Female generations and the path to gender labour equality in Spain

1. Introduction

The growing incorporation of women into the labour market is one of the most relevant phenomena that has taken place in Spain during the last decades of the 20th century. Since the beginning of the 1980s, there has been a gradual increase in the number of women who wish to work (Cebrián and Moreno, 2008).

Many important factors have been suggested to explain the different patterns of women behaviour in the labour market. Undoubtedly, the favourable pace of economic and employment growth has clearly contributed to the incorporation of women, but some ideological aspects have also played a relevant role, such as those derived from the women's liberation movement (Goldin, 2006). Institutional changes must also be considered, like women's access to higher education, childcare arrangements and tax allowances, employment law and labour market regulation, social security provision or unemployment benefits and the way in which the industrial, labour market and family spheres interrelate. Nevertheless, there are also certain factors in the labour market itself that encouraged the entry of women. On the one hand, workers' real salaries have increased making women's time spent on unpaid work more expensive and favouring the allocation of more time to paid work and less time for intra domestic work. On the other hand, the growth of the service sector has created new employment opportunities, the emergence of occupations with more flexible working time schedules and, overall, with characteristics more attractive to women.

Patriarchal ideologies and traditional sexual division of domestic work have hindered women's participation in the labour market. The male breadwinner model was deeply rooted in the culture and the society of Southern European countries until well into the 20th century, when some changes began to take place (Cousins, 1994). The Spanish transition from an authoritarian-dictatorial political system to a more pluralistic democratic one during the last years of the 70's decade, resulted in important changes and in the modernization of the society, changing habits and traditions, including modifications in the family model and in the integration of women in paid work. The traditional model of family organization throughout the life course of men and women,

which was regulated by different patterns and roles by gender, has undergone significant changes, opening the way to a new model where women combine intra and extra domestic work. The traditional women's pattern in the labour market consisted in a small proportion of women entering the labour market after school, but a large proportion of women withdrawn when they got married or when the first child was born. The family model has evolved from the prevailing sole breadwinner towards a dual earner model. However, men continue to spend much less time than women in childcare and housework and more time in paid work and leisure activities. As a result, the incorporation of women into the labour market has been accompanied by a delay in the formation of households and in motherhood and by a decrease in the average number of children. In addition, it is also observed that the differences in participation are accentuated with the arrival of children, highlighting the need to articulate measures to balance family and work life that contribute to closing this gap. Nevertheless, it is still a Mediterranean model where the family network provides core welfare support. (Gonzalez and Segales, 2014).

The modernization process did not lead to a true structural reform which would have made possible - among other effects - to eliminate or reduce inequalities in the social rights of women and men. Except for health services and certain levels of education, which have expanded and now have a more universal dimension, social protection in Spain continues maintaining a strongly contributory character. Pension systems and unemployment benefits continue to be closely linked to the labour market (Carrasco, 1997, Suarez and Hurtado 2018). However, some recent measures have had a positive influence on the transformation of the previous model, narrowing the gender gaps of participation rates and between women with and without children. For instance, some relevant measures are the increase in childcare coverage in public education for children under six years old (Legazpe and Davia, 2019), the provision of elderly care services (Dependency Law 39/2006) or the Spanish "Organic Act 3/2007 on Substantive Equality between Women and Men" (Valiente 2013, Salazar 2016). Nevertheless, the combination of women's traditional low involvement in paid work and the gendered employment model configured during the expansion period, resulted in a social protection system that did not cover men and women equally (Gonzalez and Segales 2014).

The upward trend in labour market participation in Spain, especially in prime age, started at a period of rapid destruction of employment in the Spanish economy (Bover and

Arellano, 1995, Alvarez-Llorente, 2002). This tendency has been sustained over time, it seems to be structural and should continue in the future. However, during the Great Recession and the recent sanitary crisis, an increase in inactivity among younger women has been observed. Several questions arise when studying this recent trend: to what extent the female participation rate has to do with the economic cycle? Is it generational, do young women behave differently from older generations? Are the changes associated with motherhood not so great because fewer children are born, the motherhood is delayed, and parents share responsibilities? To what extent are these effects explaining the change in the pattern of women participation in the labour market?

The purpose of this paper is to disentangle the evolution of female labour force participation in Spain over the last decades due to changes in age, period and cohort effects. The process experienced in Spain during the period analysed has similarities with the changes that are currently taking place in many developing countries, for example, the increase in the level of women's education or demographic changes such as the decrease in the birth rate. In many of these countries, structural reforms are considered to contribute and to facilitate the labour integration of women and to promote gender equality. In this sense, an in-depth analysis of the Spanish process can provide elements for understanding what is happening as well as what could happen in countries moving out from a traditional model.

Using a cohort-based model of labour force participation over the 1987-2020 period, we analyse if there are common patterns of participation over the life cycle (age effect), changes in these patterns across generations (cohort effect) and the role of the economic cycle in this evolution (period effect). Data from the Spanish labour force Survey (EPA) will be used for this analysis, a "pseudo-panel" is built using data from synthetic cohorts in order to capture the dynamics of the labour market behaviour across time.

This paper is divided into five sections. The second section presents the evolution of the Spanish labour market since 1987, highlighting the differences in the labour participation of men and women and in some variables such as the age or the number of children that are determinants of the labour role of women. The third section describes the labour behaviour for different age cohorts of women observed in the period analysed. The fourth section describes the methodology and the results obtained in an APC model and the fifth section contains the main conclusions.

2. Background

The increase in the female labour force is clear from the 1980s onwards. Since then, it has shown a persistent upward trend despite the cyclical economic recessions, although since the second part of the last Great Recession and the following recovery, remained unaltered until Covid-19 arrived. On the other hand, the male labour force only increased slightly throughout the 1980s and remained practically constant until it began to grow again at the end of the 1990s, peaking before the 2008 crisis and declining since then. The proportion of active women in the adult population between 1987 and 2020 has increased from 31 percent to 53 percent, while men's activity rate in these two years are 69 and 63 percent respectively. An important characteristic of the Spanish labour market is the high level of precariousness, with high temporary rates and part-time rates, low wages and high turnover rate that affect women mainly.

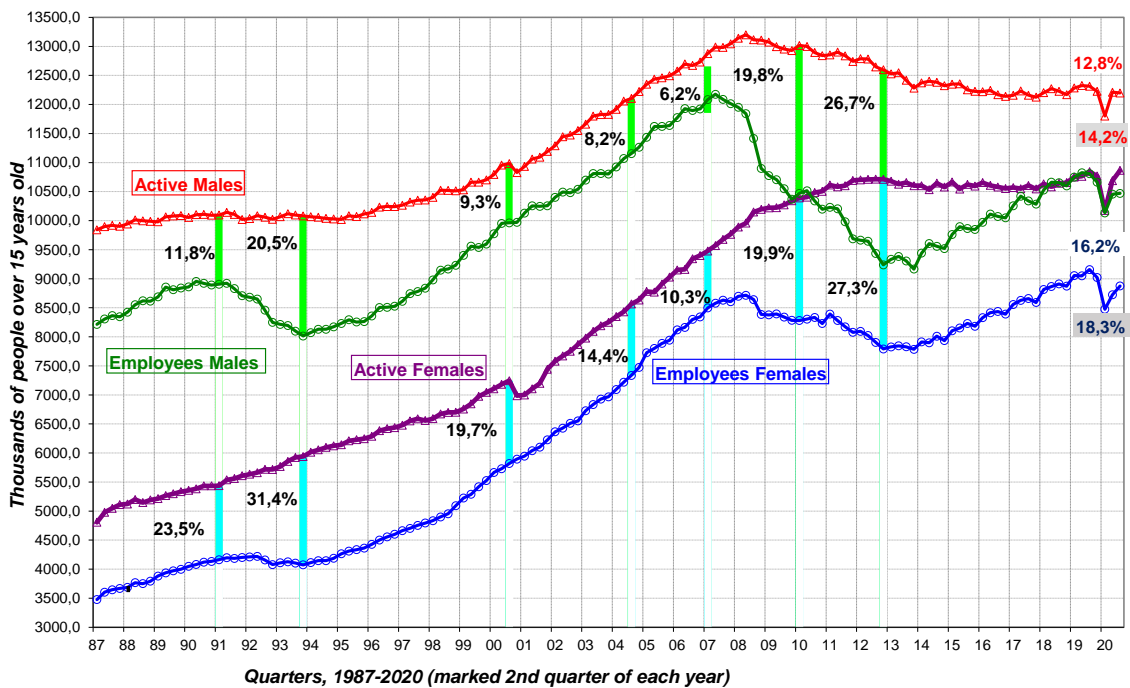**Figure 1** Spanish Labour Market, 1987-2020. (EPA 1987-2020, INE)

Figure 1 shows the evolution of the active labour force and the employed population for men and women from 1987 to 2020. The unemployed population is directly deduced from the difference between the two series and the coloured bars highlight the levels reached by the unemployment rate of these two groups for some key years in the evolution of the Spanish labour market.

From 1987 to the present, at least five stages can be identified in the Spanish labour market plus the year 2020 characterized by reflecting the immediate effects of the health

4

crisis due to the covid-19 pandemic. From the beginning of the 1980s, the active population began to grow as those born during the baby boom of the 1960s joined the labour market and the infant mortality rate was significantly reduced. Figure 1 shows the growth of the female labour force during the late 80's, not only because of the arrival of boomers at working age, but also because women of this generation have higher level of education than women of previous generations.

From 1987 to 1991 the employment recovered at an unprecedented pace in the Spanish economy. Among the factors that triggered the expansion of employment were, in addition to the world recovery, Spain's accession to the European Community in 1986 and the benefits resulting from the productive adjustments of the previous stage. It is also worth noting the role played in promoting employment by the 1984 reform of the Workers' Statute, which allowed the use of temporary, fixed-term employment contracts without cause to justify their use as a basic tool for making workforces more flexible. Figure 1 shows that, despite the good pace of job creation, the steady growth of the female labour force only allowed the unemployment rate for this group to fall to 23.5 percent at the end of the expansionary period. In contrast, the male labour force grew more slowly, and the male group of workers was able to benefit more clearly from job creation and reduce its unemployment rate to 11.8 percent.

From 1991 to 1994, the labour market again suffered the effects of the economic crisis that plunged Spain into the worst recession in terms of female unemployment in its most recent history. In addition to the negative effects of the international economic crisis, there were serious internal problems in the Spanish economy due to wage increases and the loss of purchasing power of the peseta (Spanish currency), placing the Spanish productive system at a clear disadvantage versus the outside world. Thus, the destruction of employment was more intense than in the previous crisis so that, although the loss of female jobs was less than male, the permanently increasing trend of the female labour force led to the unemployment rate for this group reaching 31.4 percent in 1994, that is, almost 1 out of every 3 women in the labour market was unemployed. In the case of men, although the volume of jobs lost was higher and the male unemployment rate increased, it was more than 10 percentage points lower than for women, standing at 20.4 percent in 1994.

The next stage reflected in Figure 1 is the economic expansion being experienced from 1994 to 2007, which favoured notable employment creation. Since 1994 and up to the

second quarter of 2007, employment increased by 67 percent, with the creation of 8.2 million jobs, of which 4.3 million were occupied by women, doubling the number of female jobs. However, as can be seen in Figure 1, the increase in employment has not been as strong as would have been necessary to bring female unemployment levels down to the level of male unemployment. In the second quarter of 2007, the unemployment rate for women (10.5 percent) was still higher than for men (6.1 percent).

During and after the Great Recession, despite the economic difficulties throughout the period, the size of the female labour force has remained stable, while the male labour force fell. Younger people are extending their years of training and some of the older ones are leaving the labour market with an early retirement, due to the difficulty of finding a job, but women in their middle ages remain in the labour market as part of the active population. The last stage, the economic recovery with the employment starting to increase in 2014, is characterized by the maintenance of the decreasing trend in the male labour force and the maintenance of the female. At this point, the level of female employment is equal to the pre-crisis level, while male employment is still lower. This situation is unusual because traditionally, after an economic crisis, male employment recovers before female employment. However, what seems to be observed is more female employment but achieved at the cost of their precariousness.

The economic crisis resulting from the effects of the Covid-19 pandemic from the end of the first quarter of 2020 has presented a series of unusual and complex characteristics compared to previous crises, both in Spain and in other countries. In the first place, it begins with a sharp and intense fall in economic activity, both on the supply and demand side, as a result of a totally exogenous factor generated by a health crisis. Secondly, its evolution is subject to ups and downs and uncertainties depending on the variations in the rate of spread of the disease and the level of restrictions established at any given time to limit economic activity and social mobility. A deactivation of part of the active population can be observed as well as an increase of the unemployment rate for both men and women.

In the evolution of the labour market and the labour participation of women in Spain, two important explanatory factors must be considered: demographic changes and the increase in the level of women's qualification.

For several decades, Spain has been characterized by having one of the lowest fertility rates in the world and for delaying motherhood. In 1981, the fertility rate was around 2.1 children per woman, the generation replacement threshold, and it continued to fall until

reaching the current level (1.23 in 2019). This means that this is not merely a cyclical phenomenon. The pattern of very low fertility that characterizes contemporary Spanish society is closely linked to the delay in the economic and residential emancipation of young adults, the tendency to postpone living with a stable partner, the increasing postponement of the decision to have children, the increase in voluntary and involuntary infertility and the reduction in the propensity to have second children (Castro-Martín et al, 2021). The increasing difficulty in achieving job stability is seen as a serious obstacle to have a child. Motherhood also continues to take a toll on women in employment conditions. The gender pay gap widens significantly when women become mothers (De Quinto, Hospido and Sanz, 2020). The responsibility for childcare falls mainly on families and mostly on women and the institutional support for balance work, family and personal life is still insufficient.

The increase in the educational level of women has played a relevant role in the labour market integration process. The greater presence of women in the educational system entails a greater investment in human capital that women try to make profitable in the paid work. For many women who have invested in their education, staying at home, without a market wage, is no longer an alternative, consequently the "natural" trajectory of the most educated women is to enter and remain in the labour market throughout their working lives. Several studies show that educational level is a key variable in the relationship between participation and maternity decisions, observing that a higher educational level implies not only a delay in maternity decisions, but also they drop the idea of having children (Legazpe, 2015).

The aggregate data on the greater presence of women in the labour market do not reveal that certain characteristics, such as age, are key to understand the unequal impact of this phenomenon. Figure 2 presents the labour participation profiles of men and women, for different age groups and years. There is no doubt that throughout these years, the participation curve of women has reached that of men, showing an important generational component in the increasing pace of incorporation into the labour market and the changing pattern of their behaviour.

**Figure 2** Participation Rates by Age and Gender (EPA 1987-2020, INE)
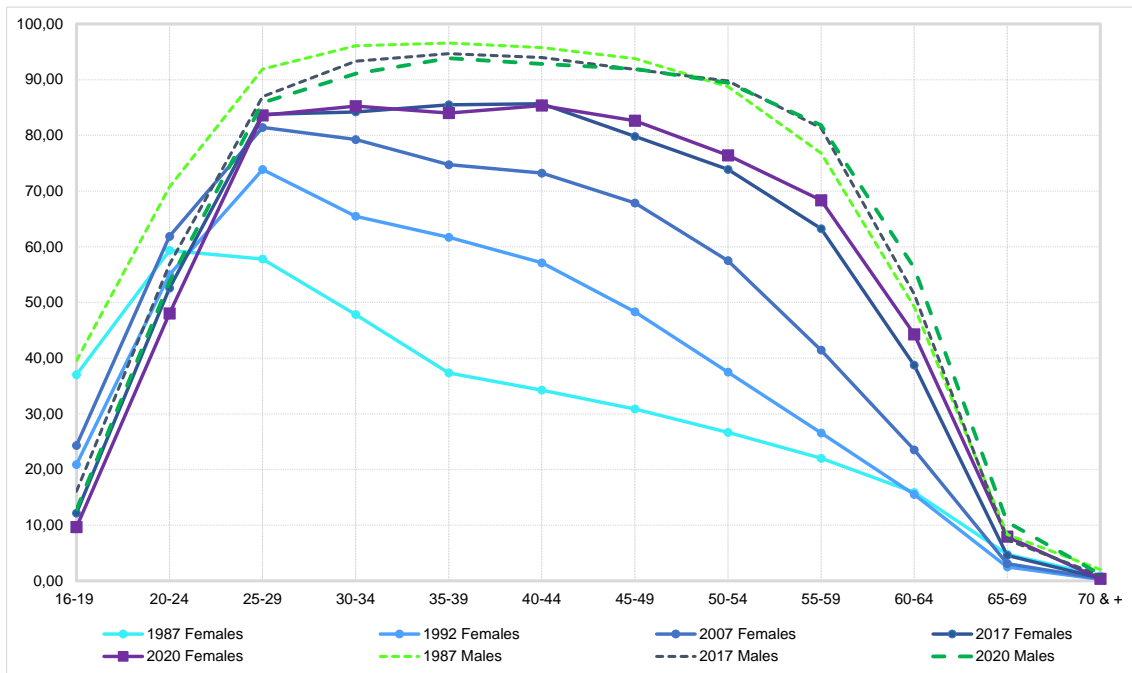
As far as women under 20 years of age are concerned, the tendency has been to decrease their presence in the labour market, a situation generated by the extension of the years of compulsory education, due to the reform of the educational system that took place mainly in the 1980s, and to the greater presence of women at higher education levels. Thirty years ago, women between 20 and 24 years of age had the highest activity rate. After that age, and with the arrival of marriage and children, a significant proportion of women retired from the labour market, with a drop in the activity rate being observed from that time onwards. This drop recovered slightly when some women, after the end of the childcare period, decided to return to work. This traditional pattern is giving way to patterns of participation that are increasingly similar to those of men, with higher rates and a greater degree of permanence in labour activity in the intermediate ages. Currently, the highest participation rate among women is in the 25-34 age group and remains above 80 percent until age 45-49.

In general, gender gaps in the labour market increase with age. On the one hand, on reaching motherhood, many women seek jobs with sufficient flexibility to reconcile family and work, leading to occupational segregation that concentrates women in lower-paid jobs. On the other hand, women accumulate less work experience throughout their active lives, working fewer hours or interrupting their labour participation, resulting in a

depreciation and lower accumulation of human capital that translates into a wage penalty (Cebrián and Moreno, 2015).

The change in the pattern of women's work behaviour at different points in the life cycle can be corroborated by the evolution of female activity rate whether women have children or not. Those are showed in Figure 3.

Figure 3 Participation Rates, women 20-50 years old, head of the household or partner of the head of the household, with or without children (EPA 1987-2020, INE)
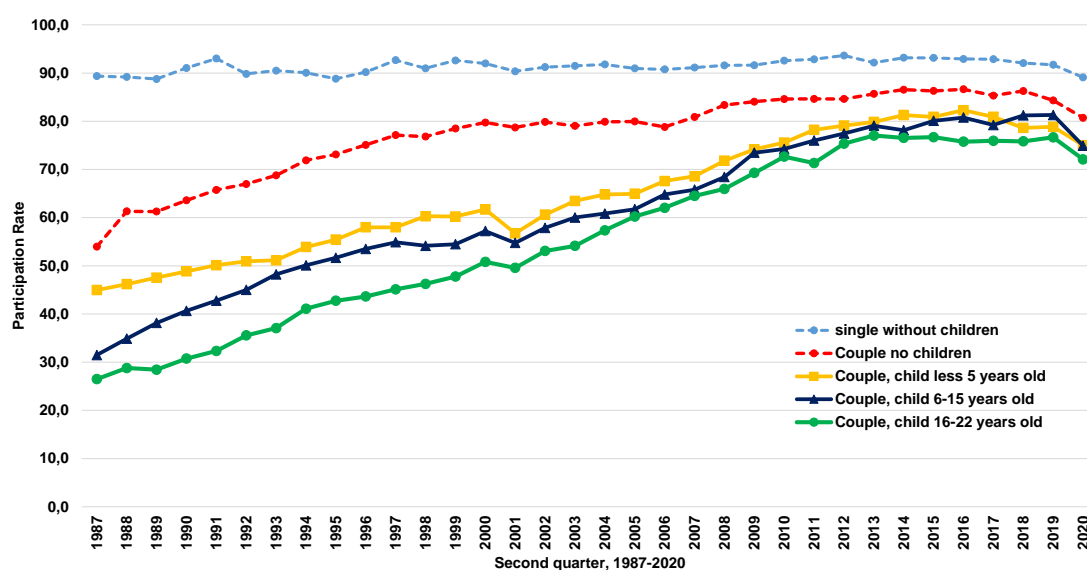
Women living alone already had an activity rate above 90 percent in 1987 and that rate has remained stable until today. Women in couple without children living in the household have increased their participation by around 30 percentage points, reaching that of women living alone. Activity rate of women with children has increased even more, rising by nearly 40 points over the period. These data show that the increase in women's participation is not only explained by the decline in the birth rate, but also there is a generational component, related to the greater stability and permanence in employment of younger cohorts of women.

3. Empirical evidence about female labour market participation from a cohort approach

Although the cross-section evidence provides many interesting results, there are some dynamic aspects of the female's participation decision, which cannot be explored with this kind of information. The changes in the female activity rate can be disentangled into

three effects that reflect these dynamic aspects: age, period and cohort. Age effects may reflect life-cycle decisions such as timing of education and marriage, fertility and retirement. Period effects include effects of business cycle and policy changes which could affect the labour market participation. Finally, cohort effects, different participation rates among different generations, may include educational attainment, lower fertility rates of younger cohorts, and the evolution of social or cultural norms.

The age- period-cohort (APC) analysis can depict the social, historical, and environmental factors that simultaneously affect individuals and populations of individuals. This methodology has a variety of applications in demography, epidemiology, sociology, and the other social sciences.

The empirical literature contains many studies with applications to female labour supply decisions. The cohort approach with data from USA is included in Pencavel (1998), who documents the changes in women labour market since 1970, considering birth cohorts, schooling groups, and age. Beaudry and Lemieux (1999) follow cohorts of Canadian women to isolate the APC effects on their participation rate to explain why the rate stagnated during the 1990's. There are some studies for European countries: Euwals, Knoef and Van Vuuren (2011) investigate the increase in the female participation rate by estimating an APC model for Dutch women, and they find that cohort effect is important for those born before 1955 but is not for younger generations. They also predict that the growth rate of female activity will slow down in the near future. Another paper focused on the Netherlands is Nientker, and Alessie (2019). They propose a new method to estimate APC effects to solve the identification problem. In Grigoli, Koczan and Topalova (2018) it is used a cohort-based model of labour force participation for 17 advanced economies documenting a significant role of common patterns of participation over the life cycle and shifts in these patterns across generations of women.

There are also several studies in developing countries. Warunsiri and McNown (2010) investigate labor supply behavior of women in Thailand by educational level, marital status and place of residence, using APC methodology and synthetic cohort data from 1985 to 2004, and handling the individual heterogeneity, wage endogeneity, sample selection and data aggregation. Tunali, Kirdar and Dayioglu (2019) provide APC analysis of female participation rate in Turkey. They consider the differences in behavior by different education levels and rural/urban region. They find M-shaped life-cycle profile for urban women and for low-educated women. In addition, they dwell on methodological issues and offer explanations for the fragility of the methods.

The evolution of the female participation in the Latin American labour markets has been studied using the APC methodology. There are some examples; with data from Brazil (1981-1999) Oliveiras and Rios-Neto (2004) describe the variation of labour force participation summarizing the changes in age period and cohort effects using a log-linear model. They conclude that among women, age effects are the most important, but period and cohort effects are also relevant, so the different patterns of participation of the cohorts cannot be attributed to temporal or age variation. Contreras, Puentes and Bravo (2005) with the same methodology for Chile find that age effect explains the female participation rate and cohort variables are also relevant, especially the number of children and the level of schooling. Duval and Orraca (2009) conducted an APC analysis of labour participation in Mexico. Life-cycle patterns of female participation rate exhibit the usual inverted U-shape and is countercyclical, suggesting possible added worker effect. The aim of Pacheco and Blanco (2005) is to discuss the APC effects in the female participation rates of three cohorts of Mexican women belonging to two socioeconomic strata (middle and popular sectors). One of their main results is that for the middleclass women the cohort effect shows more intensity, while for the popular sector women the period effect is more significant.

In Spain, published studies on female labour participation incorporate age as an explanatory variable, as an indicator of the different moments in the life cycle and also tend to take into account the economic cycle as a determinant of labour decisions. Some studies have been focused on the use of age cohorts with the aim of highlighting labour behaviour differentiated according to the year of birth. In Garrido (1992), synthetic cohorts are used to analyse descriptively the changes in the labour trajectory throughout the life cycle of different generations of women, showing an important change in the classic behaviour pattern of women born in the late 1950s and during the 1960s. This approach is repeated in Garrido (2004), Garrido and Chuliá (2005) to analyse the evolution of employment. Other authors such as Malo and Cueto (2012, 2013) also analyse longitudinally changes in labour participation following age cohorts. Cuadrado et al (2007) develop a projection of the aggregate activity rate of the Spanish economy between 2004 and 2020, by nationality and gender, using Labour Force Survey data from 1977 to 2005. The impact of the structural unemployment rate, the effects of the birth cohort, educational level and age had been taken into account to explain the participation rate in the case of males and females of Spanish nationality. For those of non-Spanish nationality is also included the compositional change of the immigration flows and the

cohort effect observed for women. They conclude that it is foreseeable that the cohort effects for men and women of Spanish nationality are likely to be finished in the near future. However, the incorporation of highly educated men and women into the Spanish labour market, as well as the generational change among women, could continue to increase the activity rate of this group.

4. Cohort Data Analysis

The numerous published studies demonstrate the relevance of following-up the birth cohorts to understand changes in the female activity rate over time. However, there are no published articles estimating the importance of the three effects, age, period and cohort, in order to understand the variation in female labour participation in Spain.

Nevertheless, it is not always possible to have longitudinal data for dynamic analysis, so monitoring synthetic cohorts over time is an interesting option to gain a deeper understanding of the dynamics of female labour force participation.

We use data from the Spanish Labour Force Survey (EPA) for the period 1987-2020. This survey is carried out by the Spanish Statistical Office (INE) according with Eurostat standards and International Labour Organization recommendations. This is an ongoing, quarterly survey targeted at private households to obtain data on the labour force and its various categories (employed, unemployed), as well as on the population outside the labour market (inactive). The sample size is about 65,000 households per quarter, equivalent to approximately 160,000-200,000 individuals.

Although the Labour Force Survey is not a panel, the sample design of this survey makes it possible to establish synthetic age cohorts and follow them over time. This data set is based on quarterly repeated representative sample survey which allows to build a pseudo-panel with a synthetic cohort approach. The same groups of people born in the same period are tracked over time, having information about their behaviour over a large part of their life. Thus, for example, women who are 20 years old in 1987 can be assumed to have similar characteristics to those who are 21 years old one year later, although they are obviously not the same. The sample of the survey is partially renewed so the interviewees are not exactly the same group, but they are equivalent from a statistical perspective. We track participation rates over time, following different cohorts defined by year of birth. Moreover, synthetic cohort definition has an advantage because there is

not affected by attrition, as it happens with panel data, because they come from cross section surveys.

However, these cohorts may be affected somewhat by international migration (Yang and Land, 2013) although this does not appear to be the case in the analysis conducted in this study. Although it is true that immigration in Spain has become a relevant phenomenon of the current century, for the sample under study the weight is not so great. In Spain at the beginning of the 21st century there were 1.57 million immigrants registered out of a total population of 40.8 million inhabitants, while the latest figures provided by the INE estimate nearly 5.5 million immigrants, 11 per cent over total population. Average inflows since 2000 are around half a million immigrants per year showing that the immigration phenomenon in Spain has undergone spectacular growth since the mid-1990s. According to the EPA data for the year 2020, 13 percent of the working population is of foreign nationality.

Active immigrant women are relatively young, around 60 per cent are between 20 and 44 years of age, with the group between 25 and 34 years of age having the greatest weight. However, the weight of foreign women in the sample we selected is only 4 percent. We have 33 years of data and we have selected women born between 1936 and 2020. The resulting data set contains 1,986,124 observations of women (4% are foreign), which amounts per year between 42,000 and 65,000 observations depending on the birth year. Each birth cohort contains between 600-1,300 observations per each age in which they are observed[1].

The number of observations is determined by the size of the cohort. In the following graphs, representing the population pyramids at the beginning of the observed period (1987) and at the end (2020), the disparity in the size of the different generations can be observed.

Throughout the 20th century, Spain developed and completed the so-called demographic transition: it began the century with high birth and mortality rates and ended it with low levels of both variables.

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[1] The model estimated in the following section has been repeated for women of Spanish nationality, excluding foreigners, and the results are similar to those for the whole population.

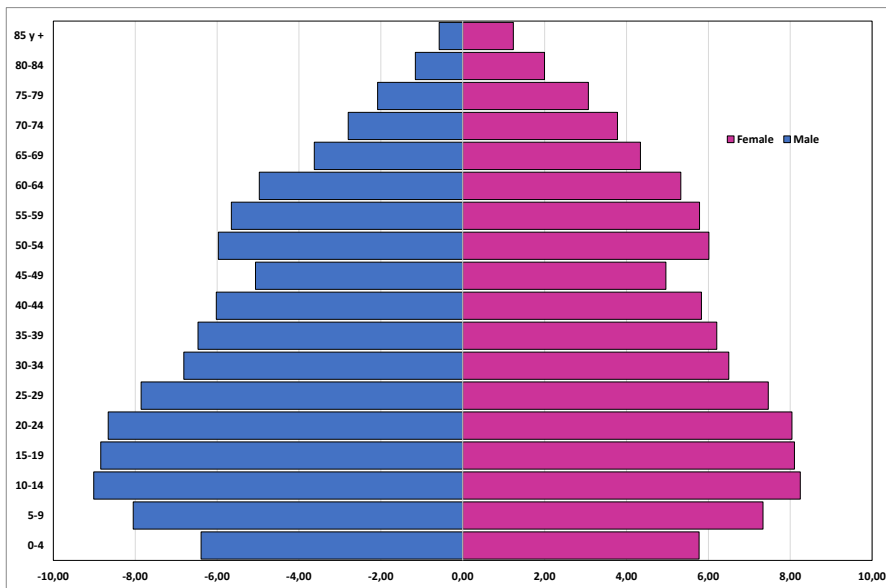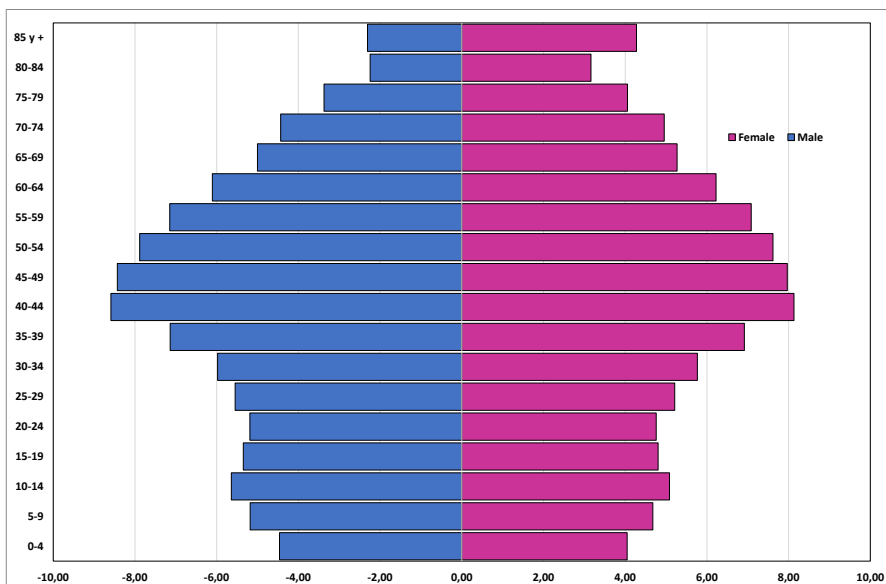**Figure 4** Population Pyramid, Spain 1987 (INE, Census)

Figure 5 Population Pyramid, Spain 2020 (INE, Census)

In the first stage, scientific advances and economic development made possible a progressive fall in mortality and a lengthening of life expectancy, processes which began in the 19th century, but which matured throughout the 20th century. The birth rate, on the other hand, after remaining at high levels for a time, began its long decline spurred by profound cultural changes, especially the emancipation of Spanish women. In the late 1980s, the generations born during the baby boom of the 1960s and early 1970s reached the working age, as can be seen in the 1987 population pyramid. The change in our age pyramid (Figures 4 and 5) shows the effect of the drop in fertility on an age structure that is not a conjunctural and it is part of a much broader demographic process. The reason

why Spain has such a low birth rate can be explained by the progressive precariousness of work, specifically the rise in unemployment and temporary employment which are notably higher in Spain than in most European Union countries.

We cannot cover the full span of an individual's potential working life (16-65). With this data we are able to observe 84 birth cohorts, but we cannot observe any birth cohort over their entire potential working life. Those born in 1936 are observed from their 51 years old to the end of the working life and those born in 2000 are observed only in their first potential working years (16-20 years old). Since younger cohorts stay in school longer, their participation rates are lower when young than older cohorts. On the other hand, older cohorts joined the labour market earlier and are leaving earlier.

The observed participation rates by cohort and age are shown in Figure 6. Each line represents the evolution of the activity rate of a cohort at different ages which they are observed. The lines corresponding to the cohorts born earlier are on the right of the graph, while the lines of the youngest cohorts are on the left. The oldest cohorts, those born before 1970 have lower participation rates, during the ages observed. Thus, women of these generations present a pattern of progressive increase in their participation. For example, women born between 1941 and 1945 at the age of 40 had an activity rate of 32 percent, while at the same age those born between 1966 and 1970 had a 75 percent activity rate. It is also observed in these older generations that the activity lines throughout the life cycle present a shape close to the classic M, which reflects a return to the labour market when their children grow up, reaching the highest rates near age 50.

The lines show a gradually decreasing pattern for the youngest cohorts due to the extension of the time that young people spend in the educational system. Comparing the cohort of those born between 1966 and 1979 with those born between 1996 and 2000 we see that the activity rate at age 16 have fallen from 41 percent to 8 percent, and at age 20 from 51 percent to 26 percent. This behaviour is not exclusive of younger women; men also enter the labour market later.

Figure 6 Female participation rates by birth cohort (in 5 year groups) and age (year by year), from cohort born in 1936-1940 to cohort born in 1996-2020. Source EPA 1987-2020, INE
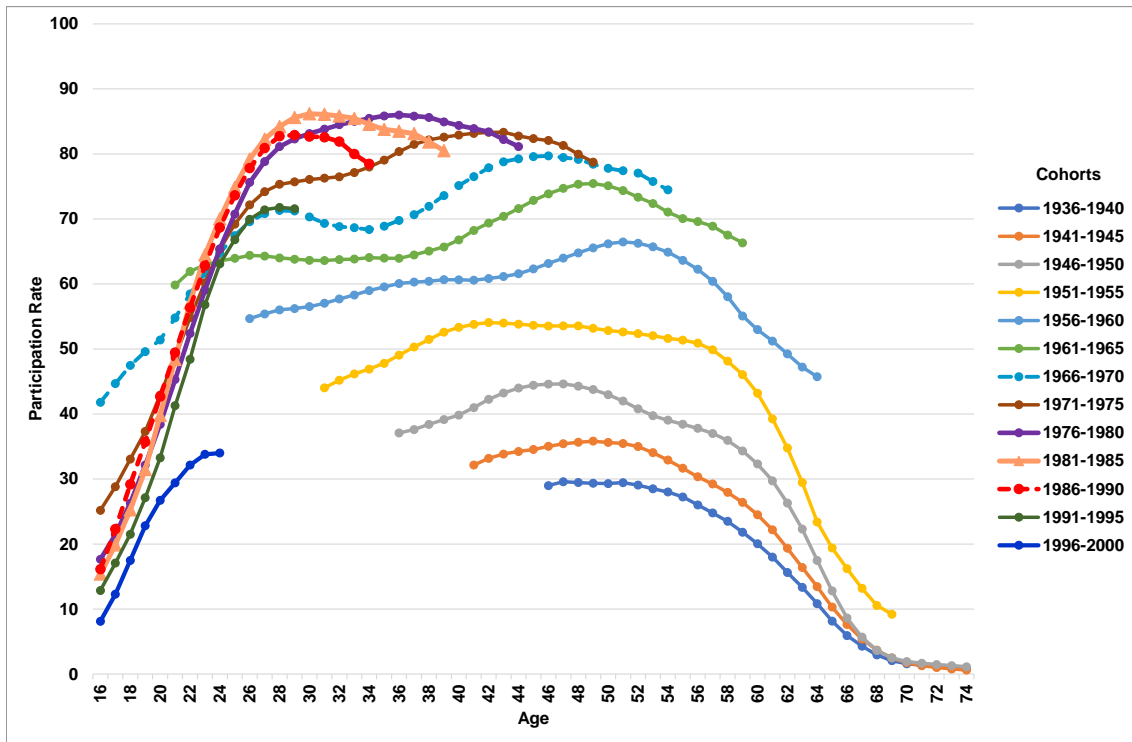
The main cause of inactivity in the labour market for the population under 30 years is to be in training, as reported by the LFS. In 2019, almost 86 percent of people in this age group who were outside the labour market cited being in training as the main reason for not working or looking for a job. The weight was even higher (95 percent) in the case of those under 20 years of age, while in those aged 25 to 29 years it was considerably reduced (to just over 49 percent), gaining in importance here the reasons under the heading of housework (32 percent), being women in this situation more than three quarters of the total number of inactive. However, the evolution in recent years would indicate that training could also have been, in the wake of the 2008 crisis and throughout the recovery period until 2019, an "escape" route from mass unemployment. It seems that the recovery after the Great Recession has been based on a pattern that, unlike what happened in the previous expansion, is not encouraging young people to leave the educational system. This current decrease in the activity rate for this group could be offset by increases in the activity and productivity of this generation in the future.

But low participation is also due to the presence of a group of young people (6 percent of the total between 16 and 29 years of age) who are not studying, are not working and are not actively seeking employment. These situations aggravate the problem of youth

unemployment with the discouraged workers, those who would like and could immediately join a job but do not actively seek it because they believe they will not find it. This discouragement, largely present at lower educational levels and probably generated after prolonged periods of unsuccessful job search, reflects a labour exclusion that, in many cases, can become chronic and lead to social exclusion.

Another remarkable aspect of the cohort participation profiles is the fact that in the millennial generations, born between 1981 and 1990, the maximum activity rate observed in the period is reached before the age of 30. It could be expected that these generations behave in the labour market more similarly to men, with their age-activity curves being an inverted U-shape. In contrast, the profiles show a peak before the age of 30 and their activity rate decline thereafter. While it is true that the last observation corresponds to the second quarter of 2020, in the middle of the pandemic and with the country confined, the drop comes from previous years. In these cohorts (1981-1990), 55 percent of the inactive women from 30 years old to the last age registered are inactive because they are caring for dependents and have family responsibilities. This percentage is slightly lower in the case of women with higher education. In this group of inactive women, 83 per cent live with children versus 64 per cent in the case of active women of the same cohorts at the same ages.

5. Models to decompose age-cohort-time effects on female labour market participation

Once cohorts have been defined, we move on to the analysis of the determinants of labour market participation. We would like to analyse if participation behaviours are more influenced by generational experiences than by age and period, whether different generations answer differently to incentives to improve their performance in the labour market. The main question is whether an individual's decision to be in the labour market is influenced more by generational characteristics, such as educational attainment, fertility rates or changed cultural and social norms. However, these values would change over time with age or with the business cycle. In fact, age effects may reflect decisions such as timing of education, marriage, fertility and retirement and period effects are relevant in terms of business cycle effects or policy changes which might affect the labour

market behaviour of all women in the same way, although some of those effects could be differently for women living in households formed by different age groups. It could be possible to find that incentives are likely to have greater impact on one generation than another, as it seems to be in the management analysis (Benson and Brown, 2011). Although evidence is limited, some studies suggest (Smola and Sutton, 2002) that there are some important differences between boomers and other younger generations.

Our following analysis attempt to break down which changes in participation are due to age (A), to the period (P) and to the cohort (C). It is important to disentangle those three effects in order to predict future trends in labour force participation and the determinants of participation behaviour.

The main problem with cross-sectional data is that age and cohort changes are confounded at one point in time what invalidates cohort analysis. However, Spanish LFS is a cross-sectional data collected repeatedly across time and it is well suited for APC analysis. We can formulate a rectangular age-by-period collection of observations, where columns correspond to age-specific observations of labour force and rows are observations from each age across the different quarters. Linking the diagonal cells of the array yields the observations belonging to people born during the same calendar years who age together. This issue explains why the Age –Period –Cohort (APC) models suffers from a major problem called "the model identification problem". These three factors are perfectly multicollinear since each component is a combination of the other two: cohort=period-age.

We decompose the changes in female labour supply into age, period and cohort effects by using synthetic cohort analysis, namely, the APC methodology.

As we have mentioned above, our analysis consists of following the same synthetic cohort over time seeking to captures age, period, and cohort effects as indicators of (unobserved) determinants of participation behaviour. Our idea is to determine whether it is possible to construct how has been the trends of Spanish female's labour supply.

In spite of the controversies around the APC identification problem, with little agreement whether any solutions exist or which solutions are better, our methodology to achieve the APC decomposition is based on the most widespread approach by Deaton and Paxson (1994) and Deaton (1997).

We have been able to verify that this methodology, despite the criticisms in the literature, offers results that adequately explain the different effects on female labour participation in Spain according to the main hypothesis of theory and our previous descriptive evidence.

This approach imposes a parametric restriction to solve the APC identification problem. First, the variables are detrended and then the restriction that time effect dummies are orthogonal to a trend and sum to zero is imposed[2]. We use an OLS estimation to obtain the coefficients for age, period, and cohort.

The regression models can be written as: $Y_{iacp} = \alpha_a A_a + \beta_p P_p + \gamma_c C_c + \varepsilon_{iapc}$

The dependent variable (Y) is the labour force participation rate of females (FLFP) born in year c at age a in year p. It is referred to individuals of age a in period p, belonging to the birth cohort c=p-a. Where a =1,....,n , p =1,.....,m, c =1,.....,(p−a) and c = p−a. A, P and C denote dummies for age, period, and cohort. A_a is set to one if individuals are aged a at the end of year p. C_c is a dummy set equal to one in case of the individuals were born in year c and P_p is a dummy set equal to one if labour force participation is recorded in year p. We then have three matrices, A_a of age dummies, C_c of cohort dummies and P_p of years dummies and we must drop one column from each but it is not sufficient to avoid an additional linear relationship across these matrices due to the identification problem. The estimation requires to drop one more column from each of the three matrices.

In our analysis, individuals are females, Y is the labour force participation rate of those between ages 18 and 65 in the period from 1987 to 2020 belonging to the birth cohorts in the interval (1936 – 2000). We decompose the changes in female labour force participation rate for a cohort in a specific year into the three afore mentioned effects: age, period and cohort, by using synthetic cohort analysis (Deaton and Paxson, 1994). The estimation subjected to this normalization is based on the regression of female labour force participation rate on each cohort and age dummies, excluding the latest, and a set of year dummies, from 1989 to 2020.

On the one hand, age effects are related to the life cycle; on the other hand, cohort effect reflect differences in the position of age profiles, whilst period effect impacts on women profiles simultaneously, independently of their age and cohort.

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[2] This is the most suitable normalization, attributing time-trends to year effects and accomplishes the orthogonalization (Deaton, 1997).

The following figures present coefficients and the upper and lower confidence intervals of the variables age, period and cohort from the estimations. All of them are significant at a confidence interval of 95 per cent[3]. The following figures, 7, 8 and 9, present the profiles followed by the estimated coefficients.

First, Figure 7 shows the trend in female labour force participation rate due to the age effect. We could expect to find how the life cycle is related to female participation in the labour market. In the more traditional model, women enter in the labour market, then they interrupt their participation to have children and they come back to the labour market once children grow up. While younger generations do not leave the labour market once they are in. The age profile combines these two different patterns.

Consequently, Figure 7 supports the hypothesis about women entering in the labour market at an early stage of the life cycle, after finishing the educational period and then they interrupt their participation in order to have children, as well as the hypothesis about coming back again, as far as the trend has a continuous positive slope. This corroborate what we have pointed out in previous section: Spanish women have a labour market pattern that is progressively similar to that of men, as far as the profile looks like an inverted U than an M.

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[3]   The number of observations is 1.788.496.
The model statistics are:
$F (143, 1788352) > 99999.00$
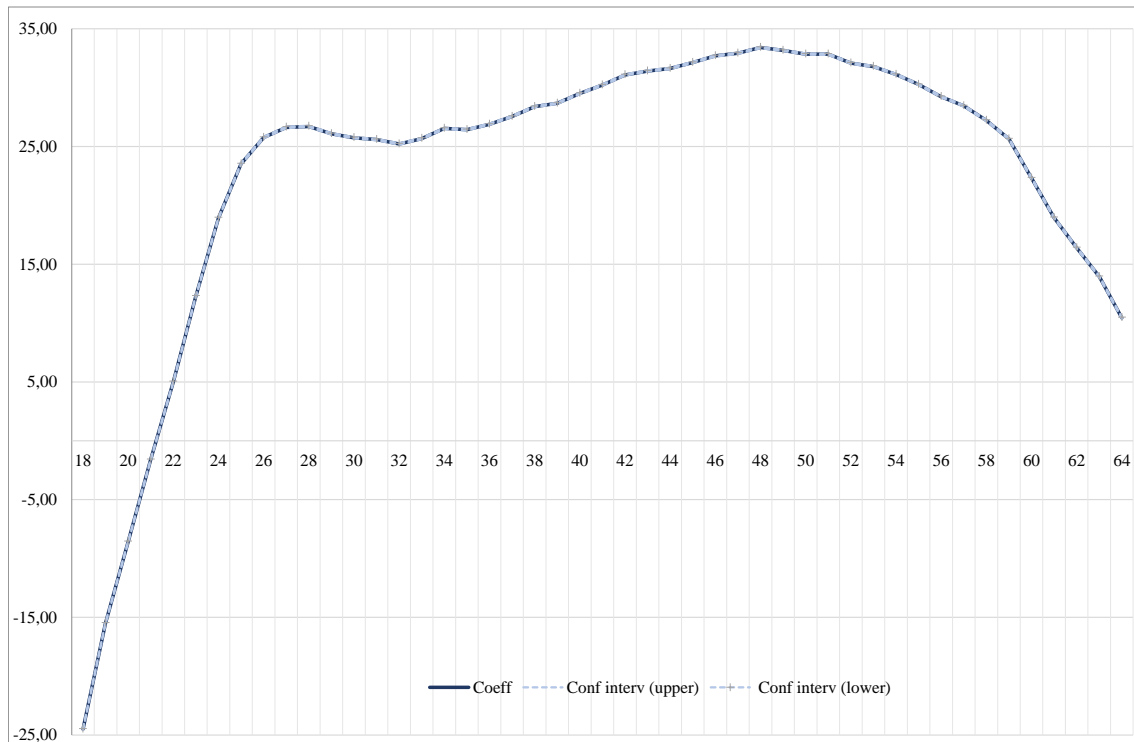Prob > F   =   0.0000.
R-squared   =   0.9737.
Adj R-squared   =   0.9737.
Root MSE   =   3.1953

Figure 7 Labour force participation rate - Age effect (EPA- women 18-65, 1987-2020)

Year effects, in Figure 8, give us interesting results about how changes in the economic and institutional background can influence female participation rate. In this analysis, we must take into account that every woman, from different cohort with different stages in their life cycle, are hit at the same time by the same shock.

We can observe a special trend without a clear relation with the cycles in the Spanish economy. As we have described previously, since 1987 we can distinguish at least five phases in the Spanish labour market: a period of recovery from 1987 to 1991, a short but deep period of crisis from 1991 to 1994, a large economic expansion from 1994 to 2007, a Great Recession from 2008 to 2013, a slight recovery from 2014 and the last crash of 2020. However, observing the Figure 8 we can only justify the impact of the last three stages but with different reasons to be explained: the Great Recession is a clear example of the added worker effect, as men were disclaimed from the male-dominated sectors, as construction. The deep destruction of male employment made women to enter in the labour market, the added worker effect was higher than the discouraged worker effect. And the light recovery made them to remain in the labour market, once they were in the labour market, but at a slower pace. However, the 2020 collapse affect everybody and consequently the decline in the trend.

Figure 8 Labour force participation rate - Period effect - (Source: EPA- women 18-65, 1987-2020)
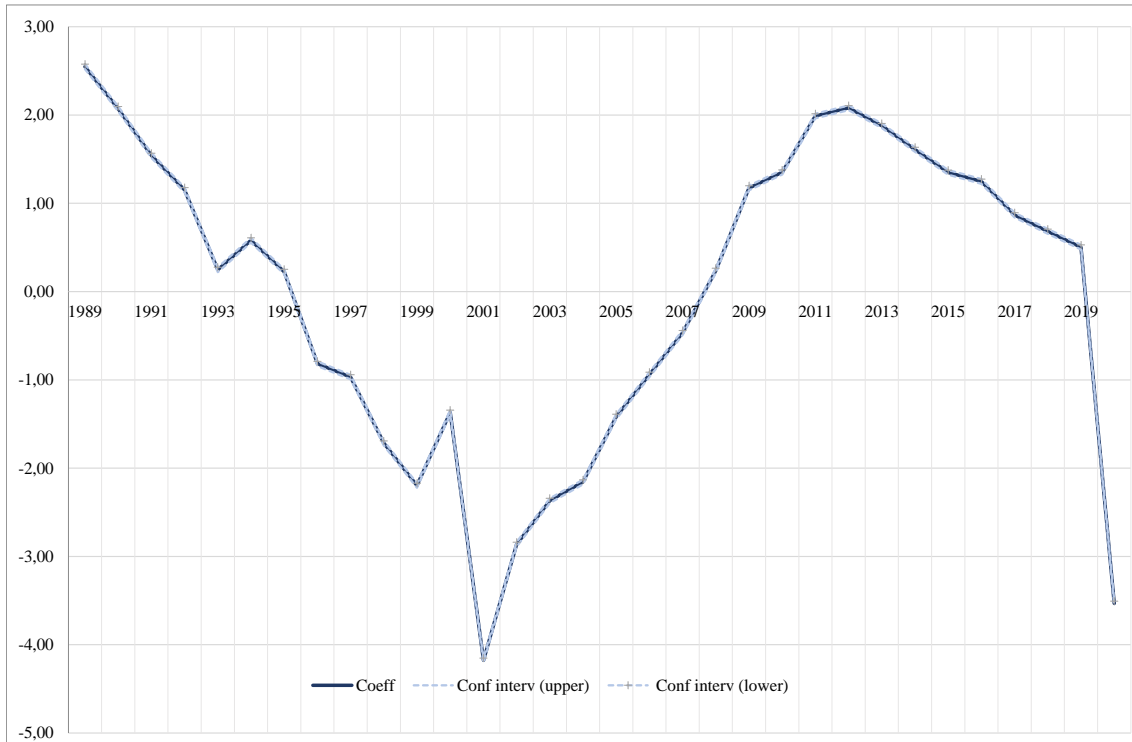
On the other hand, we speculate about the reasons for the decreasing trend from 19987 until the XXI century started. Labour force participation had an important change in 2001, when the National Institute of Statistics incorporated some important modifications in the LFS methodology. The main change involved the conditions for job search to be adapted to the new concept of unemployed person according to the new European Commission Regulation. This change, which was much more demanding in establishing the method of job search, restricted the number of unemployed persons, but increased the number of inactive persons. Specifically, to be preparing for a competitive examination, or waiting for the results of the same or a call from an employment office were not considered a job search situation. Those changes affected men and women of different ages differently. In particular, the impact was small in groups with very high activity rate as, in case of being unemployed, they probably look for a job actively. However, in other groups with lower activity there is a higher probability of finding unemployed individuals who are not actively looking for a job. Another probable reason is that those women in benefit system, who had to be registered in Public Employment Service (PES), had to prove that they were seeking employment in another way, otherwise, according to the new definition, they became inactive instead of unemployed. A study of the Bank of Spain (Cuadrado et

al, 2007) estimated the activity rate by sex and age according to the two definitions of activity in the EPA for 2001. They observed that the change in definition was more relevant for women and young people. Since 2002, when the new methodology was introduced and normalised, the female labour participation rate grows progressively as it should be expected.

In the case of Spain, we can find neither a procyclical nor anticyclical behaviour of the female participation rate. However, it is very sensitive to any change in institutional modifications. Indeed, in 2007 when the rate started to have positive coefficients, the new law about equal opportunities was approved, with a notable improve of women conditions not only in the labour market but also in terms of their role in society.

Finally, the cohort effect, Figure 9, presents the differences in the participation rate among different generations of Spanish women. We refer to a specific cohort or generation when we talk about a group of women who share the same age throughout their lives. But they also share historical, social and cultural environments, education, and even their aspirations. For instance, differences in attitudes can be a determinant influence. Boomers are higher on honesty and caring while GenXers are higher on determination and ambition. In terms of the role of work in live, there are obvious generational differences, Boomers are often defined by their careers while X-generation consider work to be a path into freedom and autonomy (Benson and Brown, 2011).

This effect can suggest why women behave differently at the same age and consequently, they have different age profiles in their relationship with the labour market. The role played by different women cohorts in the labour market can explain changes in the dynamics of their participation. Once this effect exists, it remains for the whole cohort life.

Figure 9 exhibits the trend of cohort effects for the different generations in our sample. We can observe that women born at the beginning of 80s, belonging to the so-called X-generation, have the highest participation rate. Women born before sixties have the lowest levels of participation but with a clear growing tendency. When boomers arrived in the labour market, effects turn to positive figures. Women born from 1986 onward have a strong decreasing trend.

We can corroborate that younger generations have lower participation rates because they postponed their emancipation and remain in the educational system. And, as we have

already mentioned, these cohorts' participation rate profiles are below older generations at the same age.

Figure 9 Labour force participation rate – Cohort effect (Source: EPA- women 18-65, 1987-2020)
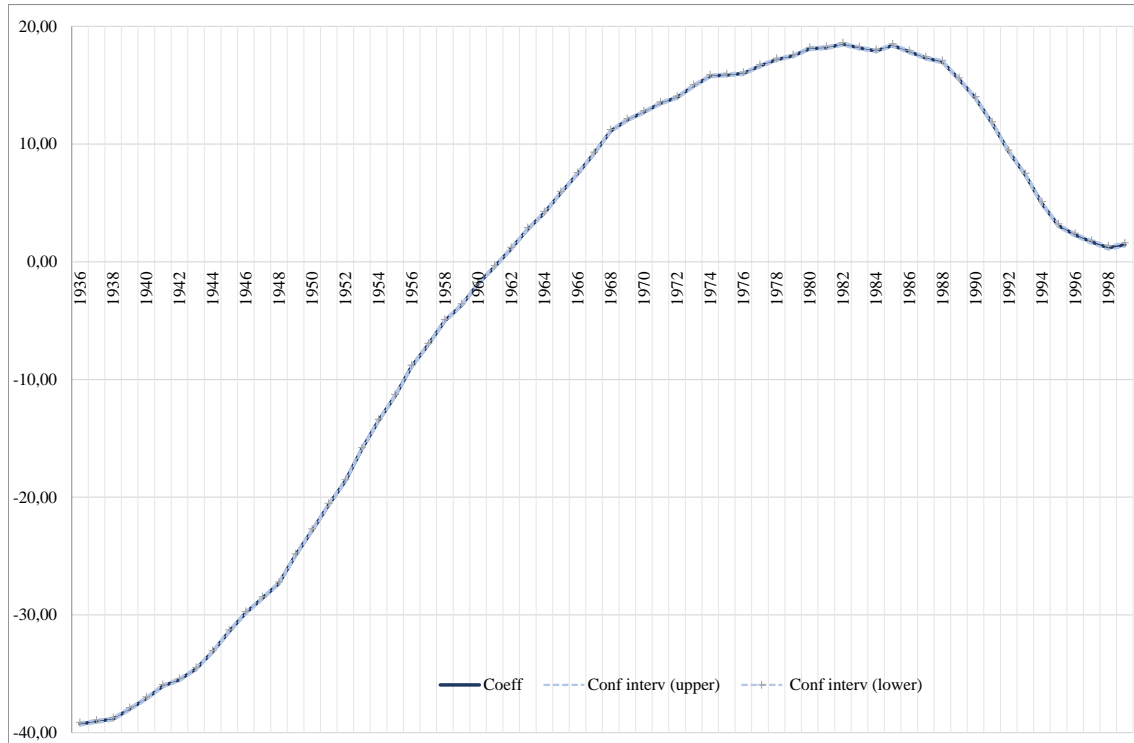
This analysis gives us information about how an increase (decrease) in the participation rate due to age and cohort effects may offset the period declining (growing) and even negative (positive) effects. The last year of observation in our model is 2020, when the covid disease was disturbing the social and economic life and the results in the labour market. The impact is still being felt during 2021 and further analysis will be needed to see what happens with female participation in the near future.

6. Conclusions

The growing incorporation of Spanish women into the labour market since the late 1980s has become one of the most relevant issues in the recent history of Spain.

The most important factors behind this increase are demographic, institutional, social and cultural. All of them explain why women choose to invest in their education, improving their human capital and training, entering and staying in the labour market, despite having to delay emancipation, household formation and motherhood.

At the beginning of the third millennium Spanish society was immersed in the traditional male breadwinner model in which women devoted more time to care responsibilities than men do. However major structural and behavioural changes called for the development of new patterns of time allocation. Better and new regimes of social protection and the new laws to promote equal opportunities and facilitate the reconciliation of work and family life have contributed favourably to this process.

The traditional role of women has been changing in favour of a more active role, similar to that of men, not only in the labour market, but also in the family sphere. Nevertheless, gendered division of time in and out the household over the life course make women more likely to enter and exit the labour market or to take parental leave or work part time in case they were employed.

However, this whole process has come at a significant social cost in terms of births. Fertility rates steadily declined through the XX century. Nowadays, Spain is the second last country in Europe, with a fertility rate is below the reposition level.

Another important characteristic of the Spanish labour market is the high level of precariousness what can hinder the female's decision of being active. The high temporary rates and part-time rates, low wages and high turnover rate affect women mainly.

We follow up the evolution of the activity rate of female's birth cohorts (1936-2000) for the period 1987-2020 to understand changes in their activity pattern throughout their life course. We use data from the Spanish Labour Force Survey (EPA). This survey is not a panel but is adequate to build a pseudo-panel with a synthetic cohort approach.
The participation profiles of the different generations show several changes throughout the period analysed. First, the participation curves reach higher values in the intermediate

ages of the younger generations, due to a greater female presence in the labour market. Also significant is the delay in the age of entry into the labour market, due to longer years in education. It is also observed a change in the profiles of the curves. For women born during the baby boom their curves have a shape similar to an M, with a spike in activity when the children are older. Whereas for the later generations the curves are more like an inverted U shape. However, in the younger generations, born after 1980, the highest activity rate is reached at around 30 years of age, decreasing thereafter. This recent increase in inactivity among young women is surprising and unexpected. It will be necessary to monitor its evolution in the future in order to understand whether this is a temporary situation, associated with the current characteristics of the labour market, or whether, on the contrary, we can speak of a new pattern of women's behaviour with respect to activity.

We decompose the changes in Spanish women labour supply into age, period and cohort effects by using the APC approach and the synthetic cohorts from EPA. This type of models suffers from an identification problem as these three factors are perfectly multicollinear since each component is a combination of the other two cohort=period-age. We have chosen the basic Deaton (1997) approach, despite its limitations, because it fits well with the predicted theoretical hypothesis: age effects are related to the life cycle, on the one hand, and on the other, cohort effects reflect differences in the position of age profiles, whilst period effect impacts on women profiles simultaneously, independently of their age and cohort.

Our first results about the age effect confirm that there is an increasing trend at the first part of the life course, reaching a peak at 27 years of age, and another interesting peak in the trend in mature ages followed by a downward trend with a higher declining tendency in participation rate by the end of the life course in the labour market.

Secondly, we cannot verify that female participation in the labour market has been negatively associated with economic recession or positively affected by economic expansion. However, it is very sensitive to institutional changes.

Thirdly, the cohort effect reveals how Spanish women born during the baby boom have experienced a highest increase in the participation rate than subsequent cohorts. This effect suggests why this cohort of women behave differently at the same age and have different age profiles in their relationship with the labour market than Millennials. The

role played by this cohorts can explain changes observed in the dynamics of their participation. Once this effect exists remains.

Despite this process, which we describe as very positive, there is still a significant gender gap in terms of participation and other aspects of the labour market, which shows that there is still a long way to go.

There are at least two aspects to be improved to avoid the setback of the achievements in gender equality: labour precariousness and sharing caregiving responsibilities. Without stable employment opportunities and decent wages, young people will be discouraged from participating in the labour market, and in the case of women, there is a risk that they will return to be secondary workers in their households or even they withdraw from the labour force. Spain still has the growing need to integrate employment and gender policy regulations.

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