METHODOLOGICAL NOTE ON THE ESTIMATED MIGRATION FLOWS OF 2014 AND THE ESTIMATED POPULATION ON 1.1.2015

GENERAL

This note presents the first estimates of migration flows for 2014 on which the estimated population on 1.1.2015 is based. As regards immigration flows, the model to be applied is the same as the one outlined in the note entitled "Short methodological note on the estimated migration flows and the estimated population 1991-2014". The note is available at the following link: http://www.statistics.gr/documents/20181/a483cf24-b563-4ef8-8ae9-d502d7d21675 .

The estimation of emigration is based only on data on Greek immigrants to Germany, as reported by the German Statistical Office (DESTATIS), given that neither the Greek Ministry of Foreign Affairs nor any other country disposes any relevant data. Knowing that Germany is the more popular destination country for emigrants from Greece, the data of Germany are used by applying regression models.

IMMIGRATION

Using the aforementioned note on estimating immigration flows for the years 1991-2014 and taking also into consideration the advantages and disadvantages of the examined models, a model with two independent variables was selected, namely immigration of the previous year and the percentage change of Gross Domestic Product (GDP) for the previous year, as well.

The equation is:

$$\ln(X_t)= 3{,}219 + 0{,}711*\ln(X_{t-1}) + 0{,}008*Z_{t-1} \qquad (1)$$

where,

X_t: Total annual immigration

X_{t-1}: Total annual immigration (previous year)

Z_{t-1}: percentage change of Gross Domestic Product (previous year)

From (1), if X_{2013} = 57.946 and Z_{2013} = -3,9,

the estimated immigration for 2014 is: X_{2014}=59.014 .

EMIGRATION

Estimates for the years 1991 – 2013 were produced on the basis of the results of the MIMOSA projects and immigration data of other countries. These estimates are included in the previously published study "Short methodological note on the estimated migration flows and the estimated population 1991-2014" and they are presented in the first column of Table 1.

On the basis of available data on Greek immigrants to Germany, as reported by Germany, three alternative estimation methods for total emigration were applied. These methods along with their resulting conclusions are presented below:

1) Regression of total emigrants on data on Greek immigrants to Germany for the years 1991-2013.

Table 1: Total emigration [1] and emigration from Greece to Germany for the years 1991-2013.

	TOTAL EMI	GR to DE
1991	64.628	29 332
1992	52.389	24 599
1993	52.929	19 093
1994	46.813	19 796
1995	47.967	21 200
1996	54.628	19 840
1997	51.794	17 305
1998	60.119	16 855
1999	54.175	18 497
2000	46.993	18 358
2001	45.909	17 529
2002	39.378	15 913
2003	37.433	12 959
2004	38.041	10 883
2005	38.583	9 692
2006	38.368	8 957
2007	40.400	8 908
2008	43.044	9 162
2009	43.686	9 709
2010	62.041	13 717
2011	92.404	25 264
2012	124.694	35 811
2013	117.094	34 728

[1]estimation from "Short methodological note on the estimated migration flows and the estimated population 1991-2014".

The regression equation resulting from the above data, with $R^2=0,716$, and significance level <0,001 , is as follows:

$$E_t = 9072,08 + 2,594676*D_t \qquad (2)$$

where E_t is total emigration during the year t and D_t is migration data from Greece to Germany for the same year according to DESTATIS.

The diagram below depicts the results of that regression:

Diagram 1. Total estimated number of emigrants and number of emigrants resulting from the regression equation (2) for the years 1991-2013.
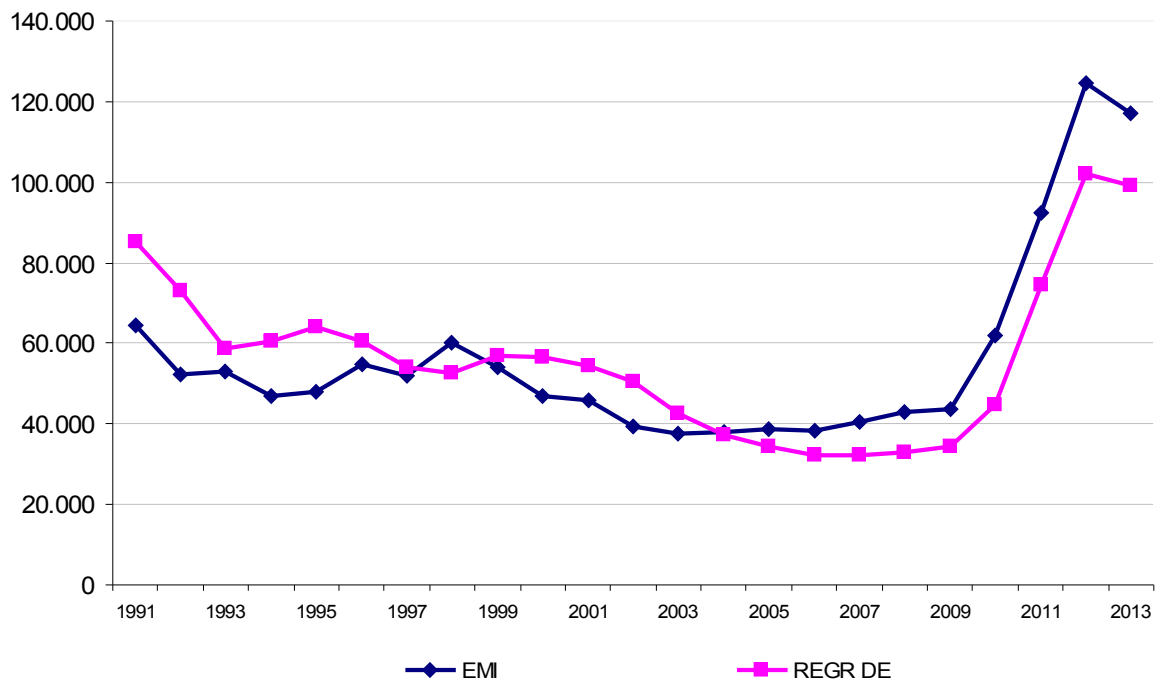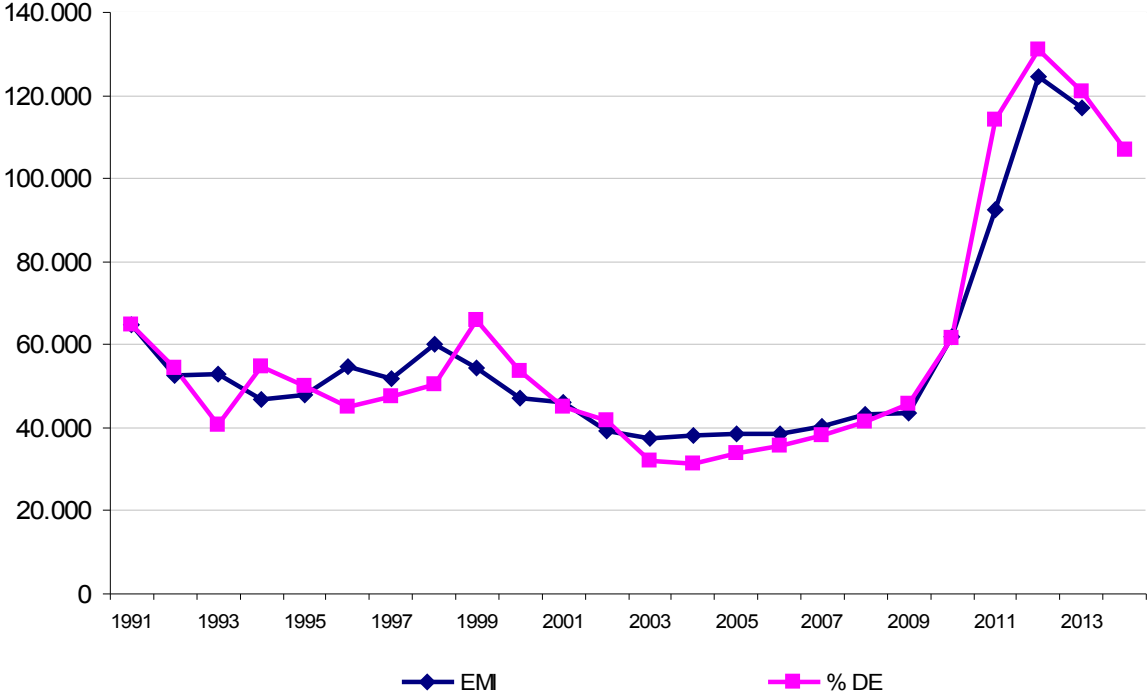

2)   Estimation of total annual emigration for the years 1991-2013 on the basis of annual percentage change of the number of Greek immigrants to Germany (source: DESTATIS) for the above period.

The annual total emigration for the years 1991-2013 is calculated using the annual percentage change of the number of Greek immigrants to Germany (source: DESTATIS) for the above period.

The comparison between the estimated time series (%DE) and the time series presented in the first column of Table 1 results to the following diagram.

Diagram 2. Total estimated number of emigrants and number of emigrants resulting from the percentage change of the number of Greek immigrants to Germany.

3) Regression of total emigrants on data of Greek immigrants to Germany for the years 2001-2013.

In this case, the first estimation method is applied on a more recent time period 2001-2013.

Table 2: Total emigration (2) and Greek immigrants to Germany for the years 2001-2013.

	TOTAL EMI	GR to DE
2001	45.909	17 529
2002	39.378	15 913
2003	37.433	12 959
2004	38.041	10 883
2005	38.583	9 692
2006	38.368	8 957
2007	40.400	8 908
2008	43.044	9 162
2009	43.686	9 709
2010	62.041	13 717
2011	92.404	25 264
2012	124.694	35 811
2013	117.094	34 728

[2]estimation from "Short methodological note on the estimated migration flows and the estimated population 1991-2014".

The regression equation resulting from the above data, with $R^2=0,914$, and significance level <0,001 , is the following:

$$E_t = 6755,205 + 3,157393*D_t \qquad (3)$$

where E_t is t total emigration during the year **t** and D_t is migration data from Greece to Germany for in the same year according to DESTATIS.

The following diagram presents the results of that regression:

Diagram 3. Total estimated number of emigrants and number of emigrants resulting from the regression equation (3) for the years 2001-2013.
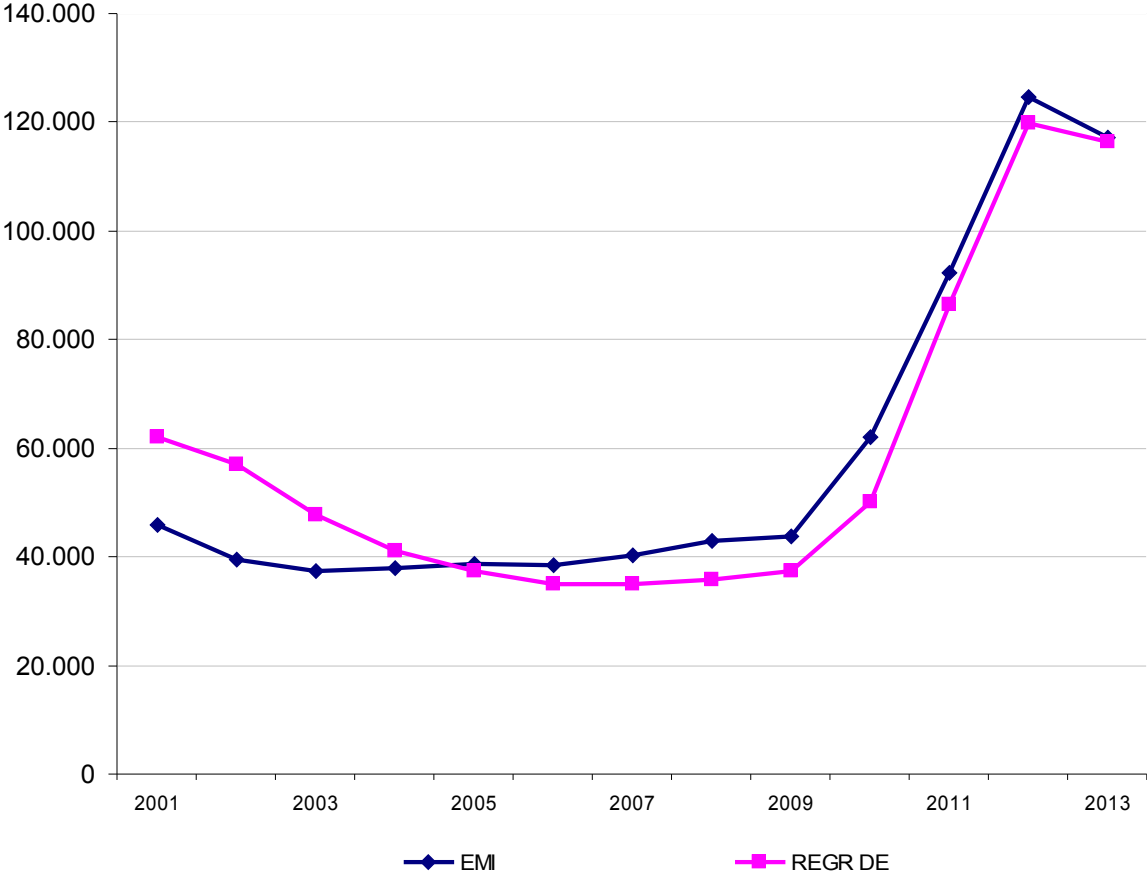
On the basis of the three aforementioned estimation methods it is concluded that the most secure results are produced by the last method, since it yields a high R-squared value and in addition it approaches quite well the results of the more recent years. Applying the regression equation (3) for 2014, for which according to the German data, immigrants from Greece are 31.687, the resulting estimate for total emigrants is **106.804**.

It is noted that for 2014 the second estimation method produces almost the same estimate (106.841) whereas the estimate produced by the first one is 91.290.

ESTIMATED POPULATION 1.1.2015

On the basis of the demographic equation Pt+1= Pt + Bt - Dt + It - Et ,

where,

P_{2014} = 10.926.807 (population 1.1.2014)

B_{2014} = 92.041 live births

D_{2014} = 113.040 deaths

I_{2014} = 59.014 (immigrant's estimation on the basis of equation (1))

E_{2014} = 106.804 (immigrant's estimation on the basis of equation (3))

the estimated population on 1.1.2015 is: **P_{2015} = 10.858.018** .

It is noted that in the light of further immigration data collected from other countries, besides Germany as regards Greek immigrants, the estimation of the level of total emigration from Greece will be reviewed and, where necessary, the tables will be revised.