

SOCIAL AND DEMOGRAPHIC PREDICTIONS IN INNER AREAS: A COMPARISON BETWEEN CAMPANIA AND SICILY¹

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Abstract. Demographic forecasts aim to chart the likely future of a population in terms of size and structural indicators. For policy they are a useful tool to understand demographic trends and plan strategies of an area. The interest for the territorial dimension has always characterized the activity in the field of demographic forecasts so that, since November 2021, the Italian National Institute of Statistics (ISTAT) has published demographic forecasts at 10 years, by age groups and municipalities with a population of over 20,000. The study aims to compare the demographic structure and the population movement in 2031 in the municipalities of Campania and Sicily classified according to the National Strategy for Internal Areas (SNAI) which aims to develop and territorial cohesion (Barca *et al.*, 2014). The choice of the regions of Campania and Sicily is determined by the fact that both are the most populous in the Mezzogiorno and have well characterized and different internal areas. Work objectives, given the real diversity in territorial behaviours and demographic characteristics, are the identification of primary determinants of marginalization compared to Italy, and a study on the ageing of the population and the decline in birth rates that will influence the contraction of working-age residents in the next decade.

1. Introduction

About four thousand municipalities for a population of over thirteen million people with an occupied area equal to fifty-nine percent of the national territory, these are the numbers of the Internal Areas in Italy so called because they are significantly distant from the centers of offer of essential services or those related to education, health, mobility. However, these are areas rich in significant environmental and cultural resources and therefore to be considered the subject of a policy of development and territorial cohesion with a view to combating marginalisation and the "demographic desert". Investments on the protection and

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promotion of the territory and enhancement of environmental and cultural resources are therefore the cornerstones on which the national strategy for Inner areas (SNAI) was based - promoted in 2013 by the Agency for Territorial Cohesion - with a view to creating new job opportunities (De Rossi, 2019). The prediction of demographic phenomena has always been fertile ground for the analysis of territories. Tracing the likely future of a population on the basis of assumptions of mortality, fertility, migration and structural components is indeed of the utmost importance for the implementation of new policies in the transport network, in the health sector, social security, as well as urban, energy and environmental needs. (Dip. politiche di coesione. 2022a; 2022b).

Table 1 – Population and percentage of the total population by Areas – Campania, Sicily, and Italy – 2021.

Classification AI	A	B	C	D	E	F	Total	A+B+C (Centers)	D+E+F (Inner Areas)	
	Urban poles	Intermunicipal poles	Belt	Intermediate	Peripheral	Ultrapерipheral				
Number of municipalities	Italy	182	60	3,828	1,928	1,524	382	7,904	4,070	3,834
	Campania	11	4	245	125	123	42	550	260	290
	Sicily	12	3	66	119	157	34	391	81	310
Population	Italy	20,325,781	1,573,512	23,733,409	8,044,378	4,636,615	716,438	59,030,133	45,632,702	13,397,431
	Campania	1,537,749	186,509	2,931,439	510,749	377,773	80,201	5,624,420	4,655,697	968,723
	Sicily	1,666,404	91,868	763,426	1,151,585	1,058,683	101,739	4,833,705	2,521,698	2,312,007
%	Italy	34.4	2.7	40.2	13.6	7.9	1.2	100	77.3	22.7
	Campania	27.3	3.3	52.1	9.1	6.7	1.4	100	82.8	17.2
	Sicily	34.5	1.9	15.8	23.8	21.9	2.1	100	82.8	17.2
Surface	Italy	24,455.1	3,727.5	96,345.0	75,837.0	79,393.6	22,310.1	302,068.0	124,528.0	177,541.0
	Campania	662.0	171.5	5,757.8	3,811.9	3,990.7	1,276.6	13,670.6	4,591.0	9,079.0
	Sicily	2,561.8	320.5	3,409.2	6,584.5	10,749.8	2,206.7	25,832.5	6,291.5	19,541.0
%	Italy	8.1	1.2	31.9	25.1	26.3	7.4	100.0	41.2	58.8
	Campania	4.8	1.3	27.5	27.9	29.2	9.3	100.0	33.6	66.4
	Sicily	9.9	1.2	13.2	25.5	41.6	8.6	100.0	33.6	66.4

Source: Our data processing from Istat

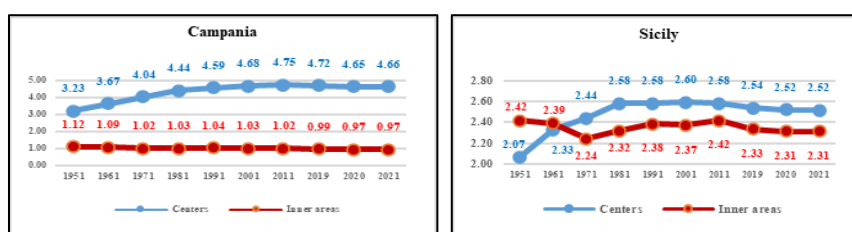
In this perspective and given the growing interest in the forecasts applied to the most "micro" territorial levels, we wanted to photograph the population structure of the inner areas and centers, both in 2021 and 2031, two regions of the Mezzogiorno of particular interest both for their demographic size and for the significant differences that emerge from the comparison between their inland areas: Campania and Sicily. The assessment of the main determinants of marginalisation in contexts of ageing populations and depopulation of inland areas, albeit similar to the national framework, highlights marked differences - see, for example, structural indices or indicators of migration flows - which make the study particularly attractive and indicative for cohesion policies which, taking their cue from the heterogeneity of territories; aim to reduce the gaps between declining inland areas and population risk areas and Centres. In a discussion based on demographic and social variables, it was chosen to operate - not casually - on short-term time forecasts (2031) mainly because the emphasis was placed on spatial disaggregation at the municipal level. Notoriously, in fact, in the forecast field, the more the temporal horizon is amplified the greater is the uncertainty of the information. The area of Belt is prevalent in

Campania and Italy, although with significantly different percentages (52% and 40%). The Urban Pole stands out in Sicily (34%). Very similar percentage population (between 1 and 3%) in the outermost areas and the inter-municipal Poles for all the territories considered. Demographic breadth comparable between Intermediate and Peripheral area of Campania and Sicily although with very different percentages (7% and 9% Campania, 22 and 24% Sicily). The Inner areas in Italy account for 23% (with predominant Intermediate area - 14%), against 48% in Sicily (predominant Intermediate area - 24%) and higher than 5% in Campania (prevailing Intermediate area: 9%) (Table 1).

2. Population dynamics

The dynamics of the resident population in the last 10 Censuses show how the difference between the two regions is particularly significant, as you can imagine, between 1951 and 2021 the resident population decreases in the Inner Areas and increases in the Centers, in particular in Campania, it decreases of -13.3% since 1951 and in Sicily of -4.4% but it is to notice that until 1961 the resident population in the Inner areas was greater in the Centers (Figure 1).

Figure 1 – Resident Population at Permanent population census from 1951 to 2021, by area (millions of people).

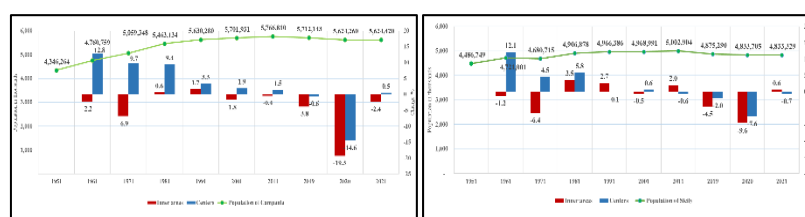


Source: General population Censuses 1951-2011 and permanent 2018-2021.

Observing the trend of the population on the individual decades and how much the population changes in annual average, we can say that in Campania in the last 70 years the resident population has increased, especially between 1951 and 2011 the residents in Campania increased by over 1 million and 400 thousand units, with an average annual growth rate (+4.7%). The decreasing trend starts in 2019 when between 2020 and 2019, in the Centers, there is an average annual decrease rate of -14.6 per thousand residents, 4.7 points lower than the equivalent of the Inner areas (-19.3 per thousand) which corresponds to the period of greatest demographic decline. In Sicily in the last 70 years the resident population is almost stationary but

from 2019 that corresponds to the period of greatest demographic decrease, is significant the reduction of the resident population in the Centers (-7.6 per thousand residents) that in the Inner areas (-9.6 per thousand). In 2021, although slight, there is a population growth in Inner areas, equal to 0.6 per thousand residents while in the Centers there is a decrease in population (-0.7 per thousand residents) (Figure 2).

Figure 2 – Resident population in Campania and Sicily (left axis) and annual average changes² for 1,000 residents in the Inner Areas and Centers (right axis).

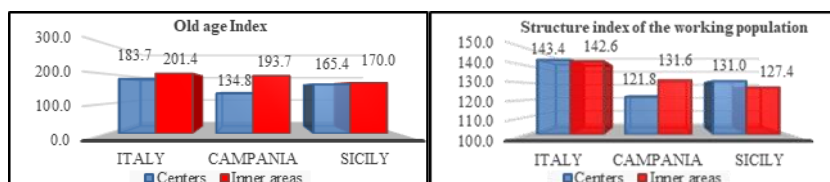


Source: General population Censuses 1951-2011 and permanent 2018-2021.

2.1. Structure of population: permanent censuses

The socio-demographic structure indicators show significant differences between Centers and Inner areas of Campania and Sicily compared to the national territory. In particular, the old age index shows the degree of ageing of the population especially in Inner areas but while in Sicily the difference compared to the Centers is less marked and is equal to 170 elderly per 100 young people, registering a difference of 4,6 percentage points compared to the Centers, in Campania is particularly evident and in the Inner areas there are well over 193 over-65s per 100 young people compared with 134.8 in the Centers (a difference of 58.9 percentage points).

Figure 3 – Old age index and Structure index of the working population (100 inhabitants).



Source: Istat, Permanent population Census, year 2021.

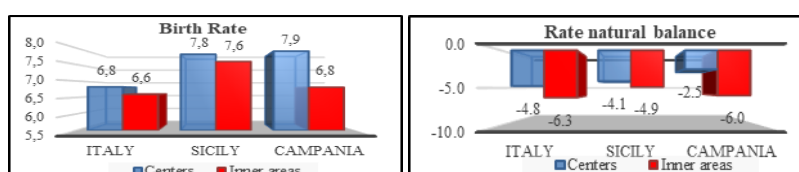
² Annual geometric (or compound) mean change.

The ageing of the Italian population is even more evident in comparison with past censuses: The old age index in 70 years increased from 33.5 in 1951 to 187.6% in 2021, of which 201 elderly people only in Inner areas. The Structure of the Working Population Index represents the degree of ageing of the working-age population, in relation to the older (still active) generations that will replace them, it is always above 100. An indicator higher than 100 means that the population of working age is very old and as a must in Figure 3 is greater in the Centers than the Inner areas in Italy and Sicily while in Campania, the index is higher in the Inner areas with a difference of almost 10 percentage points compared to the Centers.

3. Population dynamics: the main demographic balance sheet indicators

Both regions have a much higher birth rate than the national average (7.7 against 6.8) and this characteristic is reflected almost exclusively in the areas of the Centers, more significant, however, is the difference between the Inner areas, where in Sicily the birth rate exceeds by 0.8 percentage points that of Campania.

Figure 4 – Birth rate and Rate natural balance (1000 inhabitants).

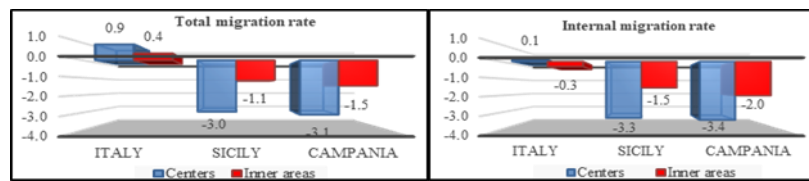


Source: Istat, Movement and calculation of annual resident population, year 2021.

Strong is the demographic crisis throughout Italy, the number of births is much lower than deaths. The natural increase in population is particularly low in the Inner areas and Sicily and Campania, although it is better than the national average, due to a higher birth rate, have, however, very low values and the difference is particularly significant in the Inner areas of Campania (Figure 4). Campania and Sicily have a negative total migration rate, a sign of a lack of dynamism in both regions, which differ considerably from the national average, which, for the same indicator, positive values with a slightly higher trend in the centers. Specifically, it emerges that the number of cancellations resulting from the transfer of residence is greater in the areas of the center than in the internal areas and this difference is more marked in Campania with a difference of 1.7 percentage points from Inner areas. The same dynamic emerges for the internal migration rate that for both regions is negative with a prevalence in the centers compared to the Inner areas, especially in Campania. The migratory rate with foreign countries is positive everywhere, but both Campania and

Sicily continue to show a lower attraction capacity than the national figure. In Campania the migratory rate with foreign countries is lower than in Sicily with a difference of 0.5 percentage points and is much more accentuated in Inner areas than in the Centers; Sicily, on the other hand, is much more homogeneous internally and is closer to the national average, with a very slight accentuation in the centers (Figure 5).

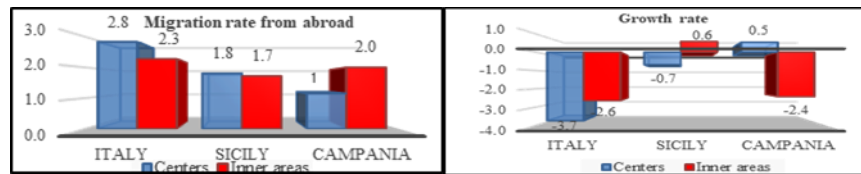
Figure 5 – Total migration rate and Internal migration rate (1000 inhabitants).



Source: Istat, Movement and calculation of annual resident population, year2021.

As regards the total growth rate, the two regions are rather uneven and diverge from the development of the Italian territory that has a sharp decrease in population, especially in the central areas, albeit slightly offset by a positive migration rate. For Sicily it is positive in the internal areas and negative in the centers, for Campania, instead, it is the opposite, it is positive in the Centers and strongly negative in the internal areas but in line with the national one (Figure 6).

Figure 6 – Migration rate from abroad and Growth rate (100 inhabitants).



Source: Istat, Movement and calculation of annual resident population, year2021.

4. Demographic forecasts: 1 January 2021-2031

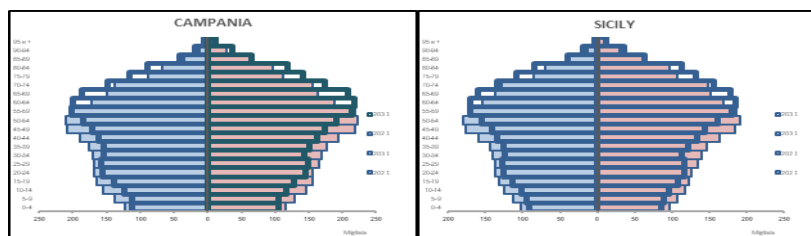
Demographic forecasts aim to chart the likely future of a population in terms of total size and structural components (Marsili, 2007). Many and diversified uses of this data by policy makers: from the field of health planning to social security, from the study of urban needs to energy-environment, from the organization of school facilities to the transport network. Being able to produce detailed spatial information is essential to analyze and understand the same national demography. However, the level of regional detail is insufficient when the planning of a territory needs micro-

based information. This led Istat to develop a new product in the field of demographic forecasting that shifts the details to the level of the municipality. The published data concern the provincial capital municipalities and all municipalities that exceed 20 thousand inhabitants. Data for consolidated supra-municipal aggregations such as SLL and SNAI are available for all other municipalities. As for this study, the forecasts are experimental and start from 2021 until 2031, as in the field of forecasting, the wider the time horizon, the more uncertain the information. The evolutionary hypotheses about the future demographic trend in the municipalities concerning fertility, survival and migration in the different municipalities are derived from regional forecasts, according to a probabilistic and redistribution approach from top to bottom. The comparisons that are presented in this paragraph have been made both using the data of the demographic database "Demo - Demography in figures", and those offered by the Experimental Statistics. The updates concern the replacement of the population per base year with the latest yield available from the Census and a partial revision of the evolutionary assumptions of the model, in line with what was the revision produced for regional and national forecasts.

4.1 Campania and Sicily, a future in comparison

The new forecasts on the demographic future of the two regions under analysis confirm the presence of a potential crisis as in the rest of the country. In the decade 2021-2031, the total population decreased: in Campania from 5,624,420 to 5,400,000 inhabitants and in Sicily from 4,833,329 to 4,600,000. The new forecasts highlight the progressive aging of the population that decreases particularly until the age of 59 years increasing from 60 years and up, as can be seen from the age pyramid (Figure 7). The population of 65 years and more today represents 19.9% of the total in Campania and will reach, according to Istat forecasts, 25.2% in 2031 (2 percentage points less than the average in Italy); the population up to 14 years is 14.3% and will be 12.5% in 2031; in the 15-64 age group from 65.8% will rise in 2031 to 62.2%.

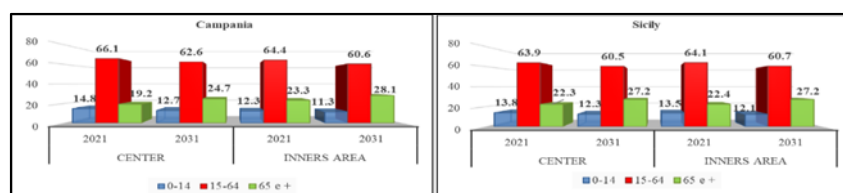
Figure 7 – Campania and Sicily. Pyramid of Age. Comparison 2021-2031.



Source: Istat, *Municipal Demographic Projections - 1 January 2021-2031*.

In the scenario of 2031, in Campania, the population over 65 years will be concentrated mainly in the Inner Areas with a difference of 3.4 percentage points more than the Centers, while the under 14 and the working age population more in the Centers (+1.4 percentage points). In Sicily the population will be equally distributed (27.2%). In the temporal comparison, the same band of population of Campania will increase more in the centers (+5.5) than the internal areas (4.8%); for Sicily the difference between Centers and Inner Areas is minimal (0.1 percentage points), while in 2031, the population under 14 years will decrease from 13.8% to 12.3% in the Centers, and that in working age will rise from 64%, to 60.5% (Figure 8).

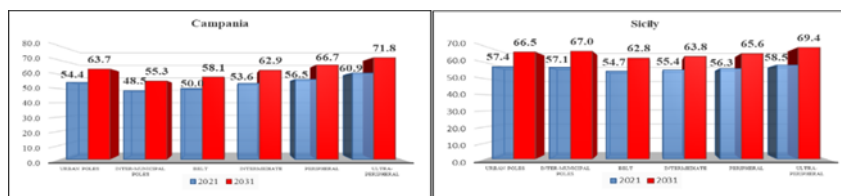
Figure 8 - Percentage composition of population in SNAI areas by age group. Period 2021-2031.



Source: Istat, Municipal Demographic Projections - 1 January 2021-2031.

The structural dependency ratio (Figure 9) expresses the theoretical social and economic burden of the population of working age; values above 50% indicate a situation of generational imbalance which in Campania, are present in all areas except for inter-municipal areas that are also those where this value increases to a lesser extent (+6.8%). The highest percentage is found in the outermost areas which are also those where the IDS increases the most (+10.9%). In Sicily, values above 50% are present in all SNAI areas with a lower ratio in Centres (54.7%) and a peak in Ultra-peripheral areas (58.5%) where there will be, in 2031, the most significant increases.

Figure 9 – Structural dependence index in SNAI areas -period 2021-2031.



Source: Istat, Municipal Demographic Projections - 1 January 2021-2031.

4.2. Some hypotheses observing the variations on the differences

Observing the variations in relation to the differences, in terms of increase and decrease (Table 2), both on the average age (this calculated both for 2021 and for 2031 only through the experimental data) and in the comparison by age groups, we immediately notice some differences. Looking at the distribution of the population from 15 to 84 years, the ageing is evident, in particular comparing the negative sign of the classes 0-64 with that of the over 65 years: while for the class 0-14 the decrease is greater in the Centers, the phenomenon is increasing in the peripheral areas for the class 15-64 years. The positive sign, if one observes the group of people over 85 years old, testifies to the ageing, greater in urban areas: the answer to this phenomenon is evidently to be found in the possibility that one has, living in urban areas, access to health and care services of proximity and high professionalism.

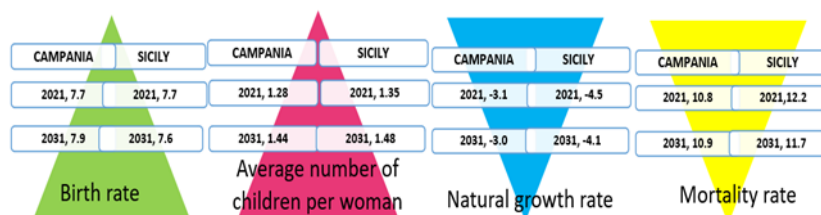
Table 2 – Differences in regional comparison by Areas, years 2021-2031 (changes).

	AVERAGE AGE		POPULATION 0-14 YEARS		POPULATION 15-64 YEARS		POPULATION 65 YEARS AND OVER		POPULATION 85 YEARS AND OVER	
	Campania	Sicily	Campania	Sicily	Campania	Sicily	Campania	Sicily	Campania	Sicily
Urban poles	2.8	2.5	-1.5	-1.2	-3.7	-3.5	5.2	4.7	0.8	0.7
Inter-municipal poles	3.4	2.5	-2.3	-0.8	-3.1	-3.7	5.4	4.5	0.8	0.9
Belt	3.3	2.6	-1.8	-1.4	-3.5	-3.2	5.3	4.6	0.8	0.6
Intermediate	2.4	2.6	-0.9	-1.3	-3.7	-3.3	4.6	4.6	0.2	0.6
Peripheral	2.4	2.4	-0.9	-1.0	-3.9	-3.6	4.8	4.6	0.4	0.4
Ultra-peripheral	1.7	2.3	-0.3	-0.7	-3.8	-4.1	4.1	4.8	0.0	0.0
TOTAL	2.9	2.5	-1.5	-1.2	-3.6	-3.4	5.1	4.7	0.7	0.5

Source: Istat, Municipal Demographic Projections - 1 JANUARY 2021-2031.

Recalling the decrease in population of 200,000 units and observing instead the increase in the birth rate and the decrease in that of mortality in both regions, the decline of the population in absolute numbers in both is evidently also caused by other factors (Figure 10).

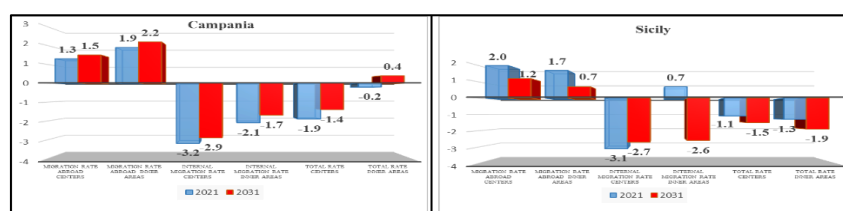
Figure 10 – Regional comparison and rates, 2021-2031 (changes).



Source: Istat, Municipal Demographic Projections - 1 January 2021-2031.

The rate of migration from abroad is always positive, especially for the Internal Areas, both in Campania and Sicily, with a growth trend, from 2021 to 2031, of 0.3 percentage points for Campania and a decrease for Sicily (-1.0). Both regions have a negative rate with regard to internal migration; in detail the phenomenon concerns more Centers than the Internal Areas both in 2021 and in 2031 where in Campania the value will be -2.9 while in Sicily -2.7 (Figure 11).

Figure 11 – Migration flows 2021-2031 (percentages). Campania and Sicily.



Source: Istat, Municipal Demographic Projections - 1 January 2021-2031.

5. Discussions and conclusions

The expected demographic decline in the coming years is mainly attributable to migratory flows, which in the forecasts show an increase in the exit from regional and state borders of a large part of the population and diversified by age group. However, a separate discourse must be made in the comparison between the real data of 2021, which are the result of a period of pandemic crisis, and the forecasts of both the 2021 and 2031 projections. In the case of Campania, in fact, considering only the projections, it can be seen that in the face of both internal (3.5%) and foreign immigration (3.2%), there is a much higher share than that, on the contrary, it leaves the region mainly to settle in other Italian regions (6.2%). For Sicily, immigration from abroad decreases (-0.3), the rate of internal immigration increases by +0.1 as well as emigration abroad by 0.5 while that to other regions decreases -0.3%. The decline of the population in 2031 compared to 2021, whether we look at the observed data or the forecast, is instead substantially "slowed down" because, in the face of migratory changes, there is a slight increase in the value of the birth rate and a moderate reduction in the death rate, albeit to a different extent between the two regions. One possible explanation may be that the elderly population leaves the inner areas more easily because it moves in search of more numerous and efficient services, especially from the social welfare point of view; young people, Instead, they look to areas that offer better and more opportunities for study and work and therefore opt for transfers outside regional and national borders (Table 3).

Table 3 – Forecast and real data. Regional comparison, migration rates and total balance.

	2021 data of		2031 data of		Difference between forecast data
	Data 2021	forecast	forecast	forecast	
Campania					
<i>Popolazione*</i>	5,624,420	5,624,420	5,384,914		-4,3
Birth rate	7.7	7.7	7.9		0.2
Mortality rate	10.8	11	10.9		-0.1
<i>Natural growth rate</i>	-3.1	-3.3	-3		0.3
Rate Immigration from abroad		2.8	3.2		0.4
Emigration rate for foreign countries		1.3	1.6		0.3
Net migration rate abroad	1.3	1.4	1.6		0.2
Rate Immigration from the inside		3.5	3.5		0.0
Emigration rate for the interior		6.5	6.2		-0.3
Net migration rate with the interior	-3.2	-3	-2.7		0.3
Total net migration rate	3.1	-6.1	-1.1		5.0
<i>Total growth rate</i>	0.0	-4.2	-4.1		0.1
Sicily					
<i>Popolazione*</i>	4,833,329	4,833,329	4,583,054		-4,8
Birth rate	7.7	7.7	7.6		-0.1
Mortality rate	12.2	12.6	11.7		-0.9
<i>Natural growth rate</i>	-4.5	-4.8	-4.1		0.7
Rate Immigration from abroad		3.7	3.4		-0.3
Emigration rate for foreign countries		1.9	2.4		0.5
Net migration rate abroad	1.8	1.8	1		-0.8
Rate Immigration from the inside		3.1	3.2		0.1
Emigration rate for the interior		6.1	5.8		-0.3
Net migration rate with the interior	-2.5	-3	-2.6		0.4
Total net migration rate	4.4	-1.2	-1.7		-0.5
<i>Total growth rate</i>	-0.1	-6	-5.8		0.2

* The data reported in the first two columns, under the heading "Population" coincide as they refer to the legal population in Campania and Sicily, defined on the basis of the Census, on 31 December 2021, as published in the G.U. on 03/03/2023.

Source: Istat, Municipal Demographic Projections - 1 January 2021-2031.

Appendix

Old age index: ratio between the population aged 65 and over and the population aged 0-14, multiplied by 100.

Structure index of the working population: percentage ratio of population aged 40-64 to population aged 15-39, multiplied by 100.

Natural growth rate: difference between the birth rate and the death rate and is calculated by comparing the natural balance of the year to the population at 31/12 of the same year x 1,000).

Total growth rate: sum of the natural growth rate and the total migration rate and is calculated as the ratio of population change in a given year (difference between population at 31 December and 1 January) and the average population of that year per thousand individuals).

Migration rate with foreign countries: ratio between the migration balance with foreign countries of the year and the average amount of the resident population, per 1,000.

Internal migration rate: ratio between the internal migration balance of the year and the average amount of the resident population, multiplied by 1,000.

Total migration rate: ratio between the year's migration balance and the average amount of the resident population, multiplied by 1,000.

Birth rate: ratio between the number of live births of the year and the average amount of the resident population, multiplied by 1,000.

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