The future of the Portuguese population in discussion: How aging will influence household structures

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Abstract:

Demographic paradigms are constantly in change with time. Together with the increasing lifespan, fertility rates are declining across entire Europe. These two factors are contributing jointly to a generalized aging in populations for the most industrialized countries. Portugal is not an exception, and if in some cases fertility recuperation is starting to be observed, it seems that this recuperation is not close to happen in the Portuguese population. Additionally, the fact that Southern Europe is in economic crisis, and that Portugal was the second country from the south, after Greece, in economic collapse, resulted in a strong impact at the family context. With such low fertility and deep economic crisis, the thematic of migration adds a major concern about the population future in the country. Migration in Portugal is predicted to increase rapidly in the next years, possibly returning to a pattern of massive out-migration.

This reality results in very deep problems to entire populations and let politicians and demographers interested in answering questions like: Will be the country economically sustainable in the future? Is Portugal going to decline total population?, or, How these changes will influence the household structures?

Trying to answer to the advanced questions, we intend to elaborate a cohort component projection, for a medium term period, allowing to identify the Portuguese population structure in the future and, at the same time, evaluate the possible changes that the country will have to face. Another purpose is to break down these projections, using the headship rate method proposed by the United Nations in 1973 and the model improvements proposed by Ediev in 2007, to estimate the future composition of households in Portugal, by age, sex and civil status. In this way, it is also our aim to provide a possible and important basis of decision for policy makers.

1. Introduction

Across history profound changes in the different societies have been registered and these changes are hand in a glove with the changes occurred in demographic paradigms. Nevertheless, even that many demographic changes can be connected with individual choices, like the decision to migrate or to have a child, the truth is that there is always something behind that influences a decision. Nowadays, the economic crisis that is installed in Southern Europe has a major impact in several of these personal decisions and also in some others that cannot be really controlled, like unemployment or health demand.

The main motivation and goal for the elaboration of this study is to evaluate the impact of the crisis in the future of the Portuguese population and at the same time to analyze the structure of the aging process itself. To accomplish the aim of the study we will elaborate and project, based on different assumptions, diverse scenarios of evolution for the next 20 years, i.e., from 2012 to 2032. In this way, without taking into account any socioeconomic variable we intend to evaluate the possible changes in the Portuguese demography; if in the near future the country can still be demographically sustainable due to aging; if the crisis itself will accelerate and intensify the aging process, together with a shrinking population; and, at last, try to understand how the household dynamics are going to change. Thus, we will try to give an answer to questions like: Will the country be demographically sustainable in the future?, Is Portugal going to decline total population?, How all the demographic changes will influence the household structure in the future?, How massive out-migration will influence the overall population?, and, Can Portuguese people expect to age alone in the future?

Our guess is that Portugal is walking towards a very pronounced decline in the overall population, which consequently aggravated by high emigration rates that will result in a deep change in the household composition, possibly isolating more and more individuals.

2. Data and methodological approach

Findings explained and presented in the manuscript, were calculated based on data collected from the Human Mortality Database (HMD: www.mortality.org) and from the Statistics Portugal (INE: www.ine.pt).

With the intention of giving an answer to the research questions and hypotheses advanced in the introductory section, we made use of the cohort component projection methodology to construct different and plausible scenarios from which we can elaborate about the possible future Portuguese population structure. The construction of these scenarios came out from a combination of the cohort component projection model and the Lee-Carter methodology to forecast future mortality and life expectancy. The combination of these two approaches results in the addiction of a probabilistic component to the projection method, and at the same time, improves the outcome. Moreover, since it is also our aim to analyze the possible changes in the household composition, the headship rate method proposed by the United Nations in 1973 and the model improvements suggested by Ediev in 2007 were additionally applied.

In a rare consensus for social sciences, the cohort component method is, nowadays, almost the only method used for population projections. The methodology accounts for population age distribution and consists in segmenting the population into different subgroups that are differentially exposed to the "risks" of fertility, mortality and migration, computing the changes over time separately in each group.

The method itself, consists basically in three steps: first, projecting forward the population in each group at the beginning of the time interval in order to estimate the number of individuals still alive at the beginning of the next interval, secondly, compute the number of births for each subgroup (males and females) over the time interval, and at the same time their number of survivals, and thirdly, add or subtract migrants to each subgroup, including the number of births from those migrants and their surviving rates.

However, one of the main problems that are connected with the population aging together with low fertility rates is the change that occurs in the household structure. In this way, separated projections of households and families become also necessary, mainly because household numbers and types help to predict the overall demand for housing and as well the demand for particular kind of dwellings. It is important, however, to make distinction between dwellings and households, once that dwellings can contain more than one household. So, if a dwelling is a residential unit, such as a house, an apartment, a flat or even a caravan, a household is commonly understood to be either a person living alone, or two or more individuals who live and eat together, such a family or a group of unrelated individuals (Rowland, 2003).

Another important distinction is between private and non-private dwellings. Private dwellings are the ones that are owned or rented by the householders, and non-private dwelling are usually characterized by having communal eating facilities, such as hotels, hospitals and nursing homes, for example.

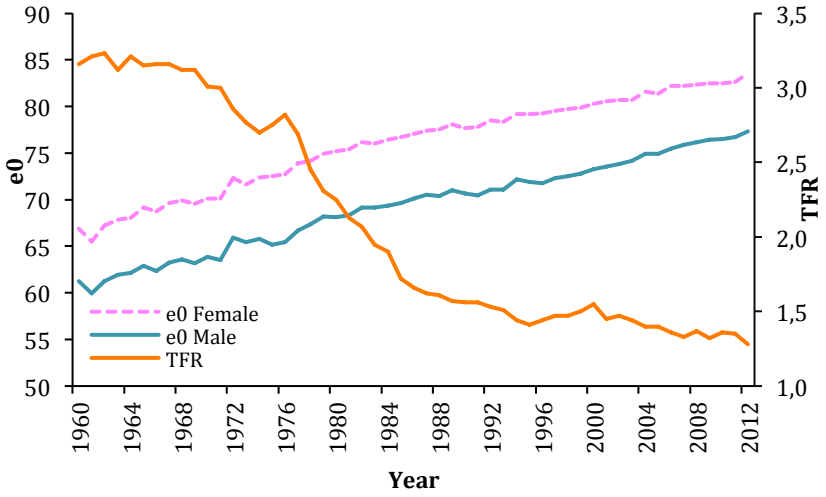
Like projections for the total population, projections for households typically refer to the usual resident population. Consequently, with the existence of projections for the total resident population, a convenient starting point is created. Conversely, the resident population numbers have to be reduced to the ones that are living in private dwellings, omitting the rest. The most used method is the *household headship method*. This method

calculates the number of households from an existing population projection by age and sex, typically the "medium variant", together with statistics on the proportion of household heads belonging to each age-sex group. Several authors (Mason, 1987; Linke 1988; McDonald & Kippen, 1998; Ediev, 2007; Zeng et al., 2013) developed different extensions or approaches trying to improve household projections allowing the identification of more detailed information about the distribution of household sizes.
In our study, the choice of the methodological approach fell on the extensions to the household headship method developed by Ediev in 2007 essentially due to data availability and by the robustness and consistence presented by the method itself when applied to empirical data.

3. Past, present and future: defining possible scenarios

Between 1960 and 2012 the structure of the Portuguese population presented a dramatic reduction at younger ages and the number of elderly increased tremendously, changing significantly population dynamics. In 2001, for the first time the population aged 65 and over surpassed the population aged 15 or less (1 693 493 elderly *Vs.* 1 656 602 young individuals), representing these two groups together about 16% of the total population. The elaboration of the 2011 census revealed that this situation become even more pronounced with an increase in the elderly population of 329 011 individuals, and a concerning decrease of young population (- 84 056 individuals).
Into the light of demography, this situation can be explained being the result of fertility decline, the increase of life expectancy and, as well, an increasing of emigration in the most recent years. The observed pattern of out-migration observed in 1960s can be seen again in a near future. Portugal, as the other Southern European countries, experienced a drastic and fast decline in live births. From 213 895 births registered in 1960, the values declined to 89 841 in 2012, what means a reduction of 56% in the total number of births. The impact of the described situation can be well seen when we observe the evolution of total fertility rate (TFR). In Figure 1 it is possible to observe that from a TFR higher than 3 in 1960, Portugal declined to 1.28 children per woman in 2012.
As it was referred in the beginning of this section, is the conjugation of changes registered in the three demographic components across time that resulted in the aging of the Portuguese population. Taking a new look to Figure 1 it is also possible to evaluate the evolution of life expectancy at birth for both sexes, which form 1960 to 2012 increased 16.7 years in the female case and 16.1 years for males. Besides the positive impact of this evolution of lifespan, its conjugation with low fertility rates can affect the country sustainability at the same time that the Portuguese population structure is aging.

Figure 1: Life expectancy at birth (e0) by sex and Total Fertility rate (TFR), for Portugal between 1960 and 2012



Source: Own calculation, INE - Statistics Portugal, HMD.

But lets not forget that migration had influence systematic changes in the population structure over the last decades, and with periods of massive out-migration in the international context, the population movements have further accentuated the aging process.

Migration, as the most volatile of the demographic components, can add even more uncertainty about the future, once that the country is under financial recue, being the second country from the southern Europe to attain this condition (Greece was the first). For the first time in 17 years, and following the information given by the *Statistics Portugal* office (Table 1), the country presents negative net migration values in 2011 and 2012. In fact, since 2010 that the number of emigrants grew more than twofold, increasing from 23 760 in 2010, to 51 958 in 2012. The registration of in-migration flows presents an opposite evolution, as expected, decreasing from 27 575 immigrants in 2010, to 14 606 in 2012. Nevertheless, the real impact of migrations in the population is difficult to measure, not only due to the difficulty to register all population movements, but also because the presented results refer only to permanent movements to avoid any uncertainty, and in Portugal, for the year of 2012, were registered around 70 000 temporary emigrants. The truth is that the real number of permanent emigrants can even be higher than the registered one, mainly because if the economic crisis persists it will not be possible for all these individuals find a job in their own country. In the construction of the scenarios though, we assume that this is only a phase and the Portuguese economy will recover in the future, and this situation might (hopefully) change.

Nonetheless, above all and until nowadays, the decline of births and fertility rates are the major responsible for the fact that Portugal becomes currently, according to the information presented by the World Population Data Sheet 2010[2], the sixth country in the ranking of the most aged ones.

[2] Population Reference Bureau

Table 1: The evolution of immigrants and emigrants in Portugal between 1991 and 2012

Year	Permanent Immigrants	Permanent Emigrants	Temporary Emigrants
1991	4507	37336	—
1992	16202	25559	16998
1993	27989	16566	17609
1994	38825	14552	21259
1995	42702	11290	13390
1996	51656	14533	19468
1997	59875	18468	29681
1998	56788	11098	14261
1999	68297	14040	24003
2000	77775	10667	16641
2001	61609	5396	14827
2002	50611	8813	18545
2003	31425	6687	20321
2004	21093	6757	—
2005	21741	6360	—
2006	22741	5600	—
2007	29661	7890	—
2008	29718	20357	—
2009	32307	16899	—
2010	27575	23760	—
2011	19667	43998	56980
2012	14606	51958	69460

Source: Own calculation, INE - Statistics Portugal.

One of the most important steps in the elaboration of the different projection scenarios is a careful and in depth exploration of a country demographic components, i.e., fertility, mortality and migrations. So, after a first phase where it was show a contextualization of the country itself, we are now in a good position to elaborate the possible and differentiated *"what if"* scenarios for the future of the Portuguese population.

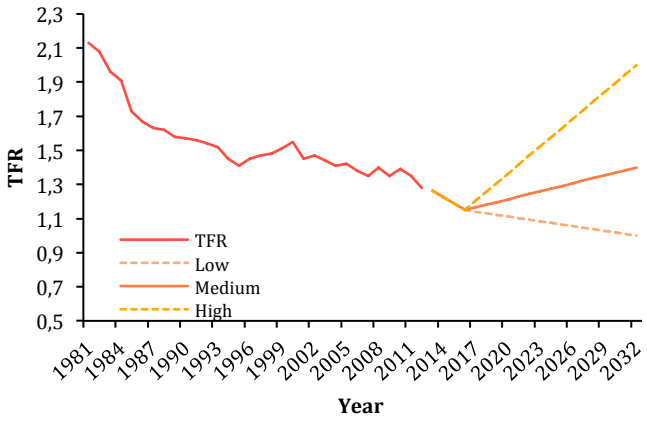
Nevertheless, if it can be said that the first two demographic components are characterized by some lethargy, the true is that the migration component is always more volatile and unpredictable. Therefore, if in the case of mortality we just follow the tendency of the past applying the Lee-Carter forecasting method, using the confidence intervals to elaborate the "extreme scenarios"[3]. For fertility it was elaborated a more conceivable scenario, based on similarities with other countries, and two extreme others. One-way found to solve the migration situation was to go back to past when the Portuguese reality was characterized by massive out-migration patterns.

Starting with the assumptions elaborated for the fertility component (Figure 2), and always starting from the last available population data, i.e., the year of 2012, where the observed value for the TFR is 1.28, we believe that Portugal, following the tendency that took place in several other European countries, will keep registering a decrease in TFR. So, for all the scenarios it was defined that the TFR for 2016 can decrease to 1.15. Thus, is only from 2016 onwards that we can expect different possible evolutions, and in a so-called "central" scenario (the most possible one) we admit that the TFR will slightly increasing until 2032, achieving the value of 1.4. In a "high" scenario, i.e., in the best case, it would be good that the value of 2.0 children per woman can be reached, and in opposition, in a "low" scenario, i.e., the worst considered case, it can be assumed that Portugal will not recuperate its fertility rates and the decline can be even more

[3] Scenarios not so likely to occur, but that can give a better perception about future possible changes in the population structure.

pronounced, possibly attaining in average the value of a single (1) child per each woman.

Figure 2: Total fertility rate (TFR) between 1981 and 2012 and possible scenarios until 2032 in Portugal

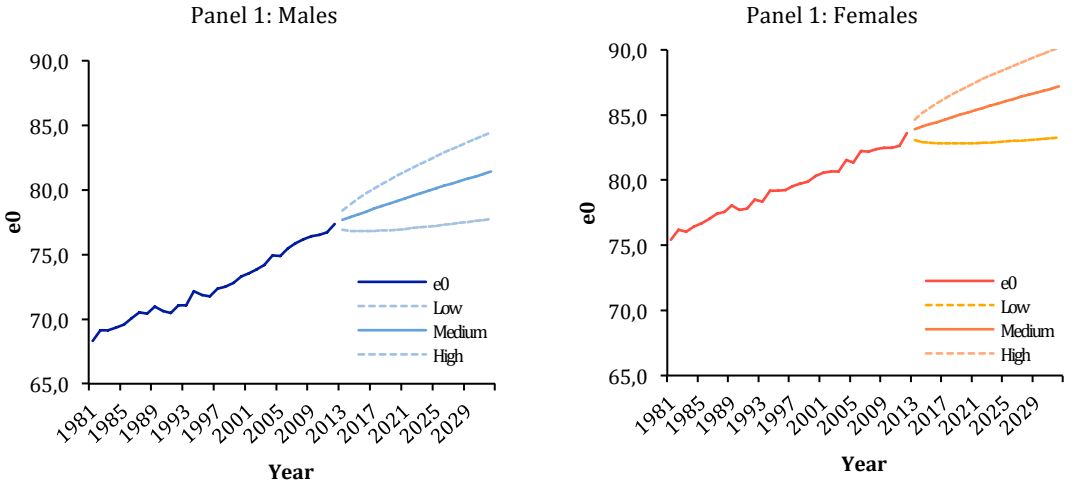


Source: Own calculation, INE - Statistics Portugal, HMD.

In the case of the assumptions taken for the mortality component and presented in Figure 3, like it was advanced in the introductory section, it was followed the obtained values from the Lee-Carter forecasting methodology. In this case, it can be expected that in a "central" scenario, the observed life expectancy at birth for females increase from around 83.5 years, in 2012, to 87.2 years in 2032. As expected, the values related to the male situation are a bit lower, and we expect that from the registered 77.3 years of life expectancy at birth in 2012, the value increase to 81.4 years in 2032. This situation corresponds to an increase of 3.72 and 4.06 years in the life expectancy of females and males, respectively, during the 20 years of the study.

Nevertheless, in our calculations, it is also assumed that life expectancy at birth could present a faster ("high scenario") or lower ("low scenario") increase with time. In this situation, it is expected, if the "high scenario" becomes real, that life expectancy at birth for females reach the value of 90.1 and for males 84.5, in 2032. On the other hand, the values associated with the "low scenario", are, as predictable, a bit lower, and in 2032 is expected that females achieve 83.3 years of life expectancy at birth and 77.7 years in male case.

Figure 3: Life expectancy at birth (e0) between 1981 and 2012 and possible scenarios until 2032 for male and female in Portugal



Source: Own calculation, INE - Statistics Portugal, HMD.

Lastly, lets direct now our attention to the migration component that was introduced in the projection model using net migration values. Based on recent trends and taking into account emigration and immigration separately, we assume that the first one will follow the same pattern of increase registered between 2009 and 2012 (11 686 emigrants per year in average) until 2022, increasing from 51 958 to 168 821. The period taken into account for this assumption is due to 2009 being the year immediately after the beginning of the crisis (2008), and when people started to realize the situation of the country. After 2022, we believe that is possible that these values decline until the ones observed in 2009 (16 899).

For the second case, i.e., immigration, we assume that the inflow tendency will decelerate and, without doubt decrease, because the country is not at the time economically stable and consequently, non-attractive. In this way, it is really possible that in 2022 the number of immigrants equals the minimum value registered since the 1990s, more specifically in 1991, with an inflow that decreases from 14 606 individuals (2012) to 4 507 individuals (2022). Once again, and like it is considered in the emigrants case, we think that these values will start to increase after the economic recuperation and possibly the values of 2009 can be registered again in 2032 (32 307).

For this last component, the migration structure taken into account corresponds to the one observed in the year of 2012, and because there is no information available by gender, it is assumed that men and women have the same migration probability across age and time.

The combination of the above-presented scenarios resulted in nine (9) base scenarios that were combined *a posteriori* with the migration assumptions for the projected period resulting in a total of eighteen (18) scenarios. In order to simplify what we will refer, from now on to the scenarios as numbers:

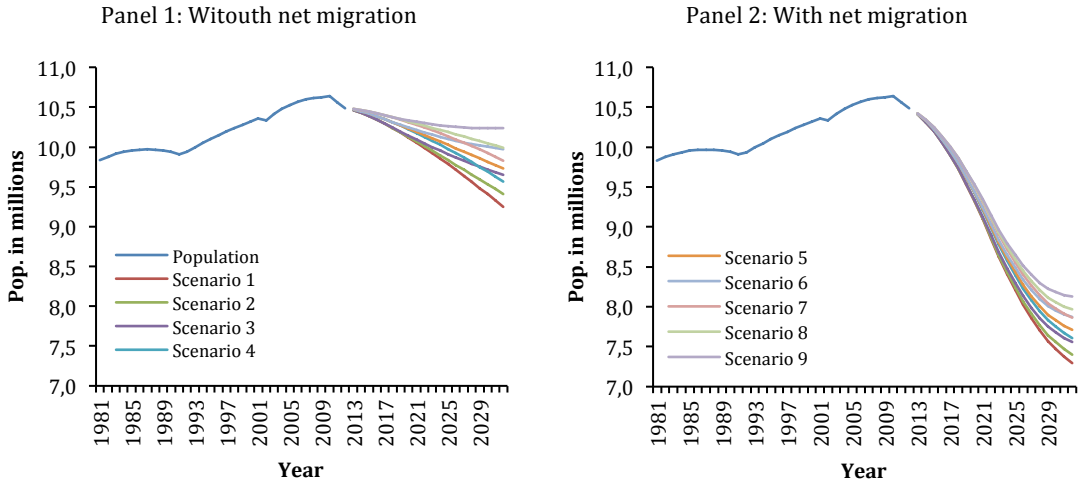
1. *Lower life expectancy* combined with *lower fertility* rates;
2. *Lower life expectancy* rates combined with *central fertility* rates;
3. *Lower life expectancy* rates combined with *higher fertility* rates;
4. *Central mortality* rates combined with *lower fertility* rates;

5. *Central mortality* rates combined with *central fertility* rates;
6. *Central mortality* rates combined with *higher fertility* rates;
7. *Higher life expectancy* rates combined with *lower fertility* rates;
8. *Higher life expectancy* rates combined with *central fertility* rates;
9. *Higher life expectancy* rates combined with *higher fertility* rates.

Nevertheless, in our study, we are only going to focus our attention in only three of them: (5: *Central aging scenario*) the one that we consider most probable to occur, where is combined the "central options" of both, fertility and mortality; (7: *Fastest aging scenario*) one scenario where low rates of fertility combined with high life expectancy result in aged population structure; and lastly, (3: *Slowest aging scenario*) a scenario where the opposite results are obtained, once that "higher" rates of fertility are combined with lower life expectancy, resulting in a young population structure. In total, and besides that our analyses starts only with the natural growth of population, when the migration impact is introduced, the number of scenarios taken into account becomes six though.

The choice of focusing in only six of the constructed scenarios is directly connected with the aim of our study and formulated hypotheses. Nevertheless, in Figure 4 we can take a look on the projected evolution of the different scenarios for the population itself, without (panel 1) and with (panel 2) net migration. Despite that the 18 scenarios present different evolutionary patterns, all of them estimate a decrease in the number of individuals residing in Portugal independently of the baseline assumptions. One possible "solution" for the reduction of Portuguese population is migration, however, with the economic crisis that is devastating the country, any chance of attractiveness for outsiders is really improbable, not to say impossible. Under the current situation, and expecting that the negative net migration will increase for at least 10 years, it is widely believed that the impact become even more pronounced, and if without taking into account the impact of net migration we expect that the country "loses" around a maximum of 1.5 millions of inhabitants. The negative impact of migrations can increase this value up to 3.5 millions.

Figure 4: Evolution of the Portuguese population from 1981 to 2012, and the constructed scenarios until 2032, without and with net migration included.



Source: Own calculation, INE - Statistics Portugal, HMD.

4. The future of the Portuguese population in discussion

4.1. Portugal in 2032

As it as seen in the previous section, the economic collapse occurred in Portugal is very likely to intensify the pace of aging of the population structure itself, that was already very delicate *per se*. Together, the low number of registered births and the predictable fast increase of out-migration are expected to result in an even more aged population than supposed before, resulting from an economic instability that started in 2008 but that only in 2010 begun to be strongly experienced in Portugal. The results presented in Figure 4, are only the confirmation of the already expectable population aging but now with very convincing possibilities of a strong reduction in the number of residents.
Table 2 presents the total estimated number of individuals by the three main scenarios chosen previously for Portugal for the years of 2022 and 2032. As it can be observed, if in the estimates obtained without the impact of net migration, independently of the analyzed scenario, the total decrease in the population size for the next 20 years is expected to not be higher than 8% (- 837 266 inhabitants), the impact of net migration can be around 3.5 times higher, resulting in a decrease between 25% and 28% in the overall population (- 2 625 922 to - 2 927 859 inhabitants).

Table 2: Total Population

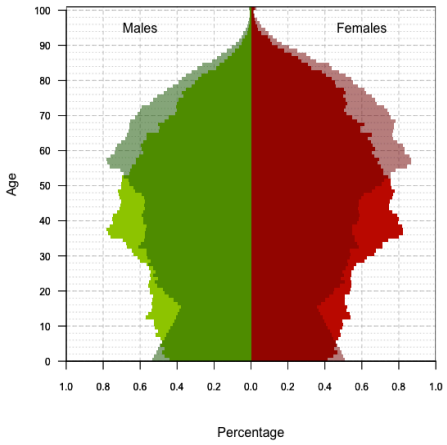
	2012	2022		2032	
		Without net migration	*With net migration*	*Without net migration*	*With net migration*
Lowest aging scenario	10 487 289	10 045 013	8 896 721	9 650 023	7 559 430
Central aging scenario	10 487 289	10 149 553	9 006 571	9 728 165	7 712 028
Fastest aging scenario	10 487 289	10 245 164	9 105 668	9 827 602	7 861 367

Source: Own calculation, INE - Statistics Portugal.

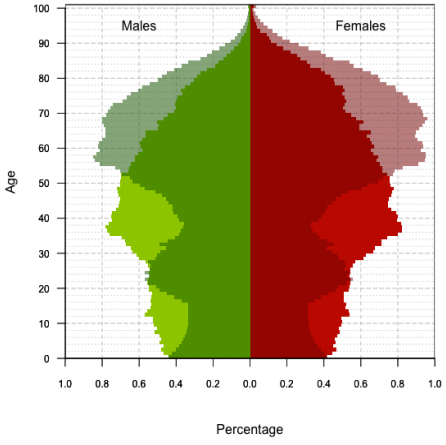
The results presented until now confirm that under the current conditions, the Portuguese population is going to decrease, however, it is difficult to predict the real number or proportion of this decrease. Nevertheless, if a shrinking population may not be a problem by itself, the aging of the population structure might result in the unsustainability of the country. The population pyramids presented in Figure 5 are a very good example of this situation, and if in all the three-presented scenarios aging is common to all of them, the introduction of net migration into the equation gives a better picture about the possible and concerning economic unsustainability of the country that can driven by the demographic evolution of the country.

Figure 5: Portuguese population structure in 2012 and 2032 for the selected scenarios

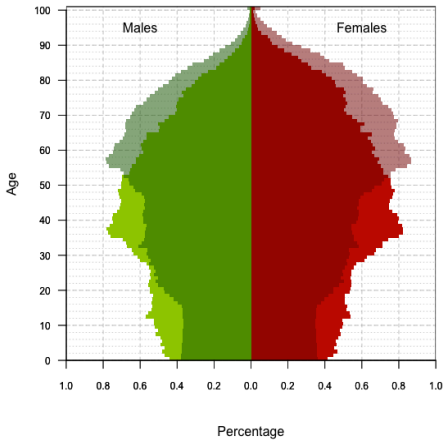
Panel 1: Slowest aging scenario witouth net migration



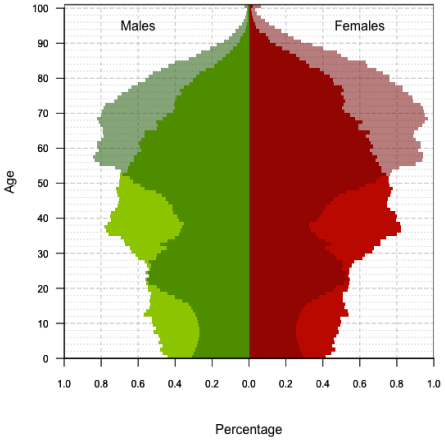
Panel 2: Slowest aging scenario with net migration



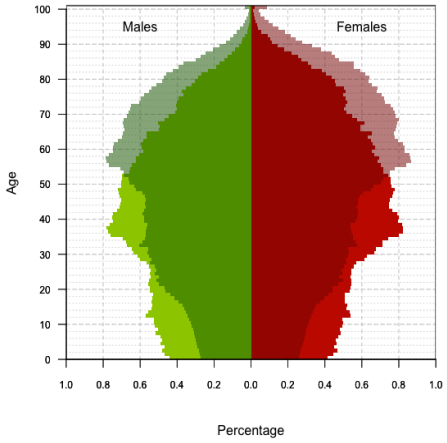
Panel 3: Central aging scenario witouth net migration



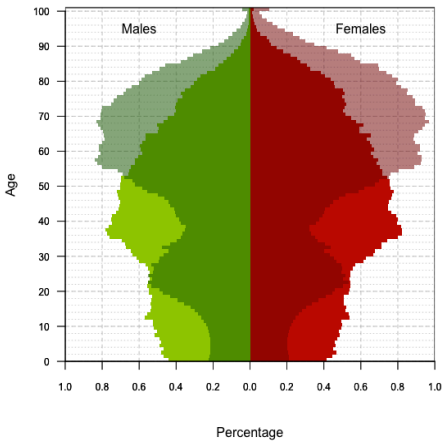
Panel 4: Central aging scenario with net migration



Panel 5: Fastest aging scenario witouth net migration



Panel 6: Fastest aging secenario with net migration



Source: Own calculation, INE - Statistics Portugal.

In a first glance the results presented in Table 3 show a concerning increase in the proportion of elderly population across time, and at the same time, a decrease in the proportion of both, young and active population. Once again, if the obtained results without the impact of net migration are already disturbing, with the impact of massive out-migration flows, the situation escalates. Another concerning situation is given by the examination of the obtained results when the Aging Index[4] (A.I.) was calculated, mainly because if in 2012, we can define the Portuguese situation as still "positive" (more younger than elderly inhabitants), when for every 100 young inhabitants where recorded around 97 elderly inhabitants, in 2032 is almost sure that this value significantly increases. According with the chosen scenario, it is expected that the number of elderly inhabitants per each 100 young ones vary between 149 and 356, increasing even more the concerning around the country sustainability.

Table 3: Proportions of young (0-19), active population (20-64), aged population (65+) and aging index

		2012	2022			2032		
			Slowest aging scenario	**Central aging scenario**	**Fastest aging scenario**	**Slowest aging scenario**	**Central aging scenario**	**Fastest aging scenario**
Without net migration	**0-19**	20.0	17.7	17.2	16.8	17.6	15.0	13.2
	20-64	60.6	59.7	59.3	58.9	56.3	56.2	56.0
	65+	19.4	22.6	23.5	24.2	26.2	28.8	30.8
	A.I.	96.7	128.0	136.8	144.2	149.1	192.3	233.8
With net migration	**0-19**	20.0	17.0	16.5	16.2	14.5	12.2	10.7
	20-64	60.6	57.5	57.0	56.6	52.6	52.0	51.4
	65+	19.4	25.5	26.5	27.3	32.8	35.7	38.0
	A.I.	96.7	150.0	160.2	168.7	226.0	292.1	355.9

Source: Own calculation, INE - Statistics Portugal.

Resuming, we can that the aged population increases at the same time that the total population decreases around one third and one fourth, depending on the different assumed scenarios. Following the fastest aging scenario with net migration, the aged 65+ population might achieve the number of 2 983 888 inhabitants (from which 1 708 098 are females), including 1 034 371 individuals aged 80+ (645 985 females and 388 386 males).

In opposition, the labor force not only decreases in proportional terms, but also in absolute values, being only 4 340 992 inhabitants from the 6 904 482 that share the same age group, for the year of 2012.

Although that this population decreasing was completely expected, the true is that ones did not expected such a fast development in what concerns with the absolute change.

[4] Number of elderly by 100 children

The aging of the labor force and its reduction have a strong impact in the innovation and productivity that, per se, will negatively affect the economic development of the country, and all these changes will add more effort to the taxpayers themselves.
Together, the increasing of aged population, the diminution of the labor force and young population, will change dramatically the consumption and saving habits, but always depending more on the wage itself than on the evolution of the population structure.
Confirming this hypothesis, the huge increase expected in the number and weight of elderly population, will have an adverse impact in the education, health and social insurance systems.
Projecting health care demand associated with aging, should be always taking into account variables like the marital status, the presence of adult decedents, elderly population salary and level of education and social prestige (Ziegler & Doblhammer, 2010).
In a situation like this, family could be very important, mainly in a country characterized by a welfare system highly designated according to familiarist principles or in elderly helping system highly centered in familiar connections (familiarist welfare system).

4.2. Changes in the household structure

Across our study, and like it was predetermined in our goals and research questions, it can be seen the overall concerning changes that Portugal will need to face, in a near future, in what concerns with the deep changes that are predicted to happen in the population structure of the country. Nonetheless, if aging is a major problem that can be even more pronounced due to the Portuguese economic situation, all these structural transformations will also affect families dynamics and not only the demographic situation *per se*. Population aging will also cause a great demand for the different needs, becoming also urgent that this demand could be suppressed by competent and efficient solutions.
A consequence of the consolidation of a "heavier" top on the population pyramid is also the increasing proportion of the population that is living in institutional households, specifically after age 65. Table 4 presents the projected evolution for the case of males and females separately, and it can be seen that among all the male population, it is expected that the proportion of 65 and more aged males grow 2.4 times in the next 20 years, while that the proportion of female (65+) population institutionalized grows around 2.3 times. However, and even that expected due to the higher female life expectancy, it is also important to refer that in any case the proportion of female population that is living in institutional households after age 65 is, independently of the observed scenario, always higher than in the male case.

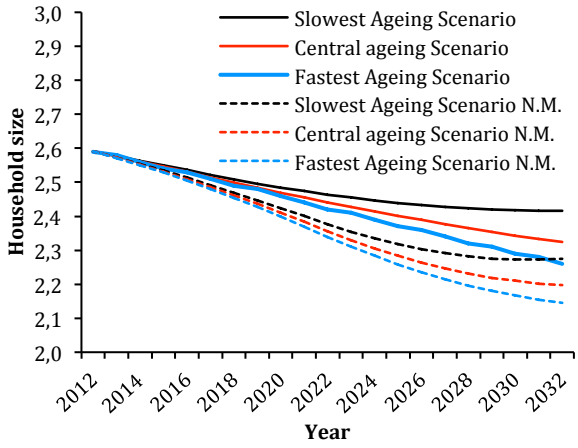
Table 4: Proportions of institutionalized males and females aged 65+ in the years of 2012, 2022 and 2032

		2012	2022		2032	
			Without net migration	*With net migration*	*Without net migration*	*With net migration*
Males	**Slowest aging scenario**	0.5	0.6	0.7	0.7	0.9
	Central aging scenario		0.6	0.7	0.8	1.1
	Fastest aging scenario		0.7	0.8	1.0	1.2
Females	**Slowest aging scenario**	1.2	1.4	1.6	1.6	2.1
	Central aging scenario		1.6	1.8	2.0	2.5
	Fastest aging scenario		1.7	1.9	2.3	2.8

Source: Own calculation, INE - Statistics Portugal.

At the same time that the future of the Portuguese population is hand in a glove with decline and aging, it is also expected to see major changes in the household dimensions and demand. In 1960, the average size of the Portuguese households was 3.6, but after 52 years, i.e., in 2012, the observed value decreased to 2.6. This means that in the last 52 years each household lost around one people in average, however, under the current situation of the country, we expect that in the next 20 years the decrease in the average size of the households vary between a minimum of 0.2 and a maximum of 0.4, i.e., with and without the impact of net migration, respectively. This situation means that the pace of decrease observed in the last 52 years in the household average size can be now registered again, but in a shorter time range. The results presented in Figure 6 give a very clear example about this situation, and at the same time, allow a better understanding about the possible changes in the household composition that can succeed from the predicted high negative net migration.

Figure 6: Evolution of average household size, in the selected scenarios between 2012 and 2032, for Portugal with and without the net migration impact

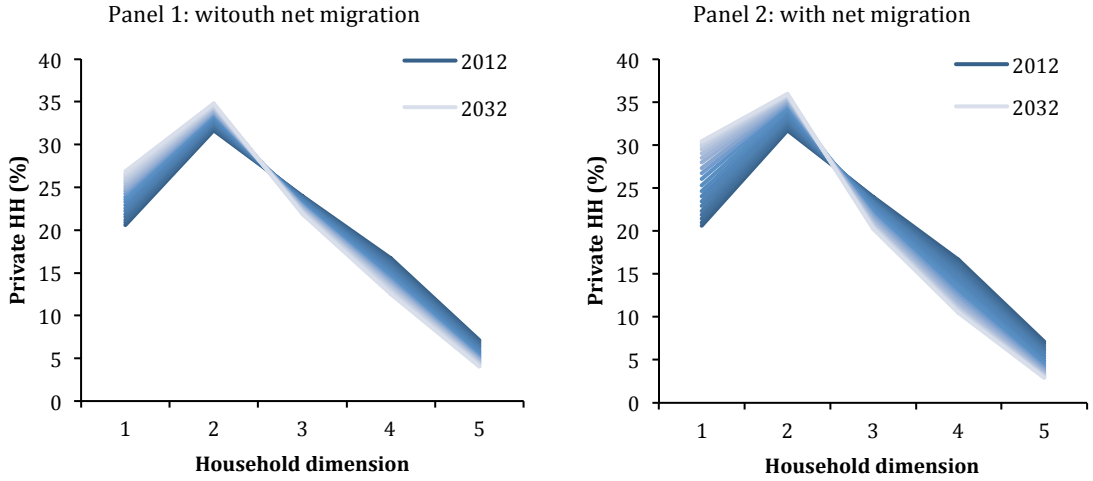


Source: Own calculation, INE - Statistics Portugal.

Another important information comes directly from the methodology improvements proposed by Ediev in 2007 to the household headship method and that allows the identification of more detailed information about the distribution of household sizes. In order to avoid the addiction of more uncertainty to our results, it was our choice to apply these methodological extensions only to the central aging scenario, the one that we think to be more likely to occur. Both panels from Figure 7 present the obtained results for the evolution in the proportion of private households with a certain number of persons across the next 20 years, allowing at the same time to differentiate the impact of net migration. As the legend indicates, the darker blue (both cases) indicates the year of 2012 and the lighter grey corresponds to 2032. The analysis of these results indicates that the proportion of households with dimension 1 and 2 are predominant, and at the same time that this predominance is increasing. This situation means that one or two persons compose the most part of the households, and it is very likely that this become a standard with time. The impact of net migration in the composition of private households can be clearly seen in panel 2, where it seems that the proportion of private households with only one person are becoming really close to the ones that accomplish two persons.

This situation refers instantaneously to one of the major hypothesis in this study, which also shares the title designation: "Can Portuguese people expect to age alone in the future?", and it seems that together with the aging population structure, the Portuguese population is also walking towards a lonely future that results from different choices and uncontrollable occurrences.

Figure 7: Proportion of private households with a certain number of persons (central aging scenario)

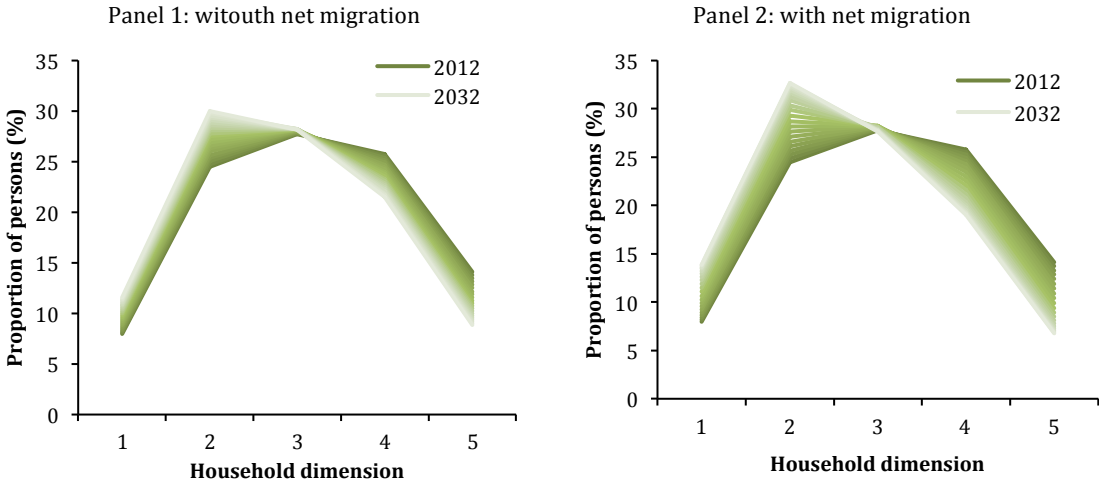


Source: Own calculation, INE - Statistics Portugal.

Still, the previous situation presented by Figure 7 can be reinforced by the results presented in Figure 8, where the proportion of persons living according with different private households size is presented. In both cases, with and without the impact of net migration (panels 1 and 2), it can be seen that at the same time that the proportion of persons living together with more than one person is decreasing, the proportion of

individuals living alone or share the private household only with one person more is increasing. Once again, the impact of net migration is shown to imply major influence in the final results. The observed (possible) changes also justify and reinforce the obtained changes in the decrease of the average size of private households across time.

Figure 8: Proportion of persons living according with different private households size (central aging scenario)



Source: Own calculation, INE - Statistics Portugal.

One of the possibilities of using the household headship method is to allow breaking the estimates into different categories, depending always from the specificity of the input information specificity. In this case, and following what was defined before as goals, we decided to estimate also the average size of the households taking into account the civil status of the head: single, married, divorced or widowed. Once again, trying to avoid the introduction of more uncertainty into our estimates, the estimates presented in Table 5 are exclusively correlated with the central aging scenario.

In a first perspective, it can be seen that the average sizes of the households when the heads are single or married is higher when compared with the divorced and widowed categories. Across time, the tendency in each category is, like it was seen before for the total population (independently of the presented scenarios), for a decrease in the average size of the households across all civil status, independently of the migration impact.

Table 5: Evolution of average household size, by civil status, between 2012 and 2032, for Portugal with and without the net migration impact (central aging scenario)

	2012	2022		2032	
		Without net migration	*With net migration*	*Without net migration*	*With net migration*
Single	2.7	2.5	2.4	2.4	2.3
Married	2.6	2.5	2.4	2.4	2.3
Divorced	1.8	1.7	1.7	1.7	1.6
Widowed	1.5	1.5	1.4	1.5	1.4

Source: Own calculation, INE - Statistics Portugal.

If future elderly in Portugal seem not to present favorable pre-established conditions in what concerns to families like the ones today, once that only a few of these inhabitants are predicted to get married, it is also important an reevaluation of their needs. At the same time that individuals become more and more compromised with their own health, living conditions keep improving, mainly due to their own individual genetic predisposition and as well from the health improvements that come from technology and medicine (Ziegler & Doblhammer, 2007).

5. Conclusions

According with our results, it is probable that Portugal loses between 1.5 and 3.5 millions of inhabitants until 2032. At the same time, and following the fastest aging scenario, the number of elderly can increase from 2 032 606 to 2 983 888 between 2012 and 2032.

This tremendous evolution in the Portuguese population has as consequence the urgent necessity of planning equipment and resources directed to the elderly. One consequence of aging is the expected increase in the number of institutionalized persons in what concerns to elderly, especially in female case, which present higher life expectancy than males.

The importance of family relationships and family composition with regard to support and care for the elderly, led us to forecast not only the average household size, but also the proportion of private households in function of the number of persons resident, and also the proportion of persons living according private households with different size.

The obtained results for those projections present a contraction in the number of large families (3 or more persons) and its proportion in the total number of families, along with a growing number of small families (1 or 2 persons) and their representation in the Portuguese society.

In recent decades the proportion of large families has been declining. However, analyzing the proportion of residents according to private households size we found that, in 2012, the highest proportion refers to households constituted by 3 individuals. Besides that, sorted in a descending order of representation, are the households with 4, 2, and 5 individuals, and the last position refers to the single (1) person households. According to our results, we expect that in 2032, the order changes, and the higher proportion of people will be living in private households with 2 individuals, followed by those composed by 3, 4, 1 and 5 individuals.

Although that the obtained results did not allow an age distribution due to lack of more detailed information, it seems particularly relevant that certain implications may derive from the aging condition. So it can be expected that in the future elderly people share the household with another individual with the same age or simply living alone.

The results also show the devastating effect of fertility decline in Portugal, in particular, promoting the reduction of the family size. At the same time, the extraordinary reduction in the proportion of individuals in private households composed by 4 to 5 persons, while the proportion of those living in households with 3 persons stays almost unchanged, might be connected with the option of Portuguese couples having one child only.

For the elderly living especially in small families with the absence of children or spouse, this situation can create the need for greater support from the community and local health services. This need become more acute in periods of economic depression.

Finally, the prediction of the evolution of the average household size by the civil status of the household head, alert us to some significant changes that may occur in relation to different types of families: (1) households whose representatives are single or married, in 2012, lived in larger households (2.7 and 2.6, respectively), however, in 2032, a reduction in the this values occurs (2.3), and this change can result from a decrease in the number of marriages; (2) although that it can be observed a generalized reduction in the number of residents in almost all cases, the average size of the aggregates whose household head is divorced will not present a great variation (1.8 in 2012 and 1.7 in 2032), which can show that single parents maintain a relative importance; and (3) happening the same situation in the case of widowers (1.5 in both years, 2012 and 2032). Due to the Portuguese mortality structure, where elderly are highly represented, we conclude, once again, that is very likely that the elderly live mainly alone or with just one other individual.

Under the observed circumstances, it can be concluded that planning elderly demands in what concerns to health care and health expenditure, should take into account not only the number of seniors that we projected for the near future, but also predict changes in their living conditions, particularly, their insertion a small family, the marital status, or the (non)existence of adult children that can support them in the future.

Finally, in a country in recession as Portugal, we can affirm that were identified urgent needs in defining social policies directed to the elderly population.

For future research, it is our intention to give a step ahead and try to get more detailed data concerning the composition of private households according to certain characteristics of individual representatives of the aggregates, which in this study was unfortunately not available.

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