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UNEMPLOYMENT AND A STOCK – FLOW MODEL ON THE LABOUR MARKET IN THE REPUBLIC OF MACEDONIA

The aim of this paper is to analyse the unemployment on the basis of administrative data sources and application of the stock-flow model. The intention is to recognize the changes and features of the unemployment regarding stocks and flows of the main segments on the labour market: employed, unemployed and inactive population in the Republic of Macedonia.

Main reasons for the implementation of stock – flow model for determining the level of unemployment in Macedonia are following: a) Labour Force Survey (LFS) used by State Statistical Office (SSO) is based on the Census from 2002, therefore the sample used for calculating the level of unemployment is inadequate; and b) contrary to any economic logic, during the great global economic crisis and in the period after the crisis, the unemployment in Macedonia permanently decreased in conditions when the economy registered negative rates of economic growth and decline in industrial production over a longer period of time.

The application of the stock – flow model, for the period 2008-2014 shows that the unemployment has not been reduced, i.e. the unemployment rate have stagnated or even increased. This is contrary to the trend of unemployment changes according to LFS of SSO. Thus, in 2014 the unemployment rate is higher than in the previous years by both alternatives in the calculations. According to our findings, the application of stock-flow model gives more realistic explanation of the changes and current situation on the Macedonian labour market, than the statistical data from the LFS of SSO in Macedonia.

Our analysis shows that in a country with high and long-term unemployment, where the phenomenon of discouraged workers is expressed, and there has not been made a Census of the population for a longer period of time, accompanied by major demographic changes such as: an aging population and massive emigration from the

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country, the implementation of stock – flow model has significant analytical value in determining the unemployment and its analysis.
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Introduction

Republic of Macedonia is a country with one of the highest unemployment rates in Europe and amongthe transition countries. The problem of unemployment in the country was subject of many studies, but only few of them were taking into consideration all available data for determining the real scope of the unemployment. Many studies and findings explicitly confirm that obtaining the relevant information about the level of unemployment assumes use of all available data sources and different models to identify the labour market changes and its features.

The main reasons for the application of stock-flow model for determining the unemployment in the Republic of Macedonia are: First, according to the LFS of SSO, during the great global economic crisis of 2008 and in the years after the crisis, when GDP in a few years has registered negative growth rates and industrial production has permanently decreased for a longer period, the unemployment in Macedonia decreased from 33.8% in 2008 to 28% in 2014, a phenomena which is contrary to any economic logic and legality; and Second, the sample of the population which is used in LFS is based on the Population census from 2002 and it is not adequate and does not correspond with the real situation in the country, because in the period after the last census from 2002, population aging process and large number of emigrated people from the country was recorded.

The aim of this paper is to analyse the unemployment on the basis of administrative data sources in the country and to recognize the changes and features of the unemployment regarding both, stocks and flows of the particular segments of the labour market (employed, unemployed and inactive population). In that context the paper is focused on applying the stock-flow model to identify the unemployment rate in the Republic of Macedonia in the period 2008-2014. The unemployment rate calculated according to stock – flow model gives more complete picture of the situation on the labour market, because it provides an information about the importance of the inactive working age population, as well as for the nature of unemployment in the country. This cannot be seen through the Labour Force Survey data for the unemployment rate. The LFS has limited analytical value because it is not using the labour flows between the contingents of employment, unemployment and inactive population. Besides that it is based on a sample survey data that are extrapolated to the total population, which means that the relevance of the LFS data depends on the accuracy of the available data on the total population.

Therefore, for calculating the unemployment rate by applying the stock-flow model we are using the administrative data from the Employment agency of the Republic of Macedonia (about the stocks, inflows and outflows on the labour market) and administrative data from the Health Insurance Fund of Macedonia (for the total number of employees which covers the total number of active workers and active farmers who pay for health insurance). Having on mind that the number of employees in both categories is actually greater we

made estimations of this two categories where the number of informal workers (in all sectors except in agriculture) is estimated at 15% of the formally employed, while the number of active farmers is estimated at around 60,000 persons.Based on that, the stock-flow model is calculated with two alternatives: alternative 1 – total number of formally employed according to the Health Insurance Fund; and alternative 2 – total number of employees with estimates for the informal employment and undeclared active farmers. For the inactive working age population which is necessary for the calculations in the stock-flow model we use the working age population 20-64 years.

The first part of the paper is focused on observation of the changes and current conditions on labour market in the Republic of Macedonia, while the second part is the literature review. The methodological aspects of stock-flow model are analysed in the third part. In the fourth part of the paper the stock-flow model is implemented based on the administrative data for the Republic of Macedonia in which the need for application of stock-flow model and implementation by using the available data is explained, and the results of the model are discussed.

1. Changes and current conditions on the labour market in the Republic of Macedonia

In the last decades Republic of Macedonia was faced with unfavourable changes on the labour market that are manifested in extremely high unemployment rate and relatively low employment rates and labour force participation rates. Today the unemployment is one of the greatest macroeconomic problems. The high unemployment persists from the pre-transition period, when the labour supply was overstating the demand, resulting with high unemployment rates. The unemployment rate in 1991 was 26%, while in the transition period was continuously rising, reaching the highest level in 2005 with value of 37.3%. Since 2005 the decrease of the unemployment rate is noticeable, but this progress is slow and don't correspond with the economic growth and creation of new jobs. Contrary to any economic logic, during the great global economic crisis and in the period after the crisis, the unemployment in Macedonia permanently decreased in conditions when the economy registered negative rates of economic growth and decline in industrial production over a longer period of time. If we look at the structure of the new employments in the period after 2005 it can be seen that great part of them are in the public sector, which means that the unemployment decrease is not only the result of the economic growth. The unemployment and employment changes, along with the changes of the labour force participation rate and of the GDP growth rate in the period 1996-2014, are presented in the Table 1.

The Labour Force Survey (LFS) data from the State Statistical Office are showing that today Republic of Macedonia has one of the highest unemployment rates in Europe. The unemployment rate is significantly above the EU average, but also is higher than the unemployment rate of the new EU member states and candidate countries, as well as of the Western Balkan countries. In 2014, in EU 28 the average unemployment rate was 10.2%, while in the Republic of Macedonia is almost three times higher (28.0%). In the last two

decades Republic of Macedonia compared to the Western Balkan countries stands out with the highest unemployment rate, with exception of Kosovo (Table 2).

Table 1

Unemployment and employment indicators and GDP growth in the Republic of Macedonia, 1996-2014

	Unemployment rate (%)	Employment rate (15-64)	Labour Force participation rate (%)	GDP growth (annual %)
1996	34.0	36.0	61.1	1.2
1997	36.0	38.1	60.8	1.4
1998	34.5	39.6	60.5	3.4
1999	32.4	40.2	60.3	4.3
2000	32.2	40.3	60.5	4.5
2001	30.5	42.6	60.7	-3.1
2002	31.9	40.4	60.9	1.5
2003	36.7	38.5	61.4	2.2
2004	37.2	36.8	58.8	4.7
2005	37.3	37.9	60.7	4.7
2006	36.0	39.6	62.2	5.1
2007	34.9	40.7	62.8	6.5
2008	33.8	41.9	63.5	5.5
2009	32.2	43.3	64.0	-0.4
2010	32.0	43.5	64.2	3.4
2011	31.4	43.9	64.2	2.3
2012	31.0	44.0	63.9	-0.5
2013	29.0	46.0	63.9	2.9
2014	28.0	46.9	65.3	3.8

Source: State Statistical Office of the Republic of Macedonia, Labour Force Survey: (http://www.stat.gov.mk/PrikaziPoslednaPublikacija.aspx?id=3); National Bank of the Republic of Macedonia: (http://www.nbrm.mk/?ItemID=750FC531FC3D1B49B16440313562D400)

The employment rate (15-64) in the Republic of Macedonia has significantly lower value (46.9% in 2014) compared to EU 28 of 64.8%. Besides the problem of the high unemployment and low employment, the country is faced with low labour force participation rate (65.3%, compared to 72.3% in EU 28 in 2014). The low labour force participation rate and the high unemployment rate are implicating on underutilization of great part of the working age population.

As for the employment rate (15-64) in the Western Balkan countries in Macedonia it is lower than in Croatia, Serbia, Montenegro and Albania, and higher from Bosnia and Herzegovina and Kosovo.

The reasons for this situation are numerous and very complex. Republic of Macedonia had the highest unemployment rate in the former Yugoslavia and started the transition process with around 150 thousands unemployed persons and unemployment rate of around 23% (in 1989). Unlike the other countries in transition, which were immune to the unemployment problems in the period before 1990, the unemployment in the Republic of Macedonia is a problem for a long time. If we compare the unemployment rates of the Republic of

Macedonia today with the period when the country was within the Republic of Yugoslavia, it can be observed that the highest unemployment rate in Macedonia was 26.7%. In the period from 1991-2014, Macedonia didn't reach this level of unemployment.

Table 2. Labour market indicators in EU 28 and Western Balkan countries, 2014

	Unemployment rate (%)	Employment to population ratio (%)*	Labour force participation rate (%)
Republic of Macedonia	28.0	46.9	65.3
EU 28	10.2	64.8	72.3
Western Balkan countries			
Albania	17.9	50.5	61.5
Bosnia and Herzegovina	27.5	31.7	43.7
Croatia	17.3	54.6	66.1
Kosovo	35.3	26.9	41.6
Montenegro	18.2	50.4	61.6
Serbia	22.0	48.6	62.3

* The indicator is calculated: number of employed (15-64) in the total population (15-64)

http://www.stat.gov.mk/PrikaziPoslednaPublikacija.aspx?id=3;
http://ec.europa.eu/eurostat/data/database; http://ask.rks-gov.net/en/lm;
http://www.bhas.ba/tematskibilteni/LFS_2014_001_01_bh.pdf;
http://www.dzs.hr/default_e.htm;
http://www.instat.gov.al/media/291851/tregu_punes_2014_____.pdf;
http://www.monstat.org/userfiles/file/ars/2014/ARS%20-%20Godisnje%20saopstenje,%202014.pdf;
http://webrzs.stat.gov.rs/WebSite/repository/documents/00/01/89/83/RS10_282-srb-IV_kvartal_2014.pdf

The high unemployment was drastically increased during the stabilization period (1992-1995), when in order to stabilize the inflation and to reach macroeconomic balance, the unemployment rate in the Republic of Macedonia was increased on more than 30%. In the last two decades the unemployment rate remains on very high level and didn't reach the value from the beginning of the nineties. In the period of transition the unemployment has increased as a result of the: social and ownership transformation of the economy (which cause loss of enormous number of jobs); changes in the economic development, accompanied with low growth rates which weren't enough to create significant number of

new jobs; structural reforms weren't realized in terms of creating propulsive sectors which can absorb greater part of the labour force. The noneconomic factors, i.e. the shocks in the economy caused by the crises in Kosovo (1999) and the military conflict in the country (2001), also had great influence on the economy and on the possibilities for creating new jobs, and with that on the unemployment rate. Besides that, the institutional framework didn't had positive influence for improving the labour market conditions. As for the policies, prevailed the labour market policies, instead the employment policies, which should have created preconditions for opening larger number of new jobs.

The unemployment in the Republic of Macedonia can be characterized as low-growth unemployment and structural unemployment. For many decades the country is faced with low economic growth. The GDP growth rates in the period 1996-2014, with exception in some years, are relatively low, and doesn't give possibility to create larger number of new jobs. At the same time, the biggest problem regarding the unemployment is determined by the labour supply and demand imbalance in terms of the qualifications, the unemployment duration, as well as of the geographical imbalance, which implicates that the unemployment in the Republic of Macedonia has the characteristics of structural unemployment.

Structural unemployment in Macedonia stems from the mismatch of supply and demand of qualified labour force. Labour supply does not meet the qualifications required in the labour market. Since 2007, the Employment Agency of the Republic of Macedonia regularly (once a year) conduct short term forecast on the labour market, so called the Skill needs analysis. The reports continuously are showing that on the labour market there is a lack of workers of certain profiles with appropriate knowledge and skills. The State statistical office data for the vacations are confirming the labour force needs for these profiles. In the last decade there is a significant rise of the number of students from the secondary education who are continuing their education. It implicates great increase of the number of highly educated persons, as well as of the registered unemployed persons with university level of education. Its share in the total number of registered unemployed persons increased from 7.7% (2008) to 16.6% (2015). Such huge inflow of the highly educated labour force which can't be absorbed by the labour market, additionally is distorting the labour market mismatch.

The abovementioned labour market mismatch was accompanied with permanent increase of the long-term unemployment and its sustainability on the high level. The share of persons who are unemployed more than one year in the total unemployment, in the period 1997-2015 is higher than 80%. Out of them, very high and increasing is the share of persons who are unemployed longer than 4 years (43.6% in 1997 and 61.3% in 2015). It results in an increase of the "discouraged workers", i.e. of the inactive working age population, which is particularly high among the young population. So, when we consider the volume of the unemployment and we calculate the unemployment rate, we should not neglect the proportion of the inactive population.

In terms of geographical distribution, unemployment is characteristic for all regions in Macedonia. As a result of the process of industrialization and urbanization in the period before independence, the unemployment in the transition period can be freely given the name "urban". In fact, two thirds of the unemployed are located in urban areas and one third in rural areas. Hence, the problem of structural unemployment cannot be alleviated through the geographical mobility of the labour. Namely, there no regions where the labour

demand is greater than the supply, so it cannot be done an overflow of the unemployment from one region to employment in another region.

According all parameters the unemployment in the Republic of Macedonia is very hard and complex problem. Its solving assumes serious approach from many aspects, including the question of determining the real scope and the structure of the unemployed persons, as an important precondition for creating appropriate employment and labour market policies.

2. Literature review

All discussions about the labour market functioning and the changes in the different categories, particularly in the unemployment rates and the labour force participation rates usually are related with the data sources and the role of the relevant institutions. In that context, Beleva (2008) discusses the administrative organization of the labour market in Bulgaria from point of view of its structure, functionality, management and capacity. She makes a review of the scientific discussion regarding the place and role of the institutions and the labour market. Many recommendations concerning the changes in the mentioned areas for improving the administrative service of the labour market are formulated. Regarding that, Tsanov (2009) also discusses the impact of the institutions of the labour market in Bulgaria on its flexibility and he evaluates the connection between the institutions of the labour market and its flexibility through quantitative evaluations and comparative analysis of the labour market institutions.

This discussion about the role of the labour market institutions, particularly from aspect of providing a data, is also relevant for the Republic of Macedonia, because they are important precondition for making comprehensive researches for the labour market changes. Although Republic of Macedonia is the country with the highest unemployment rate in Europe and an outlier in the group of high-unemployment transition countries it has not been subject of too many studies, especially regarding more profound researches based on all available data from different institutions.

Trpeski (2011) is analysing the genesis of the unemployment in the Republic of Macedonia, its nature and character, as well as the problems connected with the labour market functioning. As a data source he is using the data from the ESA and the State Statistical Office (Labour force survey). Also, his paper analyses the character of the unemployment using the data for the unemployment, employment and inactive population, as well as the flows that occur between these three contingents.

Mojsoska and Kurtishu (2012) are examining the labour market movements in the Republic of Macedonia in the period 2006-2011. They point out that beside the expectations for improvement of the allocative market efficiency (including the labour market) in the transition process, the situation of the Macedonian labour market is worsened. The authors are referring that the unemployment rate according the official statistics is decreasing since 2005, but with very low intensity. Also, based on the analysis of the data from the Employment Agency of the Republic of Macedonia, the authors find that the number of

unemployed people, as well as the number of registered applications for employments are decreasing.

Janeska (2013) found that there is certain mismatch between the supplied and demanded skills on the labour market and that the longevity of the process of job-seeking is a serious problem of Macedonian labour market. She points to three data sources for the measurement of unemployment: Employment Agency registration of the unemployed persons, Labour Force Survey (LFS) and Population Censuses in 1994 and 2002 and argue that the number of unemployed persons and unemployment rates remains on high level by all data sources, despite their different methodological background.

Bashevska (2014) is referring to the changes of the labour market in the Republic of Macedonia in the period from 2008 to the end of 2013. She concludes that the unemployment rate, analysed by the data from the State statistical office, in the nineties of the last century, as well as at the beginning of the global economic crisis, remains extremely high, which in 2013 is 29%. Moreover, the author analyses the labour market with the data of the Employment Agency of the Republic Macedonia specifying the declining trends in the registered employment and unemployment, which indicates the need for serious review of the labour data records.

The analyses in the previously mentioned papers confirm that despite the changes, the unemployment rate in the last years remains very high. All authors point out the need to use different data sources in order more realistic to identify the changes and the current situation on the labour market in the Republic of Macedonia. This approach, despite the different methodological base of the mentioned data sources, gives more comprehensive findings about the labour force, as well as about the inactive working age population in the country. Besides the use of the LFS and ESA data, Trpeski stands out and for application of the stock-flow model for calculating the unemployment rate.

Many authors in the past decades have stressed the importance of the data about the flows of the particular segments of the labour force and of the working age population on the labour market, especially in recognition of the unemployment main features. For example, Marston (1976) evaluate flows between all possible labour-market states and conclude that employment outflows are the main cause of high unemployment rates among non-whites, women, and teenagers. He makes an effort to sort out the causes of unemployment within the context of a dynamic labour market, examining labour flows.

Ehrenberg and Smith (2012) write about the limitations of unemployment rate data. They also use a simple conceptual model of a labour market that emphasizes the importance of considering the flows between labour market categories (for example, the movement of people from employed to unemployed status) as well as the number of persons in each labour market category (for example, the number of the unemployed).They point to the fact that knowledge of the determinants of these flows is crucial to any understanding of the causes of unemployment.

Todorov (2012) is making a comparative analysis of the structure of unemployed, discouraged workers and the remaining part of the inactive persons in order to calculate alternative rates of unemployment compared to the officially announced unemployment

figures for the investigated period. In his study, the estimated expanded unemployment rates take into account the discouraged workers, who possess economic characteristics similar to those of the unemployed, on one hand, and the weighed amount of the involuntary underemployed on the other hand.

Yakhin and Presman (2015) utilize a theoretical stock-flow accounting model of the labour market. They set up a simple theoretical framework for analysing the joint movement of unemployment and vacancies, decomposing fluctuations to their cyclical and structural components.

Greggand Petrongolo (2005) estimate outflow equations for vacancies and unemployed workers in Britain, departing from the stock-based analysis of matching. They explained higher initial matching probabilities using a stock-flow model, in which the stock of traders on one side of the market is matching with the inflow of traders on the other side.

Forslund and Johansson (2007) generate stocks, outflows and inflows of vacancies and job seekers to shed light on the importance of stock-flow matching and assess the contribution of labour market programme participants to matching.

Demiralp, Gantt and Selover (2010) show that a multicointegrating relationship does in fact exist between the flows into and out of unemployment as well as between those flows and the level of unemployment. In this context, Jenkins and Chandler (2010) analyse the gross flows of persons moving between different labour force categories, most notably the three economic activity groupings of employment, unemployment and inactivity.

The implications of the stock–flow matching model for unemployment, vacancies, and worker flows are developed and quantified by Ebrahimy and Shimer (2010). They have derived explicit expressions for the distribution of the unemployment rate, for the probability that a job entering the labour market causes an unemployed worker to find a job, and for the probability that a job exiting the labour market causes an employed worker to become unemployed.

Carrillo-Tudela and Hawkins (2014) develop a model of stock-flow matching in the labour market which is consistent with several stylized facts about the labour market, such as the importance of flows, as well as stocks, for matching rates, as well as with duration dependence in unemployment.

Henshall (2015) estimated labour market flows as an experimental statistics which have been produced as an aid to understanding the movements in the published Labour Force Survey aggregate estimates.

An analysis of labour market dynamics, in particular of flows in the labour market and how they interact and affect the evolution of unemployment rates and labour force participation rates, the two main indicators of labour market performance has been made by Dixon, Lim and van Ours (2014). They find that a shock to the net flow from unemployment to employment drives the unemployment rate and the participation rate in opposite directions while a shock to the net flow from not in the labour force to unemployment drives the rates in the same direction.

Studies and findings of the aforementioned authors unequivocally confirm that obtaining the relevant information about the level of unemployment in the country assumes the use of all available sources of data and different models to identify the changes and current situation on the labour market. In that context, relevant information may be obtained by applying the stock-flow model. It is a simple conceptual model of the labour market that emphasizes the importance of examining the flows between contingents of the labour market (for example, the movement of persons with the status of employees in the status of unemployed or inactive), as well as of the number of persons in each of the labour market contingents (for example, the number of unemployed, employed and inactive). Knowing the changes and determinants of these flows is essential for understanding the causes of unemployment.

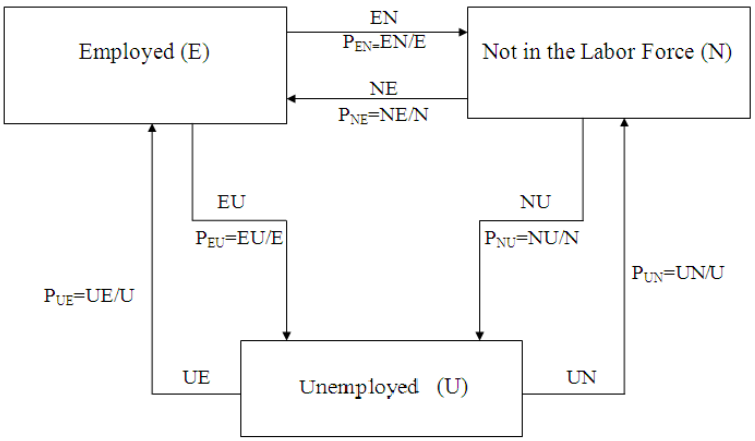
3. Methodological aspects of the stock-flow model

The unemployment is one of the oldest and most studied topics in the economy, especially in the field of labour, so any discussion about the labour market flows would not be complete without consideration of the inflows and outflows in the number of the unemployed. It is a simple conceptual model of the labour market that emphasizes the importance of examining the flows between contingents of the labour market (for example, the movement of persons with the status of employees in the status of unemployed or inactive), as well as of the number of persons in each of the labour market contingents (for example, the number of unemployed, employed and inactive). Knowing the changes and determinants of these flows is essential for understanding the causes of unemployment.

Based on the labour force movement which is presented on the figure below, it can be concluded that the unemployment rate is determined by the size of the different flows on the labour market.

Figure 2

A Stock – Flow model of the labour market



Source: Modern Labour Economics, (adjusted to Ehrenberg, R. and Smith, R., 2013), p. 497.

It can be presented with the following formula:

$U = f(^{+}P_{en}, ^{-}P_{ne}, ^{+}P_{nu}, ^{-}P_{un}, ^{+}P_{eu}, ^{-}P_{ue})$

In the formula, the unemployment rate is a "function (*f*) of":

U – unemployment rate;

$^{+}P_{en}$ – employees who have transferred to inactive population;

$^{-}P_{ne}$ – persons who from inactive population got employed;

$^{+}P_{nu}$ – persons who from inactive population entered in the contingent of unemployed;

$^{-}P_{un}$ – persons who were unemployed and moved to inactive population;

$^{+}P_{eu}$ – persons who were employed and moved to unemployed;

$^{-}P_{ue}$– persons who were unemployed and then get employed.

This equation shows the flows which influence the increase or decrease of the unemployment rate. Flows marked with "+" are aimed at increasing the unemployment rate, while flows with "-" at reducing it. For example, $+P_{en}$ and $-P_{ne}$, does not directly affect the number of unemployed. However, $+P_{en}$ reduces the active population contingent, which in the calculations leads to increase of the unemployment rate, while $-P_{ne}$ increases the active population contingent which implicates increase of the unemployment rate. The other flows are directly related to the contingent of unemployed and their effect on the unemployment rate is obvious.

Considering the values of the flows, the unemployment rate can be calculated based on the following formula: (Marston, 1976, p.169-210)

$$U = \frac{1}{1 + \dfrac{(P_{ne} + P_{nu})\,P_{ue} + (P_{ne})\,(P_{un})}{(P_{ne} + P_{nu})\,P_{eu} + (P_{nu})\,(P_{en})}}$$

In order to calculate the unemployment rate for specific year, based on this equation, first it is necessary to determine the conditions of the employees, the unemployed and inactive population per year, as well as the flows of persons which are happening between these three contingents.

4. Application of the stock–flow model on labour force market in the Republic of Macedonia

It is very important to understand the limitations of the data for the calculation of the unemployment rate. They are reflecting the part of the group, which at one point of time, actively want to work but are unemployed. However, due to a numerous reasons, this data

do not always give an accurate reflection of the economic difficulties that members of the group face with. First, persons who are inactive job seekers, including those who unsuccessfully, for a longer period are looking for job and then give up, are not counted among the unemployed. Second, the unemployment statistics does not gives any information about the levels of income of those who are employed and whether they exceed the poverty level. Third, in most of the years, a significant proportion of the unemployed are from families in which other members are earning, for example, many of the unemployed are young and often the unemployed are not the primary source of support for their families. Fourth, a significant proportion of the unemployed receive financial support while not employed, either in the form of unemployment compensation from the government or private extra unemployment benefits (Ehrenberg and Smith, 2013, p.496).

In many countries the official statistics also have limitations. In the first place, this data include all part–time workers as fully employed. Although they want to work full–time, they could not find suitable full–time employment. These persons are covered as employees in the survey, but due to the fact that they want to work full-time and cannot find a suitable work, they should be considered as unemployed; A second limitation is that in order to be counted as unemployed, a person must be actively seeking for work. But studies show that after unsuccessful look for work for a time, many people become discouraged and then abandon their job search. These discouraged workers constitute hidden unemployment; A third problem is that data do not measure the subemployed. The statistics fail to include people who are forced by economic circumstances to accept employment in occupations that pay lower wages than those they would qualify for in periods of full employment. Each of these three limitations causes the official unemployment statistics to understate the extent of underutilization of labour resources and the degree of economic hardship associated with a particular official overall rate of unemployment (McConnell, Brue and MacPherson 2015, p.542).

Having in mind all these limitations, which are also referring to the situation of the Republic of Macedonia, the application of the stock-flow model gives better explanation of the determinants of the labour market changes and of the unemployment rate value.

a) Available data sources for stock-flow model application

In the Republic of Macedonia there are two data sources that provide information about the changes and the level of unemployment, such as: registration of the Employment Agency of the Republic of Macedonia (ESA) and data from the Labour Force Survey (LFS) of the State Statistical Office of the Republic of Macedonia. Both data sources have different methodological basis and its advantages and disadvantages in terms of understanding the real situation on the labour market.

The unemployment and employment in the Employment Agency are recorded administratively by submitting reports from the labour market participants. The Local employment centres are making records of the unemployed persons or other persons who are looking for job, as well as on registered applications for employment, on monthly level, which gives relevant data on the labour market stocks and flows on local level. This data

are regularly sent to the Central Office of the Employment Agency of the Republic of Macedonia, where they are summarized and processed according different features and published as data on national level. In the last few years, the Law about records in the field of labour and the Law for employment and insurance against unemployment were changed. It influenced the way of unemployed persons recording, their division into active and passive job seekers and exemption of the registration for the right of health care from the records of the unemployment in the ESA.

The abovementioned changes in the legislation, as well as tightening the criteria for recording the unemployed persons, have an impact on the number of registered unemployed. Introducing a narrower definition for the recording of the unemployed persons, should not lead to neglecting the category of passive unemployed persons and their treatment as inactive working age population. It is necessary to determine whether individuals who claim to be inactive job seekers, are doing that as a result of lack of information, or really are not active enough in looking for work. Otherwise, the impression is that the state would like to solve the problem of the unemployment only administratively by introducing narrower definitions of unemployment, rather than through real measures, which can contribute for long-term reduction of the unemployment in the country. In such case, it's not the number of employees which will grow, but the number of the unregistered unemployed persons.

The data on the economically active population (employment and unemployment), as well as of the inactive working age population is the basic statistical information necessary for monitoring the labour market changes. For that purpose since 1996 the State Statistical Office (SSO) is conducting a Labour Force Survey (LFS), which is consistent with the methodological recommendations of the International Labour Organization (ILO). The data obtained from the LFS is allowing comparability of labour market data on international level.

The implementation of the LFS in the country, on the basis of the generally accepted methodology of the ILO is quite useful for several reasons: first, it is unified and as such is applied in most of the countries, with some minor changes (adjustments), which do not affect the consistency and comparability of the data about the unemployment among the countries worldwide; second, the time interval between the survey and the publication of the report data is short and allows fast access to information through various publications; third, the data are presented as disaggregated and in the form of aggregates. For example, the unemployment rate is determined by age, sex, duration of unemployment, etc., which is of great importance for the analytical analysis of the unemployment.

The unemployment rate of the Republic of Macedonia according the LFS has a limited analytical value because it is not calculated based on the labour flows between the contingents of employed, unemployed and inactive population. Thus, the unemployment rate can be increased and the unemployment in absolute numbers to remain unchanged, if some employees decide to leave the contingent of active population (employed and unemployed) and become inactive on the labour market. Contrariwise, the unemployment rate can be reduced if the inflow of workers from the contingent of the inactive persons is directly transferring into the contingent of employees.

The LFS is a partial examination of the population which is subject of interest. By using a specific methodology a sample from that population is drawn in order to realize the survey. In the Republic of Macedonia the LFS covers 10.000 households, which from the methodological aspect is a good sample for investigating the labour market changes. But, how well the sample represents the population, apart from its size, depends on the frame from which the sample is extracted and on the specific design of the procedure for selecting the units in the sample. As a controversial aspect in this LFS is the sample framework. Namely, the framework for the sample in the LFS is the data from the 2002 Population Census, i.e. the data on the number of households per enumeration, the population, the gender and the age of the population. But, since 2002 the situation in the Republic of Macedonia, concerning the total population (on national and regional level) is significantly changed, because of the decrease of the population natural growth, the great emigration abroad and the intensive population ageing.

In the period 2002-2014 the population natural growth has decreased from 4.8 to 1.9 per 1000 inhabitants, as a result of the decreased number of births and increased number of deaths, mostly determined by the demographic ageing. This changes were more or less emphasized on regional level, which contributed to deepening the differences in the total population increase.

Concerning the emigration abroad, there isn't relevant data from the national statistics. But, international institutions such as Eurostat and the World Bank in their reports are declaring that since 2002 until today, intensive emigration from the Republic of Macedonia abroad is registered. For example, according to Eurostat, only in the European Union in the period 1998-2014, more than 10 thousand Macedonian citizens, annually have left the country. It means that based on the emigration in the EU countries, in the period 2002-2014 the total population in the Macedonia was decreased for more than 120 thousand persons. But, this is only the part of the emigration abroad, since a great number of Macedonian citizens have emigrated in the overseas countries (mainly in USA, Canada and Australia). According World Bank data, in 2013, the stock of emigrants amounts about 626 thousands persons, while the emigration rate was 30.2% (World Bank, 2016). The same data source shows that in 2005 the stock of emigrants amounts about 370 thousands persons, while the emigration rate was 18.2%. It means that the emigration abroad has very big influence on the volume and the structure of the households. Emigration abroad was also manifested with great differences on regional level.

This fact undoubtedly are confirming that since 2002 significant changes have occurred in the scope and the structure of the total population and households on national and regional level. That means that the SSO is extracting sample of something that is significantly changed and does not correspond to the real situation concerning the total population in the country.

b) Application of stock-flow model

Considering the advantages and disadvantages of LFS, as well as the need for further analysis of the unemployment rate and for more comprehensive analysis of the labour

market in the Republic of Macedonia, the determinants of labour flows between the contingents of employed and unemployed (active population) and inactive population should be identified. In that sense, meaningful is the implementation of the stock-flow model of the labour market. Even though this model cannot exceed the value and significance of the data obtained by the Labour Force Survey, it should not be relativized as a model for determining the unemployment.

Based on the available data for the labour market flows, the unemployment rate according to stock-flow model can be calculated with administrative data from the Employment Agency of the Republic of Macedonia, as well as with the administrative data on the number of employees (from different institutions) and inactive working age population.

Administrative data or calculations/assessments based on these data for the total number of employees, unemployed persons and inactive working age population per year in the period 2008-2014 are used. As a source of administrative data for the total number of employees, data from the Health Insurance Fund of Macedonia are used, which cover the total number of active workers and active farmers, who pay for health insurance. However, it is undisputable that the number of employees in both categories is actually greater. Namely, on the number of formal employees should be added the number of unregistered workers in all sectors, except in agriculture, and the number of active population in agriculture. The estimates of the informal workers number is ranging from 10% to 30% of the formally employed personsnumber. Our estimation is approximately 15%. Regarding to the active farmers, their number according to the Health Insurance Fund of Macedonia amounts about 20,000 persons and is underestimated. The data from other sources show that in the last decade their number cannot be estimated at less than 60,000 persons.

Data on the number of unemployed persons is taken from the Employment Agency of the Republic of Macedonia, whereby the category of other job seekers is included in the total number of unemployed, because although they are passive job seekers, they are actually unemployed (Table 2).

In the calculation, two alternatives for the number of employees are made: a) total number of formally employed according to the Health Insurance Fund (alternative 1); b) total employees with estimates for the informal employment and undeclared active farmers (alternative 2). Besides the data on the number of employees and the unemployed, it is necessary to have the relevant data for the inactive working age population for the calculations in the stock-flow model. These data are obtained as a difference between the working aged population from 20-64 years and the total number of employed and unemployed persons (labour force). As working age population are taken persons from 20-64 years because young persons (15-19 years) are legally bound to compulsory secondary education. Inactive working age population is calculated based on data from the State Statistical Office population estimates.

Table 2. Number of employed, unemployed and inactive working age population in the Republic of Macedonia, 2008-2014

	Employed		Unemployed	Inactive working age population	
	Alternative 1	Alternative 2*		Alternative 1	Alternative 2
2008	483,659	599,189	343,363	453,279	337,749
2009	493,575	610,806	341,295	455,978	338,747
2010	497,798	615,368	321,341	481,481	363,911
2011	507,023	622,199	281,144	522,432	407,256
2012	499,458	613,239	243,403	575,815	462,034
2013	505,193	619,033	217,858	599,863	486,023
2014	529,331	645,592	223,808	572,793	456,533

* The number of employees in alternative 2 is calculated as the sum of formally employed + estimation of active

Source: Author's calculation based on the date from the Health Insurance Fund of Macedonia (http://www.fzo.org.mk/), Employment agency of the Republic of Macedonia (http://www.avrm.gov.mk/), State Statistical Office of the Republic of Macedonia (http://www.stat.gov.mk/)

Data from the Employment Agency of the Republic of Macedonia are taken as a source for determining the labour flows between the various contingents. This agency directly receives data and publishes them as reports through the regional employment centres. In this way the data are not obtained on a sample basis, as it was in the labour force survey, but on the actual situation. For the purpose of determining the labour flows between the contingents of employed, unemployed and inactive populationthe following reports are used: Review data for inflow and outflow of unemployed in months; Review of registered applications for established labour relations from the evidence and out of evidence of unemployed persons and Review of registered unemployed persons, all from the Employment Agency of the Republic of Macedonia. In addition, the individual flows are calculated as follows:

NE – (movement from inactive population to employed) by using data for the registered applications of established labour relations out of the evidence of unemployed;

NU – (movement from inactive population to the contingent of unemployed)by using data on persons who checked in the evidence of unemployed for the first time and data on persons removed from the evidence of unemployed by all legal basis;

UN – (movement from unemployed to inactive population) according to data for removed from the evidence by legal basis.

In order to use the same methodology for the evidence of the unemployed in the period from 2008 – 2014, when calculating the flows there are not taken into account the flows from the evidence of other job seekers and passed to the evidence of other job seekers. Therefore, these persons are included in the total number of unemployed.

EU (movement from employed to unemployed) and UE (movement from unemployed to employed) – it is used the data from employment (regardless of how long ago employment has been stopped) and have been employed, respectively.

EN – (movement from employed to inactive population) based on the total number of employees and all flows from employment and to the employment according to the following equation (because the Employment Agency of the Republic of Macedonia does not contain data on the number of inactive persons, i.e. for the flow from employees toward inactive population):

$$E(t) = E(t-1) + NE(t) + UE(t) - EU(t) - En(t)$$

c) Results of the stock-flow model application

The implementation of stock-flow model gives the results presented in the Table 3, and according to them, several relevant conclusions about the flows on the labour market can be drawn. Namely, in the period 2008-2014, the monthly average of persons who were unemployed and have left this contingent count 36.02%, from which 55.07% have transferred to the contingent of inactive, while 44.93% have transferred to the contingent of employees. In the observed period, the monthly average of persons who were leaving the contingent of unemployed was 8,992.The inflow of persons in the contingent of unemployed is lower and it counts 7,597 persons in average per month, where 50.17% is from the contingent of inactive population and 49.83% is from the contingent of employees. *It can be concluded that in the analysed period 2008-2014, the average monthly outflow of persons from the contingent of unemployed is greater than the average monthly inflow of persons to the contingent of unemployed.*

Simultaneously, in the analysed period 2008-2014, there is an increase in employment. But the increase is not because the unemployed found a job and got employment, but because of the employment of persons directly from the contingent of inactive population. The data from the Employment Agency show that from the contingent of inactive population directly or without assistance of the Employment Agency there are 14,036 employed on average per month, while from the registered unemployed persons there are only 4,040 employed persons. The contingent of employees has an average monthly net inflow with the contingent of inactive population and it is 671 persons, while in the same period, it has an average monthly net inflow with the contingent of unemployed persons which counts 255. *This data shows that employment has increased as a result of the greater inflow from the contingent of inactive population and this is an additional indicator that unemployment in the Republic of Macedonia is long-term and it has a structural character.*

If we analyse 2014 we can conclude that during this year the inflow to the contingent of unemployed is greater than the outflow, i.e. 72,044 persons passed to the contingent of unemployed and 64,575 persons have left. During the same period, 28.85% of those who were unemployed have left this contingent, where 42.78% passed in the inactive population, and 57.22% passed to the contingent of employees. On the other hand, 51.09% of the inactive population passed in the contingent of unemployed, while 48.91% of employees have lost their jobs. From *Table 3 it can be concluded that during 2014 the*

outflow of persons from unemployed to the contingent of employees is greater than the flow of persons from the contingent of employees to the contingent of unemployment, and there is a net outflow from 1,714 persons.

Table 3

Labour market flows in the Republic of Macedonia, 2008-2014

	EN	Pen	NE	Pne	NU	Pnu	UN	Pun	EU	Peu	UE	Pue
2008	136,883*	0.23	150,109	0.44	52,469	0.16	52,844	0.15	46,704	0.08	60,166	0.18
2009	172,334	0.28	185,491	0.55	53,612	0.16	57,219	0.17	60,399	0.10	58,860	0.17
2010	182,972	0.30	177,147	0.49	57,104	0.16	66,679	0.21	42,627	0.07	53,014	0.16
2011	164,597	0.26	173,149	0.43	47,231	0.12	85,251	0.30	47,176	0.08	45,455	0.16
2012	156,698	0.26	149,239	0.32	39,907	0.09	76,474	0.31	46,133	0.08	44,631	0.18
2013	127,028	0.21	133,505	0.27	13,984	0.03	25,094	0.12	20,761	0.03	20,079	0.09
2014	115,388	0.18	140,232	0.31	36,809	0.08	27,626	0.12	35,235	0.05	36,949	0.17

* This flow is calculated according to Alternative 2, while according to Alternative 1 it is 142,862

Source: Authors' calculation according to Review data for inflow and outflow of unemployed per month for 2008, 2009, 2010, 2011, 2012, 2013, 2014 - Employment Agency of the Republic of Macedonia; Review of registered applications for established labour relations from the evidence and out of evidence of unemployed persons for 2008, 2009, 2010, 2011, 2012, 2013, 2014- Employment Agency of the Republic of Macedonia and Review of registered unemployed persons - Employment Agency of the Republic of Macedonia.

Also, the contingent of unemployed left 27,626 persons who moved to the inactive population, while 36,809 of the inactive population entered in the evidence of unemployed, hence we have a net inflow from 9,183 persons. It can be seen that the net inflow is greater than the net outflow (the negative balance of the relationship unemployed – employees). *Therefore, we can conclude that in 2014 there is an increase in the unemployment due to the positive balance of flows from inactive population to unemployed persons.*

In 2014, 140,232 persons are directly employed from the contingent of inactive population, while only 36,949 persons are employed from the registered unemployed persons. The contingent of employees has a net inflow with the contingent of inactive population with 22,424 persons and a net inflow with the contingent of unemployed persons with 1,714 persons. *This data shows that employment has increased as a result of the greater inflow from the contingent of inactive population.*

When the values in Table 2 and Table 3 are replaced in the formula mentioned above, then the unemployment rate in the Republic of Macedonia is calculated on the basis of the stocks and flows on the labour market using the stock-flow model. The results of the calculations according to the two alternatives are shown in Table 4. In addition, there is a restriction in the calculation for the 2013 because of incomplete data published by the Employment Agency of the Republic of Macedonia, i.e. the unemployment rate in 2013 is calculated for the period from May to December and it does not reflect the actual conditions according to stock - flow model.

Table 4. Unemployment rate in the Republic of Macedonia calculated according the stock-flow model and LFS, 2008-2014

	Unemployment rate according the stock-flow model		Unemployment rate according LFS
	Alternative 1	Alternative 2	
2008	37.0	32.0	33.9
2009	40.0	35.0	32.2
2010	35.0	31.0	32.0
2011	29.0	25.0	31.4
2012	29.0	25.0	31.0
2013	25.0*	21.0*	29.0
2014	30.0	26.0	28.0

* The unemployment rate in 2013 is calculated for the period from May to December and it does not reflect the actual conditions according to stock - flow model

Source: Author's calculation based on the date from the Health Insurance Fund of Macedonia (http://www.fzo.org.mk/), Employment agency of the Republic of Macedonia (http://www.avrm.gov.mk/), State Statistical Office of the Republic of Macedonia (http://www.stat.gov.mk/)

According to both alternatives, in the analysed period 2008 – 2014 the unemployment rate in Macedonia calculated by the stock - flow model shows a constant declining (except in 2009) and the obtained calculations are different than the unemployment rate determined by LFS from the State Statistical Office. Considering the labour flows and the indisputable fact that the number of labour force employed in the agriculture sector, which is not formally reported, is relatively large and that a part of the labour force works in the informal sector, we can accept the results of the calculations according to alternative 2 as more realistic. The results of the calculations according to alternative 2, however, show that the unemployment rate according to the stock - flow model is lower than the unemployment rate determined by LFS for the entire period and confirm the previous qualitative analysis of the data from the Employment Agency of the Republic of Macedonia about the labour market flows. According to alternative 2 the unemployment rate calculated with the stock – flow model does not follow the dynamics of reduction in unemployment reflected in the Labour Force Survey, therefore it is not reduced in recent years, and in 2014 even shows a rise. The data also show that in 2014 the unemployment rate has increased due to the increased unemployment which is a result from the positive balance of the flows based on the relation inactive population - unemployed.

Based on the results of the stock-flow model following conclusion can be drawn:

- Although according to the Labour Force Survey the unemployment rate have dropped, especially in the post-crisis period, using the stock-flow model shows that

unemployment has not been reduced and that according to the second variant of this model the unemployment rate have stagnated or even increased.

- The results from the Table 3 are showing that in the analysed period the inflow of inactive persons to the category of unemployed is almost balanced by the outflow of the unemployed persons who become employed. This indicates on a persistent level of unemployment in the country and is highlighting the phenomenon of discouraged workers.
- The analysis shows that in the Republic of Macedonia smaller share of the employment is from the contingent of unemployed, i.e. it is flow which is balanced with the flow of the persons from inactive to unemployed. But on the other hand, very strong is the flow from the inactive population to the contingent of those persons who have been employed. This flow is three times greater than the flow from unemployed toemployed persons.
- The application of the stock-flow model more realistic is explaining the current situation on the Macedonian labour market and its performance, than by using the statistical data from the LFS.

Republic of Macedonia in the last decade is faced with intensive process of population and labour force ageing, which implicates decrease of the inflow of young population from which the new generations of workers can be recruited on the labour market. It is confirmed by the decrease of the contingent of young persons aged 18-23 (from 195,160 in 2008 to 178,682 persons in 2014 or for 8.4%), which are great changes in a relatively short period (State Statistical Office of the Republic of Macedonia, 2015). Besides that, it is confirmed by the decrease of those persons who for the first time are registered in the records of unemployed. It means that in this period the influence of the demographic factor on the unemployment changes is significantly decreased. At the same time, the number of inactive young population (25-34) was and remains large and amounts more than 60,000 persons (State Statistical Office of the Republic of Macedonia). They are persons who have finished the education and should enter the labour market as active job seekers. The application of the stock-flow model confirms the great influence of the inactive young population on the labour market changes (entering as employed or unemployed persons).

Conclusion

The qualitative analyses of the changes on the labour market and the results from the stock-flow model for calculating the unemployment rate in the Republic of Macedonia are confirming the need to use all available data sources and application of different models in order to get more relevant findings about the changes and current situation regarding the unemployment in the country.

The literature review undoubtedly confirms that in terms of great and long-term unemployment, as is in the Republic of Macedonia, it is necessary to consider both data sources (Employment Agency registration and the Labour Force Survey) about the changes of the scope of the labour force (employed and unemployed) and inactive working age

population. In these circumstances, meaningful is the application of the stock-flow model for calculating the unemployment rate. This model, based on administrative data, besides the changes in the number of employed and unemployed persons, is covering the flows of the employed/unemployed to inactive population and vice versa.

In the Republic of Macedonia the unemployment rate mostly is analyzed through the Labour Force Survey data, because of the incomplete coverage and inconsistency of the administrative data, particularly for the total number of employed persons. We consider that indisputable is the solid methodological background of the LFS, which in the Republic of Macedonia consistently is applied on good (representative) sample for studying the changes on the labour market. But, there is a doubt how well the sample represents the total population in the country, because the sample framework is based on the data from the Population Census 2002 (the data on the number of households per enumeration, the population, the gender and the age of the population). There are many facts which undoubtedly are confirming that since 2002 substantial changes have occurred in the scope and the structure of the total population and households on national and regional level. It means that the SSO is extracting sample of something that is significantly changed and does not correspond to the real situation in the country. This limitation undoubtedly is reducing the analytical value of the LFS data.

According the qualitative analyses and the results of the stock-flow model application, based on the administrative data of the Employment Agency, following conclusions can be made. In the observed period (2008-2014) the unemployment has not been reduced, i.e. the unemployment rate have stagnated or even increased. In 2014 the unemployment rate is higher than in the previous years by both alternatives. There is a persistent level of unemployment due to the almost balanced inflow of inactive persons to the category of unemployed and the outflow of the unemployed persons who become employed. At the same time, very strong is the flow from the inactive population to the contingent of employed, i.e. this flow is three times greater than the flow from unemployed to employed persons. So, one can conclude that the application of the stock - flow model givesmore realistic explanation of the changes and current situation on the Macedonian labour market, than the statistical data from the LFS.

All available data shows that the inflow of young population, from which the new generations of workers can be recruited on the labour market, is decreasing, due to the intensive process of population and labour force ageing. It implicates the decreased impact of the demographic factor on the labour market. In these circumstances, the large number of inactive young persons, who continuously are transferring to/from unemployed or employed significantly are influencing the persistent unemployment, as well as the slow decrease of the unemployment rate. The big number of inactive young population (about 60,000 persons aged 25-34) means that the unemployment in the Republic of Macedonia is higher than the registered. Besides that, the question should be raised, what happens to all those persons who have disappeared from the records of unemployment in the analysed period, whether they have transferred to inactive, have continued education, left the country, became unpaid family workers or persons who remained to work in the grey economy. All this issues need further analyses in the course of more realistic determination of the current situation on the labour market in the Republic of Macedonia.

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