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Building Recovery, Property Values and Demographic Decline After the 2009 Abruzzo Earthquake

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Abstract. The dilapidation of building stock that has come to characterise the hillside and mountainous settlements of the region of Abruzzo in recent decades is a sign of forms of economic decline and negative demographic trends. In this situation, it is difficult to imagine occasions for a turn in events triggered by endogenous forces; instead, there is a sense of the need for public intervention and targeted economic-social policies. Indeed, in settlements lacking important resources for tourism and/or infrastructures for winter sports, it is very difficult to imagine their recovery through interventions entrusted solely to the market: often negligible property values suggest the inconvenience of any building requalification project in relation to asset or income-based objectives of valorisation. The reconstruction process put into place after the 2009 earthquake could have been interpreted and implemented within a vaster programme of interventions based on clear and defined strategic capable of guaranteeing prospects for the long-term relaunching and development of damaged areas. The initial idea behind the Reconstruction Plans appeared to confirm a similar approach. In reality, reconstruction is proceeding as a simple programme of building recovery. The paper develops this thesis by attempting to demonstrate how almost a decade after the 2009 earthquake, the funding provided to date has not produced particularly relevant effects on local economics and demographics.

Keywords: Building stock · Recovery · Abruzzo earthquake reconstruction · Demographic decline · Real estate market

1 A Preliminary Consideration

The decades-long desertion of so many of Abruzzo's hillside and mountainous villages is the result of a complex process linked to forms of economic decline and negative demographic trends. This has produced an extremely high number of abandoned homes and unused public buildings.

In this situation it is clear how, long before 2009 (the year of the Abruzzo earthquake) no building recovery project could have been triggered by forces endogenous to local economies. If we exclude those settlements with a greater vocation for tourism (at the gates of national parks and/or dedicated to winter sports), in all others no intervention of real estate valorisation – either asset or income based – would have been

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convenient: extraordinary maintenance costs are equivalent to those sustained in towns along the coast and in the plains though with entirely negligible increases in value or expected returns.

Aside from considering the total and definitive abandonment of these villages, the only other alternative was State intervention, using not only the tools most commonly adopted in similar situations (fiscal bonuses, incentives, funding, etc.), but also improving the overall conditions of the territory and essential services (schools, healthcare, infrastructures, government, etc.) [1].

A similar action would provide resident populations with more reasons to remain, halting the advancement of a process of *anthropic desertification* and, in all likelihood, heightening the attractiveness of these villages, what is more often blessed by exceptional landscapes and a wealth of natural resources.

This approach appeared to be reinforced by the initial intentions of the Reconstruction Plans for *historic centres*[1], to be developed jointly with the regional and provincial government; an interesting solution that could have helped avoid the errors of the past by not limiting post-earthquake interventions almost exclusively to the reconstruction of buildings [2] (above all private), but instead framing the entire process within a more strategic approach able to ensure the socio-economic recovery of the territories involved[2].

In other words – at least at the outset – it seemed possible to imagine the realisation of a broad programme of interventions able not only to guarantee the requalification of inhabited areas and the return of evacuated populations, but also to help the city of L'Aquila and the small mountain villages of Abruzzo damaged by the earthquake recover from a condition of economic marginality and demographic decline.

Instead, this process evolved in a different direction, as demonstrated not only by the re-dimensioning of the Reconstruction Plans [3], from the outset limited solely to the recovery of buildings, but also and above all, the very relevant drain on available resources entirely to the advantage of private property that, it is worth emphasising, consists primarily of second homes.

2 Introduction

Almost ten years after the earthquake that devastated the city of L'Aquila and numerous other villages in the region of Abruzzo, it is perhaps possible to initiate a reflection on the effects of the reconstruction process and the considerable amounts of funding provided, in terms of the revitalisation of these settlements. We can begin with an analysis of demographic dynamics and property values before and after the earthquake. The analysis of demographic dynamics during the twenty-year period spanning the year 2009 may reveal, albeit it indirectly, whether post-earthquake interventions helped generate the preconditions linked to the quantitative-qualitative improvement of essential services [4], sufficient to arrest depopulation and improve the attractiveness of

[1] Law 24 June 2009, n. 77, art.14, comma 5 bis.

[2] Decree issued by the Commissioner Delegated for the Reconstruction n.3 del 9.3.2010, art.5 comma 1.

these settlements [5]. On the other hand, the cost of real estate can be considered an indicator or proxy that expresses the synthesis between the economic strength of a territory and the quality of a settlement [6].

Urban quality and the quality of buildings, while representing multidimensional concepts that can be interpreted from different vantage points and perspectives, may in any case by defined through the analyses of property values, to some degree a synthesis, effect and comprehensive measure of these phenomena.

This leads to the possibility, using market price dynamics, to read an increase (or reduction) in value in relation to the presence of urban functions, the availability of services, economic and cultural resources and employment [7, 8].

The study compared ten towns[3] located inside the earthquake 'crater' (6 in the province of Pescara and 4 in the province of L'Aquila) with four hillside and mountainous towns only marginally affected by the 2009 earthquake and with a strong vocation of tourism.

The city of L'Aquila was not considered: as the administrative, territorial and functional urban centre of reference for the region, it presents particular conditions with respect to the small towns inside the crater. As such, it requires its own specific study.

3 The Costs of Reconstruction to Date

To date, the financial resources provided in the wake of the 2009 Abruzzo earthquake total roughly 18 billion euros. There are already plans to provide a further 3 billion, taking the total cost of reconstruction to over 21 billion euros. It is very likely that this number will continue to grow in the coming years.

According to the parliamentary report on reconstruction works inside the Abruzzo crater, presented in April 2018 [9], the total amount of funding provided as of December 2016 was just under 9 billion euros; 20% was used during the emergency phase and more than 70% for building recovery. The area of "territorial development" represented only 0.03% (Table 1).

Table 1. Summary of funding for reconstruction works as of 31 December 2016 (M euros). Source: Senate of the Italian Republic, XVI Legislature

Expenditures	Approved funding	Transferred funding	Payments	%
Emergency Response and Mandatory Expenses	2,061.4	2,030.4	1,838.0	20.23
Private Reconstruction	8,015.8	5340.3	4,980.6	54.83
Public Reconstruction	2,790.0	2,393.5	1,400.1	15.41
Territorial Development	470.3	162.6	2.4	0.03
Other	1,734.9	1,704.9	863.2	9.50
Unassigned Funding	2,784.0			0.00
TOTAL	17,856.4	11,631.7	9,084.3	100.00

[3] They represent approximately 18% of the comuni within the area of the earthquake crater.

From this we can infer that the reconstruction was, from the outset, oriented exclusively toward the recovery of existing buildings, ignoring any programming of interventions to valorise territorial resources, either productive or professional, able to create employment or develop industry and, in the end, generate greater wellbeing for local communities and heighten their attractiveness. All conditions hoped for in numerous institutional documents [9].

Based on the data provided by the Special Office for the Reconstruction of L'Aquila (USRA)[4], the total amount of funding provided as of February 2019 solely for the reconstruction of the regional capital exceeds 5 billion euros (Table 2).

Table 2. Funding provided as of February 2019 for the reconstruction of L'Aquila. Source: USRA.

Expenditures	Payments	%
Private Reconstruction (works concluded by 4 February 2019)	3,599,038,973	71.0
Public Reconstruction (funding paid to 31 October 2019)	1,407,157,205	27.7
Costs of land expropriations (to 31 March 2018)	65,960,131	1.3
TOTAL	5,072,156,309	100.0

On the other hand, the monitoring carried out by the Special Office for the Reconstruction of Settlements Inside the Crater (USRC)[5] makes it possible to verify the total amount spent to date for the reconstruction of all of the communities situated inside the perimeter of the crater and those outside of it (Table 3).

Table 3. Funding provided from 2009 to the present for the reconstruction of the Towns inside and outside the earthquake crater. Source: USRC

Expenditures	Payments	%
Private Reconstruction	1,315,525,985	90.0
Public Reconstruction (including funding not paid by USRC)	77,497,923	5.3
Costs of the reconstruction of schools (including funding not paid by USRC)	69,445,304	4.7
TOTAL	1,462,469,212	100.0

Specifically, funding for private reconstruction of the other villages inside and outside the crater amounts for 90% of the relative total. In the aforementioned parliamentary report, the completion of private reconstruction, which includes the

[4] The USRA was instituted with Legislative Decree n. 83 in 2012, converted with modifications into Law n. 134 from 2012.

[5] The USRC, instituted with a Decree-Law in 2012, among its other responsibilities, monitors funding, implements interventions and manages the transmission of relative data to the Ministry of Economy and Finance.

reparation of 26,000 homes damaged by the earthquake, should amount to a total cost of 4 billion euros. Notable values that, in the forecasts, despite suffering today from a certain delay in the entire process, should in any case lead to the completion of private reconstruction works by the end of 2025. At this point, the real estate of these centres will have been entirely recovered. Thus, it is legitimate to wonder which communities will benefit, and in what economic context it will be utilised.

In this regard it is worth mentioning, initially, that the legislative framework regulating the provision of funding for private constructions recognised the integral funding of the costs of repairs or reconstruction solely for properties used as primary homes, in other words inhabited by stable residents. For so-called second homes, a lesser amount was provided and only for one home, in the case of owners of multiple properties.

This structure was successively "unhinged" by an element that strongly altered the relationship between funding for primary homes and that for second homes, as initially foreseen. We are speaking of the concept of "common areas" in condominiums or structural aggregations.[6] This concept triggered the possibility to include buildings comprised of multiple homes (both primary and non) as part of a single project, eligible for almost total funding [5].

This situation virtually equates primary and second homes in terms of their eligibility for funding and determines, in fact, as already noted [10], a greater amount for private constructions, in the order of 50% or more, with respect to the original estimate. To better comprehend the extent of this choice, it is necessary to consider that primary homes represent a very negligible percentage of the total of residential constructions that, in the best cases, does not exceed 25%, and more frequently is less than this value.

Therefore, it was a questionable choice, which has drained resources for investments in infrastructural and environmental works that could have more effectively valorised and supported the territorial system.

The analysis of demographic trends and real estate market prices demonstrates that, despite the funding provided in territories affected by the 2009 earthquake, there has been no decisive improvement with respect to previous conditions.

4 The Analysis

The study presented here compared trends characteristic of the ten towns located inside the crater (4 in the province of L'Aquila and 6 in the province of Pescara) with those of four other towns situated outside the crater, either unaffected or only damaged during the 2009 earthquake.

[6] "The terms structural aggregate refers to a collection of buildings […] which are non-homogeneous, in contact with one another or with a connection, more or less efficacious, which may interact during an earthquake or similar dynamic. A structural aggregate can thus be comprised of a single building, or by multiple buildings with generally diverse structural characteristics. The presence of an efficient seismic joint is the basis for identifying two clearly distinct aggregates." – Source. USRA Glossary.

The latter benefit from exceptional natural landscapes and facilities for winter sports, giving them an important position in Abruzzo's tourism economy.

The goal was to compare the dynamics between the two groups, before and after the earthquake, to understand the entity of changes in the two aspects studied. Specifically, the towns inside the crater are: Caporciano, Castelvecchio Subequo, Ofena and Poggio Picenze in the province of L'Aquila, and Brittoli, Bussi Sul Tirino, Civitella Casanova, Cugnoli, Montebello Di Bertona and Popoli in the province of Pescara; outside the crater the study analysed the towns of Alfedena, Rivisondoli, Roccaraso and Villetta Barrea, all in the province of L'Aquila (Fig. 1).

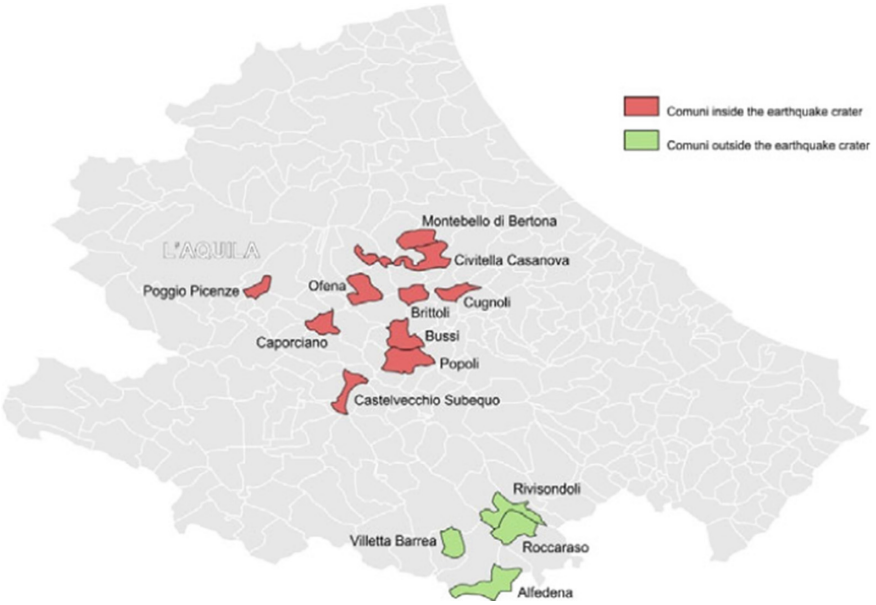

Fig. 1. Location of the towns analysed. Map by the authors

5 Demographic Decline in Towns Affected by the Earthquake

The study reconstructed demographic statistics[7] for resident populations[8] in the towns analysed (Fig. 2), characterised, like almost all of Italy's small towns[9] by a slow and continuous exodus [11]. In Abruzzo, the 2009 earthquake undoubtedly contributed to a rise in this phenomenon, though with diverse effects in different areas.

[7] Source: www.tuttitalia.it, based on ISTAT data.

[8] The term resident population refers to the population comprised of people who habitually reside in the settlement begin studied – definition taken from "15th General Census of the Population and Inhabitations", ISTAT October 2011.

[9] Small comuni are defined by Law 6 October 2017 n. 158, art. 1 comma 2.

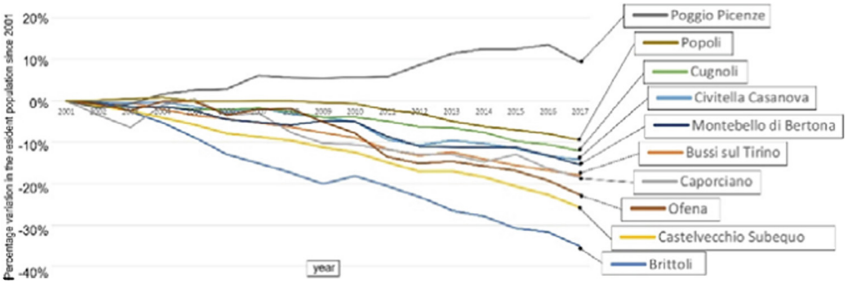

Fig. 2. Percentage variation in the resident population between 2001 and 2017. Charts by the authors based on ISTAT data.

Percentage variations in the resident population[10] calculated between 2001 and 2017[11] reveal a progressive diminution in all of the towns, with the exception of Poggio Picenze.

It is evident how, since 2001, a process of anthropic desertification can be observed in almost all of the towns studied, albeit with diverse methods.

In this regard, it is possible to distinguish between three different situations that more clearly describe the effects generated by the earthquake: negligible, relevant and determinant.

The towns of Brittoli and Bussi sul Tirino present an almost constant process of depopulation, regardless of the 2009 earthquake. In these towns, there was a decrease in the number of residents aligned with trends during the previous years (negligible effect).

In the towns of Civitella Casanova and Montebello di Bertona, the earthquake surely contributed to a rise in this phenomenon, given the significant variation in demographics during the following years (relevant effect).

Finally, the towns of Caporciano, Cugnoli, Ofena and Popoli showed a notable resilience toward the phenomenon of abandonment until 2009–2010; following the earthquake, this relative stability changed.

In particular, Ofena and Caporciano have suffered from a population decline in the range of 20% over the past 10 years (determinant effect) (Fig. 3).

A separate comment must be made for Poggio Picenze, where the 2009 earthquake had only a "temporary" effect, blocking a rise in the population until 2011, after which its once again continued to grow. It is possible that in this case the effect of abandonment was in part mitigated, if not entirely annulled, by the town's proximity to the industrial centre of Bazzano and the city of L'Aquila.

[10] The demographic trend is expressed using the methodology adopted by ISTAT, in other words using the procedure reconstruction - population calculated between censuses of the resident population based both on Censuses made in 2001 and 2011 and by examining demographic movements (births, deaths, migrations) communicated by local governments to the statistics institute.

[11] Author's elaborations on National Institute of Statistics (ISTAT) data.

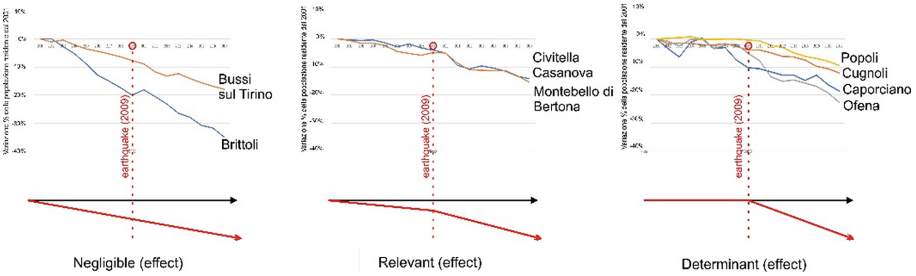

Fig. 3. Results of the 2009 earthquake on demographic dynamics. Charts by the authors.

In the towns situated outside the crater, the study revealed an inverse trend, with an increase in the resident population.

A slight discordance must be noted for the town of Rivisondoli: despite small annual shifts, in some cases negative, the final balance of the resident population during the period analysed is in any case positive (Fig. 4).

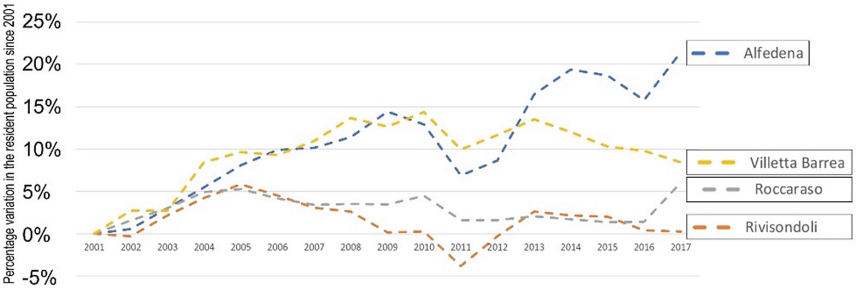

Fig. 4. Percentage variation in the resident population from 2001 to the present in the towns of Alfedena, Roccaraso, Rivisondoli and Villetta Barrea. Charts by the authors.

6 Property Values

Using data provided by the Italian Revenue Agency's *Osservatorio del Mercato Immobiliare*, the study reconstructed the historic series of real estate market prices in historic centres[12] from 2006 to the first semester of 2018.

The reconstruction of this trend reveals – both for the eight[13] towns inside the crater and the four "tourist" destinations – a "parabolic" movement that mirrors a national trend: the movement of prices … since 2012… continues during 2017 [12] (Fig. 5).

[12] Area: Central; Zone Code: B1; Typology: Civil residences; State of conservation: normal.

[13] Excluding the towns of Castelvecchio Subequo and Poggio Picenze for which the available data was insufficient.

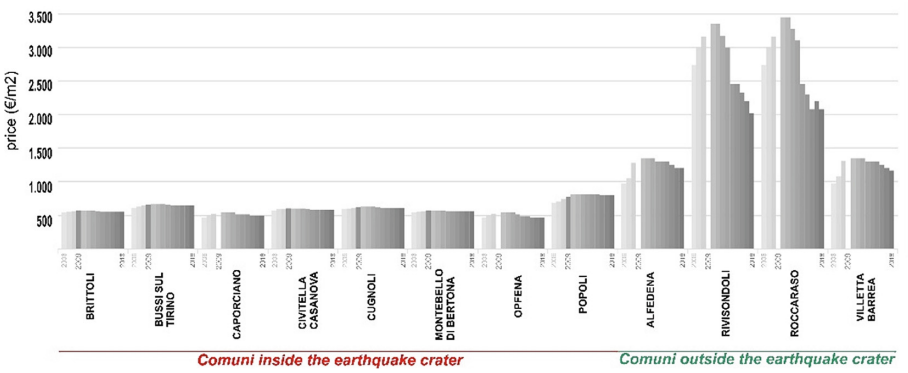

Fig. 5. Average trends in housing prices. Charts by the authors based on data provided by the Italian Revenue Agency's OMI.

Thus, prices dropped in both groups of towns; this parabola peaked in late 2009-early 2012 at an average price of €615/m2 for the towns inside the crater and €2,346/m2 for those in the tourist destinations.

In 2018 the two values diminished, respectively, to €591/m2 and €1,620/m2. In percentage terms, the reduction in the tourist destinations was more relevant (−31% compared to −9% inside the crater) reflecting the trend plausibly explained by the aforementioned dynamics (Fig. 6).

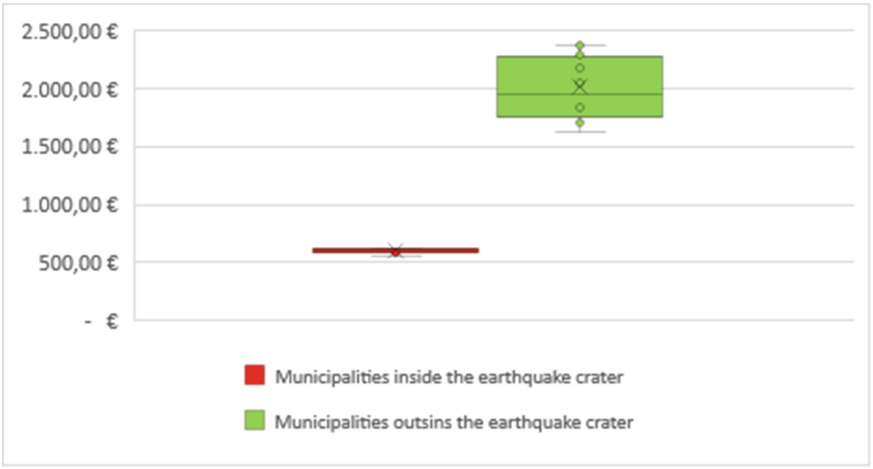

Fig. 6. Box-plot of real estate prices (except 2009). Charts by the authors.

For the towns inside the crater, the limited reduction in average prices cannot be interpreted as appreciable, in virtue of its minimum level. In other words, an average unitary price in the range of 550–600 euros per square metre to some degree represents

an "incompressible" price, below which – also in consideration of the extremely limited number of transactions[14]- it would be possible to suppose the absence of any balance between demand and supply.

7 Conclusions

The elements analysed in this text, the first results of a study that certainly merits further verifications and investigations, tend toward a reductive opinion of the overall results of the reconstruction.

Ten years after the earthquake, the notable public funding provided does not appear to have inverted – at least in the ten towns analysed – the negative demographic trend of the past twenty years, nor generated a rise in property values.

These two indicators question the quality of the expenditures made and permit the legitimate supposition of a defect in the very structure of the entire process of reconstruction.

In the towns located inside the crater, excluding the city of L'Aquila, almost all available public funding was invested in recovering private property [13], for the most part "second homes". Any other intervention not meeting this definition received no funding.

Yet, the ancient and simultaneously innovative idea of proceeding, in the wake of the Abruzzo earthquake, with the development of Reconstruction Plans (to some degree recalling the plans for the reconstruction of homes damaged during the war and defined in Legislative Decree *Luogotenenziale* n. 154/1945), hinted at other procedures and other choices [14].

For example, modifications to infrastructural and environmental systems.

One example is offered by the fate of projects linked to the structure of the territory; some settlements face relevant issues due to the instability of hillsides; the securing of areas affected by or subject to landslides was initially considered in the reconstruction plans, only to be entirely set aside later.

By focusing all attention on the recovery of buildings and restoring basic infrastructural networks, the process renounced even fundamental projects for the safety of the population, in other words, those linked to the Minimum Urban Structure, represented by a grouping of buildings, streets and spaces that must be secured in order to guarantee the safety of a population fleeing during an earthquake.

The use of resources for the post-earthquake reconstruction in Abruzzo thus raises a number of questions and recalls the serious criticisms expressed at the time by the parliamentary committees that, on more than one occasion, analysed the results of the public funding provided in the wake of the different earthquakes that struck Italy during the second half of the twentieth century: "… flows of funding directed toward … the reconstruction of private homes instead of public works … a model that cascades down into territorial plans, rigidly interconnected from the highest down to the lowest

[14] The average value of transactions inside the crater, over the course of twelve years, oscillates between a minimum of 0.8 for the town of Brittoli and 15.4 for the town of Popoli; the other 4 comuni do not exceed 4 transactions/year.

level …insufficiency of the institutional system commissioned with managing and coordinating the activities … and … controlling the evolution of spending".[15]

These considerations confirm once again the necessity to reconsider public intervention in the wake of natural catatrosophes and earthquakes in particular.

The solidarity-based approach adopted by the Italian State, which entirely finances the reconstruction of private buildings – in addition to public properties and infrastructures – is, in fact, both ineffective and inefficient. While on the one hand public intervention is reassuring for the populations involved, on the other hand it provides uncertain results, which are manifest in the inadequate relationship between good original intentions and results achieved.

The perspective suggested by the investigation presented here recalls the necessity to rethink forms of public intervention in private post-earthquake reconstruction, beginning with the underlying hypothesis of a national fund, based on a mechanism of risk evaluation and structured in accordance with a plan for economic-financial and social sustainability.

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