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Sommario

Le implicazioni del cambiamento demografico sul sistema economico e finanziario italiano

INTERVENTI

RUBRICHE

Italy's population prospects: future scenarios for the 21st century

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Abstract

In Italy, very low fertility combined with very high life expectancy will have a tremendous impact on the labour market, the pension system, and health care provision in the coming decades. Knowing future population trends is essential for the Italian society to prepare for these changes. The uncertainty about future trends in births and deaths has increased after COVID-19 and has made demographic projections more challenging. The aim of this paper is to single out the future prospects of Italy's population by comparing projections prepared by five different organizations and to better understand how population statistics change when certain assumptions are made about the future course of fertility, mortality, and migration. While all organizations agree that Italy's population will continue to decline in the future, the speed and extent of this decline as well as the resulting changes in the population age structure vary significantly across the different sets of projections and depend heavily on the differential underlying assumptions.

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Sintesi - Le prospettive della popolazione italiana: scenari futuri per il XXI secolo

In Italia una fecondità molto bassa e un'aspettativa di vita molto alta avranno un enorme impatto sul mercato del lavoro, sul sistema pensionistico e sull'assistenza sanitaria nei prossimi decenni. Conoscere l'andamento futuro della popolazione è fondamentale per la società italiana nel prepararsi ai cambiamenti. L'incertezza sulle tendenze future delle nascite e dei decessi è aumentata dopo il COVID-19 e ha reso le proiezioni demografiche più impegnative. L'obiettivo di questo lavoro è individuare le prospettive future della popolazione italiana confrontando le proiezioni preparate da cinque diverse organizzazioni e capire come cambiano le statistiche sulla popolazione quando si assumono determinate ipotesi sul futuro andamento della fecondità, della mortalità e delle migrazioni. Se tutte le organizzazioni concordano sul fatto che la popolazione italiana continuerà a diminuire in futuro, la velocità e l'entità di questo declino, nonché i conseguenti cambiamenti nella struttura per età della popolazione variano in modo significativo tra le diverse serie di proiezioni e dipendono fortemente dalle ipotesi differenziali sottostanti.

JEL Classification: J11; J21; J82; R23; Q56.

Parole chiave: *Proiezioni della popolazione; Scenari demografici futuri; Invecchiamento della popolazione; Indici di dipendenza; Struttura per età della popolazione; Ipotesi sottese alle proiezioni demografiche; Italia.*

Keywords: Population Projections, Demographic Scenarios, Population Ageing, Dependency Ratios; Population Age Structure; Assumptions underlying Population Projections; Italy.

1. Introduction

The three factors defining demographic change are fertility, mortality, and migration. Together, they determine population size and its change over time. As the stock of population is typically known, and fertility and mortality patterns tend to evolve slowly, population size is usually easier to project correctly in the short to medium run as compared to economic variables, such as GDP, or environmental variables, like the number of extreme events. Migration is the most volatile of the determinants of demographic change (Billari, 2022), but its impact at the national level is usually limited since the overwhelming majority of people do not migrate across border but within countries. On the other hand, projections in the long run are rarely accurate due to unforeseeable events such as a baby-boom or a large wave of immigration or emigration, but also because small deviations in the short-term from the path hypothesized in the projection may have large impacts in the long-run.

The guiding principle for setting reasonable assumptions in essentially all population projections is the demographic transition theory, based on historical trends, i.e., the transition from high levels of birth and death rates to a substantial fall of death rates, followed by a subsequent decline in birth rates. Italy also underwent this demographic transition, with a progressive decline of both fertility and mortality rates, stabilizing to low values of mortality in the early 1950s, and fertility in the mid-1980s (Salvati et al., 2019). The period between the early 1950s and the mid-1980s was thus characterized by rapid population growth (see Figure 1). Since then, both mortality and fertility levels have stabilized; but in recent years, fertility in Italy has continued to decline. In 2021, the total fertility rate was 1.25 children per woman (Istituto Nazionale di Statistica, 2022) – which is far below the replacement level, i.e.,

the level of fertility at which a population exactly replaces itself from one generation to the next, usually defined as a total fertility rate of 2.1[1]. Consequently, starting from 2015, Italy has experienced population shrinking – despite immigration being much higher than emigration (United Nations, 2022a). Immigration has been less and less able to compensate for decline in natural growth as the result of different factors among which the declining fertility of migrants and the increasing share of Italians moving abroad (Centro Studi Investimenti Sociali, 2021; Istituto Nazionale di Statistica, 2022).

Due to the past trends, Italy with its declining population, like many European and East Asian countries, has moved beyond the last stage of the demographic transition which would imply a stationary population, i.e., zero growth rate and a constant age structure. There is rising uncertainty about how fertility and mortality will develop in a post-transitional phase. To the surprise of many, fertility rates continued to fall below replacement level in almost every country that completed their demographic transition (Frejka & Sobotka, 2008; Zeman et al., 2018), and also life expectancy surpassed previously assumed upper limits in more and more countries (Oeppen & Vaupel, 2002). These recent developments coupled with the newest challenge of estimating the impact of COVID-19 on population trends around the world have contributed to an increased uncertainty of population projections. Knowing future population trends is important in order for societies to prepare for demographic change. This is particularly valid in the Italian context, the second oldest population in the world (after Japan), where extremely low fertility coupled with very high life expectancy will have a tremendous impact

1 Two children, one boy and one girl, would replace the two parents. The replacement level is slightly higher than two children to take into account that 1% of children do not survive to the whole reproductive ages and that more male births than female births are born (105 boys per 100 girls). These circumstances imply that 2.07 children would be needed to ensure that mothers are replaced by daughters.

on the labour market, pension system, health care, etc. The aim of this paper is therefore to single out the future prospects of Italy's population by comparing the population projections prepared by five different organizations: the Italian National Institute of Statistics (ISTAT), the European Statistical Office (Eurostat), the United Nations (UN), the Institute for Health Metrics and Evaluation (IHME), and the Wittgenstein Centre for Demography and Global Human Capital (WIC).

The remainder of the paper is structured as follows. In section 2, we describe the projection methodologies used by the different organizations and compare all available demographic scenarios provided for Italy until the end of the century. In Section 3, we examine the different assumptions for each of the determinants of population change – fertility, mortality, and migration – and analyse the impact of each of them on future population trends. In Section 4, we look at how the age structure of Italy's population will evolve under different scenarios, paying particular attention to the evolution of dependency ratios and the size of the working-age population. Next, we investigate the changing spatial distribution of the Italian population by using projections at the sub-national level (Section 5). Finally, we present some concluding remarks based on the main results described in the reviewed research (Section 6).

2. Italian population projections: different scenarios for the future

Population projections show how human population statistics will change when certain assumptions are made about the future course of fertility, mortality, and migration. They are different from forecasts or predictions since they explore different scenarios by developing the implications of diverse underlying assumptions. As a result, they do not necessarily yield a realistic picture of the future development of a population. Given that future population size and structure affect the behaviour, development, and wellbeing of institutional actors, markets, and individuals, population projections are highly demanded and a useful base for all kinds of socio-economic planning.

The most widely used international population projections are prepared by the UN Population Division, which recently published its 27th edition of official population estimates and projections, the 2022 Revision of World Population Prospects. Over the last decades, an increasing number of organizations started to generate alternative international population projections, alongside national statistical offices that typically only focus on projections for their own country. In this paper, we will use data from five different organizations: UN (United Nations, 2022a), WIC (Wittgenstein Centre for Demography and Global Human Capital, 2018) and IHME (Institute for Health Metrics and Evaluation, 2020), which are the most important players when it comes to international population projections[2]; Eurostat (Eurostat, 2020a), which is a Directorate-General of the European Commission, hence providing mostly statistical information about the EU member states; and the Italian National Institute of Statistics (ISTAT, Istituto Nazionale di Statistica,

2 In addition, the following institutions also provide international population projections: the Population Reference Bureau (PRB) and the US Census Bureau.

2021a). All projections are based on the standard cohort-component model, in which the components of population change (fertility, mortality, and net migration) are projected separately for each birth cohort (a group of persons who share the same year of birth). The base population is advanced each year by adding projected new-borns and applying projected survival rates and net migration. The projections differ, however, significantly in their assumptions and methodological approaches, as summarized below.

Both the UN and ISTAT use probabilistic methods, i.e., they explicitly consider the uncertainty associated with the predicted values of demographic change, by assigning a probability to each of the different outcomes. In addition to the most likely trajectory, they also provide values for low and high variants that represent the lower and upper limit of uncertainty, using different confidence intervals[3]. WIC, IHME, and Eurostat projections, on the other hand, follow a deterministic approach, i.e., they provide a single series of values obtained from a single set of demographic assumptions. Yet, all three institutes additionally provide several alternative scenarios – in order to provide for 'what-if' population projections that are based on different assumptions formulated on the future course of fertility, mortality, and migration. In addition, the WIC projections further distinguish themselves by using a multidimensional generalization of the cohort-component projection model which systematically includes the level of education as an additional dimension alongside age and sex.

In terms of underlying assumptions, differences among institutes are even more pronounced. UN assumptions on future levels of fertility and mortality

3 The confidence interval provides information on how likely it is that a given demographic indicator falls within predetermined limits. For example, the 90% confidence interval for a given indicator is determined by considering the distribution values that fall between the 5th and 95th percentiles. The UN provides information on the 80% and 95% confidence interval as well as the overall lower and upper limit, while ISTAT provides results for the confidence intervals of 90%, 80% and 50%.

are based on the historical variability of the changes in each variable. This approach considers both the past of each country itself and that of other countries under similar conditions experienced (in terms of level and pace of change) since 1950. For migration, UN mostly assumes that levels estimated for the period prior to the start of the COVID-19 pandemic would continue throughout the remainder of the century (United Nations, 2022b). The WIC assumptions about age-, sex-, and education-specific future trends in fertility, mortality, and migration are derived from the combination of models using historical analogy together with the scientific input of 550 international population experts and meta-experts (Lutz et al., 2014, 2018). IHME differs from both UN and WIC by using completed cohort fertility at age 50 (which is the average number of children of a certain birth cohort after completing their childbearing years) rather than period estimates of future total fertility rates (which can be interpreted as the total number of children that would be born to each woman if she gave birth to children in alignment with the prevailing age-specific fertility rates of a given period). Completed cohort fertility in IHME is modelled as a function of educational attainment and met need for contraception. Mortality projections are aggregated from previously produced cause-specific mortality forecasts by sex and age for 274 causes of death and cause groups, initiated by the Global Burden of Diseases, Injuries, and Risk Factors Study (Foreman et al., 2018). Finally, net migration in IHME is projected by fitting a time-series model using a number of covariates including a socio-demographic index, the crude population growth rate, and deaths from war and natural disasters (Vollset et al., 2020). Eurostat projections, on the other hand, are based on one central assumption: socio-economic differentials among EU member states are expected to fade in the very long term. Consequently, the reference scenario is based upon partial convergence

in each of the components of demographic change (European Commission, 2020). Finally, the underlying assumptions in the ISTAT projections, using a semi-probabilistic model, are based on the opinions of a panel of national experts who are asked to provide values for a given year with regard to a series of summarized demographic indicators, conditional on the values assumed by the same indicators in instants of time prior to the given year (Istituto Nazionale di Statistica, 2021b).

Table 1 summarizes the basic projection features for all five institutes. In addition to methodological differences, projections also differ in terms of their base year populations and projection periods which can have a significant impact on projection outcomes. For example, WIC, IHME, and Eurostat projections were all produced before 2020, and could therefore not incorporate the effects of COVID-19 into their projections. Each of the institutes provides one main scenario, which can be interpreted as the most likely scenario[4]. The main scenario takes different names depending on the institute providing the projection (Table 1). In addition, they provide a number of alternative scenarios used to test the sensitivity of the projections to changes in one or several determinants, to represent uncertainties, or to provide narratives for alternative future pathways. Data for all these scenarios are publicly available on the websites of the respective organizations, containing also more in-depth information on the methodology as well as on scenario definitions.

4 Seen from today's perspective or at the time they were developed, i.e., most of these projections were developed before the COVID-19 crisis and the invasion of the Ukraine by Russia.

Table 1 **Main features of population projections**

	Base year	Projection period	Methodological approach	Assumptions	# of scenarios	Name of main scenario
UN	2021	2022-2100 (single years)	Probabilistic	Based on historical trends	14	Medium
WIC	2015	2015-2100 (5-year time steps)	Deterministic; multi-dimensional projection model	Based on expert assessments	7	SSP2*
IHME	2017	2018-2100 (single years)	Deterministic	Based on statistical models and functions of other variables	5	Reference
Eurostat	2019	2020-2100 (single years)	Deterministic	Convergence between EU member states in all variables of demographic change	6	Baseline
ISTAT	2020	2021-2070 (single years)	Probabilistic	Based on expert questionnaires	6	Median

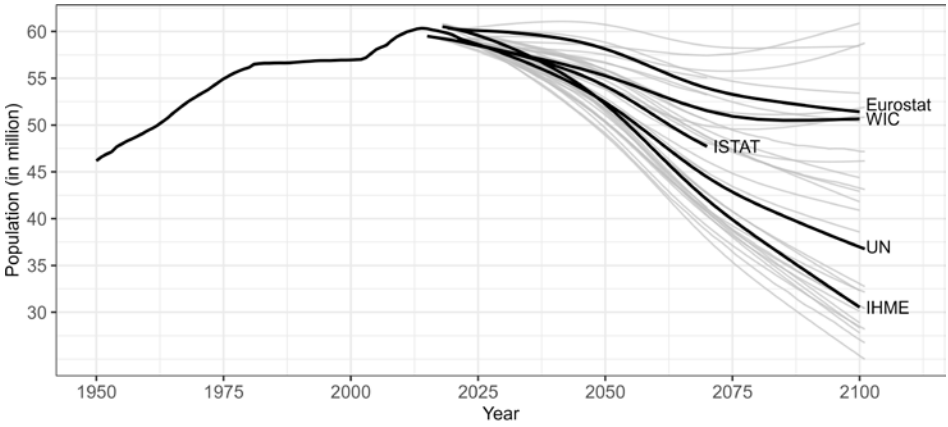
Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; K. C., 2020; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

*Note: WIC provides national population projections on assumptions concerning not only fertility, mortality, and migration, but also education. The scenarios follow the Shared Socioeconomic Pathways (SSPs) that were designed together with the international integrated assessment modelling community to support the work of the Intergovernmental Panel on Climate Change (IPCC). The SSP2 – corresponding to the medium scenario – foresees a medium expansion of education based on global trends and accordingly a medium trend in mortality, fertility, and migration (KC & Lutz, 2017).

Figure 1 depicts all 38 scenarios provided by the five institutes, including UN past estimates for the years 1950 until 2021 (see also Appendix Figure 1 which provides more detailed information about the scenarios separately for each institute). Italy's past was characterized by rapid population growth

between the early 1950s and the mid-1980s – a consequence of the demographic transition – followed by a stable population size in the following years, and again a quite significant increase in population size in the early 2000s – this time driven mostly by immigration. Since 2015, however, population started decreasing as a consequence of the very low and continuously decreasing fertility rates. As can be seen from the graph, there is a huge variety of possible outcomes for the long-term future, from 25.4 million (in the UN Low variant scenario) to 60.9 million people (in the WIC SSP2-double migration scenario) in 2100 (see also Appendix Table 1). The spread is less substantial but still important in 2070 (37.8 to 58.5 million), also in 2050 (48.9 to 60.7 million), and even in the shorter term of 2025 (57.9 to 60.5 million) – also due to already different populations in the base year.

Figure 1 **Estimates and projections of the population of Italy, 1950 to 2100**



Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

Note: Black lines represent the medium (most likely) scenarios.

Many of these scenarios are, however, not plausible and were created exclusively to convey the sensitivity of the projections to – often unrealistic – changes in the underlying assumptions. If we concentrate our attention to the main scenarios, as highlighted in Table 1 and represented as black lines in Figure 1, the differences are much less substantive but still considerable and increasing substantially over time: from 57.6 to 59.9 million in 2030, from 52.2 to 58.1 million in 2050, from 42.0 to 54.0 million in 2070 and from 30.5 to 51.4 in 2100. While all these 'middle of the road' scenarios lead to population decline in the near future, the drivers behind this population shrinking remain unclear when looking only at the total population. Therefore, in the following section, for each of the main scenarios, we separately look into the different assumptions for the determinants of population size – fertility, mortality, and migration – to understand their impact on the total projected population.

3. Underlying projection assumptions

3.1 Fertility

Italy has one of the lowest fertility rates in the world and is currently ranked 3rd in Europe, with only Malta and Spain reporting an even lower total fertility rate in 2021[5] (United Nations, 2022a). Figures by ISTAT show that

5 This statement excludes ministates with a population of less than 50,000 people. The Holy See, Andorra, and San Marino had an even lower total fertility rate in 2021 (United Nations, 2022a).

birth rates in Italy were at an all-time low in 2020, reaching their lowest level since 1861, with only marginal increases ever since (Istituto Nazionale di Statistica, 2022). This is also a result from the outbreak of the COVID-19 pandemic that was accompanied in many places by a significant drop in birth rates – with Italy being one of the most affected countries (Aassve et al., 2021).

These recent developments further increase uncertainty, thus making assumptions about future fertility levels in Italy particularly challenging. Table 2 summarizes both historical fertility trends as provided by the UN as well as underlying fertility assumptions for the main projections produced by each of the five institutes, depicting the estimated total fertility rate at different points of time. As can be seen from the figures in the table, discrepancies are quite stark early on, with differences constituting more than 0.2 children per woman already in 2030. This is, however, also a consequence of different base year assumptions, arising from different data sources used and different points of time at which the population projections were produced. All scenarios apart from the IHME Reference scenario assume a reversal of trend in the future, i.e., a recovery of fertility rates. Consequently, fertility assumptions by the UN, Eurostat, ISTAT, and WIC roughly coincide in the middle- and long-run, while IHME projections move in a different direction, assuming a total fertility rate of only 1.23 by the end of the century.

Table 2 **Estimates and total fertility rate assumptions, medium scenarios, 1950-2100**

	UN Estimates	UN Medium	Eurostat Baseline	IHME Reference	ISTAT Median	WIC SSP2
1950	2.53					
1970	2.39					
1990	1.33					
2010	1.45					
2015	1.35					1.50
2020	1.26		1.33	1.34		1.53
2025		1.32	1.35	1.35	1.32	1.56
2030		1.35	1.37	1.36	1.37	1.58
2035		1.38	1.39	1.35	1.41	1.60
2040		1.40	1.41	1.34	1.45	1.60
2045		1.42	1.43	1.33	1.48	1.61
2050		1.44	1.45	1.32	1.50	1.61
2055		1.46	1.47	1.31	1.52	1.61
2060		1.47	1.48	1.3	1.54	1.61
2065		1.47	1.50	1.29	1.54	1.61
2070		1.48	1.52	1.28	1.55	1.62
2075		1.50	1.53	1.27		1.62
2080		1.50	1.55	1.26		1.63
2085		1.51	1.57	1.25		1.63
2090		1.51	1.59	1.25		1.64
2095		1.51	1.61	1.24		1.64
2100		1.52	1.63	1.23		

Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

The total fertility rate can be interpreted as the average number of children that would be born to a woman over her lifetime if she survives until the end of her reproductive age and were to experience the exact current age-specific fertility rates throughout her lifetime. As a conjunctural indicator of fertility, total fertility rate is sensitive to changes in the timing of childbearing measured by the mean age of women at birth of first child (or at childbirth). In most European countries, women are having their first child later. This generalized postponement of childbearing towards older reproductive ages lowers the number of births in a given calendar period and depresses the total fertility rates. However, this depressing effect might disappear if the delayed births are recuperated later on, which often happens – especially among women in the prime reproductive ages. For this reason, many experts assume that fertility rates will recover to a higher level once the phase of fertility postponement comes to an end – as represented in most of the scenarios above. IHME projections, however, imply a permanent shift to very low fertility rates in many countries. This assumption has been called "quite radical" by demographic experts who also criticize that the relationship between fertility and both mean years of schooling and unmet need of contraception – on which the predictive model of fertility is based on – is not straight-forward in low-fertility countries, thus questioning the general validity of fertility assumptions in the IHME projection model (Gietel-Basten & Sobotka, 2020).

3.2 Mortality

Italy experienced significant improvements in health in the past, with the average Italian gaining about 20 years of life since 1950. Life expectancy at birth measures the average number of years that a new-born could expect to live if she/he were to pass throughout life subject to age-specific mortality rates of a given period. Today, life expectancy at birth for Italians is close to being the highest in Europe and the country also has one of the highest life expectancy ratings in the world. In recent years, however, life expectancy at birth, and especially for older persons (age 65 and above) in Italy has started to stagnate or even slightly decreased in some years – most notably in 2020 as a result of COVID-19, which hit Italy particularly hard during the first wave (Aburto et al., 2022; United Nations, 2022a).

Table 3 summarizes the development of life expectancy in Italy over time, showing both UN estimates for the past and projections for the future. Given that life expectancy significantly varies by gender – men die on average earlier than women in literally all countries of the world – values are depicted separately for men and women. All five sets of projections assume further increases in the length of life of both men and women – with the extent of the improvement, however, significantly varying between the scenarios. The WIC has by far the most optimistic assumptions, estimating that life expectancy for men in 2095-2100 will be as high as 96.4 years and 102.6 years for women. The IHME Reference scenario, on the other hand, assumes much smaller improvements, resulting in life expectancy estimates that are 12 years shorter for men and 14.2 years shorter for women compared to WIC assumptions.

Table 3 **Estimates and life expectancy at birth assumptions, by gender, medium scenarios, 1950-2100**

		UN estimates	UN Medium	Eurostat Baseline	IHME Reference	ISTAT Median	WIC SSP2
MEN	1950	63.9					
	1970	68.7					
	1990	73.6					
	2010	79.5					
	2015	80.2					81.0
	2020	80.0		81.3	81.4		82.1
	2025		82.5	81.9	82.1	81.2	83.1
	2030		83.2	82.6	82.7	82.2	84.1
	2035		83.9	83.2	83.2	82.9	85.1
	2040		84.5	83.8	83.7	83.6	86.2
	2045		85.2	84.3	84.0	84.2	87.2
	2050		85.8	84.9	84.3	84.7	88.2
	2055		86.4	85.4	84.6	85.2	89.2
	2060		87.0	86.0	84.8	85.7	90.2
	2065		87.6	86.5	84.9	86.1	91.3
	2070		88.2	87.0	85.1	86.5	92.3
	2075		88.8	87.4	85.2		93.3
	2080		89.4	87.9	85.3		94.3
	2085		90.0	88.4	85.3		95.4
	2090		90.5	88.8	85.4		96.4
	2095		91.1	89.2	85.4		97.4
	2100		91.7	89.6	85.4		

		UN estimates	UN Medium	Eurostat Baseline	IHME Reference	ISTAT Median	WIC SSP2
WOMEN	1950	67.4					
	1970	74.5					
	1990	80.3					
	2010	84.5					
	2015	84.7					85.4
	2020	84.7		85.7	85.8		86.4
	2025		86.4	86.3	86.2	85.5	87.5
	2030		87.1	86.9	86.6	86.2	88.6
	2035		87.7	87.4	86.9	86.7	89.7
	2040		88.3	88.0	87.2	87.2	90.8
	2045		88.9	88.5	87.4	87.7	91.8
	2050		89.6	89.0	87.6	88.1	92.9
	2055		90.1	89.5	87.8	88.4	94.0
	2060		90.8	90.0	88.0	88.8	95.1
	2065		91.4	90.5	88.1	89.2	96.1
	2070		91.9	90.9	88.2	89.5	97.2
	2075		92.5	91.4	88.3		98.3
	2080		93.1	91.8	88.3		99.4
	2085		93.7	92.2	88.4		100.5
	2090		94.3	92.6	88.4		101.5
	2095		94.8	93.0	88.4		102.6
	2100		95.4	93.3	88.4		

Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

The question of how much human lifespan can be extended is one of the most controversial questions in demography. In the past, researchers have repeatedly estimated an ultimate limit to life expectancy, but virtually all of these limits have been exceeded – sometimes even a few years after publi-

cation (Oeppen & Vaupel, 2002; Vaupel et al., 2021). In 2016, an article published in Nature suggested that there is evidence for a limit at about 115 years of age (Dong et al., 2016), but was received with controversy by other scientists (Lenart & Vaupel, 2017). Widespread agreement is only on the expectation that the future of longevity will be different from the past – but it is not known how different. It is therefore not surprising that researchers in different institutes have come to different conclusions about the evolution of life expectancy in Italy throughout this century.

3.3 Migration

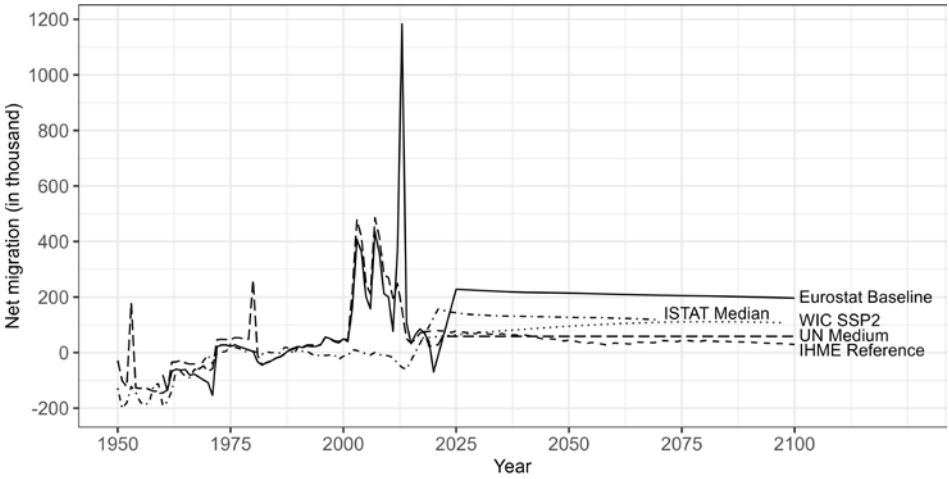
Migration is the third factor of population change, in addition to fertility and mortality. Even in the face of negative natural population growth, i.e., more deaths than births, any open population can grow or likewise shrink (more than expected from the difference between births and deaths) depending on migration rates. In fact, if it were not for immigration, Italy would have started shrinking already in the mid-90s (United Nations, 2022a).

Of the three factors defining population change, migration is by far the most difficult to measure, as expressed by Coleman, "its theory is the least satisfactory, its trend by far the most volatile, and its future by far the most difficult to forecast" (Coleman, 2008, p. 453). This is also reflected in Figure 2, showing estimated and projected international net migration (immigration minus emigration) for Italy. As can be seen on the graph, net migration in Italy was characterized by strong fluctuations in the past, ranging from -200,000 people in 1951 according to IHME estimates to over a million in

2013 according to Eurostat estimates[6]. The negative net migration between 1950 and 1970 was primarily driven by the large-scale post-war emigration of Italians towards Europe, especially Germany – mostly for economic reasons. After that, Italy quickly transformed from a country of emigration to a country of immigration. Large waves of immigration originated from the former socialist countries of Eastern Europe – in particular, after the 2004 and 2007 enlargements of the European Union – as well as from neighbouring North Africa, with arrivals soaring following the Arab Spring. These numbers, however, only reflect legal and long-term migration (typically referring to a change of country of residence for a duration of at least one year), even though a significant share of immigration to Italy happens illegally and undocumented. At irregular intervals, the government implements regularization laws for migrants who entered the country illegally, as in 1995, 1998, 2002, 2006, 2009, 2012, and 2020 (Istituto Nazionale Previdenza Sociale, 2020).

6 Estimates for the past differ between institutes due to different measurements and definitions of international migration.

Figure 2 **Estimates and projections of net migration in Italy, medium scenarios, 1950 to**



Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

The strong fluctuations in net migration in the past combined with general difficulties in measuring international migration make migration projections a challenging task. While all of the five medium scenarios assume positive net migration to Italy for the remainder of the century, the volume differs considerably between the projections. Highest net migration numbers are projected by Eurostat, assuming a slightly declining trend between 2025 (228,000) and 2100 (197,000). Lowest net migration, on the other hand, is projected by IHME, with numbers fluctuating between 28,000 and 80,000. However, it is important to note that migration projections are in many ways inherently uncertain, as the drivers of immigration flows are volatile – sometimes in the very short term and with hardly any foresigns (Bijak & Czaika, 2020).

The impact of migration assumptions on the results of the population

projections can also be seen from comparing the medium scenarios of the UN, WIC and EUROSTAT to a scenario with zero migration (see Appendix Table 1). Not surprisingly, in these closed-border scenarios, Italian's population decline is expected to be much more substantial. The difference in population size between the medium scenario and the zero-migration scenario in 2100 is 8.5 million for UN projections, 12.1 million for WIC projections, and even 21.3 million for Eurostat projections. Consequently, when taking net migration out of the picture, the overall deviations in projected population size between the different scenarios also diminish.

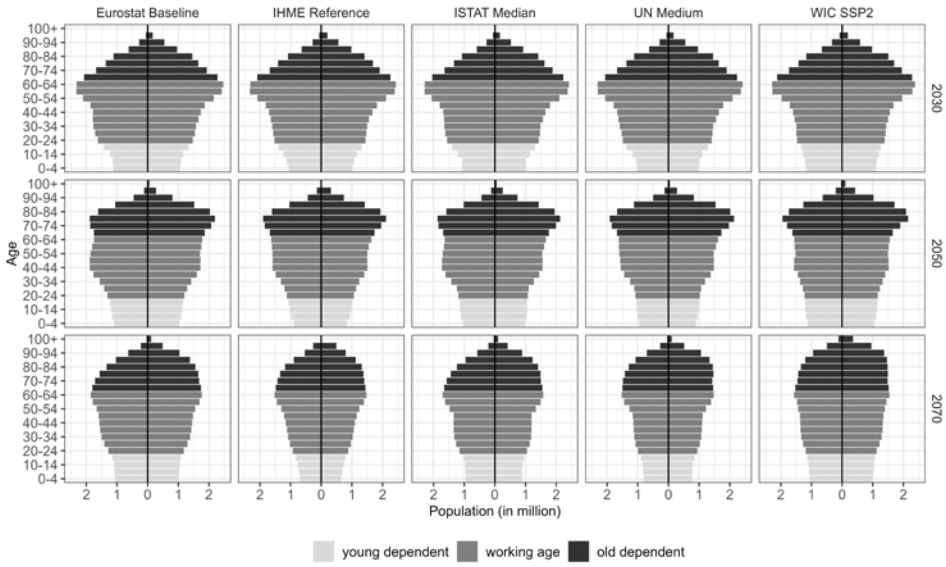
3.4 The changing age structure: from muffin to beehive

Assumptions about the future of fertility, mortality, and migration do not only influence the projected population size, but also heavily impact the age structure of the population. Italy's population is already relatively old, with a current median age of 46.8 years (United Nations, 2022a) and is expected to experience further population ageing in the future – putting increased pressure on health care and old-age support systems.

Figure 3 depicts population pyramids for Italy in 2030, 2050, and 2070 for each of the five projection scenarios. While pyramids look pretty much alike in 2030 – all urn- or muffin-shaped and the largest proportions of the population being at the age between 55 and 65 – differences are becoming more noticeable over time. The IHME Reference scenario not only results in the smallest but also in the oldest population. On the other end of the spectrum, the Eurostat Baseline projection leads to a larger population, but also more evenly spread across age groups (implying the potential for a sta-

tionary population). Overall, the pyramids in all projections become more beehive-shaped with time, which is typical for countries with low birth rates, low death rates, and a high average age.

Figure 3 **Population pyramids for Italy in 2030, 2050, and 2070, medium scenarios (males**



Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

Note: Young dependent corresponds to age group 0-19, working-age to age group 20-64; and old dependent to age group 65+.

The different colours in the pyramids represent three broad segments of the population: the young dependent who are below the age of 20 and therefore typically have not started working yet and are thus financially (and for children also in terms of care) dependent on their parents; the working-age population between the age of 20 and 64 who can be considered able and likely to work and typically contribute the most to the social security system;

and the old dependent population (age 65+) who are largely already retired and may have a greater need for health care – particularly, the oldest ones. While in 2030, those in working age will still constitute the majority of Italy's population according to all scenarios (between 54.3% according to the WIC SSP2 and 57.0% according to the Eurostat Baseline scenario), this share is expected to significantly decline thereafter. By 2050, all but the Eurostat Baseline scenario result in the majority of Italians belonging to the "dependent" segment – at least according to this dependency definition which is entirely based on chronological age. The segment that is expected to grow most throughout this century is that of the old dependent. While the population 65+ currently constitutes 23.5%, this share is projected to exceed one third in all scenarios in 2050 and 2070 and could even grow up to 38.9% by 2100 according to WIC SSP2. On the other end of the spectrum is the young dependent group, which is already the smallest segment now, but is expected to further decline as a result of the very low fertility rates.

Another way to measure population ageing is by looking at the old-age dependency ratio which is defined as the number of individuals aged 65 and older per 100 people of working age, i.e., those aged 20 to 64. In Europe, the old-age dependency ratio increased from 13.9 to 32.2 between 1950 and 2021 as a consequence of longer life expectancy and lower fertility, and sometimes reinforcing migration patterns. In Italy, the increase was even more substantive, with a change from 14.2 to 39.9 during the same time (United Nations, 2022a). A look into the future (see Table 4) shows that this trend is likely to persist and even accelerate in the decades to come. Particularly strong increases in the old-age dependency ratio can be expected by the middle of the century; the projected values for 2050 range from 66.5 in the Eurostat Baseline scenario to 78.6 in the WIC SSP 2 scenario. After that, the old-age

dependency ratio is likely to stagnate or even slightly decrease as lower-birth year groups are entering the age of 65+, before it eventually starts increasing again to values up to 81.8 (as projected in the UN Medium scenario) or 86.3 (as projected in the WIC SSP2 scenario) in 2100. However, it is important to mention that the actual burden of dependency not only depends on the changing age composition of the population, but also on the actual labour force participation – for both people in and out of working age – as well as on the productivity of those working. A recent study by Marois et al. (2020) projected that the labour-force dependency ratio, which is the ratio of all economically inactive persons to the economically active ones – regardless of their age – will be 129 by 2030, and 138 by 2060 in Italy, assuming a continuation of recent trends. This considerably higher value (compared to the old-age dependency ratio) can be explained by the fact that an important share of people of working age are not in the labour force as they are students, inactive and not looking for employment, or in early retirement.

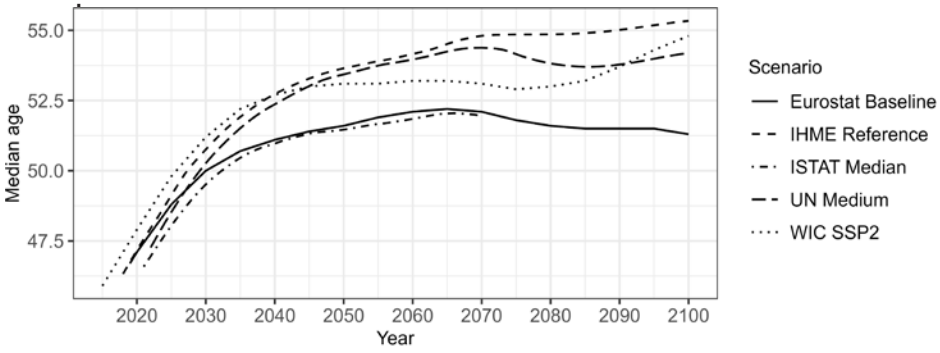
Table 4 **Italy's projected old-age dependency ratio, 2030, 2050, 2070, and 2100, medium scenarios**

	UN Medium	Eurostat Baseline	IHME Reference	ISTAT Median	WIC SSP2
2030	49.7	47.4	49.3	48.0	53.3
2050	77.5	66.5	73.5	70.7	78.6
2070	78.0	65.5	71.5	68.0	76.5
2100	81.8	68.0	75.4		86.3

Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018

Finally, looking at the development of a population's median age over time we see that all scenarios project a rise of this indicator, particularly during the next two decades. After that, there is a tendency of stagnation, but also the spread between scenarios increases. The IHME Reference scenario projects the highest median age, with a value of 53.6 years in 2050 and 55.3 years in 2100. But also under all other scenarios, the median age of the population continues to rise at least until 2070 – albeit less substantive. ISTAT and Eurostat projections yield the youngest population, with a median age of 51.5 and 51.6 years respectively in 2050, 52.0 and 52.1 years in 2070, and for Eurostat 51.3 years in 2100.

Figure 4 **Projections of median age (in years) of Italy's population, 2015-2100, medium**



Sources: Authors' own calculations based on Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018

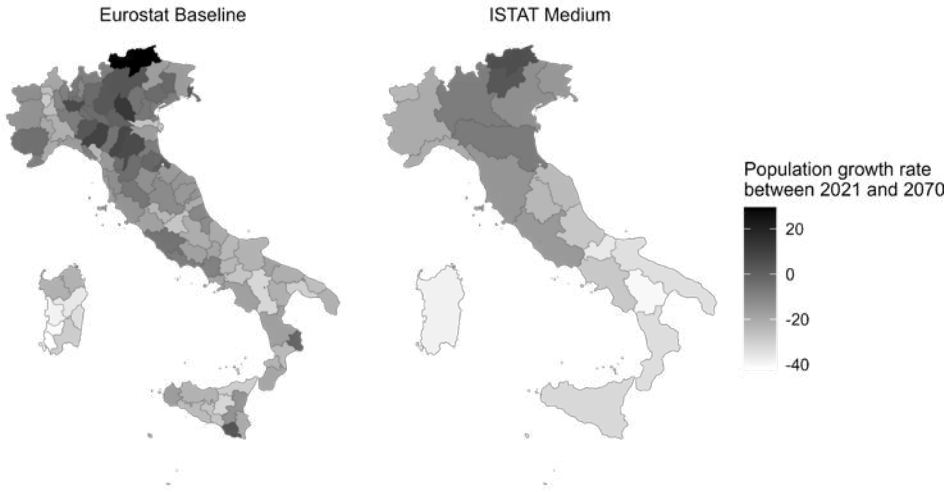
4. The changing spatial distribution of the Italian population

In addition to projections on the national level, it is also important to look at projections on the sub-national level, as fertility and mortality patterns tend to strongly vary between different regions in Italy, and internal migration further reinforces demographic differences. Among the five macro-regions, the total fertility rate is currently highest in the North-East (1.31) and lowest in the Centre (1.18). Differences are even more pronounced in terms of life expectancy: Italian women live on average 1.4 years less in the South than in the North-East, and the difference for men is even 1.6 years. Finally, in- and out-migration is spread very unevenly across Italy. When considering both internal and international migration, more people leave than enter the Islands and the South, whereas North-East, North-West, and central Italy show a positive net migration balance (Istituto Nazionale di Statistica, 2021a).

Both Eurostat and ISTAT produced projections not only on the national level, but also on the sub-national level. While Eurostat's projections are on the province level (NUTS-3), ISTAT ran its population projections only on the regional (NUTS-2) level. Figure 5 compares the projected population growth rate between 2021 and 2070 by region/province between Eurostat and ISTAT. As can be seen on the map, there are significant regional differences. While depopulation was projected under all scenarios for total Italy, not all regions are likewise affected from population shrinking. Eurostat even projects positive growth rates for Bolzano, Trentino, and some – mostly urban – provinces of Emilia-Romagna, Friuli Venezia Giulia, Lombardy, Tuscany, and Veneto. Similarly, ISTAT projected positive growth rates for Bolzano and Trentino; however, to a much smaller extent: growth rates for Bolzano are projected to be 5.8% by ISTAT and 29.5% by Eurostat; growth rates for

Trento are projected to be 2.9% by ISTAT and 3.3% by Eurostat. These differences are largely due to different migration assumptions. For example, while Eurostat projects that net migration to Bolzano will be roughly 3,000 every year, the maximum total migratory balance projected for Bolzano according to the ISTAT Medium scenario is 1900 in 2021, with a declining trend thereafter. Overall, there seems to be a strong North-South divide in terms of future population growth. Basilicata and Sardinia are likely to be most affected by population decline, with negative growth rates projected up to -40% between 2021 and 2070. In general, there is a strong trend of Italians moving to urban areas. According to the UN, the share of urban population in Italy increased from 54.1% in 1950 to 71.3% in 2021, and is expected to further increase to 81.1% by 2050 (United Nations, 2018).

Figure 5 **Projected population growth rate (in percent) between 2021 and 2070, by region/province**



Sources: Eurostat, 2020b; Istituto Nazionale di Statistica, 2021a.

As with the total population, assumptions about the future of fertility, mortality, and migration also influence the age structure of the sub-populations, resulting in important spatial differences related to population ageing. Table 5 shows the old-age dependency ratio by macro-region and region for 2030, 2050, and 2070. Both Eurostat and ISTAT project the lowest ratio in 2030 for the South (45.7 and 46.7) – as result of a younger population to start with and higher mortality – and the highest ratio for the Islands (48.3 and 49.5) which are strongly affected by out-migration of people in their prime working age. Sardinia is projected to be the region with the highest old-age dependency ratio by the middle of the century: Eurostat projects that by 2050 there will be 94.1 people (86.6 according to the ISTAT Medium scenario) above the age of 65 per 100 people of working age. For the mid-to long term future, however, both institutes expect that the Southern population will experience significant population ageing: by 2070, the South will have the country's second-highest old-age dependency ratio according to both ISTAT and Eurostat. While Eurostat assumes that the dependency burden in the long run will be lowest in the North-East, particularly, in Bolzano, ISTAT projections show the lowest old-age dependency ratio in 2070 for the North-West, with the lowest value (60.1) in Lombardy.

Table 5 Projected old-age dependency ratio by region, 2030, 2050, and 2070.

	Eurostat Baseline			ISTAT Medium		
	2030	**2050**	**2070**	**2030**	**2050**	**2070**
Total Italy	**47.4**	**66.5**	**65.5**	**48.0**	**70.7**	**68.0**
North-West	**47.7**	**64.2**	**61.9**	**47.5**	**65.0**	**61.3**
Liguria	56.7	69.1	64.6	57.3	70.8	64.0
Lombardy	44.9	62.0	60.6	44.4	62.5	60.1
Piedmont	51.8	68.3	64.4	51.9	69.5	63.6
Valle d'Aosta	49.9	67.3	61.3	50.2	69.4	60.8
North-East	**47.7**	**64.3**	**61.1**	**48.2**	**68.7**	**64.8**
Bolzano	40.4	52.1	51.7	41.4	59.8	58.9
Emilia-Romagna	47.0	63.6	60.7	47.1	66.4	63.9
Friuli-Venezia Giulia	53.0	68.5	63.6	53.2	73.7	67.9
Trentino	47.3	62.1	61.1	46.5	62.5	60.6
Veneto	47.9	65.9	62.3	49.0	71.8	66.3
Centre	**48.2**	**68.1**	**65.7**	**49.2**	**73.0**	**68.9**
Lazio	45.2	66.7	65.1	46.3	71.2	67.9
Marches	51.6	71.7	69.4	52.6	79.3	73.3
Tuscany	50.7	68.1	64.9	51.3	71.5	66.9
Umbria	52.8	72.0	68.4	54.5	83.2	79.2
South	**45.7**	**67.9**	**71.8**	**46.7**	**74.6**	**77.1**
Abruzzo	50.0	70.7	70.2	51.9	79.2	75.9
Apulia	48.4	73.3	76.3	48.5	78.1	81.0
Basilicata	51.0	75.8	79.3	52.3	82.9	86.2
Calabria	47.4	67.8	71.7	49.6	77.0	78.2
Campania	41.5	63.1	68.7	42.6	69.5	73.9
Molise	52.1	71.9	75.7	54.0	78.6	78.1
Islands	**48.3**	**71.2**	**73.2**	**49.5**	**78.8**	**77.8**
Sardinia	54.8	86.6	84.3	56.5	94.1	87.0
Sicily	46.1	66.8	70.2	47.3	74.2	75.1

Source: Eurostat, 2020b; Istituto Nazionale di Statistica, 2021a.

5. Comparing population projections through deviation from the UN scenario

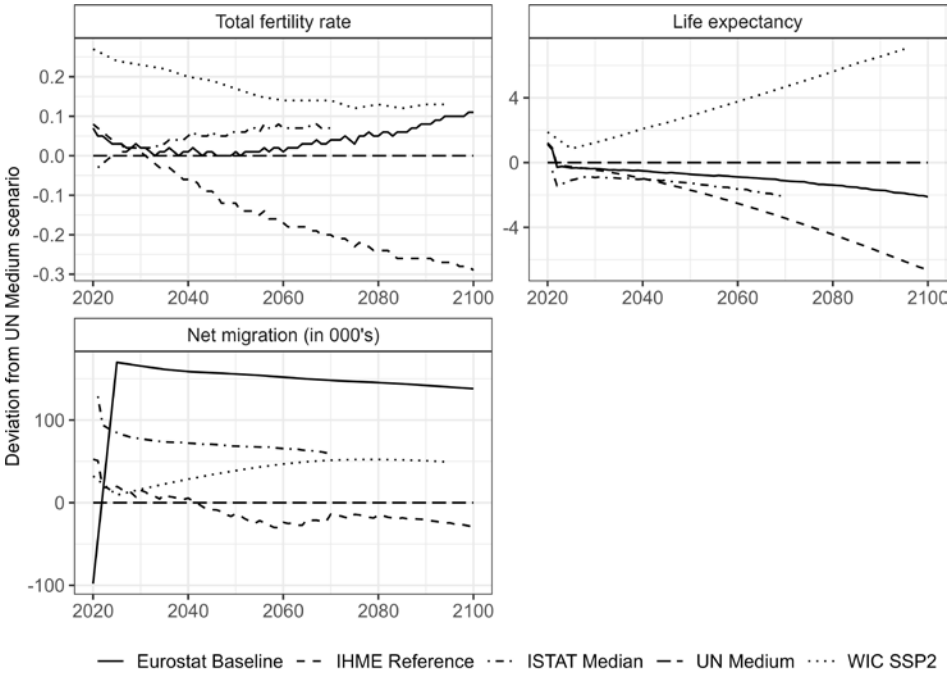
We compared different population projections for Italy, as prepared by five different organizations. While all organizations agree that the Italian population will continue to decline in the future, the speed and extent of this decline as well as resulting changes in the population age structure differ significantly for the different sets of projections and depend heavily on the underlying assumptions.

Figure 6 summarizes the differences in the assumptions about future fertility, mortality, and migration – the three factors defining any demographic change – by showing for each of the scenarios the deviation to the UN Medium scenario which represents the internationally most widely used population projection. Eurostat projects the smallest population decline (see Figure 1 and Appendix Table 1), with a projected population size of 58.1 million in 2050, 54 million in 2070, and 51.4 million in 2100. The reason for this larger number (as compared to the other projections) is first and foremost the assumption that net migration will be considerably higher as compared to the UN Medium and all other scenarios. Moreover, fertility assumptions follow a similar trend as those of the UN in the short run, but it assumes a slightly higher total fertility rate in the second half of the century. Life expectancy assumptions are a little bit less optimistic as compared to the UN, resulting in a relative decrease of the projected population size. WIC projections also yield quite high population numbers of 55.3 million in 2050, 51.5 million in 2070, and 50.7 million by the end of the century. These comparably high numbers can be explained by the fertility assumptions, as WIC assumes a relatively higher total fertility rate than all other institutes. The very optimi-

stic assumptions about future life expectancy as well as slightly higher net migration assumptions additionally reinforce the relative population advance as compared to the UN. Similarly, ISTAT projects a considerably higher net migration and a slightly higher total fertility rate than the UN. Despite a less optimistic outlook on the future life expectancy, the projected population is with 47.7 million in 2070 around 3 million higher than the UN projections at the same point of time. Finally, IHME's population projections for Italy result in the lowest population numbers with 52.2 million in 2050, 42 million in 2070, and only 30.5 million in 2100. This is mostly due to the fact that IHME assumes a continuous decline in fertility in Italy, resulting in fertility assumptions that are considerably lower than those of all other institutes, further reinforced by the comparably low life expectancy assumptions. Net migration is also assumed to be the lowest of all analysed scenarios, with average annual net migration counts of only around 35,000 in the second half of the century.

Albeit population projections – due to comparatively sluggish demographic changes – tend to be more accurate than projections of many other variables of interest, the future remains largely uncertain. The past has shown that unforeseen events such as a global pandemic or massive movements of refugees caused by wars and conflicts can affect demographic processes. Yet, it is still useful to study population projections in order to better understand how human population statistics will change when certain assumptions are made about the future course of fertility, mortality, and migration. Even though none of the organizations has a crystal ball to take a glance in the future, their projections reveal a lot about the wide range of possible paths of Italy's demographic future and can help providing a guide for planning and preparing the economy and society to demographic change.

Figure 6 **Deviation from the UN Medium scenario, all medium scenarios**



Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018

Note: Deviations of life expectancy from the UN Medium scenario represents the average deviation between the deviation of female and male life expectancy.

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Appendix Table 1. **Total population (in million), estimates and projections by the UN, WIC, IHME, ISTAT, and Eurostat, 1950-2100**

	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
UN past estimates	**46.2**	**48.0**	**49.4**	**51.2**	**53.2**	**54.9**	**56.2**	**56.6**	**56.7**	**56.9**	**57.0**	**58.1**	**59.7**	**60.3**
UN Medium														
UN Constant fertility														
UN Constant mortality														
UN High														
UN Instant replacement														
UN Instant replacement zero migration														
UN Low														
UN Lower 80 PI														
UN Lower 95 PI														
UN Median PI														
UN Medium														
UN Momentum														
UN No change														
UN Upper 80 PI														
UN Upper 95 PI														
UN Zero migration														
WIC SSP1														59.5
WIC SSP2														**59.5**
WIC SSP2 Double migration														59.5
WIC SSP2 Zero migration														59.5
WIC SSP3														59.5
WIC SSP4														59.5
WIC SSP5														59.5

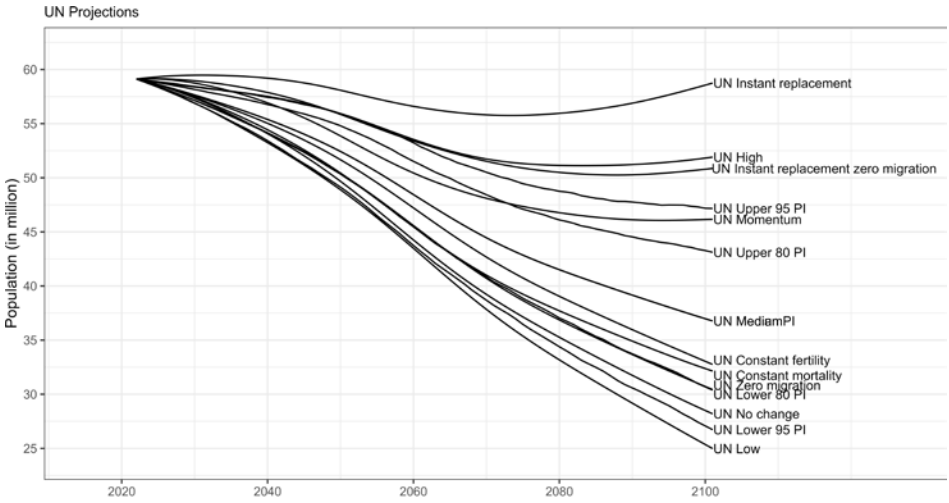
2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
59.6																
	58.6	**57.6**	**56.6**	**55.4**	**54.0**	**52.4**	**50.5**	**48.4**	**46.4**	**44.5**	**42.9**	**41.5**	**40.3**	**39.2**	**38.0**	**37.0**
	58.6	57.6	56.4	55.0	53.5	51.7	49.5	47.2	44.9	42.7	40.7	39.0	37.5	36.0	34.5	33.0
	58.6	57.4	56.0	54.4	52.6	50.4	48.0	45.5	43.1	41.0	39.2	37.7	36.3	34.9	33.6	32.4
	58.8	58.4	58.0	57.5	56.9	55.9	54.8	53.5	52.5	51.7	51.3	51.1	51.1	51.2	51.4	51.8
	59.3	59.5	59.4	59.2	58.8	58.1	57.3	56.6	56.1	55.8	55.8	56.0	56.3	56.9	57.7	58.6
	59.1	59.0	58.5	57.9	57.0	55.9	54.6	53.4	52.4	51.5	50.9	50.5	50.3	50.3	50.5	50.8
	58.4	56.9	55.2	53.2	51.2	48.9	46.3	43.5	40.6	37.8	35.4	33.2	31.1	29.2	27.2	25.4
	58.4	57.1	55.7	54.1	52.3	50.3	48.0	45.5	43.0	40.8	38.9	37.0	35.3	33.7	32.3	30.7
	58.4	56.9	55.2	53.4	51.3	49.1	46.5	43.7	41.1	38.7	36.5	34.4	32.5	30.6	28.9	27.1
	58.6	57.6	56.6	55.4	54.0	52.4	50.5	48.4	46.4	44.5	42.9	41.5	40.3	39.2	38.0	37.0
	59.1	58.7	58.0	56.9	55.5	53.9	52.1	50.4	49.1	48.1	47.3	46.8	46.4	46.1	46.1	46.1
	58.6	57.4	55.8	54.1	52.0	49.7	47.0	44.3	41.6	39.2	37.1	35.3	33.5	31.7	30.1	28.5
	58.6	57.6	56.4	55.0	53.5	51.7	49.5	47.2	44.9	42.7	40.7	39.0	37.5	36.0	34.5	33.0
	58.6	57.4	56.0	54.4	52.6	50.4	48.0	45.5	43.1	41.0	39.2	37.7	36.3	34.9	33.6	32.4
	58.8	58.4	58.0	57.5	56.9	55.9	54.8	53.5	52.5	51.7	51.3	51.1	51.1	51.2	51.4	51.8
	59.3	59.5	59.4	59.2	58.8	58.1	57.3	56.6	56.1	55.8	55.8	56.0	56.3	56.9	57.7	58.6
59.0	58.3	57.6	56.8	56.0	55.2	54.2	53.0	51.7	50.3	48.8	47.4	46.2	45.2	44.4	43.7	42.9
59.1	**58.5**	**57.9**	**57.3**	**56.7**	**56.1**	**55.3**	**54.3**	**53.3**	**52.4**	**51.5**	**50.9**	**50.6**	**50.5**	**50.5**	**50.6**	**50.7**
59.3	59.1	58.9	58.8	58.8	58.6	58.4	58.2	57.8	57.5	57.4	57.6	58.0	58.6	59.4	60.1	60.9
58.8	57.9	56.8	55.8	54.6	53.3	51.9	50.2	48.4	46.6	44.9	43.4	42.2	41.2	40.3	39.4	38.6
59.0	58.4	57.7	56.9	56.0	54.9	53.8	52.6	51.5	50.5	49.9	49.6	49.5	49.7	50.1	50.5	51.1
58.9	58.0	57.0	56.0	54.9	53.8	52.4	50.9	49.3	47.6	46.1	44.8	43.8	43.0	42.2	41.6	40.9
59.1	58.6	58.2	57.9	57.5	57.1	56.6	56.0	55.1	54.2	53.3	52.5	51.8	51.3	51.0	50.7	50.4

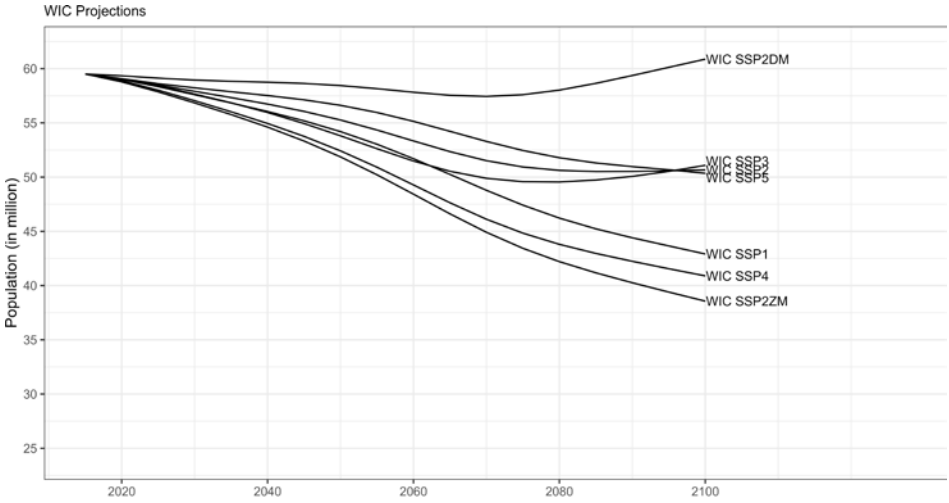
	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
IHME Reference														
IHME Faster Met Need and Education														
IHME Fastest Met Need and Education														
IHME SDG Met Need and Education														
IHME Slower Met Need and Education														
ISTAT median														
ISTAT lower limit 50% forecast-interval														
ISTAT lower limit 80% forecast-interval														
ISTAT lower limit 90% forecast-interval														
ISTAT upper limit 50% forecast-interval														
ISTAT upper limit 80% forecast-interval														
ISTAT upper limit 90% forecast-interval														
Eurostat Baseline														
Eurostat High migration														
Eurostat Low fertility														
Eurostat Low migration														
Eurostat Low mortality														
Eurostat No migration														

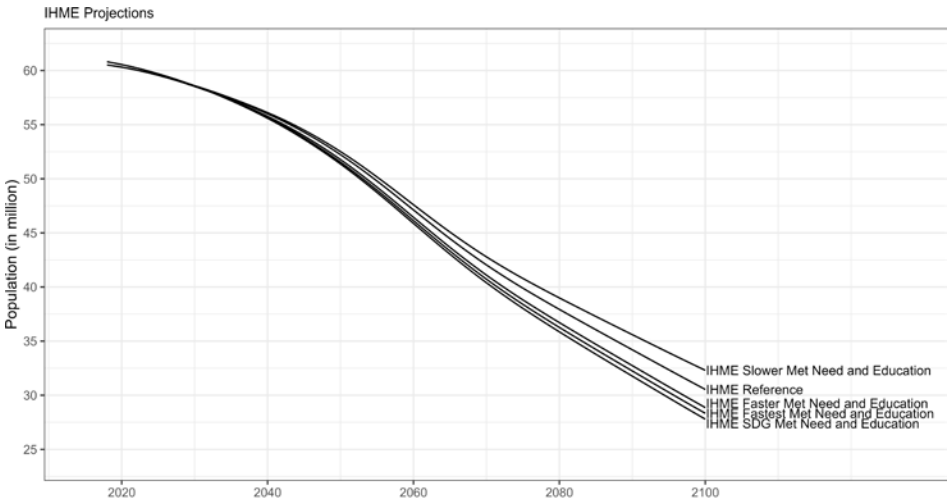
Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

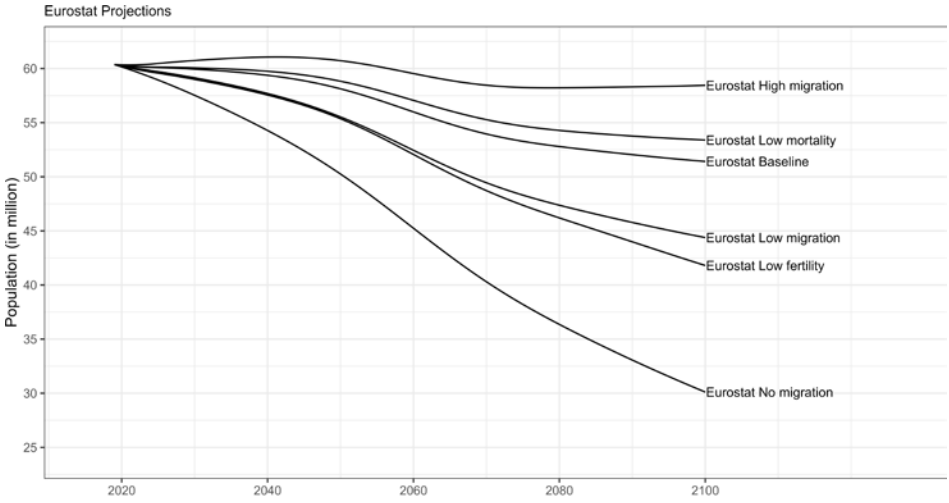
2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
60.3	**59.6**	**58.6**	**57.4**	**56.0**	**54.3**	**52.2**	**49.8**	**47.1**	**44.5**	**42.0**	**39.9**	**37.9**	**36.1**	**34.2**	**32.4**	**30.5**
60.3	59.6	58.5	57.3	55.8	54.0	51.8	49.2	46.4	43.7	41.1	38.8	36.7	34.7	32.7	30.8	28.9
60.5	59.7	58.6	57.2	55.7	53.8	51.5	49.0	46.1	43.3	40.7	38.4	36.3	34.2	32.2	30.3	28.3
60.5	59.7	58.6	57.2	55.6	53.6	51.4	48.7	45.9	43.0	40.4	38.0	35.9	33.8	31.8	29.8	27.8
60.3	59.6	58.6	57.4	56.1	54.5	52.5	50.2	47.6	45.1	42.8	40.8	39.0	37.3	35.6	33.9	32.3
	58.6	**57.9**	**57.2**	**56.4**	**55.4**	**54.2**	**52.6**	**50.9**	**49.2**	**47.7**						
	58.5	57.7	56.8	55.7	54.4	52.9	51.0	48.9	46.8	45.0						
	58.5	57.5	56.4	55.1	53.6	51.7	49.6	47.2	44.9	42.7						
	58.4	57.4	56.2	54.8	53.1	51.1	48.7	46.2	43.5	41.2						
	58.6	58.1	57.6	57.0	56.4	55.5	54.3	52.9	51.6	50.5						
	58.7	58.3	58.0	57.7	57.3	56.7	55.8	54.9	53.9	53.2						
	58.7	58.4	58.2	58.0	57.9	57.5	56.9	56.1	55.5	55.1						
60.3	**60.1**	**59.9**	**59.7**	**59.4**	**58.9**	**58.1**	**57.1**	**56.0**	**54.9**	**54.0**	**53.3**	**52.8**	**52.4**	**52.0**	**51.7**	**51.4**
60.3	60.5	60.7	60.9	61.1	61.0	60.7	60.2	59.5	58.9	58.5	58.2	58.2	58.3	58.3	58.4	58.4
60.2	59.6	59.0	58.3	57.5	56.6	55.4	53.8	52.1	50.3	48.7	47.4	46.2	45.1	44.0	42.9	41.8
60.2	59.7	59.1	58.5	57.7	56.7	55.5	54.1	52.4	50.8	49.4	48.3	47.4	46.5	45.8	45.1	44.4
60.3	60.1	60.1	59.9	59.7	59.4	58.8	58.0	57.1	56.1	55.3	54.7	54.3	54.0	53.8	53.6	53.4
60.2	58.9	57.5	56.0	54.3	52.4	50.3	47.8	45.2	42.7	40.3	38.2	36.4	34.7	33.1	31.5	30.1

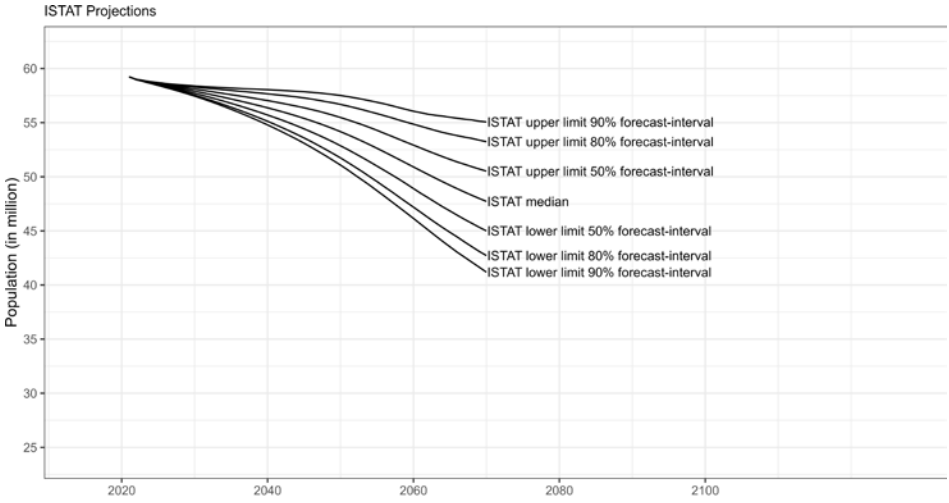
Appendix Figure 1 **Total population, projections by the UN, WIC, IHME, ISTAT, and Eurostat, 1950-2100**






IHME Projections
Population (in million)
60
55
50
45
40
35
30
25
2020
2040
2060
2080
2100
IHME Slower Met Need and Education
IHME Reference
IHME Faster Met Need and Education
IHME Fastest Met Need and Education
IHME SDG Met Need and Education


Eurostat Projections
Population (in million)
60
55
50
45
40
35
30
25
2020
2040
2060
2080
2100
Eurostat High migration
Eurostat Low mortality
Eurostat Baseline
Eurostat Low migration
Eurostat Low fertility
Eurostat No migration



Sources: Eurostat, 2020; Institute for Health Metrics and Evaluation, 2020; Instituto Nazionale di Statistica, 2021a; United Nations, 2022a; Wittgenstein Centre for Demography and Global Human Capital, 2018.

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ECONOMIA ITALIANA 2022/3

Le implicazioni del cambiamento demografico sul sistema economico e finanziario italiano

Questa edizione di *Economia Italiana* – editor **Giorgio Di Giorgio e Maria Rita Testa,** entrambi della Luiss – analizza le conseguenze dell'invecchiamento della popolazione in Italia. Come scrivono gli editor, *"L'Italia non è un paese per giovani*". Negli anni a venire gli anziani sono destinati a diventare più di un terzo della popolazione, mentre i giovani dovrebbero ridursi a poco più di un decimo rispetto a una popolazione che
- nel prossimo cinquantennio a seconda di diversi autorevoli scenari centrali previsi
- perderà dai cinque ai diciassette milioni di individui. *"L'impatto sulla società sarà dirompente non solo per il cambiamento atteso futuro ma anche perché ad oggi le avvenute trasformazioni demografiche si sono scontrate con ben pochi risultati concreti e molto silenzio da parte delle istituzioni preposte a rispondere a siffatto cambiamento*".

Il primo contributo, di **Claudia Reiter, Anne Goujon e Maria Rita Testa,** mette in evidenza le future tendenze demografiche italiane: ***Italy's population prospects: future scenarios for the 21st century.*** Il saggio di **Lilia Cavallari, Flavio Padrini, Nicola Salerno e Lorenzo Toffoli** analizza l'impatto del potenziale aumento della spesa per le cure e per il welfare nel nostro paese, ***Ageing and the sustainability of public finance.*** Due contributi sono dedicati esplicitamente al tema delle pensioni. **Carlo Lallo e Sergio Ginebri** trattano ***Gli effetti regressivi inattesi del sistema pensionistico italiano nel prossimo futuro***. Il lavoro di **Elisa Bocchialini e Beatrice Ronchini** si occupa delle forti disparità di genere nei trattamenti pensionistici italiani, ***Il gender gap pensionistico: evidenze e prospettive dalla previdenza complementare.***
Il volume si chiude con il saggio di **Domenico Curcio, Giorgio Di Giorgio e Giuseppe Zito, *Scenari demografici, risparmio e sistema finanziario italiano***, che contiene anche una proposta per sostenere le pensioni di chi non ha possibilità di versare adeguati contributi.
Completano il volume l'intervento di **Stefano Micossi**, ***Le questioni di politica economica sempre rinviate***" e la rubrica di **Marco Valerio Morelli**, ***Il sistema pensionistico italiano appare non sostenibile nella società "silver" di domani.***

ECONOMIA ITALIANA nasce nel 1979 per approfondire e allargare il dibattito sui nodi strutturali e i problemi dell'economia italiana, anche al fine di elaborare adeguate proposte strategiche e di *policy*. L'Editrice Minerva Bancaria si impegna a riprendere questa sfida e a fare di Economia Italiana il più vivace e aperto strumento di dialogo e riflessione tra accademici, *policy makers* ed esponenti di rilievo dei diversi settori produttivi del Paese.

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