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THE END OF A GROWING ITALY. WHAT ARE THE CONDITIONS FOR WELL-BEING AND DEVELOPMENT IN AN AGING POPULATION?[1]

Alessandro Rosina, Roberto Impicciatore

Abstract. Demographic projections indicate a significant decline in both the overall and working-age populations, resulting in increased economic and social dependency on older generations. This demographic shift requires strategic planning, especially in terms of employment and social welfare systems. This paper emphasizes the importance of policies addressing both quantitative factors (such as increasing birth rates and immigration) and qualitative aspects (such as enhancing workforce efficiency and integration). The paper underscores the significance of aligning Italy's demographic strategy with successful European models. It advocates for comprehensive measures to support family planning, create job opportunities, and facilitate intergenerational exchange. Furthermore, we highlight the potential contributions of an actively aging population and the concept of 'Silver Ecology' in advancing sustainable development.

1. Introduction

In the 21st century, a unique transition in the history of humanity is underway, leading to a transformation of the traditional phases of life and an alteration of the typical intergenerational relationship. This carries implications that challenge the foundations that have thus far enabled economic development and social sustainability.

The driving force behind this monumental transformation is the process of "Demographic Transition." Without this process, we would still be, as was commonly the case in the past, grappling with an infant mortality rate exceeding 20 percent, life expectancy below 40 years, and a fertility rate of five or more children per woman. This would also entail a population structure shaped like a pyramid: a broad base of youth and a scarcity of the elderly. Demographic Transition can thus

[1] For research articles with several authors, a short sentence specifying their individual contributions can be provided here. The affiliations and contacts of the authors should NOT be reported here, but at the bottom of the last page.

be understood as the process that shifts society from one organized around an abundant presence of youth to one with a predominant weight of mature and elderly individuals.

In contrast to what the term "transition" implies, the significant ongoing change is not merely a translation of demographic system coordinates, transitioning from an old to a new equilibrium. The evidence suggests a continuous shift in the generational dynamic and within life phases: longevity continues to expand, and fertility universally tends to fall below the minimum replacement threshold between generations.

Within the context of this fundamental shift, there exists a wide divergence of experiences among various countries in the advanced stage of this process. Where, thanks to robust and consistent policies, fertility hovers around or slightly below two, the population tends to maintain a certain stability in both size and internal structure (as observed in the United States, France, and the Scandinavian countries).

Conversely, in countries where fertility persistently remains below the value of two, the population tends to steadily decrease, fueling internal imbalances that progressively intensify, as is the case in Italy (alongside other Southern European countries and those in the East Asia, particularly Japan and South Korea).

The objective of this contribution is to delineate the scenarios Italy faces regarding demographic imbalances, examining the available margins, both quantitatively and qualitatively, to mitigate the negative impact on economic development and the sustainability of the social system by mid-century.

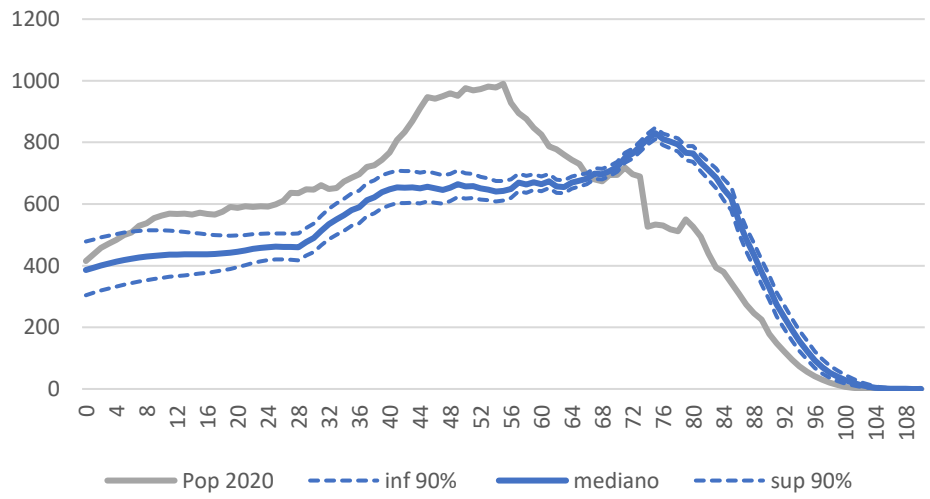
2. A country increasingly unbalanced

Demographic projections clearly highlight that in Italy the overall population will decline further and the population at older ages will increase. The scenarios from the latest Istat projections (Istat 2021) show that these two trends are the least uncertain aspects of our future. The share of those over 65, traditionally considered elderly residents, is projected to rise from about 14 million in 2021 to a range between 18 and 20 million by the middle of this century, with an incidence on the total population shifting from 23% to values between 34 and 36%. This is an unavoidable phenomenon resulting from the shift of the Baby Boomer generation (born between the late 1960s and early 1970s and therefore aged between 45 and 55 in 2020) into retirement age (Figure 1). In this case, there is no room to act on the numbers, i.e. the quantitative dimension (Rosina and Impicciatore 2022).

An ageing population inevitably faces an increase in the number of the more fragile age groups, which are more susceptible to the onset of severe and disabling diseases . The highest incidence of disability and chronic conditions among the

elderly necessitates a greater commitment in terms of care and healthcare. In Italy at the beginning of the third decade of the 21st century, nearly a third of those over 65 suffer from chronic and multimorbidity conditions, a figure that rises to nearly half among those over 85. About a third of those over 75 have a severe limitation of autonomy, affecting both personal care activities and for one in ten this affects both the daily activities of personal care and those of domestic life (Istat 2019). Even in the case of a reduction in disability rates, the condition of not being fully self-sufficient in the coming years will affect an increasing number of Italian citizens as a consequence of the absolute increase in the elderly population, becoming one of the main critical points for the country's economic sustainability, as also highlighted in the National Recovery and Resilience Plan (PNRR).

Figure 1 – *Population by age in 2050 (median scenario and 90% confidence interval) and comparison with 2020. Data in thousands.*



Source: elaborations on Istat population projections (base 1 January 2021).

The second and more immediate effect of aging is linked to the increasing pressure on pension spending. Our "pay-as-you-go" system stipulates that pensions are funded by contributions from currently employed individuals. The ratio between pensioners and workers is inevitably set to grow, as will the ratio between pension spending and GDP. In fact, according to the State General Accounting Office, the containment effect on pension amounts exerted by the gradual application of the contributory calculation system throughout one's entire working life will not be enough to offset the effects of ongoing demographic dynamics (Ragioneria Generale

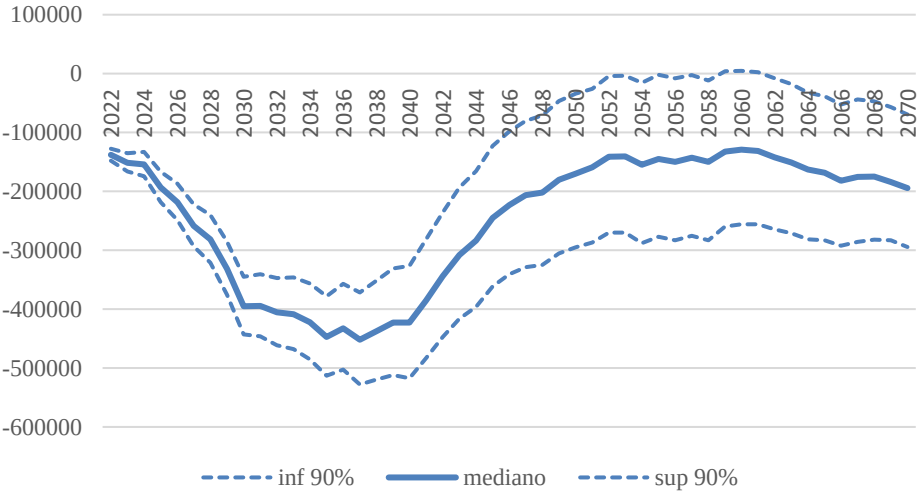
dello Stato, 2021). In the mid-2040s, total public spending (pensions, healthcare, and long-term care) will likely exceed 25% of GDP. The situation will change after 2050 when the gradual exit of the baby boomer generations under full contributory system operation will allow for a better sustainability of the ratio between pension spending and GDP. In the meantime, however, the cohorts entering the workforce may be further reduced without a reversal in birthrate trends, leading to a continuous downward spiral that would definitively compromise the country's trajectory even in the second half of the century (in such a case, progressively moving towards the worst-case scenario). Overall, while the aging process has been underway for some time, the decades leading up to the mid-century are certainly those in which the imbalance between generations in various life stages will be most pronounced whereas the outlook after the mid-century remains largely uncertain.

Italy has entered a new phase in its history not only due to the reduction of the overall population but also because of an unprecedented decrease in the active workforce (Impicciatore and Semenza, 2017). Istat projections indicate that, despite migratory flows, the contingent of potentially working-age individuals (15-64 years old) will decrease to an even greater extent, reaching an annual decrease between 350 thousand and half a million units in the 2030s (Figure 2). This constitutes a loss net of the considered positive migratory balance. The next two decades identify the phase of greatest impoverishment of the working-age population, while it is likely that towards the middle of the century, the intensity of the decline will subside. The criticality of the next twenty years emerges even when looking at the dependency ratio of the elderly, given by the ratio between the population over 65 and those in working age (15-64 years) (Figure 3). This index provides a measure of the economic-social dependency level between generations outside and within the working age. In Italy today, this stands at 37%, meaning there are about 2.7 individuals in the active age group for every individual of pensionable age. By 2050, this value is projected to rise to a range between 64 and 67, meaning for every individual over 65, there will only be 1.5 people in working age. It's worth noting that the degree of uncertainty is relatively low.

Based on these data, it may be interesting to focus on how many people will actually be employed. At the beginning of 2022, the number of employed individuals was around 23 million, and the employment rate, given by the ratio between the employed and the population aged 15-64, was close to 60%. According to projections by the State General Accounting Office, the employment rate would rise just above 66% in 2050. This leads, in any case, to a reduction in the number of employed individuals, which, according to the median Istat scenario, would be around 19 million (Ragioneria Generale dello Stato, 2021). Even considering the upper limit of the uncertainty range, the number of employed would still remain

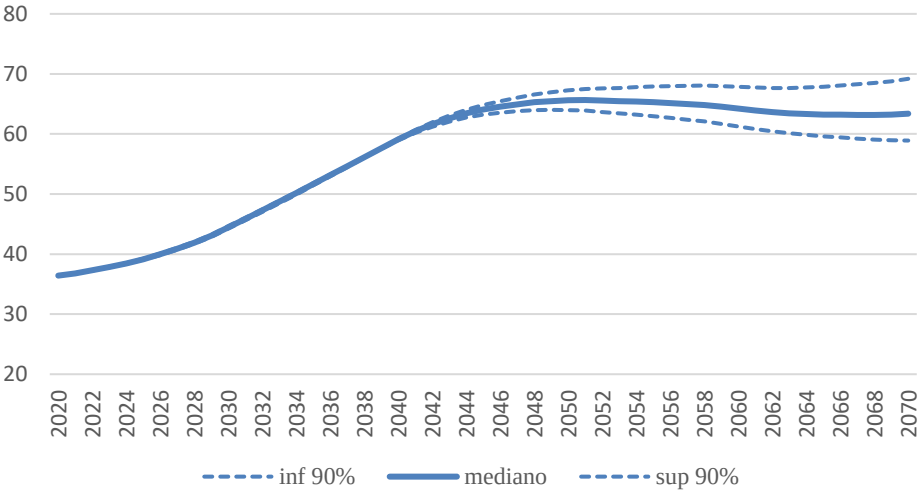
below 21 million, roughly 2 million fewer than current values (while carrying a considerably increased burden of elderly individuals).

Figure 2 – *Annual change in the number of individuals of working age (age 15-64) projected for the years 2022-2070.*



Source: elaborations on Istat population projections (base 1 January 2021).

Figure 3 – *Old age dependency ratio. Years 2020-2070.*

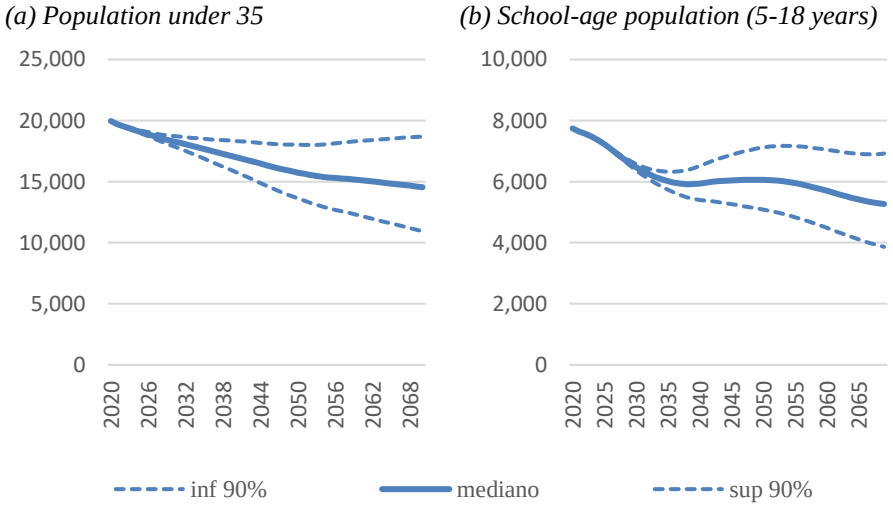


Source: elaborations on Istat population projections (base 1 January 2021).

Alongside the increase in the number of elderly people, Italy is facing an important contraction of the youthful population as a direct consequence of fertility well below the generational replacement threshold. This is a process set to continue in the coming years. However, it is important to note that in the forecasting phase, the uncertainty regarding the youngest age groups is greater as fertility assumptions play a determining role. The Istat median scenario indicates a loss of 4.2 million individuals under 35 by 2050 (Figure 4a). Nevertheless, this loss drops below 2 million when referring to the upper limit of the confidence interval. It would still represent a significant contraction but undoubtedly less dramatic. However, it is not excluded that the opposite extreme (lower limit) may occur, resulting in a loss of as many as 6.3 million.

A relevant indicator, also for educational planning purposes, is expressed by the number of young individuals of school age (Figure 4b). The decline in this component and its repercussions on the education system are one of the most immediate evidences that the decline in births is a pervasive phenomenon destined to produce tangible effects, which will be all the more profound the less we are able to govern and potentially counteract them.

Figure 4 – *Projected youth population according to Istat scenarios. Median scenario and 90% confidence interval. Years 2020-2070. Data in thousands.*



Source: elaborations on Istat population projections (base 1 January 2021).

3. Possible margins for action

3.1. Quantitative aspects

Italy shares with other Western countries the challenge of ensuring a good quality of life for the growing number of people reaching old age due to longevity (with adequate pensions, care possibilities, and assistance). This challenge can be positively addressed to the extent that the active population remains solid, as this component determines a country's capacity to generate prosperity, that is, to fuel economic development processes and make the social system sustainable (by financing and operating the welfare system).

It is in this regard that Italy appears most fragile. This places the new Italian generations at a competitive disadvantage compared to peers in countries they compete with due to the greater imbalances they must address (in the ratio between old and new generations, as well as between public debt and GDP).

For much of human history, society and the economy have operated based on a large base of young individuals and relatively few elderly. What is entirely new is the challenge of ensuring development and well-being in a world where young individuals become a scarce resource in the face of a continuous growth of the elderly population. The combination of low fertility and a reduction in the population during the family-forming age carries the risk of triggering a generational chain reaction: fewer parents, and subsequently even fewer children and future parents, a mechanism known as the "demographic trap" (Mencarini and Vignoli 2018).

Past birth dynamics have already produced an irreversible result: the Italian population has exhausted its endogenous growth capacity and is heading towards continuous decline. The balance between births and deaths turned negative towards the end of the last century, and it was then compensated by immigration. However, since 2014, not even the contribution of the foreign component has been able to counteract demographic decline (from that year until 2023, the loss was about one and a half million inhabitants).

What is at stake for Italy now is whether to resign itself to making the negative trend in births also irreversible. To avoid resignation, that is, to prevent the "demographic trap" that leads to an increasingly unstable structural configuration, an increase in fertility alone is not enough. The average number of children per woman must rise to levels that compensate for the reduction in potential mothers. In 2010, the average number of children per woman in Italy was 1.44, which allowed for 562 thousand births. The median Istat scenario (based on 2021 data) contemplates an increase in the total fertility rate to 1.44 children by 2039 (from the current 1.25), which, however, corresponds to a total of just 424 thousand births. With the same average number of children per woman, in 2039 we would have about 140 thousand fewer births compared to 2010.

Only the "high" scenario (the most favourable among those outlined in the latest Istat projections) still holds the possibility of containing imbalances in age structure and avoiding the "demographic trap." This scenario contemplates a combination of increased fertility up to 1.82 in 2050 (effectively approaching the highest levels in Europe, close to France's levels) and a migratory balance with foreign countries rising to 250 thousand (which corresponds to annual entries exceeding 350 thousand).

Increased fertility stabilizes the age group under 20 and prevents it from further decreasing, while immigration has its main effects on the crucial 20-54 age group, which, instead of losing almost 7 million inhabitants (in the worst-case scenario with migratory balance approaching zero), would limit the loss to 3.7 million (still within the scope of 2050).

In any case, this would not make the Italian population grow again; it is already in irreversible decline. However, the downward spiral mechanism would be deactivated, securing the structural basis of Italy's future with births returning to over 500 thousand. Furthermore, the reduction in potential workforce would be contained at levels that do not constitute a competitive disadvantage compared to other countries and can be compensated on the qualitative side (by investing, in particular, in a long active life and in employment opportunities for young people and women).

This scenario outlines a path similar to that of Germany, which in the last fifteen years has raised fertility from values lower than those in Italy to levels above the European average. German births went from 663 thousand in 2011 to 795 thousand in 2021. In 2011, the gap between Italy and Germany in terms of births was around 120 thousand, now it is about 400 thousand. Germany is the most interesting case of a country that has recently managed to reverse the trend by combining careful family policies with the ability to attract and manage migratory flows of individuals in working and reproductive age. In the decade preceding the pandemic, the average migratory balance was around half a million per year.

It is important to be aware that for the situation Italy finds itself in (a combination of persistent low fertility and a demographic structure tilted against new generations), the possibility of giving impetus to a solid new phase leading towards the high scenario can only be achieved by aligning with the best European experiences. European experiences tell us that economic aid is the most effective short-term effect for boosting births, as it allows for the unlocking - especially after a crisis and in conditions of uncertainty - of a choice that has been put on hold and continuously postponed. However, for this impulse to be coupled with an actual trend reversal process that continues in the medium to long term, there needs to be a solid improvement in services and tools in favour of families and in support of parental choices (with continuous monitoring and evaluation of effectiveness compared to expected results).

A recent report from the United Nations (World Population Policies 2021) shows that countries with pro-birth policies have surpassed those engaged in reduction worldwide. In the first case, these are countries with fertility rates below 2. In addition to maternity leave, the most widely adopted tool is that of fundamental childcare services for the reconciliation of work and family life (88%), followed by economic contribution (78%) and paternity leave (73%). Italy lags far behind the best international experiences in all of these measures (UN 2021).

It is not about convincing people to have children or creating psychological pressure on those who do not want to, but simply about favouring an ecosystem conducive to the free choice of having them. The margins on which family policies in Italy can act are wide, as the possible strategic space is that of the gap ("demographic deficit") between current fertility (1.25) and the desired number (around 2), or at least the value that the experience of other European countries shows as achievable (1.8). The data from the most solid research available on the comparison between intentions and behaviors (Beaujouan and Berghammer, 2019; Sobotka and Beaujouan 2014) show that Italy is among the developed countries with the greatest gap between the number of children that women at the end of their reproductive life (around 45 years) have had and what they declared they wanted when they were 20-24 years old.

No advanced mature country has seen this gap reduced without implementing solid measures and effective tools to support birth rates. Instead, the opposite can happen: the desired number can decrease in contexts where the lack of policies and public attention leads to consolidating the message that the birth of a child is not considered a social value but only a cost and a complication borne by parents. This is the risk for Italy.

The data from the Toniolo Institute's Youth Observatory highlight that the new Italian and European generations, by and large, desire to have children (biological or adopted), but they also feel free not to have them. They do not feel obliged to have them due to a biological imperative or to conform to a social norm, but they have the desire to share with them the pleasure of seeing them grow up in a context of security, with adequate care and well-being (Istituto Giuseppe Toniolo, 2023). These are the conditions that are most lacking in countries like Italy, which stand out for lower fertility and a continuous postponement of the age of having the first child. Having a child must be within the bounds of possible planning in the transition paths to adulthood for new generations, not positioned beyond a horizon that is continuously pushed further ahead until the threshold of renunciation. The lack of adequate measures to support autonomy and initiative (through housing and active labour policies) risks keeping many young Italians in the condition of children until an age where it becomes too late to become parents.

3.2. Qualitative aspects

Another key awareness that must be acknowledged is that it's not enough to address the quantitative reduction (through birth rates and immigration), but there's also a need for a qualitative strengthening of the contribution of the working-age population (starting with the new generations, across the entire territory, for both genders, as the foundation of a long active life). Even if fertility were raised to the highest levels and there were increased migration, Italy would still experience a reduction of approximately 3.7 million individuals in the 20-54 age range (almost 5 million across the 20-64 age range). Italy also has a significant margin for improvement in the efficiency of existing labor force utilization, particularly represented by the gap between youth and female employment compared to the European average.

In the crucial phase of transitioning to adulthood and building solid foundations for future paths, between the ages of 25 and 29, only two out of three people are employed (67.3%, according to Eurostat data from 2022). This is the lowest value in the entire European Union, where in the vast majority of member states, over three out of four young individuals are employed, and the EU-27 average is above 80%. This represents both a generational and gender disadvantage. In the 25-29 age group, the female employment rate in Italy is 53.9%, compared to a EU-27 value of 72.0%. In the overall 20-64 age range, Italy has the lowest female employment rate (55%) in the European Union (with an average of 69.3%), and the second largest gender gap (after Greece, at 19.7 percentage points) (Eurostat 2023).

In a systemic and integrated perspective, this qualitative improvement must be understood and implemented interdependently with the quantitative one. Improving young individuals' autonomy in housing and providing them with a solid entry into the workforce also allows for the formation of families and having children. Increased female employment, combined with reconciliation policies (at both the public and corporate welfare levels), leads to increased fertility and reduces the risk of poverty for families with children.

The management of immigration must also be considered part of a systemic action to structurally strengthen the country, with measures that help all gears integrate positively and move in the right direction. On one hand, immigration is a significant factor in addressing demographic imbalances and meeting business needs in many sectors. On the other hand, quality attraction is not possible without economic development and opportunities for work and social integration. What doesn't work in the school-to-work transition also penalizes (often even more) young immigrants. Similarly, deficiencies in work-family balance tools constrain the participation of both native-born and immigrant women in the labor market.

The response to quantitative imbalances (resulting from demographic dynamics) lies particularly in mechanisms that establish a positive relationship between life

stages and generations in society and the working world. The European Union and many developed world countries are increasingly promoting active aging. This concept refers to the process that allows for better quality of life and more enduring and satisfying participation in society and processes that generate collective well-being. This is in line with the perspectives of age Management regarding work and silver ecology regarding consumption and investment.

The extension of the retirement age must be accompanied by age management policies capable of making the prolongation of working life positive for individuals and productive for companies and organizations. However, these policies are struggling to take off in Italy. In the coming decades, the success of a company will depend more on the management of its workforce than on the provision of new technologies. As various studies highlight, by cultivating one's course of life adequately through its various stages, with necessary updates and a positive attitude, the majority of people tend to experience significant cognitive decline only after the age of 75 (Bordone et al 2020). This does not mean expecting a 60-year-old to be able to do the same things they did at 40, but it is true that a 60-year-old today can do better and more than a 60-year-old from twenty years ago. The basic principle is that the fruits of the labour of those over 55 are not something unchangeable and predetermined, but rather there is ample elasticity and room for improvement through proper management.

The collaboration between generations is becoming increasingly important. There are companies in Italy that have this approach and are excellence in their field. The aging of the population does not necessarily put mature workers in competition with the opportunities of new entrants. This only happens in economies that are not growing. If human capital is leveraged for development and innovation, raising the level of competitiveness of companies and organizations, growing opportunities are created that benefit everyone. Those contexts that are able to establish mutually stimulating, exchanging, and supporting relationships between different generations are the ones with the greatest potential for growth and competitiveness.

The impact of aging on consumption is also broad and profound and should not only be understood quantitatively (increased demand for products and services characterizing the so-called "Silver Economy"). There are lifestyle changes, preferences, and interests related to the new sense that individuals and society give to this new phase of life. However, the offerings from institutions and companies are still heavily deficient and too traditionally age-bound in this regard.

The combination of quantitative consistency of seniors, economic and time availability, higher levels of education, and the role of new technologies makes them a valuable resource within an aging society that still wants to remain dynamic on the social and cultural fronts. It is, therefore, strategic, especially for countries like Italy, that the increasing presence of the mature population is put in a position to become

increasingly enabled and enabling within the major cultural, social, and economic transformations underway. In this context, an interesting perspective is that of "Silver Ecology". It encompasses that part of the Silver Economy that concerns consumption and investments capable of promoting ecological transition in line with the objectives of Agenda 2030. But Silver Ecology also includes: volunteer activities that help reduce social and generational inequalities; civic engagement activities that help enhance culture, environment, and territory; in addition to the contribution that seniors can make within organizations through specific practices of transferring experiences and skills that improve the knowledge and actions of the new generations.

The data from a survey conducted in the early months of 2023 by AstraRicerche for the Senior Observatory on a representative sample of 1000 people aged between 60 and 75, highlights a wide awareness that seniors can significantly contribute to the economy through spending and consumption (this is the opinion of about 3 out of 4 seniors) and that they could contribute to promoting sustainable development (76.6%).

In the same perspective, the development of enabling new technologies (quality employment opportunities for new generations) that improve both long active life and mobility and safety in the home environment in advanced ages should also be considered. Investments in research and development driven by this demand increase quality employment in the most advanced sectors (especially valuing the human capital of the new generations) and strengthen and improve technologies that then extend to the entire population.

The central issue to address is, therefore, the strategies and actions necessary to prevent demographic imbalances from becoming unsustainable and to generate new well-being under conditions very different from those that allowed growth in the past. This is a challenge that needs to be approached from both a quantitative and qualitative perspective.

The combination of these data and the developed considerations makes it clear that there are no easy answers. However, it also emphasizes that seizing the challenge that demographics pose and acting in an integrated way on these fronts not only allows for addressing structural imbalances but also enables families to make their own life choices, young individuals and women to find full realization, companies to combine attention to worker well-being and productivity, and the country's system to reduce generational, gender, and social inequalities to unleash its potential to the fullest.

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MEASURING THE AGEING OF ITALIAN POPULATION WITH COMPOSITE INDICATORS USING MUNICIPAL DATA FROM THE DECENNIAL POPULATION CENSUSES[1]

Gennaro Di Fraia, Valeria Quondamstefano, Mariangela Verrascina

Abstract. The aim of this study is to summarise the measures of Italian population ageing obtained from the results of the 2001, 2011 and 2021 decennial censuses by composite indicators. The goal is to analyse similarities and differences in the ageing behaviour of Italian municipalities in an attempt to identify trends over 20 years through the 'pictures' taken in Italy with the Censuses. The 2001 Census was the last one carried out in the traditional way, door-to-door with enumerators handing out paper questionnaires to all households. In 2011, some innovations were introduced: the mailing of questionnaires, the possibility of web-filling and the intervention of the enumerators only in the final phase of non-response recovery. Since 2018, the Census, carried out annually on a sample of municipalities and households, has become continuous, i.e. Permanent. Although the survey is a sample survey, the results are referred on the entire population, thanks to the integration of the data collected in the field with those in the available archives. Some indicators concerning the structure of the population are considered. The territory considered is the municipal territory as of 2021. In order to perform a temporal and spatial analysis highlighting differences and similarities between the municipalities, the composite Adjusted Mazziotta Pareto Index (AMPI) is used. A classification of the municipalities is then performed using the CHAID (Chisquared Automatic Interaction Detector) classification tree, incorporating geographic-territorial-demographic elements into the analysis. Finally, a focus on territories that can be considered case studies: the metropolitan city of Naples and the municipality of Naples.

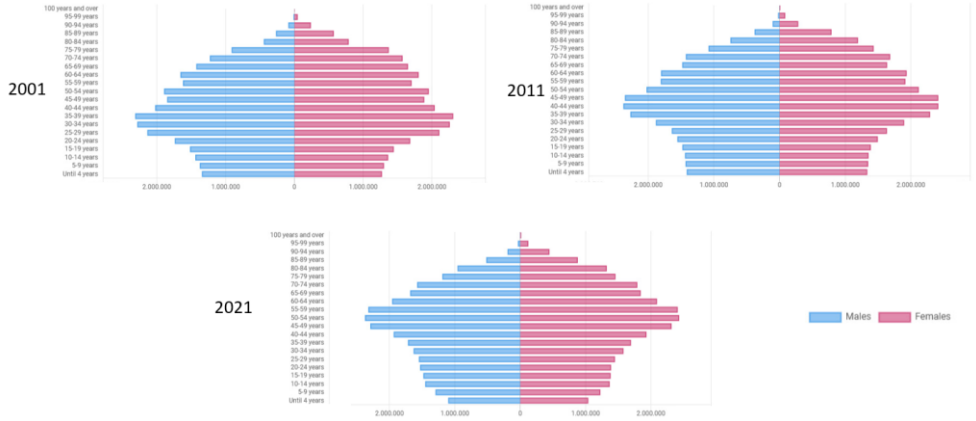
[1] The article exclusively expresses the opinions of the authors. Gennaro Di Fraia wrote paragraph 2.2, Valeria Quondamstefano paragraphs 1, 3, 4 and 5 and Mariangela Verrascina paragraph 2.1. Paragraph 6 was written jointly by the authors and is not divisible.

1. Introduction

Population ageing is now an inevitable process in many developed countries, and Italy is, as is well known, among the countries in the world and Europe that have aged the most in recent decades. "In European countries, many territories have experienced and are still experiencing a depopulation, caused by a deficit of births relative to deaths, a negative net migration, or both" (Reynaud and Miccoli, 2018).

This work focuses on the structure of the Italian population over the last 20 years. The aging of the Italian population is due to the effect of a unique age structure: the cohorts formed during the period of high birth rates (the famous years of the baby boom) are reaching the top of the age pyramid, effectively exiting the reproductive cycle, while the cohorts of newborns are indeed becoming smaller (in 2021, the total number of births was 400,249, the record low birth rate). (Figure 1).

Figure 1 – *Age pyramid of Italian population (years 2001, 2011, 2021).*



Source: Processing of ISTAT data

Since the beginning of the new millennium, there has been increased attention on the impact of demographic transformations, especially on healthcare and pension expenditure. The definition of 'elderly' or 'old person' is a debated topic in the scientific community. Traditionally, the age of 65 has been used as a threshold to define the onset of old age, partly linked to the conventional definition of retirement age. However, with demographic changes and increasing life expectancy, the question has arisen whether this threshold is still appropriate. It has been suggested considering factors such as health status, physical and cognitive function, and overall quality of life (Walker and Maltby, 2012). Our analysis embraces tradition, considering 65 years of age as the threshold (still currently

prevailing on average) for retirement. Looking at the lower end of the age pyramids, there have been changes in recent years in the female population of childbearing age, conventionally defined as between 15 and 49. Within this age group, there are fewer and fewer Italian women. On the one hand, women born between the second half of the 1960s and the first half of the 1970s have almost completely exited the reproductive phase. On the other, the younger generations are becoming smaller. The latter generations are experiencing the effect of the so-called 'baby bust', which refers to a significant drop in fertility between 1976 and 1995, when the number of children per woman was at an all-time low of 1.19.

This study examines the latest three decennial Censuses (2001, 2011, and 2021) of the population to better understand the trend of population aging in Italy, considering both the increase in life expectancy and the decrease in birth rate over time. Given the multidimensionality of the concept of aging, this study utilizes the potential of composite indicators theory (Adjusted Mazziotta Pareto Index, AMPI) and classification trees (Chisquared Automatic Interaction Detector, CHAID) assess the exponential advancement of the phenomenon, both at the national level and in specific geographic areas. In particular, cartography is used to visualize the results in a clear and intuitive manner. The composite indicators theory allows for the combination of different demographic and social variables into a single indicator, providing an overall assessment of population aging. On the other hand, classification trees help identify the main factors contributing to aging and to understand how the phenomenon has developed over time.

2. Data source

2.1. Decennial censuses

The aim of this study is to highlight the trends over 20 years through the ‘pictures’ taken in Italy with the Population Censuses. Traditionally, the census was based on the fundamental characteristics of individual enumeration, simultaneity, universality and defined periodicity. Therefore, analysis at fine territorial detail (municipal and sub-municipal) was only possible every 10 years, during census rounds.

Since the Unification of Italy, population censuses in Italy were conducted in years ending with ‘1’ (with a jump in 1891 due to an economic crisis and 1941 due to the war and with the exception of the 1936 ‘small Census’). The 2001 Census was the last one conducted in the traditional way, door-to-door with enumerators handing out paper questionnaires to all households. The 2011 Census already introduced some innovations, with the questionnaires being sent by mail, the

possibility of web filling, and with the intervention of the enumerators only in the final phase of non-response recovery.

The effort and large economic investment involved in a huge 'one-shot' operation every 10 years meant that the data was processed and disseminated with little timeliness. By the time the data were published, they were already 'dated', although they were the only ones in Italy that allowed for municipal and sub-municipal analyses. For economic reasons and the need to provide more timely data, the new strategy was introduced in 2018, and the Census became Permanent.

Unlike the censuses of the past, Permanent Censuses involve only representative samples of the population from time to time. However, the return to the country of the data obtained is census-like. This is made possible by the integration of administrative sources with sample surveys, so as to ensure exhaustiveness, increase the quantity and quality of information supply, contain the statistical burden on citizens and reduce overall costs.

The objective is to show how analysing the data available every 10 years reveals large variations and overlooks the variations recorded in the short term (those variations that emerge with the results of the Permanent Census). Annual dissemination makes it possible to identify and monitor from year to year subgroups of the population or territories in distress, situations of criticality and greater vulnerability in order to launch promptly intervention on certain phenomena. In particular, in our case, the phenomenon of ageing is investigated.

2.2. Individual indicators

From the results of the latest three decennial Censuses (Istat, 2003; Istat, 2013; Istat, 2022) of the population, some demo-social indicators are calculated. The individual indicators are derived from information regarding the age structure of the population:

(A) Percentage of population aged 0-17 years. Ratio of the population aged 0-17 years to total population (percentage). The indicator measures the share of population under 18 in the total population. The Italian value of this indicator fell by 1.6 point between 2001 (17.2%) and 2021 (15.6%);

(B) Old age dependency ratio. Ratio of population aged 65 years and over to population aged 15-64 years (percentage). This ratio indicates how many people aged 65 and older there are for every 100 individuals of working age. It has economic and social relevance: in fact, it relates people who are not self-sufficient for demographic reasons (age) - in our case the elderly - to the people who are supposed to support them. In Italy, between 2001 and 2021, this ratio has increased by 9.6 point: from 27.8% to 36.5%;

(C) Childbearing per fertile woman. Ratio of population aged 0-4 years to woman female population aged 15-49 years (percentage). It is calculated

by relating the number of children aged 0-4 years and women in the 15-49 age group. The sociodemographic significance derives from the fact that this indicator estimates the 'load' of preschool children per woman of childbearing age, that is, at an age when, especially in more economically developed countries, there is a higher frequency of working women also engaged in childcare. Between 2001 and 2021, the value of this indicator dropped by 0.9 point (from 19.1% to 18.2%);

(D) *Percentage of women 15-49 years.* Ratio of female population aged 15-49 years to total female population (percentage). The indicator measures the share of women of reproductive age in the total female population. This share, from 2001 to 2021, decreases from 46.7% to 38.9%;

(E) *Aging index.* Ratio of population aged 65 years and over to population aged 0-14 years (percentage). Represents an indicator of the degree of aging of the population. It is obtained by relating the elderly population (over 65 years old) to the young population (up to 15 years old). When a population ages there is, at the same time, a decrease in the weight of the very young: this leads to an increase in the value of this index. In the 20 years analysed in this paper, this indicator grew by 56.2 points: 131.4% in 2001 and 187.6% in 2021;

(F) *Population turnover index.* Ratio of population aged 0-29 years to population aged 65 years and over (percentage). The indicator estimates the degree of generational turnover of a population, in which the population in the age group of zero to 29 years and the elderly population (65 and over) are related. Between 2001 and 2021, this indicator dropped by 60.1 point (from 176.0% to 115.9%).

3. Methodology

3.1. Composite Indicators

In order to synthesize the individual indicators in a unique measure, a composite indicator is used. The Adjusted Mazziotta-Pareto Index (AMPI) is a partially non-compensatory composite indicator based on a standardization of the individual indicators, at the reference time, that makes the indicators independent from the unit of measure (De Muro *et al.*, 2011). Therefore, all the individual indicators are assigned equal weights and absolute time comparisons are allowed (Mazziotta and Pareto, 2016). In fact, a re-scaling of the individual indicators in the range (70; 130) according to two 'goalposts' is proposed, i.e., a minimum and a maximum value which represent the possible range of each variable for all time periods and for all units. The 'price' to pay for comparable scores over time is that indicators

with different variability are aggregated. However, the normalised indicators in an identical range have a much more similar variability than the original ones (Mazziotta and Pareto 2013).

3.2. Classification trees

The method of sorting the municipalities by AMPI is interesting and can provide information on the evidence of the phenomenon. However, a more systematic approach is needed that can classify municipalities considering the ageing composite indicator as a function of some covariates. In this perspective, a good classification method is the Chisquared Automatic Interaction Detector (CHAID), a multiple tree statistics algorithm that allows the data to be visualised quickly and efficiently, creating segments and profiles according to the results. In particular, the AMPI is the dependent variable, while the independent variables are the administrative subdivisions (Geographical area, Region, Province/Metropolitan City) some geographic characteristics (Altitude zone, Population density) and some demographic characteristics (Degree of urbanisation, Demographic size of municipalities class). For the classification of Degree of urbanisation, the Eurostat definition was followed (Eurostat, 2019).

4. Main results

4.1. Descriptive data analysis

The first step of analysis concerned correlations. The correlation analysis shows how the AMPI is highly correlated (positively or negatively) with individual indicators (more than 0.75), except for Childbearing per fertile woman (Figure 2).

The second step was to identify which indicator was the most influential for the construction of the ranking of Italian municipalities according to ageing. For the first two years under consideration, the indicator that on average moves the most positions is 'Percentage of Population aged 0-17 years' (298 and 236 respectively), while for 2021 the indicator 'Childbearing per fertile woman' (290). The least influential indicator in the 3 census years is the 'old age dependency ratio' (10, 15, 20 positions shifted on average in the ranking of municipalities).

Figure 2 – *Correlations analysis among individual indicators and AMPI (years 2001, 2011, 2021).*

2001

Correlations	A	B	C	D	E	F	AMPI
A	1.000	-0.688	0.566	0.744	-0.692	0.824	-0.911
B	-0.688	1.000	-0.348	-0.918	0.782	-0.778	0.903
C	0.566	-0.348	1.000	0.287	-0.421	0.449	-0.564
D	0.744	-0.918	0.287	1.000	-0.724	0.829	-0.919
E	-0.692	0.782	-0.421	-0.724	1.000	-0.572	0.793
F	0.824	-0.778	0.449	0.829	-0.572	1.000	-0.906
AMPI	-0.911	0.903	-0.564	-0.919	0.793	-0.906	1.000

2011

Correlations	A	B	C	D	E	F	AMPI
A	1.000	-0.789	0.488	0.794	-0.774	0.858	-0.937
B	-0.789	1.000	-0.305	-0.901	0.846	-0.811	0.929
C	0.488	-0.305	1.000	0.276	-0.368	0.356	-0.492
D	0.794	-0.901	0.276	1.000	-0.731	0.854	-0.929
E	-0.774	0.846	-0.368	-0.731	1.000	-0.626	0.835
F	0.858	-0.811	0.356	0.854	-0.626	1.000	-0.908
AMPI	-0.937	0.929	-0.492	-0.929	0.835	-0.908	1.000

2021

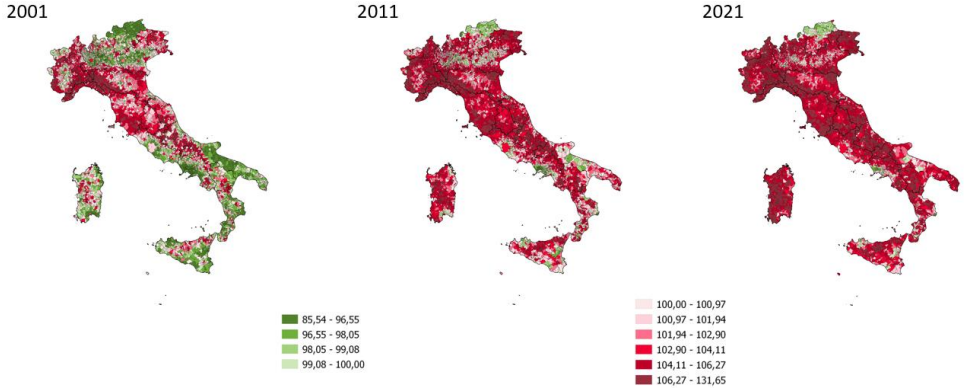
Correlations	A	B	C	D	E	F	AMPI
A	1.000	-0.79	0.556	0.803	-0.732	0.877	-0.944
B	-0.79	1.000	-0.362	-0.882	0.715	-0.862	0.913
C	0.556	-0.362	1.000	0.318	-0.413	0.46	-0.586
D	0.803	-0.882	0.318	1.000	-0.649	0.869	-0.91
E	-0.732	0.715	-0.413	-0.649	1.000	-0.599	0.786
F	0.877	-0.862	0.460	0.869	-0.599	1.000	-0.924
AMPI	-0.944	0.913	-0.586	-0.91	0.786	-0.924	1.000

Indicators	Meaning
A	Percentage of Population aged 0-17 years
B	Old age dependency ratio
C	Childbearing per fertile woman
D	Percentage of Women 15-49 years
E	Aging index
F	Population turnover index

4.2. AMPI ranking results

The aim of the work is to compare the levels of ageing in Italy in space and time. Ageing results calculated on a municipal basis, considering the Italian territory as of 31 December 2021 (7,903 municipalities), were compared over 20 years. The base year considered was 2001. Figure 3 shows the map of Italian municipalities according to the value of ageing, calculated by AMPI method.

Figure 3 – *AMPI ranking: Maps of Italian municipalities (years 2001, 2011, 2021).*



The map highlights municipalities with a low level of population aging using a dark green color. As the intensity of the green color becomes lighter, the aging phenomenon increases in intensity, eventually transitioning to shades of red. The darker the color, the higher the level of aging in those areas.

It is evident that over the course of 20 years, the level of population aging in Italy has exponentially increased, even in areas that have traditionally been

considered less affected by this phenomenon. If in 2001, only certain areas of Italy had high levels of population aging (particularly in Liguria and neighboring areas), by the time we reach 2011 and 2021, the phenomenon has spread extensively. In 2001, the base year of the analysis, 40.0% of Italian municipalities had a value of AMPI equal to or below 100. In 2011, this percentage dropped to 11.7%, and in 2021 it further decreased to 4.6%. These percentages indicate a significant surge in population aging during the 2001-2011 decade. In 2021, only the autonomous province of Bolzano/Bozen had a percentage of municipalities below the value of 100 that exceeded 50% (66.4%).

4.3. Chisquared Automatic Interaction Detector (CHAID) results

As mentioned above, the CHAID, using the composite AMPI index as the dependent variable and some administrative-geographic-demographic indicators as the independent variables, makes possible to identify groups of municipalities with similar AMPI index values. Figure 4 shows the results of the best and worst nodes in every year of observation.

Figure 4 – *The best and worst nodes (years 2001, 2011, 2021).*

EDITION	2001	2011	2021
BEST NODE	NODE 32	NODE 23	NODE 15
	1-Degree of urbanisation: Urban Audit cities	1-Degree of urbanisation: Urban Audit cities	1-Demographic size of municipalities class: 2,001-5,000 and 100,001 and over
	2-Region: Campania	2-Region: Campania	2-Province/Metropolitan City: Bolzano/Bozen
	Number of municipalities: 77	Number of municipalities: 77	Number of municipalities: 51
WORST NODE	NODE 69	NODE 45	NODE 60
	1-Degree of urbanisation: Rural areas	1-Degree of urbanisation: Rural areas	1-Demographic size of municipalities class: up to 500
	2-Province/Metropolitan City: Alessandria, Genoa, La Spezia	2-Population density: up to 35 persons per km2	2-Population density: up to 20 persons per km2
	3-Population density: up to 35 persons per km2	3-Region: Liguria, Emilia-Romagna	3-Region: Liguria, Friuli-Venezia Giulia, Emilia-Romagna, Lazio, Campania, Abruzzo, Molise, Puglia, Basilicata, Calabria
	Number of municipalities: 68	Number of municipalities: 61	Number of municipalities: 169

77 municipalities, where at least 50 per cent of the population lives in one or more urban centres of the Campania were found to be the best node at the AMPI level of ageing. Basically, these municipalities, on average, had the best level of the composite indicator for 2001 and 2011. In 2021, the situation changes: 51 municipalities in the Autonomous Province of Bolzano/Bozen with a population between 2,001 and 5,000 inhabitants or more than 100,001 inhabitants will be the least 'old' municipalities.

The situation becomes more complex for municipalities with a high level of population aging. In 2001, 68 municipalities in rural areas of the provinces/metropolitan cities of Alessandria, Genoa, and La Spezia, with a population density of up to 35 inhabitants per kmq, had the highest average level of

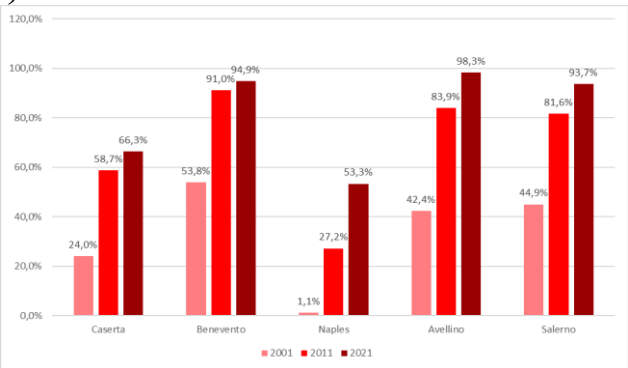
AMPI (an index measuring population aging). In 2011, 61 rural municipalities with less than 35 inhabitants per kmq in the regions of Liguria and Emilia-Romagna were at the forefront in terms of population aging. In 2021, an even higher number of 169 municipalities, with a demographic size class of up to 500 inhabitants and less than 20 inhabitants per kmq, in the regions of Liguria, Friuli-Venezia Giulia, Emilia-Romagna, Lazio, Campania, Abruzzo, Molise, Puglia, Basilicata, and Calabria, were on average the 'oldest'. These results demonstrate how the phenomenon of population aging has spread across the entire Italian territory over the past two decades.

5. Territorial insights

5.1. Campania

Given the results generated by the classification trees, a focus was placed on the Campania region to understand the evolution over time of population aging in what was once the most virtuous territory (i.e., the least 'old') in Italy. Figure 5 displays, in percentage, the number of municipalities in each province of Campania that, in the three examined censuses, had an AMPI value higher than 100 (the baseline value for Italy in 2001).

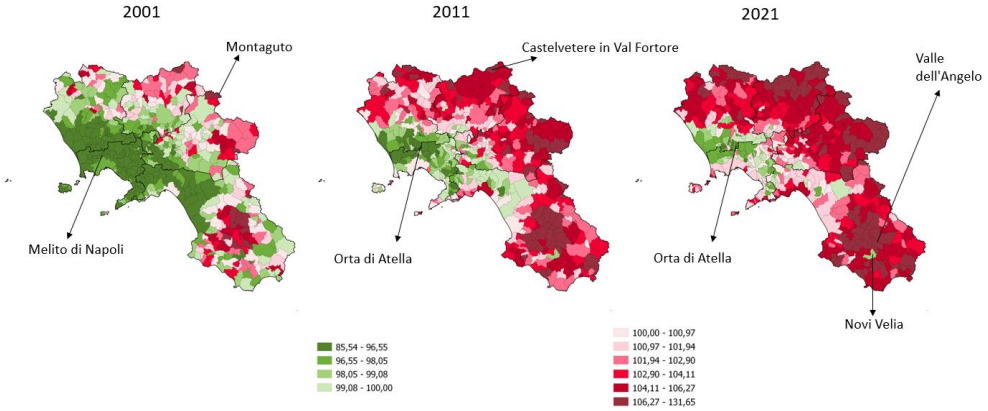
Figure 5 – *Percentage of municipalities with an AMPI value > 100 (years 2001, 2011, 2021).*



In 2001, only the province of Benevento had more than half of its municipalities (53.8%) with an AMPI level higher than 100. After 10 years 3 provinces (Salerno, Avellino and Benevento) have more than 80.0% of municipalities with an AMPI value > 100; the same provinces at the end of the 20-year period of analysis have more than 90.0% of municipalities with an AMPI value above 100.

Figure 6 shows the aging trend in the municipalities of Campania.

Figure 6 – *Map of the aging trend in the municipalities of Campania (years 2001, 2011, 2021).*



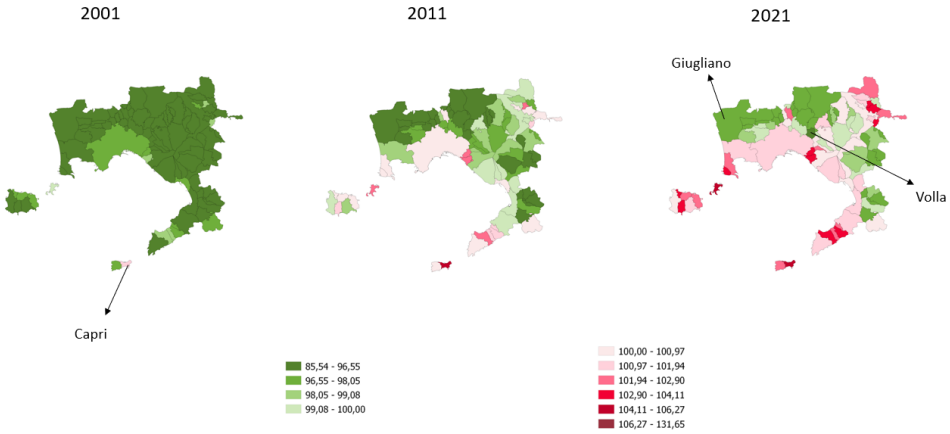
The worst Ampi value in 2001 (111.54) was in Montaguto (AV), in 2011 (113.24) in Castelvetere in Val Fortore (BN), in 2021 (115.98) in Valle dell'Angelo (SA). The best Ampi value in 2001 (85.54) was in Melito di Napoli (NA), in 2011 and 2021 (90.36, 92.89) in Orta di Atella (CE). The widest gap was recorded between 2001 and 2011 in the province of Salerno (+41.5%), between 2001 and 2021 in the province of Avellino (+55.9%).

5.2. Metropolitan city of Naples

From the results obtained in the analysis of AMPI in Campania, it was immediately noticed the uniqueness of the municipalities in the metropolitan city of Naples, with values of the index exceeding 100 by 1.1% in 2001, 27.2% in 2011, and 53.3% in 2021. Figure 7 shows the aging trend in the municipalities of metropolitan city of Naples. In 2001, Capri was the only municipality with an AMPI value > 100 and for all years under analysis had the worst AMPI value (101.11, 104.38, 106.17). The best Ampi value in 2001 and in 2011 was in Melito di Napoli (85.54 and 93.27 respectively), in 2021 in Volla (96.22). The municipality of Naples has a similar AMPI value between 2011 and 2021 (100.81 vs 100.82). Volla is the only one municipality to have an AMPI value within the first decile in all years (87.34; 94.46; 96.22). No island municipality in 2021 has an AMPI value < 100. Giugliano in 2021 is the only one costal municipality to have an AMPI value > 100. No municipality has a higher AMPI value in 2001 than in 2011.

Looking at the population figures over the last 20 years, a very slight decrease can be seen: from 3,059,196 in 2001 to 2,988,376 in 2021. The population by age shows that individuals over 64 years of age have increased by 6.7%, from 12.5% to 19.2% of the total population. Furthermore, women of childbearing age decrease from 51.1% in 2001 to 43.1% in 2021. All this could suggest that ageing in the metropolitan city of Naples is actually due to the phenomenon of a decline of births compared to deaths. Migration phenomena and their impact on the population structure could be analysed although "The effect of migration on population aging is generally regarded as minor in most situations […] So, the demographic dynamics has caused and will continue to cause population aging, which is the increase in the population above the age of 65 in absolute terms, both as compared to the younger population and as a proportion of the total population." (Reynaud and Miccoli, 2018).

Figure 7 – *Map of the aging trend in the municipalities of metropolitan city of Naples (years 2001, 2011, 2021).*



6. Conclusions and Next Steps

The phenomenon of population ageing at municipal level, using data from the traditional Population Census, provided a snapshot of the Italian situation at a ten-year interval. If it had been possible to access annual data, as the new Permanent Population Census allows, understanding population ageing at municipal level would have been more efficient. Indeed, it could have facilitated the identification of demographic changes and supported the implementation of more timely and effective policies to address the challenges associated with an ageing population.

This study could be further developed by comparing the trend of Italians and foreigners in the territory, expanding the set of elementary indicators used (e.g. Labour Force and Education) and by analyse internal and international migration. Furthermore, one could study ageing as a function of other territorial classifications (e.g. Local Employment Systems, Ecoregions, Inner Areas).

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THE AGEING OF THE POPULATION IN URBAN CONTEXTS: A STUDY ON ITALIAN METROPOLITAN CITIES [1]

Donatella Cangialosi, Debora Tronu, Daniela Vacca

Abstract. Population ageing is a multidimensional phenomenon that involves social, cultural, and economic aspects. It is a global process, although some countries are more affected than others. Among the most developed countries, Italy is notably characterized by the rapid ageing of its residents. The aim of this analysis is to examine the phenomenon of ageing in the 14 Italian metropolitan cities, which are prominent hubs of demographic attraction and regions marked by significant urbanization. The goal is to comprehend the evolution of this phenomenon compared to the past and the next decade, highlighting differences between urban areas and their surrounding regions. Particular emphasis is put on the changes in demographic components, while taking into account the factors influencing the current demographic landscape. Cluster analysis is also utilized in order to facilitate the formation of homogenous territorial groupings and to gain a deeper understanding of this phenomenon.

1. Introduction

The demographic trend of ageing is a global phenomenon with different characteristics among countries. Italy is one of the "oldest" countries in the world, with a much faster ageing process than in the rest of Europe. As early as the 1970s, demographic studies alerted to the social and economic consequences of this phenomenon (Golini, 1997). It is the consequence of multiple causes such as a gradual decline in fertility and in the number of women of childbearing age, that affects birth rates; the achievement of ever-longer survival; and also a contradictory effect of migration. This last aspect consists of a component that emigrates, mostly the young, which intensifies ageing; and a component that enters the country, which contributes to increase the younger cohorts (Reynaud *et al.*,

[1] The paper has been jointly written by all the authors but § 1and 2 can be attributed to D. Cangialosi. § 3 e 4.1 to D. Tronu, § 4.2 to D. Vacca, § 5 all the authors. Maps in ArcGis have been created by E. Patruno, indicators have been calculated by V.F. Bellafiore.

2018). In addition, the parallel decline in mortality has contributed to a slowdown in generational turnover. Added to this is the effect on the age structure resulting from the periods of high birth rates, the so-called baby booms, that occurred between the 1960s and 1970s: substantial generations were formed that today represent a significant demographic legacy on the older segments of the population.

The dynamic factors of a population, being functionally related to its age structure, have determined irreversible effects over time. The imbalance in the age structure of the Italian population has increased, leading to a prevalence of the elderly over the young that may represent a risk factor for the sustainability of the country's system (Istat, 2019). On the other hand, over the past two decades, the migration flow has contributed to population growth, partly due to the entry of foreign individuals into the country, thus mitigating the demographic decline. Today, however, fewer foreigners decide to stay permanently in Italy, which represents mainly a transit country, as in the case of asylum seekers and humanitarian protection (Istat, 2020c). Ageing is a complex, multidimensional demographic process involving social, cultural, and economic aspects. It is also the result of the general improvement of living conditions regarding health, hygiene, nutrition, and care (Istat, 2020a). An ageing population requires an adjustment of the social system to ongoing changes and new needs, as well as public policy interventions to plan the proper use of economic resources. Public funds need to be directed more toward services and support networks for the elderly segment of the, especially at the stage when they no longer benefit of autonomy and good health. The effects that the increasing share of the elderly population will have on the sustainability of the social and economic system in Europe have been debated in literature (Kashnitsky *et al.*, 2017), in particular with respect to the negative impact on pension systems (Ediev, 2014), social and health care (Golini *et al.*, 2003), and public and personal transfers to the elderly.

In this framework, the analysis of ageing population is focused on the most urbanised contexts in Italy, namely the 14 metropolitan cities. The rest of the document is organized as follows. In section 2, the spatial domain is introduced, and its internal structures are identified based on a criterion of spatial contiguity (capital cities, municipalities in the first and second belts and other municipalities of metropolitan areas). Section 3 is devoted to a description of data and methods employed. Section 4 is split in two subsections. In the first, a descriptive analysis is performed by means of a set of socio-demographic indicators at municipal level, with the aim to draw a profile of the ageing of the population and to grasp its evolutionary aspects, in both cases with respect to the time dimension, so highlighting the peculiarities and differences between urban contexts and their internal articulations. In the second, a cluster analysis is applied to the selected municipal indicators with the aim of deepening the study and arriving at an

informative synthesis based on significant clusters of municipalities, in order to draw a summary profile and offer further opportunities for interpreting the results. Finally, in section 5 results are briefly discussed, as well as suggestions for further investigations.

2. The territorial domain

The phenomenon of ageing is even more reinforced in urbanized contexts, so it was deemed interesting to analyse it from the perspective of metropolitan territory. Italian metropolitan cities were established by Law No. 56 of April 7, 2014. They are territorial entities resulting from the aggregation of neighbouring municipalities metropolitan Cities replaced provinces in ten urban areas of regions with ordinary statutes, and their territories coincide with those of former provinces: Torino, Milano, Venice, Genova, Bologna, Firenze, Roma, Bari, Napoli, and Reggio Calabria. Four metropolitan cities from special statute regions were later added, after having adapted their internal regulations to the principles of the law: Palermo, Catania, Messina, and Cagliari. Metropolitan cities have three main general institutional purposes: a) to take care of the strategic development of the metropolitan territory; b) to promote and integrate management of the metropolitan city's services, infrastructure, and communication networks; c) to take care of the institutional relations, including those with European cities and metropolitan areas (Camera dei Deputati, 2022). This new level of governance provides the territory with a new instrument of local government and generates new opportunities of development for the citizens. The territories involved have different peculiarities due to their physical conurbation and geographical location, demographic and social conditions and economic potential or disadvantages. The emergence of these areas is the result of a long regulatory path that defined the boundaries from an administrative point of view. At the same time, there are economic and territorial links that influence the definition of such cities. These aspects allow a more precise understanding of the socioeconomic evolution of the territories, since the changes that occur in urban areas are linked to the residential choices of the inhabitants and to the increase of productive settlements in the urban belts. The geography of metropolitan cities offers a direct representation of Italy's major urban centres: the city, a large urban agglomeration of national importance and declined as a pole, stands out surrounded by an aggregate of municipalities gravitating around it (Istat, 2020b). Therefore, the urban territory consisting of the capital municipality and the articulation of urban belts have been identified, allowing the observation of the dynamics of city evolution. Urban belts are identified basing on a criterion of territorial contiguity: the first belt consists of municipalities contiguous to the

capital municipality, that is, sharing its boundary at least at one point; the second belt consists of municipalities contiguous to those in the first belt. The remaining municipalities in the metropolitan area make up the outer ring (Istat, 2020b). In Italy, there are 1,268 municipalities belonging to the 14 metropolitan cities, with 14 capitals, 177 first-belt municipalities, 213 second-belt municipalities, and 864 municipalities in the outermost ring of the territory.

3. Data and methods

Population ageing in metropolitan areas is analysed through a set of indicators describing the main socio-economic characteristics of the population and some aspects of the economic structure. The selected indicators reconstruct the profile of the Italian urban contexts, consisting of the metropolitan cities and their belts, with respect to the most relevant dimensions for the analysis of ageing, such as the structure and demographic dynamics of the population, and other context components closely related to the socio-economic conditions of the population, such as the level of education, labour market participation, and the density of economic activities (Table 1).

Table 1 – *Indicator by territorial sub-domains of metropolitan cities.*

Indicator	Definition	Source	Time
Change in Population	$(Pop._{t} – Pop._{t-1}) / Pop._{t-1} * 100$	Istat	2001-2031
Old age index	(Population over 64 years / population under 15 years) * 100	Istat	2011, 2023, 2031
Old age dependency index	(Population over 64 years + population under 15 years)/ population 15-64 years * 100	Istat	2011, 2023
Mean age	Mean age of the population	Istat	2023
Birth rate	(Live births in the year / average of population) * 1000	Istat	2011, 2023
Natural growth rate	(Births – deaths in the year) / average of population) *1000	Istat	2011, 2023
Migration growth rate	(Immigrants - Emigrants in the year / average of population * 1000	Istat	2011, 2023
People with tertiary education (25-64 years)	(People aged 25-64 with tertiary education / population) * 100	Istat	2020
Employment rate (25-64 years)	(Employed 25-64 years old / population) * 100	Istat	2019
Density of local unit	(Local unit / population) * 1000	Istat	2020

The indicators are calculated in time series for the four territorial sub-domains of the 14 metropolitan cities (capital municipalities, first and second belt municipalities, and other metropolitan city municipalities) and updated to the municipal boundaries as of 1 January 2023. The territory analysed covers 1,268 municipalities (16% of Italian municipalities) and an area of 46,637 square kilometres (15.4% of the national surface area).

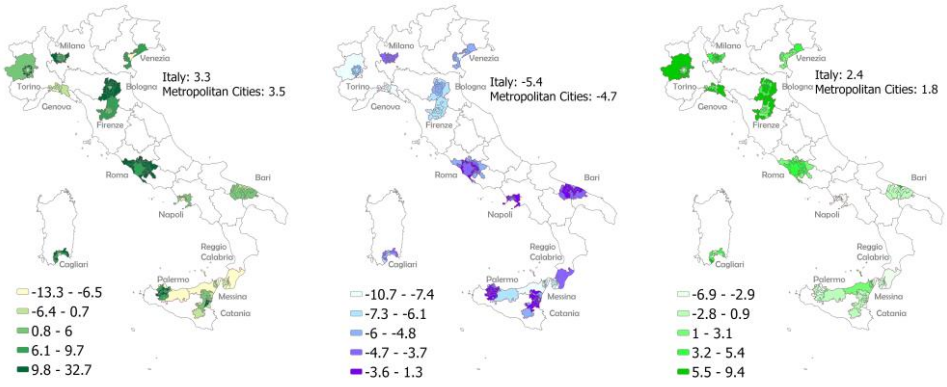
4. Results and methods

4.1. Descriptive analysis

The resident population in the metropolitan areas on 1 January 2023 amounts to approximately 21.3 million and covers a share of just over one-third of the Italian population (36.2%). Almost half of the total population of the metropolitan cities, 43.2%, resides in the 14 capital municipalities, 18.2% in the first belts, 14.3% in the second belts, and 24.3% in the remaining metropolitan territory.

Figure 1 – *Change in Population (%), Natural growth rate and Migration growth rate (‰) in the metropolitan cities.*

Change in Population 2001-2023 Natural growth rate 2022 Migration growth rate 2022



Source: Elaboration on Istat data (Nowcasting system for demographic indicators, Demographic balance and resident population)

In the period between 2001 and 2023, the metropolitan cities overall recorded a slightly higher increase in resident population than the national average (+3.5% against +3.3% for the Italian average, Figure 1). Confirming the high demographic attractiveness of these territories, growth is more significant in the metropolitan cities of the Centre and North, particularly in Roma (+13.8%), Bologna (+10.5%),

and Milano (+9.5%). On the other hand, the population decreased in Genova (-7.3%) and almost all the metropolitan cities in the South, with significant decreases in Messina (-9.5%) and Reggio Calabria (-8.2%), followed by Napoli (-2.9%) and Palermo (-2.8%). The time-series and intra-territorial analysis shows a continuous and generalized loss of population in almost all the capital cities of southern Italy, in favor of the first and second belts and the outer ring (Table 2). Between 2011 and 2021, this trend strengthens compared to the previous decade and also extends to the other capital cities of the Centre-North and the urban belts. The only exceptions are Milano, Bologna and Roma, and the first belt of Firenze, where a positive dynamic continues to be observed throughout the analyzed period.

Table 2 - *Change in Population in the metropolitan cities 2001- 2031 (%).*

Metropolitan Cities	Capital cities			First belts			Second belts			Total MC		
	2011/2001	2021/2011	2031/2023	2011/2001	2021/2011	2031/2023	2011/2001	2021/2011	2031/2023	2011/2001	2021/2011	2031/2023
Torino	2.6	-4.5	-1.3	2.3	-1.2	-3.9	12.8	-1.0	-1.2	5.2	-3.1	-2.4
Genova	-2.5	-5.7	-3.5	1.5	-6.4	-6.0	2.2	-7.4	-5.3	-1.2	-5.7	-3.8
Milano	2.2	5.5	4.9	2.6	2.4	-0.1	6.3	3.2	0.1	5.3	3.9	2.0
Venezia	-2.4	-4.7	-2.3	8.4	-0.0	-0.4	8.6	-0.6	0.4	5.4	-1.9	-0.9
Bologna	1.4	3.1	4.5	9.8	3.9	2.0	16.0	2.8	2.3	7.7	2.5	2.8
Firenze	3.1	-1.5	0.8	4.9	1.4	1.8	9.9	0.1	1.1	6.1	-0.4	1.0
Roma	5.2	2.7	-0.1	24.0	6.8	2.1	25.4	5.3	0.3	10.3	3.2	0.3
Napoli	-4.1	-4.2	-4.8	0.2	-3.9	-3.7	5.3	-1.3	-4.0	0.7	-3.0	-3.7
Bari	0.5	-0.7	-4.2	4.6	-4.4	-3.3	4.2	-2.5	-2.7	3.4	-2.6	-3.2
Reggio Calabria	1.0	-5.1	-6.5	-4.6	-7.8	-8.5	-1.5	-9.5	-8.8	-1.7	-5.7	-5.7
Palermo	-4.2	-3.5	-6.1	18.3	-0.2	-4.4	11.5	-2.6	-3.8	1.5	-3.6	-5.6
Messina	-3.7	-8.8	-6.9	-0.1	-8.4	-9.4	3.1	-7.4	-5.6	-1.3	-7.6	-6.5
Catania	-5.8	2.3	-3.6	11.5	-0.4	-2.8	6.9	-3.4	-4.5	3.8	-1.5	-3.8
Cagliari	-6.9	-2.1	-2.7	8.2	-1.3	-4.6	11.7	4.0	0.3	2.7	-1.0	-3.3
Total	**0.8**	**-0.3**	**-1.0**	**7.7**	**0.6**	**-1.3**	**9.1**	**-0.3**	**-1.8**	**4.5**	**-0.6**	**-1.5**

Source: Elaboration on Istat data (Nowcasting system for demographic indicators, Experimental Statistic-Municipal demographic projections)

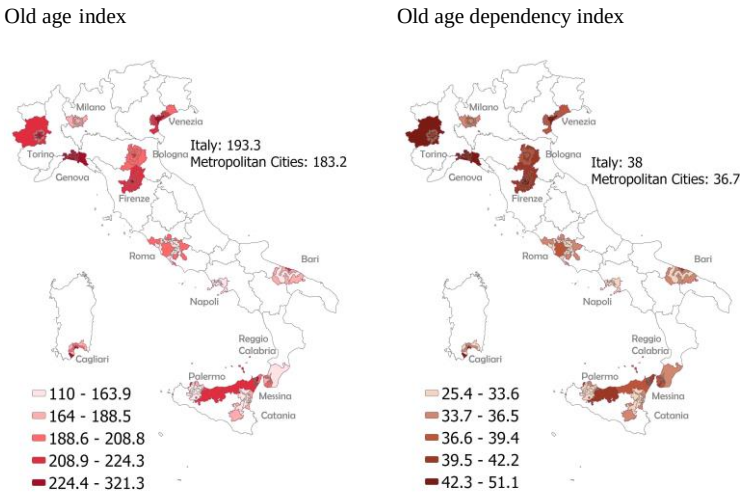
Population projections in Italy confirm a progressive decline, even in metropolitan areas. According to the median scenario, between 2023 and 2031, a decrease in resident population of -1.5% is in fact expected, equal to a loss of about 317 thousand residents. The demographic decline will affect almost all metropolitan cities but with significant territorial differences. The decrease will have lower intensities in the metropolitan cities of the North and the Centre. On the other hand, more significant decreases are expected in Messina (-6.5%), Reggio Calabria (-5.7%) and Palermo (-5.6%), while Cagliari and Bari are expected to be less negative. Bologna, Milano and Firenze, on the other hand, are the only metropolitan cities expected to continue growing, with values ranging from 2.8% in Bologna to 1% in Firenze. Over the next decade, only Bologna and Firenze are estimated to experience population growth in all the metropolitan areas, together with the municipality of Milano (+4.9 %) and the first belt of Roma (+2.1 %).

This not favorable demographic dynamic also stems from very different trends in the natural and migratory components. The decrease in population is the result of

a long-standing negative natural movement, which is less and less offset by the positive effects of migratory movements.

Considering the natural component, in 2022 the decrease in the natural balance reaches 4.7 per thousand (-0.25 per thousand in 2011) and is more significant in the capital cities (-5.4 per thousand) than in the first and second belts. The phenomenon, mainly determined by low fertility and birth rates, affects all the metropolitan cities and presents particularly critical values in Genova (-10.2 per thousand), Messina (-7.6 per thousand) and Torino (-7.0 per thousand, Figure 1).

Figure 2 – *Old age index and Old age dependency index (%) – 2023.*



Source: Elaboration on Istat data (Nowcasting system for demographic indicators)

In the same period, the migratory growth rate, determined by internal and external residential mobility processes, remaines positive (+1.8 per thousand), although it lessens sharply from that of 2011 (+2.4 per thousand). This positive dynamic is mainly sustained by migration flows from abroad, especially in the capital cities, and shows higher growth rates in the metropolitan cities of the Centre-North that are more attractive to the foreign component, such as Bologna (+6.6 per thousand), Genova (+5.5 per thousand) and Milano (+5.4 per thousand). In almost all the metropolitan cities of Southern Italy, negative growth rates are recorded, with significant decreases in the migration balance in Reggio Calabria (-4.5 per thousand), Napoli (-4.2 per thousand) and Palermo (-3.1 per thousand).

Current demographic trends have an inevitable impact on the age structure of the population, characterized by a significant shrinkage of the young and working age population in favor of the elderly (Figure 2).

In the metropolitan cities as a whole, the old-age index in 2023 is 183 elderly people per 100 children, increasing continuously from 2011 (142) and with an expected value of 239 in 2031. Higher values of the index are observed in the capital municipalities (197), especially if compared to the second belts (161), where the index remains below the national figure. Among the capital cities, Cagliari holds a negative record (321), followed by Genova (268), while Napoli is confirmed as the youngest city (159). The increasing ageing of the population leads to a continuous growth of the social burden represented by the elderly, measured by the old-age dependency ratio. The indicator, equal to 37 elderly people per 100 people of working age in 2023, shows a dynamic and territorial distribution similar to that of the old age index: it has increased since 2011 (31), especially in the belts, and reaches higher levels in the capitals (38), with the lowest value in the city of Napoli (34) and the highest in Genova and Cagliari (48).

4.2 Cluster analisys

Descriptive analysis conducted on the thematic indicators revealed significant differences between territories in terms of past and future demographic attractiveness, structural characteristics of the population, and socioeconomic conditions. A cluster analysis was applied to the dataset of elementary indicators to draw a synthetic profile of the territories. Variable selection was conducted on an initial matrix of 56 observations (the territories) and 27 indicators representative of the thematic domains. The final 19 variables were identified by combining selection criteria that ensured the representativeness of each indicator in its domain and its non-substitutability (evaluation of the correlation coefficient between indicators). cluster analysis was conducted preliminarily using the hierarchical method to identify the minimum number of groups into which to stratify the observations. Subsequently, the nonhierarchical K-means model was applied, based on a partitional cluster analysis algorithm, which allows for partitioning a set of objects into k groups based on their attributes (De Falco and Fiorentino, 2022) (in this case the 19 selected indicators are considered). The algorithm aims to minimize the total intragroup variance (distance between points within each cluster) and maximize the intergroup variance; each cluster is identified by a centroid or midpoint. Based on this criterion, the k=5 partition was selected. Cluster analysis made it possible to aggregate the territories into similar groups and track the qualitative characteristics of each group. As shown in Figure 3, clusters 1 and 2 have a strong territorial characterization and follow classic Italian North-South axes. They differ in both demographic structure (younger in Cluster 2) and socioeconomic conditions (better in cluster 1). Cluster 3 groups the territories from north to south, which are similar in terms of population growth, but with a

significant natural decline underway. Cluster 4 consists of 6 territories with the highest demographic risk, characterized by inexorable ageing. Cluster 5 gathers the capital cities of the North-Centre, including Roma and excluding Torino, and has a strong urban connotation with high demographic attractiveness and good growth in the future as well. Through the analysis of cluster centres, the characteristics of each cluster can be reconstructed (see Table 3).

Figure 3 – *Findings in Cluster Analysis.*

CL1 Attractive Northern urban belts

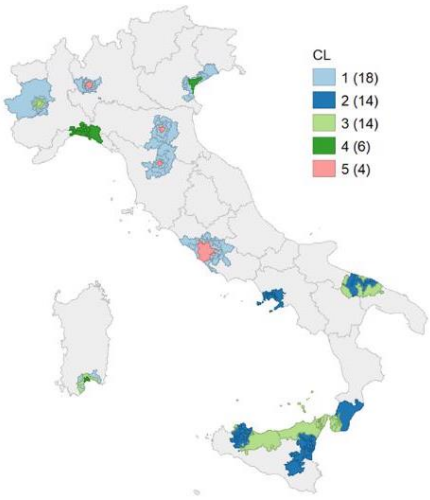
CL2 The South of the big centres, young but fragile

CL3 Declining and ageing urban areas

CL4 Strongly aged coastal areas

CL5 Large, highly attractive Northern cities

The total sum of squares: 1045
Within cluster S.S.
C1: 105,984; C2: 87,049; C3: 123,34; C4: 28,355; C5: 20,051
The ratio of between to total sum of squares: 0,650929



CL1: **Attractive Northern urban belts**. This is the cluster with the best demographic attractiveness, where a good future demographic situation is expected. The first decade of the millennium is characterized by an extraordinary increase in population (+12%), the result of a high birth rate and a positive migration component. After 2011, there is a collapse in births and then a natural decline offset by satisfactory migration growth. Employment rate is much higher than average. It is the least urbanized group. It includes 5.3 million people, of whom 33% belong to the municipalities of the 1st belt, 26% to the municipalities of the 2nd belt, and 42% live in the other municipalities, those furthest from the capital.

CL2: **The South of the big centres, young but fragile**. Territories with medium demographic attractiveness and a trend of current and prospective population loss due to both natural decrease (-2.3%) and migration (-2%). In 2011 the population shows a very young structure, which allowed the overall holding of the natural demographic component (among the groups it has the highest birth rate

8.2%), although a rapid ageing process is observed. The productive and socioeconomic environment is poor. There are about 3.2 million residents in cluster, 2,31% of whom live in the large capitals of Napoli, Palermo and Catania.

Table 3 – *Cluster centres.*

Indicators	Years	C1	C2	C3	C4	C5	*Total MC*	*Italy*
Change in Population	01-11	11.6	3.9	1.8	-1.1	3.0	*4.5*	*5.5*
	11-21	1.4	-2.6	-5.3	-5.2	2.4	*-0.6*	*-1.8*
	21-23	-0.1	-0.6	-0.7	-0.6	0.0	*-0.3*	*-0.3*
	23-31	0.3	-3.9	-6.0	-3.8	2.5	*-1.5*	*-1.8*
Old age index	2011	143.5	102.6	153.2	234.7	201.3	*142.4*	*148.4*
	2023	192.6	147.6	215.2	284.4	203.7	*183.2*	*193.3*
	2031	258.6	199.7	293.0	349.7	242.2	*239.3*	*251.0*
Old age dependency index	2011	34.0	28.0	27.2	35.0	43.6	*31.2*	*31.2*
	2023	37.8	32.3	40.0	48.8	38.3	*36.7*	*38.0*
Mean age	2023	46.6	43.9	47.1	49.8	46.9	*46.0*	*46.4*
Birth rate	2011	9.5	10.3	8.4	7.1	8.8	*9.4*	*9.1*
	2023	6.3	8.2	6.2	5.2	6.8	*6.9*	*6.7*
Natural growth rate	2011	0.4	1.7	-1.3	-5.8	-2.5	*-0.2*	*-0.8*
	2023	-5.3	-2.3	-6.8	-10.0	-5.4	*-4.7*	*-5.4*
Migration growth rate	2011	6.0	-0.1	-0.1	2.9	10.9	*4.2*	*3.4*
	2023	4.4	-3.2	0.1	4.0	5.7	*1.8*	*2.4*
Employment rate (25-64 years)	2019	72.7	51.1	57.6	71.3	73.9	*64.9*	*66.6*
People with tertiary education (25-64 years)	2020	19.4	17.2	20.0	24.5	37.2	*23.8*	*21.0*
Density of local unit	2020	75.2	60.9	67.2	91.3	121.4	*83.1*	*81.1*

CL3: **Declining and ageing urban areas**. Territories belonging to different sub-domains, distributed (albeit unevenly) throughout the country. They include the municipality of Torino and other large southern capitals (Bari, Reggio di Calabria, and Messina), parts of their urban belts and other municipalities in metropolitan territories (Cagliari belt I and other municipalities in Cagliari and Palermo). This group tends toward current and prospective population loss, mainly due to the decline in the natural population component, while there is substantial resilience in the migration component. The age structure of the population shows a fairly young composition, but tending toward ageing. Also relevant is the fragility of the entire economic system, both in terms of the labor market and the socio-economic conditions of the population. 3.1 million people live habitually in this group, 49% of whom live in the capital, 21% in the first belts and 28% in the municipalities of the other metropolitan cities, that is, in the territories furthest from the capital's borders.

CL4: **Strongly aged coastal areas**. Highly ageing territories include the municipalities of Genova and its belts, Venice and the municipality of Cagliari, which despite being geographically located in the South often shows a pattern of socioeconomic phenomena typical of the Centre-North. This cluster has low

demographic attractiveness and slight growth in the short term but is associated with a prospect of a strong decline. The cluster is characterized by: strong ageing population, high natural decrease and good migration growth, which allows the partial balance of the two components. The basic socio-economic conditions are found to be good. Cluster 4 is the smallest in terms of population, with just over 1.2 million (5.7% of the metropolitan cities' population). It has a strongly urban connotation: the population of the capital is about 80% of the cluster's residents.

CL5: **Large, highly attractive Northern cities.** Large capitals in the North-Centre, including Roma, excluding Torino. The cluster is characterized by good demographic attractiveness (4.4%) even in perspective (1.2%). Note that the migration component, although almost halved in the last decade, still manages to more than offset the natural decline. Socioeconomically, it is the cluster with the best conditions: high employment rates, high levels of college graduates, and a high concentration of local units per 1,000 inhabitants. It is highly urbanized; in fact, the capitals of Roma, Firenze, Bologna, and Milano belong to it. 4.9 million people live in this cluster, accounting for about 23 % of the metropolitan cities' population.

5. Future perspectives

Population ageing has been recognized as one of the four global demographic "megatrends," alongside population growth, international migration, and urbanization, all of which have ongoing and lasting impacts on sustainable development (United Nations, 2019). Societies worldwide, including Italy, are undergoing a longevity revolution. While some are in the early stages, others are already in an advanced state of change. The main causes of this phenomenon are primarily rooted in the structural age imbalances of the population, characterized by a decreasing number of young people and an increasing number of elderly individuals. Generational replacement is not guaranteed due to steadily declining birth and fertility rates, coupled with increasing life expectancy. Population ageing, at whatever level it occurs, necessitates public policies that can adapt to new needs, ensure adequate healthcare services, maintain the sustainability of welfare systems, address labour market issues, and promote social inclusion. Generally, metropolitan areas have a relatively younger population compared to the rest of the country, although significant differences exist among the different areas analysed. Typically, large urban centres and their outskirts are attractive, while the phenomenon of ageing becomes more pronounced as one moves away from the capitals. The significant evidence that has emerged provides a solid foundation for future research insights, paving the way for further investigations and

improvements. It is desirable to deepen the analysis by using new demographic and social indicators, leveraging the recent availability of census data at municipal and sub-municipal levels. Simultaneously, the use of spatial analysis techniques could facilitate the identification of geographic areas where similar phenomena occur in close proximity to each other. Finally, further insights into the elderly population segment could provide a more detailed picture of its specific characteristics and dynamics.

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EFFECTS OF POPULATION AGEING ON EMPLOYMENT IN ITALY[1]

Andrea Spizzichino, Cinzia Graziani, Maurizio Lucarelli

Abstract. Over the last 15 years, the Italian labour market has gone through deep changes resulting from both economic dynamics and changes in the composition of the population, which have had a crucial impact on the number of employed persons. In the economic sphere, starting from 2007, we first witnessed the biggest economic crisis since the post-war period, then a slow recovery associated with labour policies and pension reforms, finally a new collapse occurred during the COVID-19 pandemic and the subsequent post-pandemic recovery. Over the same period, the age structure of the Italian population has changed deeply, due to incoming migration flows but more significantly due to the well-known ageing process. Recent structural changes in the population between 15 and 64 years have led to a decrease in the size of the age groups with higher employment rates (35-49 years old) and to a growth of older ones, historically characterized by less involvement in the labour market. Therefore, it is crucial to be able to study employment trends net of the ageing effects. The data deriving from the Labour Force Survey allow analysis of employment with respect to the main socio-economic characteristics of individuals; in particular, the recent reconstructions produced by Istat make available comparable time series of data from 2004 onwards, adjusted for all the changes that occurred in the survey. The aim of this paper is to investigate the evolution of employment over the last 15 years, using techniques to standardise the age structure of the population. In particular, to assess the year-on-year and the five-year variations of employed persons in the main age groups, the effect deriving from the demographic component is analysed separately from that due to the 'employment performance', related to the observed variation in employment rates. The findings demonstrate that for some instances, changes in population demographics concealed the actual job market patterns, as in the case of people aged 35-49, while in other cases, such as for over-50s, demographic dynamics amplified the employment trend related to economic factors alone.

[1] Andrea Spizzichino wrote paragraphs 1, 4 and 5, Cinzia Graziani paragraph 2, Maurizio Lucarelli paragraph 3.

1. Introduction

The changing demographic dynamic, characterised in Italy by the progressive ageing of the population, is strongly reflected in the evolution of the labour market and, in particular, in the number of employed people.

Over the last fifteen years, there has been an initial increase in the working-age population, followed by a decade of decline, driven exclusively by people under 50.

These population dynamics have often led to opposing trends for some age groups between changes in the number of employed persons and those observed for the employment rate, masking the real evolution of the labour market.

Using population standardisation techniques, it is possible to remove demographic effects from the observed trends by quantifying the part of the variation that is due to "employment performance" alone.

The Labour Force Survey data make it possible to apply these standardisation techniques to comparable data over the long term, allowing a further and deeper examination of what has been observed in the Italian labour market over the last fifteen years.

2. The context

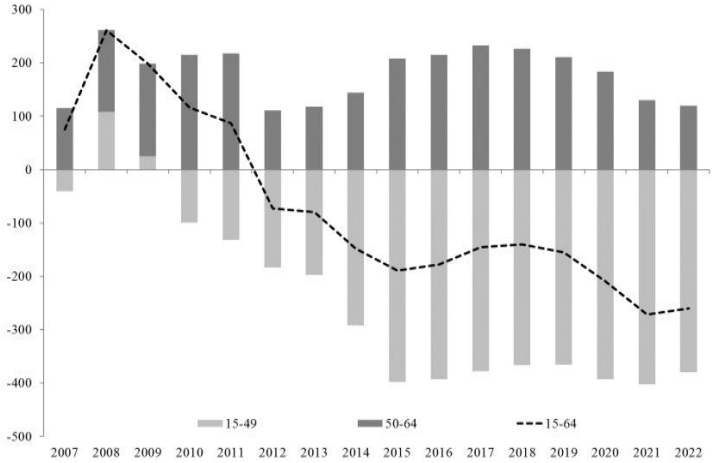
Italy is a country characterised by a strong ageing process and a falling birth rate, which are leading to a shrinking population and a changing age structure (Golini, 1997, Golini *et al*., 2003).

In particular, as shown in figure 1, between 2007 and 2022, there has been a drop in the population aged between 15 and 49 (-13.9%, or almost 4 million people), due to the departure of the large generation of 49 year-olds (an average of 960 thousand people per year). This decline has not been offset by the inflow of fifteen-year-olds (an average of 570 thousand people per year) or by the positive migration dynamic in this age group. Over the same period, the population of the 50-64 age group grew by 24.5%, or more than 2 million 600 thousand people.

Italy, unlike other European countries, is experiencing an ageing process that affects both men and women, with the gender gap in life expectancy decreasing not because women's conditions are getting worse, but because men's conditions are getting better (Caselli, 2016).

In this context, the projections of the resident population and households recently published by the Italian National Institute of Statistics have officially classified Italy as a country with a *high ageing process*.

Figure 1 – *Year-on-Year variations in the population aged 15-64 by age group, between 2007 and 2022 (data in thousands).*



Source: Istat. Labour Force Survey and Population Census.

The low fertility rate of the last 40 years, combined with the achievements in terms of increasing life expectancy, has led to a population structure, as of 2021, in which people aged 65 and over represent 23.2% of the total. On the other hand, those aged up to 14 years represent 13%, and those in the 15-64 age bracket 63.8%, while the average age is approaching 46 years. Beyond the various scenarios and assumptions that can be made, the ratio of over-65s to young people seems to be moving towards the 3:1 mark.

According to Istat forecasts, the ageing of the population will have a major impact over the next thirty years on the likely evolution of the working-age population. There will be a sudden change in the population aged 15-64, which will fall from 63.8% to 53.3% according to the median scenario. This evolutionary picture will have repercussions on the labour market, as well as on future economic and social planning.

A partial rebalancing in the population structure, albeit in the long term, may occur as the generations born between 1960 and the first half of the 1970s begin to leave the scene. These generations are now in late adulthood and will be fully shifted to the over-65s within the next twenty years. According to Istat's median scenario, the 15-64 year olds could therefore return to 54.1% by 2070, while the over-65s would fall to 34.3%. Instead, the youth population should remain stable at 11.6% (Istat, 2022).

On the other hand, falling birth rates are eroding the quantitative presence of new generations, leading to the so-called "*dejuvenation*" process (Rosina, 2011).

The demographic trends of the last three decades had a profound impact on the future of the working population[2] aged 15-64, whose projections are based on four factors:

- the demographic balance between those entering and those leaving working age;
- the number of deceased persons of working age;
- the migration balance, i.e. the difference between inward and outward migration;
- the change in labour market participation of people of working age, i.e. people who move from inactivity to employment or active job search (and vice versa).

Over the last 30 years, the first factor has been negative due to the decline in the births and the transition of the largest cohorts born after the 1940s to older age groups. However, this effect was more than compensated by a positive migration balance and by an increase in labour force participation, so that the labour force balance was still positive compared with the early 1990s. In the coming years, however, the picture will tend to worsen, as the gap between outgoing and incoming working-age people will widen with the retirement of the baby-boomer cohorts, while the migration balance - already declining in recent years - may settle at lower levels than in the past (Liaci, 2021).

This demographic process, at least in the short to medium term, will have a significant impact on the welfare, migration and, not least, employment policies (Reynaud and Miccoli, 2016).

In fact, employment dynamics have been affected by demographic changes, which in recent years have shown a progressive ageing of the population. The old-age dependency ratios, which is used to study the level of support provided to older people by the working age population, recorded the highest value among the 24 UE Member States in Italy in 2022, at 37.5%. This means that, for every person aged 65 or over, there are less than three people of working age (Eurostat, 2023).

Considering what has been observed, an analysis of labour market data capable of taking into account the demographic component, is now an unavoidable need: reading rates that have the population as denominator runs the risk of being insufficient or misleading, if not accompanied by a demographic analysis.

In recent years, many studies have focused on the composition of the labour force and, in particular, on changes in employment in order to identify the demographic component. An analysis of the employment recovery after the pandemic has shown that in the 15-34 age group, the employment rate increased

[2] The active population is the sum of the employed and unemployed and is equal to the total population net of the inactive people.

despite the significant decline in the number of employed persons (Liaci and Galli, 2022). The reason for this apparent contradiction lies precisely in the population decline.

This is also evident from the comparison of employment rates before and after the pandemic, which shows that part of the recovery in employment rates is actually due to the decline in the working-age population (De Sario *et al.*, 2022).

Starting with the monthly release "Employment and Unemployment" for December 2016, Istat also breaks down the trend changes in employment, unemployment and inactivity by age group into two components: the one resulting from the change in the population and the one due purely to the performance of the labour market ("expected" effect) (Istat, 2017). This is just for the aim of highlighting the impact of demographic changes on the estimated trend changes on these labour market aggregates.

The demographic issue has thus forcefully entered the labour market scenario; the purpose of this paper is to analyse its evolution and its impact on employment dynamics over the last 15 years.

3. The methodology

The aim of this work is to provide an assessment of the level of employment cleansed of the effects of demographic dynamics, thanks to techniques for standardising the age composition of the population.

The observed changes in employment levels are decomposed into the sum of two factors: a first component, which measures the effect attributable to population changes, and a second one, which instead represents the "expected" effect on employment levels net of the demographic component.

This second factor, attributable to the observed change in the employment rate, represents a measure of "employment performance".

It is possible to analyse changes in levels over 12 months or for time intervals of different widths, and to disaggregate the elaborations according to the main characteristics of the employed.

In this paper, we focus on total employment, broken down by three age groups: 15-34, 35-49 and 50-64; for simplicity, in the following formulas we refer only to 12-month changes (Trend Changes, T.C.).

The trend change observed at time *t* (i.e., the difference between the level of employment between *t* and *t-1*), for age group *i*, can be decomposed as follows:

$$(T.C.)_t^i = (Employment\ performance)_t^i + (Demographic\ component)_t^i$$

To derive the demographic component, we now determine the employment performance.

As mentioned, the "employment performance" represents the effect on employment levels if demographic changes didn't affect it. To determine it, therefore, we assume that the population between *t* and *t-1* does not change. In this case, the level of "expected employment" at time *t* could be obtained by multiplying the observed employment rate at time *t* by the population of *t-1*.

Thus, for age group *i*:

$$(Exp.\ employment)_t^i = Emp.rate_t^i * Pop_{t-1}^i$$

By comparing this "expected" employment level at time *t*, obtained assuming an invariant population, with the observed employment level (*Obs, employment*) at time *t-1*, we derive the "employment performance" (*Empl. performance*) at time *t*, which can be read as the trend change in the level of employment that would have been observed if the population had remained unchanged:

$$(Empl.performance)_t^i = (Exp.\ employment)_t^i - (Obs.employment)_{t-1}^i$$

By construction, we can now derive the "demographic component" as the difference between the observed trend change in the level of employment over the period from *t-1* to *t* and the "employment performance" at time *t*:

$$(Demographic\ component)_t^i = (T.C.)_t^i - (Empl.performance)_t^i$$

This decomposition allows the effect of the demographic component on the observed change in employment to be isolated and assessed separately.

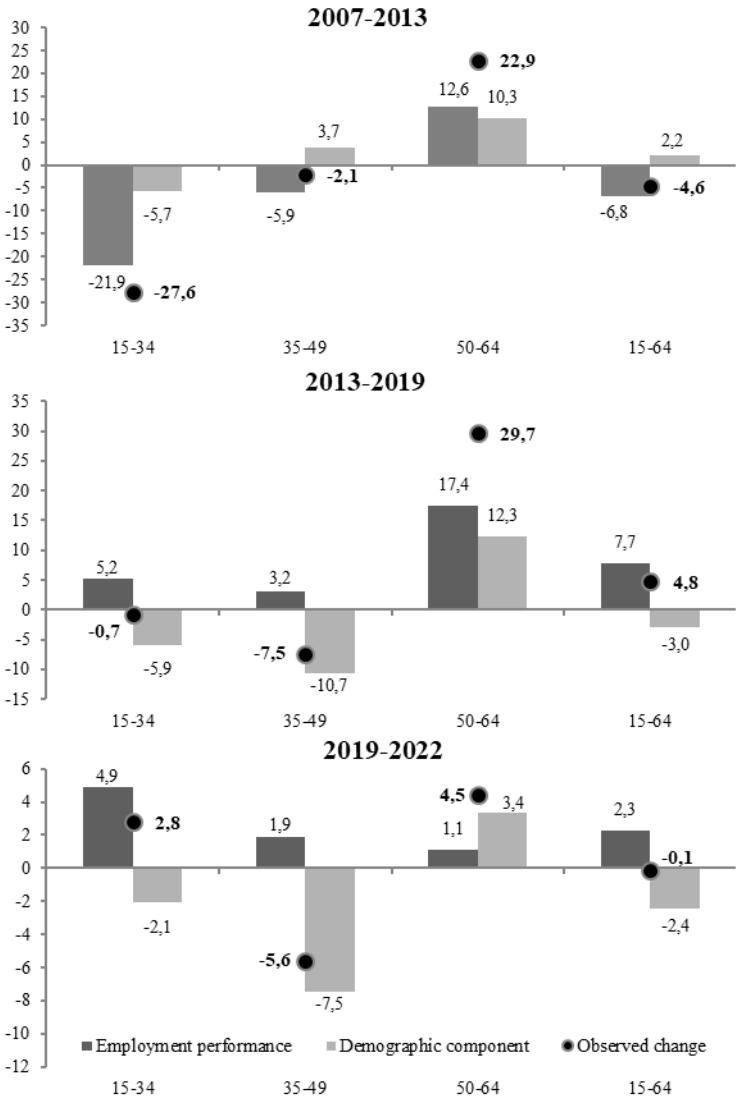
4. Main results

As already mentioned, the analyses proposed here cover the period between 2007 and 2022. This choice makes it possible to observe what happened in the first six years (2007-2013), which were characterised by a very severe economic crisis, in the second six years (2013-2019), in which the labour market grew steadily, and in the last three years (2019-2022), in which it returned to the levels of 2019 after the pandemic crisis.

Figure 2 shows, between 2007 and 2013, a 4.6% fall in employment among 15-64 year olds (equivalent to -1034 thousand), as a result of a strongly negative "employment performance" and an increase in the working age population.

It should be noted that for all age groups the two components have the same sign, with the demographic component accentuating the trend of the "expected" change; only for those aged 35-49 the increase in the population contributes to limit the fall in employment.

Figure 2 – *Breakdown of employment trend change by age group, years 2007-2013, 2013-2019 e 2019-2022 (percentage values).*



Source: Istat. Labour Force Survey and Population Census.

On the contrary, between 2013 and 2019, the effect of the "employment performance" is positive for all age groups: for those aged 15-34, it is 5.2% (265,000), and the negative change observed for the employed (-0.7%, or -37,000) is entirely determined by the decline in the population of this age group.

Even for the 35-49 age group, the sharp fall in population has a decisive influence on the fall in employment: the change observed is -7.5% (-761 thousand), against a positive "employment performance" effect of 3.2% (322 thousand).
In the 50-64 age group, demographic growth contributes to the increase in the number of persons in employment: from 17.4%, corresponding to 1,068 thousand "expected" employed persons net of demographic effects, to 29.7%, corresponding to 1,821 thousand observed. The overall growth of 4.8% recorded over this period is thus the synthesis of an even more positive "employment performance" (7.7%, or 1,655 thousand more), mitigated by the negative effect of the demographic component.

Over the last three years, compared with the previous period, the effects of the relationship between the demographic component and "employment performance" are confirmed for the over-35s, but they change for younger people. In fact, for the 15-34 age group, the decline in the population is gradually decreasing and is no longer offsetting the positive performance; thus, an employment growth of 2.8%, or 142 thousand units, is determined for this group. The overall effect between 2019 and 2022 is a slight decrease in the number of persons in employment (-0.1% or 30,000), due to the counterbalancing changes in "expected" employment and in the demographic component (+2.3% and -2.4% respectively).

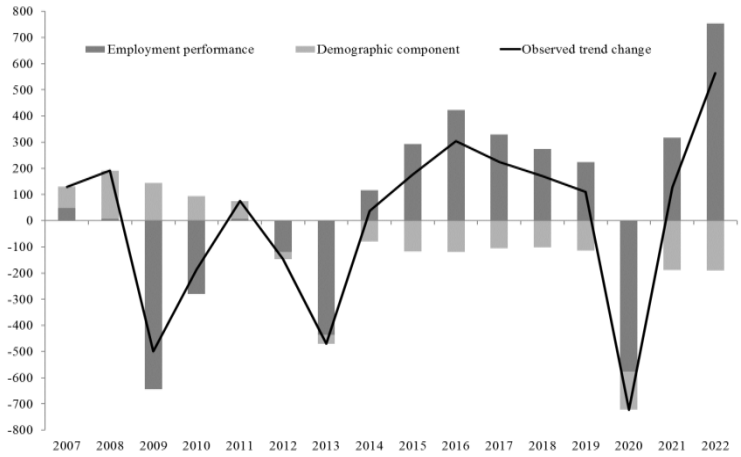
The analysis of the contributions of the two components to the trend changes in employment over the last fifteen years (Figure 3) shows for the total number of employed persons of working age (15-64), the different impact of population trends by age group.

In periods of severe crisis, characterised by negative employment changes, the demographic component had different effects: between 2008 and 2010 it limited the contraction, while in 2012, 2013 and even more so in 2020 it amplified the result of a strongly negative "employment performance".

On the contrary, between 2015 and 2022 (with the exception of 2020, a year characterised by the health emergency), the "expected" change was always more than 200,000, with a maximum of 750,000 in 2022, and was always higher than the actual level of employment.

The difference between the "expected" change and the change actually observed is due to the negative contribution of the demographic dynamic characterised by an ageing population.

Figure 3 – *Decomposition of employment levels trend change among 15-64 years old. Years 2007–2022 (data in thousands).*



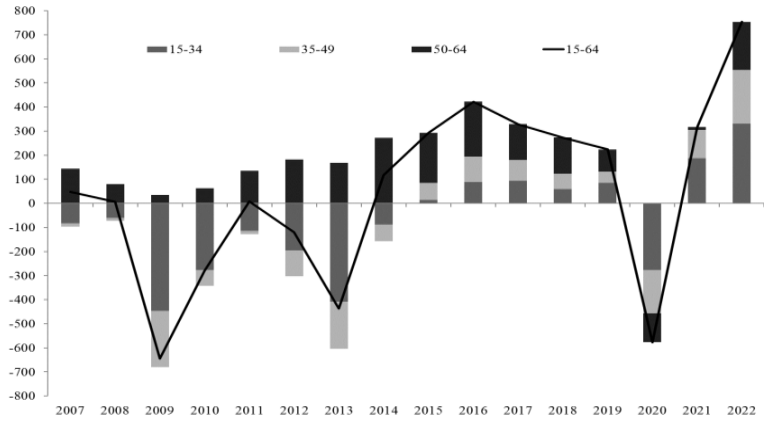
Source: Istat. Labour Force Survey and Population Census.

Looking at the changes in the employment of the various age groups net of the demographic component (Figure 4), it can be seen that until 2014, i.e. in the years in which the impact of the economic crisis on the labour market was most marked, only the 50-64 year olds showed a trend increase. On the other hand, the 15-34 and 35-49 age groups experienced strong declines, which led to a negative overall change for the 15-64 age group between 2009 and 2013. Between 2014 and 2019, the years in which the recovery of the labour market supported by employment policies was observed, all age groups show positive "expected" trend changes, although to a lesser extent for the under-50s than for the 50-64s.

The raising of the retirement age is the element that explains the dynamism of the older age groups between 2007 and 2019 and especially in the early years, when all other age groups experienced sharp declines in employment.

Excluding 2020, when due to exceptional events the "expected" change in employment was negative for all age groups, the last two years showed a reversal of the trend of the past. The younger age groups, which were most involved by the process of reintegration into the labour market after the emergency, showed a higher positive employment performance than the over-50s, for whom the effects of the pension reforms are slowly fading.

Figure 4 – *"Expected" trend change in employment levels net of demographic effect, by age group. Years 2007-2022 (in thousands).*



Source: Istat. Labour Force Survey and Population Census.

5. Conclusions

In a context of ongoing demographic change, which in Italy is mainly manifested in a rapid ageing process, it is particularly useful to assess the main socio-economic phenomena net of demographic effects.

This paper has attempted to provide an interpretation of the employment trend over the last fifteen years by showing how the number of people in employment would change in different age groups, net of changes in the age structure of the population.

The results show how, in several cases, demographic dynamics either masked the real employment trends, e.g. by registering negative changes in the 35-49 age group when employment was rising, or amplified the employment performance trends, as in the case of the over-50s, who registered a higher than expected observed change over the whole period.

In this context, it would be particularly interesting to be able to assess future employment prospects in relation to the age structure of the population, given the considerable certainty that the average age of the workforce will continue to rise gradually.

This is confirmed by the fact that while the ageing of the baby-boom cohorts will gradually push them out of the working-age population, the continuing decline in births will not allow their complete replacement by younger age groups. At the

same time, migration dynamics will continue to play an important, albeit only partially predictable, role in the age structure of the working-age population.

The decline in the working-age population is an issue that affects not only Italy but also much of the rest of Europe, although the demographic trends are not the same in all countries.

As also suggested by the European Commission (2023), to encourage more young people and women to enter the labour market could, in the medium term, help to mitigate the negative effects of demographic dynamics on the increase in the average age of the employed.

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ITALIAN DEMOGRAPHIC LANDSCAPE: UNVEILING THE IMPACT OF RESIDENTIAL MOBILITY ON POPULATION CHANGE

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Abstract. Adopting the conceptual framework of "Fast and Slow" demography, this study provides empirical evidence on the dynamics of population change in Italian provinces over the past two decades and highlights the substantial influence of migratory patterns in shaping the Italian demographic landscape. The speed of population turnover (PTR) has consistently been higher in the provinces in the Center and North of Italy, while remaining persistently lower in the South and Islands regions from 2002 to 2018. Delving into the different components of population change, namely fertility, mortality, and migratory movements, the analysis reveals that over half of the population turnover in the provinces of the Center and North can be attributed to residential mobility – either internal or external, as measured by the migration share of turnover (MST). The results show that the historical trend of high out-mobility observed in the South of Italy has now expanded to other parts of the country. Further analyses reveal a significant association between all measures of population change and economic development of the territories, namely GDP per capita. Interestingly, the provinces displaying larger growth tend to exhibit higher levels of PTR and the share of immigration within the turnover (IST), while the provinces facing depopulation are characterized by higher levels of the share of out-migration within the turnover (OST).

1. Introduction

Migration and residential mobility are pivotal factors in understanding population dynamics, particularly when examining population changes at subnational level (Benassi *et al.*, 2019). Fertility and mortality trends offer a fundamental grasp of demographic dynamics which, except for unforeseen disruptions such as the COVID-19 outbreak, typically exhibit stability or gradual shifts, especially in developed countries.

[1] Bolano, Di Nallo and Serra developed the research ideas, interpreted the results and drafted the majority of the text. Munter was in charge of the data collection and data analysis phase.

The conventional wisdom posits that population change unfolds slowly (Sauvy, 1957, p. 5). Within this framework of "slow demography," population movements are perceived as inertial and largely independent of other factors. The contemporary discourse recognizes demography as a "megatrend" that permeates various domains, including economic, political, and social transformations.

However, migratory movements introduce an element of unpredictability and rapid change, which substantially impacts the rate of population change and shapes the demographic landscape potentially in a "fast" way. Migration encompasses both internal movements and international migration. It not only influences changes in population size but also impacts its composition, distribution, and density, thereby exerting profound implications on societies and economies. In contrast to the relatively slow evolution of fertility and mortality, migratory flows are characterized by volatility, giving rise to sudden and significant demographic transformations.

The influence of migration becomes evident when analyzing population changes at the local or regional scales. Factors such as economic opportunities, political conditions, service quality, and social networks shape the migration patterns of local communities and regions. This leads to significant variations in the speed and direction of population change across different areas, resulting in diverse demographic dynamics. Moreover, migration's impact extends beyond mere numerical shifts. It affects cultural diversity, social integration, and the redistribution of resources. The arrival of new populations brings in different perspectives, enriching societies but also posing challenges related to social cohesion and resource allocations.

In this article, we embrace the quest for the paradigm shift that incorporates "fast" population change (Billari, 2022). However, we contend that it is crucial to expand this temporal framework and consider the profound impact of shorter-term fluctuations on population patterns. We present an alternative approach to understand the population dynamics in Italy. Our work begins with a comprehensive analysis of current and past data, providing a reliable snapshot of the present. We leverage this information to understand the direction of population change and ascertain its implication for economic development at a subnational level.

We extend the concept of "fast demography", previously used at a country level (Abel and Cohen, 2019; Abel and Sander, 2014; Billari, 2022) to the sub-national level (NUTS-3 level) in Italy. The notion of fast population turnover, increasingly driven by migration, is particularly relevant for areas with smaller populations, such as provinces, as it magnifies the influence of cross-border movements. Therefore, it is reasonable to apply this "fast demography" paradigm for the first time to smaller geographical units within a country, such as Italian provinces.

To examine the population dynamics in Italy since the early 2000s, we use four simple demographic indicators to measure the speed of population change. Drawing

on administrative data obtained from Istat, we initially provide a visual description of recent and current levels of population turnover at the province level, emphasizing the growing relevance of migratory movements. Subsequently, we delve into the evolution of these trends over the past two decades to understand the overall patterns. Finally, recognizing that population dynamics, specifically in- and out-movements of residents, might respond to the economic development of the area, we explore the extent to which the economic performance of provinces, measured by GDP, is associated with the speed of population change.

When studying demographic dynamics, it is important to consider the population turnover rate rather than focusing solely on population change. As discussed later in this work, unlike the population change that represents a mere counting of the population in two moments in time, the population turnover rate encompasses all aspects of population change, taking into account the inflow and outflow of individuals, including migration patterns. By examining all these determinants simultaneously, the turnover rate provides a comprehensive understanding of demographic dynamics, enabling a more accurate assessment of population composition, subnational variations, and the factors influencing population changes. When adopting a sub-national perspective, turnover rates offer a nuanced understanding of demographic dynamics by revealing variations in migration patterns and population changes across different areas within a country. These regional disparities can stem from diverse economic opportunities, policy variations, and cultural or geographic factors. Analyzing population turnover rates enables the identification of hotspots of population growth or decline, which in turn facilitates targeted interventions and informed policy decisions at the subnational level.

2. The demographic landscape in Italy

In Italy, there is a significant geographical imbalance in demographic dynamics (e.g., Golini *et al.*, 2000; Bonifazi, 2013; Reynaud *et al.*, 2020; Billari and Tomassini, 2021). Between 1995 and 2019, the country experienced modest population growth, with an average annual total growth rate of 2.4‰ (Benassi *et al.*, 2021). However, there were significant variations across regions. Most northern regions exhibited population growth, except for Liguria. In contrast, the southern regions faced a negative growth trend, with particularly low values in Calabria, Molise, and Basilicata, where the growth rate exceeded -2‰ (Benassi *et al.*, 2021). The sustained decrease in births since the early 1990s has led to a consistent negative natural balance, with a difference between births and deaths of approximately -200,000 units per year in the period 2017-2019. As a result, the limited population growth observed in recent years can be attributed solely to the migratory balance,

which is the difference between immigrants from abroad and emigrants to other countries. The migratory balance helps offset the negative natural balance (Benassi *et al.*, 2021). Consequently, there is a clear and ongoing process of demographic decline occurring across almost all regions in Italy, which is not adequately counterbalanced by migratory flows in certain areas, especially in southern provinces.

3. The measure of population turnover

This study employs a measure of population turnover proposed by Billari (2022) to assess the speed of population change and its various components. The *population turnover rate* (PTR) is defined as follows: for each *'provincia'* (*j*) (province, corresponding to the NUTS-3-level region in the European Union taxonomy) and year (*t*), the crude annual birth rate per thousand (*b)*, death rate per thousand (*d)*, immigration (*i*) and outmigration rates per thousand (*o*) are calculated. The latter two include both internal (i.e., movements across provinces) and international movements.

The area-level *population turnover rate* is then defined as the algebraic sum of each annual crude rate:

$$PTR_{j,t} = b_{j,t} + d_{j,t} + i_{j,t} + o_{j,t} \quad (1)$$

and it summarises the speed of population change. The population turnover rate (PTR) directly corresponds to the level of population turnover. However, it is important to note that two provinces displaying similar PTR values may experience very different patterns of population change due to the composite nature of the indicator, which aggregates all four components.

From the two indicators of migration and the PTR, it is possible to calculate a key indicator of population: the *migration share of turnover* MST:

$$MST_{j,t} = \left(\frac{i_{j,t}+o_{j,t}}{PTR_{j,t}}\right) * 100 \quad (2)$$

The MST is bounded between 0 and 100, with lower values indicating a minimal contribution of immigration and emigration to population change, while values above 50 indicate that migration movements are the primary driver of demographic change. In Italy, certain areas are losing population due to out-migration while others are gaining population through migration. Additionally, we will discuss the IST (immigration share of turnover), which represents the ratio between immigration rate

and PTR, and the OST, which represents the ratio between out-migration rate and PTR. Both indicators range from 0 to 100.

Data on population counts, births, deaths, and mobility have been retrieved from Istat and its "*Bilancio della popolazione"* report. Due to significant changes in data collection methods in 2002 and 2019, our analysis focuses on the time period from 2002 and 2018. Mobility data, including registrations and cancellations from the population registers (*anagrafe*), is usually available at the municipality (LAU) level. However, since our analysis focuses on the NUTS-3 level, we obtained a specific data extraction from Istat on movements across provinces and to/from abroad. In such a way we do not count movements happening within *province* (i.e., movements from municipality A towards B, both belonging to the same NUTS3 are not counted in either in-migration or out-migration rate) avoiding the issue of inflated migration counts.

Our analysis encompasses all sources of population change, namely births, deaths, and mobility. We consider the population count at year t as the average population recorded on January 1st of year *t*, and the population count on January 1st of year *t+1*.

Lastly, we will explore the relationship between population change, its components, and the economic development of the provinces. To measure economic development, we will use the logarithmic scale of GDP per capita.

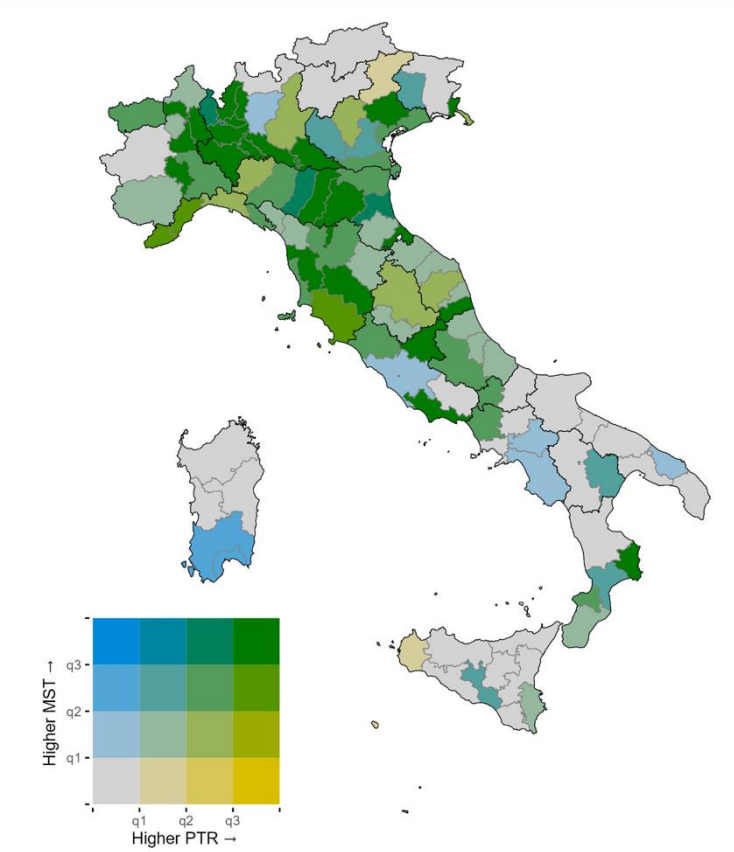
4. The population change in Italian provinces and the role of migratory movements

Figure 1 provides an overview of PTR and MST across the Italian provinces in 2018. Each color represents a specific quartile range for both measures. Provinces of the "South" and the "Islands" exhibit low population change (first quartile of PTR) and relatively modest levels of MST (represented in gray/light blue). These provinces experience relatively slow population change, where migration has a minor impact on the speed of change. Conversely, the "North-West" provinces (represented in forest green) display high-speed population change (last quartile of PTR) with migration playing a significant role in driving the speed of change.

The heterogeneity of population change across Italian provinces becomes evident when examining PTR and MST magnitudes over time and across macro-regions, as shown in Figure 2. Notably, there is a clear difference between the provinces from the North of the country ("North-West" and "North-East"), where PTR ranges from approximately 47 to 50, and the provinces from the "South" and the "Islands", where PTR ranges from around 38 to 40. When considering the role of migration, values around or above 50 are observed across all macro-regions over the past two decades,

indicating that population movements account for more than half of the overall population change. Conversely, this suggests that fertility and mortality in recent years contributed at a relatively low rate to the overall Italian population change.

Figure 1 – *Population Turnover Rate and Migration Share of Turnover in Italy in 2018. Data at NUTS-3 level.*

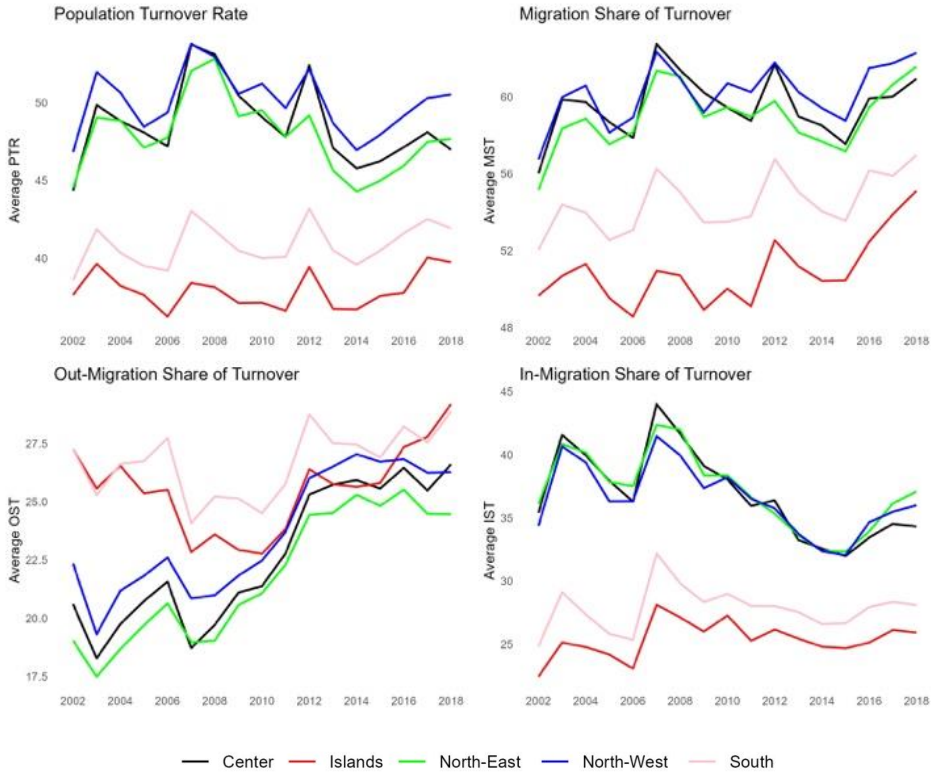


Note: Authors' elaboration. Istat data from bilancio demografico 2018. For PTR the quantile breaks are 40.2 (q1); 45.4 (q2); 51 (q3). For MST the quantiles breaks are 53.4 (q1); 57.8 (q2); 61.6 (q3).

Based on the trends depicted in Figure 2, we can infer that population turnover has remained mostly stable over time, excluding short-term fluctuations caused by specific events like the surge in migration movements in 2006. However, there are variations in turnover levels across macro-regions. When examining the factors

directly associated with mobility, we observe a noticeable upward trend in MST across the country (upper right corner Figure 2). In the bottom panel, we present the trend for the two migration flows separately.

Figure 2 – *Evolution of Population Change indicators over the last two decades by macro-regions.*



Note: Authors' elaboration. Istat data from bilancio demografico 2001-2018. Population Turnover Rate per thousand (top-left panel). Migration Share of Turnover (top-right panel). Immigration Share of Turnover (bottom-right panel). Out-migration Share of Turnover (bottom-left panel).

The upward trend in MST is primarily driven by out-migration patterns. The OST ("Out-Migration-Share of Turnover", displayed in the bottom right panel) exhibits an increasing trend, indicating a similar proportion of turnover attributed to out-migration between the northern and southern regions of the country.

Conversely, the trend in IST (Immigration share of Turnover) demonstrates relative stability over time, with a slight downward trend, especially noticeable in the North-West, North-East, and Center regions. It is important to emphasize that MST, IST and OST are relative to the overall population turnover. Therefore, the

similarity in OST values between the North and South of Italy in recent years does not imply that out-migration flows are identical across regions. Instead, it indicates that the proportion of turnover observed in a specific area of the country is comparable across macro-regions.

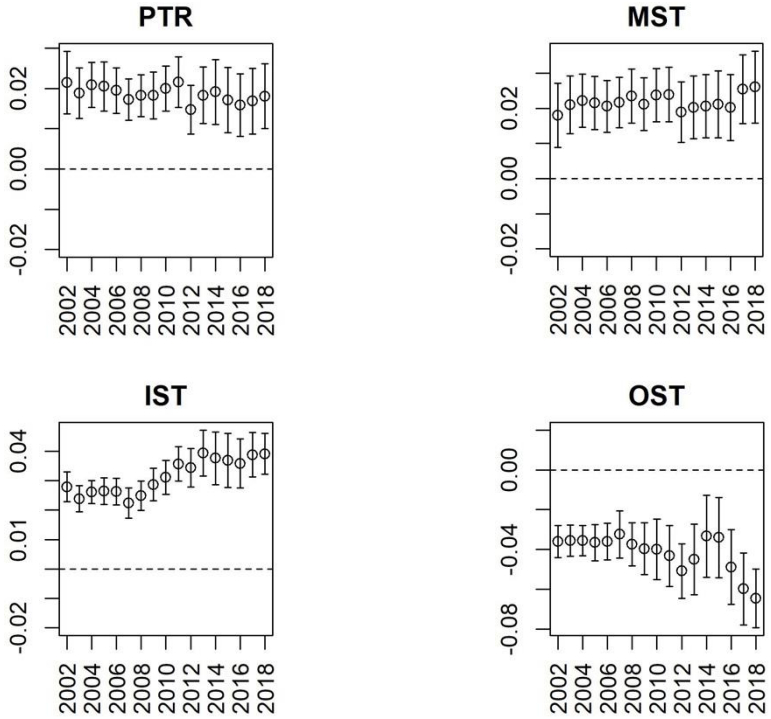
5. How much does population change respond to economic characteristics?

According to the Fast and Slow demography paradigm, population change should be viewed as endogenous and co-evolving with other factors (i.e., fast), rather than exogenous and inertial (i.e., slow). Notably, economic factors play a significant role in shaping population dynamics (e.g., Reynaud *et al.*, 2011; Bonifazi *et al.*, 2020; Billari, 2022). Figure 3 presents the association between the synthetic measures of demographic turnover analyzed in this study, such as PTR and its components, and an economic indicator of the province, the GDP per capita, using a simple linear regression model. The results reveal a positive relationship between the economic development of provinces and population change. Importantly, this positive association remains consistent and relatively stable over time.

Provinces with stronger economic conditions tend to attract more individuals. This correlation is evident in the strong positive relationship observed between GDP and IST, as illustrated in the bottom left panel of Figure 3. Furthermore, there has been an upward trend in this association following the Great Recession of 2008. Conversely, provinces with lower economic activity tend to experience a higher out-flow of the population, as evidenced by the association between GDP and OST, in the bottom right panel of Figure 3.

In order to highlight the relative contributions of individual provinces, Figure 4 in the appendix presents the association between population change and GDP in 2018, representing the last available data. Each dot in the graph corresponds to a specific province and is color-coded according to its NUTS-1 classification. As anticipated, the graph reveals a more pronounced association between economic development and migratory flows in the southern provinces.

Figure 3 – *The association between economic development (GDP per capita in log scale) and population change. Trend over the last two decades.*



Note: The figure reports the coefficients derived from linear regression models examining the association between log GDP per capita and population change indicators for each year. The top-left panel represents the Population Turnover Rate per thousand (PTR), the top-right panel displays the Migration Share of Turnover (MST), the bottom-left panel displays the Immigration Share of Turnover (IST), and the bottom-right panel illustrates the Out-migration Share of Turnover (OST). Authors' elaboration.

6. Conclusion and discussion

Measuring population turnover in a given country and recognizing the significant role of population movements in determining the speed of population change is not only relevant for describing the population dynamics, but also holds important implications for short- and long-term policies. Changes in mobility can create new and accelerated demographic "windows of opportunities", and contribute to the overall resilience of attractive local areas. Conversely, out-migration can significantly accelerate depopulation processes. Mobility flows - especially when involving working-age individuals - have the potential to reshape the population structure at a much faster rate than fertility alone. Acknowledging and

comprehending these dynamics can inform targeted policy interventions and facilitate proactive planning for demographic changes.

Our findings indicate that areas with favorable economic conditions tend to attract individuals who have the option to settle down and contribute to further development, thereby creating a positive cycle of economic and social growth. Conversely, we have observed that certain provinces, particularly in the South of Italy, struggle to attract population. This, combined with persistently low fertility levels, has contributed to the depopulation of certain areas within the country.

These declining and depopulating areas need to develop new policies aimed at mitigating demographic decline, as it could ultimately give rise to economic and social challenges. Implementing proactive measures to address this demographic decline is crucial to prevent the adverse consequences from negatively affecting these areas.

Our analysis is subject to some limitations. To maintain the study's brevity, we adopted a province-level perspective, based on the NUTS-3 classification used by the European Union, without distinguishing between internal and international mobility. Furthermore, we used GDP per capita as a proxy for economic development. However, for a more comprehensive understanding of population dynamics and the role of mobility in shaping population change in Italy, it is important to conduct further research that considers additional aspects of this phenomenon.

To enhance our understanding of population dynamics, several avenues for further research should be explored. For instance, examining the characteristics of individuals who move, such as their age, gender, and nationality, could provide valuable insights. Additionally, distinguishing between internal and external movements could offer a more nuanced understanding of migration patterns. Adopting a municipality-level perspective, rather than a province-level one, would enable a more detailed analysis. It is also essential to consider other measures of attractiveness for local areas. While economic development, as measured by GDP per capita, is one dimension, other factors such as access to services, job opportunities, potential for economic growth, the social and cultural environment, and the availability of green spaces also contribute to the attractiveness of these areas. These factors can particularly influence the younger and more dynamic segments of the population, and play a key role in fostering settlement and active engagement in the economic, social, and cultural life of these areas.

Acknowledgements.

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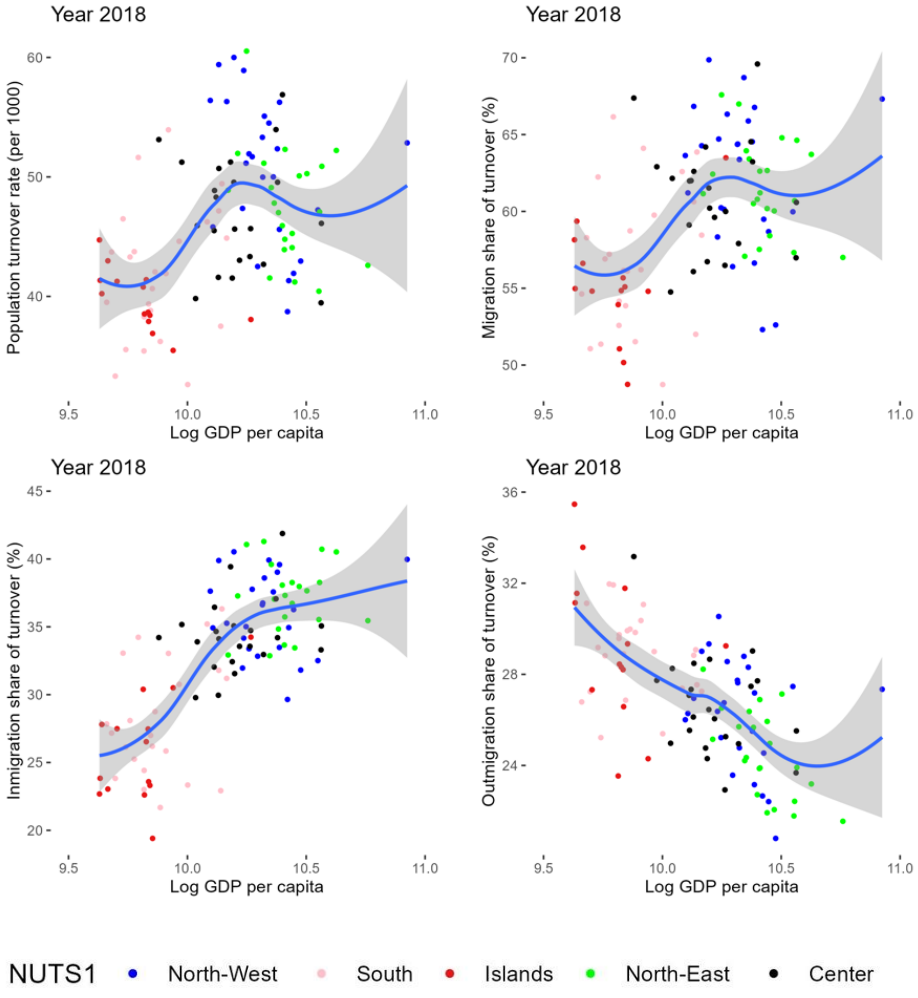
Appendix

Figure 4– *The heterogeneity in the association between economic development (GDP per capita in log scale) and population change in 2018.*



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MIGRANTS' CHARACTERISTICS, WORKING AND LIVING CONDITIONS IN THE HOUSEHOLD SERVICES

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Abstract. The aging of the Italian population, the limited resources assigned to the welfare system, and the increasing entry of women into the labour market have produced growing demand for surveillance and care activities, for supporting elderly and vulnerable populations. Given native-born workers do not satisfy this growing demand, foreign population started to play a central role in the household services in Italy in the last two decades. Among them, single aged breadwinner women became the perfect candidates for occupying these positions. However, migrant women tend to suffer the penalization of being women, migrant background, and segregated. Enlarging the limited research on this topic and using the 2021 ad-hoc module of Istat Labour Force Survey on "Working conditions of immigrants and their immediate descendants" in Italy, we aim to analyse migrants' working and living conditions to identify barriers preventing full integration and to define suitable actions to promote inclusion. Descriptive results highlight that, according to the literature, migrant women workers employed in the household services have different socio-demographic profile respect to the other average working foreign-born and native-born groups. Moreover, multivariate analyses show that they often find themselves in more unfavourable working and living conditions which make them more vulnerable.

1. Introduction

The population aging, affecting European nations, combined with the ever-increasing influx of women into the labor market, has triggered a progressive surge in the demand for personal care and domestic services, particularly for the elderly people (Shutes, 2012). This transformation has had a significant impact on Italy, not only recognized as one of the world's most aged country but also grappling with limited resources on this issue allocated to its welfare system (Reyneri, 2017). To cope with this growing labor demand, the foreign population has emerged as a significant source of support. INPS data on regular care and domestic workers in Italy revealed that, despite a decrease in the number of foreign female workers

employed in the household services, from 761,042 to 621,716 between 2013 and 2022 with a non-linear trend, they continue to constitute the predominant workforce in this sector because the employed Italian women in this sector counted 272,583 units in 2022 (INPS, 2023). Previous studies have shown that workers employed in the household services primarily are women coming from Latin America and Eastern Europe (Barbiano di Belgiojoso and Ortensi, 2015; Salaris and Tedesco, 2020; Buonomo, Gabrielli and Strozza, 2020). They are more likely to be single or divorced/separated (Simonazzi, 2009), and are often older than 40 years old and concentrated mainly in Northern Italian regions.

However, a notable dearth of specific studies exists regarding the working and living conditions of foreign domestic and care workers, as well as comparative quantitative analyses of their characteristics (Van Hooren, 2012; Kupets, 2016). This can be attributed to the challenge of obtaining representative sample sizes given the relatively small scale of this workforce. Nonetheless, such analyses are essential due to the significant role these workers play in Italian society in order to identify barriers preventing full integration and to define suitable actions to promote inclusion (Reyneri, 2017).

Our goal is to start filling this knowledge gap by providing a comprehensive understanding of labour market dynamics and valuable insights into figure out the working and living conditions of foreign workers in the household services. In particular, the following research questions are posed:

RQ1: Do domestic and care workers have specific socio-demographic characteristics?

RQ2: Do domestic and care workers suffer more unfavourable occupational conditions than the other workers?

Focusing on women, who represent 58.7% of total (foreign and native) regular workers employed in the household services (84.4% among foreigners) in 2022 and 22.1% of (male and female) migrant workers, regardless of the occupational sector (INPS, 2023), this paper aims to provide a comprehensive description of the specific individual characteristics (including also age, educational attainment, country of origin, and citizenship status) of domestic and care female workers in comparison with their Italian counterparts and with other migrant female workers employed in other sectors. Moreover, it aims to delve into their employment-related characteristics (including also overeducation, underemployment, and part-time job), and into their living conditions (isolation) determining the extent to which they face heightened risks in these domains more than the other workers.

After reviewing in section 2 the exiting literature on these issues and describing in section 3 the used data and methods, we will perform in section 4 a descriptive analysis to identify the main socio-demographic profile of workers by occupational sector and by country of birth. Continuing to use this comparative approach,

logistic analyses follow in section 4 to edge against compositional effects, and to analyse work-related penalizations of foreign domestic and care workers. In section 5, we will discuss the main findings and provide some concluding remarks.

2. Theoretical background

The household services are precarious works, characterized often by low salaries, poor working conditions, limited professional development opportunities, and high staff turnover rates (Fullin and Reyneri, 2011). Moreover, domestic and/or care work is often carried out in the informal market, rendering workers powerless against their employers who fail to acknowledge the rights, neglect accident insurance coverage and social security (Marchetti, 2022). In many countries, employment in the household services is poorly regulated, depriving workers of labour and social protections. This lack of regulatory framework further contributes to the vulnerability and isolation of domestic and care workers, exacerbating the challenges they face in this sector.

In the context of migrant domestic and care work studies, it is crucial to consider the disparities among migrant domestic and care workers arising from differences in migratory background, age, education, and other factors, which impact their work experiences in varying ways. (Marchetti, 2022).

The main challenge lies with foreign women employed in the household services, as they face a triple penalization due to their foreign status, occupation as domestic and/or care workers, and gender (Fernández and Masague, 2008). The feminist approach that considers the intersection of differences has gained significance in social sciences in recent decades. In terms of employment characteristics, migrant women in the household services often find themselves in unfavorable work conditions compared to other categories of workers (Shutes, 2012; Van Hooren, 2012). This approach calls for avoiding homogeneous views of people's experiences and seeking a deeper understanding of commonalities or real differences among them.

The existing literature underscores the challenges faced by foreign workers, including those employed in the household services, who confront penalized occupational conditions, with overeducation being a prominent issue (Lindley, 2009; Buonomo, Gabrielli and Strozza, 2020). Ensuring the full utilization of individuals' capacities is not only important for their personal well-being but also crucial for addressing the macroeconomic challenge of underutilized labor force. However, despite the increasing reliance on migrant labor in European economies, achieving comprehensive labor market integration and effectively leveraging the skills of this group, particularly migrant women, who demonstrate significant

underqualification compared to native-born women, remains an ongoing and pressing challenge (Akgüç and Parasnis, 2019).

An additional aspect of particular interest revolves around the perceived underemployment among women workers employed in the household services, particularly those who are foreign nationals (Fullin and Reyneri, 2011). The question arises as to whether these women aspire to work more hours than they currently do and, consequently, whether they are more inclined to accept part-time employment. This raises the hypothesis that they may be exposed to higher risks of underemployment, as they could find themselves in a situation where they are unable to fulfil their career aspirations due to the constraints associated with part-time work. This notion underscores the complex dynamics at play, highlighting the potential discrepancy between their desired employment conditions and the prevailing circumstances that may limit their ability to fully utilize their skills and qualifications.

An aspect of significant relevance is represented by ethnic penalty, a phenomenon that affects foreign workers. This form of ethnic discrimination, as showed by Avola (2014), increases in particular the vulnerability of migrant domestic and care female workers compared to their Italian counterparts. Ethnic discrimination creates additional obstacles and difficulties for these categories of workers, exposing them to greater risks of exploitation and precarious working conditions (Paterno *et al.*, 2016; Salaris and Tedesco, 2020).

3. Data and Methods

We relied on the data from the ad-hoc module of the LFS, conducted in 2021 on "Working conditions of immigrants and their immediate descendants" in Italy (since now on only IT-LFS). These data provide extensive information on the occupational status of the interviewees, considering various socio-economic, demographic, and territorial characteristics. A key advantage of these data is their representative nature, achieved through oversampling the foreign population, enabling accurate comparisons between individuals with and without a migratory background.

However, it is important to acknowledge some limitations. Firstly, the data are cross-sectional and do not allow for a longitudinal or panel data analysis. Additionally, they pertain exclusively to legally resident foreign citizens. As a result, the IT-LFS "observes" a specific segment of the labour market that is characterized by greater stability in terms of residence and employment. It is crucial to consider this aspect when interpreting the obtained results.

The main target group includes women aged 20-64 years at interview. The overall unweighted sample consisted of 34,936 women[1]. We focus our attention on female workers, distinguishing between those employed in the household services (since now on also "domestic") and those employed in other sectors (since now on also "other"). In particular, the domestic/care workers are respectively 2.6% among native-born workers and 18.9% among workers born in PFPM of total target group (Table 1).

Table 1 – *Women aged 20-64 in the used sample by occupational characteristics and place of birth. Absolute (abs.) and percentage (%) values.*

Occupational Characteristics	Native-born		Born abroad	
	Abs.	%	Abs.	%
Inactive	11,805	40.0	2,248	41.1
Unemployed	1,491	5.1	549	10.0
Workers in the household services	756	2.6	1,037	18.9
Workers in other sectors	15,408	52.3	1,642	30.0
Total	*29,460*	*100.0*	*5,476*	*100.0*

Source: our elaboration on IT-LFS data, 2021

Through a descriptive comparative perspective based on place of birth and employment sector, we examine in the next section some socio-demographic characteristics of female workers. These include the age at interview, the self-declared level of education (primary or less, middle school, high school or more), civil status (unmarried, married, separated/divorced/widowed), and Italian region of residence (North-East, North-West, Center, South and Islands). Focusing on foreign-born population, we also consider the area/country of birth (we have identified the most frequent countries of birth among immigrants in Italy and grouped the others into sub-continents), year of arrival in Italy (before 2000, 2001-2010, after 2010), and the acquisition of Italian citizenship (yes, no).

Subsequently, we conduct (in section 4) five different multivariate logistic analyses to assess the unfavourable/favourable working and living conditions of workers by occupational sectors (domestic and other) and by birthplace (native-born and born abroad), considering as control variables the cited socio-demographic characteristics to edge against compositional effects. In particular, we examine, through the predicted probabilities, the following employment-related dependent variables: part-time job (1 if the respondent works part-time and 0 otherwise), perceived overeducation (1 if the respondent feels of having an

[1] Among foreigners, we consider only women born in countries with strong migratory pressure (PFPM), and excluding those born in advanced economies (e.g. EU-15, countries of the European Free Trade Association, Japan, North America).

underqualified job and 0 otherwise), isolation (1 if the respondent is single person in the household and 0 if she is in couple with or without children, single parent, or non-cohabiting single parent), perceived underemployment (1 if the respondent desires to work more hours and 0 otherwise), and perceived not-highly interesting job (considering the categorical variable from 0 to 10, respectively the lowest and the highest values, on respondent's interest in their work, the dichotomous variable takes the value 1 if respondent indicates the score 7 or less[2] and 0 if she indicates 8 or more).

In our analyses, we used the weighted system provided by IT-LFS in order to make our results representative of the observed universe[3].

4. Results

Regardless of their country of birth, women in the household services tend to be, on average, older than those working in other sectors (Table 2). This trend is even more pronounced among foreign-born domestic workers. In fact, among them we observe the highest percentages at older ages (respectively 37.4% at 45-54 yrs. old and 27.2% at 55+ yrs. old).

The 54.0% of foreign-born workers employed in the household services have a high school degree or more, compared to 47.0%. of Italian counterpart. However, this percentage is lower than foreign-born workers employed in other sectors (68.5%).

The 34.8% of foreign-born domestic/care workers reside in North-East Italy, while only the 16.8% is resident in the Southern and Island regions. Interestingly, we have a complementary picture when considering native-born domestic workers (respectively 17.0% in the North-East and 31.5% in the South and Islands). From these results, the substitutive (and non-competitive) role of migrants rise.

The highest percentage of foreign-born domestic/care workers is married (45.5%), but a significant percentage is separated/divorced or widowed individuals (31.8%). In the other three groups of workers this is not the same with a significant percentage of unmarried.

[2] We defined this value according to the distribution for dividing significantly the sample in two groups.

[3] For further information see the methodological document of the survey at the following link: https://www.istat.it/it/archivio/214255

Table 2 – *Selected characteristics of female workers by place of birth and occupational sector. Percentage values.*

Characteristics	Native-born		Born abroad	
	Domestic	Other	Domestic	Other
Age at interview				
20-34	24.4	21.8	13.2	26.4
35-44	20.6	24.6	22.2	34.1
45-54	27.4	32.4	37.4	27.9
55+	27.6	21.2	27.2	11.6
Educational level				
Primary school or less	5.8	0.8	7.4	3.8
Middle School	47.2	16.8	38.6	27.8
High school or more	47.0	82.4	54.0	68.5
Civil status				
Unmarried	36.5	34.1	22.7	30.1
Married	46.9	54.2	45.5	55.4
Separeted/divorced/widowed	16.6	11.7	31.8	14.5
Italian Residence Area				
North-East	17.0	23.0	34.8	32.7
North-West	30.4	31.0	19.5	22.4
Center	21.1	21.8	29.0	23.6
South and Islands	31.5	24.2	16.8	21.3
Total	*100.0*	*100.0*	*100.0*	*100.0*

Source: our elaboration on IT-LFS data, 2021

Focusing on migrant workers only some other significant characteristics emerge (Table 3).

Not surprisingly because of foreign presence in Italy by birthplace, most of the workers (regardless of the work sector) were born in Romania (respectively 24.8% for domestic and 23.6% for other). The Ukrainians (country assuming the 5th position by number of residents in 2022) also have the 2nd highest percentage of foreign-born workers employed in the household services (12.9%). This is not the same when considering the average among workers employed in other sectors. However, the most interesting (albeit known) percentages concern the Philippines (the 8th country by number of residents), the Moldovans (12th country) and the Peruvians (16th country): respectively 10.7%, 8.6%, and 6.0%. Conversely, the Moroccans and the Albanians (respectively the 2nd and the 3rd country by number of residents) have lower percentages of domestic/care workers (respectively 3.4% and 4.2%).

Foreign-born workers employed in the household services have a percentage of Italian citizens (12.3%) which is 1/3 compared to foreign-born workers employed in other sectors (37.9%). This suggests the reduced integration process and the greater vulnerability of domestic/care workers compared to the others.

Table 3 – *Selected characteristics of foreign-born female workers by occupational sector. Percentage values.*

Characteristics	Domestic	Other
Area/Country of birth		
Romania	24.8	23.6
Ukraine	12.9	4.6
Philippines	10.7	2.0
Other Latin America	9.2	13.3
Moldova	8.6	4.1
Other Asia	7.5	4.8
Other Est Europe	6.6	11.4
Perù	6.0	2.9
Albania	4.2	9.1
Morocco	3.4	3.6
Africa Sub Saharian	3.0	5.3
Other North Africa	0.8	1.2
China	0.5	5.3
Other	1.7	8.7
Italian citizenship		
Yes	12.3	37.9
No	87.7	62.1
Year of arrival in Italy		
Before 2001	16.3	28.9
2001-2010	58.7	52.8
After 2010	24.9	18.2
Total	*100.0*	*100.0*

Source: our elaboration on IT-LFS data, 2021

There are no substantial differences in the year of arrival in Italy by employment sector; the majority arrived in Italy in the period 2001-2010 (respectively 58.7% among domestic/care workers and 52.8% among workers in other sectors).

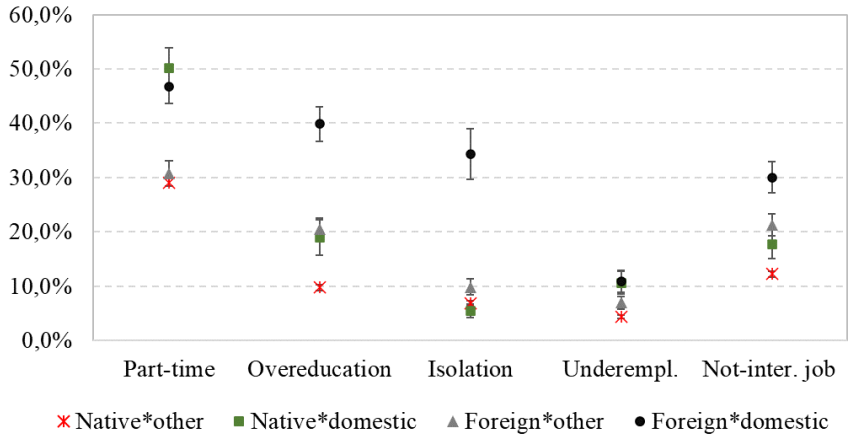
Performing logistic regressions, the predicted probabilities of the 5 dichotomous dependent variables and their relative confidence intervals are presented in Figure 1 by the interrelation of occupational sectors (domestic and other) and birthplace (native-born and born abroad), controlling for individual characteristics.

Working in the household services is more positively associated of being part-time than working other sectors. Although no statistically significant difference emerges between native-born and foreign-born domestic/care workers due to the overlap of confidence intervals.

Foreign-born domestic/care workers feel largely more overeducated than the native-born counterpart and foreign-born workers employed in other sectors. In addition, they are single person in the household more frequently than the others.

Supporting these unfavourable working conditions, foreign-born domestic/care workers are more likely than the other working groups of perceiving their job as not-highly interesting. Conversely, there is no significant difference in feeling underemployed among the compared working groups.

Figure 1 – *Predicted probabilities of being a part time worker, of feeling overeducated, of being isolated, of feeling underemployment and of perceiving job as uninteresting of female workers by place of birth and occupational sector.*



Control variables: age, civil status, educational level, area of residence
Source: our elaboration on IT-LFS data, 2021

5. Discussion and conclusion

The paper aimed to analyse characteristics, working and living conditions of foreign-born female workers employed in Italian household services, reducing the existing knowledge gap on the topic and identifying potential vulnerabilities and issues that hinder full integration.

Along with this paper we tried to answer to two research questions by using IT-LFS survey data of 2021. As concern the first question (RQ1: Do domestic and care workers have specific socio-demographic characteristics?) and according to the literature, there is a specific socio-demographic profile that characterizes foreign-born domestic workers in Italy: these women tend to have an older age than those working in other sectors, to have a higher educational degree than Italian

domestic/care workers, to get largely married but with a significant percentage of separated/divorced or widowed, to reside mainly in the North-East Italian regions, not to have Italian citizens, and to be born in East Europe (Romania, Ukraine, and Moldova) or in Latin America (Peru) or in the Philippines.

As concern the second question (RQ2: Do domestic and care workers suffer more unfavourable occupational conditions than the other workers?), the analysis has highlighted that domestic/care workers (and in particular foreign ones) are more exposed to unfavourable working conditions: they are more likely to have a part-time job, to perceived in having an underqualified job, and to feel their job as not-highly interesting.

Furthermore, we observed the existence of an "ethnic penalty" effect when comparing native-born and foreign-born workers employed in household services. According to previous reseach, foreign workers are more vulnerable compared to their Italian counterparts. It emerges when considering overeducation, isolation, and job satisfaction. These differences can hinder the integration process of these workers and, conversely, promote segregation that exacerbates these inequalities (Barbiano Di Belgiojoso and Ortensi, 2015; Buonomo, Gabrielli and Strozza, 2020). Moreover, the social meaning of work impacts on perceptions in order to pursue social mobility strategies of family status (Pedraza, 1991; Vicarelli, 1994; Ambrosini, 2011).

Future research steps should include in the analyses a greater number of individual and occupational characteristics (such as health, income, social and retirement assistance etc.) to mitigate any further compositional effect and to identify other aspects of vulnerability. Additionally, it may be useful (if possible) to further differentiate workers employed in household services, considering separately housekeepers and caregivers.

Nevertheless, some noteworthy considerations have emerged. The aging population has led to a significant increase in the demand for domestic assistance and caregiving services. However, this demand is not adequately met by the Italian workforce, creating a shortage of available workers.

One potential solution to bridge this gap between demand and supply of domestic workers can be found in the foreign labour force, aligning with the theory of “replacement migration” (Lindsey, 2001). Foreign workers, thus, become essential in Italy for the well-being of the country and its inhabitants.

However, within this perspective, a paradox can be observed. Despite their substantial importance and the notable increase in their numbers, these workers, predominantly women, are not sufficiently protected under Italian and international labour laws and social systems. These issues make them more vulnerable compared to workers in other sectors. Moreover, ethnic penalty further exacerbates

particularly the vulnerability of foreign domestic workers, impeding their integration and cohesion with the host country.

These findings underscore the need to address these inequalities and promote policies and interventions that improve working conditions and foster the socio-economic integration of migrant workers. Investments should focus on combating discrimination, recognizing and enhancing the human capital of foreigners, allowing them to occupy jobs according to their abilities, and establishing social and legal standards to ensure proper treatment of workers by employers.

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HOUSING CONDITION OF FOREIGNERS IN ITALY[1]

Evelina Paluzzi, Damiano Abbatini, Stefania Lucchetti

Abstract. The increase in life expectancy and the reduction in the fertility rate are causing not only the aging of the population in developed countries but are also changing the demand for housing. The foreign population, thanks to its younger age and a large proportion of minors, helps to alleviate and slow down the effects of demographic aging. Being residents and real estate owners in Italy can indicate family stability and integration, therefore a greater probability of procreating and a propensity to buy a house. The paper provides an initial analysis of the housing situation of the foreign population in Italy, based on data from the 2021 permanent census of population and housing and the Registry of Buildings and Dwellings by the National Institute of Statistics (Istat). Through this new type of data, not available in previous censuses, one examines the key characteristics of the foreign population who own residential properties and focuses on their geographical and territorial distribution.

1. Demographic aging, housing condition and foreign population

Demographic aging poses significant challenges for advanced capitalist countries, affecting healthcare systems, pension programs, and family support networks. The aging of the population requires a thorough consideration of urban planning, construction, and housing policies in order to adapt the housing supply to the changing needs of the population. The aging of the population also lead to changes in real estate ownership patterns: seniors, driven by needs for downsizing, might decide to sell their larger homes and purchase smaller residences or move into assisted living facilities. Furthermore, rising maintenance costs or energy efficiency expenses can also prompt elderly individuals who are more vulnerable and have fewer resources to consider real estate transactions.

[1] In the context of a joint and shared work, paragraphs 1 and 2 are attributed to Damiano Abbatini, paragraphs 3, 3.1, and 3.2 to Evelina Paluzzi, and paragraph 3.3 and 3.4 to Stefania Lucchetti. Paragraph 4 is attributed to all three authors.

A recent document published by the British Parliament thoroughly analyses the same phenomenon: "Demographic trends affect housing demand now and will do in the future. […] we discuss the key UK-wide demographic shifts which will affect housing demand in the coming years: an ageing population, household formation, international migration and internal migration." (UK Parliament, 2022, Chapter 2). Migration dynamics can influence population composition and age structure. Understanding housing conditions for the foreign population provides insights into access to different housing forms and geographic distribution patterns, highlighting potential disparities compared to the local population. Many scholars consider the most significant challenge that immigrants must face today is that of housing (Strozza and Golini, 2006; de Filippo *et al.*, 2010).

2. Materials and methods

2.1. Permanent Census of Population and Housing

The General Census of Population and Housing represents an important methodological choice and a primary source for analysing the housing conditions of the foreign population. In recent years, the population census has undergone a significant reorganization, transitioning from a comprehensive survey approach to a sampling-based method and from a decennial periodicity to an annual frequency, taking on the characteristics and name of the Permanent Census of Population and Housing.

In particular, the Permanent Census relies on the information produced by the Base Register of Individuals (RBI) and the Statistical Register of Places (RSBL) as well as data collected through specific periodic surveys (Istat, 2021). The transition to the new census model has been made possible by the acquisition, processing, and use of administrative sources for statistical purposes, which generate updated statistical registers with high temporal frequency. In addition to the statistical registers, the Permanent Census also utilizes two specific sample surveys aimed at covering the information needs not generated by the Registers and improving their quality.

This work exclusively refers to the residents enumerated in the 2021 census.

2.2. Building and Dwelling Register in Statistical Register of Places

The use of administrative archives and registries makes valuable information previously unavailable accessible. Statistical Register of Places (RSBL) is a geographically based database containing comprehensive information on territorial divisions, such as municipalities, provinces, regions, census sections. RSBL offers

advanced analytical tools that facilitate thorough and detailed analysis. In particular, the integration of buildings and addresses with geographic coordinates within RSBL enables precise positioning of the population and other statistical units on the territory, ensuring a high level of accuracy. The Building and Dwelling Register, which includes residential and non-residential properties, associates individual units with various elements such as individuals or legal entities holding rights (ownership, rental agreements, etc.), cadastral categories that denote the intended use, cadastral data, geographic coordinates of the buildings, and addresses. By utilizing these individual elements or integrating them, georeferencing of diverse statistical units such as resident population, employees within local units, and economic entities can be achieved. RSBL offers advanced analytical tools that facilitate thorough and detailed analysis. One of the main strengths of this product is the availability of geographic coordinates to which the examined statistical units are assigned.

This work exclusively refers to the conventional dwellings recorded in the 2021 census.

2.3. Holders of housing cadastral rights

Among the cadastral information, a variable of undeniable interest and novelty compared to the past is the property right code and the percentage of ownership, available for both individuals and legal entities. In this study, which is still experimental and focused on a specific population segment, the foreign population, and a specific type of property, residential dwellings, the analysis has been limited to only individuals with any form of property rights (ownership, usufruct, other enjoyment rights, etc.). However, for the percentage of ownership, a data transformation was necessary to account for possible significant variations in ownership percentages on the same property: for example, in the case of two individuals owning a dwelling, where the ownership percentages are 90% for the first person and only 10% for the second person.

3. Foreign holders of housing rights

Purchasing a house is viewed as an important indicator of immigrants' integration into their host country. It signifies a commitment to long-term residence and stabilization (Marra, 2012). Immigration plays a role in mitigating the negative effects of declining birth rates and demographic aging in Italy. The non-Italian population contributes to the country's growth and helps counteract demographic stagnation (Gesano and Strozza, 2011). The choice to live with one's family in their own house reflects a non-transitory migration project, an intention at permanent

settlement. Italy cannot overlook this contribution from abroad for its demographic, economic and social implications.

Different immigrant communities in Italy have varying approaches to housing. Some communities are more likely to become property owners or hold shares in buildings, while economic constraints may prevent others from realizing their housing projects, such as buying a house.

The paragraph discusses the distribution of cadastral shares among the foreign population based on factors like the holder's country of citizenship, gender, age, and geographic distribution within Italy. It suggests that young people may be more inclined to buy and maintain houses, potentially benefiting the housing market and contributing to the rejuvenation of the housing stock. In addition, the housing market could be livened up by some nationalities who show a certain propensity to purchase a house, just like Italians who are largely homeowners. Overall, it’s undeniable the role of immigrants in Italy's demographic and housing dynamics, their potential to help address demographic challenges and stimulate economic activity in the housing sector.

3.1. Foreign holders by citizenship

Foreign individuals holding housing rights make up 1.2% of all property right holders in Italy. Their distribution by country of citizenship is influenced by the size and duration of the respective communities' settlement in Italy. However, some smaller immigrant communities rank higher among foreign property owners, while larger communities that have been in Italy for a longer time rank lower.

European foreigners, who make up 47% of the total foreign population, represent nearly 70% of foreign property right holders. In contrast, Africans (22.6% of the foreign population) account for less than 9% of property holders, and Asians (one-fifth of the total foreign population) make up around 16% of property holders. The European Union is the most highly represented region, with over 40% of foreign property holders, followed by Central and Eastern Europe with 23%. Both areas have the higher female representation. East Asia ranks third with 9.2% and shows a gender balance. North Africa (6.8%), Central and Southern Asia (6%) have the higher male representation among property holders.

This analysis shows that property ownership among foreign individuals in Italy does not always directly correlate with the size of their respective communities or the duration of their stay in Italy. Some smaller communities or those with a different history of settlement may have a more significant presence among property owners. This information sheds light on the diversity and complexity of property ownership patterns among different immigrant communities in Italy.

Among foreign individuals in Italy, the most populous nationalities typically continue to lead in terms of property ownership. Romania is the largest community,

accounting for nearly a quarter of all foreign property right holders followed by Albania, which represents 10%, and China, accounting for 7%.

Table 1 – *Foreign Holders by country of citizenship: first 20 nationalities.*

Country of citizenship		Foreign holders of housing counted as Resident at Population Census 2021		Foreign Population Census 2021		% of foreign holders in Census 2021
		% of the total	% women	% of the total	% women	
1	Romania	24,3	57,1	21,5	56,9	8,5
2	Albania	9,7	48,7	8,3	48,7	8,7
3	China	7,0	55,4	6,0	49,3	8,9
4	Ukraine	4,7	78,0	4,5	77,8	7,8
5	Moldova	4,3	65,2	2,3	66,1	14,2
6	Morocco	4,0	41,6	8,4	45,6	3,6
7	Germany	3,6	62,1	0,7	61,8	41,3
8	United Kingdom	3,3	53,8	0,6	52,1	43,6
9	France	2,7	65,1	0,6	60,3	35,4
10	India	2,4	38,0	3,2	41,7	5,5
11	Peru	2,2	57,2	1,9	57,6	8,7
12	Poland	2,1	80,2	1,5	74,7	10,6
13	Egypt	2,0	25,5	2,8	34,0	5,3
14	Philippines	1,5	55,7	3,2	56,7	3,6
15	Russian Federation	1,5	78,5	0,7	81,3	15,3
16	Pakistan	1,4	23,7	2,7	28,0	4,0
17	Ecuador	1,3	56,9	1,3	55,8	7,1
18	Spain	1,2	80,3	0,5	66,6	17,7
19	Switzerland	1,2	52,2	0,2	57,8	57,8
20	Bangladesh	1,1	20,3	3,2	28,7	2,7

While the most populous nationalities are at the top of the property ownership rankings, there are substantial differences compared to the 2021 Census data. Some communities with a long history of settlement and a large presence in Italy occupy lower positions in the rankings. For example, Morocco, the second-largest community according to the Census (420,000 individuals, 8.4% of the total foreign population), ranks sixth among foreign property right holders it is surpassed by China, Ukraine and Moldova. Moldova, despite not being among the top ten largest communities in the Census (2.3% of the total foreign population), has a prominent position in the rankings of property owners. Germany, United Kingdom and France represent only 2% of the foreign population enumerated in the 2021 Census but they are among the top ten communities of foreign property right holders.

Communities such as Egypt and Asian nationalities, excluding China, do not hold high positions among foreign property owners in Italy. This group includes countries such as Bangladesh, Pakistan and the Philippines. India is the only

country relatively higher in the ranking. In addition, African countries like Nigeria, Tunisia and Senegal, despite their significant presence and a large number of individuals born in Italy, do not appear among the top 20 property owners. On the contrary, some countries belonging to the older EU membership tend to have high percentages, but also some non-EU countries such as the Russian Federation and Moldova that show significant values, at around 15%.

The last column in the table 1 represents a ratio, which indicates the relationship between the number of foreign property owners and the number of foreigners counted in the 2021 Census, categorized by their country of citizenship. This ratio provides a general measure of how invested each community is in the Italian housing market and indirectly reflects their willingness to establish roots in Italy. Foreign property owner's account for 7.6% of the total number of foreigners compared to 57% among Italian property owners. Romania, with over one million residents in Italy, records an 8.5% ratio, similar to Albania and China, but with a significant absolute value. However, Morocco and Egypt, despite their long-standing presence and high number of births in Italy, have relatively low ratios. Asian countries also display lower values, whereas Latin American nationalities have more significant proportions, comparable to those at the top of the ranking.

3.2. Foreign holders by sex and age

The average age of foreign property holders is 47.6 years, significantly younger than the average age of Italian property owners, which is 61.2 years. Foreign property owners are mainly concentrated in younger age groups, with a notable presence in the 0-34 and 35-54 age brackets. Regarding nationality-specific trends, EU countries, excluding Romania and Poland, tend to have relatively older property owners. In contrast, the youngest property owners are from Asian countries, particularly Bangladesh, Pakistan, Egypt, and Albania. This youthfulness may be attributed to a higher percentage of individuals born in Italy among these nationalities.

According to gender distribution, 56.2% of foreign property owners are women, which is slightly higher than the 51.4% of Italian property owners who are women. However, specific nationalities such as Ukraine, Poland and Russian Federation, which have a strong female presence, show an even higher representation of women as property owners. In contrast, certain Asian and African communities, including Egypt, Morocco, Bangladesh and Pakistan, have a higher male representation among property owners. Importantly, for these same nationalities, the percentage of female property owners is lower than the percentage of women counted in the 2021 Census. This suggests a significant gender imbalance and a hypothetical male-led management of residential properties within these communities.

Table 2 – *Foreign Holders by sex and age: first 20 countries.*

Country of citizenship	Sex Ratio	Average Age
Romania	75,1	45
Albania	105,2	42,8
China	80,6	47,2
Ukraine	28,3	48,3
Moldova	53,3	44,4
Morocco	140,7	45,6
Germany	61,2	63,2
United Kingdom	85,8	62,9
France	53,7	59,5
India	163,1	43,7
Peru	74,8	48,7
Poland	24,7	49,4
Egypt	292,7	42,9
Philippines	79,6	51,3
Russian Federation	27,6	50,4
Pakistan	323,2	42,6
Ecuador	75,5	47,4
Spain	24,6	53,6
Switzerland	89,8	66,6
Bangladesh	391,5	40,7
Total	**77,8**	**47,6**

3.3. Geographical distribution

The majority of foreign property holders in Italy are located in Northern Italy, with Lombardia having the highest share at 29.1%. The North-West region accounts for over 40% of foreign property holders. Veneto, Emilia-Romagna, and Lazio also have significant proportions of foreign property holders, around 10% each. In terms of gender distribution, in some regions of Central and Southern Italy, the percentage of female foreign property owners is higher, with Campania at 76% and Calabria at 71%.

Foreign property holders are spread across various municipalities in Italy, with significant variability based on nationality. Milano accounts for 4.9% of foreign holders, followed by Roma at 4.1% and Torino at 2.5%. Genova, Venezia and Prato each have 1.1% of foreign property holders.

Table 3 – *Foreign Holders by NUTS2 level.*

NUTS 2	% Foreign holders of housing	% women
Lombardia	29,1	52,0
Veneto	13,1	51,9
Emilia-Romagna	10,5	55,7
Lazio	10,2	61,9
Piemonte	9,3	56,7
Toscana	8,6	59,2
Friuli-Venezia Giulia	3,3	52,7
Liguria	3,0	59,2
Umbria	2,3	60,1
Marche	2,2	57,9
Sicilia	2,1	66,8
Abruzzo	1,6	61,3
Puglia	1,4	65,5
Campania	1,2	76,0
Calabria	0,8	71,3
Sardegna	0,8	62,8
Molise	0,2	67,0
Valle d'Aosta/Vallée d'Aoste	0,2	57,6
Basilicata	0,2	68,2
Total	100,0	56,2

Trentino Alto Adige is not included in the database.

The majority of cadastral rights owned by foreigners are concentrated in Milano and/or Roma, with these municipalities occupying the top positions for most of the 20 communities of property holders, except for Morocco and Pakistan. Different countries of citizenship show distinct patterns of concentration. Romania is spread across approximately 5.400 municipalities, mainly in larger ones. Moroccan owners seem to be more concentrated in about 2.800 municipalities, particularly in Torino and predominantly small to medium-sized municipalities. Surprisingly, Caltanissetta ranks second, showing a clear prevalence of women, followed by the small municipality of Sermide and Felonica in the Mantova area.

Egyptian property rights are concentrated in a few municipalities, with Milano being the primary location, accounting for 27% of the rights, as well as neighbouring municipalities like Cinisello Balsamo, Sesto San Giovanni, and Pioltello.

Albanians have property rights spread across approximately 3,300 municipalities, primarily in larger ones, with Genova having the highest concentration. China is present in around 1,700 municipalities, mainly in larger urban areas, with Milano, Prato, and Roma accounting for 37% of the shares.

Ukrainians hold property rights mainly in Roma, Milano, Brescia, and Venezia. Polish property holders are also present in Roma and Milano, as well as Ardea and Ladispoli. Moldovan property rights are concentrated in Venezia, Parma, Roma, Padova and Brescia, while Russians own properties in Milano, Roma, Campione d'Italia, Torino and Sanremo.

Filipino property rights, concentrated in a few hundred municipalities, are primarily found in Milano (about one-third of the total) and Roma. Indian property holders have rights in Roma and Brescia, as well as in smaller municipalities like Arzignano and Viadana. Bangladesh has the majority of its shares in Venezia (14.4%) and Monfalcone (11%), but also in larger municipalities. Pakistan's property rights are present in Carpi, Brescia and Portomaggiore.

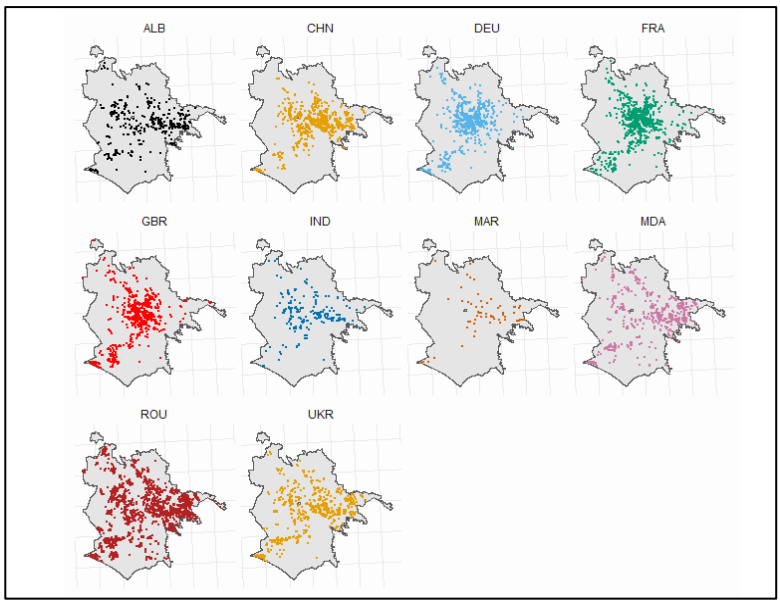
Ecuador is mainly represented in Genova (15.5%) and Milano, while Peru is present in Milano (13.7%) and Torino. Lastly, property holders from old EU member countries and Switzerland are primarily distributed in Roma, Milano, Torino, and Firenze.

3.4. Georeferenced real estate units: towards a sub-local spatial analysis

As mentioned earlier (section 2.2), the availability of geographic coordinates is one of the key advancements in the new framework for producing census data using registry information. Indeed, compared to analyses conducted using traditional census data (see, for example, Todisco *et al.*, 2008), these coordinates enable the exact positioning of statistical units, including individuals, families, and other entities.

Figure 1 displays the positions of each residential property owned by major foreign nationalities in the municipality of Roma.

Figure 1 – *Georeferenced real estate units.*



A quick glance reveals distinct territorial distributions, with some nationalities exhibiting more pronounced patterns than others do. For instance, properties owned by French, German and British citizens (ranking third, fourth, and fifth, respectively, in terms of foreign property ownership) are predominantly concentrated in the city centre and along two main road axes. One axis approximately follows Via Cassia, connecting the centre to the northwest quadrant, while the other extends from the centre to Ostia, the primary residential area along the Roman coast. A similar distribution pattern is observed for properties owned by Romanian citizens, who represent the largest foreign nationality in terms of residential property ownership in Roma. However, they also show a significant concentration in the southeast quadrant of the city, specifically between Via Tuscolana and Via Casilina, leading towards the Castelli Romani area. In contrast, properties owned by Chinese citizens, the second-largest non-Italian nationality in terms of property rights, are mainly clustered in the city centre. These brief observations on the territorial concentration or dispersion of properties among specific population segments aim to highlight the potential of this type of data within the scope of this study. The availability of high-quality geographic coordinates allows for novel analysis that was previously unavailable. Spatial analysis enables the identification of geographic patterns, clusters, and distributions of data (Costarelli and Mugnano, 2020). Additionally, geographic coordinates facilitate the creation of new variables to assess various aspects, such as distance and accessibility to specific amenities (hospitals, pharmacies, public transportation and green spaces) or exposure to risks (crime, pollution, hydrogeological instability). In conclusion, the use of precise geographic coordinates offers valuable insights into the spatial distribution and potential patterns of foreign population in relation to property ownership.

4. Conclusions

Foreigners registered in the 2021 Census account for 8.5% of the total population in Italy. When combined with "new Italians" (naturalized citizens), the percentage rises to almost 11% (Paluzzi *et al.*, 2011). A significant portion of the non-Italian population is composed of minors, making the foreign population much younger on average than the native Italian population. The average age of foreigners is 35.4, while for Italians, it is 47.2. About 18% of foreigners and naturalized individuals in Italy are actually born in the country. These individuals grow up in Italy, attend Italian schools, and become integrated into the socio-economic context. They represent a potential source of homebuyers and future property owners, contributing to the slowing of population aging and the

rejuvenation of the housing stock. The aging of the native population can have positive effects due to increased demand for a workforce specializing in elderly care and the establishment of new family units coming from abroad. Immigrants, who are typically of working age, contribute to the rejuvenation of the Italian population.

While Italian legislation often ties immigrants' official existence to stable employment and housing, only a small portion of immigrants own property. For immigrants, buying a house can represent the achievement of stability and the realization of their migration project. An important aspect to underline is the meaning that the house takes on for an immigrant who intends to build his future in Italy: it is the demonstration to himself and to others of the success of his own migration project. The purchase of a house by stable foreign workers can represent the fulfillment of the migration project, the achievement of stability in the country of arrival and the creation of a family and one's descendants. The arrival of immigrants, including refugees, in less-populated and aging regions can economically revitalize these areas, which have been affected by emigration.

The article discusses a descriptive analysis of ownership data from the Cadastre administrative source to understand how the foreign population can contribute to addressing the aging population issue and modernizing the housing stock in Italy.

The study represents an initial exploration of territorial analysis combined with socio-demographic variables, providing insights into the living conditions and interactions of foreign communities in Italy. It's viewed as a lens through which to observe the migration phenomenon, its evolution, living condition and interaction with the 'elderly' Italian society. By utilizing geographic coordinates, it's possible to understand the living conditions of individual foreign communities, also the complex interplay between immigration, housing, and demographics in Italy and how immigrants play a role in addressing issues related to an aging population and housing stock.

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DOES THE IMMIGRANT BACKGROUND AFFECT STUDENT ACHIEVEMENT? CROSS-COUNTRY COMPARISONS OF PISA SCORES[1]

Valentina Ferri, Giovanna Di Castro, Salvatore Marsiglia

Abstract. The paper aims to analyze the learning differentials between natives and students with an immigrant background. Using econometric methods, we compare countries with different migration histories and the gap between immigrant and native students in other European countries. Through the analysis of the reading scores (OECD PISA 2018 tests), we deepen the gap between immigrants and native students. To investigate this gap, our study analyzes the role played by different variables such as gender, social and economic background, motivational characteristics, and school context to understand how they influence the educational gap between students with an immigrant background and natives. We find that the most important variables that contribute to the gap are the school's and family's socio-economic index and the language spoken at home.

1. Introduction

The gap in educational achievement between native-born and immigrant students has been extensively studied in the literature, and overall, there is a consensus in attributing this gap mainly to differences in parents' socio-economic background and, especially in non-English speaking countries, in speaking a foreign language at home (Marks, 2005; Mostafa, 2010; Teltemann *et al.*, 2022).

However, through studies using OECD PISA data it is possible to make international comparisons and investigate the differences found between countries, useful for shedding light on which dimensions can most influence the gap or conversely contribute to mitigating it (OECD, 2019). In fact, the size of the difference in educational achievement between immigrant and native students depends strongly on the country considered.

As is well known, the rate of immigrant (residents) population has progressively increased over the last century, first in Central European states and then in Southern and Northern European states. For this reason, the number of foreign-born babies and students tends to grow steadily, and integration issues are

[1] The article is exclusively expressing the authors' opinions. Although the paper is the result of joint work, sections are attributed as follows: paragraphs 3 and 4 to Valentina Ferri; paragraphs 2 and 5 to Giovanna Di Castro; paragraphs 1 and 6 to Salvatore Marsiglia.

increasingly topical, reshaping our societies (Castles and Miller, 2018). However, industrialized countries differ considerably in terms of the proportion of migrants, the socio-economic background of migrants compared to the native population, the characteristics of the education system, and the success of integration policies. Although foreign students in Europe are, on average, slightly less educated than natives, there is great heterogeneity between countries.

The aim of the study is to analyze the educational gap between native-born and foreign-born students in several European countries to investigate the impact of the condition of origin on students' educational achievement. Through the analysis of the results of the OECD PISA 2018 tests, the work aims to analyze the learning differentials between natives and students with immigrant backgrounds. Using econometric methods, we focus our attention on reading literacy scores deepening the gap in reading literacy between immigrants and native students. In addition to thus contributing to the existing academic debate, the study will provide useful insights to inform educational policies aimed at supporting the success of students with immigrant backgrounds.

2. Literature review

Numerous studies have shown that the educational disadvantages experienced by migrant students are mainly due to the precarious socioeconomic conditions of the family in the host country (Entorf, 2015; Bilgili *et al.* 2018). Differences in the economic and cultural resources available to families can affect access to educational opportunities and family support, creating a gap in educational achievement (Banerjee, 2016). In addition, some studies have attempted to analyse the impact of the phenomenon of "school segregation", understood as the concentration of male and female students in homogeneous classes by socioeconomic disadvantage; a condition that in standardised measures of educational achievement tends to be associated with lower academic performance (Perry, 2010; Chiurco *et al.*, 2023).

The use of a foreign language at home can also be a challenge for immigrant pupils, especially in non-English speaking countries. This can negatively affect their learning abilities and active participation in class, as well as being an indirect indicator of greater integration in the host country. Furthermore, foreign students who use a language at home different from that of the host country, or from that used in assessment tests, sometimes score lower than other foreign students (Entorf and Minoiu, 2005). Conversely, the association between the use of the host country's language at home and a greater sense of belonging at school and higher reading scores has been shown (Kilpi-jakonen and Alisaari, 2021). In some countries, speaking a minority language more frequently with parents may indeed have a positive impact on achievement, but it is important to strike a balance between minority languages at home and the language of instruction at school.

However, the relationship between language use at home and school performance appears to be more complex than how it has been conceptualised in most studies and is still an open area of analysis (Agirdag and Vanlaar, 2018).

It is important to consider that the size of the disparity in educational attainment between native and immigrant students varies widely across countries. This variation can be attributed to factors such as immigration policies, the socioeconomic diversity of migrants, the characteristics of the education system, and the resources available for integration (OECD, 2016). Migration across Europe is an increasing reality in recent decades, affecting countries with a long history of immigration as well as countries that are newer to the phenomenon. Therefore, there is no single explanation for the disparity, but rather a complex set of factors that must be considered in context.

3. Data and methodology

This study uses OECD PISA 2018 microdata on 15-year-old students' reading literacy proficiency, the edition's main survey domain. Furthermore, in addition to student proficiency data, the survey contains information on family socio-economic background, attitudes, beliefs, home possessions, school and learning experiences, and in-depth questions about computer familiarity and future expectations.

The countries considered in the study are Denmark, United Kingdom, Germany, Switzerland, Italy, and France. We have chosen these countries not only because there are some important differences in the history of immigration but also because of their different educational systems.

We apply the Oaxaca Blinder decomposition (Blinder, 1973; Oaxaca, 1973), to estimate the amount of the differential between foreign and native students.

Through this method, we distinguish which part is the result of the differences in characteristics included in model estimations and which part remains unexplained. We estimated the threefold decomposition, dividing the differences in reading literacy scores into endowments (E, due to differences in the predictors), coefficient (C, the contribution of the unexplained component), and interaction effects (I, indicating simultaneous differences) between the two groups:

$$E = \{E(X_M) - E(X_F)\}\,\beta_M \quad (1)$$

$$C = E(X_M)\,(\beta_M - \beta_F) \quad (2)$$

$$I = \{E(X_M) - E(X_F)\}\,(\beta_M - \beta_F)) \quad (3)$$

The group differences in predictors are weighted by the coefficients of the native student (reference group) to calculate the endowments effect. The variables included in the model are as follows in the next table 1.

Table 1 – *Variables included in the model.*

Variable	Note
Female	takes the value 1 if the student is female, 0 otherwise;
Escs	is an index that measures the access of students to family resources (financial capital, social capital, cultural capital, and human capital);
Mean_escs	is the average escs index at the school level;
Misced	takes the value 1 if the mother is graduated, 0 otherwise;
Fisced	takes the value 1 if the father is graduated, 0 otherwise;
Cultposs	is an index of cultural possession of the family;
Lang_at_home	takes the value 1 if the students speak the language of the country of destination/ mother tongue and 0 if he/she speaks another language;
Link	takes the value 1 if is available to use at home internet connection, 0 otherwise;
Computer	takes the value 1 if the students use computers at home, 0 otherwise;
Joyread	is an index of enjoyment of reading activities;
Resilience	is an index that measures the student-reported higher self-efficacy;
Compete	is an index that the student indicated a greater perception of competence/difficulty than the OECD average;
Belong	is the scale that indicates the sense of belonging at school;
Gfofail	is an index of the student's fear of failure;
Mastgoal	is an index of ambitious learning goals;
Workmast	is an index of motivation;
Age	includes age from 15 years and 3 completed months to 16 years and 4 completed months (14 possible options: ex. 15 years and 3 completed months; 15 years and 4 completed months; 15 years and 5 completed months);
Disclima	is a scale that shows that the student enjoyed a better disciplinary climate in language-of-instruction lessons;
Quietpl	is a quiet place to study;
Tschoolt	is a school program.

4. The results of the model and the differences in the predictors

Regarding the results of the model shown in Table 2, in Switzerland, Italy, France, and Denmark, both the explainable part of the distribution (i.e., due to differences in the characteristics of the two groups) and the "unexplainable" component (due to unobserved factors or discrimination) are significant.

The overall difference between the two groups can be explained by differences in the independent variables ranging from 38 points (for Italy) to 22 points (for France). Approximately 10 points of the difference is explained by exogenous unexplained characteristics.

This percentage is higher for Denmark where it reaches 30 points. In contrast, in Germany and GBR, the discriminating part of the breakdown is not significant.

As Table 3 shows, the variable that corresponds to a measure of the average socio-economic level of the school (mean_escs) is significant in all countries, indicating that the difference in scores between foreign and native students is greater in schools with a higher socio-economic level than in those with a lower

socio-economic level. However, the socio-economic and cultural level of the family of origin (escs) is significant in Germany (27 points), Denmark (11 points), Switzerland (11 points), and GBR (3 points) where this variable increases the differential between natives and foreigners.

Table 2 – *Oaxaca Blinder decomposition, overall results.*

	Germany	Denmark	France	United Kingdom	Italy	Switzerland
Group_1	537.7622***	519.0307***	518.6594***	524.6578***	491.3209***	512.9881***
	[1.7734]	[1.2462]	[1.3948]	[1.0260]	[0.9612]	[1.7371]
Group_2	486.6050***	456.7982***	475.7316***	508.0883***	447.8532***	466.8393***
	[4.7276]	[2.7818]	[3.8333]	[2.9149]	[3.1771]	[2.6459]
Difference	51.1572***	62.2325***	42.9278***	16.5695***	43.4677***	46.1489***
	[5.0493]	[3.0481]	[4.0792]	[3.0902]	[3.3194]	[3.1652]
Endowments	57.7829***	22.4711***	19.6399***	5.5719*	38.0436***	34.6398***
	[5.8912]	[3.7717]	[4.1416]	[3.3687]	[3.9140]	[3.2746]
Coefficients	79,128	29.7135***	9.4753**	32,955	10.6916***	9.7982**
	[5.8086]	[4.5210]	[4.0281]	[3.9661]	[3.0664]	[4.1030]
Interaction	-14.5385**	10.0480**	13.8126***	7.7020*	-52,676	17,109
	[6.5542]	[5.0573]	[4.0965]	[4.1961]	[3.7042]	[4.2025]

Source: Authors' elaboration on PISA data.

It could be noted (Table 3) that schools may have a different proportion of immigrant students, which, can also influence the socioeconomic status of a school. Moreover, previous studies have found that native students and students from higher socioeconomic backgrounds attend private schools with fewer immigrant students (Betts & Fairlie, 2003).

5. The contribution of unexplained component

The language spoken at home (lang_at_home), as evidenced by numerous studies in the literature, (Ferri *et al.*, 2023) is significant for all countries (first Germany 22 points) except for the United Kingdom. It seems clear that where the language of the host country is predominantly used at home, the student benefits from reporting better results on reading tests. The language spoken at home, in fact, represents, as is well known, not only a variable affecting better learning in foreigners but sometimes also a proxy for the level of integration in that family.

The United Kingdom deserves a separate discussion. The "English" language is the second most spoken language in the world and the one most studied in schools

around the world, contributing to the highest level of assimilation of the same. The results for this country are, for this reason, somewhat distant from the others and the language spoken at home is not one of the significant variables.

The UK is also the country where the difference between native and foreign students is lowest by far (16 points - table 2), and where foreign students perform best, compared to their foreign counterparts in other countries.

Table 3 – *Oaxaca Blinder decomposition, endowments.*

	Germany	Denmark	France	United Kingdom	Italy	Switzerland
Female	-0.0008	-0.2065	-0.0231	-0.1873	-0.0582	-0.1026
	[0.0907]	[0.3444]	[0.1853]	[0.2855]	[0.1117]	[0.1406]
Escs	26.7756***	11.4822***	0.8134	2.8951**	-5.2241	10.6138***
	[6.4753]	[3.6091]	[4.1286]	[1.4699]	[3.2747]	[2.5898]
Mean_escs	22.3008***	13.2645***	19.7913***	7.4178***	12.5063***	12.6973***
	[2.9797]	[2.1114]	[2.4959]	[1.1964]	[1.6884]	[1.4191]
Misced	-1.5694	-4.2388**	-4.0443*	0.8209*	0.3803	-2.3604**
	[2.3632]	[1.8347]	[2.0999]	[0.4719]	[0.6421]	[1.0305]
Fisced	-9.2624***	-0.6884	-1.7838	0.8531*	-0.024	-4.2870***
	[2.7107]	[1.2342]	[1.2173]	[0.4887]	[0.0811]	[1.1369]
Cultposs	-1.9443	-1.3891	2.7426**	-0.0923	0.6005	1.2414*
	[1.6738]	[1.5439]	[1.3939]	[0.2619]	[1.7297]	[0.6688]
Lang_at_home	22.2668***	6.5269***	1.5772	3.3938	13.8738***	13.1059***
	[4.3454]	[2.4437]	[2.5563]	[2.4156]	[2.6854]	[2.5423]
Link	0.0118	0.5295	0.1565	0.3821	0.5659	0.2495
	[0.1577]	[0.3230]	[0.2618]	[0.2715]	[0.3452]	[0.2628]
Computer	0.1308	0.011	0.9849*	-0.1532	3.5207***	0.4193*
	[0.4666]	[0.1444]	[0.5600]	[0.1725]	[0.8659]	[0.2460]
Joyread	0.2617	-2.4006***	1.5563	-7.6325***	1.0696**	0.3728
	[0.9451]	[0.8167]	[0.9624]	[1.2653]	[0.4802]	[0.7878]

Source: Authors' elaboration on PISA data.
Other variables included: resilience, compete, belong, gfofail, mastgoal, workmast, age, disclima, quietpl, tschoolt.

Regarding the observed gap in the coefficient effect (table 4), the variable that always seems to play a very relevant role in increasing the gap is the father's education level. It might be reasonable to think, therefore, that the parent with a higher level of education may be discriminating in the increase of the reading score, thus creating a greater distance in the scores of foreigners and natives.

This situation happens in Switzerland, Germany, and Great Britain. There could also be another explanation. Often, having a high level of education enables families to have their children attend schools that keep the origin foreign language, but this could also penalize the acquisition of German or English in this case.

It is worth observing that in Germany the coefficient effect is not significant at all, which means that the model explains the gap with observable characteristics. The same situation also occurs in Great Britain.

Relative to Great Britain, there are many factors that seem to increase the unexplained component. Of all of them, it is worth pointing out that having a mother with a degree decreases the coefficient effect, which could be because it increases the score of foreigners. The mother plays a large role in terms of language acquisition. Having a mother with a university degree, of course, could also favor natives, but we assume that, since it is a coefficient effect, the more correct interpretation is that it increases the socio-economic status of the foreign family, thus favoring a lower "discrimination" effect.

Immigrant parents have a deep apprehension about the education of their children, but they face many challenges because of their limited language proficiency and limited understanding of the new educational context (Garcia-Reid *et al.*, 2015). The language spoken at home is very important because it helps to reduce the coefficient effect; we could probably imagine that an individual's linguistic distance would favor his or her isolation in the classroom. Being able to express oneself with one's peers and teachers to the best of one's ability is obviously a predictor of greater inclusion of the individual in the school context, as well as better study results.

The Swiss system seems to show very interesting results in the coefficient effect: possession of cultural tools as well as access to the internet seem to affect the discrimination effect and seem to diminish the unexplained coefficient effect. We may therefore think that the family economic profile as well as the availability of tools flattens the coefficient effect (table 4).

It emerges a personal dimension that opens space for different interpretations, for example, goal orientation and fear of failure. Results also re-emerge in interactions.

In Italy, family income seems to be very relevant, as well as the presence of a computer at home, this suggests a probably lower socio-economic index for foreigners, and this leads to a discriminatory effect linked to family economic aspects. In this sense, the mother with a high educational qualification, proxied by a more affluent and probably more integrated life, would greatly reduce the reading differential (table 4).

It is also important to make some observations concerning the general level of scores in the various countries (table 2).

If we don't consider the UK, which for the reasons mentioned above has the highest score, the group of foreign students from Germany has the highest performance in reading tests among the countries considered. The difference with

Italy's foreign colleagues is around 40 points (table 1) on the tests, which corresponds almost to one school year of learning according to the OECD.

Table 4 – *Oaxaca Blinder decomposition, coefficient effect.*

	Germany	Denmark	France	United Kingdom	Italy	Switzerland
Female	0.9989	-5.8039*	4.5459	-0.3431	-4.3036	-2.7346
	[4.2126]	[3.2623]	[3.7207]	[3.5523]	[3.1487]	[2.7165]
Escs	14.8779***	0.1035	-5.0296	-0.3798	-10.1881**	-0.9574
	[5.1328]	[0.4854]	[3.4238]	[0.8523]	[4.1468]	[1.8377]
Mean_escs	-0.9015	-5.8927**	2.1764	-0.4427	-4.0202	-0.1434
	[1.9531]	[2.3514]	[1.4606]	[1.2820]	[2.6483]	[0.5578]
Misced	0.4684	24.6433**	12.7812	-37.4457***	-16.0837**	-3.3521
	[9.2819]	[10.7913]	[9.9863]	[11.2442]	[8.0622]	[7.5426]
Fisced	37.9464***	3.9268	3.8731	23.1726**	-6.637	20.1681**
	[11.0175]	[9.1378]	[10.2343]	[11.4438]	[8.3862]	[8.7299]
Cultposs	-0.5435	-3.6031**	1.5007	-0.2281	-0.5328	1.4620**
	[0.5102]	[1.5411]	[3.0279]	[0.2235]	[0.6292]	[0.6889]
Lang_at_	8.5821	-11.0179***	-8.0896**	-14.0209***	9.7979***	-2.2429
home	[6.2813]	[4.2616]	[3.6412]	[3.8669]	[3.6581]	[4.4232]
Link	6.3852	-74.2754*	-20.9076	-37.5493	-8.1065	-63.7192***
	[30.5916]	[44.8313]	[25.2035]	[31.7901]	[12.8447]	[23.8142]
Computer	25.4638*	-22.6572	0.6757	-6.4211	-23.5165***	-1.0712
	[14.2555]	[24.1229]	[10.2769]	[11.0397]	[6.6941]	[12.3121]
Joyread	-0.8373	-1.6829***	-0.3655	1.2125**	-0.0352	-0.6161
	[1.0323]	[0.5915]	[0.5579]	[0.5229]	[0.2023]	[0.7737]
_Cons	-460.4400**	-75.9598	-162.9733	-249.2944	-73.1188	11.9531
	[226.9693]	[161.6118]	[185.3429]	[157.8590]	[148.8042]	[149.1679]

Source: Authors' elaboration on PISA data.
Other variables included: resilience, compete, belong, gfofail, mastgoal, workmast, age, disclima, quietpl, tschoolt.

6. Conclusions

The study provided an overview of the educational outcomes measured by PISA tests in reading of foreign-born versus native-born students in several European countries, including Switzerland, Italy, France, Denmark, Germany, and the United Kingdom.

These differences in performance can be explained by a factor's combination, including both those related to the characteristics of the two groups, as well as those due to unobserved or "discrimination" factors, which were analyzed through econometric analysis.

Among the explicit variables, the average socio-economic level of schools emerges as the only significant factor in all the countries analyzed. This relevant

result shows that the difference in scores between foreign and native students is more pronounced in schools with a higher socio-economic level than in those with lower levels.

One possible explanation for this result is that schools with a higher socio-economic level might have a higher concentration of native students from favorable socio-economic backgrounds in environments where they would benefit more from shared interactions and learning opportunities, as opposed to foreign students who might be more likely to come from more socio-economically diverse backgrounds and might be at a disadvantage, accentuating the differential between the two groups. Immigrant families have often lower levels of ESCS, and the parents of immigrant students are less educated than parents of native students (Schleicher, 2006). The group of native students, in economically advantaged backgrounds, may also have greater access to educational resources, and a greater amount of cultural stimulation in their families of origin.

Furthermore, it is found that the socio-economic and cultural background of the family of origin is significant only in Germany, Denmark, Switzerland, and the UK, where the difference between native and foreign students increases further. This is not the case in Italy, and France, suggesting that the social composition of schools, contextual factors, or social dynamics play a more important role in influencing the achievement gap between these two groups of students. For example, there may be differences in the quality of teaching and access to additional educational resources that are not directly reflected by the measure of the socio-economic level of students at the individual level.

The language spoken at home, as shown by numerous studies (see also Ferri *et al.*, 2023), also significantly influences the achievement gap between foreign and native students in all countries considered, except Great Britain. Foreign students who speak the language of the host country at home tend to have better reading performance than those who speak a different native language more frequently at home.

We can assume that the language spoken at home, for foreign students, not only represents a vehicle for learning and consolidation but also reflects a proxy for the level of integration of the family. This underlines the importance of providing adequate language training to students' families and support to foreign students to facilitate their academic success.

The United Kingdom (GBR) scenario requires a separate, in-depth analysis. It is evident that English, as the predominant language, is assimilated by foreign students more quickly than other languages used in the countries under comparison. English is considered the second foreign language par excellence, it is assimilated more easily by students due to its presence in the media or social media, and its global relevance. It is likely that every student and family already has a knowledge base of this language in addition to studying it in class as an additional subject. This factor contributes to distancing the UK's results from the other countries surveyed. This is also the country where the difference between

native and foreign students is lowest by far (16 points), and where foreign students perform best, compared to their foreign counterparts in other countries.

We also feel it is important to note that in Germany and Great Britain, the coefficient effect is not significant at all, which means that the reasons for the gap between natives and foreigners are well explained by the characteristics observed in the model. Analyses of the observed gap in the coefficient effect do, however, reveal a significant role of the father's level of education in widening the gap between foreign and native students, especially in Switzerland, Germany, and Great Britain.

It is supposed that the higher educated parent may influence the increase in reading scores, thus creating a greater disparity between foreign and native students. However, there could be another explanation: the higher education of immigrant families could allow them to have their children attend schools that maintain their mother tongue as their first language, in order not to lose the value of this cultural and identity resource, which could penalize language acquisition in the host country.

In the UK, and in Italy, several factors seem to increase the unexplained gap component, including the fact that having a mother with a university degree reduces the coefficient effect. This could be due to the increased scores of foreign students, as the role of the mother is also crucial for language acquisition. Presumably, the presence of a mother with a university degree also increases the socio-economic status of the foreign family, the possible integration, and the likelihood of speaking the language of the host country at home, reducing the discriminatory effect.

In the Swiss context, factors such as possession of cultural tools and access to the Internet seem to influence the discrimination effect by decreasing the unexplained part of the gap. This suggests that family economic profile and availability of resources have a leveling effect on the coefficient effect.

Finally, some relevant observations emerged by analyzing the differential in the scores of native and foreign students across countries. The lowest difference between the two groups is found in the United Kingdom, probably due to the mentioned factors such as language and other elements that favor the assimilation of English by foreign students. On the other hand, the highest difference between the two groups is observed in Denmark, followed by Germany, Switzerland, France, and Italy. On the other hand, foreign students in Germany show the highest performance in reading tests compared to the other countries examined. Consider that the difference between foreign students in Germany and those in Italy is around 40 points in the tests, corresponding to almost one school year of learning according to the OECD.

The results presented underline the importance of considering the national context and country-specific factors when analyzing differences between foreign and native students. It is crucial to understand the role of language, as well as parental education level and socio-economic conditions to correctly interpret the

observed disparities in test scores. On the other hand, the most significant role for all countries seems to be that corresponding to the socio-economic composition of schools.

This provides significant insights to guide educational policies aimed at reducing differences and promoting the inclusion of foreign students in the school system.

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LEARNING PERFORMANCES OF UNACCOMPANIED FOREIGN MINORS: A CASE STUDY

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Abstract. The reception paths offered for unaccompanied foreign minors (UFMs) in the destination country are fundamental to acquiring the tools to enter the world of work and, more generally, build a new life, particularly the possibility of quickly learning the native language and dedicating oneself profitably to study and training. Starting from this consideration, we investigated the learning paths of the UFMs hosted by the Municipality of Milan. We identified the determinants for their successful performance by acquiring information from the minors and the operators who had them in charge. The analyses showed that staying in the reception pathway and the backgrounds of the UFMs are equally relevant to achieve positive performances. On the one hand, although many UFMs dropped out of the more structured educational pathways (CPIA and school), legal and relational inclusion impact significantly; on the other hand, the origin, the approval or otherwise of the parents to migrate, and the years of study in the country of origin are just as important to have educational results.

1. Introduction and theoretical framework

An unaccompanied foreign minor (UFM), according to the definition in the Recast Qualification Directive 2011/95/EU by the European Union, is a "minor who arrives on the territory of an EU Member unaccompanied by the adult responsible for him/her by law [...] or who is left unaccompanied after he/she has entered the territory of the EU Member State"[1]. UFMs are considered among the potentially most vulnerable migrants (Morgano, 2020). They are vulnerable as minors, and as foreigners, and because their parents do not accompany them during dangerous and complex journeys, characterized by exposure to high risks regarding safety and psycho-physical integrity. Moreover, they are forced to imagine their future in a country whose language they do not yet know, far from their own place of origin, and without the support of an attachment context that can compensate for

[1] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:337:0009:0026:en:PDF

these fragilities (Accorinti, 2014; Foschino Barbaro and Sgaramella, 2021). To the initial vulnerability is added a complex condition determined by their status, which places them at the crossroads of multiple juridical affiliations: minors, foreigners, possibly asylum seekers, and often victims of trafficking.

Some research has shifted attention from vulnerabilities to the resilience characteristics that distinguish UFMs: many have chosen to undertake migration to help their families redeem themselves financially or have often been able to overcome independently the problematic experience of the journey, putting in place autonomy and determination (Accorinti, 2016; Çelikaksoy and Wadensjö, 2016).

Generally speaking, the complex system of factors underlying international migration becomes even more intricate in the case of UFMs: for example, the family can play a preponderant or marginal role if not present, or may even be harmful if it represents a main factor driving individuals to flee (Accorinti and Vitiello, 2017).

Furthermore, the UFMs' migration projects may differ significantly from each other. Their circumstances are unstable and constantly evolving, requiring local institutions to provide personalized attention to individual cases to determine which reception practices best protect their interests (Accorinti, 2014; IOM, 2018).

Law 47/2017[2] provides Italy with an advanced regulatory framework for the recognition of the rights of UFMs and their protection (Fondazione Ismu, 2019). In Italy, as well as in the rest of the European Union, UFMs are foreigners with citizenship from outside the EU, who are, for whatever reason, on national territory without legal assistance or representation (Pavesi, 2020). Furthermore, this law reaffirms the absolute principle of non-refoulement, introduces the role of the voluntary guardian, and makes provisions to facilitate the realization of UFMs' right to education and health. Of particular importance is art. 13, which outlines the possibility for the Juvenile Court to entrust a young adult to social services to allow that individual to complete the social integration courses already started, up to the twenty-first year of age.

Risk and resilience factors function differently depending on the contexts in which UFMs find themselves (Aleghfeli and Hunt, 2022). Furthermore, different studies show the importance of keeping UFM in the reception circuit, since the phenomenon of their "untraceable" is relevant (Unicef, 2017; Ministry of Labour and Social Policies, 2022).

From this point of view, the reception paths offered to UFMs in the destination country are fundamental, particularly the possibility of quickly learning the native

[2] Provisions on protection measures for unaccompanied foreign minors.
http://www.prefettura.it/FILES/AllegatiPag/1162/LEGGE_7_aprile_2017_n_47.pdf

language and dedicating oneself profitably to study and training. Entering school may represent an excellent opportunity to process the traumas caused by migration and acquire stimuli and motivation to build a new life project gradually (Biagioli, 2015). Therefore, school plays a strategic role being the primary integration tool, together with professional training. Italian is learned at school, students can work on social integration, and it is through school and professional training that one acquires the necessary skills for subsequent job placement (Pavesi, 2020; Santagati and Barzaghi, 2021). In offering the tools of speech and knowledge, school supports the minor in self-discovery and the placement of his or her history and path within a broader socio-cultural horizon (Augelli *et al.*, 2020).

Identifying risk and resilience factors in educational pathways is necessary to guide reception policies aimed at UFMs, whose characteristics are increasingly changing and heterogeneous (Aleghfeli and Hunt, 2022). As the law on the rights and protection of UFM has advanced, the same can be said for the Italian legislation which regulates foreign minors' right to education: all foreign minors, even if without a residence permit, have the right to be enrolled in school (of all types and levels, not just compulsory school). The enrolment of foreign minors takes place in the same manner and under the conditions provided for Italian minors and can be requested at any time of year (Accorinti, 2014). Alongside compulsory schooling and their rights and duty to education, UFMs regardless of legal status have access to professional training courses. The legislation on the right and duty to education and professional training stipulates compulsory education for ten years; compulsory education continues up to the age of 18, and is fulfilled by obtaining a secondary school diploma, or a professional qualification lasting at least three years, or enrolling in an apprenticeship. Indeed, various surveys show that with the prolongation of reception, the involvement of minors in the education and training system becomes almost universal (Santagati and Barzaghi, 2021).

It should be kept in mind that many UFMs should be enrolled old for their grade, having yet to complete compulsory schooling. However, they are more easily placed in the CPIA[3] in the context of initial literacy courses. In some cases, they are only later included in the scholastic path of the lower secondary school

[3] CPIA stands for "Centro Provinciale per l'Istruzione degli Adulti" ("Provincial Center for Adult Education"). At the CPIA, it is possible to obtain: the final certificate of the first cycle of education (equivalent to completing middle school), a certification of fulfilment of compulsory education, and a certification of knowledge of the Italian language at level A2 of the Common European Framework of Reference for Languages developed by the Council of Europe. Specifically, regarding enrolment in CPIAs, established by DPR 263/12, the regulations stipulate the enrolment requirements for minors who have reached the age of sixteen and do not possess the final certificate of the first cycle of education. In exceptional cases, motivated by specific needs, individuals who have reached the age of fifteen may be admitted (Article 3, DPR No. 263/12).

within the CPIA. The CPIA is a strong point of reference because it offers structured courses and UFMs perceive it as a real school, with the possibility of certification and creating a course of study more suitable for the individual's needs (Augelli, 2020).

Another important element is that the reasons underlying migration vary according to the country of origin, with a substantial impact on the reception pathways in the host country (Santagati and Barzaghi, 2021) and on different propensities to abandon these pathways (Unicef, 2017).

Furthermore, some research has shown how overcoming the difficulties connected to migration (which may include leaving the country of origin in conflict with one's parents) selects a more motivated group of migrants capable of going beyond difficulties and who have considerable decision-making capacity (Çelikaksoy and Wadensjö, 2016; Augelli *et al.*, 2018).

The networks created in the host country are equally crucial. The more that adolescents create their own networks and peer contacts, the greater opportunities they have of achieving positive pathways for successful social inclusion (Augelli *et al.*, 2018; Fondazione Ismu, 2019). Furthermore, the possibility of good social inclusion is also linked to the possibility for UFMs to gain experience outside their host communities through performance in sports, cultural, and social activities envisaged in an individualized educational program (Augelli *et al.*, 2020).

Finally, it should be kept in mind that slow and complex procedures for obtaining a residence permit in the host country are a fundamental obstacle to supporting UFMs and their transition to adulthood (Fondazione Ismu, 2019).

Through the case study of UFMs hosted by the Municipality of Milan, we studied their learning paths, and we identified the determinants for their successful performance based on the prevailing evidence in the recent literature cited above.

2. Data and methods

2.1. Data

We used data from a survey collected for a project carried out by the Municipality of Milan and the Department of Statistics and Quantitative Methods (DISMEQ) of the University of Milan Bicocca. The project aimed to investigate the UFMs hosted by the Municipality of Milan on 31 December 2021 collecting information about their socio-demographic backgrounds, the characteristics of their travel to arrive in Italy, hosting conditions, future projects, and operator ratings. In addition, detailed data on education and training pathways were collected to allow a more comprehensive analysis of how UFMs get involved. This allows a better

definition/description which, if based only on data from institutional sources, is partial, incomplete, and fragmented (Santagati and Barzaghi, 2021).

Therefore, the survey's target population consisted of unaccompanied foreign minors and young adults (henceforth generically UFMs) who were guests with the Municipality of Milan on 31 December 2021. The survey tool was a standardized quantitative questionnaire shared by the 'Policies Unit for Inclusion and Immigration' of the Municipality of Milan and the DISMEQ.

After a pre-test in four communities in December 2021, three training days were organized for the operators who would be responsible for carrying out the survey, involving all the organizations that have UFMs under their care in partnership with the Municipality of Milan.

The operators of the reception units then administered the questionnaire in January and February 2022. The survey phase effectively ended on 28 February, and 96 reception units (including reception centres, educational communities, and apartments) were surveyed within the 25 out of 26 institutions participating in the survey, which in total housed 598 UFMs. The number of guests extracted from the Municipality of Milan database on the same date was 648 units, excluding 59 guests of the institution that declined to participate in the survey. The lower number of cases in the survey in comparison with the municipal data is due to the need to update the latter, which at the time of the extraction included guests who had left some time previously.

In the end, 566 valid questionnaires were collected, representing 86% of the total UFMs. Except for one, the responses contained data for all the institutions that hosted UFMs on 31 December 2021 in agreement with the Municipality of Milan and all UFMs who were hosted on that precise date. The survey, therefore, takes on the characteristics of a census.

The survey that was conducted has a complexity deriving from the fact that it is intended both for the UFMs themselves and for operators; UFMs were interviewed to identify the reasons underlying their migration choices and future intentions, and operators were called upon to complete assessments in several areas relating to the UFMs' reception process, and to provide objective data on the courses undertaken and the characteristics of their assigned UFMs.

2.2. Methods and variables

The outcome variable was "educational performances", derived from two questions available in the questionnaire. The first question assessed whether a level

of Italian language proficiency equal to A2[4] had been reached. The second question identified those who had not started or had stopped attending school or a CPIA or training course. Therefore, the outcome variable assumed a value of 0 if an Italian language level equal to A2 had not been achieved, or if attendance in a school/CPIA/training course had not been started or had been interrupted. Otherwise, the variable assumed the value 1 (reached an Italian language level equal to A2, and school attendance or a CPIA or training course was not interrupted).

The dependent variable considered the essential elements contributing to educational failure: difficulties related to understanding the Italian language, inconstancy in school attendance, and students' failure to achieve classroom goals (Biagioli, 2015). Furthermore, the A2 level was chosen because the CPIA requires this level for minors to be placed in lower secondary school courses, as it is considered fundamental learning the language to enable study (Augelli, 2020).

We used five main explanatory variables based on the prevailing evidence emerging in the literature: 'Citizenship': Egypt (reference), Albania, Tunisia, Bangladesh, or other countries; 'Years of study in the country of origin'; 'Total parental agreement with migration': no (reference), yes; 'Italian friends': no (reference), yes; 'Operator assessment of participation in recreational activities': scale from 1 (minimum) to 5 (maximum). Furthermore, we used the following control variables: 'Residence permit': no (reference), yes; 'duration of stay', measured as the months spent in Italy.

We performed descriptive statistical analysis to show the main characteristics of UFMs in the case study, and we applied a logistic regression model to test the roles of covariates mentioned above.

3. Results

3.1. Descriptive results

Structural features. As can be seen from Table 1, almost all of the guests are male (97.2%). the most prevalent citizenship is Egyptian (43.8%), followed by Albanian (15.4%) and Tunisian (11.8%). The predominance of Egyptians reflects the flows of Egyptian UFMs who have Milan as their destination, due to a consolidated migratory chain that makes Egypt the most populous migrant

[4] The level of Italian detected in the survey is expressed in the six levels (A1, A2, B1, B2, C1, C2) of the Common European Framework of Reference for Languages developed by the Council of Europe (CEFRL) scale. https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions

community among Milan residents[5]. The share of 18-21-year-olds is substantial (34.2%), highlighting how the reception pathways follow the UFMs beyond the minor age. On the other hand, the proportion of those who have arrived in Italy for at least two years is lower (21.3%) because a significant portion of UFMs is 17 years old upon arrival. Finally, less than a third studied for 9-13 years in the country of origin and a high share (43.2) came from rural areas.

Table 1 – *UFMs' citizenship and associated characteristics (%), 31 December 2021.*

Citizenship	%	male	18-21 years old	From rural areas	9-13 years of schooling in the country of origin	Very low-income family	≥2 years migratory duration
Egypt	43.8	99.6	29.4	50.6	28.0	16.9	8.5
Albania	15.4	97.7	39.1	34.9	64.7	4.7	46.5
Tunisia	11.8	100.0	26.9	25.4	24.2	7.5	16.9
Bangladesh	9.7	100.0	29.1	51.9	3.7	29.1	5.9
Pakistan	5.1	100.0	44.8	62.1	20.7	20.7	24.1
Other countries	14.2	83.5	49.4	30.8	36.8	17.9	47.8
Total	100.0	97.2	34.3	43.2	31.8	15.4	21.3

Source: elaboration on survey UFMs Milan Municipality

The communities have specific traits: Albanians and Bengalis are represented by opposing statistics. The former community has the highest education levels (64.7% studied in their country of origin for at least nine years), the lowest percentage of very low-income families (4.7%), and the longest migratory history (46.5% present in Italy for two or more years). On the contrary, the latter community has the lowest level of education (only 3.7% reach nine years of schooling), the highest incidence of very low-income families (29.1%), and the most recent migratory history (only 5.9 % have been present for two or more years). Among the other more numerous communities, Tunisians have characteristics similar to Albanians (few come from very low-income families or rural areas). In contrast, the Egyptian and Pakistani communities have traits in common with the Bengalis (with an above-average incidence of very poor and those from rural areas). Moreover, Pakistanis notably have the highest percentage of 18-21-year-olds (44.8%), just as the group of UFMs from other countries (49.4%). In contrast, Egyptians have a comparatively more recent migratory history (only 8.5% have been in Italy for two or more years).

Knowledge of the Italian language and school dropout. Upon entry to reception, knowledge of the Italian language is largely deficient. Improvement in Italian can

[5] Cfr. http://sisi.comune.milano.it/ The statistical computing platform of the Municipality of Milan.

be appreciated by stratifying the guests by the duration of their reception in agreement with the Municipality of Milan (Table 2): the share of Pre A1s is inversely linked with the duration they have been in reception (reaching zero among those present for over two years); conversely, level B1 becomes consistent among those who have been hosted for more than six months, and level B2 among those who have been guests for over a year, being the most frequent level among those who entered over two years ago (40%). Among the UFMs who have been present for the longest time, the Albanian community, on average more educated and inclined to learn Italian, is the largest. Therefore, the effect of migration duration is partly attributable to changes over time in the characteristics of flows.

Table 2 – *Percentages of UFMs by Italian level and by attended courses, stratified by duration since first entry in agreement with the Municipality of Milan.*

		Duration since first entry (in months)				
Italian level	First entry	0-3	4-6	7-12	13-24	> 24
Pre A1	88.2	40.2	29.1	9.5	7.0	0.0
A1	9.1	47.8	54.7	39.3	30.3	8.0
A2	2.0	8.7	14.5	39.3	34.5	21.0
B1	0.5	3.3	1.7	11.9	18.3	31.0
B2 or more	0.2	0.0	0.0	0.0	9.9	40.0
Total	100	100	100	100	100	100
Attendance						
Italian course	-	84.8	91.5	97.6	95.8	95.0
CPIA	-	42.4	61.0	72.6	74.1	81.0
Primary or	-	12.6	14.7	15.7	18.0	49.0
Professional	-	1.1	4.3	16.9	28.2	47.5

Source: elaboration on survey UFMs Milan Municipality

Among the education and training opportunities offered to UFMs during their reception, in addition to Italian courses, there are CPIAs, primary or secondary school/CFP[6], and training courses (Table 2). After the Italian courses, which are attended by almost all the UFM guests, the CPIAs receive the highest number of enrolments (about two out of three UFMs). School (primary or secondary) and the training courses attracted the participation of around one in five UFMs. By stratifying attendance by duration of reception, it can be observed that participation in education and training increases among the UFMs present for the longest time. Attendance of at least one Italian course exceeded 90% among guests who had been present for over three months. For CPIA, schools, and training courses, attendance rate increased gradually with the duration since the first entry: it

[6] CFP stands for Centro di Formazione Professionale, an institution that provides vocational training to prepare individuals for entering the labour market.

exceeded 80% for CPIA, approaching 50% for schools and training courses among guests received for over two years.

Based on the survey data, the incidence of leaving school or training early can be estimated. Interruptions in attendance affected 5.5% of those attending Italian courses and 10.9% of those enrolled in a training course. The drop-out rate among UFMs enrolled in a CPIA and school is much more relevant (34.8% and 32.5%, respectively; Table 3) compared to that of Italian courses and training.

Table 3 – *Percentages of UFMs who, having completed an Italian course, CPIA, school (primary or secondary), or a training course, obtained a certification/diploma or dropped-out.*

	Italian course	CPIA	Primary or secondary school	Professional training course
drop-out	5.5	34.8	32.5	10.9
certificate/diploma	94.5	65.2	67.5	89.1

Source: elaboration on survey UFMs Milan Municipality

3.2. Results of the multivariate model

Net of the other variables, citizenship of origin is a significant characteristic that produces differences in UFMs' educational performance (Table 4). Among the citizenships considered, Egyptians and Bengalis are the communities with the least effective performances. In particular, compared with the Egyptian reference community, Albanians and Tunisians are more than three times as likely to have achieved an Italian level at least equal to A2 and not to have dropped out of school/training. Since the Egyptian community has a strong presence in Milan, the difficulties identified among UFMs of this origin are presumably not linked to the intention of leaving Italy. The lower propensity to engage in reception pathways may depend on being able to rely on the support of the community of origin in employment integration. Furthermore, the dichotomy of Albania vs Bangladesh as extremes of more and less education is confirmed by previous surveys (Santagati and Barzaghi, 2021). In the same way, school background has a statistically significant effect on "educational performances"; each additional year of study in the country of origin increases the probability of achieving an Italian level of at least A2 and not dropping out of school/training.

Furthermore, regarding relationships, although with weak statistical significance, we found performance to be better among those who migrated without parental consent. Likewise resulting in literature, this suggests greater motivation for migration, favouring a stronger commitment to learning the Italian

language and attending school/training courses. On the other hand, social relationships with Italians are associated with better linguistic and educational performance, confirming the positive role of relationships with natives.

Another quantitative variable that has a positive and significant effect on linguistic and school/training performance is the operators' assessment of participation in recreational activities. In this case, the positive involvement of UFMs in recreational activities can therefore be interpreted as a socializing tool that facilitates and promotes educational and training success.

Table 4 - *Logistic regression –Odds ratios and significance. Outcome variable "Educational performances".*

	Exp(B)	Sign.
Citizenship (ref. Egypt)		0.040
Albania	4.270	0.016
Tunisia	3.728	0.022
Bangladesh	2.754	0.110
Other Countries	1.902	0.182
Years of study in the country of origin	1.228	0.004
Total parental agreement with migration (ref. No)	0.512	0.070
Italian friends (ref. No)	1.929	0.073
Operator assessment of participation in recreational activities	1.450	0.034
Residence permit (ref. No)	3.337	0.020
Duration of stay (in months)	1.041	0.006
Constant	0.017	0.000

Source: elaboration on survey UFMs Milan Municipality

Regarding control variables, first staying in Italy also has a positive effect. That is not a foregone conclusion; it is true that those who have been in the country for longer have had more time to improve their Italian, but also for their studies/training to be interrupted. Probably on the basis of the identified link, we can trace the selection effect of UFMs who, if they have remained in reception for longer, have shown greater determination to continue their reception paths by making use of training courses. Meanwhile, other UFMs, that are not observable in the survey, have interrupted their reception path because they do not intend to stay in Italy and/or lack interest in the education and training paths made available by the Municipality of Milan. This association, therefore, demonstrates the importance of keeping UFMs in the reception circuit.

Secondly, obtaining a residence permit is an "accessory" element that appears to be very relevant. The UFMs that have a permit achieve better educational performance, net of other variables. It is plausible that obtaining a valid residence permit offers UFMs greater awareness and peace of mind for the positive continuation of their reception process.

4. Conclusions

A preliminary element that should be underlined is that gathering multiple data, including that from prior to migration, helps to improve a broad understanding of the phenomenon, overcoming the shortcomings of many previous UFM studies based on limited sets of variables. From this point of view, the case study of Milan, analysed through a questionnaire addressed to both UFMS and operators who deal with these minors, reveals the relevance of factors that cannot be deduced from mere administrative data.

Specifically, the case study conducted on UFMs hosted by the Municipality of Milan shows how the integration process, which requires knowledge of the Italian language and attendance at school and training courses, is closely connected to legal and relational inclusion. Although many UFMs dropped out of the more structured educational pathways (CPIA and school), those who persisted in the overall program achieved positive performances.

Finally, staying in the reception pathway and the backgrounds of the UFMs are equally relevant. The latter aspect is evident from the results; in fact, the educational performances differ to the origin, the approval or otherwise of the parents to migrate, or concerning the years of study in the country of origin.

The study's findings contribute to a better understanding of UFMs' educational outcomes and can inform policies and interventions to improve their learning performances.

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BEYOND THE EMERGENCY: CHARACTERISTICS AND BEHAVIOUR OF REFUGEES AND ASYLUM SEEKERS IN ITALY

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Abstract. In the last decade, Italy has been affected by significant flows of migration for humanitarian reasons. According to the Italian National Institute of Statistics (Istat) more than 500,000 people have sought asylum in Italy since 2014 (the year of the first humanitarian crisis in the Mediterranean). In 2021, there were almost 31,000 new permits for reasons related to international protection. Most of the new documents were granted to Pakistani nationals (6,090), followed at a distance by Bangladeshis (nearly 5,000) and Nigerians (3,057). Incoming flows are clearly recovering (+129%) compared to the previous year, a period affected by the pandemic. Contrary to earlier understanding, some of people arriving for humanitarian reasons are not temporarily passing through the country but remain for many years. Refugees and asylum seekers have special characteristics that distinguish them from the other migrants. The aim of the paper is to present a descriptive analysis of the inflows and the stocks of asylum seekers and refugees during the last decade. The study is based on the data of residence permits. This dataset highlights the dynamics that have affected these particular flows of migrants. In the first part, our paper focuses on the characteristics of migrants and their territorial distribution in Italy. In the second part the authors analyze, applying record linkage techniques and regression models, the likelihood that asylum seekers remain in Italy and study the factors that affect the choice to stay.

1. Introduction

Migration is an important world population phenomenon. It has been observed and studied in numerous fields both for the determinants of moving and the numerous effects that this event is able to generate (World Bank, 2023). Today many international migrations are forced migrations.

According to the UNHCR's main annual report, *Global Trends in Forced Displacement 2022*, the number of people forced to flee due to war, persecution, violence and human rights violations rose to a record 108.4 million at the end of

2022, an unprecedented increase of 19.1 million on the previous year. Even in 2023, numbers continue to grow mainly due to the outbreak of the conflict in Sudan, which has generated new exoduses. In 2022, instead, the war in Ukraine was the main driver of forced exodus, the fastest exodus of refugees since World War II. In Italy, the number of people who have been forced to leave their country due to war and persecution stands at 354,414 and of these 41% come from Ukraine.

The last decade has seen the settling of migrants who arrived in the past decades and by a significant change in the migratory flows arriving in our country (Istat, 2022). Migrant entries have decreased and migration characteristics and patterns have changed. In particular, for migrants coming from non-EU countries, there has been a drastic contraction of flows for *work* reasons. There has been stability in those arriving for *family reunification* (linked to stabilisation processes in Italy). But there has been a sudden growth in arrivals of people seeking *international protection*. This is linked to the "refugee crisis in the Mediterranean" in 2016-2017 (Istat, 2021; Blangiardo and Ortensi, 2023).

This study focuses on asylum seekers that is those who have left their country of origin, filed an asylum application in another country and who are waiting for the evaluation of refugee status by the authorities of their host country.

According to the UNHCR (United Nations High Commissioner for Refugees), there are almost 3 million asylum seekers in the world. A large proportion are resident in North America and Europe. In 2022 the United States, Germany, Costa Rica and Spain were the countries that received the most asylum applications (UNHCR, 2023). Based on data from the European Union Agency for Asylum (2023), Italy is the fifth country in the EU in terms of number of asylum requests (after Germany, France, Spain and Austria).

2. Objectives

The preliminary objective of the paper is to provide an overview of regular immigrants in Italy from 2011 to 2021 by examining some socio-demographic characteristics (e.g. citizenship and gender). In particular, we intend to carry out a brief descriptive analysis of regular immigrants in Italy over the last decade, focusing the study on the reason for their residence permit through a longitudinal approach. Using this approach, we intend to study the immigrant population present in Italy five years after the issuance of the first residence permit. Furthermore, we deepen the analysis by focusing only on immigrants to whom the prefecture has issued a residence permit for asylum. For many years, asylum seekers were considered a "temporary presence" in the receiving countries. But it is now clear that several refugees spend long periods of their life in the destination

countries. The aim of this part of the study is to identify how many asylum seekers are not a temporary presence in Italy. We focus on the profile and the main demographic characteristics of the long stayers: regular asylum seekers who remain in Italy five years after the issue of their residence permit.

3. Data and Methods

The data used in this analysis are mainly based on information from residence permits issued to non-EU citizens, particularly those related to political asylum. Istat (Italian National Institute of Statistics) harmonises and processes this information from the archives of the Ministry of the Interior.

The data used in this work refer to residence permits and not to asylum applications. There are numerous differences between the two datasets. This is due both to the time lag between the different procedures (asylum application and issue of the permit) and to the fact that an asylum application does not always correspond to a residence permit. However, residence permits[1] can be a useful source for better understanding the paths chosen by migrants in Italy. Specifically, stock data from 2011 to 2022 and flow data from 2011 to 2021 were used in this work.

For some years, Istat has been employing the residence permit dataset longitudinally. The data referring to the various years are linked through deterministic record linkage, employing unique identification codes. The linkage allows for individuals to be followed over time and to verify the continuity of their regular presence in the area. Obviously, regular migrants can be so monitored. If the person loses his residence permit, but remains in Italy, he or she "disappears" from the residence permit dataset. The unique code is available for about 90% of the cases. This allows for the performance of good quality analyses.

A logistic regression analysis was conducted on a group of over 180,000 non-EU citizens who entered Italy as asylum seekers in 2007 and, then again, from 2011 to 2016. The following variables were used:

- the response variable provides information on the presence or non-presence of the asylum seeker on Italian territory five years after the residence permit was issued;the five covariates used in the analysis are: gender; age (15-20 years, 21-25 years, 26-30 years, 36 years and over); citizenship (the first ten citizenships); Italian territorial units (five macro-regions: North-West,

[1] As mentioned above, the data of residence permits for "asylum seekers" register the arrival of migrants later than their asylum applications due to the time lag between the application and the issuance of the permit. Some problems were also noted with the registration of asylum seekers' permits in some provinces. In these places there is, therefore, undercounting.

North-East, Centre, South, Islands); and the issue year of the first residence permit (2007, 2011, 2012, 2013, 2014, 2015, 2016).

For the model, the proc logistic of the SAS software was used, with a recursive procedure, using the backward elimination selection technique: the model initially presents all the covariates, the level of significance (p value) and at each iteration the covariate that exceeds the threshold value of p value (0.05) is eliminated. In the present case it was not necessary to remove any variables.

4. Results

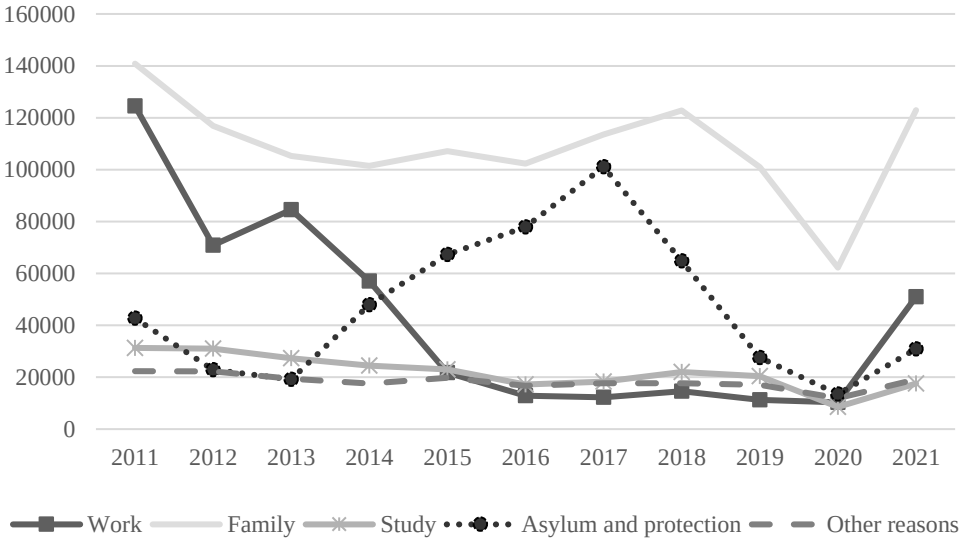
4.1. Descriptive Longitudinal Analysis

The data on residence permits can provide useful information on the flows and presence of people in our country for asylum or other forms of international protection.

Between 2011 and 2021, a total of 515,616 asylum permits were issued (Figure 4.1).

In recent years, in the face of a very low number of entries for work, permits issued for these specific reasons have become of primary importance. They account in some years for more than 30% of new issuances, as, for example, in 2016 and 2017. Subsequently, between 2018 and 2020, there has been a steady decline in new permits issued for international protection reasons. This is true both in absolute relative terms for the total number of permits issued. In 2020, as a result of the measures put in place to stem the spread of COVID-19 (primarily long border closures), the number of new permits issued reached an all-time low. Newly-issued asylum permits amounted to 13,467, which is 12.6% of the new documents granted in the year, a slightly higher share than in 2011. Between 2019 and 2020 at the height of the COVID-19 pandemic, there was thus a negative change in this type of permit of 51.1% compared to the previous year. In 2021, on the other hand, there was a recovery in the number of new permits issued - a total of almost 242,000 (+ 127% compared to 2020) - and new asylum documents also began to grow again: almost 31,000 were issued (+ 129% compared to 2020), a higher number than even in 2019. In relative terms, however, permits for asylum and other forms of protection had, in 2021, a lower relative importance than in 2019 (12.8% vs. 15.6%) because, following the regularisation measure issued in 2020 (Art. 103 of Decree-Law 34 of 2020), work permits have grown considerably. In general, over the last five years there has been a decrease of more than 16% in the number of new permits granted compared to the previous five years.

Figure 1. - *New permits issued during the reference year by reason, 2011-2021 (provisional values), absolute values.*



Source: Elaboration on Istat data.

The decrease has also been accompanied by a noticeable change in the characteristics of newcomers, with consequences for flows in general – there has been a change in the main countries of origin of immigrants. Between 2009 and 2021, the rankings of the main citizenships changed significantly from year to year. They tended to go hand in hand with the political crises and conflicts that broke out in different parts of the world.

Between 2016 and 2017, for example, there was a peak in the number of Nigerians who occupied first place in the ranking by number of arrivals (Table 4.1); this dynamic is to be traced above all to humanitarian crises in that country, which, at least in part, receded in the following years. A similar trend, though with smaller numbers, can be seen for arrivals from Mali. More constant over time, with less evident peaks, was the growth in arrivals from the Indian subcontinent (India, Pakistan and Bangladesh). These were only partially attributable to the search for international protection.

Asylum flows are special kind of migration, with different characteristics from labour or family reunification flows. Traditionally the share of women and minors among migrants seeking protection is very low, although in recent years the presence of children and young people has increased.

Table 1 - *Ranking of the top 10 countries by number of new residence permits granted in the year (provisional values), 2009-2021.*

2021	2019	2017	2015	2013	2011	2009
Albania	Albania	Nigeria	Morocco	Morocco	Morocco	Ukraine
Morocco	Morocco	Albania	Nigeria	China	China	Morocco
Bangladesh	India	Morocco	Albania	Albania	Albania	China
Pakistan	Pakistan	Pakistan	China	India	Tunisia	Moldova
India	Bangladesh	Bangladesh	Pakistan	Ukraine	India	Albania
Egypt	China	China	India	Bangladesh	Moldova	India
Ukraine	U.S.A.	Senegal	Bangladesh	U.S.A.	Ukraine	Pakistan
U.K.	Egypt	India	Ukraine	Egypt	U.S.A.	Peru
China	Ukraine	U.S.A.	U.S.A.	Pakistan	Bangladesh	Egypt
Nigeria	Nigeria	Gambia	Senegal	Senegal	Philippines	Bangladesh

Source: Elaboration on Istat data.

Focusing on 2021, it will be seen that almost 31,000 new permits were issued for protection reasons; most of the new documents were granted to citizens of Pakistan (6,090 new documents issued), followed – but at a distance – by Bangladeshis (almost 5,000 permits) and Nigerians (3,057 new documents). In general, there was a clear upturn in entry flows compared to the previous year, which had seen numbers dampened by the effects of COVID. However, in 2021 new entries were 36% higher than those recorded in 2019 (those for asylum and other forms of protection 12%).

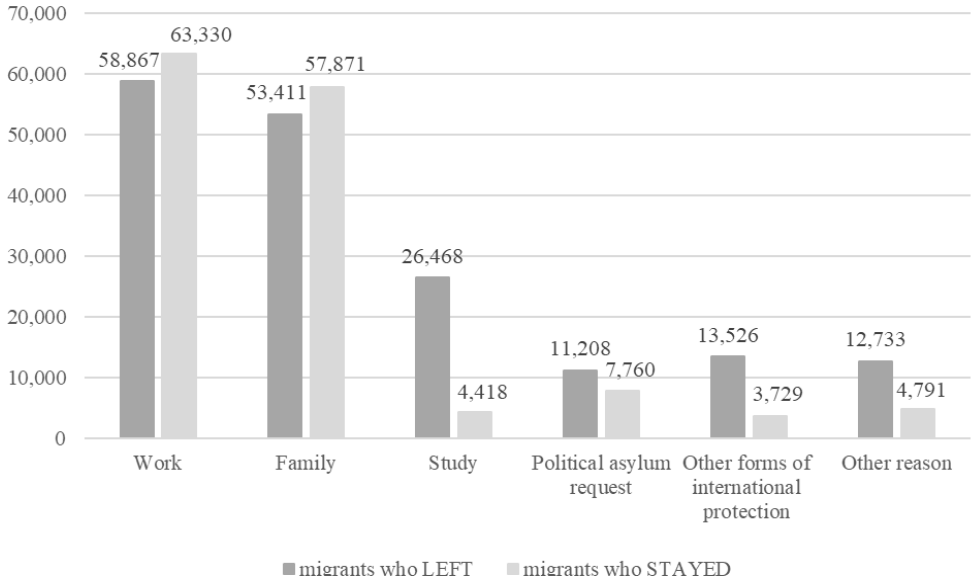
The analysis flags up which types of flows are more transitory and those which are more likely to stabilise on Italian territory. Considering two specific entry cohorts (those who entered Italy for the first time in the same year) – that of 2011 and that of 2016 –a record linkage operation between datasets verified their presence five years after the issuance of residence permits, respectively on 1st January 2017 and 1st January 2022.

As will be seen in Figure 4.2, the largest flows in 2011 came from the share of those who entered Italy for work (122,197 individuals) or for family reasons (111,282 migrants): these flows represented, respectively, 38.4% and 35% of the total number of immigrants.

Then, these were followed by 9.7% of entries for study reasons (30,886 people), 6% for requests for political asylum (18,968 people), 5.4% for other forms of

international protection[2] (17,255 migrants) and 5.5% for other reasons[3] (17,524 individuals).

Figure 2 - *Immigrants arrived in Italy in 2011 (absolute value) by presence after 5 years (01-01-2017) by reason of the permit.*



Source: Elaboration on Istat data.

The share of regular "long stayers" from the 2011 entry cohort stands at about 44.6% in 2016 of the total entries in 2011 (141,899 people). In particular, those who remained in Italy on 1st January 2017, both for work and family reunification reasons, were more than 50% (121,201 individuals). In the case of permits for asylum seekers, the share of those who had settled in Italy exceeded 40% (7,760 migrants). For other types of flows (study, other forms of international protection and other reasons) the percentage is, meanwhile, below the average value (35%) and represent 12,938 people.

Considering the 2016 flows (Figure 4.3), one can immediately see how they have changed compared to those of 2011.

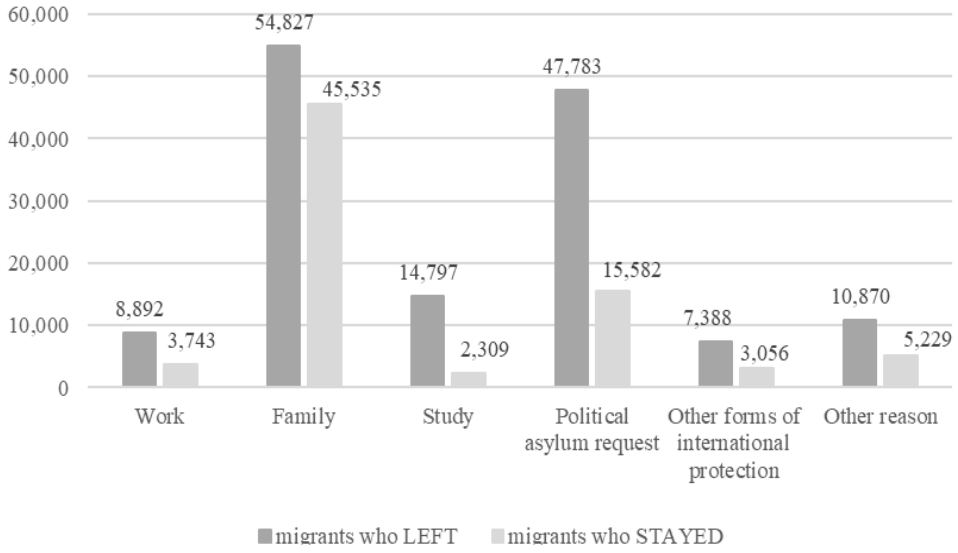
This is so both in the reason for the residence permit and in the extent of the flows. First of all, we can see a decrease in the number of people to whom a

[2] It includes: political asylum, subsidiary protection, humanitarian reasons.

[3] Explicitly taken into account, as statistically relevant, are: religion, elective residence, health and "other"; the latter includes the other reasons for which the permit was issued, such as: reasons of justice, integration of minors, recognised stateless person, sporting activity, etc.

residence permit was issued of about 100,000 compared to 2011. There is a percentage change of about -30%. Looking at the 2016 cohort, one observes a drastic decrease in permits for work reasons, accounting for 5.7% of the total permits issued in that year (in absolute value 12,635 people), and a 45.6% increase in permits for family reasons (100,362 individuals), although these had already stood at high levels in previous years. Another relevant aspect to highlight is the substantial increase in the share of those seeking political asylum, which is about 29% of all permits issued (63,365 migrants). The situation remained more or less similar to 2011 for other types of permits.

Figure 3 – *Immigrants arrived in Italy in 2016 (absolute value by presence after 5 years (01-01-2022) by reason of the permit.*



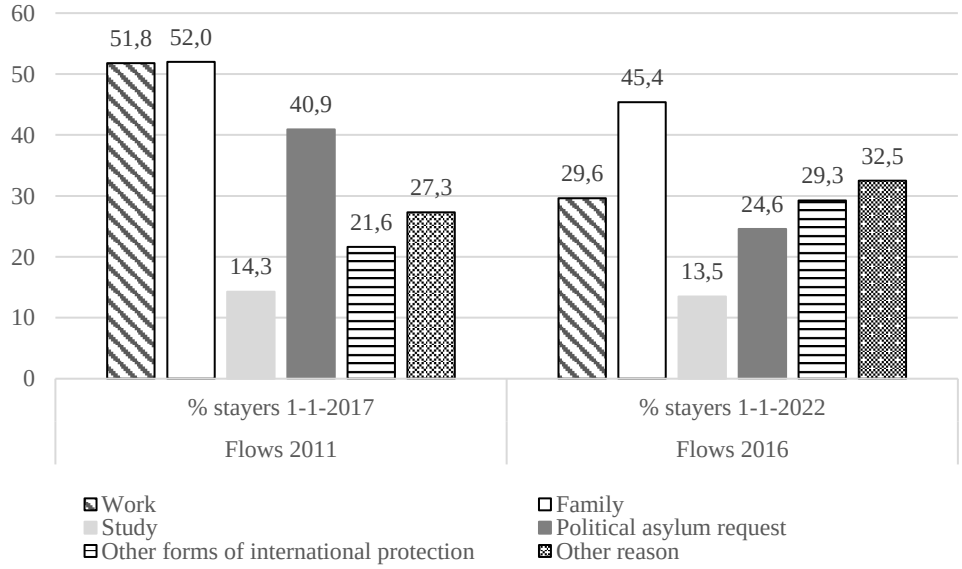
Source: Elaboration on Istat data.

The percentage of those remaining in Italy for work reasons was, in the 2016 entry cohort, about 30% (3,743 individuals) and for family reunification 45% (45,535 migrants). Only the "study" motivation has a lower percentage of regular settlers as of 1 January 2022 (13.5% and in absolute value 2,309 people) than asylum (24.6% or 15,582 individuals).

Finally, comparing the percentages of the 2011 and the 2016 cohorts who remain in Italy after five years (Figure 4.4.), these are migrants who were still in our country on 1st January 2017 and 1st January 2022.

It is worth bearing in mind that the share of settled migrants in the 2016 cohort was almost half (75,454) of that recorded for the 2011 cohort (141,899).

Figure 4. - *Percentages of long stayers (present after 5 years) among migrants who arrived in Italy in 2011 and 2016 by reason of permit.*



Source: Elaboration on Istat data.

The share of those who settled in Italy for family reasons is the highest for both cohorts (52% and 45.4%). The share of migrants for work permits has, meanwhile, decreased by more than twenty percentage points between the two cohorts (from 51.8% to 29.6%) since in many cases these are permits for seasonal work. There has been a clear decrease in those with asylum permits, highlighting in that these migrants are less likely to remain on Italian territory: for the 2011 cohort there was a 40.9% decrease and for that of 2016 a 24.6% decrease. Analysing the two cohorts, an increase of about seven percentage points is observed for immigrants settled in Italy on the basis of other forms of international protection. For "study", the percentage of those who remained in Italy remained almost unchanged in the two years considered (2017 and 2022) and stood at about 14%.

4.2 Logistic regression model

The analysis focuses on migrants who have been issued a residence permit to apply for political asylum. Through the results provided by the application of the logistic regression model, we aim to identify the profile and some demographic

characteristics of asylum seekers who are still in Italy five years after the issue of their residence permit.

As can be seen from the Table 4.2, almost all estimates are significant (p-value<0.05).

It is worth noting that the asylum seekers who were most likely to remain in Italy after five years from the moment their permit was issued were women. In fact women are 43% more likely than men to settle in Italian territory.

Considering age, younger asylum seekers, aged fifteen to twenty, tend to stay in Italy for shorter periods than migrants who are older than 35.

Table 2. - *Results of the logistic regression model.*

Odds Ratio Estimates				
Effect	**Point estimate**	**Wald 95% confidence limits**		**p-value**
Sex Women vs. Men	1.425	1.375	1.477	<.0001
Age 26-35 vs. 36+	0.97	0.933	1.008	0.3385
Age 21-25	0.949	0.912	0.987	0.1472
Age 15-20	0.93	0.891	0.97	0.0013
Cit. Pakistan vs. Senegal	1.961	1.856	2.072	<.0001
Cit. Bangladesh	1.902	1.793	2.018	<.0001
Cit. Afghanistan	1.792	1.654	1.941	<.0001
Cit. Other nationality	1.449	1.376	1.525	0.0032
Cit. Mali	1.405	1.327	1.487	0.5926
Cit. Nigeria	1.393	1.325	1.465	0.9118
Cit. Gambia	1.385	1.307	1.467	0.804
Cit. Ghana	1.351	1.269	1.439	0.1797
Cit. Côte d'Ivoire	1.037	0.969	1.111	<.0001
Cit. Guinea	1.028	0.947	1.116	<.0001
Terr. Centre vs. South	1.46	1.414	1.508	<.0001
Terr. North-East	1.19	1.15	1.23	<.0001
Terr. North-West	1.184	1.147	1.222	<.0001
Terr. Islands	0.85	0.818	0.883	<.0001
Year 2011 vs. 2016	2.083	2.011	2.158	<.0001
Year 2012	1.681	1.608	1.758	<.0001
Year 2007	1.564	1.374	1.781	0.0005
Year 2013	1.494	1.413	1.58	<.0001
Year 2014	0.961	0.931	0.993	<.0001
Year 2015	0.732	0.711	0.754	<.0001

Note: The reference category of each independent variable examined in the analysis was indicated only once.
Source: Elaboration on Istat data.

Furthermore, among asylum seekers, those with Pakistani (+96%), Bangladeshi (+90%) and Afghan (+79%) citizenship are more likely to stay in Italy compared to Senegalese. Senegalese citizens are considered the least likely to remain.

Territorial distribution was taken into account by considering the geographical location of the prefecture that issued the residence permit. Asylum seekers living in Central Italy are 46% more likely to stay permanently than asylum seekers living in the South, while those living on the Islands tend to stay in the country only temporarily (0.85%).

Finally, examining the year of arrival of asylum seekers in Italy, it is evident that only for the 2014 and 2015 flows is there a lower likelihood that migrants will remain in Italy compared to the 2016 flow (respectively 0.96 and 0.73); while for the other years considered there is an opposite trend. In particular, asylum seekers who arrived in Italy in 2011 show a greater propensity to put down roots in the territory than migrants who entered in 2016, and this propensity is double that found in 2016.

5. Conclusions and future developments

Human beings have never stopped moving, producing different cultures, languages and ethnicities. Migration is a powerful force for development, improving the lives of migrants, their families and the societies in which they settle. At the same time, there are also challenges and difficulties for migrants, their countries of origin and for destination countries (World Bank, 2023).

In this paper, a descriptive contextual analysis was carried out on regular migrants who arrived in Italy in the decade 2011-2021 using residence permits. We focussed particularly on the reason for issuing residence permits and citizenship. Subsequently, two cohorts of migrants who arrived in Italy in 2011 and 2016 were followed for five years; through this longitudinal approach, an attempt was made to identify which migrants remained on Italian territory after five years, and then to study those who stabilised according to the reason behind their residence permit. It was thus possible to provide a picture of how migratory characteristics and patterns in Italy have changed rapidly over the last decade.

There was a consistent increase from 2008 to 2019 in the flows of migrants seeking international protection and, in particular, political asylum seekers. In this regard, there is a consensus that the management of these movements and their consequences, political, social and economic, must be properly analysed and addressed. It is important to measure the phenomenon and assess the living conditions and the degree of integration of refugees in host countries, and it is appropriate to monitor their presence on the territory (Giovannetti and Olivieri,

2022). To this end, we sought to identify the profile of the regular asylum seekers who were most likely to remain in Italy five years after the issue of their permit. Our results showed that they are mainly women compared to men, older than 36 years of age compared to younger age groups, and more likely to have Pakistani, Bangladeshi and Afghan than Senegalese citizenship. In addition, it appears that those who have chosen to remain are those who obtained a permit in the central regions of the country compared to those in the south and those who obtained a residence permit in 2011 and 2012 compared to 2016.

Starting from these first results, we would like to continue the analysis by studying the mobility of asylum seekers within Italy, paying particular attention to the effects of the large flows of migrants who arrived in Italy from Ukraine in 2022 fleeing war. There are over 132,000 refugees: 53% of whom are women and 32% minors.

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THE NARRATIVE OF THE SOCIAL FRAILTY OF THE OLDER POPULATION IN THE ITALIAN PRESS

Giulia Cavrini, Marina Marino, Agostino Stavolo

Abstract. Italy is the oldest country in Europe as of 2022, with a median citizen age of 48 years. As the older population continues to grow rapidly, issues such as frailty and life satisfaction have become increasingly critical. One area that has received little attention thus far is social frailty, which can be defined as insufficient participation or a complete absence of participation in social networks, along with a perception of inadequate contact and support (Bunt et al., 2017). This concept encompasses various social resources or limitations, social behaviors and activities, and self-management skills that all contribute to fulfilling social needs. The article aims to analyse and define the issues related to the older population as they are represented in the Italian press. In particular, the study aims to identify the similarities and differences in the narrative in different periods (2012, 2019, 2022), also focusing on the living conditions of the older people during the pandemic period. The Italian press highlighted the crucial role of women in caring for elderly relatives at home, emphasizing the importance of the gender dimension in supporting and caring for parents. In the following years, however, the focus shifted to the role of care institutions in preserving the individuals' dignity and the need for political intervention with welfare measures specifically aimed at the older population. Policy intervention played a crucial role in improving their socio-economic conditions, primarily through the creation of specific bonuses and allowances.

1. Introduction

In the twentieth century, Western countries experienced a significant dual demographic transformation: there was an unprecedented rise in life expectancy, followed by a notable decrease in fertility rates during the latter half of the century. These demographic shifts have resulted in a rapidly growing aging population, influencing the duration and timing of various family roles and intergenerational connections (Cisotto *et al*., 2022). According to Eurostat's 2023, Italy is the oldest

country in Europe as of 2022, with a median citizen age of 48 years (40.7 in 2002). Specifically, 23.8% of 65 years old and over in 2022.

To explore inequalities in ageing, and to design and manage health and social policies addressed to older people in bad health conditions, the identification of the negative aspects of ageing becomes relevant. As a result of the increase in the elderly population, frailty has emerged as a major public health problem. Frailty is a widely recognized term used to describe a complex condition characterized by heightened vulnerability resulting from negative health consequences associated with aging. However, there is an ongoing debate surrounding the essence of frailty (Bunt *et al*., 2017). On one side, there are models and concepts that emphasize the physical aspects of frailty (Fried *et al*., 2004). On the other side, integral models highlight the multidimensional nature of frailty (De Vries *et al*., 2011; Rockwood, 2005). These comprehensive models emphasize the dynamic biopsychosocial nature of frailty and outline the progression from life-course determinants and diseases to frailty and subsequent adverse outcomes (Gobbens *et al*., 2010). The fundamental notion is that frailty escalates as a result of the accumulation of physical, psychological, and social deficits or issues. While physical, psychological, and social frailty are all encompassed within the broader concept of frailty, the domain of social frailty remains relatively unexplored.

Social frailty has been explicitly defined in certain studies as inadequate or complete absence of engagement in social networks, along with the perception of lacking connections and support (Andrew *et al*., 2008). However, the majority of literature remains inconclusive regarding the nature and extent of social frailty as a concept, and there is significant variation in the approaches taken to define it. Other studies have investigated the impact of social deficits or issues on frailty, viewing social vulnerability as a contributing factor, and have found a moderate yet discernible association between social vulnerability and overall frailty. In this contribution, therefore, it was decided to start by identifying the most important topics related to social frailty. The aim is to define the main topics of the Italian national press on the conditions of elderly people and visualise how these have evolved in 2012, 2019 and 2022. To do this, we used a topic modelling technique, the Latent Dirichlet Allocation (LDA).

In the following paper, section 2 presents the methodology, including how the journal articles were extracted, the cleaning and pre-processing process and the formalisation of the LDA. The 3rd section identifies the results of the contribution, and the last section identifies the conclusions and future developments of the work.

2. Methodology

2.1. Data collection and preparation

To identify the articles of the Italian press, we utilized Octoparse software to extract newspaper articles from Google using two search queries: "anziani" (“older adults”) AND "condizioni anziani” (“older adults’ conditions”), in the years 2012, 2019, and 2022.

We eliminated duplicates and articles that did not match the search queries. In table 1, we indicated for each year, the number of articles extracted from Octoparse and the final number of documents.

Table 1 – *Documents extracted.*

Year	N° articles extracted	N° documents
2012	271	221
2019	310	252
2022	373	284

Text mining is a technique used to identify the main topics of a document by quantifying and analysing the words that compose it. We carried out several text pre-processing operations to convert the textual data (i.e., articles) into structured data that can be analysed statistically. Documents are parsed and tokenized, resulting in a set of distinct strings (tokens) separated by spaces, punctuation marks, or other special characters. The scheme achieved by tokenization is known as bag-of-words (BoW), as it treats each document as a multiset of its tokens, without regard to grammatical and syntactic roles. In a BoW corpus, the order between words does not matter. Once documents have been atomized into basic components, pre-processing phases are necessary to reduce linguistic variability (Uysal and Gunal, 2014). Initially, all term characters were converted to lower case. To ensure consistency between the different language variants, further normalisation procedures were implemented, such as the correction of misspelled terms and word accents, and the elimination of numeric characters (Misuraca and Spano, 2020). Next, we considered the process of grammar tagging in order to assign each term its respective part of speech (POS), identifying nouns, adjectives, and verbs for vocabulary construction. This stage turns out to be central because it allows for the recognition of POS functional to the identification of word

categories. To reduce morphological variability, lemmatization was carried out, where each term was re-turned to its canonical form: verbs are returned to the present infinitive, while nouns and adjectives to the masculine singular. When documents have been pre-processed, we constructed the so-called vocabulary by stacking identical terms and counting the number of occurrences of each term (type) in the document collection. From the list of vocabulary terms, we removed stop-words (i.e., common terms used in the specific language and domain analysed, such as prepositions and conjunctions) as well as the search queries "anziani" and "condizioni anziani" to ensure that the topics produced by topic modeling technique are meaningful and not characterized by the same top words. In addition, to further reduce noise in the topics inferred, words that rarely occur in the corpus are removed (Dahal *et al*., 2019). At the end of these phases, we returned a database composed by tokens, types and documents represented in table 2. According to these, it is possible to construct the document-term matrix, where on the rows there are the documents, and the columns are defined by the terms.

Table 2 – *Number of tokens, types, and dimensions of document-term matrix*

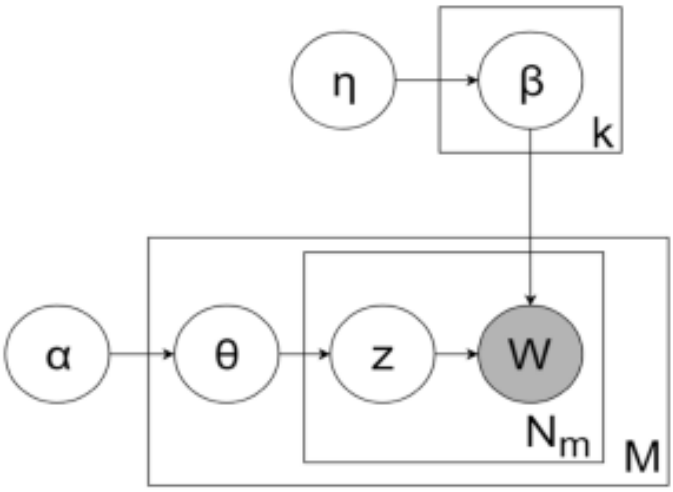
Year	Tokens	Types	Doc-term matrix
2012	15.886	2.750	221 x 2.750
2019	14.979	2.983	252 x 2.983
2022	13.514	3.232	284 x 3.232

2.2. Latent Dirichlet Allocation (LDA)

Topic modeling is a technique used in natural language processing (NLP) that extract topics or themes in a corpus of text data. The goal is to automatically identify hidden patterns in a collection of documents. It is also useful for underlying meaning out of newspaper corpora on a given topic (Uys *et al*., 2008). Han and Yoon (2007) examined 1,725 newspaper articles published between 1997 and 2006 that featured the terms "aging" or "elderly" in their text. Meanwhile, Lee (2022) analyzed articles from 10 Korean newspapers between 2006 and 2019 that included the term "aging" in titles. There are several kinds of topic modeling techniques among which Latent Dirichlet Allocation (LDA) is especially popular. LDA is a generative probabilistic model of a corpus, and it used in unsupervised machine learning algorithms (Blei *et al*., 2003; Hoffman *et al*., 2010). The basic idea is that documents are represented as random mixtures over latent topics, where

each topic is characterized by a distribution over words. The Dirichlet distribution is employed to determine the distribution of topics per document. In the LDA generative process, the outcomes from the Dirichlet are utilized to assign words in a document to various topics. According to the model, documents are observable objects, while topics, distribution of per-document topics, classification of each word on topics per document are hidden structures.

Figure 1 – *LDA generative process. Circles represent variables, and rectangles represent repetition among documents, words, and topics. The shade circle is the only visible variable in the corpus, the others are latent in the LDA model.*



Source: Blei et al.,2003.

LDA belongs to the category of generative models. The generative process of LDA is illustrated in Figure 1 through a plate diagram. Assume that the corpus comprises M documents, each containing N_m (*m* from 1 to M) words. The corpus consists of W distinct words overall, and there are k topics. The hyperparameters α and η are used for the Dirichlet distributions, which generate the k-dimensional document/topic (θ) vectors and *W*-dimensional topic/word (β) vectors, respectively. The parameters θ and β function as categorical distributions, from which topics and words are selected (sampled). The LDA model's generation process can be divided into four steps: (1) Sampling β_j for each topic *j*; (2) Sampling θ_m for each document *m*; (3) Sampling a topic *z* for each word position *n* in document *m* (which is repeated N_m times), using the categorical distribution parameterized by θ_m; and (4)

Sampling a word from the categorical distribution parameterized by β_z (Blei et al., 2003). The primary aim of training an LDA model is to identify θ and β such that the probability of generating the actual corpus is maximized (Blei, 2012). LDA considers α, η, and k as parameters and randomizes all other values except w. This model works by looking at the word co-occurrences within documents, assuming that words that co-occur within a document are more likely to be related to the same topic, and that documents that contain the same words are more likely to contain the same topics (Dahal *et al*., 2019). After many iterations, a fully trained LDA model is produced, with the document/topic and topic/word matrices as the main objects of interest.

3. Results

LDA was applied to the term-document matrices to determine the topics extracted from the journalistic narrative in the selected years. For each topic, the 10 words with the highest value of probability of becoming part of the topic are given.

Figure 2 – *Topics extracted from LDA in 2012.*

Topic 1	Topic 2	Topic 3
Famiglia	Analisi	Promozione
Domicilio	Approfondimento	Supporto
Donna	Invecchiamento	Sociale
Lavoro	Sperimentazione	Dignità
Assistenza	Sorveglianza	Abuso
Gestione	Salute	Autosufficiente
Attrezzatura	Prospettiva	Socializzazione
Agevolazione	Vita	Centro
Servizio	Intervento	Servizio
Familiare	Analizzare	Promuovere

In 2012, the journalistic discourse revolved around three primary themes that centred on the older population. The first theme delved into the essential role played by the family network in providing care and assistance to older individuals. This critical activity encompassed a range of direct support, including daily aid

with household tasks, personal care, medication management, as well as emotional and social support. Journalists recognized the contribution of women in ensuring the well-being and comfort of their elderly members, highlighting the selfless dedication and love exhibited in this caregiving role. The second theme focused on early articles that tackled the emerging challenges posed by the growing elderly population. With improvements in the quality of life and declining fertility rates, older adults were experiencing increased life expectancy, sparking a broader discussion on how to provide comprehensive medical and social care tailored specifically to their unique needs. The topic underscored the importance of identifying appropriate facilities that not only offered support but also ensured the preservation of dignity for elderly individuals. Within this narrative, journalists also addressed the pressing issue of abuse perpetrated by staff in care facilities, shining a light on disturbing events occurring within these establishments and calling for greater accountability and reforms in the eldercare sector.

Figure 3 – *Topics extracted from LDA in 2019.*

Topic 1	Topic 2	Topic 3
Impiego	Struttura	Enterale
Iscritto	Sociale	Dolore
Lavoro	Valorizzare	Patologia
Incapacità	Intervento	Demenza
Progetto	Disabilità	Deficitario
Obbligo	Domicilio	Cure
Inclusione	Strategia	Emotivo
Fragile	Termine	Diagnostico
Welfare	Supporto	Salute
Asl	Assistenza	Decisionale

In 2019, the Italian press extensively covered three significant topics that had gained prominence in the preceding period. The first topic revolved around social welfare concerns, particularly focusing on employment opportunities for older individuals. The pressing need was recognized to incorporate their wealth of experiences and professional backgrounds as valuable resources within various projects. It was imperative to harness their expertise and skills to contribute to

society and promote their inclusion. The second theme tackled the importance of establishing comprehensive support structures and medical assistance to cater to individuals in both home and institutional settings. The Italian press emphasized the necessity of providing adequate care and assistance to people in need, ensuring their well-being and comfort. The discussion surrounding this topic underscored the significance of accessible and quality healthcare services, with an emphasis on promoting a compassionate approach to healthcare delivery. Closely related to the theme, the third topic shed light on the realm of illness and pain experienced by the older adult population. The press brought greater attention to the issue of senile dementia and neurodegenerative diseases that manifest in old age. The profound impact of these conditions on individuals and their families was highlighted, creating awareness about the challenges faced by those affected. The Italian press sought to create a more informed society by shedding light on the realities of these illnesses, thereby encouraging support, research, and medical advancements.

Figure 4 – *Topics extracted from LDA in 2022.*

Topic 1	Topic 2	Topic 3
Sociale	Amministrazione	Coordinamento
Stato	Agire	Disuguaglianza
Spesa	Aiuto	Famiglia
Sviluppo	Ampliare	Equipe
Spazio	Lista	Caregiver
Territorio	Interrogazione	Piano
Equità	Ricoverare	Contributo
Sostegno	Casa	Fondo
Ssn	Vaccinazione	Misura
Nazionale	Vaccinare	Misurare

The 2022 marked a significant shift in the narrative of Italian newspapers, driven by the far-reaching impact of the Covid-19 pandemic. Three prominent themes emerged, each shedding light on different aspects of the challenges faced by the older population. Firstly, there was a heightened focus on the welfare state and the national health system, both of which played pivotal roles in developing policies aimed at supporting the older adults. The pandemic exposed vulnerabilities within the existing framework, prompting discussions on the urgent need for

comprehensive measures to safeguard the well-being of older individuals. Attention was directed towards strengthening the welfare state and healthcare infrastructure, with an emphasis on improving accessibility, affordability, and quality of care for the elderly. The pressing goal was to ensure that they received the necessary support and protection in the face of ongoing health crises. Concurrently, there was a strong emphasis on the need to enhance the facilities catering to the older adult population, particularly considering the pandemic. The focus was on improving the safety and preparedness of these establishments, including nursing homes and assisted living facilities. Journalistic discourse highlighted the significance of implementing stringent infection control measures and developing robust vaccination strategies to minimize the risk of contagion. This theme underscored the importance of prioritizing the health and well-being of elderly residents and the dedicated staff who care for them, recognizing their vulnerability to infectious diseases. Additionally, the economic measures implemented by the government in response to the pandemic became a significant topic of discussion. Recognizing the socio-economic impact on individuals and families, journalists explored the various initiatives aimed at supporting people financially and socially. This included measures such as stimulus packages, unemployment benefits, and targeted assistance programs. The media played a crucial role in disseminating information about these measures, ensuring transparency, and encouraging public engagement in navigating the economic challenges faced by the elderly and the wider population.

4. Discussion and conclusions

In conclusion, the journalistic discourse on the elderly population has evolved and adapted to changing times, addressing significant topics over the years. In 2012, the focus was on the central role of the family network in providing care and assistance to the elderly, carried out mainly by women. At the same time, attention was drawn to the emerging challenges posed by a growing older adult population, emphasizing the need for comprehensive medical and social care tailored to their specific needs. The pressing problem of abuse within care facilities also received attention, calling for greater accountability and reforms in the elderly care sector. Looking ahead to 2019, the Italian press shifted its focus to social issues and job opportunities for the older people. The aim was to harness their experience and professionalism as valuable resources within various projects, fostering their inclusion and contribution to society. The emphasis was placed on the significance of providing extensive support services and medical care for the older adults, whether they reside at home or in institutional facilities. In addition, the press shed

light on the challenges posed by diseases such as dementia and neurodegenerative diseases, with the aim of creating awareness and encouraging support, research, and medical advances. In 2022, the narrative has changed once again due to the profound impact of the Covid-19 pandemic. The welfare state and the national health system were challenged, gaining importance as essential pillars in the development of policies to support the older adults. Strengthening the accessibility, affordability and quality of care has become crucial in the face of continuing health crises. The need to strengthen care facilities for the older adults, focusing on safety and preparedness, was emphasized, just as the economic measures put in place by the government to support individuals and families was an important topic of discussion, highlighting the importance of providing financial and social assistance in difficult times.

The evolution of the narrative in Italian newspapers reflects the commitment to address the unique needs and challenges of the elderly population. From recognizing the crucial role of families in caregiving to advocating for comprehensive health and social care, the media have played a key role in fostering awareness, promoting dialogue, and supporting the well-being and dignity of older people in society. To further advance research in the field, it is worth considering the analysis of print media during the Covid-19 period to identify and highlight the narrative surrounding the events that unfolded throughout the pandemic (2020 and 2021).

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VULNERABLE WOMEN POPULATION DURING THE COVID-19 PANDEMIC

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Abstract. The COVID-19 pandemic provoked heritages for all citizens, from the richest to the poorest, but exacerbated, even more, the hardships of vulnerable people in economic, social and psychological spheres. Within the H2020 project "COVINFORM"[1], this case study focuses on vulnerable female population, which is "doubly-burdened", facing both economic vulnerability and gender disparity. Moreover, the study brings out those aspects affecting migrant women. Through a qualitative survey, it was possible to identify the responses of the policies adopted at that time. Women suggest a severe psychological impact of the pandemic about being away from family and losing jobs. Distancing and fear of infections aggravated the isolation of migrants. The solidarity network among Non-Governmental Organizations (NGOs) and civil society was crucial for vulnerable people at all research sites.

1. Introduction

The COVID-19 has severely hit the whole world, with an estimated 767 million infected people and more than 6,9 million of deaths, as at the end of June 2023[2]. In the months since March 2020 on, when the World Health Organization first declared COVID-19 a global pandemic, the situation rapidly worsened from a public health crisis to a global economic and social crisis, with both short and long-term consequences. Political leaders in many countries took measures to limit the contagion rates in order to relieve the pressure on health care systems and prevent the excess deaths. Measures had a different impact across regions and municipalities in the world and governments worked arduous to interconnect all multidisciplinary mechanisms inside the societies.

[1] This project has received funding from the European Union's H2020 research & innovation programme under Grant Agreement No. 101016247

[2] Data retrieved from https://covid19.who.int/ on 30 June 2023.

According to the report published by OECD, the virus has had devastating impacts on physical health and mortality. Excess deaths in 33 OECD countries averaged 16% between March 2020 and early May 2021, compared to the average number of deaths during the same period from 2015 to 2019. This resulted in a 7-month fall in 29 OECD average life expectancy in 2020 (OECD, 2021).

Although government support helped to sustain average household income in 2020 and stemmed the tide of job losses, the average working hours fell sharply and 1 in 3 people in 25 OECD countries reported financial difficulties (OECD, 2021). In the second half of 2020 the youth unemployment rate was double than the working-age adults one. All economic sectors were affected through disrupted global supply chains, weaker demand for imported goods and services, a decline in international tourism and a decline in business travel (OECD, 2020). Entrepreneurs particularly hit by measures to contain the virus spread (OECD, 2020). Overall, the global economy set for a recession.

Experiences of the pandemic varied widely depending on age, gender, race and ethnicity, as well as jobs, pay and skills. The United Nations (UN) and other bodies such as the International Monetary Fund (IMF) stressed that the pandemic increased inequality globally. An additional 8% of the world's population was predicted to fall into poverty (Sumner et al., 2020).

Socially isolating was easier for people with spacious homes, with areas to walk, and reliable fast Internet. People living in overcrowded houses with a few or unsafe open areas, lack of running water to wash hands, and inadequate access to the Internet (Egger *et al.*, 2020) or institutions (prisons and refugee detention centres/camps) were more vulnerable to the negative effects of isolation measures. Homeless people, often living with mental illnesses, were particularly vulnerable. Those holding insecure and casual jobs were the first to be laid off and faced unemployment, with its attendant mental and physical health effects.

In this context, from a policy perspective, understanding whether and how communities respond to government is a crucial action.

This paper is realized in the framework of the H2020 project "COVINFORM[3]", in particular within the WP6 of the project "Citizen and community responses and impact assessment". Aim of WP6 is to identify barriers, unintended consequences, trade-offs, lessons learned and practices in COVID-19 responses across diverse local contexts. An estimated n.180 interviews were identified, described, and analysed, 12 from each target country and municipality. This study attempts to bring out the difficulties lived by vulnerable population, especially migrant population in six out of 15 countries participating to the project: Austria, Belgium, Germany, Italy, Spain and Sweden.

[3] Website of the COVINFORM project is available at https://www.covinform.eu/

According to OECD, immigrants were disproportionately affected by COVID-19 (OECD, 2022). This was due to a range of factors such as poorer housing conditions with higher incidence of overcrowding; a higher dependency on public transport; overconcentration in areas with higher population density; fewer possibilities for teleworking and a higher incidence of frontline job; as well as language barriers and other structural obstacles to access health services and communications regarding prevention measures.

In particular, we aim to disentangle how the interviewed population reacted to difficulties faced during the pandemic, their expectations and the role of governments and communities in their life.

2. The case study of female population

In the attempt to shed light on the myriad of experiences of women about the gendered impacts of the pandemic in time of COVID-19, the researchers of the project decided to interview a sample of women with vulnerability.

Literature shows that across every sphere, from health to the economy, security to social protection, the impact of COVID-19 was exacerbated for women and girls only due to their sex. UN Secretary General António Guterres noted on 9 April 2020 that COVID-19 was going ' *... deepening pre-existing inequalities which are in turn amplifying its impacts on the lives of women and girls*' (UNSDG, 2020). He advocated that any government plan for economic recovery post-COVID-19 had to have leadership and equality for women at the centre.

Approximately a quarter of women and men lost their job during the pandemic (UN Women, 2021). The decline in employment opportunities had a significant impact on women's engagement in the labour market, particularly considering that women had lower participation rates during the pandemic compared to men. For women aged 25-54, the participation rate was 63%, whereas for men, it was 94% (UN Women, 2018). The decrease in employment was also evident in the average duration of paid working hours. Own-account women workers[4] were especially likely to see their paid working hours reduced (82% women compared to 65% of men). This is explained by the evidence that women own-account workers are overrepresented in the retail trade, accommodation and food sectors, which have been hit hard at that time (ILO, 2020a). Furthermore, globally, 86% of own-account workers working informally, women working informally are more affected

[4] Defined by the ILO as "workers who, working on their own account or with one or more partners, hold the type of jobs defined as a "self-employment jobs", and have not engaged (on a continuous basis) any employees to work for them."

than men by the pandemic as they are often in more vulnerable situations than their male counterparts (UN Women, 2021).

Prime-working age women, widowed women and women with limited education were especially vulnerable to the economic shock (Scarpetta *et al.*, 2010).

Women who lost jobs were more likely to see increased unpaid care and domestic work. In particular, the amount of time women employed to unpaid care work increased with the presence of children in the household (ILO, 2020b). This points out that women's domestic and care obligations forced them to cut down paid working hours more than men, so reflecting the unequal ways domestic and economic responsibilities are shared between women and men living together. Clearly, all these factors have had repercussions on women's mental and physical health, exacerbating gender inequalities also in mental or emotional strains.

Additionally, this study aims to bring out the double burden of migrant women who have had to deal with issues concerning both economic and gender vulnerability and their experiences as immigrants.

Women migrant workers, as stated in the UN Women Guidance Note, were at a heightened vulnerability towards job loss, exploitation of their labor and human rights, and the contraction of the coronavirus. They are likely to work in the informal economy, especially domestic service and the care sector, with insecure contracts and no paid leave or ability to work from home. They are also more likely to be engaged in short-term work. Their jobs are generally excluded from social insurance schemes, which means no social safety nets to compensate for lost income and limited access to health care and maternity protection.

According to the Migration Data Portal's latest update in 2020, there are approximately 8.5 million female migrant domestic workers worldwide. Unfortunately, the outbreak of the pandemic resulted in their job dismissals, accompanied by disregard and denial of their health and safety.

For live-in migrant domestic workers, losing their jobs also means losing their place to live. The onset of travel restrictions has increased financial challenges and uncertainty, with many stranded far from home (Carvalho *et al*., 2020).

The economies of many countries around the world are sustained by the remittances sent home by women migrant workers (IFAD, 2017). Remittances provide a lifeline for families and communities in their countries of origin, especially during times of crisis. Given the economic downturn caused by the impacts of COVID-19, women migrant workers sent fewer remittances, further increasing the vulnerabilities of families that depend on this income.

3. Data and Methodology

During the research, each project partner collected a list of civil society organizations (CSOs) active in their target sub-national research site, then it assessed the candidate organizations for relevance with regard to participation in COVID-19 responses and contact with vulnerable groups. On February 2022, it was decided to focus the forthcoming resident interviews on low-socioeconomic status women. Accordingly, several partners targeted at least one CSO serving this vulnerable group. Additionally, it was determined that at least 12 women should be interviewed per site.

Our empirical research draws up on the findings of the qualitative survey carried out in the following research sites: Austria, Belgium, Germany, Italy, Spain and Sweden. For this study, we have collected data from 76 women interviewed in the chosen countries, 52 of them are migrants. A more narrowly defined sample provides a more credible research design and enables us to arrive at more reliable conclusions.

The method used is the semi-structured interview, which follows a guide realized by the researchers of the COVINFORM's Consortium. It is centred on the general topic of the lived experiences from 2020, the beginning of the pandemic, to July 2022, when the interviews took place. The semi-structured interview crosses topical trajectories as the conversation unfolds, in particular it is divided into seven main topic questions:

1. A warm-up question;
2. Key memories of pandemic: the most important memories of the pandemic;
3. Social networks: how face-to-face contacts changed;
4. Support networks: any kind of support received during that time;
5. Information seeking and sense-making: how and where the respond inquired about the virus, measures, testing, vaccines…;
6. Living Environment: how the place where the respondent lives played a role in the experience of the COVID-19 pandemic;
7. Closing question.

As explained in the resident interview guide within the WP6, the uniqueness of this survey is to collect more innovative data on issues that have not already been documented: vulnerability has always been concerning with an ascribed status rather than a realistic experience. Focusing on a group frequently considered as vulnerable, gives the opportunity to engage with the differences between ascribed and lived vulnerability.

Moreover, the chosen group is relevant and comparable across national contexts. Low socio-economic status (SES) is consistently considered a risk factor

or *driver of vulnerability* across country contexts, which makes it a group that can suitably be compared across partner countries.

The main strategy of the project, which is outlined in the guide, was to carry out interviews as a part of the study to monitor how women of low SES acquired information and formal/informal support during the COVID-19 pandemic.

A significant aspect of this study is that it also provides valuable information by focusing on the sub-category of migrant women, as well as comparing whether different factors have emerged in their lives.

Based on COVINFORM's intersectional theoretical framework, we used social network analysis focuses on patterns of relationships between actors, individuals or even organizations/institutions, and the exchange of resources between them. Resources can be *tangible*, such as financial resources, services, practical help or goods, or *intangible* such as a friendship, social support and information. Social networks can help to explain why certain people have greater access to influence and power through the resources and information disseminated through social ties at different levels (household, community, or institutional), and therefore have different experiences of the COVID-19 pandemic. Social network analysis also allows us to explore how people can mediate disadvantages, and how groups of people are not homogenous, even if they share specific characteristics (e.g. gender, SES and migrant status) (Information is available in the guide).

This analysis is particularly relevant to better understand the experiences of women with low SES, as poverty often leads to social exclusion or isolation, and even more so when the survey concerns women belonging to a further disadvantaged social category, such as migrants. Limited social networks and support are more frequent among socio-economically disadvantaged people, with fewer external or non-family ties, therefore more limited social networks have restricted the access to information or instrumental forms of support on a large scale.

During the pandemic, lockdown and social distancing measures further enhanced the isolation of some individuals, despite more social support being needed to cope with the additional stress factors concerning finances, health, and wellbeing.

The research findings could assist policymakers in strengthening the quality of support networks and improving information access for more marginalized groups.

4. Results

The following results refer to a sample of 76 women. The main demographic characteristics of the samples interviewed in each country of residence are

described below. Note that for some countries it was not possible to collect all demographic characteristics of the population.

- In Austria of the 12 respondents, 6 are migrants. The average age of the women is over 50. The number of children is at least three for each woman. About half of them are unemployed. The declared jobs are caregiver, housekeeper, shop assistant, butcher, cook, and tailor. The migrant women come mainly from Afghanistan, Russia, Ukraine and Serbia;
- In Belgium of the 12 respondents, 10 are migrants. The average age of the women is over 40. All women are married or widowed. The number of children is at least three per woman. The migrants come mainly from Morocco, Afghanistan and Israel;
- In Germany, of the 17 respondents, 14 are women specifically 7 are migrants and 3 are men, excluded from the sample. They are retired or pre-retired, job seekers or jobless, and some of them are apprentices. Migrants come from the former Yugoslavia, Kosovo, Algeria, Turkey and Afghanistan.
- In Italy of the 12 interviewees, 9 are migrants. The average age of the women is over 35. A large proportion of the interviewees have two children. Half of them work as caregivers or domestic helpers. The migrant women come mainly from Peru, Cameroon and Guinea Bissau.
- In Spain of the 19 respondents, 14 are women specifically 11 are migrants and 5 are men, excluded from the sample. The average age of the women is over 40. At least half of the respondents have a child and are married. Migrants come mainly from Central and South America and Morocco.
- In Sweden of the 12 women interviewed, 9 are migrants. The average age of the women is over 40. Half of them are married or cohabiting. On average, they have three children. They work as nannies, nursing assistants, caregivers and some of them are students. Migrants come mainly from Turkey, Kenya, Somalia, Syria, Morocco and Iran.

The process of descriptive analysis enables us to not only identify challenges faced by vulnerable women but also highlight the crucial experiences encountered by vulnerable migrant women. Unemployment, isolation and other effects of pandemic have exacerbated inequalities that already existed before the crisis.

In line with recent literature, data collected from this study highlight that migrants' jobs have the least guarantees. One of the first problem emerged from the interviews is the fear to lose one's job or not be able to pay rent or bills. Too many migrant women have declared that their decisions to live with their partner came from the loss of economic income. Respondents rarely received government aids while CSOs and several solidarity networks supported them with the distribution of food.

The loss of jobs put a strain on the already precarious economic stability, but not only that: other factors, such as cuts in public transport or unsecured security arrangements, further aggravated the labour situation at that time. Migrant women expressed concerns regarding their families residing in other countries who were unable to receive remittances, which consequently leads to an economic impact on the countries of origin as well.

The confinement, especially for young women interviewed, was very hard. Migrant women declared to suffer discrimination in the hard-to-manage contexts.

Situations of high emotional stress emerge in each area of the research.

We have broken down our results for each of the macro-area studied.

Key memories of pandemic

The moment that marked the awareness of the beginning of a pandemic was the lockdown: the closure of shops, the inability to move and the interruption of all activities. Among the most important memories there are the fear of contagion that affected women's behaviour and the number of deaths. Images of coffins along the Italian streets are in the memory of the women interviewed not only in Italy but also in other EU countries.

Respondents narrated their experience of being hospitalised, either personally or through family members, with a wealth of detail, and a lot of emotion emerged even two years later. Even when the virus has left no obvious marks, the women seem to relive the same fear. Among migrant women, there is also concern for distant families and an increased sense of loneliness due to the impossibility of going out and meeting the few acquaintances. Restrictive measures have threatened the social networks that migrant women have woven with great difficulty.

Social networks

For most of the women interviewed, especially in the first pandemic phase, the contact with people not living together was cut off. The only exceptions were given by women working during that period. For them, returning home was a very stressful experience due to the risk of infecting their relatives. And worse, they complained of few protective measures taken during working hours and/or to get workplace. After the first lockdown, face-to-face contacts gradually resumed, first by taking safety measures and then, even better, after the vaccine, regardless of the number of infections. Migrant women throughout the pandemic period are in virtual contact with their family/friends in their countries of origin. Meanwhile, reopening communication channels in the country of residence was a gradual, demanding process.

Support network

The main support channel was family and friends. The respondents, in turn, contributed by shopping for food and basic necessities. Above all, these dynamics made possible to overcome periods of quarantine and virus positivity.

In several cases, CSOs filled the gaps that government and private sectors were not able to do.

In Austria, various CSOs engaged actively in providing assistance and support to women, with a specific focus on migrant women from Muslim backgrounds. These organizations also extended their support to individuals facing financial difficulties, as well as managed services for homeless people and refugees residing in Austria. Their efforts also encompassed ensuring access to proper accommodation for refugees.

In Belgium, the CSOs collaborated with underprivileged individuals, specifically those with low income and those who are homeless or struggling with drug addiction.

In Germany, CSOs assisted individuals facing multiple vulnerabilities, such as deaf refugees, transgender individuals who were victims of domestic violence, and single parents of autistic children. These CSOs, along with grassroots initiatives, also augmented the government's endeavours by establishing networking platforms.

In Italy, various entities among which CSOs, grassroots organizations, charities, communities, mutual aid organizations (MAOs), and similar groups, extended support in the form of food aid, healthcare services, information dissemination, and listening.

In Spain, CSOs offered health and social assistance to vulnerable women, migrants, homeless individuals, and others in need. They operated by mobile vans, providing essential supplies and services directly to the homes of those in need. Additionally, they utilized mobile offices and technology-based procedures to ensure efficient and accessible assistance.

In Sweden, a significant number of CSOs represented sports, religious, and cultural organizations. These entities were commonly referred to as "cultural guides" or "health guides," as their main purpose was to help individuals overcome challenges and better understand the working of Swedish society.

In this part of the interview is being investigated if the types of support, received or needed, was different because of the gender status. The gender gap emerges for women with children who worked and helped their children with daily activities at the same time. In Germany, several women reported that they received essential support from teachers even during out of school hours. Migrant women felt alone to support their children because of language barriers and few information about the country of residence, confirming the common practise of women to perform the dual tasks of working and caring for children. They needed more helps from governments. Moreover, respondents complained the lack of support for pregnant women and new-borns, especially among migrants who are not familiar with the healthcare and legal system.

Neither governments guaranteed safety devices and tests for people who could not afford them.

Information seeking and sense-making

Television and searches on internet were the favourite communication channels. Migrants used radio and YouTube channel in their mother tongue. Although the government channels were considered the most reliable, there was a strong tendency to follow information from relatives and friends. One more bad point was unclear information, not available in all languages and on all communication devices. CSOs and YouTube channels spread information in several languages but not everyone had internet connection or devices. Government should have ensured that information was given to everyone. In Austria, sending information letters by mail was appreciated.

Respondents needed the dissemination of reliable and consistent news, especially in the period of the vaccination campaign, when Government actions were confused. The Swedish government was criticised for not having implemented restrictive policies as in other EU countries.

Living environment

Data analysed in this section refer to the living environment of respondents during the pandemic. They did not complain the limited space of their flats but rather the lack of gardens or outdoor spaces. It emerged the need for them to go out just to break for a while the routine and get rid of the anxieties arising from cohabitants.

A particular case is the interviews conducted within a squat in the municipality of Rome, where more than 60 families share outdoor spaces. These women felt lucky because, although the high risk of contagion, they were able to take advantage of outdoor space and did not suffer from loneliness thanks to the closeness of their family and neighbours.

5. Conclusions

The idea behind this study fits into what is known as “intersectional feminism” (Davis, 1981).

Women, class and race are the sub-categories on which our research lies.

The aim is to eradicate the errors from social protection schemes. Women, irrespective of their migrant status, should enjoy their full human rights during the pandemic and beyond, in compliance with the international law. This means ensuring access to essential services. Moreover, as residents they should be included and afforded the same treatment as national in national and local crisis response and recovery plans across all sectors of work. A concrete response

measure should be generated for migrant women, rendered jobless, in the informal economy. Women need to be provided with information and guidance on the healthcare and legal system.

Universal access to gender-responsive social protection measures should ensure that everyone, irrespective of migration status, has a social safety net in times of need: basic income and family and child benefits.

Focusing on responses of the European countries considered, they strove to tailor their responses based on contributing factors or shared characteristics among them. Governments tried to support various group of population in response to COVID-19 pandemic's barriers either in collaboration with the CSOs or on their own, but the results show that it was not enough. However, it was only thanks to the solidarity network that women were enabled to be recognized their basic needs, and most importantly, they could enjoy the closeness to someone.

The main lessons learned and good practises emerge from the analysis show that the pandemic had significant impacts on vulnerable populations, exacerbating the challenges faced by those who were already in disadvantaged situations. Additionally, the pandemic shed light on the significance of addressing precarious employment conditions and the necessity of fortifying the social protection system.

CSOs played an essential role in the response to the pandemic, such as the creation of neighbourhood solidarity networks and the existing network between local authorities providing high effective in supporting communities. To ensure preparedness for potential future crises, it is important for authorities to encourage and nurture these collaborative efforts.

Gender roles and the economic disparities between genders can lead to further inequalities for marginalized groups. In the interviews, specific profiles that are at a disadvantage include single-parent households, second-generation women, migrant women with limited proficiency in the dominant language, and women facing job loss.

Low confidence in institutions had a detrimental impact on the response to health campaigns, including trust in politicians, media, and healthcare authorities. This lack of trust hampered effective integration and the ability of migrant residents to embrace crucial health information.

Furthermore, it is evident that informational initiatives were adequately disseminated but failed to reach the migrant population. Notably, migrant women were more inclined to receive vaccinations when individuals from the same cultural and ethnic background delivered the information in their native language.

In conclusion, the interviews confirm a strong psychological impact of the pandemic. Distancing and fear of contagion aggravated the isolation of migrants. Government assistance programs can play a crucial role in improving the accessibility of information and addressing the basic needs of at-risk women. These

initiatives could provide them the necessary resources and tools to effectively respond to the policies that have been put in place during crisis and in day-to-day situations.

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MEASUREMENT OF DAILY COMMUTING IN THE ITALIAN PERMANENT POPULATION CENSUS[1]

Carolina Ciccaglioni, Loredana Di Consiglio, Tiziana Pichiorri, Fabrizio Solari

Abstract. Recently, the Italian National Statistics Institute decided to move from traditional enumeration census to a combined census, whose backbone is given by statistical registers and administrative archives. The main goal of the new census process is to provide yearly information. In this work, the estimation process for both work-related and study-related commuting is presented. Predictive modelling approach is used to produce commuting estimates. Explicitly, a multinomial logistic model is assumed. Estimates are produced at municipality level using 2019 census survey data and the information included in statistical registers and administrative archives. Results are presented, displaying the relevance of the administrative data in the estimation process.

1. Introduction

Over the past few years, the Italian National Statistics Institute (Istat) has to face more and more complex information requirements referred to both the improve the supply and quality of statistical information and update to a data production system adherent to the other EU countries.

The goal of producing information on an annual basis and the possibility of using administrative data sources made necessary a reconsider the design of the Italian Population and Housing Census. Therefore, Istat has replaced the traditional census with a combined census - named Italian Permanent Population and Housing Census - placing the integrated system of statistical registers and administrative sources at the core of statistical production. Census sample surveys are planned to support registers, providing information where this is missing, incomplete or of unsatisfactory quality in registers and administrative sources.

This work describes the estimation process of the census tables (multidimensional tables describing certain phenomena) related to resident

[1]Sections 1 and 5 were written by L. Di Consiglio and F. Solari, sections 2 and 3.2 were written by T. Pichiorri, sections 3.1 and 4 were written by C. Ciccaglioni.

population commuting for work or study reasons. Commuting is usually associated to only work-related commuting flows. In this study commuting is intended in a broader sense, including also study-related commuting flows. In addition to this, attention is paid to commuting within and outside the municipality of residence.

Estimates were produced by means of predictive modelling, using a multinomial logistic model to combine survey data with register and administrative data.

Commuting is a relevant phenomenon in Europe which increased consistently in recent years, due to the changes in production systems that led to a higher labour mobility. Furthermore, improvements in transport and communication infrastructures has simplified goods and services' movements leading to commuter routes expansion.

This paper describes census tables estimation process referred to commuting population in 2019 and presents the first results.

Section 2 is dedicated to the target variables and target parameters definition. Section 3 is devoted to the estimation process description. The results are shown in Section 4 and final remarks are provided in Section 5.

2. Notation and definitions

As previously described, the aim is to produce estimates for work and study commuting flows. A commuter is defined as an individual making the same journey between home and place of work or place of study back and forth, at least three days per week. It is considered as a commuter also an individual moving inside his/her own municipality of residence. The target population is the resident population moving daily by work or study reasons, by place of destination (inside/outside the residence municipality - Italy or other countries), by gender (male/female), for all the Italian municipalities, that is at LAU2 level.

The estimation process takes as input the binary variable occupational status, according to which each individual is classified as either employed or non-employed. The occupational status is the result of a different estimation process. Specifically, it is predicted through means of a latent class model in an independent Istat estimation process (for details about latent class models, see Biemer, 2011). The definition adopted in the Italian census assumes that an employed individual can be only a work commuter and a non-employed individual can only be a study commuter. Furthermore, the variable gender is available for all the individuals in the population.

The following notation is used throughout the manuscript. Let q $(q = \text{work}, \text{study})$ and g $(g = \text{male}, \text{female})$ denote the generic commuting reason and

the generic gender, respectively. Besides, let j $(j = 1, \dots, M)$ be the generic municipality. The resident population in the municipality j can be classified according to their occupational status, i.e. employed and non-employed. Let ${}_gN_j^{\text{work}}$ and ${}_gN_j^{\text{study}}$ denote the employed and the non-employed population size in municipality j, respectively, having gender g. Furthermore, let i denote the generic individual in the municipality j, where or depending on whether is employed or not. Then, for each individual i in the municipality j, the target variable can be defined in the following way

$$Y_{ij}^q = \begin{cases} 0, & \text{if } i \text{ is not a commuter for the commuting reason } q \\ 1, & \text{if } i \text{ is a commuter inside } j \text{ for the commuting reason } q \\ 2, & \text{if } i \text{ is a commuter outside } j \text{ for the commuting reason } q \end{cases}.$$

The target parameters are given by the commuting rates for study and work at municipality level, that is, for $j = 1, \dots, M$, $q = \text{work}, \text{study}$, $g = \text{male}, \text{female}$,

$$\bar{Y}_{.j}^q(k) = \frac{\sum_{i=1}^{{}_gN_j^q} 1_{ij}^q(k)}{{}_gN_j^q}, \dots k = 0, 1, 2,$$

where

$$1_{ij}^q(k) = \begin{cases} 1, & \text{if } Y_{ij}^q = k \\ 0, & \text{otherwise} \end{cases}.$$

3. Estimation method

3.1. Model definition

Since the target variable Y^q is a categorical one, the natural choice is to assume a multinomial distribution for Y^q and a multinomial logistic model. Suppose a sample of a municipalities is selected from the overall set of the Italian municipalities. Furthermore, a sample of individuals is drawn within each sampled municipality. Let m be the size of the sample of municipalities and let n_j^q (q= work, study) denote the size of individuals in the sampled municipality j related to the employed and non-employed sub-populations. The multinomial logistic model

adopted for all the individuals $(i = 1, \dots, n_j^q)$, for all the municipalities $(j = 1, \dots, m)$ and for $q = \text{work}, \text{study}$ can be expressed as follows

$$\log \frac{\text{Prob}\left(Y_{ij}^q = k\right)}{\text{Prob}\left(Y_{ij}^q = 0\right)} = x_{ij}^q \beta_k, \dots k = 1, 2, \tag{1}$$

where x_{ij}^q is the value assumed for the individual i in the municipality j by the set of auxiliary variables chosen for the target variable Y^q.

Equation (1) implies

$$\text{Prob}\left(Y_{ij}^q = k | x_{ij}^q, \beta_k^q\right) = \frac{1}{1 + \sum_{k=1}^{2} \text{e}^{x_{ij}^q \beta_k^q}}, \dots k = 0$$

and

$$\text{Prob}\left(Y_{ij}^q = k | x_{ij}^q, \beta_k^q\right) = \frac{\text{e}^{x_{ij}^q \beta_k^q}}{1 + \sum_{k=1}^{2} \text{e}^{x_{ij}^q \beta_k^q}}, \dots k = 1, 2.$$

For $j = 1, \dots, M$, $q = \text{work}, \text{study}$ and $g = \text{male}, \text{female}$, the target parameters are estimated as

$$_g\hat{\bar{Y}}_{.j}^q(k) = \frac{\sum_{i=1}^{{}_gN_j^q} \hat{1}_{ij}^q(k)}{{}_gN_j^q}, \dots k = 0, 1, 2,$$

where $\hat{1}_{ij}^q(k) = \widehat{\text{Prob}}\left(Y_{ij}^q = k | x_{ij}^q, \hat{\beta}_k^q\right)$ is the predicted probability to assume the value k of the variable Y^q for the individual i in the municipality j under the model (1).

3.2. Model selection

The auxiliary variables used in the estimation process can be split into individual level and municipality level variables. The former set of variables includes individual socio-demographic and administrative variables. The list of the socio-demographic variables used in the models is given by gender, age, citizenship (Italian, foreigner) and educational level (illiterate, literate but no formal educational attainment, primary education, lower secondary education, upper secondary education, bachelor's or equivalent level, master's or equivalent level, doctoral or equivalent level). An important role is played by administrative variables denoting work and study activities. These variables provide information on location and reference month to which each activity refers to. The latter set includes information available at municipality level. In particular, these variables are geographical coordinates (longitude, latitude), population density and some municipality level indexes, that are administrative municipality classification (capital, regional chief town, provincial chief town), inner area classification (urban pole, inter-municipal pole, urban belt, intermediate area, peripheral area, ultra-peripheral area), degree of urbanization, mountainousness index, altitude index, climate index, seismic risk index. Furthermore, inter-municipal distances, commuting rates at 2011 census, municipality presence in smaller islands and, only for the study commuting variables, the presence of school establishments within the municipal territory (primary, lower secondary and upper secondary school).

The sampling design is supposed to be informative, since both sampling weights and target variables depend on the municipality population size. The above described municipality level variables are considered in the model because they are strongly correlated with the municipality population size and they are supposed to integrate the information deriving from the sampling weights (for instance, see Little, 1983).

Variable selection was carried out using a backward stepwise procedure based on the Akaike Information Criterion (AIC) (Akaike, 1973). Moreover, Classification and Regression Trees (CART) (Breiman et al., 1984) was used to validate the results provided by the AIC and to define proper re-classifications for some auxiliary variables. In detail, the segmentation algorithm suggested a reclassification of the variables age, distances between residence municipality and work/study municipality, assuming a non-linear relationship with the target variable. This analysis was carried out at national and regional levels, for both work and study commuting flows, within and outside the residence municipality.

Separate models are defined for employed and non-employed individuals, for work and study commuting. Non-employed individuals are highly heterogeneous in terms of commuting propensity and availability of predictive auxiliary variables

from administrative sources. Therefore, CART recommended to split the non-employed individuals into two sub-populations: individuals in compulsory education age, with ages ranging from 6 to 16 years, and the remainder, aged from 0 to 5 years and aged 17 years and older. For each different sub-populations, distinct model estimation was performed. Furthermore, for all commuting populations, distinct model selection was carried out for each Italian region in order to maximize the predictiveness of the adopted set of auxiliary variables.

As far as work commuting, the non-parametric analysis suggests that the most influential territorial variables are 2011 census commuting rates, inter-municipal distances. Moreover, significant variables are the degree of urbanization, the inner areas classification and municipality presence in smaller islands (for the regions Latium, Campania, Apulia).

With regard to the study commuting variables, the inter-municipal distances played a relevant role in the model fitting process. Scholastic institutes presence or absence turned out to be a strongly significant variable. Specifically, presence of primary and lower secondary schools for the 6-16 aged non-employed model and upper secondary schools for the other non-employed model resulted to be an important input for the target variable prediction.

Location of administrative signs of work or study (the same as the residence municipality, in the same province of the residence municipality, in the same region of the residence municipality, outside the region of the residence municipality) turned out to be the most predictive individual auxiliary variable. Other relevant individual auxiliary variables are citizenship, educational level and age-class.

4. Results

2019 is the reference year for the commuting census process presented in this work. The reference year for the commuting census process presented in this work is 2019, which consists in household survey and an area survey on enumeration areas and addresses. A two-stage sampling design was used for both survey components. Municipalities are the primary sampling units, while the secondary ones are given by households for first component and by enumeration areas or addresses for the component area. The surveys involved 2.848 municipalities and 2.836.208 individuals. Figures 1,2,3 display the commuting rates for all the Italian municipalities. Municipality level commuting rates are shown only for ‘commuting inside the residence municipality’ category and for ‘commuting outside the residence municipality’. No commuting individuals' rates are not displayed since they are not a census target.

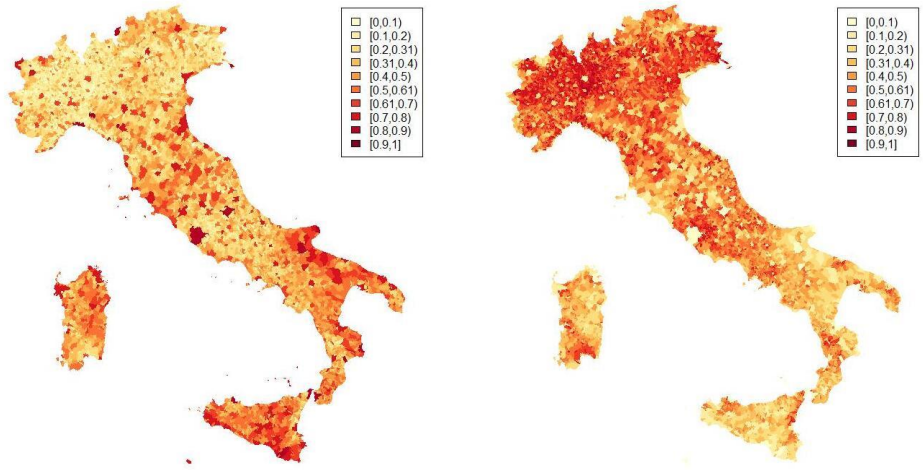
Figure 1a shows work commuting flows inside the same municipality mainly involve larger cities. Furthermore, this phenomenon is also relevant for urban and inter-municipal poles. High commuting rates are also observed for peripheral and ultra-peripheral areas with high degree of urbanization. Symmetric behaviour is found for the work commuting flows outside the residence municipality displayed in Figure 1b. As expected, work commuting flows are smaller for large municipalities and in general for municipalities with high level of urbanization.

With regard to study-related commuting, Figures 2a and 2b shows the commuting rates for 6-16 aged sub-population, inside and outside the residence municipality, respectively. It can be observed that the 6-16 study commuting displays analogous mobility trend to work commuting.

Commuting rates for not 6-16 aged sub-population are displayed in Figures 3a and 3b. Only largest municipalities and some peripheral and ultra-peripheral areas display large inside municipality commuting rates.

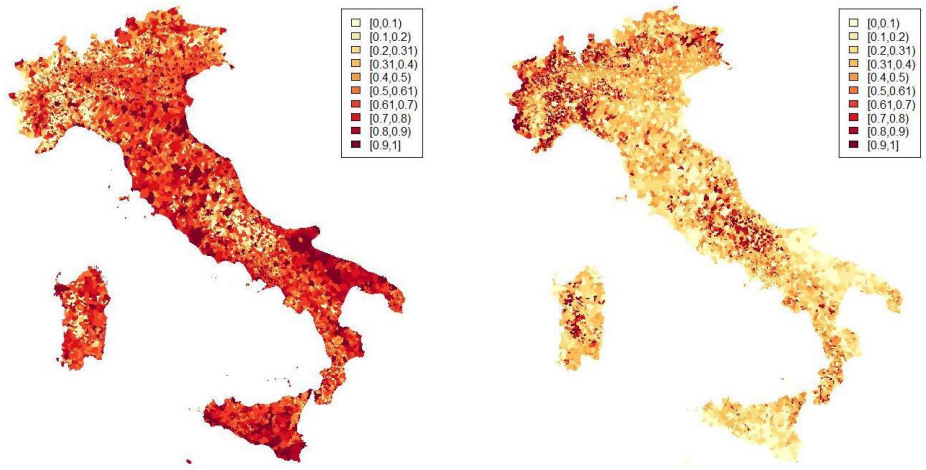
As a general comment, it can be noticed that commuting rates outside the residence municipality are higher in the Northern regions than in central and southern regions.

Figure 1 – *Work commuting rates: (a) inside the municipality, (b) outside the municipality.*



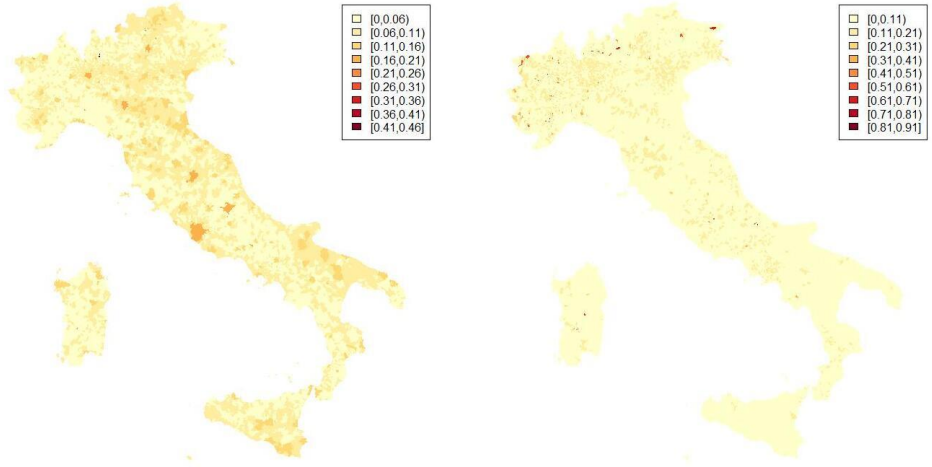
(a) (b)

Figure 2 – *6-16 aged study commuting rates: (a) inside the municipality, (b) outside the municipality.*



(a) (b)

Figure 3 – *No 6-16 aged study commuting rates: (a) inside the municipality, (b) outside the municipality.*



(a) (b)

5. Conclusions

This work describes the estimation process leading to the production of the census tables about work and study commuting. The estimation methodology is consistent with the modernization process embraced by Istat in recent years. Specifically, the modernization process provides for a general integration framework between register and administrative data on the one hand and survey data on the other hand (Falorsi, 2016). Here, coherence is attained by means of a model prediction approach, with survey data integrated with register and administrative data inside a multinomial model context. Alternative solutions can be provided by mixed effects multinomial logistic models (see, for instance, Agresti, 2013, Chapter 13) or adopting machine learning techniques, supervised or unsupervised learning. An example of application of machine learning technique is given in Ciccaglioni et al. (2022). Specifically, the authors carried out an experimental study implementing neural networks to provide estimates for work-related commuting.

Here, estimates and analyses refer to 2019. It must be underlined that commuting is a constantly evolving phenomenon, especially after the Covid-19 pandemic. Significant changes in commuting are expected after the introduction of smart work and study modes. In order to take into account the new situation, from 2021 specific answers have been added to the census survey questionnaire. Then, the measurement of commuting represents a real challenge for the next few years.

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IS LIFE EXPECTANCY ENOUGH? ESTIMATING AGE-SPECIFIC MORTALITY RATES BY CONSIDERING THE RELATIONSHIP BETWEEN SILER MODEL PARAMETERS AND LIFE EXPECTANCY AT BIRTH.

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Abstract. Understanding mortality in detail, with respect to age, sex and country, is crucial for comprehending this complex phenomenon. Indirect estimation has emerged as a valid approach to derive analytical values from a synthetic index, allowing us to move beyond the narrow focus on life expectancy at birth that characterises many forecasting models. By exploiting the correlations between the parameters of the Siler model and life expectancy at birth, it becomes possible to reconstruct age-specific mortality rates across the entire lifespan, from age 0 to 100. Preliminary results indicate small estimation errors and a coherent, smooth and easily interpretable fit.

1 Introduction

Life expectancy at birth (usually denoted by e_0) is the most widely used index to summarise and communicate the longevity of a population or its subgroup. It represents the average number of years a newborn is expected to live given the mortality conditions at a specific point in time. However, there are critical issues with the use of e_0. For instance, it does not consider the health status or other characteristics, such as infant and premature mortality levels or inequality at death. Despite these limitations, its value is easily obtained and calculated. This has led to the development of forecasting models focused solely on estimating life expectancy (Pascariu *et al.*, 2018; Raftery *et al.*, 2014; Torri and Vaupel, 2012). These very parsimonious techniques have demonstrated high accuracy in predictions by taking advantage of the linear trend in life expectancy observed over the past 50 to 60 years (Oeppen and Vaupel, 2002; White, 2002). As a result, the need for indirect estimates arose: models that could reconstruct precise life tables based on a given level of e_0. For instance, the U.S. Census Bureau derives period age-specific death rates through projections of life expectancy at birth by sex and race (United States Census Bureau, 2014). Ševčíková *et al.* (2016) demonstrated how estimated projections for e_0 could be converted into age-specific death rates

using the Lee-Carter model. A similar approach was proposed by Pascariu et al. (2020). Alternatively, Nigri *et al.* (2022) suggested employing a deep neural network model to obtain age-specific mortality from observed or predicted life expectancy. While the concept of modeling life tables is not new in the literature (see for example Coale and Demeny, 1966), this paper explores a new, simple, and parsimonious methodology for reconstructing specific mortality rates from life expectancy at birth. The underlying idea builds upon previous studies: an identical average level of mortality (i.e., equal life expectancy at birth) corresponds to the same curve of specific mortality rates, without differentiating between countries and sexes. Given that this curve can be approximated using the Siler model (Siler, 1979, 1983), the same value of e_0 is associated with the same vector of parameters. Consequently, by fitting appropriate functions (not necessarily linear) between e_0 and estimated coefficients, it becomes possible to approximate mortality throughout the entire lifespan. In this paper, we present the first analyses concerning the reconstruction of mortality by exploiting the relationships between Siler model parameters and life expectancy at birth, discussing the advantages and disadvantages of the proposed approach.

2 Method and Data

The model proposed by Siler (Siler, 1979, 1983) to estimate mortality rates at age x ∈ (0, ω) consists of three mathematical functions: a negative Gompertz function for infant mortality, a positive constant (known as Makeham's constant (Makeham, 1860)) to account for deaths occurring randomly with respect to age, and a Gomperz function (Gompertz, 1825) for adult/senesent mortality. The specific death rate at age x, denoted as mx, is described by the following formula

$$m_x = a_1 e^{-b_1 x} + a_2 + a_3 e^{b_3 x}, x > 0. \quad (1)$$

In equation 1, parameter $a_1 > 0$ represents the intensity of infant mortality, and $b_1 > 0$ the rate of its decline, $a_3 > 0$ describes the initial size of mortality at approximately age 30 and $b_3 > 0$ expresses the rise of the mortality rate over ages.
Maximum likelihood estimation was used to calculate the model parameters. It assumes that the number of deaths observed in a given age interval follows a Poisson distribution

$$P(D = d; \theta) = f(d; \theta) = \frac{1}{d!}\theta^d e^{-\theta}, \quad (2)$$

where θ is the rate parameter and d is the number of deaths occurred in a given interval of time. For each age interval, we have information about the number of people exposed to the risk of dying, Ex, and the number of deaths that occurred, Dx. Assuming that deaths observed at a given age interval are independent from deaths occurred in other one, the likelihood and log-likelihood functions are as follows

$$L(\theta;\ Ex, Dx) = \prod_{x=0}^{\omega} \frac{1}{D_x!} \theta^{D_x} e^{-E_x \theta};$$
$$l(\theta;\ Ex, Dx) \propto \sum_{x=0}^{x=0} D_x \log(\theta) - E_x \theta. \tag{3}$$

The Siler model is estimated by substituting θ with the hazard function of the equation 1.

To illustrate and test the proposed methodology, mortality rates from Sweden and the United States of America in the Human Mortality Database (Human Mortality Database, 2023) were utilized. The HMD contains high quality data that undergone standardised procedures, ensuring the comparability of information across different populations. The two selected countries exhibit notable differences: while both have small infant mortality rates, the USA has a lower life expectancy and experiences higher levels of premature (or mid-life) mortality (Case and Deaton, 2015, 2017). In contrast, Sweden is characterized by its high longevity. The chosen time period spans from 1950 (after the Second World War and the associated economic crises) to 2019 (the year preceding the Covid-19 pandemic). As the HMD often applies various correction procedures and models for old age mortality based on the country (Wilmoth and Horiuchi, 1999), this analysis focuses on ages 0 to 100.

Once the Siler model was estimated, the relationship between its five parameters (on a logarithmic scale) and the life expectancy at birth for the corresponding country and year was examined. Figure 1 displays a clear linear patterns between e_0 and a_1, as well as between e_0 and a_3 (although the values are more dispersed in the first graph, the Pearson correlation coefficient remains high). In contrast, the relationship between life expectancy at birth and a_3 is visibly quadratic. No apparent relationship is observed between e_0 and b_1, particularly for the United States. The value of b_1 for the years considered remains relatively

stable, albeit at two different levels for males and females. In the case of Sweden, a fluctuating trend is observed, potentially due to model identification issues, as highlighted by Mazzuco *et al.* (2018). Finally, both Swedish males and females show decreasing values of life expectancy at birth and Makeham's constant, whereas for the United States, although the trend is downward, the reduction is considerably smaller for both sexes. Looking at the relationship between e_0 and a_2 as a whole, however, there does not seem to be a clear pattern. Considering these observations, the following functions were defined to estimate each parameter of the Siler model, using life expectancy as an explanatory variable:

$$\log(a_{1,t}) = a_{1.1} + a_{1.2}e_{0,t} + \varepsilon_t; \quad (4)$$

$$\log(b_{1,t}) = b_{2.1} + \varepsilon_t; \quad (5)$$

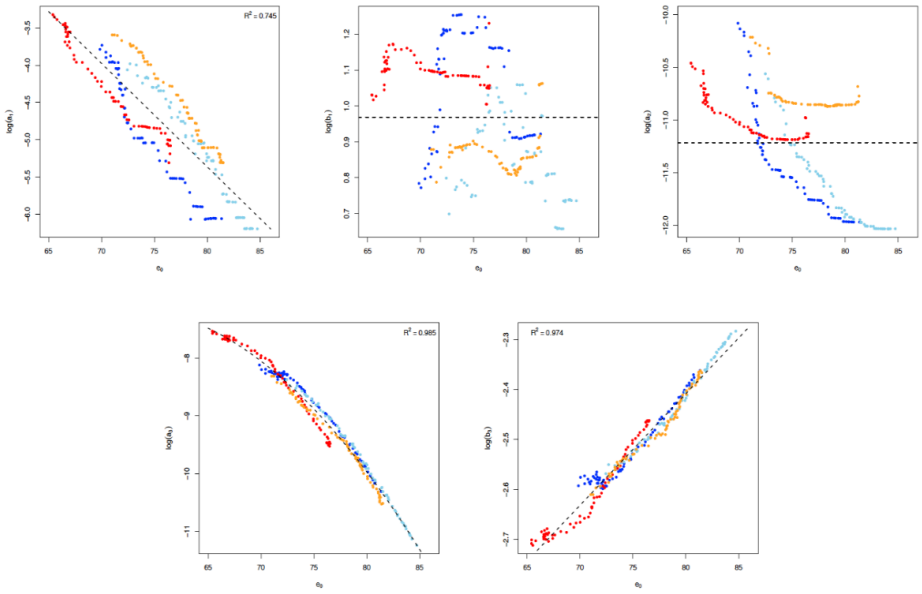
$$\log(a_{2,t}) = a_{2.1} + \varepsilon_t; \quad (6)$$

$$\log(a_{3,t}) = a_{3.1} + a_{3.2}e_{0,t} + a_{3.3}e_{0,t}^2 + \varepsilon_{t;} \quad (7)$$

$$\log(b_{3,t}) = b_{3.1} + b_{3.2}e_{0,t} + \varepsilon_{t;} \quad (8)$$

where ε_t are independent and identical random variables normally distributed with mean of zero and variance of σ^2. The logarithmic transformation of the parameters is particularly convenient to avoid issues in their parametric reference space. The linear determination indeces, R^2, for models 4, 7 and 8 are 0.75, 0.99 and 0.97, respectively.

Figure 1 – *The relationship between life expectancy at birth, e_0, and parameters of the Siler model on a logarithmic scale. Warm colors (red for males, orange for females) represent the USA, while cool colors (blue for males, light blue for females) represent Sweden. The dashed lines depict the selected model for estimating the parameters using life expectancy at birth and its coefficient of linear determination, R2, is indicated in the corresponding panels.*



Once the parameters are estimated and the life expectancy at birth for the population of interest is selected, the parameters of the Siler model can be derived, and specific mortality rates for each age interval can be calculated. Although the specification of the functions for b_1 and a_2 may not be entirely convincing (and error assumptions are not fully satisfied), the overall estimations of the Siler model are reasonably accurate, as shown in section 3.

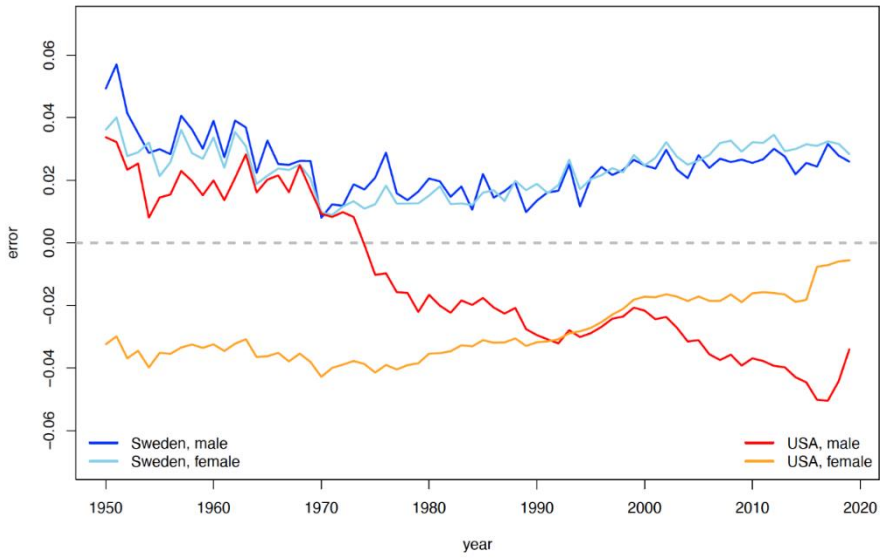
3 Results

In order to compare the classical estimates (obtained year-by-year via maximum likelihood of the equation 3) with those calculated using direct parameter estimations, we analyzed the age-specific death rates for ages 0 to 100 obtained

through both methodologies. The error measure is expressed as a percentage, reflecting the difference between the estimated and original log-death rates.

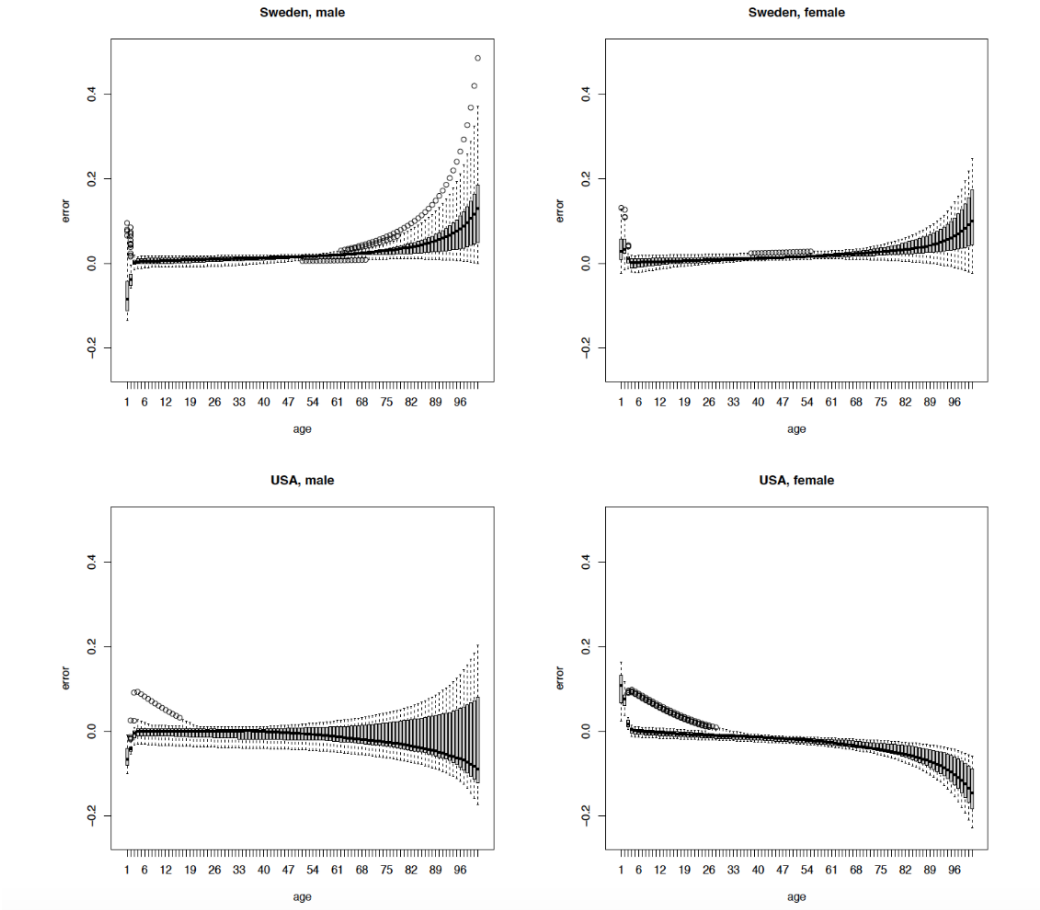
Figure 2 illustrates that the average errors is range between -6% and 6%. Hence, the differences are relatively small for both countries. However, for Sweden (both sexes), the proposed methodology tends to overestimate the death rates. On the contrary, American women consistently exhibit an underestimation, although this tendency decreases in more recent years. In contrast, American men demonstrate the highest differences during the later years of the series.

Figure 2 - *The mean relative errors between the estimated and original log- death rates from 1950 to 2019.*



When examining the errors across the lifespan (see Figure 3), death rates at early and advanced ages are more difficult to estimate. Specifically, Swedish men display an increase in error variability with advancing age. Despite exhibiting similar trends, the discrepancies remain minor for the other scenarios. However, considering the medians, they are very close to t 0 (no errors) for almost all ages. Figure 3 shows that in Sweden, the model tends to overestimate mortality rates beyond the age of 80, whereas in the USA, it tends to underestimate them.

Figure 3 – *Distribution of relative errors between the estimated and original log-death rates across different age groups.*



4. Discussion

By leveraging the relationships between life expectancy at birth and Siler parameter estimates, we were able to reconstruct specific mortality rates for ages 0 to 100, without any additional information about sex and country. Although the link functions between coefficients and e_0 are not always entirely satisfactory, the approximation achieved is generally satisfactory, with small errors observed for both Sweden and the USA.

When comparing this approach to methods proposed by Pascariu et al. (2020) and Nigri et al. (2022), which calculate each mortality rate using specific linear or

non-linear equations, it is worth noting that the estimates obtained using the Siler model yield smoother rate curves but with lower precision. For instance, the Siler model cannot account for the accidental hump often observed for males around the age of 20. However, it is important to consider that the new methodology is much more parsimonious than the approaches described by the aforementioned authors, which generally leads to greater imprecision. Nonetheless, a comparison among the different methodologies is desirable.

The accuracy of the suggested method relies on the quality of the year-by- year estimates obtained through maximum likelihood, as well as the precision of the link functions. In the latter case, exploring additional populations is crucial. Analyzing countries that have experienced a sharp decline in infant mortality since the Second World War (such as Italy and Spain) and nations where it is still significant (e.g., Russia) would provide valuable insights. Moreover, estimating other datasets could further enhance our ability to model (parametrically or not) the relationships between parameters and e_0, particularly for b_1 and a_2.

Conducting, additional tests is therefore essential to validate this approach, but the initial results are certainly promising. In response to the question "is life expectancy enough" we can confidently answer in the affirmative.

Acknowledgements

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THE CARE NEEDS OF FRAIL ELDERLY: A REGIONAL ANALYSIS OF THE SUPPLY OF HEALTH CARE SERVICES[1]

Lorella Sicuro, Domenico Tucci, Rosalia Coniglio

Abstract. The developed world's population is aging because of the trends of increasing in life expectancy and decreasing of fertility rate. These demographic changes result in an increasing share of old and very old people, leading to new patterns of morbidity and mortality, such as the increasing number of degenerative and often multiple and chronic diseases. These trends are predicting the increase of demand on health care services.

This paper aims to analyze at the regional level, thanks to the use of twenty-four indicators from ISTAT and Ministry of Health sources, the needs of frail elderly people and the care they receive, both informal and formal, taking into account the presence of alternative services, such as home care assistance.

Since it is a complex and multidimensional phenomenon, because it is defined and represented by a set of elementary indicators, it was decided to synthesize the information through the MPI (Mazziotta-Pareto Index), a non-compensatory composite index. Specifically, the twenty-four elementary indicators are grouped in six synthesis indices related to the following thematic areas: potential needs, demo-social-health context, residential supply, complementary and alternative territorial supply, hospital inappropriateness and informal care.

The results highlighted that in the South there are high values of potential needs and informal care. The North is characterized by a low level of potential care need and greater presence of residential and territorial supply. This study provides policy makers a feasible and objective methodological approach that makes possible a global reading of the phenomenon examined, easy to calculate and to interpret.

The strengthening of territorial supply and greater coordination between hospital and territory for the taking care of frail elderly, should be capable to keep elderly healthy and guarantee an improvement in the patient's real and perceived quality of life.

[1] The paper is the result of the common work of the authors. In particular, paragraph 1 is attributed to Rosalia Coniglio, paragraph 2 is attributed to Lorella Sicuro, paragraph 3. to Domenico Tucci, paragraph 4 to Lorella Sicuro.

1. Introduction

The increasing ageing of the population and, therefore, advances in survival, on the one hand represent an achievement and on the other hand pose the problem of the quality of the years of life gained. Certain diseases may occur later or be better treated, or other diseases are prevented from killing, but not from causing suffering or disability (Livi Bacci, 1999). In Italy, on 1st January 2023 there were more than 14 million elderly people aged over 65, representing 24.1 per cent of the total population. Moreover, 33.3 per cent of the over-65 population had serious chronic and multi-morbidity diseases (among the over-85s, 47.7 per cent). Besides, 3.8 million elderly people had serious reduction in autonomy in daily activities of personal care or in domestic life (Istat, 2019). Therefore, the elderly are at risk of the conditions that characterise a good quality of life: independence, namely the ability to carry out autonomously the normal activities of daily life (Burgio *et al.*, 2010).

In this context, the family remains the main support of the elderly; nevertheless, the family composition itself has been undergoing rapid change and is characterised by the disappearance of the 'extended family' and the increasing in single-person households, many of which are made up precisely of elderly people. These demographic changes reduce the number of children and family members available as potential caregivers, which, in the best of cases, can make up for it by relying on the assistance of the in-home nurse (Vaccaro and Coletta, 2021). In Italy, more than 50 per cent of the elderly receive help from family members (on a non-exclusive basis), 17 per cent of them is assisted by a paid caregiver, and 6.4 per cent receive help from other people (friends, voluntary associations, etc.).

Although so-called informal care is important, in order to guarantee appropriate care for elderly patients in frail conditions, care pathways consisting of an organisational set of health and social treatments are necessary. These appropriate treatments are essential to stabilise the clinical picture, limit the functional decline and improve the quality of life (Cricelli *et al.*, 2020). In order to achieve this goal, territorial care, also known as primary care, must be strengthened. Therefore, forms of home hospitalisation could avoid inappropriate access and permanence in hospital or in residential facilities (risky, for example, in an epidemic context, as the covid-19 pandemic has shown) and allow to the elderly to remain in their usual living environment (Damiani and Michelazzo, 2020). The purpose of this study is to analyse at a regional level the needs of the frail elderly and the assistance received, both informal and formal, taking into account the presence on the territory of alternative services, such as home care, demographic and socio-economic factors that may affect this assessment.

2. Methods

Most of the socio-economic phenomena such as development, progress, poverty, social inequality, well-being and quality of life have a multidimensional nature and cannot be measured by a single descriptive indicator. Therefore, these phenomena require, to be measured, the 'combination' of different dimensions, to be considered together as components of the phenomenon. The phenomenon analysed in this paper took into consideration the provision of services for the elderly and their care needs from different points of view. In particularly, we elaborated twenty-four indicators from Italian National Institute of Statistics (Istat) and Ministry of Health surveys related to the health status of the elderly population and health care supply. Since this is a complex and multidimensional phenomenon, we decided to synthesize the information by applying a methodology known as composite indicator or composite index. In this paper, we considered the MPI (Mazziotta–Pareto Index) method, a non-compensatory composite index used by Istat for measuring "Equitable and Sustainable Well-being" in Italy (Mazziotta and Pareto, 2011).

The MPI index is designed to satisfy the following properties: normalization of indicators with a specific criterion that purifies the indicators both from the unit of measurement and from their variability; simplicity of calculation; ease of interpretation (Verrecchia, 2019).

This method makes it possible to construct a synthetic measure for the case in which the components are non-substitutable, i.e. they all have the same weight (importance) and no compensation between them is allowed. It consists of:

- standardization of indicators through standardized deviations: let $X=\{x_{ij}\}$ be a matrix of n rows (statistical units) and m columns (indicators elementary) (where M is the mean and S is the mean square deviation of the j-th indicator), we have:

$$z_{ij} = 100 \pm \frac{(x_{ij} - \mathrm{M}_{x_j})}{\mathrm{S}_{x_j}} 10$$

- a penalty coefficient is introduced that depends from the variability of the indicators with respect to the average value ("horizontal variability"): this variability is measured through the coefficient of variation (cv, for the i-th unit):

$$\mathrm{cv}_i = \frac{\mathrm{S}_{z_i}}{\mathrm{M}_{z_i}}$$

- where

$$M_{z_i} = \frac{\sum_{j=1}^{m} z_{ij}}{m} \quad \text{e} \quad S_{z_i} = \sqrt{\frac{\sum_{j=1}^{m} (z_{ij} - M_{z_i})^2}{m}}$$

- the generalized form of the MPI index can be written as follows:

$$MPI_i^{+/-} = M_{z_i} \pm S_{z_i} cv_i$$

It is based on the arithmetic mean of the standardized indicators, adjusted with a measure of horizontal variability, proportional to the standard deviation and a direct function of the coefficient of variation. Therefore, the Index can be decomposed into two parts: the average effect (compensatory) and the penalty effect (unbalancing), although it does not completely remove the indicators from the variability effect. The sign ± indicates the 'polarity' of the j-th indicator, i.e. the sign of the relationship between the j-th indicator and the phenomenon being measured. Consequently, the elementary indicators are converted so that they all oscillate within the same scale, with mean 100 and mean square deviation equal to 10: the values obtained are be included in the 70-130 range. Therefore, it is easy to identify the territorial units that have an index higher than the average value (values greater than 100) and those that have a lower index (values less than 100).

This approach penalizes the score of each unit (the arithmetic mean of the standardized values) with a quantity that is directly proportional to the "variability horizontal". The aim is to favour the units that, with the same average, present a greater balance between the values of the indicators.

In this study, six synthetic indices related to the following areas were elaborated: potential needs, demo-social-health context, residential supply, complementary and alternative territorial supply, hospital inappropriateness and informal care. Table 1 listed the 24 indicators related to each composite index. The data are referred to 2019, the last year that was in common for all selected indicators.

For a better representation of the data, we have divided the indices into tertiles and we refigured the territorial distribution through cartograms.

3. Results

The results at regional level for each of the synthetic indices processed are presented below. (Table 2 and Figure 1)

Table 1 - *Composited Indices elaborated by Mazziotta-Pareto Index with related indicators.*

Potential need	Severe chronicity
	Multi-morbidity
	Severe difficulties in at least one personal care activity
	Severe difficulties in household activities for at least one activity
	Difficulties in mobility or functional limitations
Demo-social-health context	Lonely elderly
	Health perception: bad and very bad
	Over 80 years of age out of total population
	Severe difficulties in personal care activities due to aids deemed insufficient or missing
Residential supply	Guests of the residential socio-medical institutions for the self-sufficient elderly
	Guests of the residential socio-medical institutions or the non self-sufficient elderly
Complementary and alternative territorial supply	Social-medical home care
	Users of day care centers
	Users of vouchers
	Receiving telemedicine and teleassistance
	Users of community/social centers
	Home care
	Total home care hours per elderly person
	District health facilities with elderly care
Hospital inappropriateness	Hospitalizations with overthreshold stay with medical DRG of patients aged 65 years and older
	Hospitalization rate for heart failure (age >= 65 years)
	Hospitalization rate for influenza in the elderly
Informal care	Severe difficulties in personal care activities for aid received from family members
	Severe difficulties in personal care activities due to aid received from paid persons

3.1. The Indices

Potential need: The potential needs of the elderly expressed by the indicators relating to multi-morbidity, severe chronicity, limitations in mobility and difficulties in performing activities of daily living, are greater in the South of Italy than in the North. In particular, the lowest value is recorded in Trentino Alto Adige (Index=87.2), the highest in Calabria (115.5), followed by Campania (113.8). In the South, Molise is the virtuous region, but near to national average (98.8); Emilia Romagna is the northern region characterised by high values (102.0).

Demo-social-health context: There is not real territorial characterisation about demo-social-health context, although the most virtuous regions are mainly located in the Centre-North of Italy. In this synthetic index are included the lonely elderly, those who perceive their state of health as bad and very bad, the over-80s and those who feel that the help they receive is insufficient or lacking. Liguria (109.1) in the North and several regions in the South record the higher levels of distress (Basilicata, Calabria, Sicilia and Sardegna, with the values of the Index ranged from 104.9 to 107.0). The regions of the North East, and Abruzzo (95.2) and Molise (94.2) record the lower levels of discomfort.

Residential supply: The residential supply includes the two indicators relating to the users of social and socio-medical residential facilities for the self-sufficient and non-self-sufficient elderly. The entire North is characterised by high values, with the exception of Trentino-Alto Adige (96.4). In particular, Piemonte has the highest value (114.9), followed by Lombardia (104.7). In Centre of Italy, Marche (103.9) has high values; in the South, Basilicata (105.4) is the region with the highest value, followed by Molise (101.9), while Campania is the region with the lowest value (88.2).

Complementary and alternative territorial supply: This index, which mostly includes territorial or primary care, is very variable. In the North of Italy the virtuous regions are Friuli-Venezia Giulia (106.8), Valle d'Aosta (104.2) and Veneto (103.1); Trentino-Alto Adige (98.8), Lombardia (98.8) and Piemonte (97.6) are the northern regions with values under the average. In the Centre of Italy Abruzzo (101.3) and Lazio (101.7) are the regions with higher values. In the South, which has the lower values, Molise (100.8) is the only region with Index value above the average; Calabria records the lowest value of Italy (92.6)

Hospital inappropriateness: This synthetic index, which includes indicators expressing organisational inappropriateness and reduced accessibility and functionality of territorial services, shows an unexpected North-South geographic gradient with some exceptions; in particular, Trentino-Alto Adige has the highest value (111.0) and Toscana the lowest one (89.9). In the South of Italy all values (except for Molise, where the Index is equal to 100.3) are below the average.

Informal care: Regarding to the help that elderly people with serious difficulties in personal care activities receive from family members and paid caregivers, in the North the Index is significantly lower than in the Centre and the South. In particular, Veneto (89.8) is the region with the lowest value; the higher values belong to Sardegna (120.4) and Marche (116.5). Emilia-Romagna (108.5) is the only northern region with value of Index above the average. In the South, only Molise (94.2) and Puglia (98.7) record values under the average.

Table 2 - *Mazziotta-Pareto Synthesis indices related to Potential need, Demo-social-health context, Residential supply, Complementary and alternative territorial supply, Hospital inappropriateness and Informal care at regional level, 2019, Italy.*

Regions	***Potential need***	***Demo-social-health context***	***Residential supply***	***Complementary and alternative territorial supply***	***Hospital inappropriateness***	***Informal care***
Piemonte	93,2	98,6	114,9	97,6	94,6	90,3
Valle d'Aosta/Vallée d'Aoste	89,1	96,4	100,4	104,2	100,9	92,2
Lombardia	92	94,1	107,7	98,8	103,5	93,5
Trentino Alto Adige/Sudtirol	82,2	95,4	96,4	98,8	111	94,1
Veneto	90,8	90,7	102,3	103,1	109,6	89,8
Friuli-Venezia Giulia	87,1	96,1	100,8	106,8	109	92,1
Liguria	90,7	109,1	104,7	101,6	96,3	94,2
Emilia-Romagna	102	98,6	102,5	101,3	106,2	108,5
Toscana	96,2	96,3	94,7	98	89,9	99,8
Umbria	105,4	98,2	95,5	97,5	99,5	105,8
Marche	104,3	97,6	103,9	97,7	101,4	116,5
Lazio	96,5	103,5	96,3	101,7	99,8	95
Abruzzo	106,6	95,2	93,7	101,3	100,1	100,1
Molise	98,8	94,2	101,9	100,8	100,3	94,2
Campania	113,8	97,7	88,2	94,9	92,9	104
Puglia	106,8	99,7	93	95,4	95,7	98,7
Basilicata	107,7	106,3	105,4	96,5	96,5	100,3
Calabria	115,5	106,3	92,4	92,6	90,9	101
Sicilia	109,4	107	96,2	98,5	96,2	103,3
Sardegna	109,2	104,9	97,2	96,8	93,2	120,4

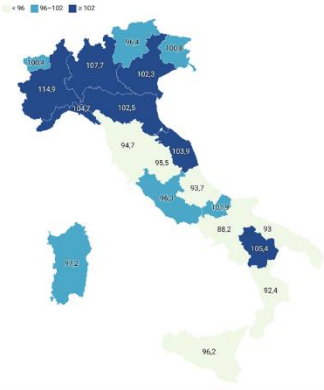
Source: Istat and Ministry of Health

Figure 1 - *Territorial distribution by region of the six synthesis indices*.

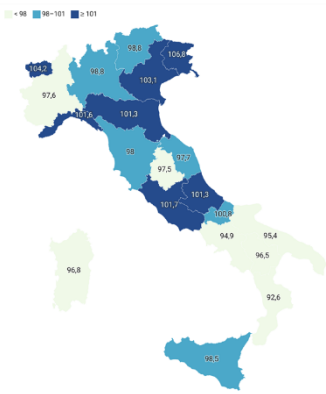
Potential needs

Demo-social-health context

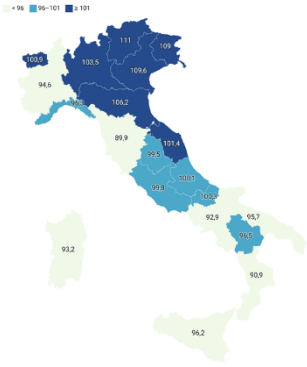
Residential supply



Complementary and alternative territorial supply



Hospital inappropriateness



Informal care

3.2. The regional profiles

The territorial distribution by region of the six synthesis indices is illustrated by the cartograms of Figure 1. Regarding to the North West of Italy, the needs of the

elderly are not very high, but the socio-sanitary demo context is critical; on the side of service supply, there is a strong presence of residential socio-assistance; in Valle d'Aosta and Liguria complementary and territorial supply, and hospital inappropriateness are high. Liguria record high values also for informal care.

In the North East of Italy, Lombardia, Veneto, Friuli-Venezia Giulia and Trentino Alto Adige have the lowest needs, also with a non-critical socio-health demo context; on the side of supply, residential and territorial ones, and hospital inappropriateness are high. Emilia Romagna is characterised by behaviour similar to that of Central Italy: the needs of the elderly as well as demo-social characteristics are medium; all types of assistance (informal, formal and hospital inappropriateness) are high.

For the Centre of Italy, Toscana presents high potential needs and there is high prevalence of territorial supply and informal care, but less residential supply. Lazio shows high levels of needs of the elderly, also critical is the social demo-social conetxt, which, however, is met by all the aid networks, in particular by territorial assistance.

In the South of Italy, Abruzzo responds to the needs of the elderly with informal care, territorial supply and hospital inappropriateness, while the residential offer is rather lacking. Campania and Sardegna show very similar behaviour, responding to the needs of the elderly mostly with the greater presence of informal care (Sardegna also records high values of residential care). Calabria, Sicilia and Puglia also respond to the needs of the elderly with informal care, Sicilia also records high values of territorial supply. Basilicata is the southern region with the highest residential offer, followed by informal care.

4. Conclusions and Discussions

This study provides policy makers a feasible and objective methodological approach that makes possible to take measurements using a set of indicators, which could be easily retrieved from administrative and statistical data. Besides, the elaboration of synthetic indices allow a global reading of the phenomenon examined, easy to calculate and to interpret. The work focuses on the relationship between the care needs of frail elderly and the supply of health care services, but - taking into account also the main features of the social and health context - an evaluation-oriented contribution can be provided to support the decision making process for the long term care of elderly.

The application of this approach to Italian context showed how supply of health care services for the elderly substantially varies across Italian regions. In the North of Italy, a low level of potential care need seems to be mismatched with high level of residential and alternative supply, and of hospital inappropriateness. This may be

explained by the large number of elderly living alone and the high employment rates in Northern households, included women (Istat, 2023). These factors facilitate the recourse to the institutionalization.

Regarding very low availability of residential services in Southern Italy, it might reflect some cultural and religious factors. In fact, in Southern of Italy the care for the elderly is viewed as natural responsibility of the family. For these reasons, the families in South of Italy might be reluctant to institutionalize their relatives and want to keep them at home as long as possible. This sense of responsibility for the care of elderly that traditionally characterizes Southern Italy families might also explain the low level of alternative and complementary territorial supply. Therefore, the potential care needs meet a response trough the informal care provided by relatives or caregivers supporting the family, even if this kind of assistance is not always specific and appropriate.

In general, recent evidence suggest that older people tend not to want institutional care, and families and other informal carers strongly prefer to continue to care for their family members in a friendly environment such as their own homes and local communities (Zigante, 2018).

Besides, in order to respond to the growing health needs of elderly and improve the performance and quality of health services (Who, 2018), the entire health system must contribute to the appropriateness of integrated care and continuity of care (Ghiottoa *et al.*, 2018).

The strengthening of territorial supply and greater coordination between hospital and territory for the taking care of frail elderly, are capable to keep elderly healthy by prevention and timely treatment of illness and disease, manage care for chronic illness to avoid worsening of a patient's health (Van Loenena, 2014) and guarantee an improvement in the patient's real and perceived quality of life.

Already in the last decades, facing with a rapidly increasing elderly population and soaring costs of health and long-term care services, many governments as Sweden, Denmark, the Netherlands and Great Britain discouraged the building of additional nursing homes and turned to new models of home and community-based care testing different approaches for providing high quality, low-cost care in the home (BJ Coleman, 1995). In the last years, above all after covid-19 pandemic, policy makers want to undertake this course of action also in Italy.

In Italy, the Recovery Plan endorsed specific measures for the elderly. These measures will be completed by 2026. It is being planned for home care the measure called "ageing in place": while it is true that in Italy the care of non-self-sufficient elderly persons is often already carried out mainly at home, it is also true that this often occurs in situations of loneliness, if not abandonment. In the absence of adequate public professional services, monetary support for ageing in place ends up feeding the market of private family carers (not always regular).

To reverse this trend, interventions are planned in the area of care and territorial health: it will consist in the creation of 1,288 community homes and single points of access to healthcare services in which multidisciplinary teams (general practitioners, paediatricians and social workers) will be active. Besides, it will be created a shared model of home care that makes the most of the possibilities offered by new technologies (such as telemedicine, domotic, digitalisation); an information system in each local health authority capable of collecting clinical data in real time; the activation of 602 Territorial Operating Centres (Cot), one in each district to coordinate home services with other health services, ensuring the interface with hospitals and the emergency-urgency network (Pesaresi, 2021).

In conclusion, for the future it will be interesting to evaluate the output of Recovery Plan and assess the trend and intra-regional variability of care services for elderly. In fact, although healthcare planning takes place at regional level, considering regional averages is not sufficient; trends and variability within regions, among the Health Local Units (HLUs) of the same region for example, should be assessed. Even if the HLUs are located in the same region with the same general principles and organisation, such as the same criteria for financing public and private health care providers, there may be changes in the performance of their primary care programme: differences in health care resources and efficiency of care.

Besides, a single regional territory may contain different geographic areas (such as mountainous areas and areas with high or low population density), and the continuity of people's social and health integration is managed locally. Moreover, to identify the virtuous regions it is necessary not only to have high levels of care for the frail elderly, but also uniformity within them (Damiani *et al.*, 2009).

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THE POINT OF VIEW OF CHILDREN OF PRIMARY SCHOOL ON BULLYISM

Nidia Batic

Abstract. The term "bullying" denotes aggressive, harassing, offensive, physical, verbal or relational behaviours, intentionally and repeatedly implemented by one or more subjects (bullies) towards one or more victims, who are unable to react and / or ask for help. Acts of bullying are already present in Italian primary schools and it is therefore important to launch awareness-raising and prevention initiatives on the subject to accompany children towards broader projects in order to promote citizenship. The aim of the research was to explore the perceptions and opinions, on the above antisocial behaviours and bring out useful suggestions from the children to deal with bullying situations in the classroom. As for the bullie is described as one who feels strong and does not feel guilty about their actions, who takes pleasure in doing harm, thinking that the victim deserves it. The victim is perceived as a subject who lives his situation with strong inner discomfort (he is sad, suffers, feels humiliated), is isolated and does not react and does not seek help for fear of the consequences. Children have an understanding attitude towards victims and invite them not to bear in silence and share what happens to them with the teacher and parents (their own and the bully). The victims should also try to react (but without violence) and take courage, while having an educational attitude towards bullies; however they would not exclude a punishment, that is usually delegated to the teacher.

1. Introduction

The term bullying indicates aggressive theybehaviour (Olweus, 1993, Cowie, 2002, Smith and Monks, 2002, Gini and Pozzoli, 2018) directed toward peers, in a group context (Menesini, 2003), toward subjects who are younger, smaller, weaker or in some other situation of relative disadvantage (APA Dictionary of Psychology).

Three are the protagonists of bullying: the bully, the victim, the spectators. The *bully* engages in violent behaviour, with a strong need to dominate others (Coie et al., 1991), while the *victim* is usually a subject who suffers without asking for help,

is insecure and more anxious than the other members of the group, (Olweus, 1993) and therefore an easy target for the bully. *Spectators* can take on different roles: helper, reinforcer of the bully, assistance of the bully, defender of the victim and outsider (Salmivalli et al., 1996), or they can observe without intervening, intervene in support of the victim or in support of the bully.

Bullying can manifest itself through different modalities, classified by Rivers and Smith (1994) and Genta et al. (1996): physical, verbal and indirect (relational, social). The physical mode consists of attacking the subject or damaging their things; The verbal modality takes place through insults, teasing, threats, humiliation, while the indirect mode uses strategies of social isolation of the subject, for example through defamation, which aim to undermine the self-esteem of the victim and / or their social status (Smith and Monks, 2002).

Bullying manifests itself with aggressive behaviour, but in order to distinguish it from other types of violent manifestations of more episodic feature, three conditions must be met (Thomas et al., 2015): *intentionality* to deliberately create physical or psychological harm to the victim, with a form of proactive aggression[1]; *repetition* of behaviours that are repeated and protracted over time (and with lasting consequences, Smith and Sharp, 1994, Smith and Monks, 2002) and *asymmetry of power*, as the bully places himself in a position of superiority and aims to conquer a position of dominance (Gini and Pozzoli, 2018).

A further classification introduced by Olweus (1993) proposes a distinction between *active bullying* and *passive bullying*: in the first case the bully acts with the intention of harming the victim and achieving his purpose, while the passive bully is one who acts by imitation, because he is guided by the actual bully. Similar to this is the classification proposed by Rigby (1996) which distinguishes between *malicious bullying* (active) and *non-malicious bullying* (passive). But even among the victims a distinction can be made between passive victims and provocative victims, who can provoke, with their irritating way of behaving, reactions from the bully (Menesini, 2003).

Bullying seems to be a mostly male phenomenon regarding the role of the bully, who seems to prefer physical, aggressive bullying, while females use more forms of social bullying (Smith and Monks, 2002). For the role of victim, according to Menesini (2003) there are no marked gender differences, while others argue that even in this role the number of males prevails (Fedeli, 2007).

[1] Coie et al. (1991) introduced the distinction between proactive aggression, which occurs on the initiative of those who perform a violent action, and reactive aggression, which is instead a response to a provocation. The bully usually acts proactively.

1.1 Dataset

The focus of this work is represented by children attending primary school. Baby-bullying is still a little-known phenomenon, difficult to quantify, and it is worrying that such young children can intentionally perform violent gestures (Medri, 2018), and is often interpreted as liveliness, unruly acts or rudeness (Mariani, 2009), and this makes difficult to diagnose it. However, most data on the prevalence of bullying refers to older boys, and bullying data are associated with those of cyberbullying. Both phenomena have been growing in recent years, and a report by the NGO Bullying Without Borders[2] shows that in Italy 7 out of 10 children (who attend lower and upper secondary school) suffer some form of bullying or cyberbullying every day.

In the most recent ISTAT survey (2015) carried out in 2014 on children aged 11 to 17 [3], it emerged that 52.3% say they have been subject to some form of bullying in the 12 months prior to the survey. In particular, 32.9% suffered harassment a few times a year, 10.7% once or more a month (but less than a few times a week) and 9.1% once or more a week.

The first reports on the monitoring of bullying in Italian schools carried out through the ELISA platform (E-Learning of Teachers on Anti-bullying Strategies) and referring to the school years 2020-21 and 2021-22 concern the direct testimonies of secondary school students and the opinions of primary school teachers[4] (table 1).

Table 1 – *Victims and bullies in school (percentage values)*

School years	High school students	
	Victims	Bullies
2020 - 2021	22,3	18,2
2021 - 2022	25,3	18,1
	Opinions of primary school teachers	
	Victims	Bullies
2020 - 2021	5,0	5,3
2021 - 2022	4,3	4,4

Sources: https://www.piattaformaelisa.it/monitoraggio/

[2] Quoted by Gioia, 2022.

[3] The survey referred to the last 12 months before the research.

[4] Following the entry into force of Law 71/2017 and the issuance of the Guidelines for the prevention and contrast of cyberbullying (MIUR note prot. N. 5515 of 27-10- 2017) in 2018 the Ministry of Education and Merit started, in collaboration with the University of Florence, the ELISA project which aims to train teachers and monitor this phenomenon in primary and secondary schools of first and second degree.

In one year time span the percentage of victims has increased by 3 points, while "self-certified" bullies are substantially stable (18%). The perception of the phenomenon at primary school level is very different; there, teachers estimate a much lower presence of bullies and victims and report a decrease in bullying episodes.

Finally, according to the most recent research of the “indifesa” Observatory of 2022-23, 47.7% of young people between 14 and 26 years have been victims of bullying or cyberbullying[5].

As we have seen, the data reported here have been collected with different methodologies and referred to subjects of different ages, so they are not comparable, but equally bring out a worrying picture on the spread of bullying in our country.

2. Objectives, tools and methods

The aim of this research was to identify the perception and evaluation of bullying by children attending primary school. To this end, a special questionnaire was structured: at the beginning a short story was written where there is Fede who acts with verbal, physical and social aggressive behavior towards Ale, but the term "bullying" is never written. The two protagonists were given nicknames that can be used for both boys and girls, and then the children were asked to assign a gender to Fede and Ale.

In the final version, the questionnaire counted 12 questions and administration[6] took place in the period between February and April 2023, involving 19 classes of primary schools in the provinces of Belluno, Pordenone, Trieste and Udine. The sample was made up of 323 pupils, of which 25.4% third-graders, 38.4% fourth and 36.2% fifth-graders, with a presence of 49.7% of males and 50.3% of females (one pupil did not respond).

Given the methods of selecting the sample and the aims of the research, there is no probabilistic sample, therefore the results of the research cannot be the object of inference for purposes of generalization. Nevertheless, these results have provided

[5] Since 2014 Terres des Hommes, with OneDay and ScuolaZoo carry on the Osservatorio “indifesa”, to hear of testimonies of young people on gender violence, discrimination, bullying, cyberbullying and sexting.

[6] The administration of the questionnaires was made by trainee university students in Education Sciences of the University of Udine, while class teachers were attending. Before administering the questionnaire, the research project was approved by the Managers of the schools involved and an information form was also signed by the families with the consent for the administration of the questionnaire to their children. The data were collected anonymously and processed in aggregate form in full respect of privacy according to the GDPR (2016/679) and Legislative Decree 101/2018.

useful information to teachers who have taken action to make targeted interventions in response to the different connotation of the problem present in the individual classes.

3. **Data analysis and hypothesis testing**

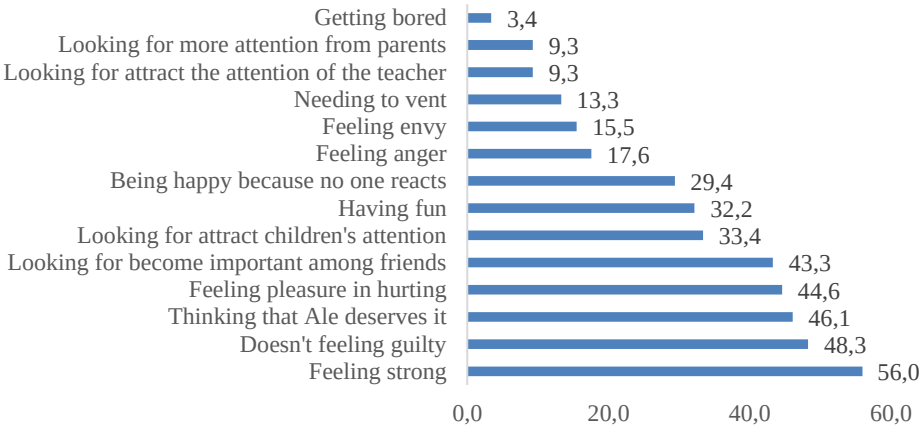
The first interesting data concerns the gender of the bullies: 86.2% of respondents believe that the bully (Fede) is a male and 70.7% think that the victim is also a male (in agreement with Olweus, 1993, Genta et al., 1996, for which males are more likely to be involved in bullying episodes). The second useful data to frame the spread of the phenomenon in the school, indicates that, according to interviewed children, in their classes 55.3% behave like Fede and 40.2% are victims like Ale.

The structure of the story allowed the students to try getting inside the mind of the bully and the victim so to describe what their feelings and emotions are, and to think about what the behaviour of classmates who act as spectators should be.

3.1. Feelings of the bully

The children traced an emotional profile of the bully that winds through different definitions (figure 1).

Figure 1 – *How children think the bully feels (percentage values).*



Finally, 13.3% respond to the open question, including some that try to understand the deepest moods of the bully: "she feels excluded", "she does not want to show who she really is", "she feels a little sad and a little happy", "she has a sad and tragic past" (probably the person who wrote it had a very specific child in mind).

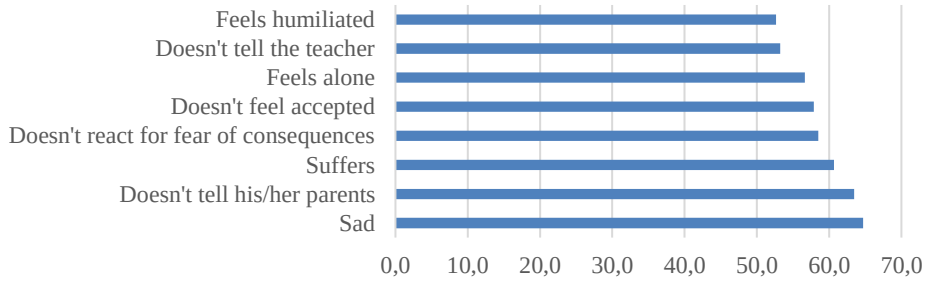
There is no difference in opinion according to the gender of the respondents, except for the statement that Fede "enjoys it" ($\chi^2 = 7.284$), "feel pleasure in hurting" ($\chi^2 = 6.610$) and "does not feel guilty" ($\chi^2 = 4.474$) supported more by males than by females[7].

3.2. Feelings of the victim

The victim is described as a child experiencing a whirlwind of feelings.

Considering the items with more than 50% answers, it emerges that the victim is perceived as a person who lives the situation inwardly with great *discomfort*, is *isolated* and does not find the courage to ask for help from adults nor to react, for *fear* of consequences (figure 2).

Figure 2 – *How children think the victim feels (percentage values).*



This is in accordance with the research of the Osservatorio "indifesa" and with the literature that describes the victim as a weak subject (Olweus, 1993), who is not able to defend himself, and on which the bully can act undisturbed and make a considerable asymmetry of power prevalence (Gini and Pozzoli, 2018). A chi squared test was applied on the same answers and did not reveal any difference in perception between children by age, while with reference to gender, males, rather than females, believe that the victim feels sad ($\chi^2 = 6.779$), alone ($\chi^2 = 4.164$) and suffers ($\chi^2 = 5.870$).

[7] Tables 2x2 (gender for each item with dichotomous response) have been applied the χ^2 test with α=0.05 (Diamond and Jefferies, 2006).

3.3. Role of classmates

Children place great confidence in the possibility that classmates will resolve conflict situations by talking directly to the bully to make him desist (86.3%) but, at the same time, they believe that an intervention by adults can be decisive, first of all that of parents (73.9%) or in any case of an adult (71.4%). Classmates should side with the victim (66.2%), talk to him or her (61.2%) and remove them from isolation by involving them in different activities (49.7%). But not everyone thinks alike: a 5.0% would choose to be on the side of Fede, the 0.9% would choose to be on the side of both Fede and Ale, and just over a quarter (26.4%) would not side with anyone. 38.8% of children assume that classmates "would like to intervene but do not know how to do it" and few (but there are some) suggest to do noything for fear of the bully (10.6%) or to move away (9.6%) or pretend nothing has happened (7.1%). 5.9% say classmates should laugh if Ale is teased or laugh if Ale plays pranks (5.3%). These latter behaviours could represent a strong point for the bully who, not finding direct opposition in children, could feel authorized to act, thanks to the silence and fear of part of the class (Mariani, 2009). Among the 15.8% of the "other proposals" what is already foreseen in the structured question is reiterated: a pacifying attitude and desire to understand the bully's motivations and only one child proposes to beat him.

3.4. Advice to victims

Finally, the children were asked to suggest how the victim, the bully and even the class teachers should behave. In fact, children mostly provide synthetic answers, in which one or two suggestions are present in the vast majority of cases, with a high dispersion of indications. The responses were subjected to content analysis (Losito, 1996).

The advice for the victim is to *share* their experience and *react* to the situation. The first advice is not to bear the situation in silence but to share it with an adult (overcoming the fear of a reaction of the bully, Cowie, 2002), first with the teacher (36.7%) and own parents (26.8%), but also with those of the bully (5.8%) or own schoolmates (who probably have already noticed). Although the most common advice is to turn to an adult, there are children who suggest further *reaction strategies*: a) *deal with the situation*: 10.9% suggest to "defend / react / respond" or "pay bullies back in their own coin", while 16.6% proves to be conciliatory and mostly proposes to the victim to talk to the bully, understand why he/she behaves in that way and ask them not to do it again, play with him/her, make peace with him/her, become his/her friend; b) *avoid the situation*: 14.1% suggest "letting go / ignoring /

not caring / not thinking about it / not being with Fede, not listening to him and not talking to him"; finally, there are 5 children who propose to the victim to leave or even change school; c) *take courage*, make a path of self-reinforcement, "work" on self-esteem and not isolate yourself: 12.6% say that the victims should "take courage / not be intimidated / not be afraid / not give up / be strong / be respected". The last tips are to sign up for a martial arts class or go to the gym, not to "play the victim" and be more confident.

3.5. Advice to the bully

From the content analysis of the question on the advice to be given to Fede, three categories of answers can be identified, from which it emerges that children are educational towards the bully and are also worried about his future:

a) recommendations on *things not to do*: 34.2% of children simply say that Fede "must stop", while other children go into more detail: he must stop doing harm, tease, annoy, insult, bully, steal, beat, play pranks and must not exclude Ale and other companions from activities;

b) suggestions on *things to do*: at first behave properly ("like a gentleman"), both towards the victim and the rest of the class, become good and kind and become friends with the victim, get along with him, talk and apologize and make peace, but there are also those who suggest talking to the teacher to check if Ale doesn't tells lies;

c) food for thought for their present and their future (which denotes a great maturity in the children interviewed): 1) an invitation to evaluate the impact that their actions can have on the victim, to reflect that if the same harassement were done to them, he would not be happy and to the fact that he could pay the consequences if someone decided to take revenge ("what goes around comes around"); 2) an invitation to project himself/herself into the future when, if they continue to bully, twill remain friendless and perhaps will not improve in life; 3) a suggestion to Fede to respect everyone and accept them as they are and not to feel superior or more important; 4) eventually, a number of interviewee realize that, perhaps, Fede has problems and should reflect on the reasons why he/she behaves like a bully and talk about it with someone and that he/she should learn to control himselves/herselves and "think before speaking" and that it is not necessary to act as a bully to attract attention. One child suggests that he should "tell parents that they feel alone".

3.6. Advice to the teacher

Two categories of interventions suggested to the teacher can be identified:

a) *to say*: as soon as they becomes aware of an act of bullying, first of all they should ask the bully to stop, scolding him and inviting the bully and victim to make each other peace and become friends. What is important is the invitation made by the children to let the teacher talk to the parents of the bully and the victim;

b) *to do*: the actions to be taken are mostly to give the bully a demerit note and put him in punishment. Teachers are also invited to monitor the childrens' behaviour always observing them and to talk about the topic in class. A child proposes to draw up rules against bullying and someone proposes to increase group activities, because evidently they have understood that group work can help them improve relationships within the class.

What is striking in all these suggestions, is the educational approach towards the bully, which must be implemented by every classmate. The children interviewed suggest that a punishment should be given which, however, she be delegated to the teacher, avoiding children to-do-it themselves.

3. Conclusions

It is very important to be able to bring out the phenomenon of bullying because it is widespread but protected from a form of fear and silence that children themselves recognize. In the present bullyism can create strong discomfort and suffering in the victims and hinders their emotional well-being as well as psychological and social disorders (Hodges et al. 1997; Tani, 1999); in the future the children who are bullied may develop forms of rejection for school activities (Olweus, 1993) or may lead to extreme self-destructive behaviours (Callaghan and Joseph, 1995). This is also in accordance with what also emerges from the recent report of the Osservatorio "indifesa" 2023: 38% of victims report loss of self-esteem and trust in others, 21% isolation from peers, worsening of school performance or refusal of school, in addition to the presence of panic attacks (19%), cases of depression (11%) and self-harm (8%). But there are also consequences for bullies who, if they do not change their attitude towards classmates, will have much more probability to continue as adults to engage in antisocial behavior (Sharp and Smith, 1995).

The great concern for the spread of bullying regards not only the school and is projected into cyber-space and, even if this is not the focus of this work, it cannot be ignore the alarm that concerns it: "'There are legions of paid trolls and trolls who attack only for pure evil and who do not discriminate between minors and who spend

their time insulting, threatening and inciting suicide to young people, bringing offenses to unbearable levels, 24 hours a day, 365 days a year. These real faceless killers are responsible for more than 200,000 deaths per year, among children and adolescents worldwide' said Miglino[8]"(Gioia, 2022).

Bullying harms everyone's right to be respected and grow free, and is configured as a "public health problem" (Gini and Pozzoli, 2018). Prevention is presented as the best strategy to address the problem; in 2002 the WHO in the World Report on Violence and Health (Krug et al., 2002) presented Recommendation to prevent and combat violence and, implicitly, also bullying, including research on violence (causes, consequences and prevention) and primary prevention of violence.

The Kandersteg Declaration[9] against bullying in children and adolescents dates back to 2007, which identifies five actions to be taken: 1) counter bullying in all places where children and adolescents live, study and play; 2) activate prevention actions at an early age and continue them in childhood and adolescence, promoting positive relationships between peers, with the aim of reducing risk factors and strengthening protection factors; 3) train all adults who are in contact with children and young people to enable them to promote healthy relationships and prevent bullying; 4) activate social policies and prevention programs based on scientific research; 5) carry out ongoing monitoring and evaluation actions of the intervention paths.

In Italy, on 29 May 2017, Law no. 71 “Provisions for the protection of minors for the prevention and contrast of the phenomenon of cyberbullying” was issued, and subsequently the ELISA project mentioned in note 4 was launched.

The first places where to carry out prevention are those of socialization, family and school, where it is necessary to activate an educational process that makes children internalize from an early age the concept of respect, which is the basis of civil coexistence, as well as one of the requirements for achieving citizenship skills[10]. It is necessary to insist on the consequences of bullying, because "baby bullies are not always fully aware of how devastating what they do can be for a child" (Medri, 2018), and to start projects of education to teach children about emotions, as the possibility of developing empathic capacity can increase and favour the manifestation of prosocial behaviours by the classmates towards weaker children, and favour their integration and psychological well-being (Pignatti et al., 2003).

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[8] Javier Miglino. Global Director of Bullying without frontiers.

[9] The participants in the Conference "Joint Efforts Against Victimization" held in Kandersteg on 8-10 June 2007, signed the Declaration, committing themselves to promote actions to prevent bullying and victimization of children and adolescents (EADP, 2019).

[10] European Key Competences 2018, Citizenship competence: "Citizenship competence refers to the ability to act as responsible citizens and to participate fully in civic and social life..." (Consiglio dell’Unione Europea, 2018).

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