

***ESTIMATING THE SIZE OF ROMANIAN SHADOW ECONOMY.  
A LABOUR APPROACH***

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**Abstract**

*The size of Romanian shadow economy was estimated using the labour approach covering the period 2000-2009. Two types of data were used: administrative and survey. The empirical results reveal, for both source data (administrative and survey) the existence of a negative relation between activity rates and the estimated value of unofficial employment as expected. The analysis of the data for the period 2001-2009 indicates a substantial difference in the results obtained. While the figures from administrative data report only 800 thousand persons unofficially employed, the survey results reveal about 1900 thousand persons that work in unofficial sector. This difference is due to the different ways of data collecting for the official employment and unemployment. Correlation coefficients for the period 2001-2009 reveal for both types of data (administrative and survey) the presence of a negative relationship between official unemployment and unofficial employment. Given results are approximatively and show the level of Romanian shadow economy which is presumably underestimated. These phenomena occur because of available statistics and method limitations.*

**Keywords:** shadow economy, unofficial employment, official employment, official unemployment, labour approach, Romania

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## 1. Introduction

The size of shadow economy was estimated using the labour approach that relies in the difference of actual (real) and official (registered) use of labour. There are two sources of evidence for these two aspects. On the one hand, the Labour Force Survey (LFS) reveals the actual side. On the other hand, the official records from the Romanian Employment Agency (REA) or the Romanian Institute of Statistics (RIS) provide the official labour use side in the labour market.

The main idea is to calculate the value of shadow economy using labour approach for the period 2000-2010 and two types of data: administrative and survey data. The basic difference in the data is their application and comparability. Evaluations based on administrative data are impossible to compare with other countries as they represent a typically Romanian way of data collecting as opposed to survey data. The empirical approach is based on Crnkovic-Pozaić (1999) and Svec (2009) for Croatia, Nastav and Bojnec (2007) for Slovenia.

## 2. The labour approach

According to Crnkovic-Pozaić (1999) and Svec (2009), the basic idea underlying this method is activity rates follow-up in a certain country and comparison of the results with those in other countries. The method is one of indirect methods and is meaningful only if the changes in official population activity rates are caused by factors related to the underground economy. Its advantages are availability of data on rates and the simple calculation. The number of unemployed who work in unofficial economy can be revealed using this method, but the number of those employed in both unofficial and official economy remains unknown. The reduction of the rate can indicate the retreat of population from official and participation in unofficial economy.

The labour approach is rather rough and limited. One of the main disadvantages is the fact that the initial value of unofficial employment is always zero. The assumption is not realistic, but the method algorithm itself gives such value. Although its' simplicity, it has the following drawbacks:

- the assumption on the full-time participation of the unemployed in the shadow economy (and that no one with an official job participates (part-time) in the shadow economy) is not properly grounded, due to sampling errors, underreporting and the fact that not all of those registered as unemployed according to the LFS work full-time in the shadow economy. Jon Isachsen and Strøm (1985, 35) stress that 'it is more common to work part-time in both sectors'.
- the problem of underreporting (understating) of the data to the LFS and REA is also present.

- different data sources on the labour force in the economy are very limited in their consistency: the LFS measures the *employment*, whereas the administrative sources usually report the *jobs*.

-the method doesn't include and measure second job owners.

The method was more important for the 90-ies, but today other methods are more credible.

According to Crnković-Pozaić (1997), the activity rate can be defined as a ratio of persons who either are or wish to be economically active to all persons of working-age:

$$\text{activity rate} = (\text{the employed} + \text{the unemployed}) / \text{persons of working-age} \quad (1)$$

$$\text{the employed} + \text{the unemployed} = \text{labour force (total labour supply, total working population, de facto economically active population)} \quad (2)$$

Alternative definition:

$$\text{activity rate} = (\text{the employed} + \text{the unemployed}) / \text{total population} \quad (3)$$

The main steps are:

- Data on the employed and unemployed should be obtained from the National Institute of Statistics and de facto active population calculated according to the formula (2).
- Activity rate is to be calculated using the formula (1) or (3).
- Zero activity rate is defined according to the formula (1) or (3), in the process of which initial data of the given time series are used. Hypothetically active population for the time period  $t$  is equal to the product of multiplication of the zero activity rate and total population in year  $t$ .
- After the values from step 1), 2) and 3) have been calculated, it is possible to calculate the value of the employed in unofficial economy according to the formula (4). By this, the so called *hypothetical* activity rates are calculated and then compared in each of the years to the official, *de-facto* activity rates. The latter would normally be (by assumption) lower and the difference between the hypothetical and de-facto active population is the measure of the number of people working in the shadow economy.
- The share of employed in the unofficial economy is computed as:

$$\text{share of employed in the unofficial economy} = (\text{hypothetically active} - \text{de facto active}) / \text{de facto active} \quad (4)$$

So, the method point out that employment data from official sources and labour force surveys must be compared. The difference of the officially recorded and the expected rates of activity of the population are analysed. The expected rates are based on rates recorded in the reference years (when it is assumed there was no UE). The comparison takes various assumptions as its point of departure, and additional data from the labour force survey are also used as well.

In the paper, I will estimate the size of the shadow economy using the labour approach, differentiating between the two methods of employment estimate in unofficial economy: the one based on historical activity rates (administrative data) and the other based on labour force survey (LFS).

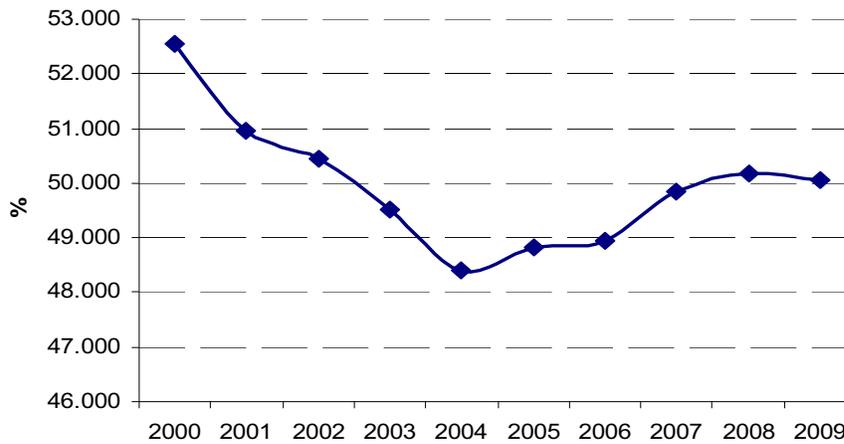
### **3. Data**

The size of the shadow economy is estimated using the labour approach, differentiating between the two methods of employment estimate in unofficial economy: the one based on historical activity rates (administrative data) and the other based on labour force survey (LFS) using annual data covering the period 2000-2009. The main sources of data are Labour force survey (LFS), Tempo database and Labour force balance.

### **4. Empirical results**

#### ***4.1. Administrative data***

In the estimation process of the shadow economy using the labour approach, we are forced to use annual data covering the period 2000-2009, since the administrative data are provided only annually. The main data source is *the Labour force balance*. The main empirical results are presented in table 1. It needs emphasizing that alternative definition (activity rate is equal to ratio of de facto active population to total population 15 years and over) was used in the calculation, because data on economically active population are not available.



Source: Labour force balance, National Institute of Statistics.

**Fig. 1. The evolution of activity rates for 2000-2009**

There is a significant drop in activity rate until 2004, after which growth is achieved. In the period 2002-2004 de facto active population declines much faster than the total population grows. This phenomenon results in the drop in the activity rate. After 2004 de facto active population grows and thus, grows the rate. The values of the rates vary between 48.4% and 52.

Table 1. Administrative data for 2000-2009\*

	-thousand persons-							
	Total population <sup>3</sup>	Civil employment <sup>4</sup>	Registered unemployment <sup>5</sup>	De facto active population	Alternative activity rate <sup>6</sup> %	Hypothetically active population	Unofficial employment	Unofficial employment (%)
2000	18337.13	8629.3	1007.131	9636.431	52.55	9636.43	0.00	0.00
2001	18422.77	8562.5	826.932	9389.432	50.97	9681.44	292.01	3.11
2002	18015.5	8329	760.623	9089.623	50.45	9467.41	377.79	4.16
2003	18100.88	8305.5	658.891	8964.391	49.52	9512.28	547.89	6.11
2004	18173.18	8238.3	557.892	8796.192	48.40	9550.27	754.08	8.57
2005	18251.14	8390.4	522.967	8913.367	48.84	9591.25	677.88	7.61
2006	18250.29	8469.3	460.495	8929.795	48.93	9590.80	661.00	7.40
2007	18249.12	8725.9	367.838	9093.738	49.83	9590.19	496.45	5.46
2008	18238.97	8747	403.441	9150.441	50.17	9584.85	434.41	4.75
2009	18224.18	8410.7	709.383	9120.1	50.04	9577.08	456.98	5.01

Source: Labour force Balance, National Institute of Statistics, Tempo database.

\* Figures calculated for age of 15 and over were used.

<sup>3</sup> The following definitions are provided by the Romanian Statistical Yearbook, 2009-publication of the National Institute of Statistics ([www.insse.ro](http://www.insse.ro)).

**Total population**, on July 1 was calculated from data of the Population and Housing Census (march 2002), regarding the population with permanent residence in Romania, plu natural increase and balance of internal and international migration determined by permanent residence changes for population at national level; for population at locality level the balance of internal migration determined by permanent residence changes and number of persons with temporary residence in locality was added.

<sup>4</sup> **Civil employment** includes, according to the methodology used for the labour force balance, all persons who, during the reference year, carried out a socio-economic lucrativ activity, excepting military staff and similar (Ministry of National Defence, Ministry of Administration and Interior, Romanian Intelligence Service staff, conscripts), political and community organizations employees and the convicts.

<sup>5</sup> **Registered unemployed** represent persons who fulfill the cumulative conditions stipulated by the Law no.76/2002 regarding the system of unemployment insurance and employment incentives and who register to the employment agency in the territorial zone they have domicile or, by case, residence, or another provider of employment services functioning according to the law, in order to get a job.

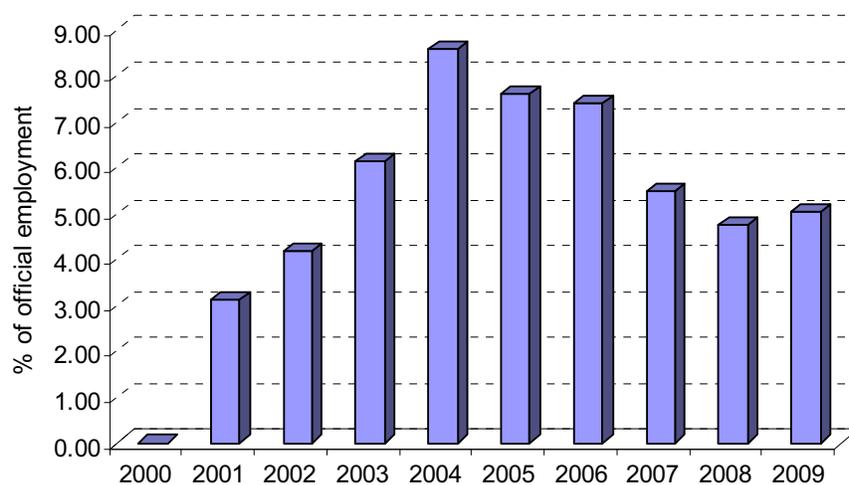
**According to the legislation in force**, unemployed quality is held by person who fulfills the following cumulative conditions:

- a) he is looking for a job from 16 years old at least to pension age;
- b) his health, his physical and psychological capacities make him able to work;
- c) he has no job, he gets no income or, from legal activities, he gets an income lower than the value of reference social indicator according to the Law no.76/2002;
- d) he is available to start work in the next period if he finds a job;
- e) he is registered to the National Agency for Employment.

<sup>6</sup> Alternative activity rate = (the employed + the unemployed) / total population aged 15 years and over.

By comparing both figures we find out that activity rate is inversely proportional to estimate of people employed in unofficial economy. As the activity rate falls, the unofficial employment grows. The obtained result is meaningful as the population switches from official to unofficial economy. One of the reasons for switching can be aspiration for higher earnings (black labour brings higher earnings). The assumption that everybody who leaves labour force enters unofficial economy is not entirely correct. Naturally, there is always a share of active population that becomes inactive, but this method cannot calculate its percentage.

However, the empirical results are approximatively, revealing the fact that the level of Romanian shadow economy is presumably underestimated due mainly to available statistics and method limitations.



**Fig.2. Estimate of employment in unofficial economy for 2000-2009**

Analyzing possible correlations between employment in the official economy, unemployment in official economy and employment in unofficial economy for the period 2001-2009 (we have ignored the initial year, in which the labour approach suppose that the unofficial employment is zero, because the difference between hypothetically active and de facto active population is zero), we can notice the existence of a negative significant relationship between official employment and official registered unemployment(-0.50). It is realistic to assume that the increase in the number of employed persons in official economy at the same time decreases the number of the registered unemployed.

The inverse relationship between official employment and unofficial employment (-0.45) can be explained by the fact that the persons employed in official economy, satisfied with

their jobs and income do not think about moving to underground economy. Instead, the last year is characterized by a decline in the official employment, which could have an impact of the growth of unofficial employment.

The number of registered unemployed decreased over the period, meaning the more and more Romanian people works, but in the official statistics the number of employees is decreasing during the period. A possible explanation could be the fact that there are unemployed persons who work, meaning that a decrease of the unemployed number leads to an increase of the unofficial employment, by involving those unemployed in unofficial sector. This could also explain the negative correlation founded between official unemployment and unofficial employment (-0.50).

**Table 2. Pearson's correlation coefficients for the period 2001-2009  
(administrative data)**

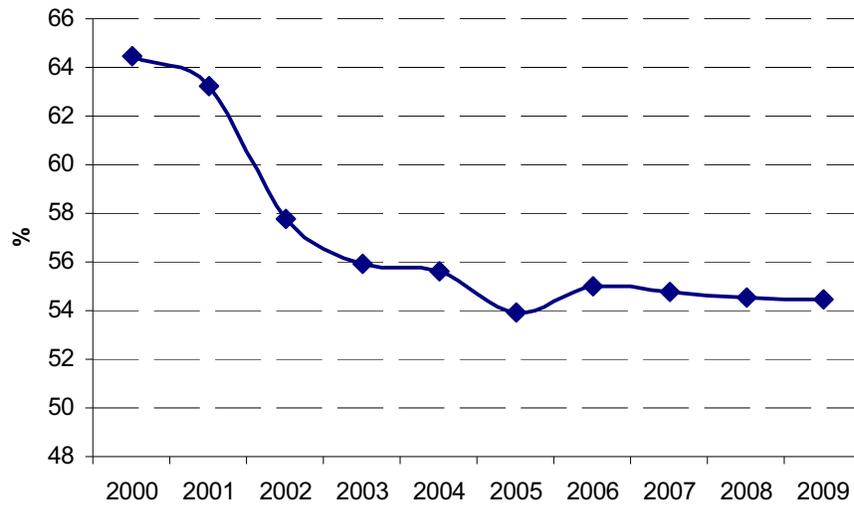
Variable	Correlation coefficient
Official employment and official unemployment	-0.496
Unofficial employment and official employment	-0.448
Unofficial employment and official unemployment	-0.502

#### **4.2. Labour force survey data**

For the estimation of the shadow economy we used annual data from the Household Labour Force Survey (HLFS) covering the period 2000-2009.\* The main empirical results are presented in table 3.

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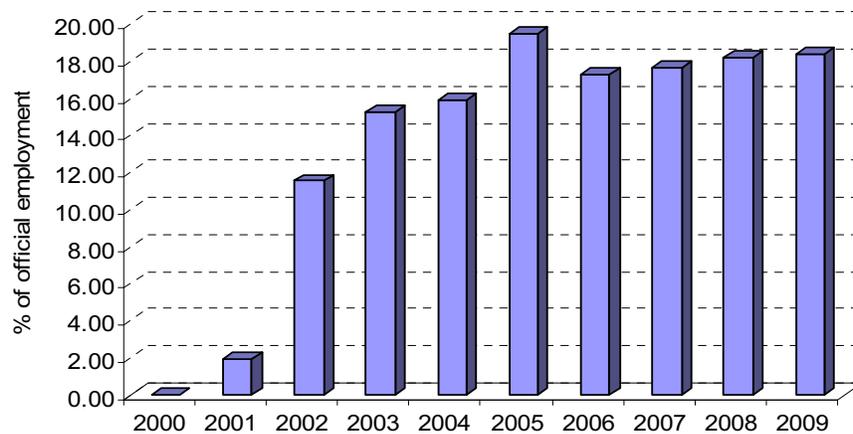
\* The HLFS is conceived as an important source of inter-census information about labour force; the survey provides, in a coherent way, essential data about main population segments (economically active - employed and unemployed - non-economically active), with numerous possibilities of correlation and structuring by demo-socio-economical features, conditions. The main statistical objective of the EU Labour Force Survey (EU LFS) is to divide the population of working age (15 years and above) into three mutually exclusive and exhaustive groups - *persons in employment, unemployed persons and inactive persons* - and to provide descriptive and explanatory data on each of these categories.



Source: Labour force survey (LFS), National Institute of Statistics.

**Fig. 3. The evolution of activity rates for 2000-2009**

Until 2005, there is a significant drop in activity rate from LFS data. Beginning with 2006, we can notice a slowly increase of the activity rate (55%) which remains about the same value until the end of 2009. The values of the rates vary between 53.94% and 64.44%.



**Fig.4. Estimate of employment in unofficial economy for 2000-2009**

By comparing both figures we find out that activity rate is inversely proportional to estimate of people employed in unofficial economy. As the activity rate falls, the unofficial employment grows. The obtained result is meaningful as the population switches from official to unofficial economy, as in the case of administrative data.

Table 3. Labour force survey data for 2000-2009\*

	Total population	Total employment <sup>8</sup>	ILO unemployment <sup>9</sup>	De facto active population <sup>10</sup>	Alternative activity rate <sup>11</sup> %	Hypothetically active population	Unofficial employment	Unofficial employment (%)
2000	18178.7	10897.6	816.1	11713.7	64.44	11713.7	0.00	0.00
2001	18297.2	10807.5	758.5	11566	63.21	11790.06	224.06	1.94
2002	18396.1	9767.6	862.1	10629.7	57.78	11853.78	1224.08	11.52
2003	18001	9367.9	699.7	10067.6	55.93	11599.2	1531.60	15.21
2004	18091.2	9282.9	776.5	10059.4	55.60	11657.32	1597.92	15.88
2005	18204.4	9114.6	704.5	9819.1	53.94	11730.26	1911.16	19.46
2006	18228.3	9291.2	728.4	10019.6	54.97	11745.66	1726.06	17.23
2007	18247.9	9353.3	640.9	9994.2	54.77	11758.29	1764.09	17.65
2008	18244.2	9369.1	575.5	9944.6	54.51	11755.91	1811.31	18.21
2009	18229.5	9243.5	680.7	9924.2	54.44	11746.43	1822.23	18.36

Source: Labour force survey (LFS), National Institute of Statistics, Tempo database; Eurostat, Annual survey results.

\* Figures calculated for age of 15 and over were used.

<sup>8</sup> The following definitions are provided by the Romanian Statistical Yearbook, 2009-publication of the National Institute of Statistics ([www.insse.ro](http://www.insse.ro)).

**Total employment** includes, according to the methodology of "Household labour force survey" all persons aged 15 years and over, who carried out an economic activity producing goods or services of at least one hour<sup>3</sup> during the reference period (the week previous to the recording) in order to get income as salaries, payment in kind or other benefits.

**ILO unemployed** according to International Labour Office (ILO) criteria, are persons aged 15-74 years who, during the reference period, simultaneously meet the following conditions:

- have no job and are not carrying out any activity in order to get income;
- are looking for a job, undertaking certain actions during the last four weeks (registering at employment agencies, or private agencies for placement, attempts for starting an activity on own account, publishing notices, asking for a job among friends, relatives, mates, trade unions);
- are available to start work within the next two weeks, if they immediately find a job.

<sup>10</sup> **De facto active population** is in this case, **economically active population** (active persons) comprises all persons aged 15 years and over, providing available labour force for the production of goods and services; it includes employed population and ILO unemployed.

<sup>11</sup> Alternative activity rate = (the employed + the unemployed) / total population aged 15 years and over.

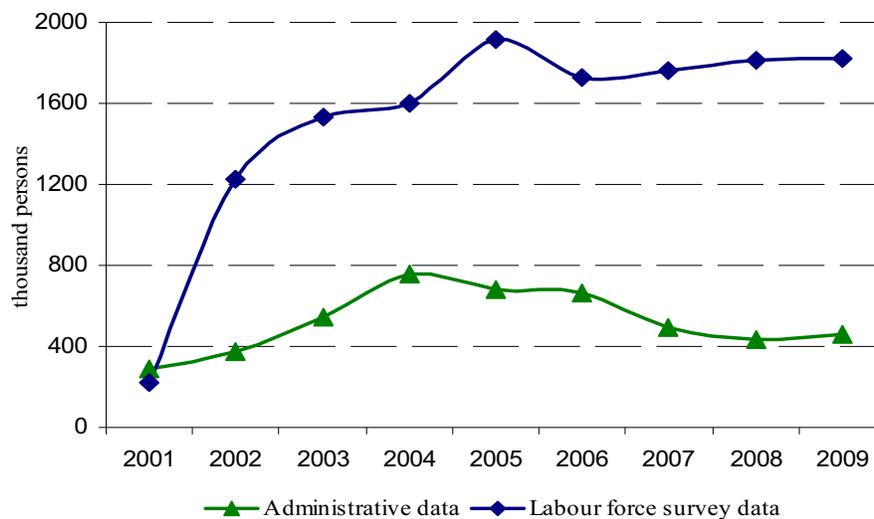
Analyzing the values of Pearson's correlation coefficients (that must be treated with due reserve, having a relative number of observations) between official employment, official unemployment and unofficial employment, the positive correlation (0.365) between official employment and official unemployment is quite unusual, due mostly to data collecting and the way of their processing.

The significant negative relationship (-0.98) between official employment and unofficial employment could be explained by the fact some of the people that walks out from employed category does to unofficial sector.

The negative relationship between ILO unemployment and unofficial employment (-0.48) reveals that a part of unemployed persons works in unofficial sector, since a decreasing of unemployment would cause an increase in unofficial employment, due to the fact that official number of employees was decreasing during the period.

**Table 4. Pearson's correlation coefficients for the period 2001-2009 (survey data)**

Variable	Correlation coefficient
Official employment and official unemployment	0.365
Unofficial employment and official employment	-0.980
Unofficial employment and official unemployment	-0.481

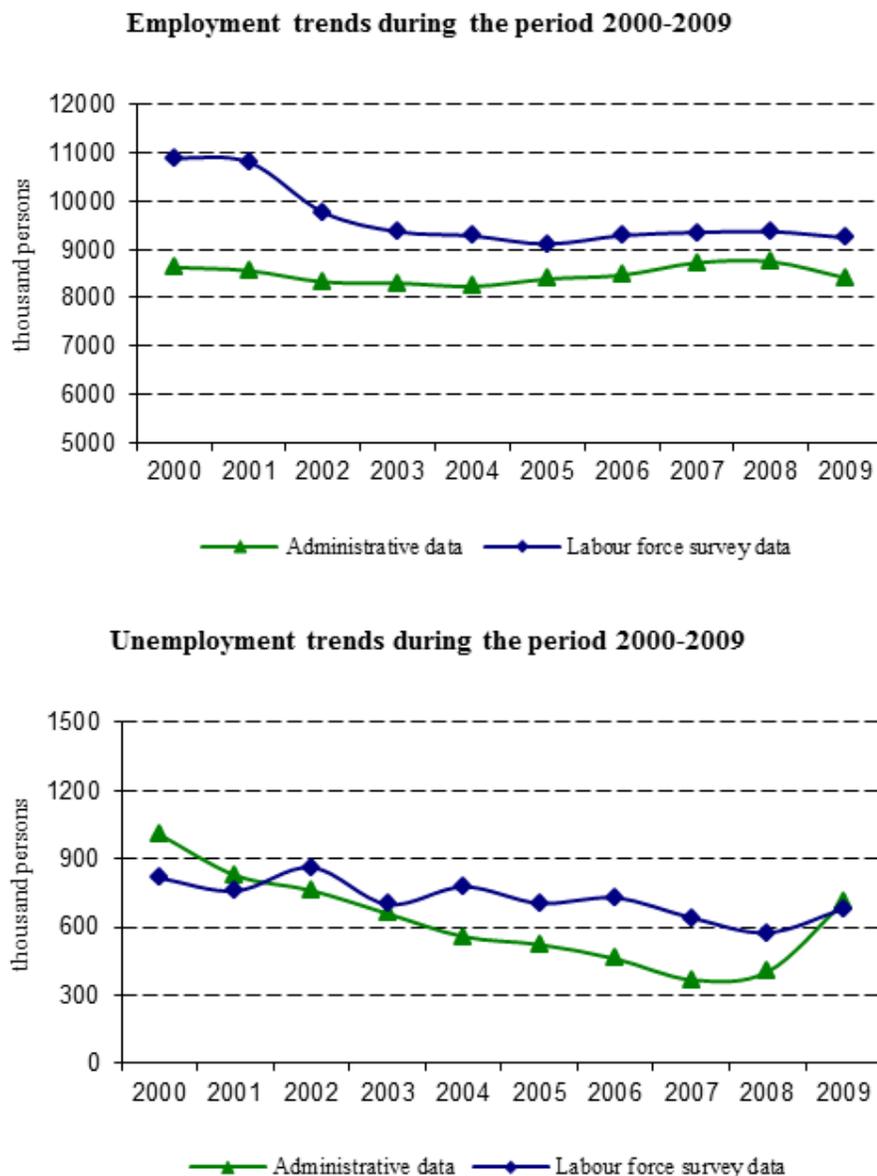


**Fig.5. Evolution of unofficial employment during the period 2001-2009**

Analyzing comparatively the both figures revealed by the two different data source, it can be observed that unofficial employment from administrative data was under evaluated, while labour force survey data provides quite large figures.

While the figures from administrative data report only 800 thousand persons unofficially employed, the survey results reveal about 1900 thousand persons that work in unofficial sector. Since total population 15 years and over is quite similar for both source data (the

differences being negligible) the difference in the results is caused by the differences in employment and unemployment data.



Source: Labour force balance (Tempo database, National Institute of Statistics); Labour force survey (Eurostat).

**Fig.6. Employment and unemployment trends for 2000-2009**

The relatively small values of unofficial employment from administrative data are owed to significant small figures in civil employment and registered unemployment comparative with the LFS data.

## 5. Conclusions

The aim of the paper was to estimate the size of shadow economy for the period 2000-2009 using labour approach. We have used two types of data: administrative and survey data.

For both source data (administrative and survey) it was observed a negative relation between activity rates and the estimated value of unofficial employment as expected.

The analysis of the data for the period 2001-2009 indicates a substantial difference in the results obtained. While the figures from administrative data report only 800 thousand persons unofficially employed, the survey results reveal about 1900 thousand persons that work in unofficial sector.

This difference is due to the different ways of data collecting for the official employment and unemployment. Correlation coefficients for the period 2001-2009 reveal for both types of data (administrative and survey) the presence of a negative relationship between official unemployment and unofficial employment.

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- \*\*\*Tempo database, National Institute of Statistics.
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