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.

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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:

$$PTR_{j,t} = b_{j,t} + d_{j,t} + i_{j,t} + o_{j,t} \tag{1}$$

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:

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

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.*
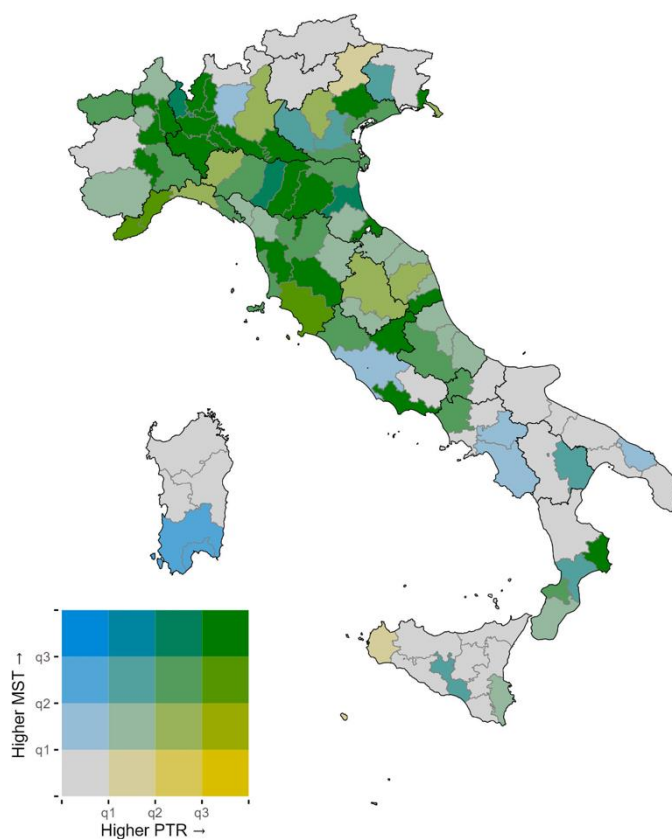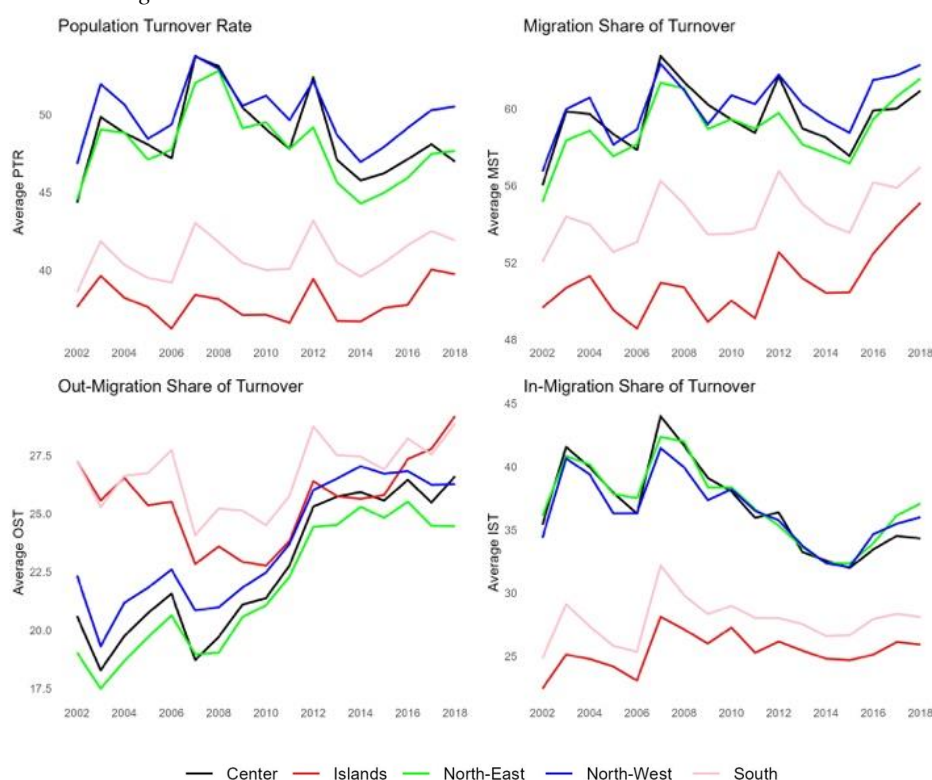

Note: Authors' elaboration. Istat data from bilancio demografico 2018. For PTR the quantile breaks are 40.2 (q1); 45.4 (q2); 51 (q3). For MST the quantiles breaks are 53.4 (q1); 57.8 (q2); 61.6 (q3).

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.*
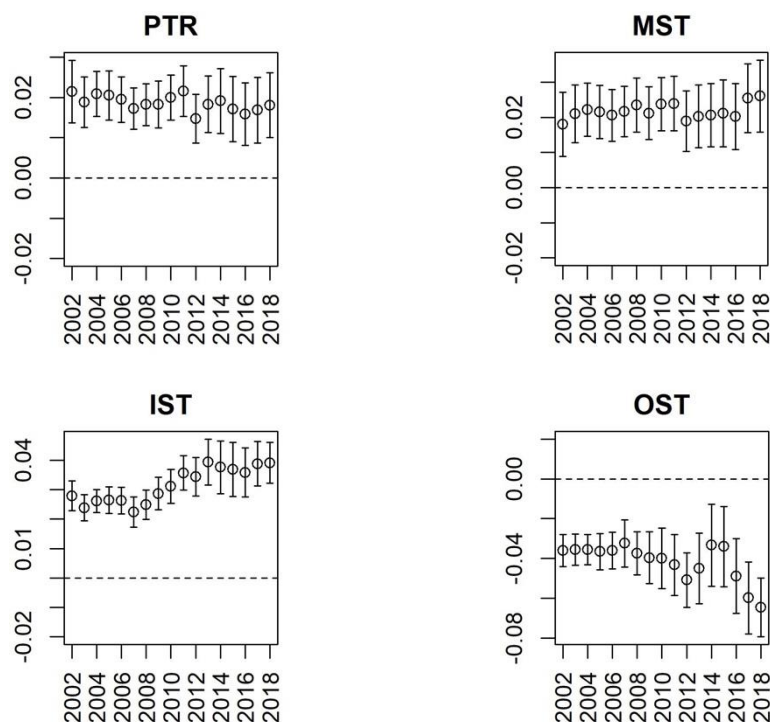
Note: The figure reports the coefficients derived from linear regression models examining the association between log GDP per capita and population change indicators for each year. The top-left panel represents the Population Turnover Rate per thousand (PTR), the top-right panel displays the Migration 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.

Appendix

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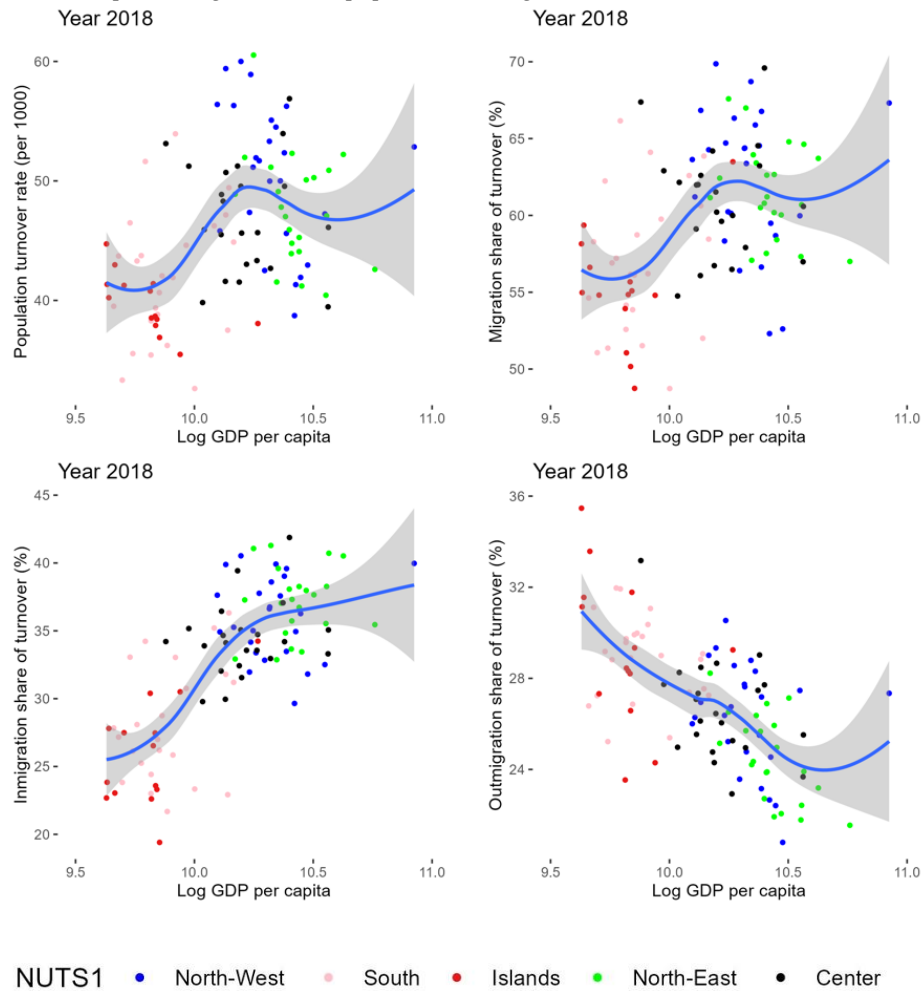
References

ABEL G.J., COHEN, J.E. 2019. Bilateral International Migration Flow Estimates for 200 Countries. *Scientific Data,* Vol.1, pp. 82.

ABEL G. J., SANDER N.. 2014. Quantifying Global International Migration Flows. *Science,* Vol 343, No. 6178: pp 1520-1522.

BENASSI F., BONIFAZI, C., HEINS, F., LICARI, F., TUCCI, E. 2019. Population change and international and internal migration in Italy, 2002-2017: Ravenstein revisited. *Comparative Population Studies*, Vol. 44.

BENASSI F., BUSETTA A., GALLO G., STRANGES M. 2021. Le disuguaglianze tra territori. In Billari FC, Tommasini C. (Eds.) *ASIP - Rapporto sulla popolazione. L'Italia e le sfide della demografia*. Bologna: Il Mulino.

BONIFAZI C. 2013. Mobili per forza. *Spostamenti di popolazione nell'Italia della crisi.* Bologna: Il Mulino.

BONIFAZI C., HEINS, F., LICARI F., TUCCI E. 2020. The regional dynamics of internal migration intensities in Italy. *Population, Space and Place,* Vol. 27, No. 7.

BILLARI F. C. 2022. Demography: Fast and slow. *Population and development review*, Vol. 48. No. 1, pp. 9-30.

BILLARI F.C, TOMASSINI C. 2021. Rapporto sulla Popolazione. L'Italia e le sfide della demografia. Il Mulino, Bologna.

GOLINI A., MUSSINO, A., SAVIOLI M. 2001. Il malessere demografico in Italia. Una ricerca sui comuni italiani. Bologna: Il Mulino.

REYNAUD C., CONTI C., STROZZA M., TUCCI E. 2011. Mobilità della popolazione, immigrazione e presenza straniera. In *Rapporto sulla popolazione. L'italia a 150 anni dall'Unità.* In Salvini S, De Rose A. (Eds). Bologna: Il Mulino.

REYNAUD C., MICCOLI S., BENASSI F., NACCARATO A, SALVATI L. 2020. Unravelling a demographic Mosaic: Spatial patterns and contextual factors of depopulation in Italian Municipalities, 1981-2011. *Ecological Indicators,* Vol. 115.

SAUVY A. 1957. *La Population*. 4th edition. Paris: Presses Universitaires de France.

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