THE COVID-19 PANDEMIC IN ITALY: REGIONAL COMPARISONS

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Abstract

In this short report we will try to fully clarify from the numerical point of view what has been, and is today, the emergency from Coronavirus in Italy. Therefore, we will attempt to estimate the effectiveness of restrictive measures implemented by the Italian government and to analyze the results amid regions and the differences between regions. The data originate from the Italian Civil Protection based on which they were transmitted by each Italian region that give only an idea of the real national contagion.

Key words: *Coronavirus, Italy, effectiveness, emergency, government measures.*

INTRODUCTION

On 10 March 2020, with a decree of the Prime Minister, Italy stops. Only essential services remain in operation. The day after the World Health Organization ruled: it is a pandemic. The first known cases are recorded in the second half of February in two small Lombard municipalities: Codogno and Vo Euganeo. From

that moment on, each of the Italian regions activated uncoordinated and inhomogeneous policies that influenced territories with very different effects, sometimes mild, and sometimes, as in the well-known case of Lombardy, disastrous.

Analysing the data in numerical terms is the first step for a full understanding of a critic event such as Covid-19. The objective of this section is to understand, starting from the trend of the curve of the coronavirus epidemic, the effectiveness of restrictive measures implemented by the Italian government and analysing the results amid the regions and the differences between regions.

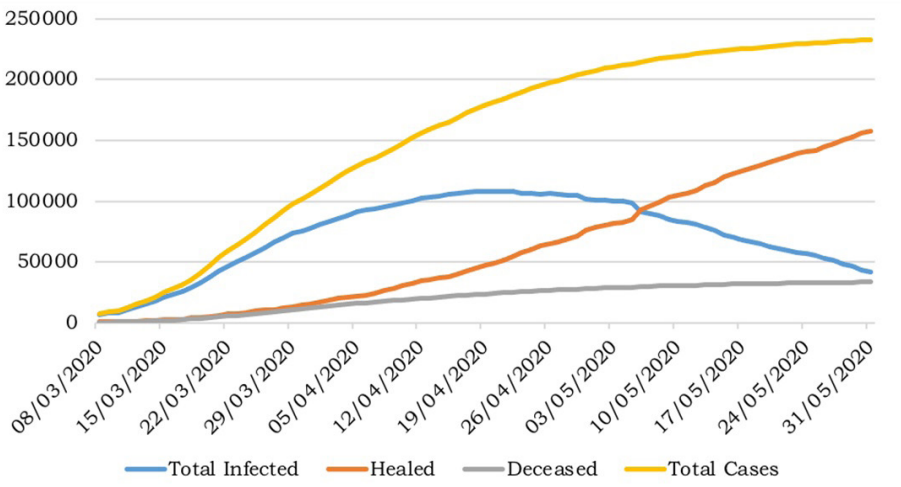
The analysis has been done on data reported by the Civil Protection on the basis of data received from each Italian region that only give an idea of the real national contagion, since the spread was certainly wider (just consider the high number of asymptomatic people detected during the emergency). In this short essay, we will try to fully clarify from the numerical point of view what has been and is today the emergency from Coronavirus in Italy.

Almost all the data analysed in this paper focus on the time span from March 8th to May 31st.

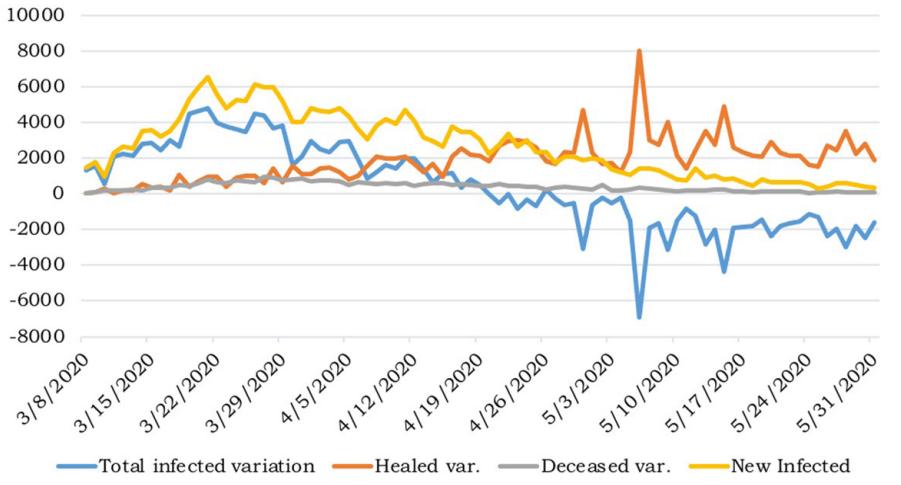
1. THE SPREAD OF CONTAGION

In order to introduce this analysis by giving a clear and comprehensive idea of the trend of epidemic, it is necessary to start from the main numbers of infections, healed, deceased and new positives. It is interesting to note that the slope of the cured/discharged curve and the number of daily contagions arched positively in the last weeks analysed, and how the value of positives (current and total) has reached its peak on April 19 (108,253 contagions) and is in sharp decrease (Graph 1 and Graph 2).

Graph 1. Total data of positive, healed, dead and total cases from 8th March to 31st May. Processing of data confirmed by the Department of Civil Protection.



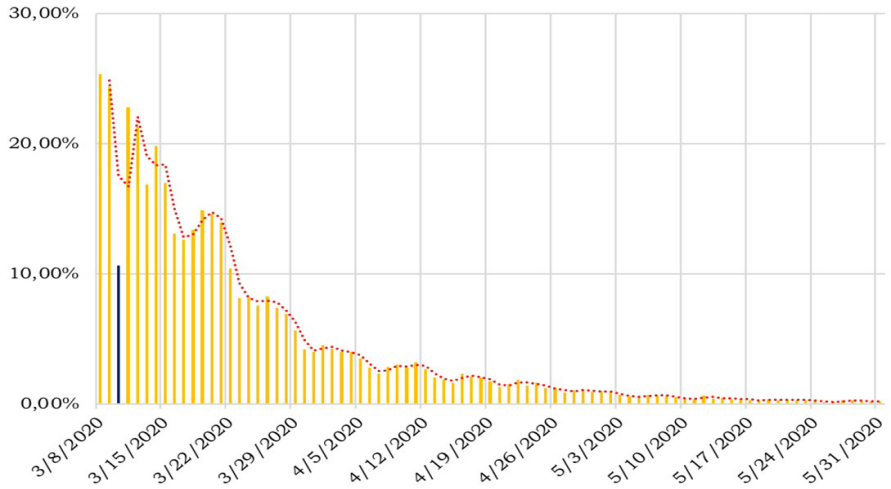
Graph 2. New day-to-day cases of the positive, healed, dead and total cases from 8th March to 31st May. Processing of data confirmed by the Department of Civil Protection.



To illustrate the trend of new positives and of the results of implemented restrictive policies, the percentage increase of new positives compared to the previous day was graphed (Graph 3). This graph, since it analyses how the growth in percentage of

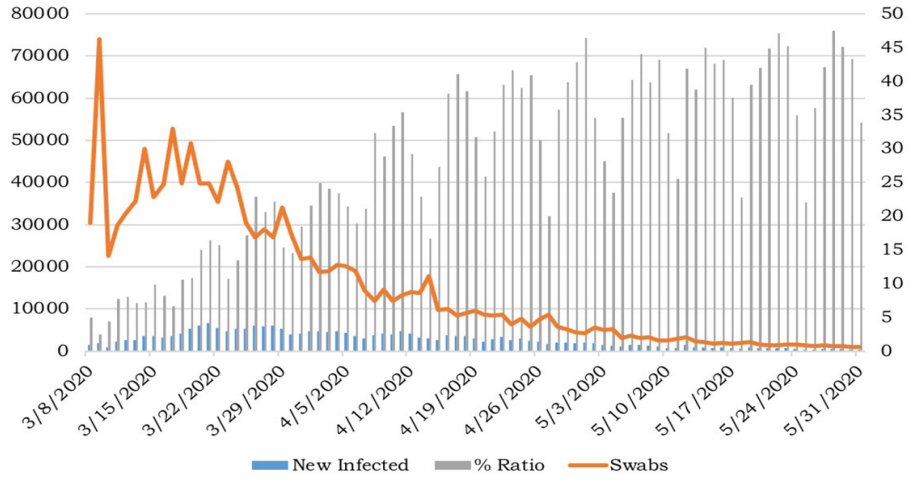
the total cases day by day, is extremely explanatory: looking at the moving average (red line) it is clear how much the epidemiological trend had been clearly decreasing just few days after beginning of the lockdown (the blue bar).

Graph 3. Daily percentage variation of cases from 8th March to 31st May. Processing of data confirmed by the Department of Civil Protection.



The positive effects of the restrictive measures are also recorded when the trend of the infection, measured with the number of new positives, is assessed with respect to the swabs carried out. Also in this case, even if the trend is less linear in consideration of the lower number of swabs carried out on Sunday, from the strong decrease in the percentage values, the improvement of the Covid-19 infection is highlighted once again considering that on 31st May, the percentage of positives on the total swabs carried out was around 0.65%, against 46.20% on 9th March. (Graph 4).

Graph 4. Daily swabs and infected from 8th March to 31st May. Processing of data confirmed by the Department of Civil Protection.



Although the number of positives is a value often criticized and replaced by the number of deceased due to higher reliability, research and insights enables to demonstrate how, on different time scales, the two values are closely interconnected and therefore with relatively equal reliability.

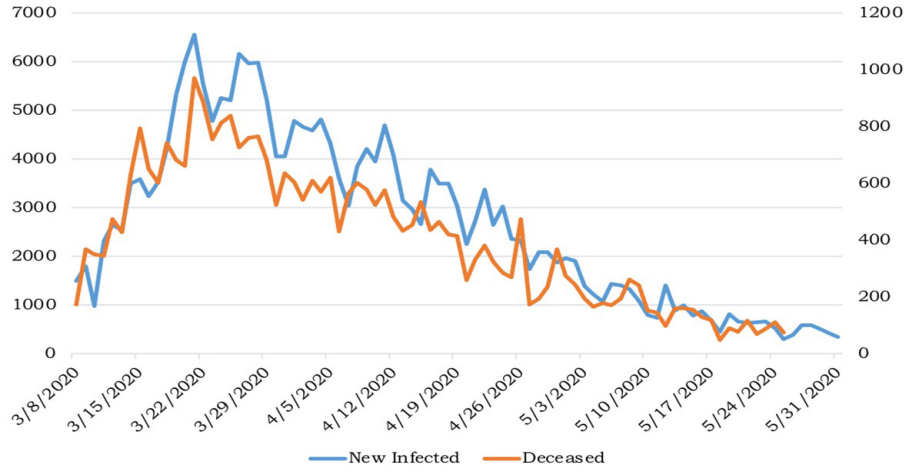
In the following graph (Graph 5), the positive values were plotted starting from 8th March 2020 and the numbers of deaths that occurred six days later (14th March 2020). In this regard, the deceased of a given day are a seventh of the new cases occurred six days before. The perfect correlation of the two curves is constant for the entire duration of the lockdown, demonstrating the value of this index.

In addition to the number of positive and deceased, an even more reliable indicator is that of hospitalizations and intensive care units. This is because the number of victims, while being highly indicative, in many cases concerns people hospitalized days or weeks before, and therefore a time lag must be considered compared to the time they contracted the virus.

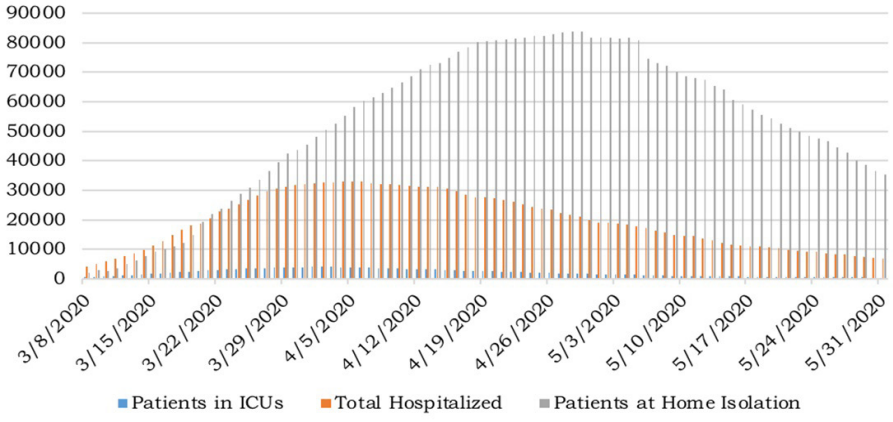
In this regard, therefore, the following two graphs in numerical

terms represent the patients admitted to intensive care units, the hospitalized and those in home isolation since the beginning of the epidemic. Although in Graph 6 the general trend of the load on the Italian healthcare system is clearly more explanatory, the curve in Graph 7 allows to clearly observe the exact moment when the trend changed, more or less a month after the beginning of lockdown (negative values of inpatients and admitted to therapies in intensive care units).

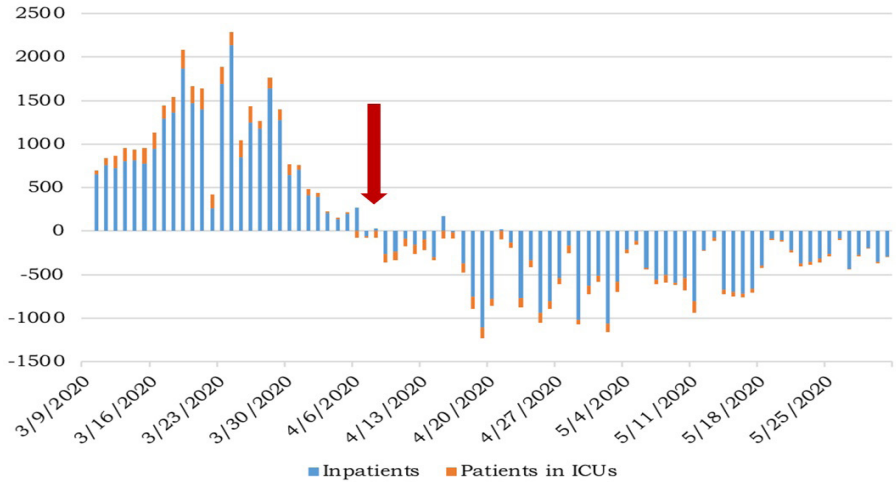
Graph 5. Comparison between the new positives and the deceased seven days after the day referred to the new positives. Processing of data confirmed by the Department of Civil Protection.



Graph 6. The trend of patients in intensive care units, hospitalizations and home isolation. Processing of data confirmed by the Department of Civil Protection.



Graph 7. Inpatient values and day-to-day admitted to intensive care units. Processing of data confirmed by the Department of-Civil Protection.

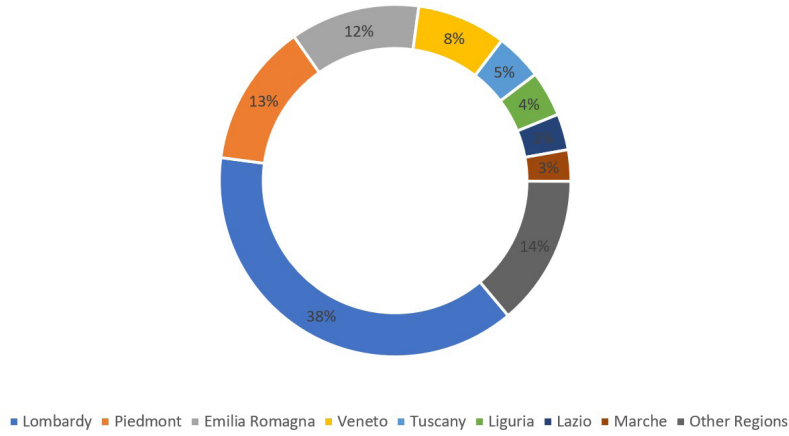


2. WEAKNESS AND TERRITORIAL RESILIENCE TO THE VIRUS: REGIONS AND PROVINCES COMPARED

Deepening of the survey on a regional scale enriches the reflection with additional cognitive elements. The Italian public health service, established in 1978 based on the English and Swedish model, has a decentralized configuration in favour of regional government bodies. Following the constitutional dictate, and with its subsequent amendments accentuating the aspects of federalism, the Italian public health service is based on the division of powers between the State and the Regions. The State in particular since 2001, has the responsibility of defining health essential services that all the Regions must offer to citizens, wherever they reside, while the Regions that have almost exclusive responsibility for the organization and management of the health service. Financing of the essential levels of health care has remained the task of the State, which allocates financial resources from its budget to the Regions, according to capita needs and equalization criteria.

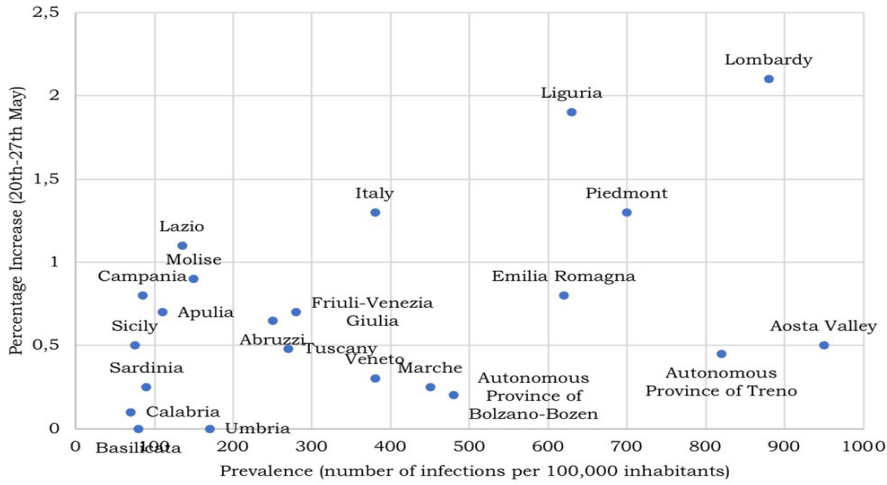
The choices and investments of the national and regional system are not harmless and the divergence of regional policies has emerged in all its gravity in the different reaction capacity between the various regions of northern Italy, those most affected by the pandemic.
Analysing the regional distribution of the pandemic indicators, it is clear how much the northern regions have been affected: Lombardy, Emilia-Romagna, Piedmont, Tuscany and Veneto.

Graph 8. Geographical distribution of COVID-19 cases nationwide, update on June 3rd, 2020. Processing of data confirmed by the Department of Civil Protection.

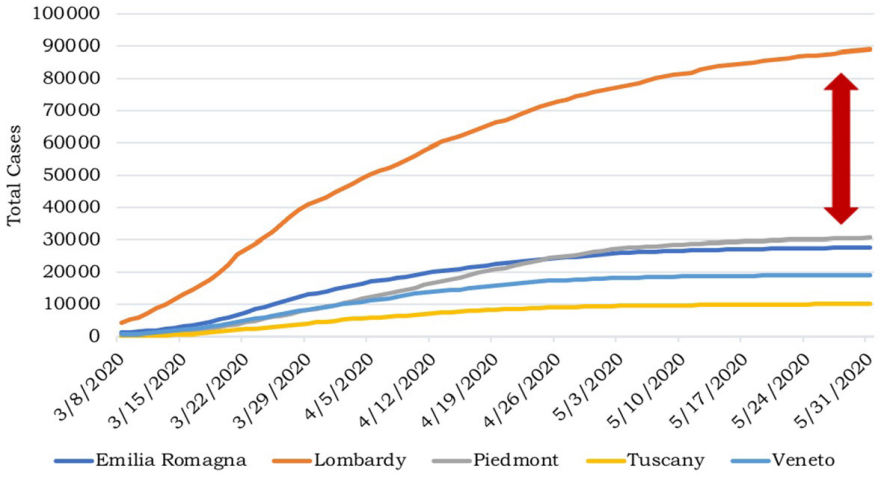


The virus, on the other hand, less affected the central and southern regions. This trend is also visible if comparing the data relating to the prevalence values (number of infections per 100,000 inhabitants) with the percentage increase in COVID-19 cases.
Also, in this case Lombardy represents a clear outlier with respect to the epidemiological trend both in the national scenario and amid the northern regions. This terrible trend has significantly contributed to the Italian positioning in world rankings (Graphs 9 and 10).

Graph 9. Prevalence and percentage increase of COVID-19 cases, updated on June 3rd, 2020. Processing of data confirmed by the Department of Civil Protection.

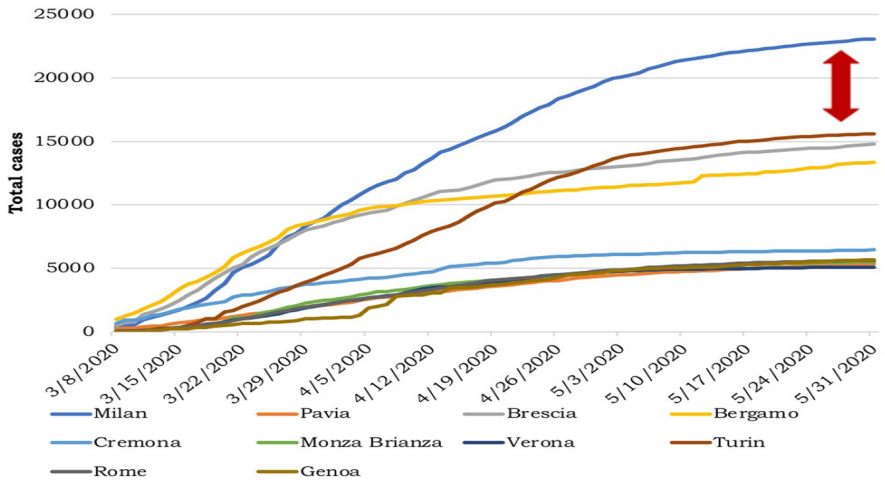


Graph 10. The trend of the five regions with the most infections in Italy. Processing of data confirmed by the Department of Civil Protection.



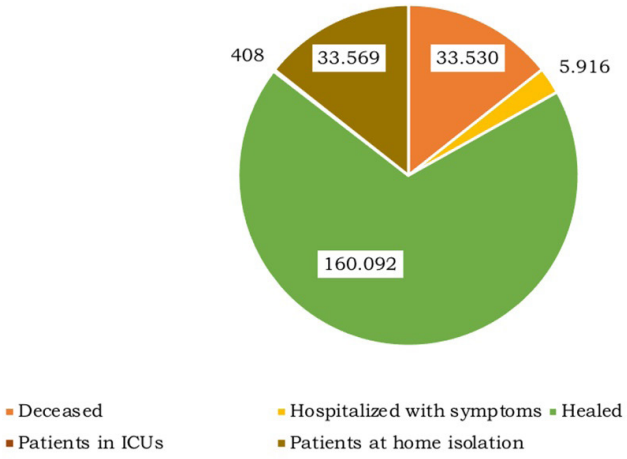
Analysing only the 10 most affected Italian provinces, the contribution of the Lombardy region (and of the northern area) emerges once again with six provinces out of the 10 analysed (Graph 11).

Graph 11. The trend in the provinces with the most contagions. Processing of data confirmed by the Department of Civil Protection.



In conclusion, we wanted to report the current situation updated on June 3rd in order to better understand what the emergency situation was in Italy at that day (Graph 12) (died: 33,530; admitted to intensive care units: 408; hospitalized with symptoms: 5,916; in isolation at home: 33,569; healed: 160,092).

Graph 12. COVID-19 cases as of June 3rd, 2020: isolated, hospitalized patients recovered and deceased. Processing of data confirmed by the Department of Civil Protection.



Analysing the data in numerical terms, after almost 3 months of the lockdown, the critical phase of the Covid-19 epidemic has passed. However, given the clear difference that remains between the north and south of the country in terms of contagions, and the ease with which the virus is contracted and is spread, it is necessary to continue to constantly monitor the virus permanence index, while keeping in place the control measures for the spread of the infection.

3. ITALIAN MOBILITY DURING THE EMERGENCY

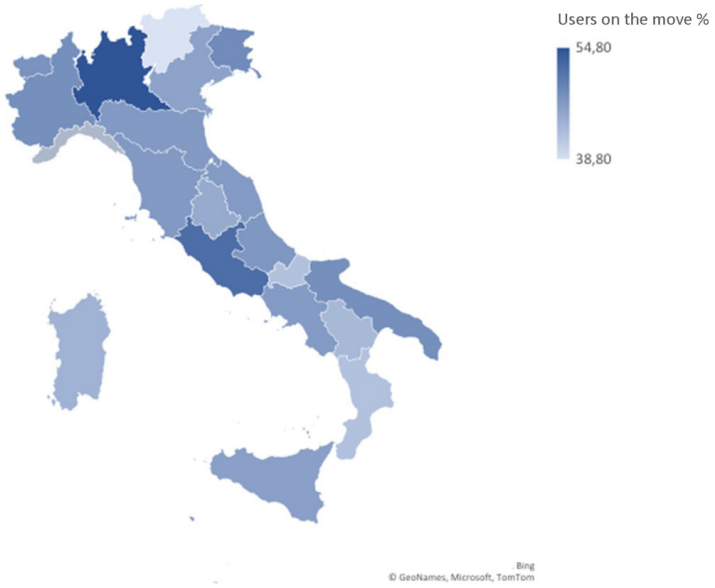
One of the human behaviours most penalized by the closure of all activities, in addition to the social and emotional dimension, was the freedom of movement. The impact on travel was a consequence of the interruption of all unnecessary activities but it was also dictated by the necessity to contain the contagion that more easily spreads in crowded public environments.

Mobility in Italy has undergone major changes since the lockdown was launched by the government.

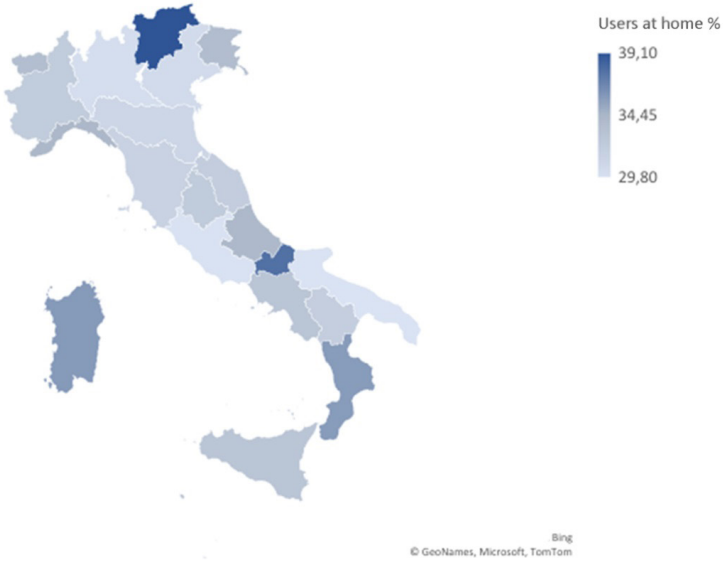
The analysis of the data relating to lockdown mobility, helps to understand the different level of restrictions adopted by the regional governments, and enriches the research with the reasons that have caused such a different reaction to the pandemic by the Italian regions. The survey was made with Geo-referenced information taken from Enel X's City Analytics. Data were analysed and cross-referenced, thus enabling also to explore the flows in certain places of interest taken then as a sample.

From the geographical representation (Map 1), it is clear that the region with the highest moving user rate, at the time of the first Prime Minister Decree (hereinafter referred to as "DPCM"), is Lombardy with 54.80%, followed by Lazio (52.0%), Puglia (48.20%) and Trentino-Alto Adige (38.8%). It is physiological that most of the people in Lombardy did not stay at home, given the high concentration of productive activities in that region, as well as there were numerous permissions to exit. Such a

Map 1. Regional COVID-19 mobility analysis carried out during 5 working days until 25th March, the lockdown moment - users on the move (percentage values). Elaboration of the data: City Analytics Enel X, 2020



Map 2. Regional mobility COVID-19 analysis carried out during 5 working days up to 25th March, the lockdown moment - users stationary at home (percentage values). Elaboration of the data: City Analytics Enel X, 2020.



different level of mobility in the region can be so traced back to the region´s economic structure, which largely contributes the country's GDP and the consequent power of pressure exerted on politicians by the business system, which not only influenced the delay in adopting the restrictive measures, but which also contributed to continuing with some production activities. In the capital, on the other hand, the mobility recorded on the closing days is attributable to the presence of the governance offices with a minimum level of activity maintained - unlike the other regions, such as Trentino which, ipso facto, was moving towards internal closure.

Looking at mobility data more in detail, average percentage of people who stayed at home from March 18th to 25th is 34.45%. The regions with the highest number of users left at home are Trentino Alto-Adige (39.10%), Molise (37.80%), Sardinia (35.90%), and Calabria (35.80%). The lowest index is with the Regions of Lombardy, Lazio and Apulia.

Lombardy reduced its mobility by 53.9%, while 77.2% of Lombard workers did not go to the work taking advantage of online working with staying at home. Only 19.3% were in offices or factories in the area.

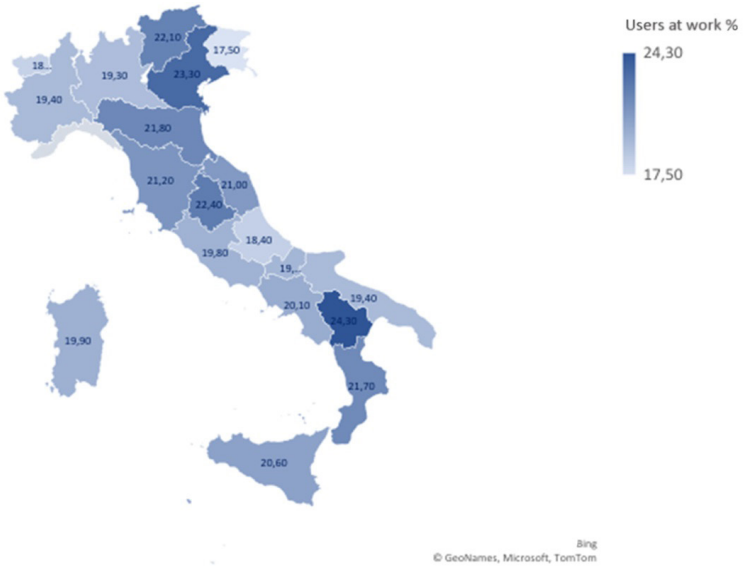
Therefore, if we consider only the workers and not the entire region´s population, 55% have no longer returned to work in the office (Map 3). If 19.8% of Lazio workers still went to work during the period under consideration, in Rome this percentage rose to 20%, while 30% of Roman users stopped, 50% of workers in the capital did not return to their work, a percentage like that of Milan.

Therefore, concisely, from the period taken into analysis, 68% of Italian workers no longer went to work. On average, only 21% continued to go to work due to conditions of necessity.

This was the only possible with the Joint Action of the Minister of Health and the Minister of the Interior through a new ordinance to make all natural persons forbidden from moving by

public or private means of transport outside the Municipality of their residence as at the time of the Decree, except of proven work necessity, absolute urgency or for health reasons.

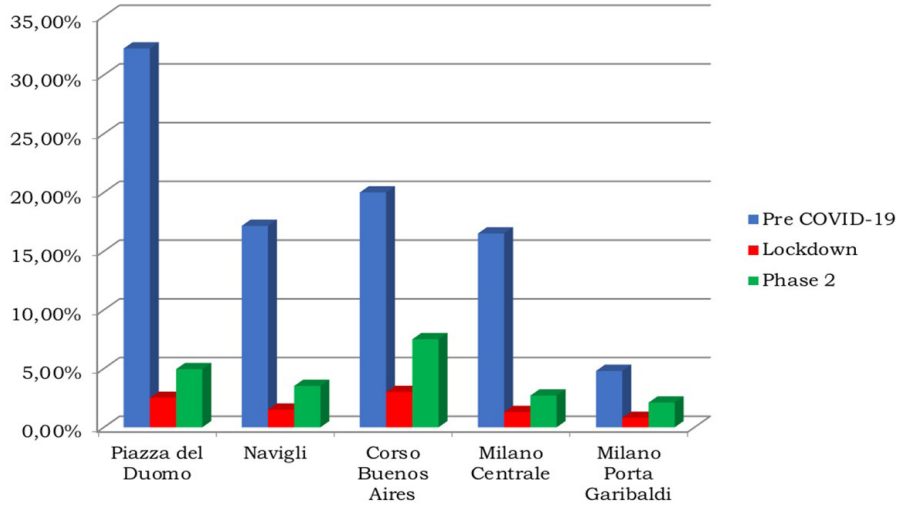
Map 3. Regional mobility COVID-19 analysis carried out during 5 working days up to 25th March, the lockdown moment - users at work (percentage values). Elaboration of the data: City Analytics Enel X, 2020.



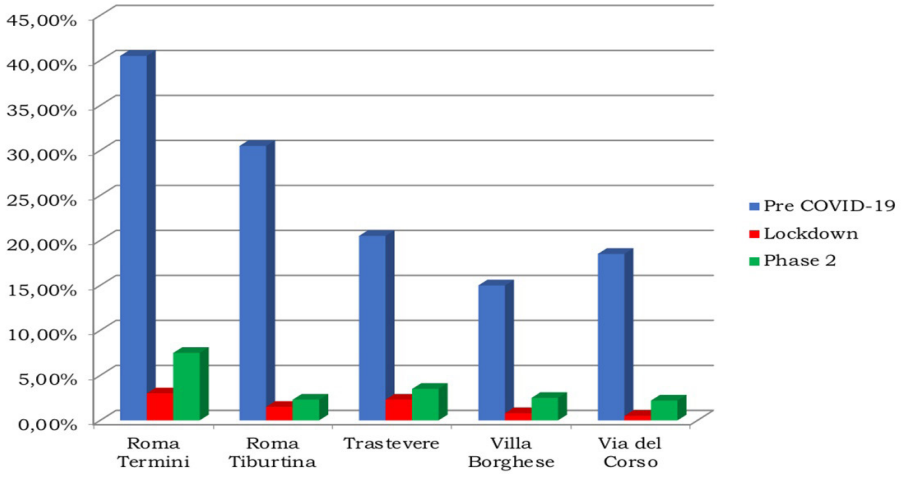
3.1. The three phases of the emergency and the movement flows in the main city centres

Focusing on the three main phases that marked the emergency (Pre-Covid19, Lockdown, Phase 2) in relation to the mobility towards the Points Of common Interest (hereinafter referred to as POIs) of different types, in the main Italian cities of Milan, Rome and Naples on a basis of 10,000 inhabitants, it makes clear the number of users who went to the selected POIs and the exact day. The phases can be divided as follows: Pre-Covid 19 (8th February – 24th February), the last week of lockdown (26th March – 3rd May) and the first week of Phase 2 (4th May – 17th May); they are compared to an average daily percentage of visitors to Milan, Rome and Naples (Graphs 13, 14 and 15).

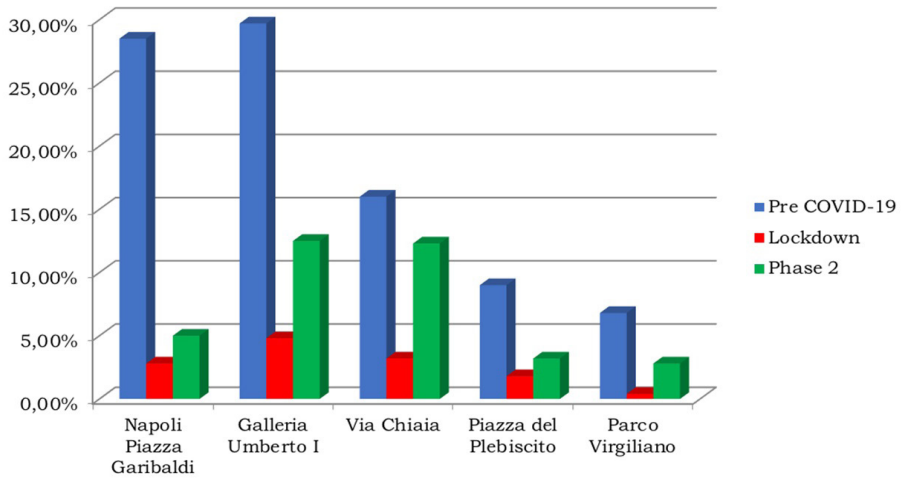
Graph 13. Milan - daily average of POI visitors compared to an average daily percentage of visitors. Elaboration of the data: City Analytics Enel X, 2020.



Graph 14. Rome - daily average of POI visitors compared to an average daily percentage of visitors. Elaboration of the data: City Analytics Enel X, 2020.



Graph 15. Naples - daily average POI visitors compared to an average daily percentage of visitors. Elaboration of the data: City Analytics Enel X, 2020.



What do the data tell us? In the graphs above, it is possible to distinguish on the abscissa axis the five main points of interest for each city examined and on the ordinate axis, the average percentage of daily visitors to the POIs mentioned. It is understandable to note that, in the Pre-Covid19 phase (in blue in the Graphs), all values are in the normal range, in the cities of Milan and Naples higher than 30%, respectively in Piazza Duomo and Piazza Garibaldi, and 40% at the Roma Termini station in the Eternal City. In red (Lockdown), the values drop to the minimum, with percentages of visitors that nearly touch zero.
Surely, the points of interest examined suffered heavily from the lockdown imposed by the Government.
The recovery starts from May 4th and enters Phase 2. In green, the 10% peak is registered in Naples, an extremely high percentage of users on the move in the POI Galleria Umberto and Via Chiaia. The Neapolitan city is, therefore, the only one to recover in a more determined way.

Before the pandemic (pre-covid19, February 8th – February 24th)

Before the pandemic (Pre-Covid19, February 8th – February 24th), the POIs in Milan and Naples were visited daily by a high percentage of citizens. Roma Termini is the POI with the highest percentage: an average of 40% of the Roman sample passed through the station every day, with peaks of almost 60% during the week. Less significant, albeit high, the values recorded in other places, such as Trastevere, a privileged destination for nightlife (20.2%) and Villa Borghese that counted for a daily average of 1,520 visitors on a basis of 10,000.

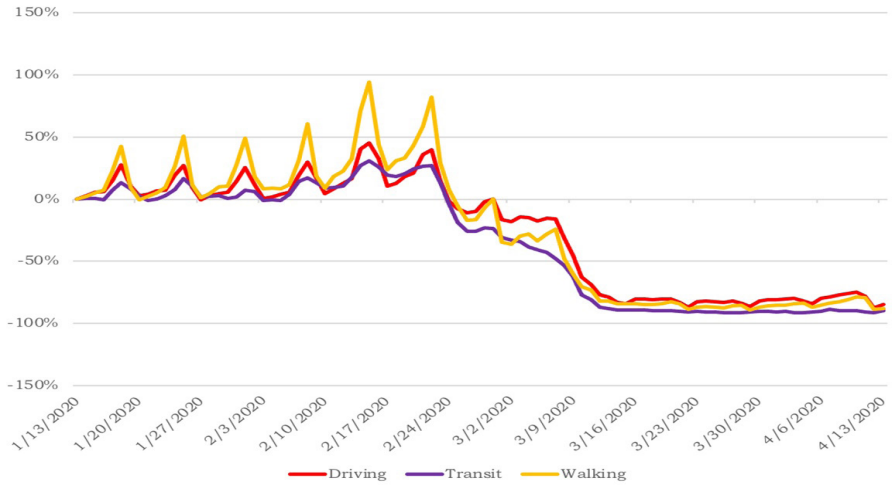
The second POI with the highest "traffic" among those examined, is Piazza Duomo in Milan, the centre of the city: 31,2% of the inhabitants of Milan walked beside the cathedral and the Galleria Vittorio Emanuele II every day. If the gap registered between visitors during the week for Roma Termini (44.8% on average) and weekend visitors (30.5% on average) is important, the place preferred by the Milanese does not follow exactly the same dynamics: 35.3% during the weekend and 29.3% during the week. Milano Centrale is only the third most visited POI in Milan: only 16.8% of the sample crossed daily the station. Corso Buenos Aires reached 1.9%. Then 11% of the 10,000 Milan citizens also lived their nightlife of the Navigli on weekends, with peaks of over 17%. In Naples, the Galleria Umberto I and the Naples Garibaldi station were frequented by 28% of the sample. Chiaia, the wealthy district of the city, with boutiques, restaurants and elegant bars, was another place that never remained deserted in Naples (15.7%).

From lockdown to Phase 2 (March 26th – May 3rd)

The percentage of POIs visitors inevitably dropped significantly during the lockdown, with students and most workers forced at home. The average percentage of people passing through the POI areas dropped to 4.9% in Milan, to 7.3% in Rome, and to 11.8% in Naples. None of the POIs alone reach-

es a percentage higher than 5% of the sample, a level almost touched only by the Galleria Umberto I in Naples. In Milan, the liveliest POI during the lockdown was Corso Buenos Aires with an average of 2.2%. Roma Termini dropped by over 37 percentage points, Piazza Duomo in Milan by 30 points. In light of the data collected, it is clear that the mobility trend practically stopped in the second half of April, recording -85% of car journeys, -88% of pedestrian movements and -90% of journeys with vehicles of public transport (Graph 16).

Graph 16. Mobility Trends in Italy from 13th January to 13th April 2020. Data collected by Apple, apple.com/covid19/mobility, (accessed 25th September 2020).



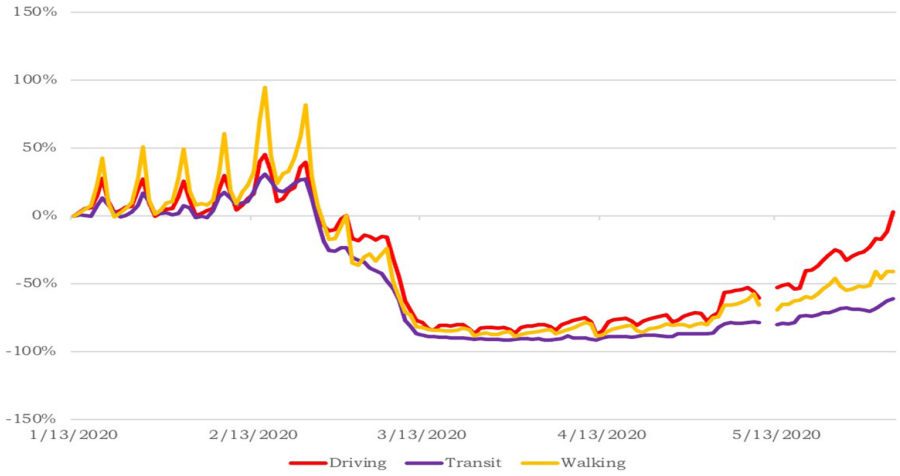
The recovery: Phase 2 (4th May – 17th May)

During the first week of Phase 2, offices and factories reopened for 4.4 million workers. But also, families reunited again. An attempt to return to normal life, with facemasks, sanitation and social distancing.

In Milan, only 17.9% of the sample returned to attend the POI examined. Rome notices the rhythms of Milan, with the difference of Roma Termini, which on the contrary to the station of Milano Porta Nuova, returned to be a hub of the Roman mobility: 8.4% of the Romans began to frequent the area again.

Naples restarted more decisively. From 87.4% Pre-Covid to 12% of the lockdown phase, in the post May 4, over 3,000 citizens started to move around the capital. More than 20% of the citizens returned to be frequent in the areas of Chiaia and the Galleria Umberto I.

Graph 17. Mobility Trends in Italy from 13th January to 2nd June 2020. Data collected by Apple, apple.com/covid19/mobility, (accessed 25th September 2020).



The lockdown data meant significant improvements on the contagion front. These data (Graph 17) testify how obligatory the confinement was but also how much the citizens respected the provisions.

Although not all Italian regions had shown such improvements, the restrictions began to ease starting from the relaunch phase and the mobility trend curve begins to soar, recording an increase in car travel of + 3%.

The Italian government had foreseen a gradual recovery in the various sectors of social, economic and productive activities, also through the identification of new organizational and relational models, which consider the need to contain and prevent

emergencies[1].

In this regard, as soon as the Government started talking about the *Phase 2*, the monitoring of people on the move immediately registered an increase. A matter of a few percentage points more, but sufficient to cause concern. Rightly or wrongly seen as an example in contagion containment measures, the indicators showed the signs of possible new outbreaks.

In the light of the macroscopic analysis conducted on the Italian regions and microscopic ones on the cities, it is found that the effects of the lockdown were severe in several sectors and led Italy to close in a vice. We see that, in the phase prior to Covid19, there were daily mobility trends with peaks of over 60%, until then they dropped at around -85% at the time of the lockdown decree.

Companies, activities, interpersonal relationships were stopped. And, according to what the IMF declared, the effects of the new Coronavirus will have a major impact on the economic aspect of Italy with a drop in GDP of -9,1%, recording a loss of 3% globally.

It is certainly touching to see how the life of Italians has changed, how the economy has been distorted, rediscovering, even in an emergency, new forms of adaptation, such as *smart working* and *smart studying*, especially where it was not yet foreseen, as in the regions of southern Italy. The road to a real recovery will be arduous, but now confinement is the safest solution for those realities still in high risk. The so-called *red areas* such as Milan, Bergamo, Lodi, will still have to keep the emergency plans active not to fall in new possible outbreaks.

Analyzing the data offered by the three Italian cities (Milan, Rome and Naples), which trace the geographical tripartite division of the entire Peninsula, a precise analysis emerged of how

1 D.P.C.M. of 14th April 2020, source: http://www.governo.it/it/coronavirus-misure-del-governo, (accessed 25th September 2020.)

the emergency has affected some areas more than others. Nevertheless, during the lockdown phase, the points of interest of the sample cities, which under normal conditions record very significant percentages of movements on a daily basis, have seen a significant reduction in the mobility of citizens. And exactly because mobility is the core business of the country's economy, seeing Italian cities deserted as they were never seen before, both in workplaces and near places of entertainment and social life, it makes clear how much the different phases of the pandemic have changed movements of the Italians, and how the dynamics and socio-demographic relationships within the cities have changed and will be on the agenda even next months.

4. THE GOVERNANCE OF THE EMERGENCY

This paragraph will examine the ordinances issued by the Italian regions following the health emergency caused by COVID-19 in the period from 9th March 2020 to 4th May 2020 (the so-called Phase 1). Therefore, an analysis and a comparison will be done with the aim of understanding whether more or less restrictive measures, with respect to the various Decrees of the President of the Council of Ministers (DPCM), could have affected the number of contagions at regional level.

Ministerial Decrees

The Decree of the President of the Council of Ministers of 9th March 2020 extends nationally the measures provided for by Art. 1 of the Prime Ministerial Decree of 8th March 2020 (with urgent measures to contain the contagion in the Lombardy region and in the provinces of Modena, Parma Piacenza, Reggio Emilia, Rimini, Pesaro and Urbino, Alessandria, Asti, Novara, Verbano-Cusio-Ossola, Vercelli, Padua, Treviso, and Venice). According to the provisions of the Decree of 9th March 2020, any form of gathering of people in public places or in spaces open to the public was prohibited, and sporting events of all orders

and disciplines, in public or private places, were suspended. The movement of people was prohibited except for the proven reasons of health, necessity or work and each citizen had to fill in a special self-certification form. In addition, the DPCM of 11th March 2020 prepared the closure of retail commercial activities, markets, catering activities (excluding the delivery service as well as the food and beverage administration exercises located in the service and refuelling areas located along the road, motorway and railway, airport, lake and hospital stations), activities relating to personal services were suspended, banking, financial, insurance services as well as the activities in the agricultural, zootechnical and agro-food processing sector, including the supply chains that supply goods and services**.** In addition, the Presidents of the Regions can order that the service provided by local public transport companies are reprogrammed in order to reduce and/or eliminate services in relation to the health interventions necessary to contain the coronavirus emergency based on the actual needs and with only the specification of ensuring the minimum essential services.

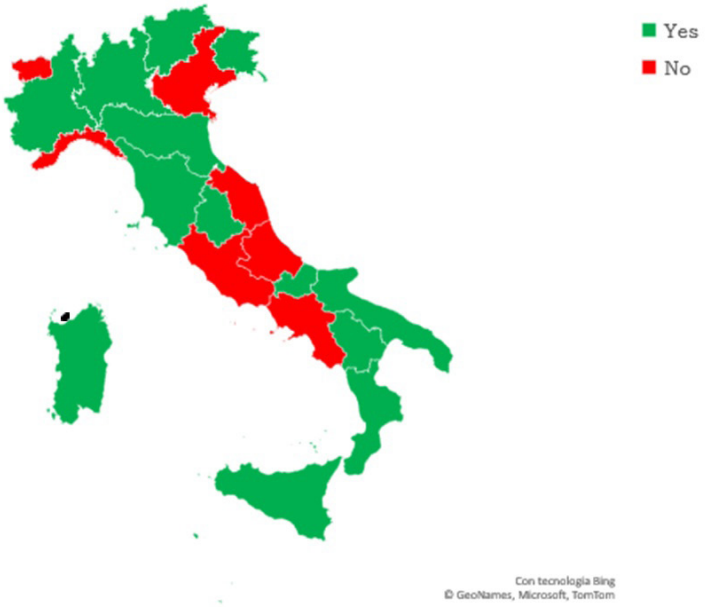
Comparing decisions taken at ministerial level and the measures decided at regional level, it is possible to grasp the differences and the different impact they had on the number of positives to the virus. The differences between the ordinances of the various regions can be understood in relation to factors such as delivery, re-opening of weekly markets (in covered places or in streets and squares), of the service areas (hospital, airport, motorways, refuelling, lakes and railways), as well as places of worship, the minor or major reduction in scheduled or non-scheduled public transport services and finally individual motor activity.

Proceeding a more detailed analysis of the ordinances, it can certainly be noted, as for example in the delivery sector, that the decisions taken by the regions were not homogeneous. In fact, while in the regions such as Piedmont, Lombardy, Trentino Alto

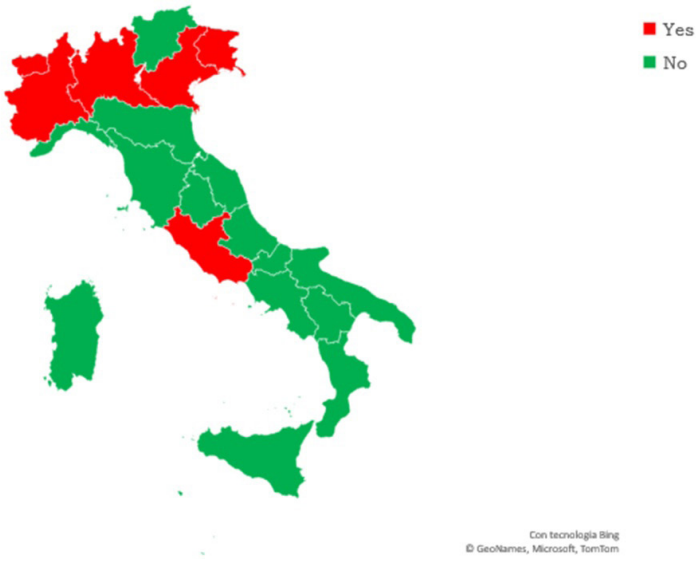
Adige, Friuli-Venezia Giulia, Emilia-Romagna, Tuscany, Basilicata, Puglia, Molise, Calabria and Sicily, the delivery service remained operational, in line with the ministerial decision, the remaining regions chose not to grant it and therefore opting for more restrictive measures than those being established at the Government level. For example, Umbria and Sardinia chose to resume the service on 3rd April and 4th respectively, therefore, during the so-called Phase 1, while the other regions decided to make the service operational at the end of April with the approach of Phase 2 and therefore in relation to a lower number of infections. It can be well imaged how the delivery sector can have an important impact on the increase of infections as it involves direct contact between a large number of people: those who work in this type of service and between these workers and the customers of the service. It remains to be asked whether in regions such as Lombardy, Piedmont, Emilia-Romagna, Trentino Alto Adige and Tuscany, affected by a high number of infections, it was an imprudent measure to guarantee these services especially in the light of the fact that, despite a lower number of contagions, other regions chose to act in the opposite direction. Processing of data provided by the websites of the regions of Piedmont, Lombardy, Aosta Valley, Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna, Liguria, Tuscany, Umbria, Abruzzi, Lazio, Marche, Basilicata, Apulia, Molise, Campania, Calabria, Sicily and Sardinia.

As for the indoor and outdoor markets, difference between the regions of Northern, Central and Southern Italy can be seen. In contrast with the ministerial decision to arrange the closure of the markets, in the majority of the northern regions the markets were opened in Phase 1 (with the exception of Emilia-Romagna, Trentino Alto Adige and Liguria) with the necessary precautionary measures; not the same can be said of the regions of central, southern and insular Italy where the choice of opening up the markets was shared exclusively by the Lazio region. Also, in this

Map 4. Operability of the delivery services from 9th March to 4th May 2020.



Map 5. Closing of all types of markets from 9th March to 4th May 2020.



case, as for the delivery service, the choice of an opening cannot certainly be considered prudent.

Processing of data provided by the websites of the regions of Piedmont, Lombardy, Aosta Valley, Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna, Liguria, Tuscany, Umbria, Abruzzi, Lazio, Marche, Basilicata, Apulia, Molise, Campania, Calabria, Sicily and Sardinia.

As regards the access to places of worship, with the exception of already planned particular ceremonies, a several Italian regions such as Valle D'Aosta, Veneto, Emilia-Romagna, Lazio, Abruzzo, Basilicata Puglia, Campania and Sardinia decided not to allow their citizens any access to the Churches, not even through precautionary measures, in stark contrast, therefore, to the measures decided at ministerial level.

There is a certain homogeneity within all Italian regions as regards the reduction of line and non-line transport services almost reduced to the same extent with few percentage of changes in line with the provisions at ministerial level. It is interesting to note that Sardinia, despite the incredibly low number of infections, decided to eliminate maritime transport services totally in the period from 15th March to 3rd May. Furthermore, Abruzzo decided to reduce the railway services by up to 80% and scheduled and non-scheduled services with percentages ranging from 50% to 80%, remarkably high percentages compared to the rest of Italy. The reduction or suppression of scheduled and non-scheduled services had an important impact on the increase or reduction of contagions, given that the transport sector produces a significant number of contacts and, therefore, a very high possibility of contagion.

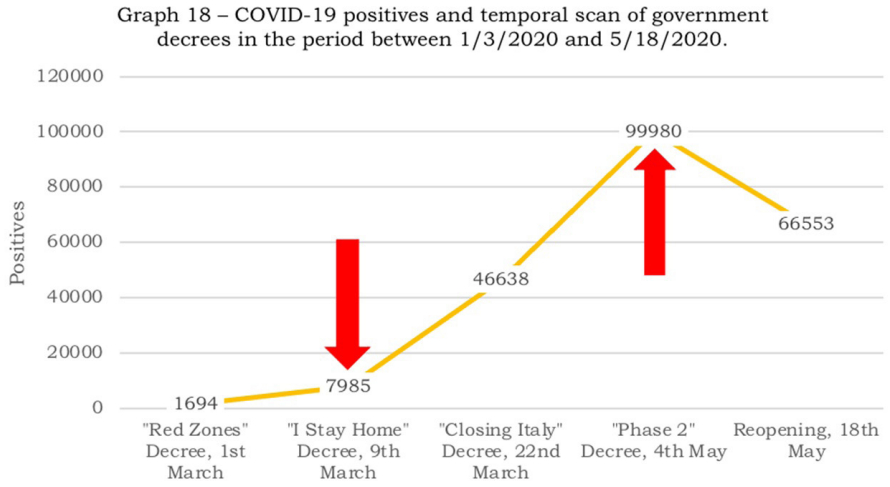
The last relevant factor to analyse is individual motor activity. While the decrees of the Italian government did not prevent individual motor activity, regions such as Valle D'Aosta, Veneto, Friuli-Venezia Giulia, Liguria, Umbria (allowed only from April 3rd), Campania, l Abruzzo, Basilicata (allowed only from April

15th), Sardinia (allowed only from April 13), Sicily and Calabria decided not to grant it except for strictly healthy and necessary reasons. Finally, in Piedmont, Lombardy, Trentino Alto Adige, Marche, Emilia Romagna was granted (but within 200 meters away from home) despite being among the regions most affected by the virus nationally.

Map 6. Individual sport activity from 9th March to 4th May 2020. Processing of data provided by the websites of the regions of Piedmont, Lombardy, Aosta Valley, Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia, Emilia-Romagna, Liguria, Tuscany, Umbria, Abruzzi, Lazio, Marche, Basilicata, Apulia, Molise, Campania, Calabria, Sicily and Sardinia.

In conclusion, as can be seen, moreover, from Graph 18, a greater number of contagions corresponds to an increase in the restrictive ministerial measures, and therefore to a decrease in the contagion following the application at regional level of the latter, as can clearly be seen from the date of 4/5/2020.

Graph 18. COVID-19 positives and temporal scan of government decrees in the period between 1/3/2020 and 5/18/2020. Elaboration of data provided on the website of Civil Protection and on the Ministry's website.



CONCLUSION

The purpose of the ministerial decision to univocally extend the measures relating to the contagion from COVID-19 to the whole territory and to leave decision-making autonomy to the regions, must be recognized under the circumstances that most of them did not have high percentages of contagion in relation to those most affected. For this reason it was chosen to dictate general guidelines and to leave the regions with autonomy decision-making in this sense. The ministerial decision assumes of not being able to take responsibility for the management of the individual regions, leaving them the possibility of following the government line or not.

Italy is certainly not a homogeneous territory as regards the measures and behaviours undertaken by the various regions. This different approach certainly influenced the number of COVID-19 infections, the different factors analysed in the regional ordinances affected the number of cases to a lesser or

greater extent. Regions such as Lombardy, Piedmont, Tuscany and Emilia-Romagna, which are among the most affected regions at national level, decided to follow the ministerial line entirely, or almost, unlike many central, southern and insular regions, in addition to some northern regions less affected by the virus, which followed an opposite, more restrictive line.

In the end, it remains rise a question of whether the behaviour undertaken by regions such as Lombardy, Piedmont, Tuscany and Emilia-Romagna was actually prudent, as well as the ministerial decision to undertake the so-called Phase 2 despite the very high number of current infections in several areas, especially in Lombardy.

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