

Economically Active Population Survey (EAPS) Combination of employed persons by professional situation series (period 2005-2008) (2011 population- based survey)

Last updated: June 2014

1 The "professional situation" variable in the EAPS

Within the Economically Active Population Survey (EAPS), the "professional situation" variable provides information which lets us determine the status in employment of employed persons. These data are standardized according to the International Classification of Status in Employment (ICSE) adopted by the 15th International Conference of Labour Statisticians, which took place in January 1993.

The employment relationship, or job situation, is established according to the different types of contract or agreement, explicit or implicit, of the holder with other persons or organizations. The basic criteria used for delineating the classification subgroups are the type of economic risks involved with the jobs and the type of authority that the job holders would have over the establishment and other employed persons.

Based on these criteria, ICSE-93 groups are defined by mentioning the distinction between, on the one hand, "employees" and, on the other hand, "self-employed":

- **Employees:** Employees are all those workers who hold explicit or implicit (verbal or written) employment contracts which give them a basic remuneration which is not directly dependent upon the revenue of the unit for which they work.
- **Self-employed:** Self-employed are jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced. The incumbents make the operational decisions affecting the enterprises, or delegate such decision while retaining responsibility for the well-being of the company.

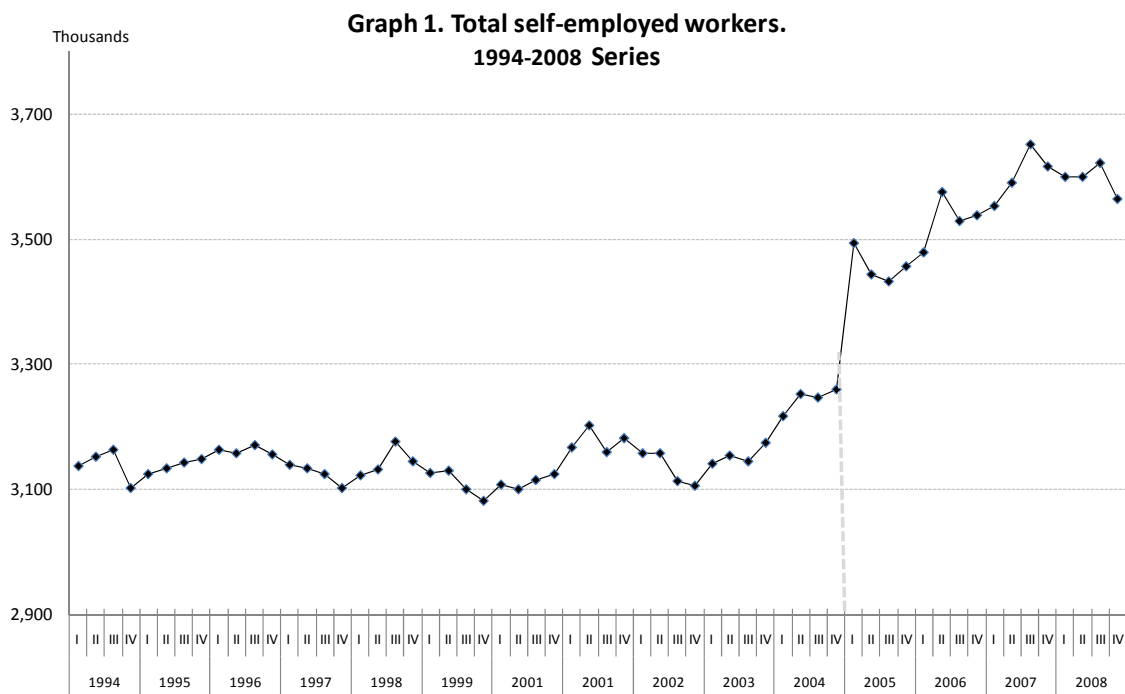
Sometimes is difficult to distinguish if an employed person is employee or self-employed. As a rule, an employee is considered to be a person which receives a direct or indirect remuneration (in cash or in kind) according to the amount of work done, regardless of the value of the production or the process profitability. This also includes piece-rate basis or contingent fee jobs. In turn, a self-employed person receives an income directly according to the value of the production for which s/he is responsible, regardless of the more or less work contributed. These kind of workers must take decisions on the markets in which they operate and look for finance for purchasing/leasing the needed machines and equipment. For example, if a farm owner has a mower and he hires a driver for it, this latest worker will be considered as

"employee"; while if the driver is the owner (or the lessee) of the mower, then the driver will be considered as "self-employed".

In 2009, after analysing the problems with obtaining this variable in the EAPS in the period 2005-2008, we decided to include some additional questions for workers who reported being members of a cooperative, self-employed persons or unpaid family workers (family assistance) in order to clarify more precisely the nature of the laboral relation at their jobs. The questions added in 2009 are available to be consulted in Annex 1. These additional questions were though to specify more precisely the situations of member of the cooperative (looking for avoid the inclusion of the employees hired by cooperatives in this category), family assistance (only possible if the person is part of the household unit) and self-employed persons who, even being self-employed persons in form (for example, due to their contribution scheme) are in fact employees.

2 Change in the questions included in the EAPS in 2009

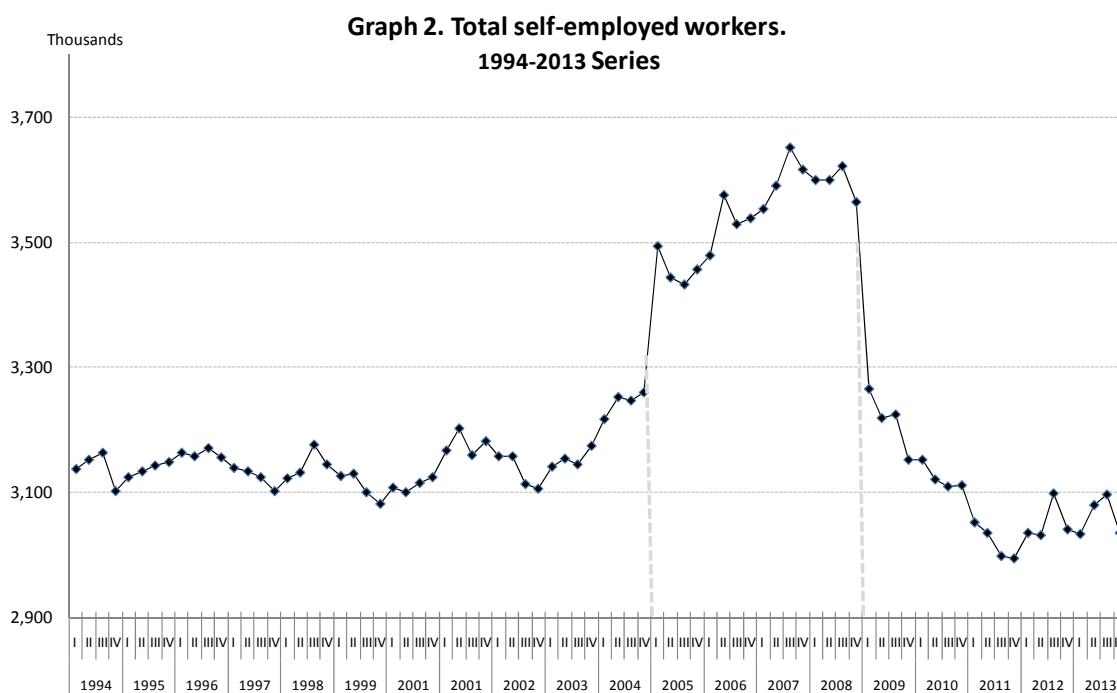
As can be seen in Graph 1, since the 1Q2005 there is a mismatch in the level of the EAPS series for the total self-employed persons. Said group includes, for the period 2005-2008, *employers* (key 01) with an average of 30.7%, *self-employed persons*(key 03) with 60.2%, *members of a co-operative* with 2.2% (key 05) and *family assistance* (that person who works, without reglamentary remuneration, in the company or business of a relative with whom s/he lives) with 6.9% (key 06).



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self-employed persons, in order to clarify more precisely the nature of the laboral relation at their jobs. These additional questions were thought to specify more precisely the situations of *member of the cooperative* (looking for avoid the inclusion of the employees hired by cooperatives in this category), *family assistance* (only possible if the person is part of the household unit) and *self-employed persons who*, even being self-employed persons in form (for example, due to their contribution scheme) are in fact employees.

Graph 2 shows the effect of such measure on the total employed persons series before and after including these questions. It can be observed that the mismatch of 1Q2005 was almost totally adjusted since 1Q2009.



Looking at these results, it is clear that the change of the questionnaire in 2005 produced an overrating of the three said professional situation categories. In order to link the results, we must adjust downwards the *independent workers*, the *cooperative members* and the *family assistance* members (keys 03, 05 and 06) for the period 2005-2008. These adjustments have an (also downwards) impact on the total self-employed series. In turn, this reduction will be added to the *employed persons* or the *private sector employees* series (key 08). This will not affect the total number of employed persons, since it is only a redistribution of these employed persons among the different professional situations.

3 Modelling changes in professional situations

From 2009 onwards, EAPS quarterly series include the classification in the professional situation according to the original questions used between 2005 and 2008, and the new professional situation, adjusted with the new

questions included in 2009. Therefore, by using an econometric model, we can try to evaluate the decrease in the number of self-employed persons and the subsequent increase of employees and wage earners by the same amount in the quarterly EAPS series for the period 2005-2008.

For carrying out the adjustment, we have used the "binary logit" model. In this model, the variable "response" has just two possible values: 0 (when the classification of "self-employed worker" remains unchangeable when answering the new questions included) and 1 (if this classification changes from "self-employed worker" to "private sector employee"). In turn, we must evaluate which EAPS variables are statistically significant for this change of classification of the professional situation and the potential interactions between them for this change.

Original data for the model are those obtained from the population groups that before including the new questions were classified in keys 03, 05 and 06, for the series since 1Q2009 to 3Q2012 (which was the last data available when the model was adjusted). Within this group, those whose key remains unchangeable after including the new questions will have a value 0 in the response variable, and those who switch to key 08 will have a value of 1.

In practice, for the model of likelihood of change, we have taken into account a SAS "PROC LOGISTIC" proceeding with a "logit" response function. EAP variables and the interactions between them will be selected if they can help to explain the changes in the "response" variable in a level of statistical significance of at least 5%.

EAP variables which finally were considered as "significant" (after making groups in categories when necessary due to the sample size) are the following (in "order of selecting"):

- *Previous professional situation.* Persons who, before including the new questions, would be classified in one of the 03, 05 or 06 groups. It happens because there are differences between the magnitudes of the adjustments for each one of these self-employed series of each group.
- *Occupation.* Big occupation groups (1 figure) according to the CNO94, in force up to the 1Q2011. First, we had to change the bases of 2011 and 2012 series from NCO09 to NCO94. Thus, we will be able to apply directly this model to series 2005-2008, which had this previous classification.
- *Dependants.* Annual sub-sample question, that is, it only applies to one sixth of the total sample, but it is highly illustrative of the real professional situation.
- *Seniority.* Time (in months) since the date when starting working in the company. It is observed that the more seniority, the more probability of actually being self-employed (or the less probability of change).
- *Activity.* 1 digit Sections of CNAE93 activity branches (with some regroupings), in force up to the 4Q2007 inclusive. Thus, we have also previously restructured all series since 1Q2008.

- *Age*. This quantitative variable also explains the professional situation, so that the older a person is, the more probability of actually being self-employed (or the less probability of change).
- *Autonomous Community of residence*. Grouping the Autonomous Cities of Ceuta and Melilla.

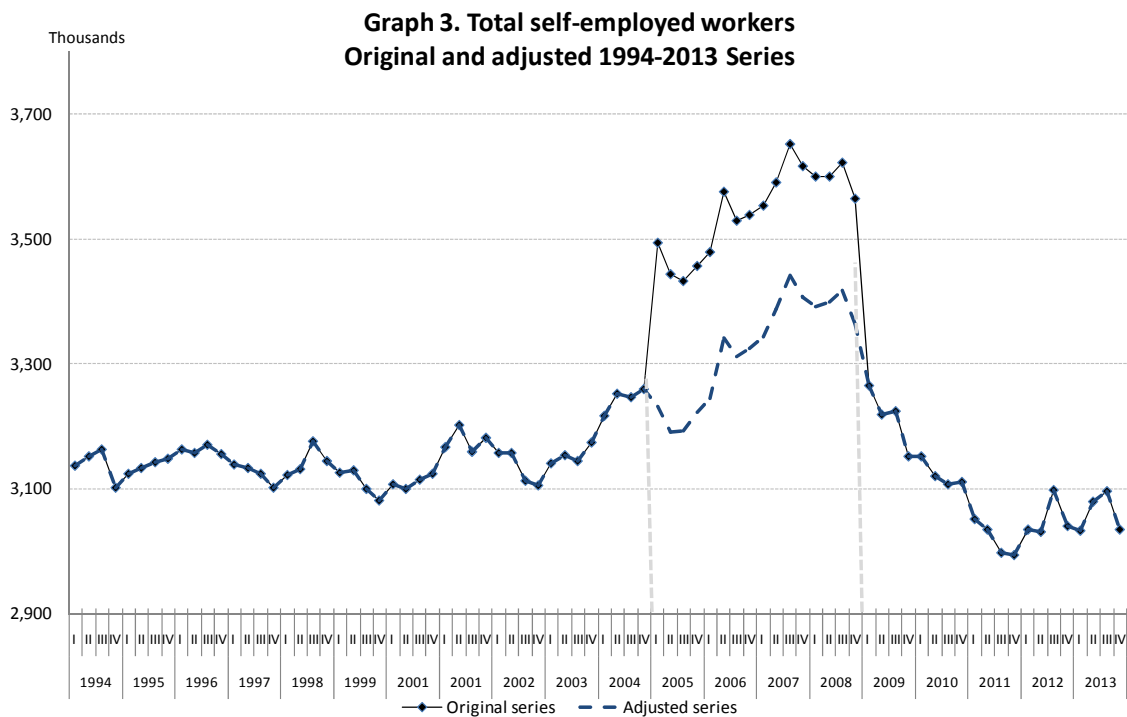
The following significative interactions between the variables above are also observed:

- *Previous professional situation* interacts with the *occupation* variable.
- *Previous professional situation* interacts with the *dependants* variable.
- *Previous professional situation* interacts with the *seniority* variable.

Regarding the evaluation of the goodness-of-fit of the model, we calculate the measures of association between the predicted probabilities and the observed responses. Out of said adjustment, we obtain a 82.2% percentage of accordance, a 0.65 "Somers's D" coefficient and a 0.825 "c coefficient".

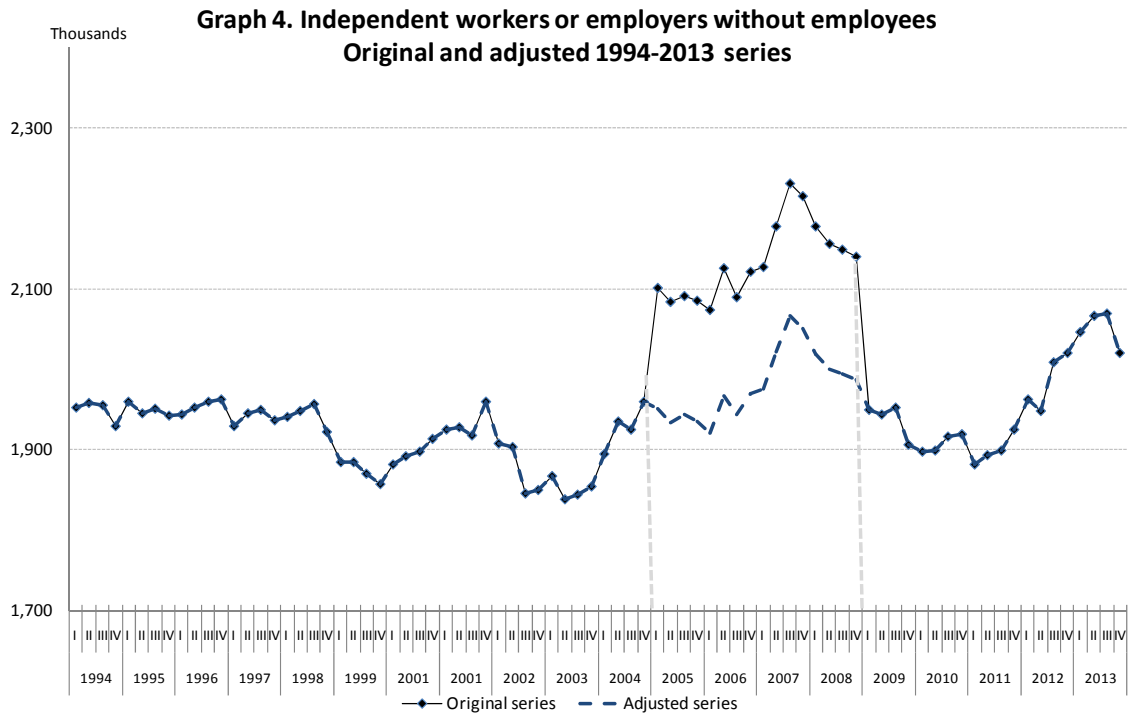
4 Adjustment of the professional situations in the 2005 - 2008 EAPS series

Graph 3 reflects the original and adjusted series for the total employed persons classified as *self-employed persons*. Stability in the adjustment during the different periods is constant, and it implies a -6.2% average decrease in the manpower level for the period 2005-2008.

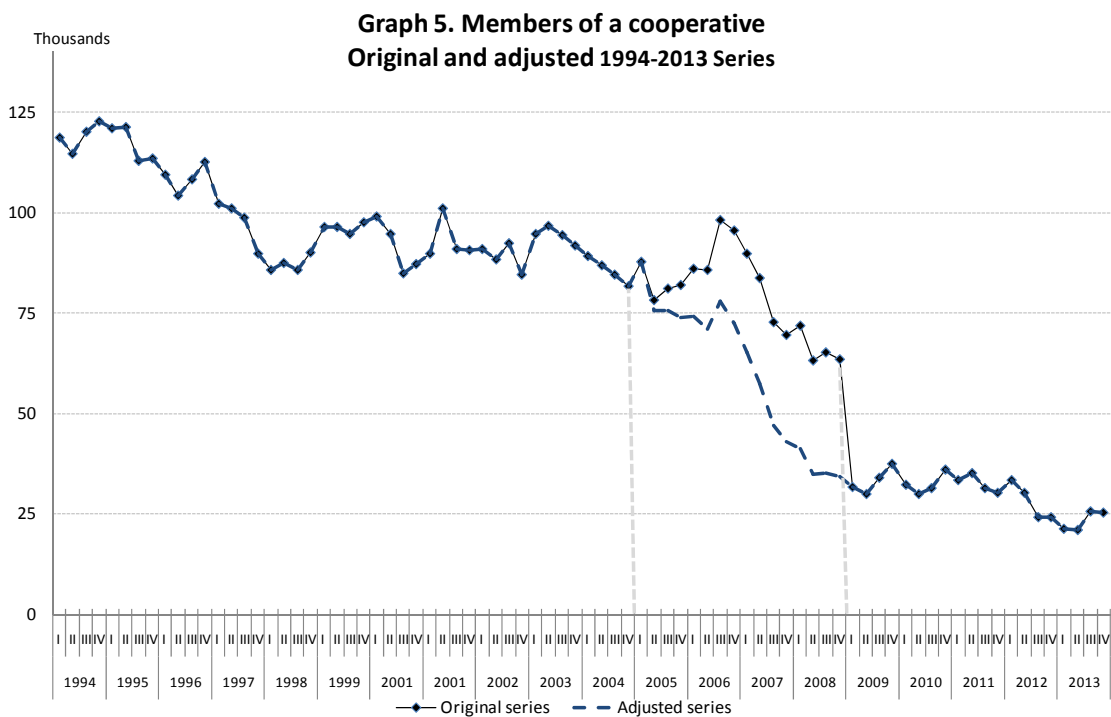


Regarding the adjustment on the group *independent workers or businesspersons without employees*, it is included in graph 4, being quite

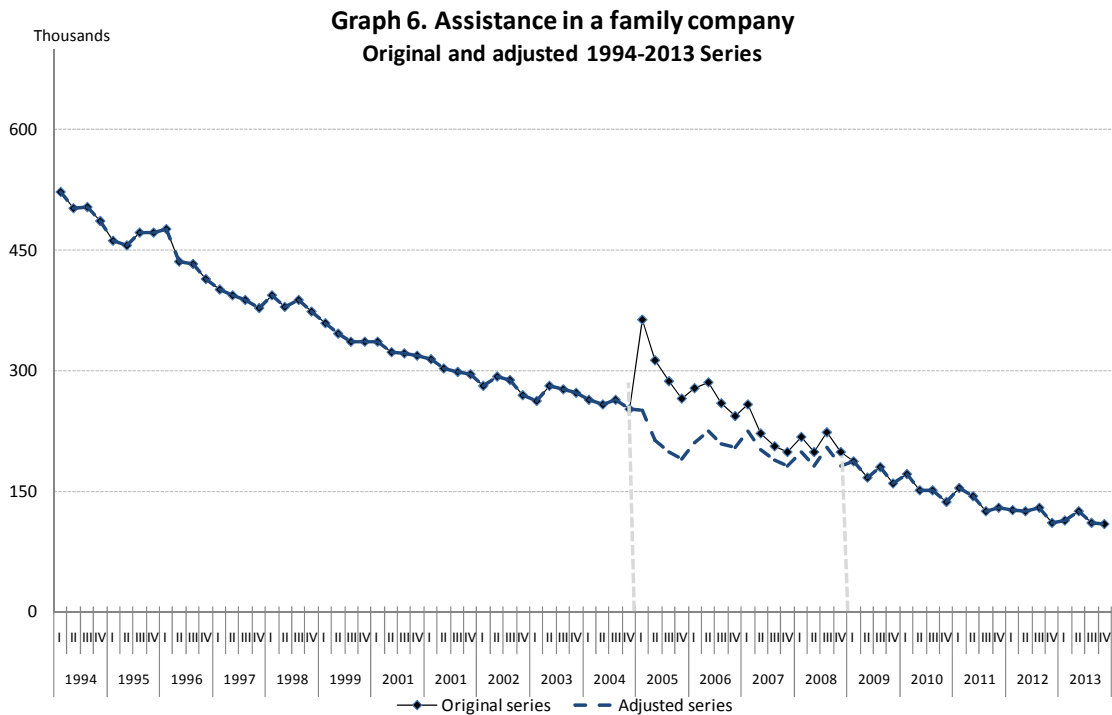
similar to the previous results, showed by graph 3. It registers a 7.2% decrease in the average level for the period 2005-2008.



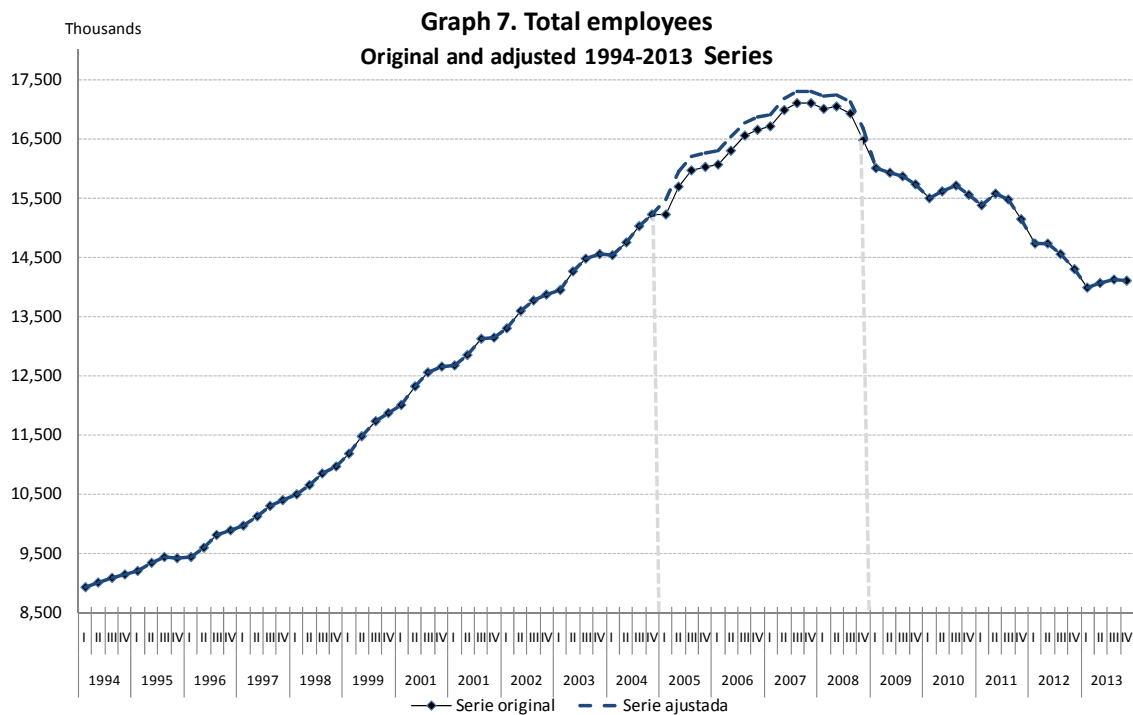
Graph 5 shows the adjustment for *cooperative members*. The series final gap is smoothed for the 2005-2008 period. For the said period, the average decrease was -25.4%.



Similar to Graph 5, the adjustment for *family assistance* series has moderated its initial upward trend, as shown in Graph 6. It registers an average level decrease of -17.3%.



Finally, graph 7 shows the upward adjustment for the *employees* group, registering an average increase of 1.3% for the 2005-2008 period.



5 References

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Hosmer, D. W., Jr. and Lemeshow, S. (2000), Applied Logistic Regression, Second Edition, New York: John Wiley & Sons.

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Orche Galindo, J., García Martínez, M.A. (2013), Additional questions to better measure the self-declared professional status and how to link the mismatches produced in previous series through an econometric model. Workshop on LFS Methodology, Gdańsk, Poland, May 2013.

SAS Institute Inc. (2010), SAS / STAT User's Guide, Second Edition.

SAS Institute Inc. (1995), Logistic Regression Examples Using the SAS System, Cary, NC: SAS Institute Inc.

Annex 1. Additional questions about the professional situation since 2009

<p>2. ¿Cuál de las siguientes es su situación profesional?. Le leo las opciones:</p> <p>Miembro de una cooperativa</p> <p>Empresario con asalariados</p> <p>Trabajador independiente o empresario sin asalariados</p> <p>Ayuda en la empresa o negocio familiar</p> <p>Asalariado sector público (es decir, de algún tipo de administración o ente público)</p> <p>Asalariado sector privado</p> <p>Otra situación (especificar: _____)</p> <p>No sabe</p>	<p>SITU12</p> <p>1 <input type="checkbox"/></p> <p>2 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>3 <input type="checkbox"/> Pasar a 2c</p> <p>4 <input type="checkbox"/> Pasar a 2d</p> <p>5 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0</p> <p>6 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0</p> <p>7 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>0 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0</p>
<p>2b ¿Es además asalariado en ella?</p> <p>Sí</p> <p>No</p> <p>No sabe</p>	<p>COOAS2</p> <p>1 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0 *</p> <p>6 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>0 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p>
<p>2c ¿Cómo desarrolla su actividad?. Le leo las opciones:</p> <p><i>(Entrevistador léale las opciones hasta que dé una respuesta afirmativa)</i></p> <p>Por su propia cuenta en su negocio, buscando o atendiendo a sus clientes</p> <p>Tiene un cliente casi en exclusiva aunque también atiende otros clientes cuando surgen</p> <p>En o para la empresa o negocio de un empleador que le proporciona trabajo</p> <p>No sabe</p>	<p>DESAC2</p> <p>1 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>2 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>3 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0 *</p> <p>0 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p>
<p>2d ¿El familiar propietario del negocio reside con usted en esta misma vivienda?</p> <p>Sí</p> <p>No</p> <p>No sabe</p>	<p>RESID2</p> <p>1 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p> <p>6 <input type="checkbox"/> Pasar a Cuadro 2, antes de 3.0 *</p> <p>0 <input type="checkbox"/> Pasar a Cuadro 1, antes de 3.0</p>

* Preguntas de asalariados