring the NOE;
- The two rounds of the Statistical Office of the European Communities (Eurostat, 2005) *Pilot Projects on Exhaustiveness* (PPE) (in 1998 and 2002) [1];
- The Handbook jointly prepared by Organisation for Economic Co-operation and Development (OECD), International Monetary Fund (IMF), International Labour Organisation (ILO) and Interstate Statistical Committee of the Commonwealth of Independent States (CIS StatCom), "*Handbook* for *Measuring the NOE*" (2002);
- The System of National Accounts 1993 (SNA 93 and 2008).

Given this *conceptual background* Authors turn to the empirical issue of how to define a useful *analytical frameworks***:**

- to compare approaches across Countries and to share experiences;
- to help focus efforts on NOE causes that have the biggest effect on GDP.

(*) Full Professor of Economic Statistics - Department of Statistics and Mathematics for Economic Research, University of Naples "*Parthenope*", Naples, Italy - e-mail: claudio.quintano@uniparthenope.it.

(**) Researcher of Economic Statistics - Department of Statistics and Mathematics for Economic Research, University of Naples "*Parthenope*", Naples, Italy - e-mail: paolo.mazzocchi@uniparthenope.it.

[1] Annex "A" in Eurostat (2005) lists the projects and the countries involved in the European Commission's Phare Multi-Country Programme.

In earlier papers of them (Quintano and Mazzocchi, 2008 and 2009) the Authors analysed the methods that had been devised in the literature and by taking into account the major characteristic features of the hidden economy, they worked out an alternative method, the so-called *Latent Variable Method*.

By adapting this approach to the specificities of new European Union Candidate Countries, the present paper makes an attempt of determination of the share of hidden economy in order to validate the official data, when they are available, to measure the NOE phenomenon. After a brief discussion on the Eurostat's *Tabular Approach to Exhaustiveness (TAE)* and N1 to N7 framework used in Section 2, the paper presents some features connected with the model of studying the NOE during the recent years in Section 3.

Afterwards, Sections 4 and 5 briefly summarize the results of estimations worked out with the *Latent Variable Method* and they presents some conclusions about the country-to-country differences according to Eurostat framework and UNECE'survey.

## 2. Conceptual background

*Lack of coverage* causes problems for the NA estimates. Therefore from 1996, Eurostat started to work intensively with the European Union Candidate Countries (CCs) on the improvement of *consistency*, *reliability* and *exhaustiveness* of their NA (Eurostat, 2005) through the Eurostat' *TAE*. The "*Tabular Approach*" comes from the tabular framework employed for the two previous exhaustiveness projects (1998-2000 e 2000-2003) and it involves the filling of three *standard tables* both for the *output approach* (it is the most widely employed by Countries for GDP estimates) and for the *expenditure approach* (Table 1 - *Elements of non-exhaustiveness*; Table 2; *Exhaustiveness adjustments*; Table 3A - *Summary of adjustments*). No tables were requested by Eurostat for the *income approach* to GDP.

The purpose of using a standard set of tables (and procedures) is to ensure that:

- the different possible types of *non-exhaustiveness* are clearly defined and distinguished;
- all possible types of *non-exhaustiveness* are investigated in a systematic way;
- the breakdown of *exhaustiveness adjustments* is standardised;
- the exhaustiveness adjustments made by the Countries are given in absolute figures and expressed as percentages of GDP;
- a similar level of coverage and detail is used by all Countries;
- in general, the results across Countries are as comparable as possible.

Defining the different types of non-exhaustiveness is a key part of the *TAE* methodology and they monitor that the non-exhaustiveness types are *mutually exclusive*. At the core of comprehensive and systematic assessment of exhaustiveness is the division of all productive activities according to their potential for *non-exhaustiveness*.

To make easy the analysis and the interpretation, the division is based on a standard set of *non-exhaustiveness types* labelled N1-N7 (Table 1).

**Table 1. - Eurostat's Tabular Approach - N1 to N7 framework - Non-Exhaustiveness Types.**

| |
|---|
| Unit deliberately not registered - underground - N1 |
| Unit deliberately not registering - illegal - N2 |
| Producers* not required to register - N3 |
| Legal persons not surveyed - N4 |
| Registered entrepreneurs not surveyed - N5 |
| Producer deliberately misreporting - N6 |
| Other statistical deficiencies - N7 |

Source: Eurostat, 2005, Annex C; UNECE, 2008a.
*Note that enterprises are referred to as producers to ensure that it is understood that all possible types of enterprise are involved, including non-market household enterprises.

The seven types under this N1-N7 framework can be broadly classified into the four following categories: *not registered*, *not surveyed*, *misreporting* and *other statistical deficiencies*. The following type and definitions (associated with each category, such as legal person and producer) are included:

- *Not registered*: N1, N2, N3
- *Not surveyed*: N4, N5

- *Misreporting*: N6
- *Other statistical deficiencies:* N7

The description of the *TAE* has been concentrated on the *output approach* to GDP anyway types N1-N7 can be applied to analysis by the *expenditure approach* and the same types N1-N7 are appropriate for the *income approach* (with some exception).

The Eurostat (2005) *Guidelines* provides (Annex E) a short description of a variety of methods which are available for identifying *non-exhaustiveness* and developing exhaustiveness adjustments (e.g. *Labour Input Method*).

Over the period 1996-2004, ten Countries became EU Member States (Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia) and a significant number of NA projects have been undertaken by these Countries with the aim of achieving compliance with ESA95.

When Eurostat carried out the *first* of two rounds of PPE, eight types of non-exhaustiveness were identified (T1-T8) but with the *second* Pilot Project the classification was modified to clarify the boundaries among the different types. The main difference between the first and the second classifications is that while the T1-T8 *framework* relates the *non-exhaustiveness* types to the NOE *problem areas* instead the N1-N7 *framework* is based on subdividing the producers according to their potential for non-exhaustiveness (UNECE, 2008a).

**Table 2. - Eurostat's Tabular Approach - T1-T8 framework**

| |
|---|
| Statistical underground (Non-response to surveys – T1; Out of date registers – T2; Unregistered because of other reasons than deliberate non-registration – T3) |
| Economic underground (Underreporting of production – T4; Intentionally not registered – T5) |
| Informal sector – unregistered units – T6 |
| Illegal production – unregistered units – T7 |
| Other types of undercoverage – T8 |

Source: Luige (2008) and UNECE (2008a; 2008b).

The UNECE (2008a) publication presents an inventory of the current practices of forty three Countries in measuring NOE activities to ensure the exhaustiveness of their NA. The material was collected through a survey undertaken by the UNECE Statistical Division during 2005-2006 in order to allow some cross-country comparisons of the methods used to estimate the size and importance of the different types of NOE.

The survey issued by UNECE is a continuation of a similar survey carried out in 2001-2002 when only twenty nine Countries participated; it refers to the concepts, definitions and terminology as recommended in the OECD (2002) *Handbook* and Eurostat (2005) *Guidelines*. The cluster of 43 Countries that provided information about their methods of estimating the NOE contains the following 8 new EU Member States: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Romania (the survey comprises also 3 EU Candidate Countries: Croatia, the former Yugoslav Republic of Macedonia and Turkey).

Broadly, the survey is divided into several sections, each of which serves as an indicator of current practices adopted: definitions and concepts used; data sources and estimation methods, and implications and effects on GDP estimates.

These Countries used a wide variety of data sources (such as agricultural census, Labour Force Survey, etc.) and methods (e.g. the *Labour Input Method*, using of *fiscal data* etc) for estimation the non-observed activities (instead some of them are used only in one or a few Countries, particularly the surveys to capture a specific activity).

The estimation techniques adopted spanned the three main approaches: *production approach*, *expenditure approach* and *income approach*. For several Countries has been produced two or more estimates of non-observed activities by employing more the one of the three approaches; mostly the production method has been followed by the expenditure approach.

The size of the adjustments for NOE varies widely by groups of Countries as indicated in the Table 3 which provides information on the different types of non-observed activities estimated by Countries.

**Table 3. - Adjustments for NOE activities*.**

| Countries | year | N1 | N2 | N3 | N4 | N5 | N6 | N7 |
|---|---|---|---|---|---|---|---|---|
| Bulgaria | 2001 | ◙ | ◙ | ◙ | ◙ | ◙ | ◙ | ◙ |
| Czech Republic | 2000 | ◙ | ◙ | ◙ | ◙ | ◙ | ◙ | ◙ |
| Estonia | 2002 | ◙ | ◙ | | | | ◙ | ◙ |
| Hungary | 2000 | ◙ | ◙ | ◙ | | | ◙ | ◙ |
| Latvia | 2000 | ◙ | ◙ | | | | ◙ | ◙ |
| Lithuania | 2002 | ◙ | ◙ | | | | ◙ | ◙ |
| Poland | 2002 | ◙ | ◙ | ◙ | | | ◙ | ◙ |
| Romania | 2002 | ◙ | | ◙ | | | ◙ | |
| Slovakia** | | | | | | | | |

Sources: UNECE (2008a)
Notes:
*For some Countries, the classification into different types of non-exhaustiveness has been made by the UNECE secretariat and should be treated as indicative. More details in UNECE (2008a).
** Slovakia was not included into UNECE'survey therefore it was not possible to establish which types of activities takes part in the NOE.

The UNECE surveys conclusions underline that, due to the use of different approaches, it is difficult to identify clear trends in NOE dynamics across these Countries. Besides, the increase (or reduction) in the share of NOE in GDP may be either an indication of the changes in the economic activities, or due to the improvement of the statistical sources and methods, or both.

Broadly, three major groups of Countries can be identified in respect to their approach towards measuring the NOE: 1) the Countries rigorously following the TAE; 2) the Countries that have a thorough and systematic approach to ensure the exhaustiveness of NA but do not (regularly) measure the NOE as such; 3) the remaining Countries have different approaches or (a) using its own framework and methods (e.g. Italy – Quintano and Mazzocchi, 2008 and 2009 - which is not explored in this paper, is a "pioneer" in measuring NOE so allowing the diffusion - in other Countries - of the so-called *Italian approach*); b) focusing on measuring the non-observed activities in specific branches but not using a comprehensive framework; c) focusing on informal sector and informal labour, mainly using the *Labour Input Method*. Because of the above mentioned reasons, it is difficult to identify clear trends in NOE dynamics across Countries, even though in recent years, the Countries are increasingly paying attention to ensuring the exhaustiveness of NA and improving data collection and estimation methods to be as exhaustive as possible in their GDP estimates.

## 3. Methodology

Attempting to measure the size of shadow economy, the related literature is plentiful of different models[2] and broadly it discerns three different approaches related to the NOE: *Direct Approaches*, *Indirect Approaches, Model Approach*. On the other hand, there are several empirical surveys on the diffusion of the underground economy in single Countries and various methods have been employed using different variables and using different models according to the Author's target or to the opening assumptions. So, the OECD *Handbook* presents a systematic strategy for achieving exhaustive estimates of GDP and it suggests some methodological approaches to follow working with NA[3]. The *Handbook* proposes a tool to create a *common structure* according the *Data Quality Program* (DQP) of the IMF, through the Data Quality Assessment Framework (DQAF) and its

[2]Schneider and Enste (2007) shoed the following summary related to the approaches to estimate the NOE

| Method | Approach |
|---|---|
| **Direct Methods** | 1) Surveys |
| | 2) Inquiries on tax evasion |
| **Indirect Methods** | 3) Discrepancy between the national accounting of distribution and |
| Approach via National Accounting | application (macro-economic approach) |
| | 4) Discrepancy between income and expenditure of the household |
| | (micro-economic approach) |
| | 5) Difference between the official and the actual income rate |
| Monetary Approach | 6) Cash velocity |
| | 7) Cash velocity of major bills |
| | 8) Transaction method |
| | 9) Cash demand |
| Physical Input Method | 10) Electricity consumption approach |
| **Causal Methods** | 11) Approach of "*soft modelling*" & Model approach |

Sources: Schneider and Enste (2007), p. 27.
[3]More details in Quintano and Mazzocchi (2009)

quote that "*Good quality NA are vital for economic policy making and research*".

Particularly, the *Model Approach* is connected[4] whit the statistical theory of *Latent Variables* and this paper proposes a model[5] which intends to extract one *latent factor* (labelled *shadow economy*) using a set of *observed* variables. Among the possible methods to consider, depending on the reasons why the results are achieved, the Authors suggest to use the statistical theory connected with *factor analysis,* employed in several researches as an alternative way related with the NA (Zizza, 2002; Ritschl, Sarferaz and Uebele, 2008; Doz and Lenglart, 1996). In National Accounting, when it's possible, the same aggregate can be esteemed through two different perspectives in order to realize a "r*econciliation among separate estimates*" so validating the order of size of the phenomenon (undervalue or overprice the aggregates, the macro variations, etc).

The *factor analysis technique* is designed to detect the structure in the relationships between observed variables and to reduce the number of variables. Therefore, *factor analysis* is applied as a *data reduction*; On the other hand, a set of observed variables can be explained in terms of a fewer *unobservable* constructs known as *latent variables* or *common factors*, attempting to reduce the *complexity* of the data transforming beginning model in a simpler one but almost informative than the beginner (the result would be obtained as extension of the mathematical method of *Principal Component Analysis* - PCA - Fabbris, 1997).

The model is applied on the *causal* variables of the NOE and intends to estimate a *statistical index* through the *factor analysis*; the percentage variation of the *index* could be matched with the percentages variations of each Country estimates for the outstanding period. The [1] equation shows the factor analysis model

$$x_j = \sum a_{ji} f_i + u_j c_j \qquad [1]$$

where $f_i$ is the common factor i-eth; $a_{ij}$ is the coefficient that combine the factor $f_i$ to the variable $x_j$ (*factor loading*); $c_j$ is the specific factor of $x_j$ and $u_j$ his coefficient.

The model allows to define a statistical *index* to match single EU Countries monitoring each *annual percentage variation* during the last ten years; the factor analysis' results are also used to try to estimate the NOE phenomenon for each years. In order to perform the pattern, the following variables have been employed:

- *tax burden;*
- *unemployment male rate;*
- *(ratio between) Currency* in circulation and the intermediate monetary aggregates *M2*[6]*;*
- *sharing to the official economy* (which concerns *activity male rate);*
- *per-capita GDP to constant prices*[7].

Different Countries have been analyzed through the twelve data matrix showed in Annex I which includes several data sources[8].

## 4. Comparing alternative empirical estimates of unobserved economic activity

In order to analyse the NOE in some new EU Member States over the last ten years through the *Latent Variable Method,* in this section the following 12 Countries are involved in the treatment of relationships between the variables interested in the *unobserved variable estimation procedure*: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.

[4] More details in Zizza (2002)

[5] The study of NOE using the Model Approach was originally proposed by Frey and Weck - Hanneman (1984).

[6] More details in European Central Bank's definition of Euro Area Intermediate Monetary Aggregates - www.ecb.int.

[7] The following remarks have been performed in connection with the variables involved:

- the *tax burden*, defined such as "ratio between the sum of *direct taxes*, *indirect taxes*, taxes in *capital account* and the *social security contributions* with the GDP estimated" in terms of contributions per capita;
- *unemployment male rate*, which concerns the "ratio between *unemployed job seekers* and the corresponding Labor Force" ; in this paper the Authors consider only the *male gender rate* because (as specified by Frey and Weck-Hanneman, 1984), *unemployment female rate* would decrease due to the factors not connected with the NOE but connected with different aspects, e.g. female emancipation;
- *ratio between currency* (banknotes and coins held by public) and the aggregate monetary M2;
- *sharing to the official economy*, which concerns *activity male rate* or the *official presence rate of male persons in working age*; its concerns "the ratio between the people belonging to the Labor Force and corresponding reference population; adding the *activity rate* and the *inactivity rate* the result will be equal to the 100 percent";
- *Per-capita GDP to constant prices*.

[8] The Eurostat database have been used for data about *tax burden*, *unemployment male rate, activity male rate;* the statistics database of the Central National Banks of each Countries have been employed in connection with contribution to Euro Area monetary aggregates; the International Monetary Fund (IMF) have been employed for information about GDP

The NOE official estimates have been achieved by each National Statistical Office - when they are available - and several Countries have figures only for few years.

The estimates obtained through the TAE framework have been compared with the figures combining various variables belonging to the informative end economic picture connected to the NOE, so validating the order of size of the phenomenon (undervalue or overprice the aggregates, the macro variations, etc).

The Table 4 shows the (*acceptable*) results connected with the *Factor Loadings*, with the *communality* and with the explained *variation* through the model. The calculations show a significant explained *variation* through the first latent variable (*the shadow economy*); broadly, the explained variance reaches a size of no less than 57% (Hungary and Poland) and often it catches over the 70%; at least for three Countries (Slovakia, Malta, Bulgaria) the explained variance reaches more than the 90%.

**Table 4. - Latent Variable Method' results using the data matrix in Annex I.**

| Countries / Variables | Bulgarian | Cyprus | Czech Republic | Estonia | Hungary | Latvia | Lithuania | Malta | Poland | Romania | Slovenia | Slovakia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor Loadings | | | | | | | | | | | | |
| Tax burden | 0.990 | 0.817 | 0.911 | 0.978 | 0.985 | 0.984 | -0.968 | -0.946 | 0.845 | 0.967 | -0.978 | 0.991 |
| Unemployment male rate | -0.963 | 0.708 | -0.957 | -0.896 | -0.303 | -0.958 | 0.904 | 0.954 | 0.081 | -0.713 | 0.895 | -0.928 |
| Ratio between Currency and M2 | 0.864 | 0.859 | 0.026 | 0.051 | 0.846 | 0.735 | 0.946 | 0.976 | -0.859 | -0.483 | 0.568 | 0.928 |
| Sharing to the official economy | 0.988 | 0.856 | 0.957 | 0.989 | 0.989 | 0.983 | -0.986 | -0.981 | 0.954 | 0.934 | -0.942 | 0.994 |
| Per-capita GDP to constant prices | -0.991 | 0.958 | -0.429 | -0.797 | -0.328 | -0.703 | 0.907 | 0.936 | -0.680 | 0.755 | 0.680 | 0.948 |
| Communality | | | | | | | | | | | | |
| Tax burden | 0.981 | 0.667 | 0.831 | 0.957 | 0.970 | 0.968 | 0.938 | 0.895 | 0.714 | 0.935 | 0.956 | 0.983 |
| Unemployment male rate | 0.927 | 0.501 | 0.915 | 0.803 | 0.092 | 0.918 | 0.817 | 0.910 | 0.006 | 0.508 | 0.801 | 0.861 |
| Ratio between Currency and M2 | 0.747 | 0.738 | 0.001 | 0.003 | 0.716 | 0.541 | 0.895 | 0.952 | 0.738 | 0.233 | 0.323 | 0.861 |
| Sharing to the official economy | 0.977 | 0.733 | 0.916 | 0.978 | 0.979 | 0.967 | 0.972 | 0.963 | 0.910 | 0.873 | 0.888 | 0.987 |
| Per-capita GDP to constant prices | 0.982 | 0.917 | 0.184 | 0.635 | 0.107 | 0.495 | 0.823 | 0.877 | 0.463 | 0.570 | 0.463 | 0.898 |
| Explained Variation Ratio | | | | | | | | | | | | |
| | 92.282 | 71.123 | 56.930 | 67.510 | 57.277 | 77.760 | 88.880 | 91.940 | 56.640 | 62.375 | 68.610 | 91.800 |

Source: Authors' elaboration of data from Annex I.

## Bulgaria

The treatment of the NOE in Bulgaria in compliance with Eurostat'PPE provides a figures only for 2001.

Table 5 shows the Bulgarian NOE Official Estimates connected with the adjustments for NOE activities mentioned in Table 3 (some figures based on "*personal correspondence*" with the Bulgarian Center for the Study of Democracy have been quoted e.g. in Feige and Urban, 2008, p. 292).

**Table 5. - Bulgarian NOE Official estimates: year 2001.**

| N3 (percentage variation) | N1,N4, N5,N6,N7 (percentage variation) | Total adjustments |
|---|---|---|
| 2.5 | 7.7 | 10.2 |
| years | GDP - constant prices (Base Year: 2000) (EUR Billions) | Adjustment for NOE activities (percentage variation) |
| 2001 | 15.190 | 10.2 |

Source: UNECE (2008a)

Table 6 shows the size of the unrecorded sector estimated by *Latent Variable Method*; the analysis' results allow to define a statistical *index* that need to monitored through its *percentage variation* and through several Base Indices Numbers.

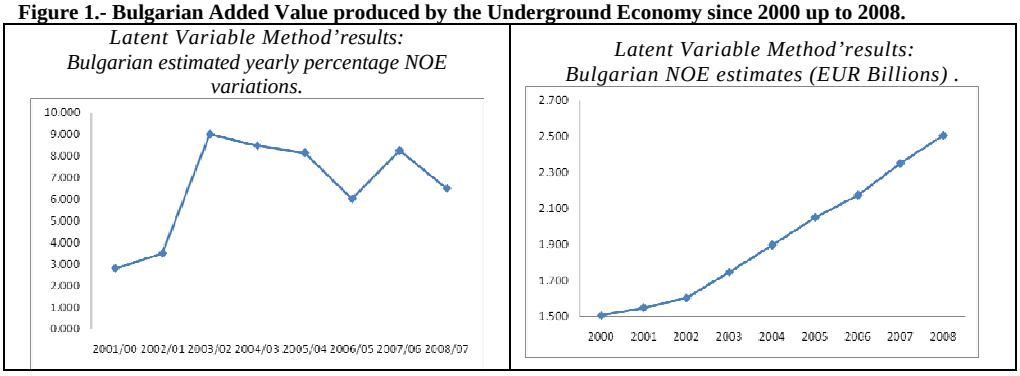
**Table 6. - Bulgarian Added Value produced by the Underground Economy since 2000 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2000) | Latent Variable Method: estimated figures (EUR Billions) |
|---|---|---|---|
| 2000 | - | 100 | 1.507 |
| 2001 | 2.802 | 102.802 | 1.549 |
| 2002 | 3.491 | 106.392 | 1.603 |
| 2003 | 9.000 | 115.967 | 1.748 |
| 2004 | 8.468 | 125.788 | 1.896 |
| 2005 | 8.143 | 136.031 | 2.050 |
| 2006 | 6.013 | 144.211 | 2.173 |
| 2007 | 8.241 | 156.094 | 2.353 |
| 2008 | 6.500 | 166.241 | 2.505 |

Source: Authors' elaboration of data from Annex I.

In this context, in order to estimate the size of Bulgarian NOE through the model proposed (Figure 1 and Table 6) it's necessary to anchor the figures at a "base" aggregate through the only one Bulgarian estimate (which has been obtained thanks the UNECE' experience) to determine the *adjusted* starting point which calibrate the factor analysis' estimates.

**Figure 1.- Bulgarian Added Value produced by the Underground Economy since 2000 up to 2008.**




## Cyprus

The treatment of the NOE in Cyprus was not included in UNECE' survey and any figures connected with the phenomenon are available.

So, Table 7 shows the size of the unrecorded sector estimated by *Latent Variable Method* through its percentage variation and several *Base Indices Numbers* (Figure 2).

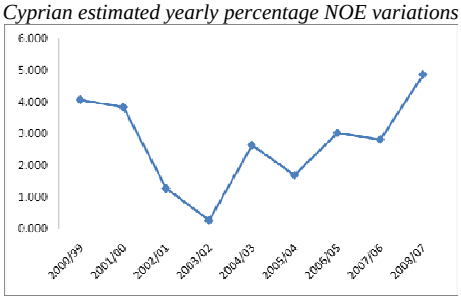
**Table 7. - Cyprian Added Value produced by the Underground Economy since 1999 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 1999) |
|---|---|---|
| 1999 | - | 100 |
| 2000 | 4.069 | 104.069 |
| 2001 | 3.840 | 108.066 |
| 2002 | 1.277 | 109.446 |
| 2003 | 0.273 | 109.744 |
| 2004 | 2.641 | 112.643 |
| 2005 | 1.693 | 114.550 |
| 2006 | 3.025 | 118.014 |
| 2007 | 2.816 | 121.338 |
| 2008 | 4.863 | 127.238 |

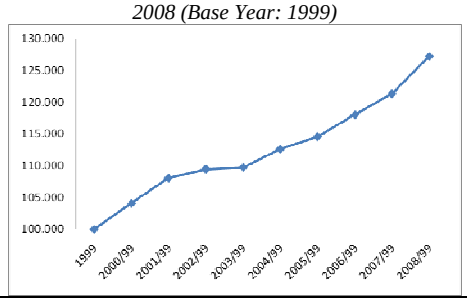
Source: Authors' elaboration of data from Annex I.

**Figure 2. - Cyprian Added Value produced by the Underground Economy since 1999 up to 2008.**

*Latent Variable Method'results:*
*Cyprian estimated yearly percentage NOE variations*




*Latent Variable Method'results:*
*Cyprian NOE estimates – Base Indices Numbers 1999-2008 (Base Year: 1999)*




## Czech Republic

Table 8 quotes the Czech NOE Official estimates connected with Eurostat'PPE showing figures due the o*utput approach*, the *expenditure approach* and the *income approach* to GDP.

**Table 8.- Czech NOE Official estimates. Summary of NOE adjustments: percentage of GDP year 2000.**

| Approach | N1 | N2 | N3 | N4 | N5 | N6 | N7 | Total |
|---|---|---|---|---|---|---|---|---|
| Output approach | 0.5 | 0.2 | 1.3 | 1.5 | 1.0 | 4.4 | 0.3 | 9.3 |
| Expenditure approach | - | 0.1 | 2.5 | 0.6 | 0.5 | 0.6 | 0.4 | 4.6 |
| Income approach | 0.49 | 0.16 | 1.01 | - | 0.55 | 4.09 | 0.32 | 6.62 |

| years | Adjustment for NOE activities |
|---|---|
| 2000 | 4.6 (E), 6.6 (I), 9.3 (O) |

Source: UNECE (2008a)

Some figures reported in Table 8 have been update by based the Czech Statistical Office disseminating the Official NOE estimates time series through *Income approach*, over the period 1998-2007 (Table 9).

**Table 9. - Czech NOE adjustments since 1998 up to 2007 (incidence on GDP).**

| Year / Adjustments | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| N1 | 0.004 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 |
| N2 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| N3 | 0.012 | 0.012 | 0.012 | 0.011 | 0.010 | 0.010 | 0.009 | 0.009 | 0.008 | 0.008 |
| N4 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| N5 | 0.011 | 0.012 | 0.010 | 0.009 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 |
| N6 | 0.046 | 0.046 | 0.044 | 0.044 | 0.041 | 0.042 | 0.040 | 0.037 | 0.037 | 0.036 |
| N7 | 0.003 | 0.004 | 0.004 | 0.004 | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| NOE Total | 0.079 | 0.080 | 0.077 | 0.075 | 0.069 | 0.069 | 0.065 | 0.062 | 0.062 | 0.059 |

Source: Gross National Income Inventory - Annual National Accounts Department - Czech Statistical Office - website http://apl.czso.cz

Table 10 shows Czech official NOE and Latent Variable Method'estimates. In order to estimate the size of Czech NOE through the Latent Variable Method showed in Figure 3 it's necessary to anchor the figures at a "base" aggregate through base Czech official estimates. Thus, the first three years (2001-2003) have been used to determine the *adjusted* starting point which calibrate the factor analysis' estimates.

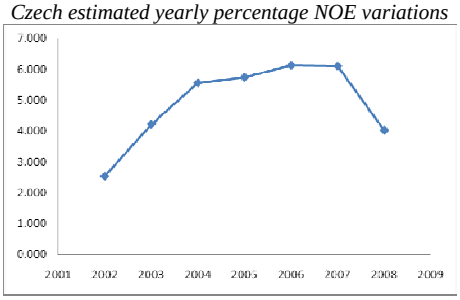
**Table 10. - Czech Added Value produced by the Underground Economy since 2001 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2001) | Latent Variable Method' estimates (EUR Billions) | Czech official NOE estimates (EUR Billions) |
|---|---|---|---|---|
| 2001 | - | 100 | 6.642 | 6.621 |
| 2002 | 2.543 | 102.543 | 6.811 | 6.184 |
| 2003 | 4.226 | 106.876 | 7.099 | 6.432 |
| 2004 | 5.562 | 112.820 | 7.493 | 6.361 |
| 2005 | 5.741 | 119.297 | 7.924 | 6.418 |
| 2006 | 6.128 | 126.608 | 8.409 | 6.798 |
| 2007 | 6.104 | 134.336 | 8.922 | 6.906 |
| 2008 | 4.028 | 139.746 | 9.282 | 6.621 |

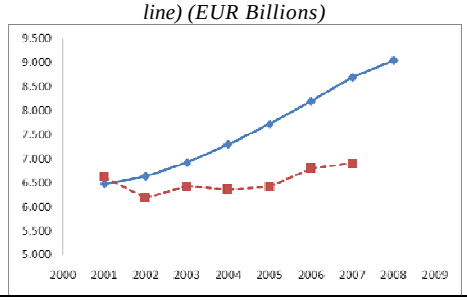
Source: Authors' elaboration of data from Annex I

**Figure 3. - Czech Added Value produced by the Underground Economy since 2001 up to 2008**

*Latent Variable Method'results: Czech estimated yearly percentage NOE variations*




*Latent Variable Method' estimates (blue continuous line) and Czech official NOE estimates (red sketched line) (EUR Billions)*




The Figure 3 shows the *Latent Variable Method'* results, in term of estimated value, and the Official NOE' figures. Thus, the Figure 3 indicates the trends keep a similar in size estimations; also, the Figure 3 shows that the tendency of the estimates are quite similar but it appears a upper estimation of the phenomenon compared with the Official Data.

## Estonia

Table 11 quotes the Estonian NOE Official estimates connected with Eurostat'PPE showing figures due the adjustments by economic activity (percentage of GDP year 2000).

**Table 11.- Estonian NOE Official estimates. Summary of NOE adjustments by economic activity: percentage of GDP year 2000.**

| Adjustments for NOE activitie | N1 | N2 | N6 | N7 | Total |
|---|---|---|---|---|---|
| % of GDP | 4.2 | 0.6 | 3.2 | 0.9 | 8.9 |

| years | Adjustment for NOE activities |
|---|---|
| 2000 | 8.9 |

Source: UNECE (2008a)

Some figures reported in Table 11 have been updated by Statistics Estonia (SE) disseminating the Official NOE estimates time series over the period 2000-2005 (Table 12).

**Table 12. - Estonian NOE Official estimates.**

| Years | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|
| NOE (CUP, Million of EKK Estonian kroon) | 9133.0 | 10771.8 | 9621.7 | 10447.4 | 11113.3 | 11917.6 |
| % of GDP | 9.5 | 9.9 | 7.9 | 7.7 | 7.3 | 6.8 |

Note: Estonian NOE Official estimates covers all four types of non-exhaustiveness (absolute figure in current prices in millions and % of GDP):N1-N2-N6-N7
National Currency & Exchange rate: EUR / EKK Estonian kroon = 1 / 15.65
Source: National Accounts Service - Statistics Estonia (SE) – website www.stat.ee

Table 13 shows Estonian official NOE and Latent Variable Method' estimates. In order to estimate the size of Estonian NOE through the Latent Variable Method showed in Figure 4 it's necessary to anchor the figures at a "base" aggregate through base Estonian official estimates. Thus, the *adjusted* starting point which calibrate the factor analysis' estimates have been used moving from the first three years (2000-2002) figures.

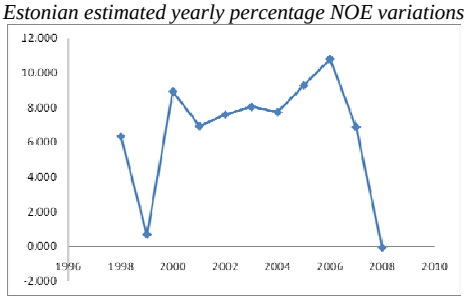
**Table 13. - Estonian Added Value produced by the Underground Economy since 1997 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 1997) | Latent Variable Method' estimates (EUR millions) | Estonian official NOE estimates (EUR millions)* |
|---|---|---|---|---|
| 1997 | - | 100 | 539.176 | - |
| 1998 | 6.343 | 106.343 | 573.374 | - |
| 1999 | 0.694 | 107.081 | 577.355 | - |
| 2000 | 8.926 | 116.639 | 628.892 | 583.578 |
| 2001 | 6.937 | 124.731 | 672.521 | 688.293 |
| 2002 | 7.598 | 134.209 | 723.622 | 614.805 |
| 2003 | 8.046 | 145.008 | 781.847 | 667.565 |
| 2004 | 7.735 | 156.224 | 842.321 | 710.115 |
| 2005 | 9.283 | 170.726 | 920.515 | 761.508 |
| 2006 | 10.802 | 189.168 | 1019.947 | - |
| 2007 | 6.880 | 202.182 | 1090.117 | - |
| 2008 | -0.074 | 202.032 | 1089.310 | - |

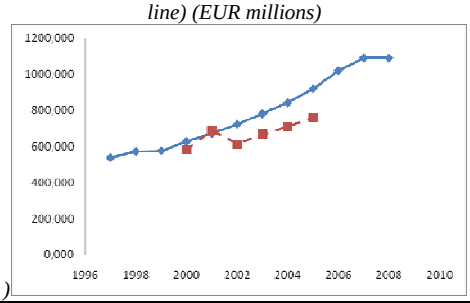
Source: Authors' elaboration of data from Annex I.
*National Accounts Service - Statistics Estonia ( SE) – website www.stat.ee

**Figure 4.- Estonian Added Value produced by the Underground Economy since 1997 up to 2008**

*Latent Variable Method'results: Estonian estimated yearly percentage NOE variations*




*Latent Variable Method' estimates (blue continuous line) and Estonian official NOE estimates(red sketched line) (EUR millions)*




)

The Figure 4. shows the *Latent Variable Method'* results and Official NOE' estimates in term of estimated value. Thus, the Figure indicates the estimates trend keep a similar in size and tendency estimations.

## Hungary

Table 14 quotes the Hungarian NOE Official estimates connected with Eurostat'PPE showing figures due the adjustments by economic activity (percentage of GDP year 2000).

**Table 14.- Hungarian NOE Official estimates. Summary of NOE adjustments by economic activity: percentage of GDP year 2000.**

| Adjustments for NOE activitie | N1 | N2 | N3 | N6 | N7 | Total |
|---|---|---|---|---|---|---|
| EUR Million | 1451.6 | 720.0 | 66.4 | 3518.0 | 500.4 | 6256.4 |
| % of GDP | 2.8 | 1.4 | 0.1 | 6.7 | 0.9 | 11.9 |

| years | Adjustment for NOE activities |
|---|---|
| 2000 | 11.9 |

Source: UNECE (2008a)
*Exchange rate used: EUR / HUF Hungarian Forint = 1 / 250 HUF.

In Hungary various estimates of NOE activities have been published by researchers and research institutes but the estimates derived from these research works cannot easily be incorporated into the NA due they do not conform to the standard classifications and the estimation methods cannot be repeated regularly as is required for official statistical publications (UNECE, 2008a).

Table 15 shows the size of the unrecorded sector estimated by *Latent Variable Method* (also in the table appears the *percentage variation* and several Base Indices Numbers).

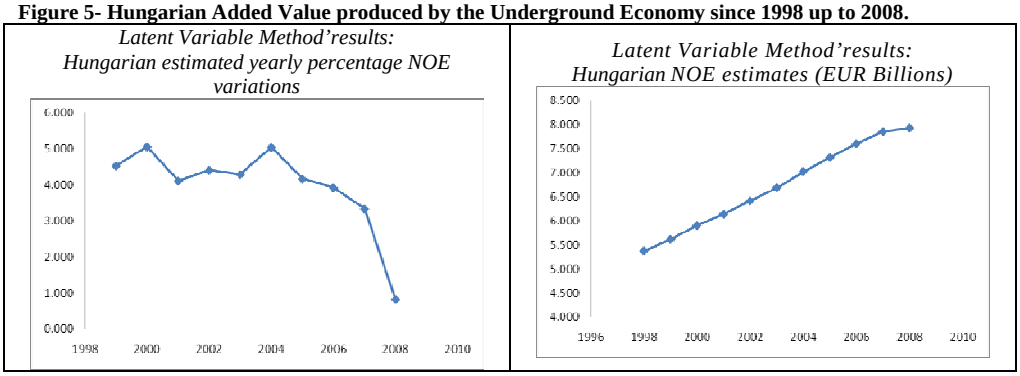
**Table 15. - Hungarian Added Value produced by the Underground Economy since 1998 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2000) | Latent Variable Method' estimates (EUR Billions) |
|---|---|---|---|
| 1998 | - | 91.061 | 5.375 |
| 1999 | 4.528 | 95.184 | 5.618 |
| 2000 | 5.059 | 100 | 5.902 |
| 2001 | 4.109 | 104.109 | 6.145 |
| 2002 | 4.411 | 108.701 | 6.416 |
| 2003 | 4.288 | 113.363 | 6.691 |
| 2004 | 5.040 | 119.076 | 7.028 |
| 2005 | 4.167 | 124.038 | 7.321 |
| 2006 | 3.922 | 128.904 | 7.608 |
| 2007 | 3.333 | 133.200 | 7.862 |
| 2008 | 0.820 | 134.293 | 7.926 |

Source: Authors' elaboration of data from Annex I

In this context too, in order to estimate the size of Hungarian NOE showed in Figure 5, it's necessary to anchor the figures at a "base" aggregate through the only one Hungarian estimates (which has been obtained thanks the UNECE' experience) to determine the *adjusted* starting point which calibrate the factor analysis' estimates.

**Figure 5- Hungarian Added Value produced by the Underground Economy since 1998 up to 2008.**




## Latvia

In the Table 16 appears the Latvian NOE Official estimates connected with Eurostat'PPE showing figures due the o*utput approach* and the *expenditure approach* to GDP (years 2000).

**Table 16.- Latvian NOE Official estimates. Summary of NOE adjustments: percentage of GDP year 2000.**

| Approach | Total |
|---|---|
| Output approach (O) | 13.6 |
| Expenditure approach (E) | 8.28 |

| years | Adjustment for NOE activities |
|---|---|
| 2000 | 13.6(O), 8.28 (E) |

Source: UNECE (2008a)

Some figures reported in Table 16 have been update by the Central Statistical Bureau of Latvia - National Accounts Section (see Table 17).

**Table 17 - Latvian Added Value produced by the Underground Economy since 1998 up to 2008.**

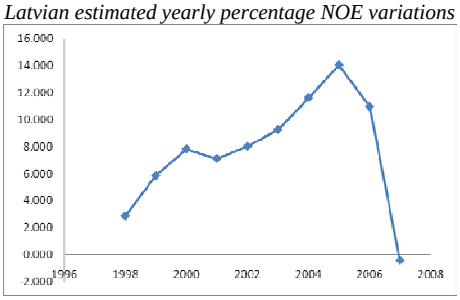
| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2002) | Latent Variable Method' estimates (EUR Billions) | Latvian official NOE estimates (EUR Billions)* |
|---|---|---|---|---|
| 1998 | - | 79.501 | 0.894 | - |
| 1999 | 2.871 | 81.784 | 0.920 | - |
| 2000 | 5.851 | 86.568 | 0.973 | - |
| 2001 | 7.834 | 93.350 | 1.050 | - |
| 2002 | 7.124 | 100 | 1.124 | 1.245 |
| 2003 | 8.022 | 108.022 | 1.215 | 1.084 |
| 2004 | 9.263 | 118.027 | 1.327 | 1.042 |
| 2005 | 11.628 | 131.752 | 1.481 | 1.173 |
| 2006 | 14.059 | 150.275 | 1.690 | 1.238 |
| 2007 | 10.975 | 166.768 | 1.875 | 1.080 |
| 2008 | -0.424 | 166.060 | 1.867 | - |

Source: Authors' elaboration of data from Annex I.
* Central Statistical Bureau of Latvia - National Accounts Section -Statistical data on EU Countries website www.csb.gov.lv

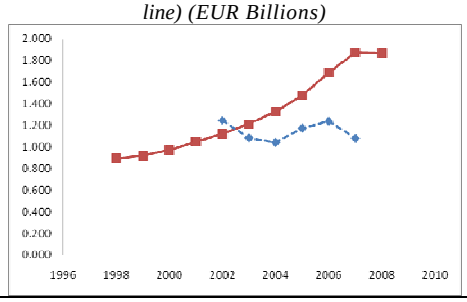
Table 17 shows both the Latvian official NOE and the model' estimates. In order to estimate the size of Latvian NOE through the Latent Variable Method showed in Figure 6 it's necessary to anchor the figures at a "base" aggregate through base Latvian official estimates. Thus, the first three years (2002-2004) have been used to determine the adjusted starting point which calibrate the factor analysis' estimates.

**Figure 6.- Latvian Added Value produced by the Underground Economy since 1998 up to 2008**

*Latent Variable Method'results: Latvian estimated yearly percentage NOE variations*




*Latent Variable Method' estimates (red continuous line) and Latvian official NOE estimates(blue sketched line) (EUR Billions)*




The Figure 6 shows the *Latent Variable Method'* results and Official NOE' estimates in term of estimated value. Thus, the Figure indicates the estimates keep a similar in size estimations but the Figure shows that the tendency of the estimates are different afterwards the 2006 .

## Lituania

Table 18 shows the Lithuanian NOE Official estimates connected with Eurostat'PPE showing figures for adjustment for NOE activities in 2002.

**Table 18.- Lithuanian NOE Official estimates. Summary of NOE adjustments: percentage of GDP year 2002.**

| Years | Adjustment for NOE activities |
|---|---|
| 2002 | 18.9 |

Source: UNECE (2008a)

Statistics Lithuania disseminates the Official NOE estimates time series splitting *total* adjustments in "*due to economic reasons*" and "*due to statistical reasons*"

**Table 19. - Lithuanian NOE Official estimates divided for economic and statistics reasons.**

| Years | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004* | 2005* | 2006* |
|---|---|---|---|---|---|---|---|---|---|
| Total adjustments | 17.9 | 17.7 | 18 | 18.3 | 18.9 | | 16 | 14.4 | 12.9 |
| Due to economic reasons | 15.3 | 15.7 | 16.8 | 17.5 | 18.2 | | - | - | - |
| Due to statistical reasons | 2.6 | 2 | 1.2 | 0.8 | 0.7 | | - | - | - |

Source: Statistics Lithuania - Statistikos Departamento - Head of National Accounts Division -National Accounts of Lithuania 2006 & 2007 www.stat.gov.lt [All releases/Year 2008/Economy and finance/GDP].
* Formed part of the total adjustment is not identified (in 2003 it occur a break)

Table 20 shows Lithuanian official NOE and *Latent Variable Method'* estimates (the figures have been anchored at a "base" aggregate through base Lithuanian official estimates, to calibrate the starting NOE estimates).

**Table 20.- Lithuanian Added Value produced by the Underground Economy since 1998 up to 2008.**

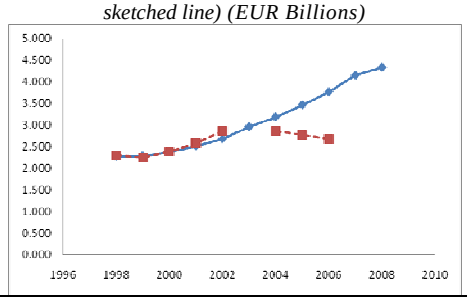
| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 1998) | Latent Variable Method' estimates (EUR Billions) | Lithuanian official NOE estimates (EUR Billions)* |
|---|---|---|---|---|
| 1998 | - | 100 | 2.279 | 2.308 |
| 1999 | -0.056 | 99.944 | 2.278 | 2.249 |
| 2000 | 4.351 | 104.292 | 2.377 | 2.381 |
| 2001 | 6.030 | 110.581 | 2.520 | 2.581 |
| 2002 | 6.278 | 117.523 | 2.678 | 2.850 |
| 2003 | 10.543 | 129.914 | 2.961 | - |
| 2004 | 7.701 | 139.919 | 3.189 | 2.857 |
| 2005 | 8.741 | 152.149 | 3.468 | 2.775 |
| 2006 | 8.697 | 165.380 | 3.769 | 2.681 |
| 2007 | 10.234 | 182.306 | 4.155 | - |
| 2008 | 4.433 | 190.387 | 4.339 | - |

Source: Authors' elaboration of data from Annex I.
* Statistics Lithuania - Statistikos Departamento - Head of National Accounts Division -National Accounts of Lithuania 2006 & 2007 www.stat.gov.lt [All releases/Year 2008/Economy and finance/GDP]

**Figure 7- Lithuanian Added Value produced by the Underground Economy since 1998 up to 2008.**

*Latent Variable Method'results: Lithuanian estimated yearly percentage NOE variations*


*Latent Variable Method' estimates (blue continuous line) and Lithuanian official NOE estimates (red sketched line) (EUR Billions)*




The Figure 7 indicates that the model' results and official estimates keep a similar in size until the 2002 but the tendency of the estimates are different afterwards the 2004.

## Malta

The treatment of the NOE in Malta was not included in UNECE' survey and any figures connected with the phenomenon are available.

So, Table 21 shows only the size of the unrecorded sector estimated by *Latent Variable Method* through its percentage variation and several *Base Indices Numbers*.

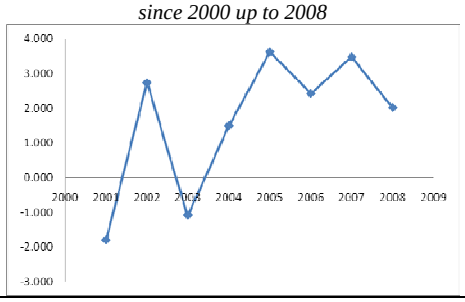
**Table 21. - Maltese Added Value produced by the Underground Economy since 2000 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2000) |
|---|---|---|
| 2000 | - | 100 |
| 2001 | -1.797 | 98.203 |
| 2002 | 2.731 | 100.885 |
| 2003 | -1.081 | 99.794 |
| 2004 | 1.490 | 101.281 |
| 2005 | 3.620 | 104.947 |
| 2006 | 2.421 | 107.488 |
| 2007 | 3.473 | 111.221 |
| 2008 | 2.017 | 113.464 |

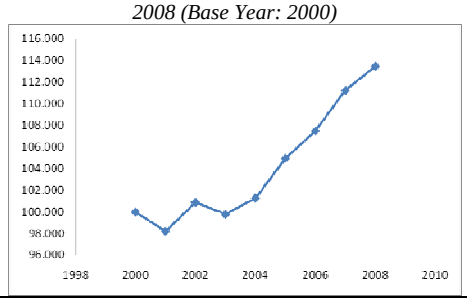
Source: Authors' elaboration of data from Annex I.

**Figure 8- Maltese Added Value produced by the Underground Economy since 2000 up to 2008.**

*Latent Variable Method'results: Maltese estimated yearly percentage NOE variations since 2000 up to 2008*




*Latent Variable Method'results: Maltese NOE estimates – Base Indices Numbers 2000-2008 (Base Year: 2000)*




## Poland

Table 22 quotes the Poland NOE Official estimates connected with Eurostat'PPE showing figures due the adjustments by economic activity (percentage of GDP year 2000).

**Table 22.- Polish NOE Official estimates. Summary of NOE adjustments by economic activity: percentage of GDP year 2000.**

| Approach | N1 | N2 | N3 | N5 | N6 | N7 | Total |
|---|---|---|---|---|---|---|---|
| Output approach (O) | 3.4 | 0.6 | - | - | 7.8 | 3.9 | 15.7 |
| Expenditure approach (E) | 1.3 | 0.8 | 1.6 | - | 4.0 | 0.1 | 7.8 |

| years | Adjustment for NOE activities |
|---|---|
| 2001 | 15.7 (O), 7.8(E) |

Source: UNECE (2008a)

Table 23 shows the analysis' results. In this occurrence too, in order to estimate the size of Polish NOE through the Latent Variable Method showed in Figure 9 it's necessary to anchor the figures at a "base" aggregate through the only one Polish estimates which has been obtained thanks the UNECE' experience.

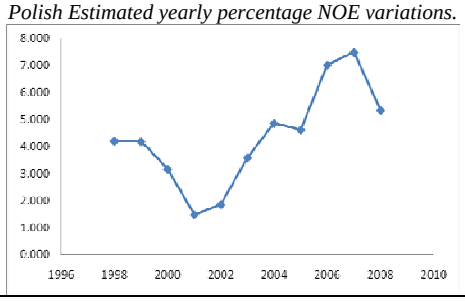
**Table 23 - Polish Added Value produced by the Underground Economy since 1997 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2002) | Latent Variable Method: (EUR Billions) |
|---|---|---|---|
| 1997 | - | 86.382 | 17.798 |
| 1998 | 4.203 | 90.013 | 18.546 |
| 1999 | 4.184 | 93.779 | 19.322 |
| 2000 | 3.163 | 96.746 | 19.934 |
| 2001 | 1.484 | 98.181 | 20.229 |
| 2002 | 1.853 | 100 | 20.604 |
| 2003 | 3.586 | 103.586 | 21.343 |
| 2004 | 4.862 | 108.623 | 22.381 |
| 2005 | 4.616 | 113.636 | 23.414 |
| 2006 | 7.011 | 121.603 | 25.055 |
| 2007 | 7.482 | 130.701 | 26.930 |
| 2008 | 5.341 | 137.682 | 28.368 |

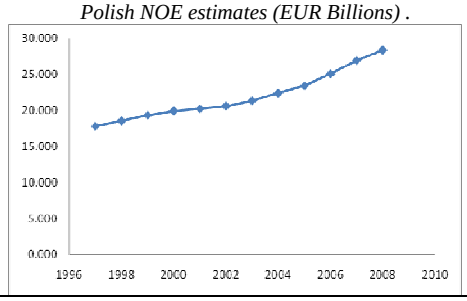
Source: Authors' elaboration of data from Annex I.

**Figure 9- Polish Added Value produced by the Underground Economy since 1997 up to 2008.**

*Latent Variable Method'results:*
*Polish Estimated yearly percentage NOE variations.*




*Latent Variable Method'results:*
*Polish NOE estimates (EUR Billions) .*




## Romania

Table 24 shows the Romanian NOE Official estimates (Eurostat'PPE figures due the adjustments by economic activity - percentage of GDP year 2002).

**Table 24.- Romanian NOE Official estimates. Summary of NOE adjustments by economic activity: percentage of GDP year 2002.**

| years | Adjustment for NOE activities |
|---|---|
| 2002 | 17.7 |

Source: UNECE (2008a)

Some figures reported in Table 25 have been disseminated by based the *Institutul National de Statistica - Directia Diseminarea Informatiilor Statistice*; also, the Table 25 shoes both Romanian official NOE and Latent Variable Method' estimates.

**Table 25. - Romanian Added Value produced by the Underground Economy since 2000 up to 2008.**

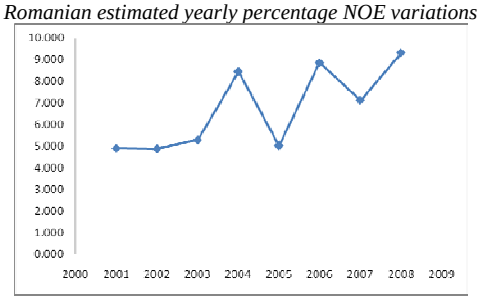
| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2000) | Latent Variable Method' estimates (EUR Billions) | Romanian official NOE estimates (EUR Billions)* |
|---|---|---|---|---|
| 2000 | - | 100 | 3.500 | 3.472 |
| 2001 | 4.892 | 104.892 | 3.642 | 3.631 |
| 2002 | 4.871 | 110.001 | 3.819 | 3.753 |
| 2003 | 5.279 | 115.809 | 4.021 | 3.455 |
| 2004 | 8.448 | 125.593 | 4.361 | 3.529 |
| 2005 | 5.021 | 131.899 | 4.580 | 4.209 |
| 2006 | 8.856 | 143.580 | 4.985 | 5.250 |
| 2007 | 7.115 | 153.795 | 5.340 | 5.799 |
| 2008 | 9.316 | 168.122 | 5.837 | 6.266 |

Source: Authors' elaboration of data from Annex I.
* Institutul National de Statistica - Directia Diseminarea Informatiilor Statistice – Romania -website: www.insse.ro.

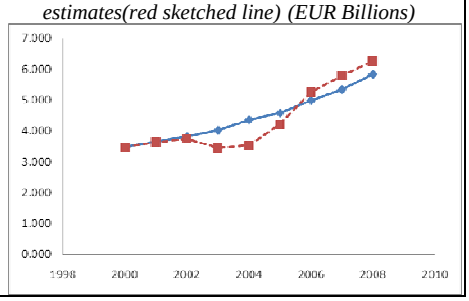
In the Figure 10 appears the amount anchored at a "base" aggregate to determine the *adjusted* starting point which calibrate the model' results.

**Figure 10. - Romanian Added Value produced by the Underground Economy since 2000 up to 2008**

*Latent Variable Method'results:*
*Romanian estimated yearly percentage NOE variations*




*Latent Variable Method' estimates (blue continuous line) and Romanian official NOE estimates(red sketched line) (EUR Billions)*




The Figure indicates the estimates keep a similar in size estimations until the 2002 and but afterwards the 2005. Several differences appears both years 2003 and 2004.

## Slovakia

Slovakia doesn't joint in the UNECE' survey; so, the Table 26 shows the figures disseminated by the Statistical Office of the Slovak Republic.

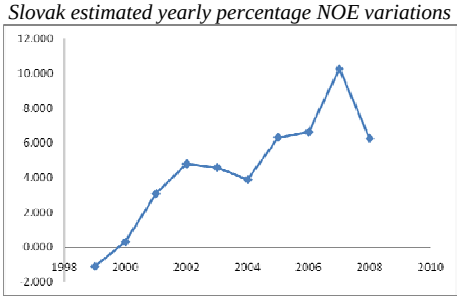
**Table 26. – Slovak Added Value produced by the Underground Economy since 1998 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 1998) | Latent Variable Method' estimates (EUR Billions) | Slovak official NOE estimates (EUR Billions)* |
|---|---|---|---|---|
| 1998 | - | 100 | 4.118 | 4.456 |
| 1999 | -1.099 | 98.901 | 4.073 | 4.581 |
| 2000 | 0.309 | 99.206 | 4.086 | 4.643 |
| 2001 | 3.099 | 102.281 | 4.212 | 4.898 |
| 2002 | 4.802 | 107.192 | 4.415 | 4.928 |
| 2003 | 4.598 | 112.121 | 4.618 | 5.267 |
| 2004 | 3.900 | 116.494 | 4.798 | 5.056 |
| 2005 | 6.333 | 123.871 | 5.101 | 5.466 |
| 2006 | 6.638 | 132.094 | 5.440 | 5.973 |
| 2007 | 10.288 | 145.684 | 6.000 | 6.548 |
| 2008 | 6.275 | 154.825 | 6.376 | 6.866 |

Source: Authors' elaboration of data from Annex I.
* Imputed Unobserved (NOE) Income - Statistical Office of the Slovak Republic - Bratislava - Slovak Republic - website www.statistics.sk

**Figure 11.- Slovak Added Value produced by the Underground Economy since 1998 up to 2008.**

*Latent Variable Method'results:*
*Slovak estimated yearly percentage NOE variations*




*Latent Variable Method' estimates (blue continuous line) and Slovak official NOE estimates (red sketched line) (EUR Billions)*

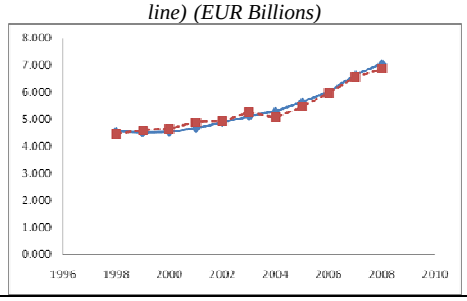



Table 26 and Figure 11 show the size of the unrecorded sector estimated by *Latent Variable Method* and the Slovak Official NOE estimates (anchoring the figures at a "base" aggregate to determine the adjusted starting point which calibrate the model' estimates). The Figure indicates that the estimates keep a similar in size and in growing tendency.

## Slovenia

The treatment of the NOE in Slovenia was not included in UNECE' survey and any figures connected with the phenomenon are available.

Feige and Urban (2008) published a paper where several estimated have been showed (source Authors' correspondence with Statistical Office of the Republic of Slovenia) (Table 27A),

**Table 27A. - Slovenian Added Value produced by the Underground Economy (2000).**

| years | Adjustment for NOE activities (percentage variation) |
|---|---|
| 2000 | 6.6 |

Source: Feige and Urban (2008)

Table 27B shows the size of the unrecorded sector estimated by *Latent Variable Method* (a statistical *index* that need to monitored through its *percentage variation* and several Base Indices Numbers).

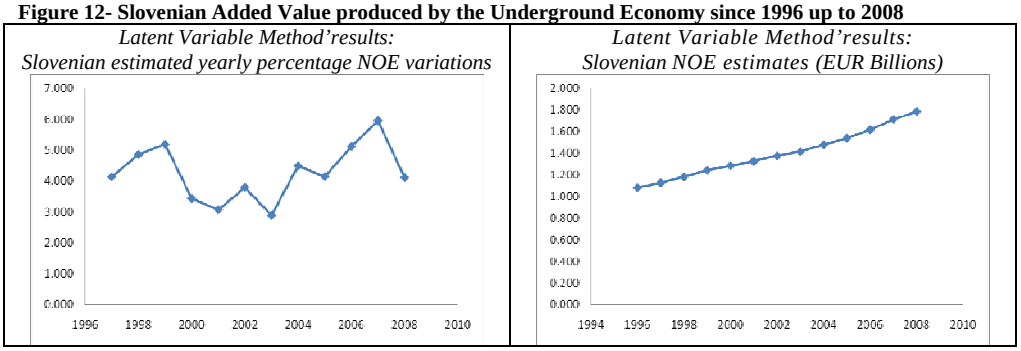
**Table 27B. - Slovenian Added Value produced by the Underground Economy since 1996 up to 2008.**

| Years | Latent Variable Method: Estimated yearly percentage variation | Latent Variable Method: Base Indices Numbers (Base Year: 2000) | Latent Variable Method' estimates (EUR Billions) |
|---|---|---|---|
| 1996 | - | 84.174 | 1.082 |
| 1997 | 4.137 | 87.656 | 1.126 |
| 1998 | 4.853 | 91.910 | 1.181 |
| 1999 | 5.185 | 96.676 | 1.242 |
| 2000 | 3.438 | 100 | 1.285 |
| 2001 | 3.075 | 103.075 | 1.324 |
| 2002 | 3.795 | 106.988 | 1.375 |
| 2003 | 2.892 | 110.082 | 1.414 |
| 2004 | 4.494 | 115.028 | 1.478 |
| 2005 | 4.147 | 119.798 | 1.539 |
| 2006 | 5.116 | 125.927 | 1.618 |
| 2007 | 5.949 | 133.417 | 1.714 |
| 2008 | 4.112 | 138.904 | 1.785 |

Source: Authors' elaboration of data from Annex I

In order to estimate the size of Slovenian NOE it's necessary to anchor the figures at a "base" aggregate through the only one available Slovenian estimates which has been obtained thanks the Feige and Urban' paper.

**Figure 12- Slovenian Added Value produced by the Underground Economy since 1996 up to 2008**



## 5. Summary and conclusion

Table 28A summarizes the estimated sizes of the underground economy obtained by the *Latent Variable* method in percent of official GDP for each of 12 Countries considered.

Due to the fact that more than one Countries don't have any official figures connected to the underground economy, some of them originate by several existing literature evidences (the literature of the last years contains many references to the shadow economy estimates). Particularly, the figures connected with the share of the underground economy as percent of official GDP in Cyprus and Malta are extracted from Fethi, Fethi, and Katircioglu (2006) and from Embaye (2007).

**Tab. 28A - Summary measures of the underground economy estimates as percent of official GDP in each of 12 Countries considered.**

| Countries / Years | Bulgaria | Cyprus | Czech Republic | Estonia | Hungary | Latvia | Lithuania | Malta* | Poland | Romania | Slovakia | Slovenia |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1996 | - | - | - | - | - | - | - | - | - | - | - | 6.64 |
| 1997 | - | - | - | 10.19 | - | - | - | - | 11.16 | - | - | 6.59 |
| 1998 | - | - | - | 10.28 | 11.88 | 14.59 | 17.67 | - | 11.08 | - | 13.40 | 6.66 |
| 1999 | - | 5.35 | - | 10.37 | 11.91 | 14.53 | 17.92 | - | 11.04 | - | 13.25 | 6.64 |
| 2000 | 10.32 | 5.57 | - | 10.31 | 11.90 | 14.38 | 17.97 | 12.10 | 10.93 | 18.25 | 13.11 | 6.60 |
| 2001 | 10.20 | 5.78 | 7.54 | 10.24 | 11.90 | 14.36 | 17.86 | 11.88 | 10.96 | 17.95 | 13.07 | 6.60 |
| 2002 | 10.10 | 5.86 | 7.59 | 10.22 | 11.91 | 14.44 | 17.76 | 12.21 | 11.00 | 17.91 | 13.08 | 6.61 |
| 2003 | 10.49 | 5.87 | 7.64 | 10.31 | 11.92 | 14.56 | 17.80 | 12.08 | 10.97 | 17.92 | 13.06 | 6.61 |
| 2004 | 10.67 | 6.03 | 7.71 | 10.32 | 11.95 | 14.63 | 17.86 | 12.26 | 10.92 | 17.92 | 12.91 | 6.62 |
| 2005 | 10.86 | 6.13 | 7.67 | 10.34 | 11.96 | 14.77 | 17.99 | 12.70 | 11.03 | 18.06 | 12.88 | 6.61 |
| 2006 | 10.82 | 6.31 | 7.63 | 10.38 | 11.96 | 15.01 | 18.13 | 13.01 | 11.11 | 18.23 | 12.66 | 6.58 |
| 2007 | 11.04 | 6.49 | 7.59 | 10.43 | 12.19 | 15.10 | 18.35 | 13.46 | 11.19 | 18.42 | 12.64 | 6.57 |
| 2008 | 11.06 | 6.81 | 7.59 | 10.58 | 12.06 | 15.17 | 18.45 | 13.73 | 11.20 | 18.54 | 12.63 | 6.56 |

Source: Authors' elaboration of data from Annex I.
* Note: Embaye (2007) contains several underground economy estimated for Bulgaria, Cyprus, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovak Republic that don't fit with the figures showed.

**Fig. 13. – Summary measures of the underground economy estimates as percent of official GDP in each of 12 Countries considered.**

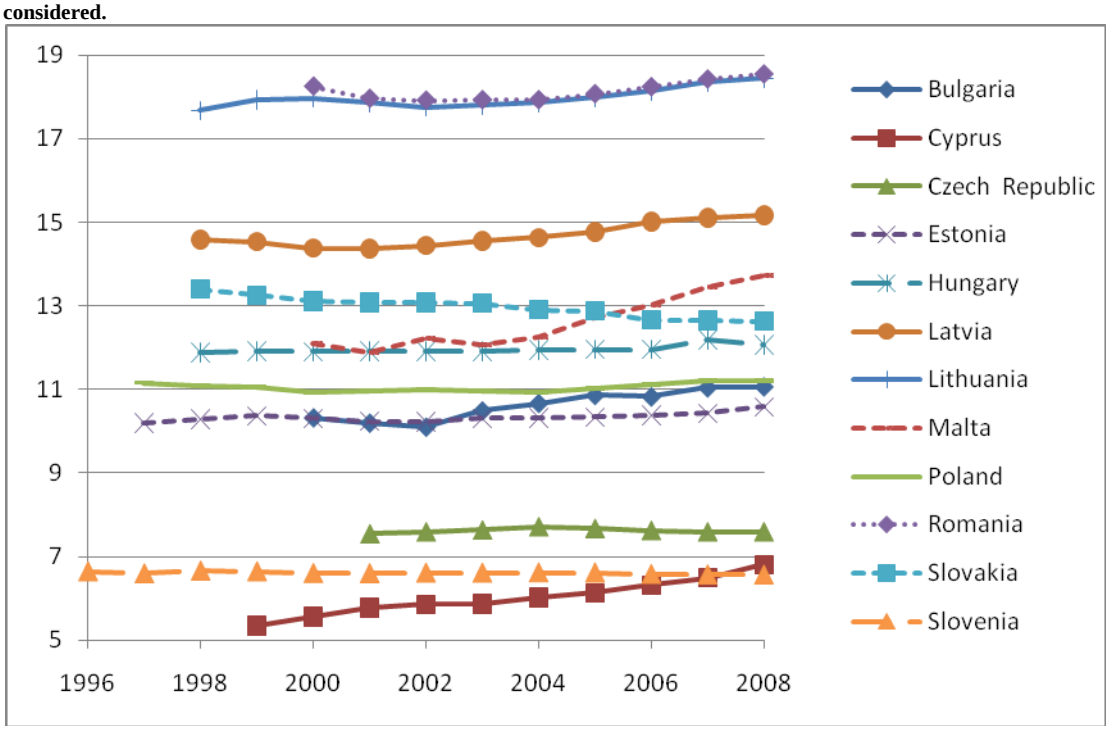


Fig. 13 shows the share of the underground economy as percent of official GDP in the selected European Union (EU) Countries. Comparing the incidence on GDP across various Countries the Fig. 13 suggests that since the beginning of the period the hidden economy in GDP in Romania, Lithuania and Latvia are bigger than the other countries. According the figures, the hidden economy percent of official GDP is almost stable for Slovenia, Poland, Czech Republic, Estonia. Moreover, the hidden economy grew more rapidly in Malta and Cyprus.

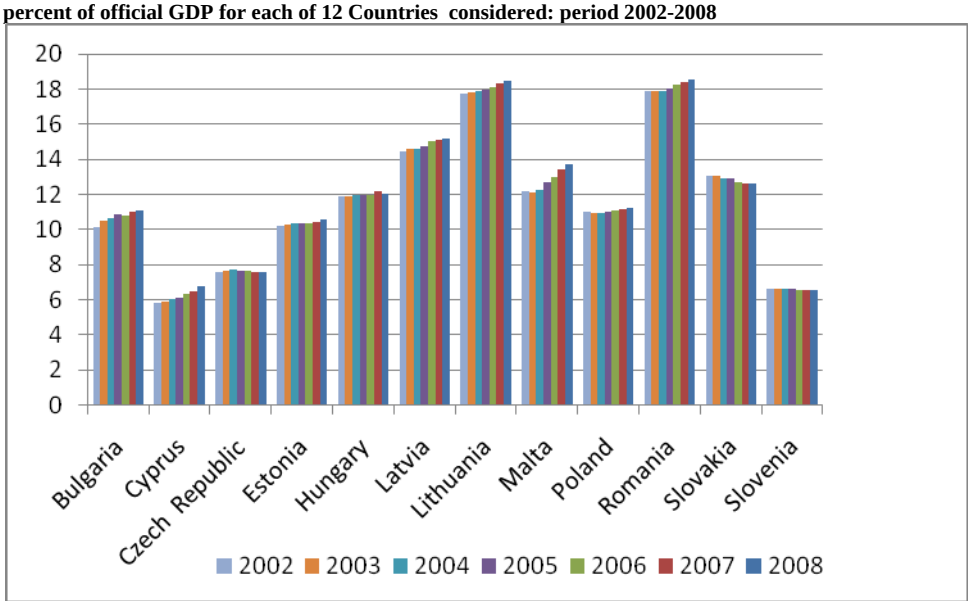
Slovenia, Cyprus and Czech Republic present the lower share of the underground economy as percent of GDP at beginning and at the end of the series.

**Tab. 28B - List of 12 Countries of Euro Area according the rank of the share of the underground economy as percent of GDP: period 1997- 2008.**

| Years / Rank | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Poland | Lithuania | Lithuania | Romania | Romania | Romania | Romania | Romania | Romania | Romania | Romania | Romania |
| 2 | Estonia | Latvia | Latvia | Lithuania | Lithuania | Lithuania | Lithuania | Lithuania | Lithuania | Lithuania | Lithuania | Lithuania |
| 3 | Slovenia | Slovakia | Slovakia | Latvia | Latvia | Latvia | Latvia | Latvia | Latvia | Latvia | Latvia | Latvia |
| 4 | | Hungary | Hungary | Slovakia | Slovakia | Slovakia | Slovakia | Slovakia | Slovakia | Malta | Malta | Malta |
| 5 | | Poland | Poland | Malta | Hungary | Malta | Malta | Malta | Malta | Slovakia | Slovakia | Slovakia |
| 6 | | Estonia | Estonia | Hungary | Malta | Hungary | Hungary | Hungary | Hungary | Hungary | Hungary | Hungary |
| 7 | | Slovenia | Slovenia | Poland | Poland | Poland | Poland | Poland | Poland | Poland | Poland | Poland |
| 8 | | | Cyprus | Bulgaria | Estonia | Estonia | Bulgaria | Bulgaria | Bulgaria | Bulgaria | Bulgaria | Bulgaria |
| 9 | | | | Estonia | Bulgaria | Bulgaria | Estonia | Estonia | Estonia | Estonia | Estonia | Estonia |
| 10 | | | | Slovenia | Czech Republic | Czech Republic | Czech Republic | Czech Republic | Czech Republic | Czech Republic | Czech Republic | Czech Republic |
| 11 | | | | Cyprus | Slovenia | Slovenia | Slovenia | Slovenia | Slovenia | Slovenia | Slovenia | Cyprus |
| 12 | | | | | Cyprus | Cyprus | Cyprus | Cyprus | Cyprus | Cyprus | Cyprus | Slovenia |

Regarding the ranking of the hidden economy' measures six Countries occupy a position in the middle over the entire period (Latvia, Slovakia, Malta, Hungary, Poland, Estonia, Bulgarian)). Romania is consistently at the top of the list. Only in Slovakia, the hidden economy' ranking changed connecting the decrease of the incidence of the shadow economy on GDP

**Fig. 14. – Estimated sizes of the underground economy obtained by the Latent Variable Method in percent of official GDP for each of 12 Countries considered: period 2002-2008**




The estimated sizes of the underground economy obtained by the *Latent Variable* method in percent of official GDP for the final years (2002-2008) are showed in the Fig. 14 for each of 12 Countries.

# ANNEX I

**Table 29. - Bulgarian indicators over the period 2000 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 2000 | 1160.403 | 0.167 | 1213.864 | 5039.608 | 0.674 | 1823.995 | 14.596 |
| 2001 | 1156.472 | 0.202 | 1575.302 | 6340.281 | 0.679 | 1911.678 | 15.190 |
| 2002 | 1164.768 | 0.189 | 1705.119 | 7083.566 | 0.668 | 2010.561 | 15.870 |
| 2003 | 1336.316 | 0.141 | 1980.800 | 8418.249 | 0.663 | 2124.639 | 16.666 |
| 2004 | 1473.945 | 0.126 | 2366.195 | 10380.438 | 0.672 | 2280.029 | 17.773 |
| 2005 | 1621.549 | 0.103 | 2758.683 | 12903.364 | 0.670 | 2438.053 | 18.881 |
| 2006 | 1693.976 | 0.087 | 3185.693 | 16371.878 | 0.688 | 2609.744 | 20.075 |
| 2007 | 1867.659 | 0.065 | 3800.616 | 21495.508 | 0.706 | 2790.614 | 21.312 |
| 2008 | 1974.559 | 0.055 | 4105.247 | 23359.865 | 0.725 | 2986.535 | 22.644 |

Source:
*** Bulgarian National Bank - website www.bnb.bg
[Statistics - Monetary Statistics - Monetary Survey - ECB Definition on Monetary Aggregates]
National Currency & Exchange rate: EUR / BGN Bulgarian Lev = 1 / 1.95583 BGN

**Table 30. - Cyprian indicators over the period 1999 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1999 | 3796.372 | 0.032 | 515.052 | 10588.408 | 0.780 | 24207.256 | 16.624 |
| 2000 | 3984.143 | 0.032 | 495.431 | 11541.698 | 0.813 | 25160.553 | 17.461 |
| 2001 | 4391.885 | 0.026 | 500.838 | 13078.845 | 0.816 | 25883.710 | 18.157 |
| 2002 | 4567.224 | 0.029 | 513.874 | 14426.090 | 0.810 | 26100.481 | 18.539 |
| 2003 | 4614.533 | 0.036 | 681.251 | 15007.332 | 0.821 | 26138.330 | 18.892 |
| 2004 | 4965.438 | 0.036 | 753.680 | 15850.813 | 0.829 | 26610.081 | 19.686 |
| 2005 | 5109.002 | 0.043 | 892.878 | 17464.541 | 0.829 | 27003.776 | 20.463 |
| 2006 | 5539.100 | 0.040 | 1119.871 | 20057.951 | 0.827 | 27557.578 | 21.292 |
| 2007 | 5821.791 | 0.034 | 1282.534 | 24176.820 | 0.829 | 28212.634 | 22.221 |
| 2008 | 6809.916 | 0.032 | 1445.196 | 28295.689 | 0.820 | 28911.659 | 22.975 |

Source:
*** Central Bank of Cyprus -website www.centralbank.gov.cy
[Statistics : 1) Money, Banking and other Financial Statistics ; 2) Monetary and Financial Statistics]
National Currency & Exchange rate: EUR / CYP Cyprus Pound = 1 / 0.566 CYP
*Note*: 1996-2007 The Money, Banking and other Financial Statistics include information on monetary aggregates, interest rates, stock market indicators, reserve assets and exchange rate indices. As from January, 2008 this publication has been replaced by the "Monetary and Financial Statistics Publications".
2008 - The "Monetary and Financial Statistics" is a monthly publication which replaces the "Monetary Survey" and "Money, Banking and other Financial Statistics".

**Table 31. - Czech indicators over the period 2001 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 2001 | 2940.245 | 0.067 | 6668.694 | 47369.155 | 0.784 | 8654.119 | 88.062 |
| 2002 | 3069.393 | 0.060 | 7766.321 | 55368.481 | 0.784 | 8822.392 | 89.733 |
| 2003 | 3264.616 | 0.062 | 8691.080 | 59344.617 | 0.778 | 9132.793 | 92.965 |
| 2004 | 3565.435 | 0.071 | 9296.215 | 61990.177 | 0.776 | 9527.156 | 97.134 |
| 2005 | 3747.868 | 0.065 | 10356.781 | 68557.055 | 0.784 | 10095.259 | 103.269 |
| 2006 | 3946.838 | 0.058 | 11592.587 | 77920.267 | 0.783 | 10743.120 | 110.278 |
| 2007 | 4199.445 | 0.042 | 12723.388 | 90642.434 | 0.781 | 11387.728 | 117.527 |
| 2008 | 4371.779 | 0.035 | 14352.085 | 103364.433 | 0.781 | 11843.336 | 122.266 |

Source:
*** Czech National Bank - ARAD System
website www.cnb.cz
National Currency & Exchange rate: EUR / CSK Czech Koruna = 1 / 25.47

**Table 32. - Estonian indicators over the period 1997 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1997 | 1294.609 | 0.103 | 567.585 | 1307.706 | 0.790 | 3764.825 | 5.293 |
| 1998 | 1376.960 | 0.099 | 579.674 | 1381.962 | 0.783 | 4003.338 | 5.577 |
| 1999 | 1379.621 | 0.125 | 736.958 | 1682.990 | 0.758 | 4037.997 | 5.569 |
| 2000 | 1453.590 | 0.138 | 843.962 | 2105.636 | 0.749 | 4447.045 | 6.102 |
| 2001 | 1503.605 | 0.126 | 761.125 | 2605.629 | 0.740 | 4805.709 | 6.569 |
| 2002 | 1585.039 | 0.108 | 749.923 | 2896.128 | 0.739 | 5203.268 | 7.083 |
| 2003 | 1739.841 | 0.102 | 859.725 | 3210.658 | 0.753 | 5594.945 | 7.587 |
| 2004 | 1863.359 | 0.104 | 1065.585 | 3717.853 | 0.745 | 6038.636 | 8.159 |
| 2005 | 2026.430 | 0.088 | 1416.914 | 5277.898 | 0.736 | 6608.957 | 8.906 |
| 2006 | 2258.163 | 0.062 | 1851.712 | 6766.652 | 0.758 | 7310.092 | 9.830 |
| 2007 | 2440.561 | 0.054 | 1881.355 | 7674.038 | 0.775 | 7786.207 | 10.452 |
| 2008 | 2539.575 | 0.058 | 2417.764 | 8092.383 | 0.783 | 7680.745 | 10.293 |

Source:
*** Information Expert - International and Public Relations Department - Eesti Pank
website www.bankofestonia.info
National Currency & Exchange rate: EUR / EKK Estonian kroon = 1 / 15.65

**Table 33. - Hungarian Indicators over the period 1998 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1998 | 1716.445 | 0.09 | 2,452.557 | 16,051.526 | 0.663 | 4403.083 | 45.262 |
| 1999 | 1798.157 | 0.075 | 3,135.610 | 18,579.837 | 0.675 | 4598.519 | 47.151 |
| 2000 | 1867.923 | 0.07 | 3,240.734 | 20,826.187 | 0.676 | 4852.289 | 49.598 |
| 2001 | 1935.878 | 0.063 | 3,803.880 | 24,322.044 | 0.672 | 5060.447 | 51.618 |
| 2002 | 2009.957 | 0.062 | 4,332.916 | 27,654.640 | 0.669 | 5294.940 | 53.875 |
| 2003 | 2084.416 | 0.061 | 4,937.792 | 31,438.069 | 0.677 | 5533.698 | 56.125 |
| 2004 | 2187.197 | 0.061 | 4,918.347 | 34,562.364 | 0.671 | 5814.908 | 58.828 |
| 2005 | 2271.877 | 0.07 | 5,866.831 | 39,055.133 | 0.679 | 6063.670 | 61.228 |
| 2006 | 2347.066 | 0.072 | 6,739.634 | 43,676.103 | 0.687 | 6315.373 | 63.637 |
| 2007 | 2546.791 | 0.071 | 7,581.240 | 47,429.567 | 0.69 | 6404.998 | 64.473 |
| 2008 | 2491.329 | 0.076 | 7,835.285 | 52,245.911 | 0.683 | 6533.554 | 65.698 |

Source:
*** Magyar Nemzeti Bank [Ungarian National Bank]
website http://english.mnb.hu/engine.aspx
[Monetary Statistics - English Site - Statistics - Statistical Time Series - Tab.4 - Monetary aggregates and counterparts ]
National Currency & Exchange rate: EUR / HUF Hungarian Forint = 1 / 272.763 HUF

**Table 34. - Latvian indicators over the period 1998 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1998 | 853.687 | 0.151 | 533.257 | 2250.534 | 0.763 | 2531.306 | 6.127 |
| 1999 | 844.346 | 0.144 | 606.894 | 2415.468 | 0.752 | 2637.856 | 6.330 |
| 2000 | 839.735 | 0.144 | 686.939 | 3067.654 | 0.730 | 2846.221 | 6.767 |
| 2001 | 882.513 | 0.142 | 791.910 | 3713.574 | 0.727 | 3092.215 | 7.311 |
| 2002 | 939.564 | 0.133 | 886.768 | 4542.800 | 0.749 | 3318.288 | 7.784 |
| 2003 | 1020.496 | 0.106 | 971.514 | 5545.649 | 0.737 | 3578.890 | 8.344 |
| 2004 | 1115.366 | 0.106 | 1036.035 | 6958.838 | 0.744 | 3910.060 | 9.069 |
| 2005 | 1261.561 | 0.091 | 1249.537 | 5563.025 | 0.744 | 4348.295 | 10.028 |
| 2006 | 1493.043 | 0.074 | 1529.554 | 7770.973 | 0.762 | 4905.491 | 11.256 |
| 2007 | 1658.277 | 0.064 | 1494.801 | 8890.471 | 0.776 | 5442.515 | 12.416 |
| 2008 | 1650.560 | 0.080 | 1450.078 | 8495.656 | 0.786 | 5420.103 | 12.307 |

Source:
*** Bank of Latvia
Monetary Bullettin [website www.bank.lv]
National Currency & Exchange rate: EUR / Latvian Lat = 1 / 0.7021 Lats

**Table 35. - Lithuanian indicators over the period 1998 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1998 | 1126.843 | 0.146 | 810.357 | 2449.722 | 0.787 | 3633.948 | 12.898 |
| 1999 | 1152.423 | 0.151 | 793.269 | 2637.685 | 0.770 | 3606.107 | 12.709 |
| 2000 | 1199.017 | 0.186 | 769.984 | 3084.193 | 0.749 | 3766.421 | 13.228 |
| 2001 | 1218.169 | 0.186 | 845.661 | 3741.949 | 0.742 | 4045.627 | 14.107 |
| 2002 | 1245.538 | 0.142 | 1087.929 | 4469.677 | 0.743 | 4347.773 | 15.083 |
| 2003 | 1365.717 | 0.127 | 1341.549 | 5337.900 | 0.754 | 4816.989 | 16.639 |
| 2004 | 1460.964 | 0.110 | 1483.231 | 6528.528 | 0.734 | 5197.573 | 17.857 |
| 2005 | 1595.414 | 0.082 | 1772.127 | 8645.302 | 0.721 | 5645.101 | 19.274 |
| 2006 | 1745.253 | 0.058 | 2098.152 | 10526.529 | 0.705 | 6125.010 | 20.789 |
| 2007 | 1971.270 | 0.043 | 2348.181 | 12809.256 | 0.710 | 6705.171 | 22.644 |
| 2008 | 2085.969 | 0.061 | 2467.678 | 12761.498 | 0.714 | 6975.540 | 23.522 |

Source:
*** Central Bank of the Republic of Lithuania - website www.lb.lt
National Currency & Exchange rate: EUR / LTL Lithuanian Lita = 1 / 3.4528 Litas

**Table 36. - Maltese indicators over the period 2000 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 2000 | 2900.924 | 0.064 | 923.100 | 4528.800 | 0.803 | 10298.646 | 3.973 |
| 2001 | 3022.187 | 0.069 | 975.700 | 4932.400 | 0.821 | 9946.365 | 3.909 |
| 2002 | 3195.044 | 0.066 | 1017.500 | 5492.500 | 0.807 | 10130.844 | 4.012 |
| 2003 | 3147.773 | 0.069 | 1072.500 | 6636.900 | 0.808 | 10033.569 | 3.999 |
| 2004 | 3302.825 | 0.066 | 1132.100 | 6797.900 | 0.807 | 10078.800 | 4.044 |
| 2005 | 3505.094 | 0.064 | 1162.200 | 7085.000 | 0.791 | 10363.835 | 4.185 |
| 2006 | 3582.007 | 0.063 | 1112.900 | 7451.700 | 0.781 | 10622.330 | 4.317 |
| 2007 | 3785.353 | 0.059 | 610.200 | 8275.300 | 0.776 | 10915.026 | 4.477 |
| 2008 | 3880.009 | 0.056 | 669.227 | 8431.613 | 0.769 | 11117.504 | 4.601 |

Source:
*** Monetary & Financial Statistics - Statistics Office - Central Bank of Malta - website www.centralbankmalta.org

**Table 37. - Polish indicators over the period 1997 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1997 | 1504.078 | 0.091 | 10371.071 | 43965.222 | 0.731 | 4126.376 | 159.483 |
| 1998 | 1532.753 | 0.085 | 13148.603 | 54823.064 | 0.725 | 4330.385 | 167.428 |
| 1999 | 1579.777 | 0.118 | 12942.642 | 65857.977 | 0.721 | 4526.677 | 175.003 |
| 2000 | 1545.369 | 0.144 | 11954.355 | 73633.367 | 0.718 | 4744.540 | 182.446 |
| 2001 | 1554.050 | 0.169 | 14631.864 | 80752.242 | 0.716 | 4827.549 | 184.645 |
| 2002 | 1602.557 | 0.192 | 15208.309 | 79496.674 | 0.708 | 4899.506 | 187.310 |
| 2003 | 1640.555 | 0.190 | 16254.338 | 84034.368 | 0.698 | 5092.410 | 194.553 |
| 2004 | 1689.015 | 0.182 | 16954.044 | 90371.112 | 0.699 | 5367.725 | 204.951 |
| 2005 | 1824.687 | 0.166 | 17280.637 | 101755.764 | 0.708 | 5564.319 | 212.365 |
| 2006 | 1997.520 | 0.130 | 21280.809 | 117943.742 | 0.701 | 5914.579 | 225.590 |
| 2007 | 2198.916 | 0.090 | 25164.069 | 134643.209 | 0.700 | 6311.042 | 240.580 |
| 2008 | 2319.273 | 0.064 | 30968.186 | 161841.441 | 0.709 | 6645.483 | 253.192 |

Source:
*** National Bank of Poland - website www.nbp.pl
[Statistics - Monetary and Financial Statistics - Monetary aggregates & Divisia monetary indexes]
National Currency & Exchange rate: EUR / PLN Polish złoty = 1 / 4.08 PLN

**Table 38. - Romania indicators over the period 2000 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 2000 | 264.013 | 0.080 | 614.368 | 4416.706 | 0.757 | 867.348 | 19.183 |
| 2001 | 266.066 | 0.073 | 850.477 | 6456.134 | 0.743 | 921.006 | 20.285 |
| 2002 | 273.269 | 0.092 | 994.940 | 7985.298 | 0.710 | 971.812 | 21.324 |
| 2003 | 284.713 | 0.076 | 1383.723 | 10996.444 | 0.702 | 1026.173 | 22.438 |
| 2004 | 304.955 | 0.091 | 1798.735 | 15401.718 | 0.708 | 1116.811 | 24.335 |
| 2005 | 325.383 | 0.078 | 2717.184 | 20604.296 | 0.694 | 1167.542 | 25.353 |
| 2006 | 361.233 | 0.082 | 3610.979 | 26661.337 | 0.707 | 1263.634 | 27.344 |
| 2007 | 395.479 | 0.072 | 5087.470 | 35302.721 | 0.701 | 1344.649 | 28.996 |
| 2008 | 436.679 | 0.067 | 6041.480 | 41464.558 | 0.706 | 1465.367 | 31.490 |

Source:
*** National Bank of Romania - website www.bnro.ro
National Currency & Exchange rate:
2000-2004 - mlld of Romanian "old" Lei (ROL)
2005-2008 - millions Romanian Leu (RON) [1 EUR = 4.19 RON]
On 1 July 2005, the leu was revalued at the rate of 10,000 "old" lei (ROL) for one "new" leu (RON)
[1 Romanian "new" Leu (RON) = 10,000 Romanian "old" Lei (ROL)]

**Table 39. - Slovak indicators over the period 1998 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1998 | 2093.961 | 0.122 | 2424.570 | 17796.177 | 0.769 | 5698.428 | 30.734 |
| 1999 | 2014.278 | 0.163 | 2599.525 | 19655.265 | 0.763 | 5694.638 | 30.743 |
| 2000 | 1966.910 | 0.189 | 2739.489 | 20398.900 | 0.765 | 5767.835 | 31.161 |
| 2001 | 1985.877 | 0.198 | 2949.436 | 20584.809 | 0.774 | 5990.164 | 32.221 |
| 2002 | 2084.254 | 0.186 | 3019.418 | 22257.988 | 0.762 | 6274.584 | 33.752 |
| 2003 | 2172.836 | 0.174 | 3159.382 | 22629.806 | 0.766 | 6570.586 | 35.350 |
| 2004 | 2183.948 | 0.174 | 3334.337 | 24302.985 | 0.765 | 6903.218 | 37.173 |
| 2005 | 2313.755 | 0.155 | 3977.840 | 26055.889 | 0.765 | 7349.151 | 39.606 |
| 2006 | 2342.036 | 0.123 | 4354.087 | 30145.435 | 0.764 | 7966.943 | 42.971 |
| 2007 | 2584.039 | 0.099 | 4703.997 | 33692.370 | 0.759 | 8785.358 | 47.450 |
| 2008 | 2745.228 | 0.084 | 1600.576 | 35551.458 | 0.764 | 9337.509 | 50.482 |

Source:

*** Narodna Banka Slovenska [NB] - website www.nbs.sk/en/statistics
[Monetary statistics of monetary financial institutions]
National Currency & Exchange rate: EUR / SKK Slovak koruna = 1 / 30.1260 SKK

Note: Evaluating developments in monetary and banking statistics: The transition from a national methodology for monetary and banking statistics to the harmonized methodology of the ECB began to be made in 2002. During 2003, this process centred on a new concept for compiling balance sheet statistics for the institutional sector of monetary financial institutions, monetary aggregates, and the M3 aggregate's counterparty assets. [Source: 2005 Statistics - AnnualReport - chap12 - url www.nbs.sk/_img/Documents/_Publikacie%5CAnnualReport%5CENG2005%5CAR2005_chap12.pdf]

**Table 40. - Slovenian indicators over the period 1996 to 2008.**

| Year | Tax burden* (EUR) | Unemployment male rate** | Currency (EUR million)*** | M2 (EUR million)*** | Sharing to the official economy**** | Per-capita GDP - constant prices (EUR -Base Year: 2000)***** | GDP - constant prices (Base Year: 2000) (EUR Billions)***** |
|---|---|---|---|---|---|---|---|
| 1996 | 3121.298 | 0.070 | 856.600 | 9029.895 | 0.711 | 8198.328 | 16.290 |
| 1997 | 3183.421 | 0.068 | 1153.600 | 9127.075 | 0.718 | 8604.272 | 17.079 |
| 1998 | 3392.571 | 0.073 | 1242.700 | 9224.255 | 0.73 | 8967.292 | 17.740 |
| 1999 | 3592.330 | 0.072 | 1480.300 | 10196.058 | 0.722 | 9408.521 | 18.702 |
| 2000 | 3664.974 | 0.065 | 1510.000 | 10779.140 | 0.717 | 9782.818 | 19.469 |
| 2001 | 3795.028 | 0.057 | 1777.300 | 11265.042 | 0.725 | 10066.374 | 20.073 |
| 2002 | 3958.472 | 0.059 | 1896.100 | 11750.943 | 0.729 | 10429.098 | 20.806 |
| 2003 | 4088.652 | 0.063 | 1925.800 | 11848.123 | 0.716 | 10715.064 | 21.392 |
| 2004 | 4284.213 | 0.059 | 2222.800 | 12431.205 | 0.742 | 11184.737 | 22.343 |
| 2005 | 4495.670 | 0.061 | 2371.300 | 13403.008 | 0.751 | 11614.858 | 23.269 |
| 2006 | 4698.369 | 0.049 | 2549.500 | 14495.768 | 0.749 | 12236.283 | 24.600 |
| 2007 | 4958.034 | 0.040 | 2698.000 | 14605.044 | 0.758 | 12983.964 | 26.092 |
| 2008 | 5163.306 | 0.040 | 2995.000 | 14714.320 | 0.758 | 13516.509 | 27.203 |

Source*:*

***Bank of Slovenia - Monetary Aggregates
http://www.bsi.si/pxweb/Dialog/Database/ang/serije/01_denar_banke/01_denar_banke.asp
National Currency % Exchange rate: the Tolar was the currency of Slovenia from 1991 until December 31, 2006: EUR / Slovenian Tolar = 1 / 260.63

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Shared source*:*

* Statistical Office of the European Union (EUROSTAT) and the Commission's Directorate-General for Taxation and Customs Union (2009), Taxation trends in the European Union, website http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm

** EUROSTAT:
[Data] - [Population and social conditions] - [Labour market] - [LFS main indicators] - [Unemployment - LFS adjusted serie] - [Unemployment rate by gender]
website: http://epp.eurostat.ec.europa.eu/portal

**** EUROSTAT - Activity male rate (between 15 and 64 years):
[Data] - [Population and social conditions] - [Labour market] - [Employment and unemployment (Labour Force Survey)] - [LFS series - Detailed annual survey results] - [Activity and activity rates - LFS series]
Activity rates by sex, age groups and nationality (%)
website http://epp.eurostat.ec.europa.eu

***** International Monetary Fund (IMF)
Gross Domestic Product, constant prices (National currency - Euros)
Base Year: 2000
[Data & Statistics] -[World Economic and Financial Surveys] - [World Economic Outlook Databases (WEO)]
website www.imf.org/external/pubs/ft/weo/2008/02/weodata/index.aspx

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