Activity rate projection

Methodological note.

Introduction

Attempts to anticipate future performance of the population in relation to the labour market is of obvious relevance, since it provides valuable information for a whole host of purposes of significance in the economic and social sphere. To quote a few examples, activity rate projections are used in relation to sustainability scenarios of social protection systems, the general lines of future economic development, policies relating to the labour market, training of workers, etc.

However, this information is very difficult to compile. It is certainly hard to take into proper consideration the different conditioning factors which determine the participation degree in the job market of the population of working age, first in the past, continuing at the present moment and, lastly, in its future evolution within a 15-year scope. As on prior occasions, only in contrast with future facts will the published results be proven correct.

General description of the method used

These forecasts compiled for the 2006-2021 period would come to update those carried out in 2002. Like the former, the main source of information is the Economically Active Population Survey, which also provides basic information for drawing population estimates.

The procedure used in this survey maintains the general methodological lines of those undertaken in the INE up to this time. People interested in obtaining more detailed information can consult the corresponding publications "Activity Rate Projections 2000-2013. Data by Autonomous Community. INE (2002)', 'Activity Rate Projections 1998-2013. National Data. INE (2000)' with results by sex and age group of the first series, 'Activity Rate Projections by Age Group and Sex. INE (1995)'.

The results now published take into consideration the EAPS methodological changes during the 2002-2005 period, which have brought about significant modifications affecting activity rate computations, such as, on the one hand, the implementation of a new operational definition of unemployment since 2002, and how the increasing population of foreign nationals is considered in the survey.

Rate extrapolation is based on a mathematical modelling of the curve describing time trends in quarterly series, using exponential models, specifically logistic curves, applying the Verhulst method for estimating the parameters of the equation.

Variable t appears in these corrections, and is assigned the values 1, 2, 3... corresponding to the position of the quarters under consideration during the

periods under observation, from the first quarter of 1977 (t=1) until the first quarter of 2006, and being predicted, beginning with the second quarter of 2006.

The exponential equations for each Autonomous Community and for the national total appear in appendix 1.

The series calculated for each Autonomous Community have been for females aged 16-64, males aged 16-64 and both sexes aged 16-64. Direct estimation based on the series model for both sexes is actually a new feature with respect to previous editions. Indeed, the both-sexes series was previously calculated as an aggregate of the corresponding activity rates by sex, using projections of population residing in family dwellings as a weighting. The huge difficulty in obtaining this information, in view of the uncertainty regarding foreign population inflow contingents, has recommended an independent estimation of the series for both sexes in each Autonomous Community and, by extension, the series for males, females and both sexes for the national total.

The changes introduced in 2002 with the implementation of the new operational unemployment definition have been saved with the introduction of a jump variable calculated using the 2001 data (year for which there is direct information available for both definitions) updated with the new EAPS population base introduced in 2005 (in other words, including the population base of the 2001 census and that calibrated from the elevation factors of the survey to the total foreign nationals aged 16 or over by Autonomous Community).

A "correction" factor has been introduced in the activity rates prior to the first quarter of 2001 to save the significant jump shown by the series between the aforementioned quarter and the fourth quarter of 2000 (chart 1).

Chart 1. Estimate of the jump in 2001 in the activity rates of the population aged 16-64 due to the unemployment definition in force since 2002

	TOTAL	MALES	FEMALES
TOTAL	1.75	1.29	2.22
Andalucía	2.35	1.78	2.92
Aragón	2.17	1.28	3.1
Asturias (Principado de)	4.26	3.4	5.1
Balears (Illes)	0.58	0.35	0.8
Canarias	1.51	1.3	1.7
Cantabria	2.91	2.13	3.67
Castilla y León	1.75	1.09	2.42
Castilla-La Mancha	2.18	1.32	3.07
Castilla y León	1.75	1.09	2.42
Cataluña	0.28	0.24	0.32
Comunitat Valenciana	1.04	0.67	1.43
Extremadura	6.18	4.51	7.92
Galicia	2.1	1.67	2.54
Madrid (Comunidad de)	1.94	1.51	2.35
Murcia (región de)	1.4	0.92	1.9
Navarra (Comunidad Foral de)	1.15	0.68	1.63
País Vasco	0.9	0.6	1.2
Rioja (La)	2.24	1.76	2.72
Ceuta y Melilla	10.87	8.1	13.75

The aforementioned correction factor is the value of the difference between the arithmetic average of the activity rates for the four quarters of 2001 according to the unemployment definitions.

The projection horizon was set at 15 years with the aim of avoiding the influence of fertility fluctuations on the activity of the population studied.

Finally, mention that the calculation procedure for projections focuses on estimating general trends, by leaving stationary variations which can occur in different quarters of the year, variations which affect the analysed collectives in a different manner. Under regular circumstances, a greater variability can be expected from estimate figures as a result of the greater capacity of the EAPS' to reflect part-time jobs and, in general, a greater level of detail regarding the different degree of relationships of persons with regard to the activity.

Annex I

Exponential correction equations for 2006-2021 activity rate projections

ANDALUCÍA

Both sexes

$$Y_t = 54{,}37 + \frac{15{,}6385}{1 + 3425{,}20\ e^{-0{,}0803\ t}}$$

Males

$$Y_t = 66{,}50 + \frac{16{,}4730}{1 + 227{,}7771\ e^{-0{,}0594\ t}}$$

Females

$$Y_t = 25{,}00 + \frac{33{,}2187}{1 + 33{,}6242\ e^{-0{,}0436\ t}}$$

ARAGÓN

Both sexes

$$Y_t = 60{,}65 + \frac{15{,}4638}{1 + 138746{,}4350\ e^{-0{,}1136\ t}}$$

Males

$$Y_t = 76{,}25 + \frac{10{,}8458}{1 + 2092{,}4541\ e^{-0{,}0755\ t}}$$

Females

$$Y_t = 65{,}30 - \frac{22{,}4780}{1 + 0{,}0000087\ e^{0{,}1105\ t}}$$

ASTURIAS (PRINCIPADO DE)

Both sexes

$$Y_t = 67{,}30 - \frac{14{,}6247}{1 + 0{,}0001210\ e^{0{,}08823\ t}}$$

Males

$$Y_t = 62{,}80 + \frac{17{,}5053}{1 + 2892{,}96\ e^{-0{,}0749\ t}}$$

Females

$$Y_t = 57{,}00 - \frac{20{,}8081}{1 + 0{,}0000026\ e^{0{,}1227\ t}}$$

Balears (Illes)

Both sexes

$$Y_t = 82{,}93 - \frac{24{,}8422}{1 + 0{,}0349\ e^{0{,}03733\ t}}$$

Males

$$Y_t = 76{,}00 + \frac{11{,}7432}{1 + 140{,}3210\ e^{-0{,}0528\ t}}$$

Females

$$Y_t = 72{,}00 - \frac{31{,}7449}{1 + 0{,}0055\ e^{0{,}0572\ t}}$$

CANARIAS

Both sexes

$$Y_t = 58{,}10 + \frac{15{,}5113}{1 + 3105{,}7601\, e^{-0{,}0788\, t}}$$

Males

$$Y_t = 85{,}00 - \frac{5455{,}3593}{1 + 68{,}3832\, e^{0{,}0244\, t}}$$

Females

$$Y_t = 36{,}40 + \frac{25{,}5655}{1 + 306{,}2202\, e^{-0{,}0648\, t}}$$

CANTABRIA

Both sexes

$$Y_t = 72{,}60 - \frac{28{,}5342}{1 + 0{,}0019\, e^{0{,}0698\, t}}$$

Males

$$Y_t = 59{,}00 + \frac{24{,}4801}{1 + 17{,}8036\, e^{-0{,}0404\, t}}$$

Females

$$Y_t = 40{,}00 + \frac{23{,}8610}{1 + 18572{,}3441\, e^{-0{,}0937\, t}}$$

CASTILLA Y LEÓN

Both sexes

$$Y_t = 58{,}25 + \frac{14{,}7286}{1 + 11081{,}5578\ e^{-0{,}0901\ t}}$$

Males

$$Y_t = 76{,}00 + \frac{7{,}8407}{1 + 191142{,}3294\ e^{-0{,}1129\ t}}$$

Females

$$Y_t = 41{,}20 + \frac{19{,}8331}{1 + 300137{,}6497\ e^{-0{,}1226\ t}}$$

CASTILLA-LA MANCHA

Both sexes

$$Y_t = 55{,}50 + \frac{17{,}1072}{1 + 6998{,}8895\ e^{-0{,}0880\ t}}$$

Males

$$Y_t = 74{,}40 + \frac{12{,}1669}{1 + 290{,}4326\ e^{-0{,}0614\ t}}$$

Females

$$Y_t = 26{,}50 + \frac{31{,}4224}{1 + 231{,}8197\ e^{-0{,}0611\ t}}$$

CATALUÑA

Both sexes

$$Y_t = 59{,}90 + \frac{20{,}6713}{1 + 130{,}4368\, e^{-0{,}0530\, t}}$$

Males

$$Y_t = 89{,}00 + \frac{6{,}8115}{1 - 0{,}2279\, e^{0{,}0235\, t}}$$

Females

$$Y_t = 45{,}30 + \frac{24{,}9431}{1 + 112{,}3916\, e^{-0{,}0548\, t}}$$

Comunitat Valenciana

Both sexes

$$Y_t = 77{,}10 + \frac{6{,}9825}{1 - 0{,}2867\, e^{0{,}0184\, t}}$$

Males

$$Y_t = 88{,}00 + \frac{258{,}8360}{1 - 3{,}9642\, e^{0{,}0241\, t}}$$

Females

$$Y_t = 39{,}50 + \frac{24{,}9921}{1 + 162{,}4504\, e^{-0{,}0573\, t}}$$

EXTREMADURA

Both sexes

$$Y_t = 51{,}50 + \frac{17{,}3442}{1 + 2864{,}3651\, e^{-0{,}0825\, t}}$$

Males

$$Y_t = 83{,}00 - \frac{18{,}7297}{1 + 0{,}0310\, e^{0{,}0423\, t}}$$

Females

$$Y_t = 27{,}40 + \frac{29{,}8906}{1 + 855{,}7897\, e^{-0{,}0732\, t}}$$

GALICIA

Both sexes

$$Y_t = 72{,}10 - \frac{12{,}1028}{1 + 0{,}0001\, e^{0{,}0864\, t}}$$

Males

$$Y_t = 81{,}50 + \frac{58{,}0927}{1 - 0{,}7096\, e^{0{,}0290\, t}}$$

Females

$$Y_t = 48{,}00 + \frac{15{,}7145}{1 + 1773908{,}8379\, e^{-0{,}1411\, t}}$$

Madrid (Comunidad de)

Both sexes

$$Y_t = 59{,}05 + \frac{20{,}6400}{1 + 9978{,}0406\ e^{-0{,}0894\ t}}$$

Males

$$Y_t = 74{,}20 + \frac{13{,}5937}{1 + 506{,}6515\ e^{-0{,}0608\ t}}$$

Females

$$Y_t = 52{,}00 + \frac{20{,}1573}{1 + 7706495{,}3695\ e^{-0{,}1449\ t}}$$

MURCIA (REGION DE)

Both sexes

$$Y_t = 59{,}80 + \frac{13{,}2896}{1 + 6408{,}2058\ e^{-0{,}0859\ t}}$$

Males

$$Y_t = 86{,}00 + \frac{5{,}7976}{1 - 0{,}0847\ e^{0{,}0338\ t}}$$

Females

$$Y_t = 59{,}00 - \frac{20{,}1744}{1 + 0{,}0003\ e^{0{,}0860\ t}}$$

Navarra (Comunidad Foral de)

Both sexes

$$Y_t = 55{,}40 + \frac{24{,}6907}{1 + 427{,}9314\ e^{-0{,}0630\ t}}$$

Males

$$Y_t = 86{,}36 - \frac{6{,}9797}{1 + 0{,}00003256\ e^{0{,}0969\ t}}$$

Females

$$Y_t = 70{,}10 - \frac{22{,}7521}{1 + 0{,}00000453\ e^{0{,}1153\ t}}$$

PAÍS VASCO

Both sexes

$$Y_t = 56{,}25 + \frac{19{,}8171}{1 + 528{,}9604\ e^{-0{,}0655\ t}}$$

Males

$$Y_t = 85{,}00 - \frac{137{,}7858}{1 + 0{,}4609\ e^{0{,}0404\ t}}$$

Females

$$Y_t = 47{,}80 + \frac{18{,}6442}{1 + 14911{,}3920\ e^{-0{,}0930\ t}}$$

RIOJA (LA)

Both sexes

$$Y_t = 59{,}40 + \frac{17{,}7232}{1 + 1546529{,}5336\ e^{-0{,}1341\ t}}$$

Males

$$Y_t = 70{,}40 + \frac{17{,}0805}{1 + 661{,}8041\ e^{-0{,}0707\ t}}$$

Females

$$Y_t = 68{,}00 - \frac{25{,}5222}{1 + 0{,}0000000039\ e^{0{,}1810\ t}}$$

CEUTA AND MELILLA

Both sexes

$$Y_t = 44{,}00 + \frac{24{,}5713}{1 + 49{,}5309\ e^{-0{,}0786\ t}}$$

Males

$$Y_t = 83{,}80 - \frac{40{,}3531}{1 + 0{,}1266\ e^{0{,}0597\ t}}$$

Females

$$Y_t = 54{,}65 - \frac{39{,}0551}{1 + 0{,}0508\ e^{0{,}0657\ t}}$$

NATIONAL TOTAL

Both sexes

$$Y_t = 58{,}70 + \frac{16{,}9492}{1 + 3112{,}5026\ e^{-0{,}0782\ t}}$$

Males

$$Y_t = 87{,}35 + \frac{225{,}8743}{1 - 3{,}3332\ e^{0{,}0224\ t}}$$

Females

$$Y_t = 20{,}00 + \frac{45{,}2149}{1 + 287{,}3386\ e^{-0{,}0660\ t}}$$

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Subdirectorate-General for Labour Market Statistics.