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Real estate cycles and credit extended: an empirical analysis of the segment of housing purchased with a loan

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Abstract This article aims to describe, with regard to the sales of housing purchased with a loan, and based on the data available to the real estate market observatory at Agenzia delle entrate, the relationships between the main variables related to the loan (number of houses purchased with a loan, these houses' exchange value, principal extended, interest rate), the real estate cycle for the last decade, and some characteristics of the residential markets at the local level. In general, it may be stated that despite the evidence of some strong uniformities due to macroeconomic phenomena (competition in the banking market, policies of central banks, and increasingly strong interconnection between the different countries' financial markets), more or less intense structural differences remain, connected with territorial and local characteristics. Therefore, while the trend over time in some crucial variables related to loans (the incidence of purchases with loans out of total house purchases, loan to value, interest rate) follows relatively homogenous paths, analysis by local characteristics (chiefly: classes of market dynamics, demographic classes of municipalities, geographic area) often shows a specific ordering of these variables by local characteristic.

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INTRODUCTION

After the great recession of 2008-2009, known to have been triggered by the imbalances in the United States real estate market, international bodies (IMF, OECD, ECB, EUROSTAT) began to keep under more systematic and organic observation the trends in the real estate market, and in particular the residential one which, everywhere, represents the lion's share of real estate exchanges.

Since then, broad reflection has taken shape on what were referred to as “macro-prudential policies,” with particular reference to the sector of financing house purchases and the companies operating in the construction industry.

The logic of these policies is to take action with instruments that, in an overheating market and particularly in terms of housing prices, avoid lending practices that harshen the risks of the financial and credit sector's overexposure to the real estate sector. In effect, *rebus sic stantibus*, rising price trends entail further loan funding and risks to the maintenance of the value of the collateral backing the loans, if, for any outside factor, prices were to reverse course and begin to fall.

There are essentially three types of instruments the supervisory authorities can use for macro-prudential policies, net of variations and combinations:

- interventions aimed at settling limits to the admissible loan to value (LTV), which is to say the amount of credit that can be extended in comparison with the value of the house put up as collateral;
- interventions aimed at establishing the admissible ratio between the amount of the instalment owed for servicing the debt and the income available to the loan applicant (*debt-service-to income*, DSTI);
- interventions in sectoral capital requirements (SCR) aimed at restricting the possibility of extending credit for certain sectors – rationing – by raising the coefficients of capital needed for these sectoral exposures.

Macro-prudential policies essentially have the aim of containing the amount of credit provided by the banks and, by this, to reduce demand on the real estate market and consequently to ease prices. In any event, the main objective is to diminish banks' exposure growth in order to attenuate the risks derived from traumatic inversions of the cycle of prices and of the real estate market.

Beyond whether or not instruments of this kind are effective with regard to the objectives, their actual possibility of use requires, as a prerequisite, complete information and knowledge of real estate market data. As pointed out earlier, after the crisis, international institutions and central banks began to keep Europe's real estate markets under closer observation; for example, EUROSTAT has worked out methods, shared with a number of national statistics institutions, to develop the housing prices index published in Italy by ISTAT with a historic series starting from 2010.

The IMF publishes a quarterly *Global Real House Index*. Figure 1 shows this index from the first quarter of 2000 to the third quarter of 2016.

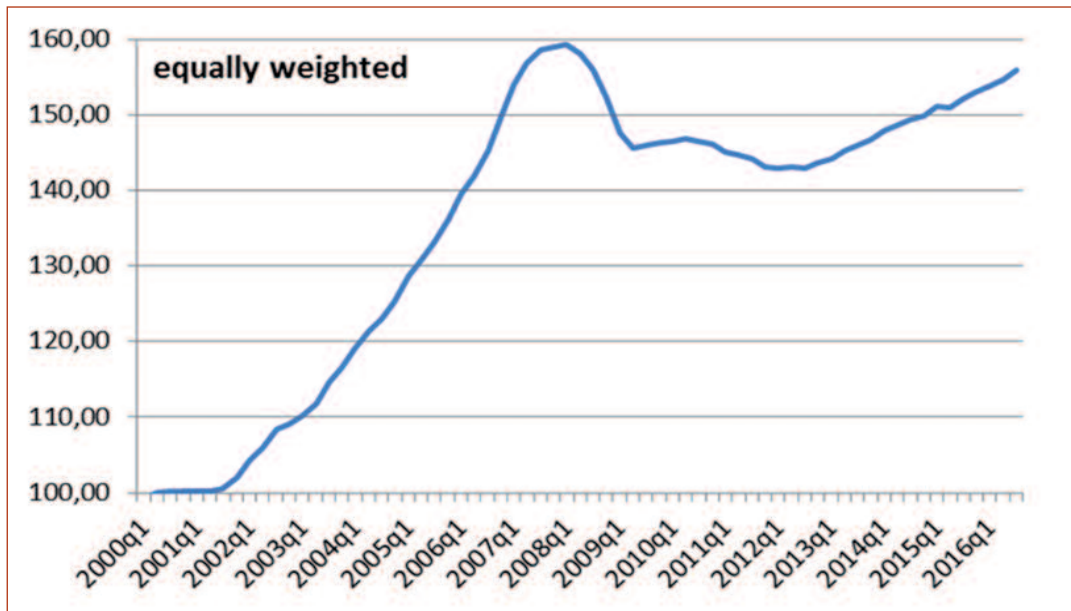


Figure 1 Housing prices, IMF global index - Source - IMF, GLOBAL HOUSING WATCH, January 2017

As may be noted, between 2001 and the first quarter of 2008, we have, on an international level, witnessed exponential growth in average housing price levels. With the rise of the crisis during 2008, prices, on a global level, plummeted (about -8% to the third quarter of 2009, followed by approximately 2% more through 2012, for a total decline of about 10%). Since 2013, we have seen constant recovery of the price index, returning to almost pre-crisis levels. But these trends are not uniform. In fact, the IMF identifies¹ three groups of countries:

- “gloom” countries that still show declining prices; these are 18 countries (including Brazil, China, Russia and, among leading European nations, Finland, France, Greece, Italy, Holland, Poland, and Spain);
- “bust and boom” countries that have recorded rebounding prices since 2013 after a strong decline during the crisis period; in this case as well these are 18 countries (including the United States, Japan, New Zealand and, among leading European nations, the United Kingdom, Germany, Denmark, Hungary, and Portugal);
- lastly, the “boom” countries, which saw a modest decline in prices during the crisis followed by a rapid positive upswing in prices during subsequent periods these are 21 countries, including Australia, il Canada, India, Israel, and South Korea and, among European nations, Austria, Belgium, Norway, Sweden, and Switzerland).

¹ Cf. FMI, GLOBAL HOUSING WATCH November 2016 and first quarter 2017, respectively in <http://www.imf.org/external/research/housing/report/pdf/1116.pdf> and http://www.imf.org/external/research/housing/report/pdf/Q1_2017.pdf

Figure 2 shows the housing price index net of inflation for the three different groups, clearly illustrating the various dynamics in the prices that on average have marked each group.

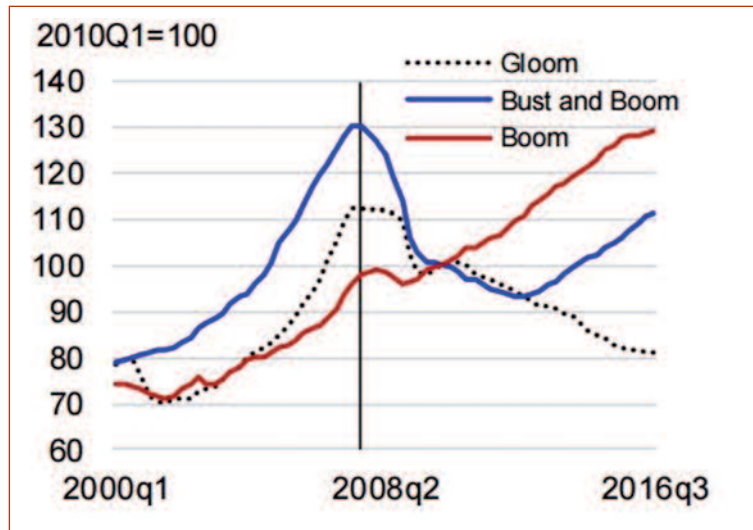


Figure 2 Index of real prices for groups of countries - Source - MF, GLOBAL HOUSING WATCH, January 2017

Over the years, many countries have operated macro-prudential policies. Figure 3 shows the number of countries that in each of the three groups² have activated the various instruments, alluded to earlier, of these policies.

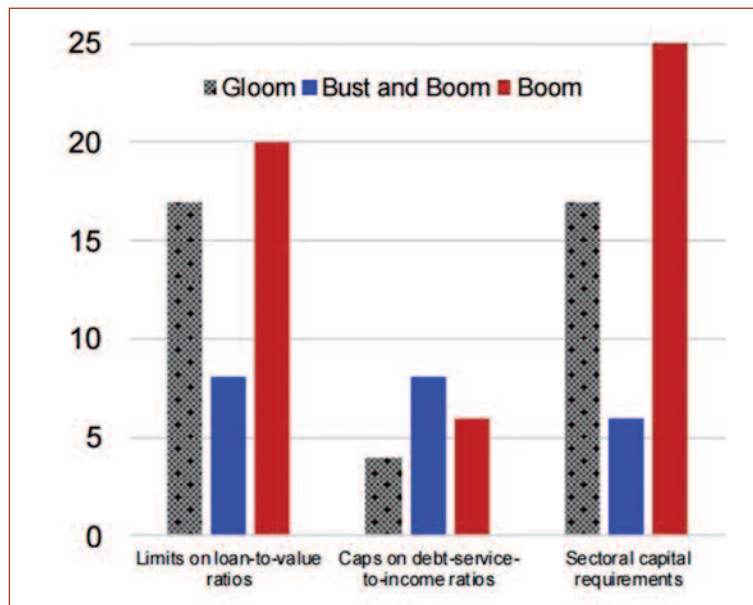


Figure 3 Number of implemented macro-prudential policies - Source - IMF, GLOBAL HOUSING WATCH November 2016

² FMI, GLOBAL HOUSING WATCH, November ; op. cit.

Macro-prudential policies were implemented mainly in the “boom” countries, and mainly used the SCR and LTV instruments.

In our opinion, this general framework, albeit useful for comprehending the global dynamics of the residential market and any underlying systemic risks derived from extending credit in conditions of market stress, provides only a partial picture. For example, unlike many countries, in Italy the sharp decline in prices did not take place immediately after the crisis broke out, but was manifested mainly starting from the fourth quarter of 2011. So there was a fair time lag. Of course, any recovery is likely to take place with a certain delay. But what is taking place in our country is that since 2015, and last year in particular, the number of purchased houses has begun rising again. This implied an increase in the total value of the exchanges (“turnover”), which is to say the total of the monetary amount circulating in the residential market.

This aspect leads us to reflect on the fact that the market information currently available for all countries is probably still insufficient: that is to say, monitoring unit price trends (by unit of area) is not enough. Information would be needed on the quantities exchanged, and consequently on the “turnover” and on the weight of the flow of lending capital extended on this “turnover” (it makes a difference whether demand on the market depends exclusively on credit or has an “autonomous” component depending substantially on accumulated savings).

In the second place, while the real estate market, by its nature, reflects global phenomena (interest rates, economic cycles, etc.), it has nonetheless a highly local, sub-national component, and reflects a dual demand: for investment and for satisfying a primary need (housing plain and simple). This makes it particularly difficult to be “managed” with macro policies, due to the various distributive and territorial impacts they may have.

To draw one example, a possible intervention aimed at reducing loan to value means that, the house’s purchase value being equal, the credit that may be obtained is reduced. This has obvious repercussions in terms of distributive effects, because inevitably the purchase may be less accessible for less wealthy families (households with fewer savings), besides there is no guarantee that a reduced demand will result (since a primary need, some how, has to be dealt with). This problem is of even greater impact when acting through a variation in terms of SDTI, in which, the monetary amount of the instalment being equal, a greater available current (or expected) income is demanded to the borrower. Moreover, from the territorial standpoint, there is no guarantee that price trends are “critical” everywhere. In Italy, for example, in the major markets (15 cities together represent 30% of the 2000-2015 “turnover”), the cycle of prices until 2012 showed enormous growth, unlike the smaller municipalities. In this case, too, macro-prudential policies would have excessive impacts on less “critical” territories as well.³

This is why it is possible that macro-prudential policies, aimed at any rate at stabilizing markets to make bank exposures less risky, should also have other instruments, in addition to those that are lending proper, that act upon demand and supply in order to achieve the same goal of stabilization.

³ For these aspects, and in general an analysis of the trends of the Italian real estate market, see G. Guerrieri, *Livello e andamento dei valori di mercato e dei valori catastali (2000-2015)* in Quaderni dell’Osservatorio 2016, at http://www1.agenziaentrate.gov.it/documentazione/omi_quaderni/Quaderni_2016r.pdf

OBJECTIVES AND ARTICULATION OF THIS WORK

The new tasks that Italian lawmakers recently attributed to Agenzia delle entrate's real estate market observatory (Osservatorio del mercato immobiliare – OMI)⁴, also include providing statistical and economic information and of collaborate, to that end, with the authority charged with macro-prudential supervision.⁵ This framework has led the national real estate observatory (OMI) to develop some initial analyses as to the relationship between the real estate cycle recorded in Italy and the credit that was paid, through mortgage loans, for the purchase of homes by natural persons in Italy.⁶

This work has the objective of empirically describing the relationship between certain variables, such as, for example, the incidence of purchases with loans out of total house purchases, the loan to value and the interest rate, and an analysis of the markets disaggregated by classes of monetary dimension and dynamics of local markets, by demographic classes of the municipalities, and by geographic area. This is also for the purpose of verifying whether or not there are differences between these local characteristics in terms both of trends and in levels of considered variables.

The work is organized in the next seven paragraphs, and one dedicated to brief conclusions.

The following paragraph specifies what the information on house purchases with loans is, and where it is drawn from. The descriptive analyses presented below are based on the database used to produce a previous essay,⁷ supplemented by the data on the housing units purchased by natural persons with mortgage registered on the purchased house.

The second paragraph is dedicated to a summary of the main variables considered (and available) regarding Italy for the 2004-2015 period. The paragraph “The size and dynamics of local markets” analyzes the trend in loan-supported sales through a disaggregation of local markets by monetary dimension of the residential market, and by their dynamics.

The paragraph immediately thereafter introduces the analysis of certain variables (the incidence of sales with loan, and the differential of the average value of the house), the crossing with the dynamics of the local markets, and some territorial disaggregations (geographic area and demographic class). And the fifth paragraph is dedicated to analyzing the relationship between incidence of sales with loan and the value of houses by territorial characteristics (in particular, geographic area and dynamics).

The last two paragraphs are dedicated, in order, to loan to value and to the interest rate, analyzing levels and trends by characteristic of the local markets.

4 Reference is made to the regulation approved with Legislative Decree no. 72/2016, which introduces into the Consolidated Banking Law (Legislative Decree no. 385 of 01 September 1993) Chapter I bis, and into this article 120-sexiesdecies titled *Osservatorio del mercato immobiliare* (“real estate market observatory”) which reads: *The real estate market observatory instituted at Agenzia delle entrate ensures statistical monitoring of the residential real estate market and makes the appropriate communications for the purposes of the macro-prudential supervision controls.*

5 Currently Banca d'Italia. However, art. 10, paragraph 1 of Law no. 170 of 12 August 2016 delegates the Government to adopt, by no later than 12 months of the date of the law's entry into force (by no later than 16 September 2017), one or more legislative decrees for implementing recommendation CERS/2011/3 of the European Committee for systemic risk, of 22 December 2011, with regard to the national authorities' macro-prudential mandate. Among the delegation criteria, the aforementioned article of law provides, among other things, for the institution of a Committee for macro-prudential policies, without legal personality, as independent authority designated to conduct macro-prudential policies. Banca d'Italia is expected to belong to this Committee, presiding over it and performing the role of guidance on these policies, joined by the Italian securities and exchange commission (Commissione nazionale per le società e la borsa – CONSOB), the Italian insurance supervisory authority (IVASS) and the supervisory commission for pension funds (Commissione di vigilanza sui fondi pensione – COVIP). The Committee's meetings are also to be attended by the Ministry of the economy and finance, and the antitrust authority (Autorità garante della concorrenza e del mercato – AGCM).

6 Indeed, for some time, within the yearly residential report, data drawn from mortgage registrations have been used (cf. OMI (national real estate observatory), residential real estate report, various years, <http://www.agenziaentrate.gov.it/wps/content/Nsilb/Nsi/Documenta-zione/omi/Pubblicazioni/Rapporti+immobiliari+residenziali/>); an exploration of these data over a set of years is also done in the essay by I. Barbaccia, S. Serafini, *Ciclo immobiliare e ruolo del credito*, published in *Quaderni dell'Osservatorio 2016*, http://www1.agenziaentrate.gov.it/documenta-zione/omi_quaderni/quaderni_2015.pdf

7 Cf. note 3.

THE AVAILABLE INFORMATION

The information that can currently be used by the real estate market observatory regarding mortgage loans refer,⁸ for now, to that drawn from the land registry and pertaining to the mortgage registration and the transcription of the sale, with the deed taking place on the same date of the registration, or in a restricted range of time. In this way, houses are selected that, in a given year, were purchased by taking out a loan with a mortgage on the purchased house itself. Here forward, omitting any other indication, when this work refers to mortgage loans, it will be making reference to this specific form.⁹ This first extraction makes it possible to count the number of houses purchased with loan normalized by share of sold ownership (NTN_IP).

By crossing these data with those from the cadastral archive, it is possible to learn information on the area of these houses purchased with loan (in the form described above). The extraction of this information has been thus far limited only to the years 2012-2015.

From the data on the mortgage registration of the archives of real estate advertising, the following information is available with regard to the 2004-2015 period:

- amount of principal paid for the individual loan;
- interest rate applied to the first instalment of the loan;
- term of the loan at the moment of the mortgage registration.

For the years 2012-2015, with the information on the area of the houses purchased with a loan, as well as the average municipal value per unit of area of the houses, developed based on the real estate observatory's quotations, it was possible to directly estimate the total exchange value at the municipal level of these houses (municipal "turnover" obtained by multiplying the municipal value by the total amount of the area). Below, it will be discussed how the attempt was made to estimate the "turnover" for the years prior to 2012 as well.

The information was aggregated by municipality (average or total amount depending on the variable). As for the municipalities, it is to be underscored that all the municipalities where the tabular cadastre is in force, and therefore the entire autonomous provinces of Trento and Bolzano, as well as Gorizia and Trieste, *are excluded*. Moreover, since, during the considered period, there have been several modifications in the area of existing municipalities (new municipalities have been established both by division and by merging), the attempt has been made to realign the historic series for the municipalities existing in 2015 (with some difficulties and therefore simplifications that at any rate do not compromise the value of the information).

The database was thus constructed in which each municipality is associated with the information on loans (as indicated above), and, limited to 2012-2015, with the turnover. This database was supplemented (using the municipality's identifier as a key) by the one already discussed and referred to and at the end of the introduction. This made it possible to use other information as well, pertaining to each municipality's residential market.

It bears stressing that subsequent analyses were thus based on average municipal data (or total, depending on the variable) and this necessarily entails strongly reduced spread. However, to grasp the differences by broad territorial aggregations, this level of detail of the database is wholly sufficient.

⁸ At the moment of writing. In fact, for some time, additional developments have been underway, aimed at investigating the entire universe of mortgage loans.

⁹ In fact, houses may be purchased with loans secured by mortgage on other kinds of real property. However, this is a less important mode. According to some initial elaborations, in fact, house purchases with loan backed by other properties (other than the purchased house) represent only 1.4% of the total of purchased houses.

NATIONAL SUMMARY: HOUSING UNITS PURCHASED WITH LOAN BY NATURAL PERSONS

As already discussed in the previous paragraph, in this work the housing units that are the object of analysis are only those purchased and for which a mortgage guaranteeing the loan paid out was registered at the same time.

Table 1 summarizes the data available on a national level (again excluding those regarding the municipalities with tabular cadastre) referring to the 2004-2015 period.

The trends described in Table 1 clearly show how the number of houses purchased (NTN_IP) with loan and with mortgage registered on the same purchased house (hereafter, this condition will not be specified, as it will be taken as implicit) has followed the trend on the Italian residential market: a growth phase until 2006 and a significant decrease since 2007, stabilizing in 2010-2011 and precipitating in the 2012-2013 period, and then beginning a slow recovery starting in 2014 (in particular, in 2016 the recent reports of the real estate market observatory show a more sustained recovery).

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
NTN_IP (number of real estate units)	357,206	389,383	404,017	368,739	270,065	240,853	263,587	251,659	154,426	142,648	160,762	192,219
CAPITAL PAID (in billions of €)	37.86	45,13	50.35	47.14	34.32	31.17	35.88	34.11	19.51	17.45	19.18	22.92
CAPITAL PAID PER UNIT (in €)	106,003	115,904	124,624	127,847	127,085	129,404	136,129	135,531	126,363	122,307	119,336	119,265
INTEREST RATE (for first instalment)	3.68%	3.67%	4.33%	5.32%	5.55%	3.68%	2.73%	3.37%	4.25%	3.94%	3.40%	2.75%
DURATION (years – average)	19.54	20.87	22.37	23.23	23.24	22.93	23.20	23,41	22,90	22,60	22,61	22,52
YEARLY INSTALMENT (average in €)	7,705	8,047	8,811	9,714	9,863	8,454	7,996	8,463	8,738	8,277	7,648	7,172

Table 1 National summary - NTN_ip. Capital, Rates, Duration, Instalment
Source: real estate market observatory (OMI) – Agenzia delle entrate

The trend in the other variables indicated in the summary in comparison with the NTN_IP trend is shown in the graphs in Figure 4 below.

Analysis of the individual graphs shows that as a rule, the NTN_IP is influenced inversely to the interest rate, with the considerable exception of the 2008-2009 period when, in the presence of strongly reduced interest rates, the NTN_IP also fell sharply.

The duration of the loans showed growth through 2007 (about 23 years), then holding substantially steady (between 22 and 23 years).

On the other hand, the capital extended on average per housing unit purchased by loan tended to increase until 2010-2011, followed by a relative fall.

Of course, both the duration and the extended capital also depend on the purchase values, in addition to the banking policies that may be summed up as loan to value (LTV), the latter itself influenced by the trends in prices, and in part by the discretionary choices of credit institutions, and the central bank's monetary policies.

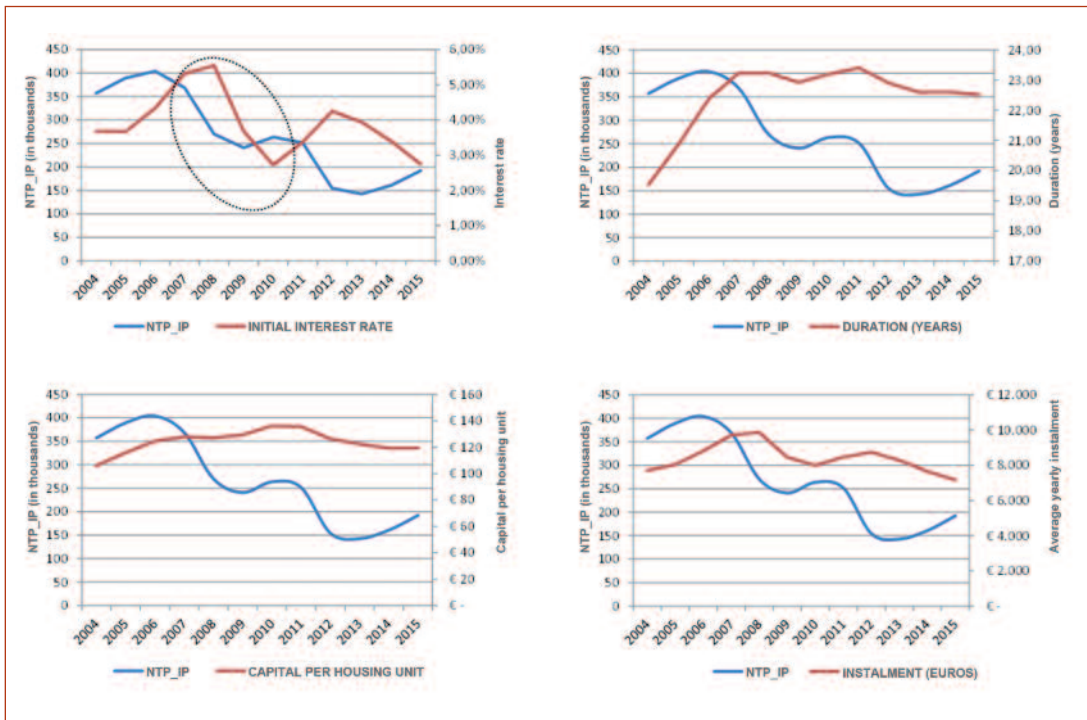


Figure 4 Interest rate, duration, capital paid out per mortgaged housing unit, and average instalment
 Source - our processing of data from OMI-Agenzia delle entrate

Lastly, the average yearly instalment is a synthesis of the trend of the interest rate, of the duration, and of the capital paid out per housing unit.

Behind this information, however, lies a variety of local and economic situations should the descriptive analysis go to a level of greater detail.

For the purposes of this article, some *sub*-national aggregations of certain data set out in Table 1 will be examined.

SIZE AND DYNAMICS OF LOCAL MARKETS

Real estate markets, as already discussed in the introduction, are certainly influenced by macroeconomic variables, also of an international nature, given the closely interconnected markets, but are at any rate affected by the particular “fixity” on the territory of the specific object of the exchange. Consequently, local variables, and specific territorial structures (urban size, demographics, accumulated wealth, proneness for tourism, local urban policies, road infrastructure, and so on), have considerable importance in explaining the variabilities within the paths of the real estate cycle shaped on the macroeconomic level. Credit policies and loan payment policies are also affected by local conditions. An initial perspective from which the variables in Table 1 may be analyzed is their trend with respect to two distinct aggregations.¹⁰ The first refers to a classification of the Municipalities in terms of size of the houses’ overall exchange value (“turnover”) and we call it the market’s size variable. The second also refers to a classification of Municipalities, but with regard to the market’s dynamics in terms of housing units sold, with respect to existing stock.

The *size variable* borrows the categories used for T-shirt sizes (SMALL, MEDIUM, LARGE, EXTRALARGE).¹¹ The *dynamics* variable, on the other hand, was *clustered* in five groups (ABSENT/SCARCE; WEAK; AVERAGE; CONSIDERABLE; STRONG) in accordance with a substantially empirical method.¹²

¹⁰ The classification adopted for each Municipality in the aforementioned G. Guerrieri, *Livello e andamento dei valori di mercato...*, op.cit. is cited.

¹¹ In particular, the “turnover” of each Municipality was first estimated, based on the corresponding sold area of the houses and on the average municipal real estate market observatory quotation; then the “turnover” for the entire 2002-2015 period was added up for each Municipality and for the national total, and lastly, each Municipality’s share of the total “turnover” compared to the total national one was calculated. The market “sizes” were then identified based on the parameters indicated in the second column of the following statement (the number of Municipalities by size is also reported).

MARKET SIZE	TURNOVER CLASS SHARE, 2000-2015	No. of municipalities
SMALL	$\leq 0.02\%$	6.785
MEDIUM	$> 0.02\% \text{ e } \leq 0.05\%$	555
LARGE	$> 0.05\% \text{ e } \leq 0.4\%$	264
EXTRA-LARGE (*)	$> 0.4\%$	15
Totale		7.619

Source: G. Guerrieri *Livello e andamento dei valori di mercato...*, op.cit., pg.23;

(*) A possible variant would be that of excluding the Municipalities of Milan and Rome, and of considering them separately, because they each represent a market share considerably detached from that of the other members of the EXTRALARGE category; this option was not considered in this exercise.

¹² According to G. Guerrieri *Livello e andamento dei valori di mercato...*, op.cit., note 23, p.24: “The average of the all municipalities’ ratios between average turnover and average housing stock value, both regarding the entire period 2000-2015, equals 1.49%, with a standard deviation equal to 0.69%. The discrimination thresholds were assumed as equal by subtracting and adding part of the standard deviation according to the following grid (defining as R_j the aforementioned ratio between average turnover and value of average housing stock of the j -th municipality, with M as the national average and $DVSTD$ the corresponding standard deviation):

	absent/scarce	Weak	average	considerable	Strong
Threshold criterion	$M - DVSTD/2$	$M - DVSTD/4$	$M + DVSTD/4$	$M + DVSTD/2$	
R_j	$R_j \leq 0.97\%$	$0.97\% < R_j \leq 1.32\%$	$1.32\% < R_j \leq 1.66\%$	$1.66\% < R_j \leq 2.01\%$	$R_j > 2.01\%$
n. comuni	1,669	1,177	1,453	1,831	1,489

The definition of these thresholds, aimed at judging the local market’s intensity and dynamics in terms of the ratio between average value of what is sold and the average economic value of the whole stock, is by all means wholly empirical. Considerations of purely subjective value could be chosen or, as was chosen in the end, they could be anchored by central classes (“weak,” “average,” “considerable”) at intervals of equal amplitude, defined substantially on the basis of the distribution of the variable R . There is complete awareness that this classification is, in any event, as just pointed out, wholly empirical. Nevertheless it still makes it possible to discriminate the local markets on the basis of their specific dynamics.”

Classifying the Municipalities in the above terms made it possible to analyze the trends of the sales made with mortgage loans in accordance with this dual vantage point. Tables 2, 3, and 4 below respectively show, with regard to the various market sizes, the index number (2004=100) of the housing units purchased with loan (NTN_IP), of those unaided by loan (NTN_NO IP), and the total index number of the housing units purchased by natural persons (NTN PF). Lastly, the graph in Figure 5 shows the trends of the NTN (total, with loan and without), as well as the percentage incidence of NTN_IP on NTN PF.

MARKET SIZE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SMALL	100.0	111.5	118.0	109.3	79.3	67.7	71.2	66.9	40.0	35.3	38.5	45.7
MEDIUM	100.0	109.4	116.9	108.1	79.1	70.5	75.7	71.7	44.4	40.9	45.6	54.9
LARGE	100.0	107.4	111.3	100.8	74.0	67.9	76.0	72.8	44.5	41.3	47.4	56.9
EXTRALARGE	100.0	106.5	103.7	91.8	68.3	63.5	73.3	72.1	45.8	45.0	52.1	62.2
National total	100.0	109.0	113.1	103.2	75.6	67.4	73.8	70.5	43.2	39.9	45.0	53.8

Table 2 N. index (2004=100) NTN_IP - Source: OMI-Agenzia delle entrate

MARKET SIZE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SMALL	100.0	99.8	100.5	96.3	91.4	81.7	75.1	75.1	62.9	55.9	54.5	52.8
MEDIUM	100.0	100.8	99.6	95.4	88.2	79.6	73.9	72.9	62.5	56.1	54.5	53.4
LARGE	100.0	96.7	95.9	91.7	87.9	78.2	76.0	76.9	63.7	57.3	57.1	57.2
EXTRALARGE	100.0	98.4	92.5	86.2	84.3	79.0	79.5	83.4	75.1	69.8	71.8	70.2
National total	100.0	98.9	97.8	93.3	88.7	79.9	75.8	76.5	65.1	58.6	58.0	56.9

Table 3 Index number (2004=100) NTN_NO IP - Source: OMI-Agenzia delle entrate

Market size	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SMALL	100.0	104.9	108.1	102.0	86.1	75.6	73.4	71.6	53.0	47.0	47.5	49.7
MEDIUM	100.0	104.9	107.8	101.4	83.9	75.3	74.7	72.4	53.9	48.9	50.3	54.1
LARGE	100.0	101.8	103.2	96.0	81.3	73.3	76.0	74.9	54.6	49.7	52.5	57.1
EXTRALARGE	100.0	102.6	98.3	89.1	76.0	70.9	76.3	77.5	59.9	56.9	61.5	66.0
National total	100.0	103.7	105.0	98.0	82.6	74.1	74.9	73.7	54.8	49.9	51.9	55.5

Table 4 Index number (2004=100) NTN PF - Source: OMI-Agenzia delle entrate

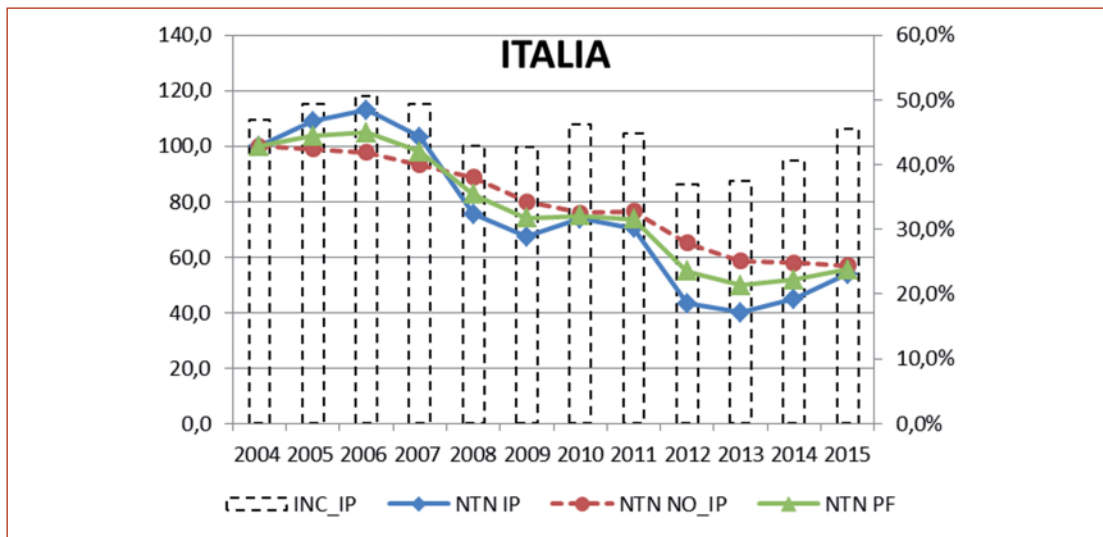


Figure 5 NTN_IP, NTN_NO IP and NTN PF index numbers; % incidence, NTN_IP
 Source: our processing of OMI-Agenzia delle entrate data; at left, the measurement of the index number, and at right the measurement of the percentage incidence of NTN_IP on NTN PF.

It is to be observed that the trends of purchases unaided by a loan are constantly and linearly falling during the period under consideration, aside from a brief pause in 2011. The curve of the trend of total purchases (NTN PF) thus depends essentially on those done with the financing of a mortgage loan (NTN_IP).

It is to be taken into consideration that the percentage (INC_IP) of houses purchased with a loan out of the total has oscillated between a maximum of 50% in 2006 and a minimum of 37% in 2012 (bar chart with dotted bars in Figure 5, and values on the right vertical axis).

These trends, albeit with a few differences, show strong analogies between the different market dimensions, as may be observed in Figure 6 below.

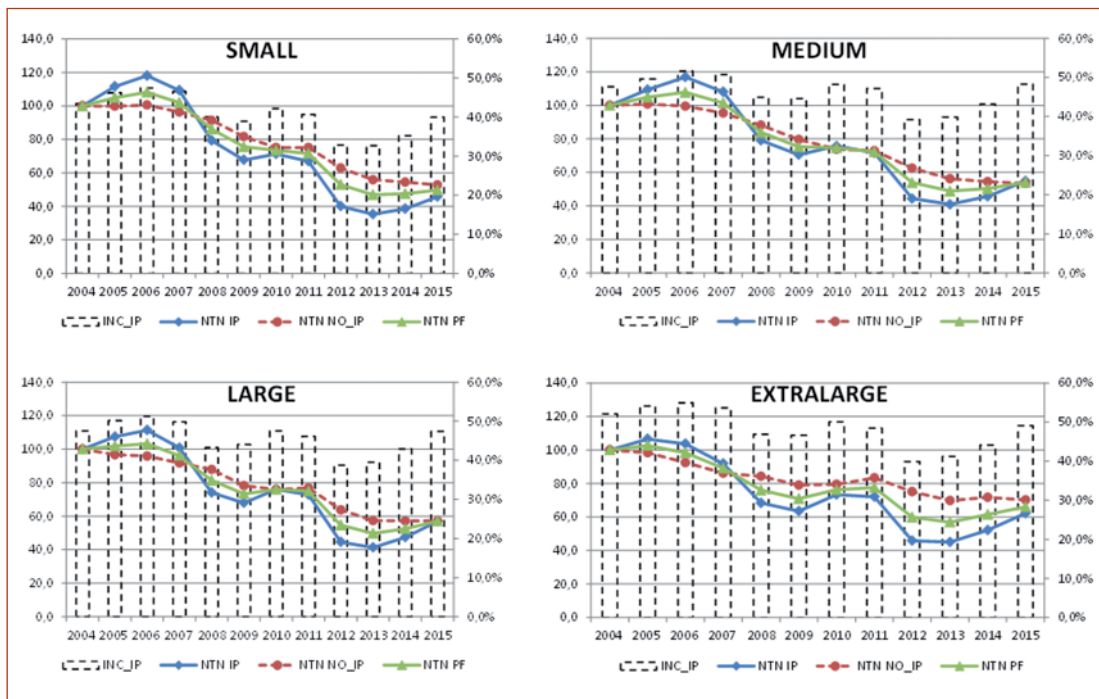


Figure 6 N. NTN and INC indices NTN_IP (% incidence) by market size
 Source: our processing of OMI-Agenzia delle entrate data; at left, the measurement of the index number, and at right the measurement of the percentage incidence of NTN_IP on NTN PF.

On the other hand, the percentage incidence of houses purchased with mortgage loan out of the total (NTN_IP in relation to NTN PF), calculated as an unweighted average of the entire fifteen-year period, equals 40.5% for the SMALL size, 46.2% for MEDIUM, 45.7% for LARGE, and 48.4% for EXTRALARGE. In particular the relative lower incidence recorded for SMALL leads, in this market size, to a slightly lower dependence of the overall cycle on sales (NTN PF) from the purchases financed with loan. The converse takes place in the EXTRALARGE size where, in fact, the incidence of purchases of loans is relatively greater. Table 5 shows the percentage incidence of NTN_IP out of total NTN PF.

MARKET SIZE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
SMALL	43.5	46.2	47.4	46.6	40.0	38.9	42.2	40.6	32.8	32.7	35.2	40.0
MEDIUM	47.6	49.6	51.6	50.7	44.9	44.6	48.2	47.2	39.2	39.8	43.2	48.3
LARGE	47.5	50.1	51.2	49.9	43.3	44.0	47.5	46.1	38.7	39.5	42.9	47.4
EXTRALARGE	52.1	54.1	54.9	53.7	46.9	46.6	50.1	48.4	39.9	41.2	44.1	49.1
National average	46.9	49.3	50.5	49.4	42.9	42.7	46.2	44.8	37.0	37.5	40.6	45.5

Table 5 INC_IP - NTN_IP incidence on NTN PF (percentages) by market size
 Source: our processing of OMI-Agenzia delle entrate data

Through 2006, the level of incidence of purchases with loans certainly rose with the growth of the market size. Subsequently, the LARGE size was at a level systematically lower than the MEDIUM size class. In 2015, SMALL showed the minimum, with 40% of houses purchased with mortgage loan, while EXTRALARGE reached about 49%. For all sizes, there was a drastic drop in the incidence during the 2012-2013 period.

If the same variables are observed from the vantage point of the market's dynamics, the results are slightly different, and depend of course on the different incidence of sales made with loan in the different clusters. Figure 7 reports the trends of the NTNs (NTN PF; NTN_IP; NTN_NO IP) and the percentage of NTN_IP out of NTN PF for each cluster related to the residential market's dynamics in the municipalities.

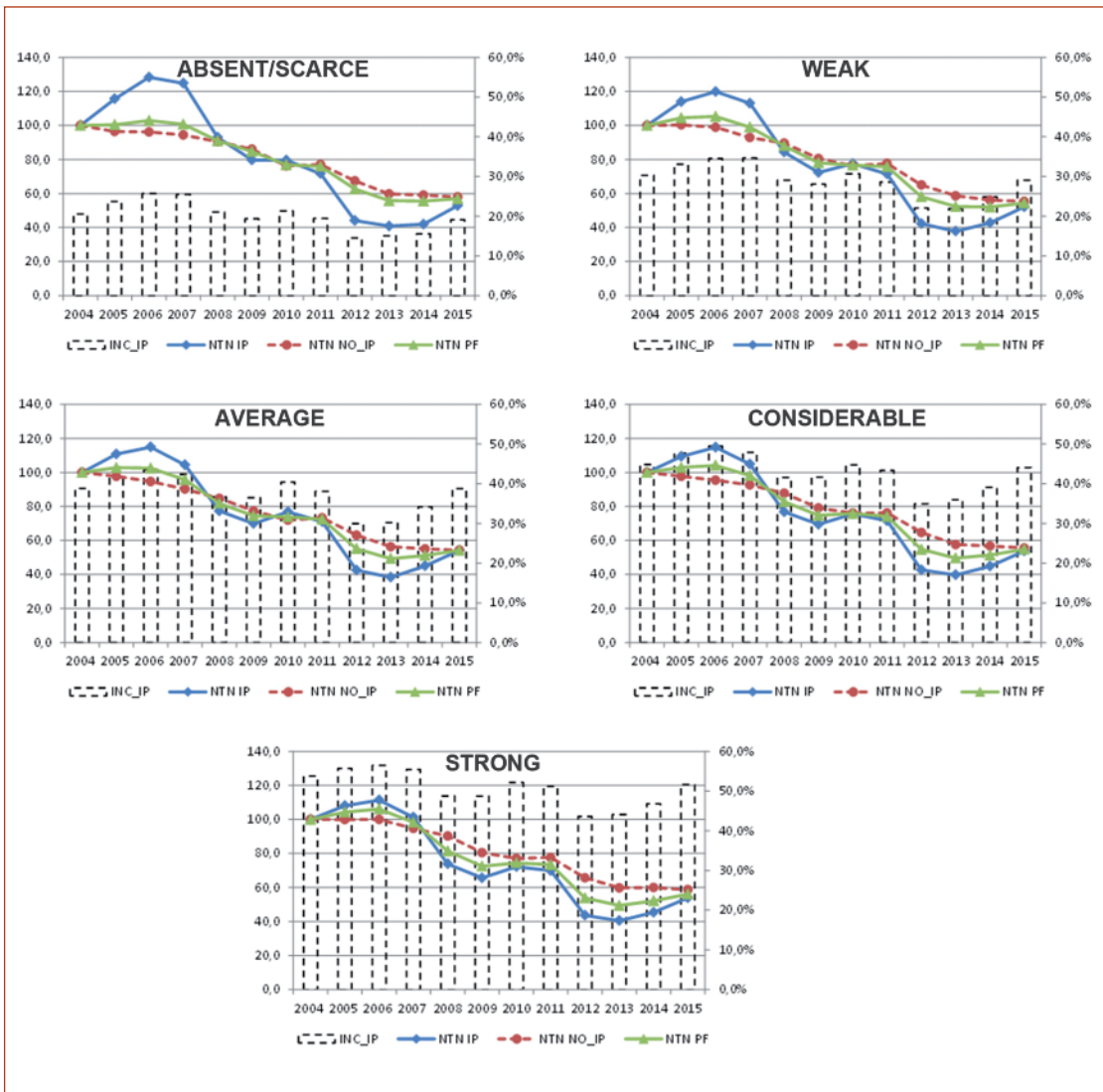


Figure 7 N. NTN and INC_IP indices by market dynamic - Source: our processing of OMI-Agenzia delle entrate data; at left, the measurement of the index number, and at right the measurement of the percentage incidence of NTN_IP on NTN_PF

As may be observed, the curves of the overall sales of houses depend on those related to sales supported by mortgage loan, to a degree that grows with the increased dynamics of the reference market. Where the dynamic is ABSENT/SCARCE or WEAK, the NTN PF curves are in line with the NTN_NO IP ones, although large curves are present in the NTN_IP trend.

As already stated, this depends substantially on the incidence of purchases with mortgage loan out of the total (INC_IP =NTN_IP in relation to NTN PF). In effect, this incidence (hereforward, INC_IP), calculated as an unweighted average for the entire fifteen-year period, is particularly diversified among the different dynamics clusters: it equals about 20% for SCARCE/ABSENT, about 29% for WEAK, 37.6% for the AVERAGE cluster, 43% for the CONSIDERABLE cluster, and lastly approximately 51% for the STRONG cluster.

In this case as well, as shown in Table 6, the INC_IP trend is therefore relatively stable over time for any market dynamic.

MARKET DYNAMIC	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ABSENT/SCARCE	20.6	23.7	25.7	25.5	21.0	19.3	21.3	19.4	14.5	15.0	15.5	19.1
WEAK	30.3	33.1	34.5	34.6	29.1	28.1	30.7	28.6	22.0	21.9	24.9	29.1
AVERAGE	38.8	41.9	43.5	42.4	36.7	36.5	40.4	38.1	30.0	30.2	34.2	38.8
CONSIDERABLE	44.9	47.7	49.5	47.9	41.6	41.7	44.7	43.3	34.9	36.0	39.1	44.1
STRONG	53.8	55.7	56.4	55.4	48.8	48.7	52.1	51.2	43.6	44.1	46.8	51.7
National average	46.9	49.3	50.5	49.4	42.9	42.7	46.2	44.8	37.0	37.5	40.6	45.5

Table 6 INC_IP (percentages) by market dynamic
 Source: our processing of OMI-Agenzia delle entrate data

The cluster of the market dynamic showing at any rate the greatest variability, measured with the variation coefficient, is ABSENT/SCARCE. In this case as well, the 2012-2013 period saw a drastic decline in INC_IP. The amount of the reduction, however, is relatively less homogeneous, since it ranges from five points less for the ABSENT/SCARCE dynamic to the approximately eight points less found for AVERAGE, CONSIDERABLE, AND STRONG.

Beyond the variability over time of INC_IP, what appears relevant and to some degree permanent is the structural difference of the INC_IP level's between the dynamic's different clusters. This is quite visible in Figure 8 below, which graphs the differentials from the national average of INC_IP values reported in Table 6, and the amplitude of the standard definition.

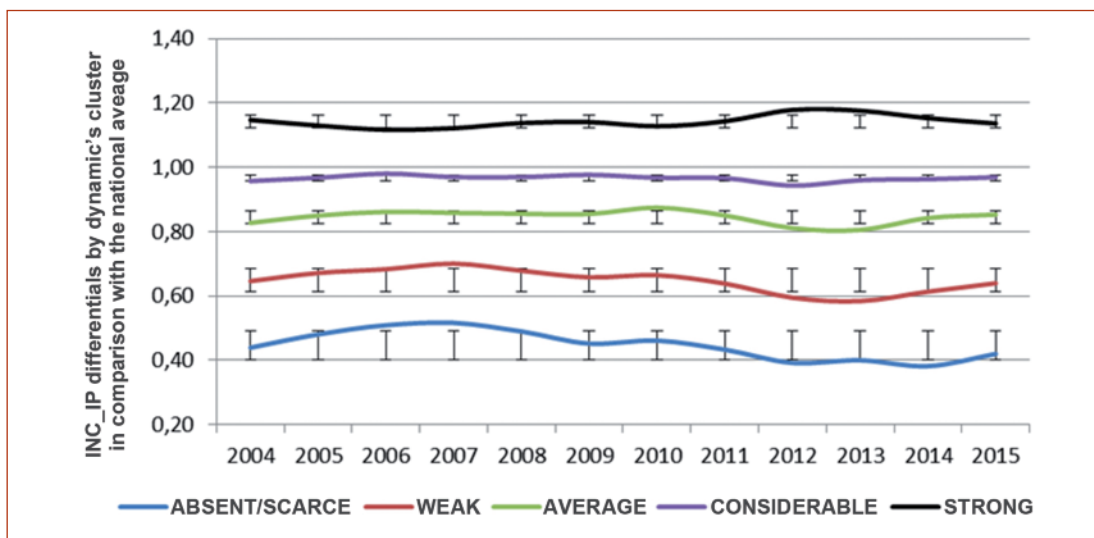


Figure 8 INC_IP differentials by dynamic's cluster in comparison with the national average
Source: our processing of OMI-Agenzia delle entrate data

The differentials are rather stable over time. A greater variability is found for the STRONG and CONSIDERABLE dynamics, but in each case the INC_IP levels remain permanently in decreasing order as the market dynamic grows.

To a certain degree, this facilitates the analysis, since reference may be made even to a single year in order to investigate those relevant, local aspects that can influence the various INC_IP levels. For example, it may be supposed that as the market dynamic increases, such conditions are created, both on the price side (for the purchaser) and from the insolvency risk side (for the credit institution extending the loan), by which it may be easier for the purchaser to have own capital for the purchase of the house, and at the same time less convenient for the credit institution to make the necessary capital available because, should a situation of insolvency arise, the low local market dynamics would make the mortgaged asset de facto illiquid.

The analysis continues by considering 2012, which is the year of greatest crisis in the residential sector.

MARKET DYNAMICS, DEMOGRAPHIC CLASS, AND GEOGRAPHIC AREA.

Before proceeding with additional analysis, it should be verified to what degree, as regards the INC_IP variable, the dynamic’s clusters are interrelated with other variables, such as the municipality’s demographic class, and the geographic area they belong to. In this regard, reference may be made to Figure 9 (dynamics and demographic class) and Figure 10 (dynamics and geographic area). The figures’ graphs are constructed by setting for the various vertical lines the attribute of the demographic class or geographic area, and the INC_IP values for the dynamic’s various attributes are positioned on them. For example, in the graph in Figure 9, the first vertical line relates to the “up to 5,000 inhabitants” demographic class, and the INC_IP values for this demographic class’s different dynamic clusters are arranged on that line.

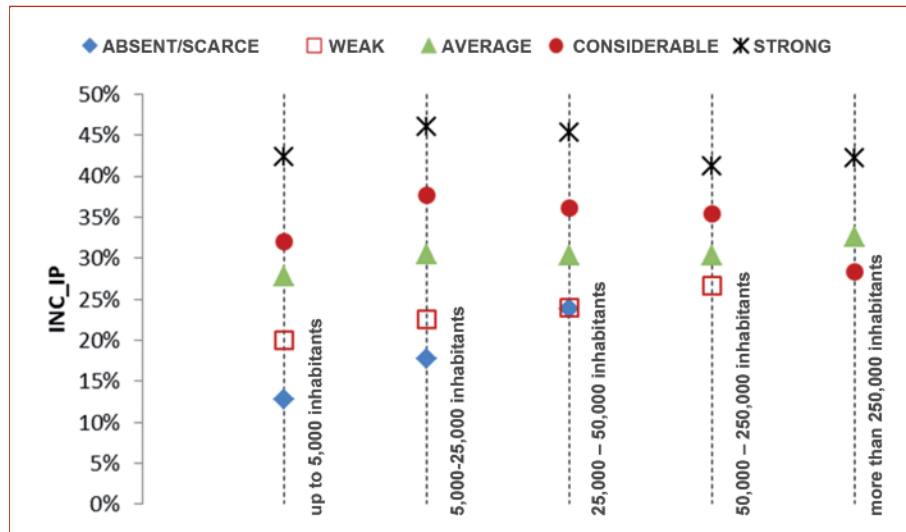


Figure 9 INC_IP by dynamic and demographic class (2012)
 Source: our processing of OMI-Agenzia delle entrate data

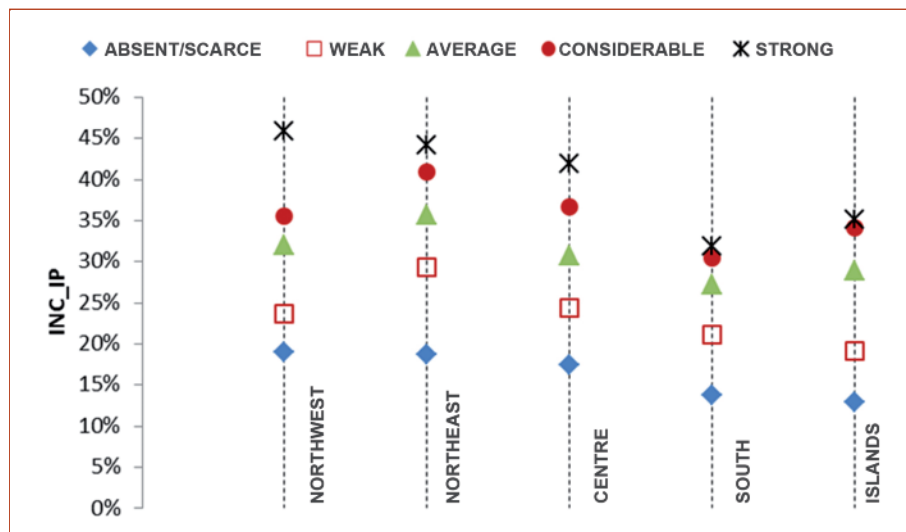


Figure 10 INC_IP by dynamic and geographic area (2012)
 Source: our processing of OMI-Agenzia delle entrate data

Figure 9 shows first of all that the INC_IP values, in each demographic class, generally rise as the dynamic rises. Secondly, the spread of INC_IP values in the various dynamic clusters tends to be reduced as the demographic class rises. Lastly, the INC_IP levels, dynamic clusters being equal, present a relative stability as the demographic class varies, except for the ABSENT/SCARCE and WEAK dynamic clusters, for which the values rise significantly as the demographic class rises.

According to Figure 10, if we find INC_IP values growing for all the geographic areas as the dynamic rises, the spread of these values tends to be less accentuated, even if it appears greater for the centre-north areas than in the south and on the islands. In this case, in fact, the INC_IP levels, the dynamic clusters being equal, are clearly less in the SOUTH and on the ISLANDS than in the other areas of the country.

It may be concluded that the two considered variables have a certain influence over INC_IP: the demographic class with respect to the ABSENT/SCARCE dynamic and the geographic area that shows for the SOUTH lower INC_IP levels for all the dynamic's clusters. In both cases, this is probably due to a price effect that tends to be greater as the demographic class rises, and sharply falls for the areas of the SOUTH and of the ISLANDS (see Prospects 1 and 2)

Demographic class	AVERAGE NTN PF VALUE, 2012 (euro)
Up to 5,000 inhab.	116,516
5,000-25,000 inhab.	146,885
25,000-50,000 inhab.	161,417
50,000-250,000 inhab.	172,622
Over 250,000 inhab.	281,044
National average	173,730

Prospect 1 Average value of houses sold by natural persons, by demographic class

Geographic area	AVERAGE NTN PF VALUE, 2012 (euro)
NORTHWEST	177,359
NORTHEAST	172,193
CENTRE	231,545
SOUTH	131,342
ISLANDS	120,988
National average	173,730

Prospect 2 Average value of houses sold by natural persons, by geographic area

Therefore, an initial hypothesis is that the local differences analyzed by dynamic clusters, by demographic class and by territorial area relate the reasons for the various INC_IP measures to the various levels of price per housing unit (which are obviously affected by the average values per unit of area and by the average area of the house). In effect, the latter, at least in part, determine both the absolute amount that may potentially be paid with the loan, and the greater possibility, where prices are lower, to be able to do without financing.

The following graphs relate the variable INC_IP with the difference between the average value of the house purchased with a loan and that referring to the house purchased without a mortgage (and correlated loan). It must first be observed that this difference is always positive. At the national average level, the deviation equals 25,000 euros, which is to say the houses purchased without mortgage are purchased on average at a price 13% below those purchased with loan.

This difference may at any rate vary depending on the local factors taken into consideration (market dynamics, demographic class, or geographic area).

Table 7 and the graph in Figure 11 show the relationship between INC_IP and the aforementioned difference between the average values of the houses ("Diff. VALAB").

The absolute amount of Diff. VALAB is much larger for the ABSENT/SCARCE dynamic cluster and measures as a percentage a deviation on the order of 1/3, which is to say the average value of a house purchased unsupported by a loan is on average one third lower than that of the house purchased with a loan. In the second place, Diff VALAB decreases as the dynamic and the incidence of purchases with loan on the total of purchases grow. Therefore, the positive correlation found between dynamic and INC_IP is explained by the falling trend (as the dynamic rises) of the differential between the average value of the house purchased with a loan in comparison with that of the purchase without a loan. In essence, where there is, for example, market ABSENCE/SCARSITY, houses can be purchased at prices that are on average lower, which make it possible to purchase without a loan; where, even in this dynamic cluster, prices exceed a certain threshold (a threshold that will depend on the conditions in which actual demand may be expressed in terms of expected income and accumulated savings), purchasing with loan may be relied on (about 14% of the cases, as INC_IP shows).

Market dynamic	VALAB (€) NTN_IP 2012	VALAB (€) NTN_NO IP 2012	INC_IP 2012	Diff VALAB 2012
ABSENT/SCARCE	125,543	84,533	14%	41.010
WEAK	133,934	104,569	22%	29.365
AVERAGE	159,444	137,362	30%	22.083
CONSIDERABLE	172,580	160,431	35%	12.149
STRONG	206,536	196,925	44%	9.612
National average	189,557	164,453	37%	25.104

Table 7 INC_IP and Diff. VALAB by market dynamic (2012) - Source: our processing of OMI-Agenzia delle entrate data

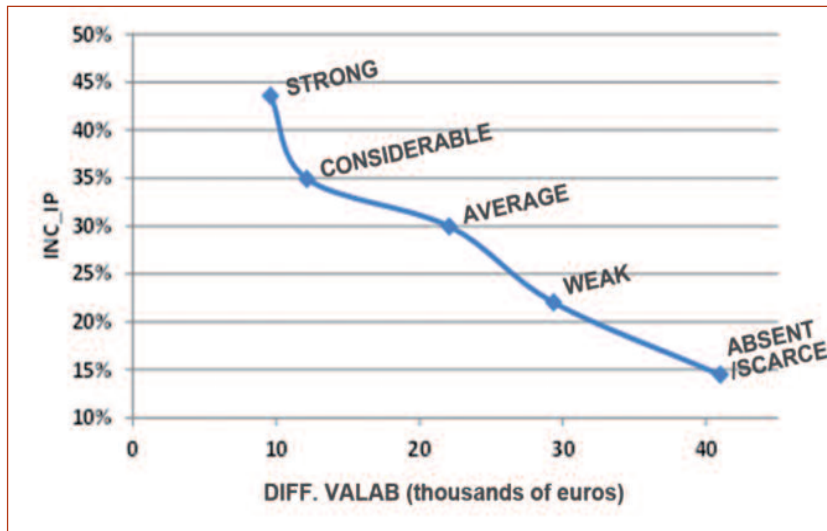


Figure 11 INC_IP and Diff VALAB by market dynamic (2012)

The same table and the same graph are presented again by demographic class (Table 8 and Figure 12). In this case, there is no clear relationship between demographic class, Diff. VALAB and INC_IP. It is only pointed out that the over 250,000 inhabitants class is associated with the maximum value of Diff VALAB and INC_IP. This is likely to depend on the greater heterogeneity of prices for houses for which, as they are normally more expensive, there is more frequent reliance on a loan, and those that are not backed by loan must record prices on average lower in order to complete their purchase.

Market dynamic	VALAB (€) NTN_IP 2012	VALAB (€) NTN_NO IP 2012	INC_IP 2012	Diff. VALAB 2012
Up to 5,000 inhab	133,052	109,819	28,8%	23,234
5,000-25,000 inhab.	156,494	140,901	38,4%	15,592
25,000-50,000 inhab.	172,602	154,515	38,2%	18,087
50,000-250,000 inhab.	183,371	166,118	37,7%	17,253
Over 250,000 inhab.	298,961	269,149	39,9%	29,812
National average	189,557	164,453	37,0%	25,104

Table 8 INC_IP and Diff. VALAB by demographic class (2012) - Source: our processing of OMI-Agenzia delle entrate data

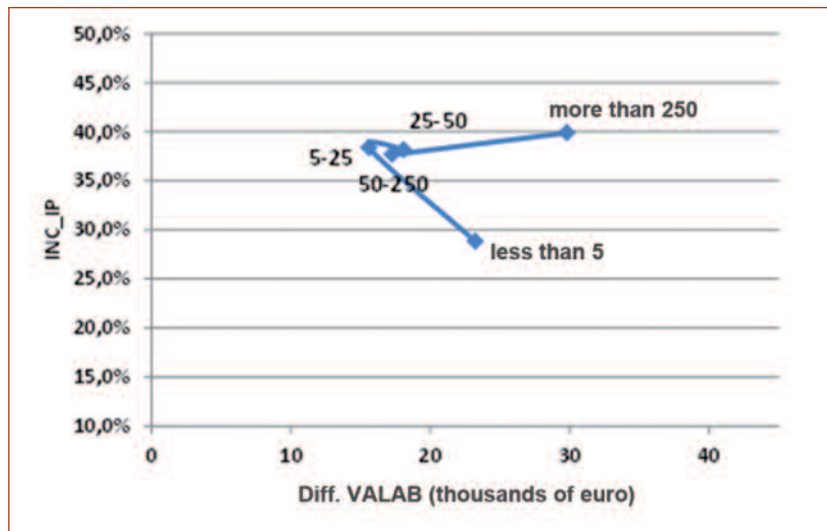


Figure 12 INC_IP and Diff VALAB by demographic class in thousands (2012)

On the other hand, a closer correlation is found (Table 9 and Figure 13) when considering the geographic area of the property's location, along with two other variables (INC_IP and Diff. VALAB). In fact, a low incidence and high Diff. VALAB are recorded for the SOUTH and the ISLANDS, an intermediate situation for the CENTRE, and, to the contrary, a high incidence and low Diff. VALAB for the NORTH (NORTHEAST and NORTHWEST show an almost equivalent INC_IP and a Diff. VALAB higher in the NORTHWEST than in the NORTHEAST).

Market dynamic	VALAB (€) NTN_IP 2012	VALAB (€) NTN_NO IP 2012	INC_IP 2012	Diff. VALAB 2012
NORTHWEST	184,589	172,045	42%	12,544
NORTHEAST	175,896	169,507	42%	6,389
CENTRE	247,978	221,332	38%	26,646
SOUTH	153,099	123,567	26%	29,531
ISLANDS	142,926	112,619	28%	30,308
National average	189,557	164,453	37%	25,104

Table 9 INC_IP and Diff. VALAB by geographic area (2012) - Source: our processing of OMI-Agenzia delle entrate data

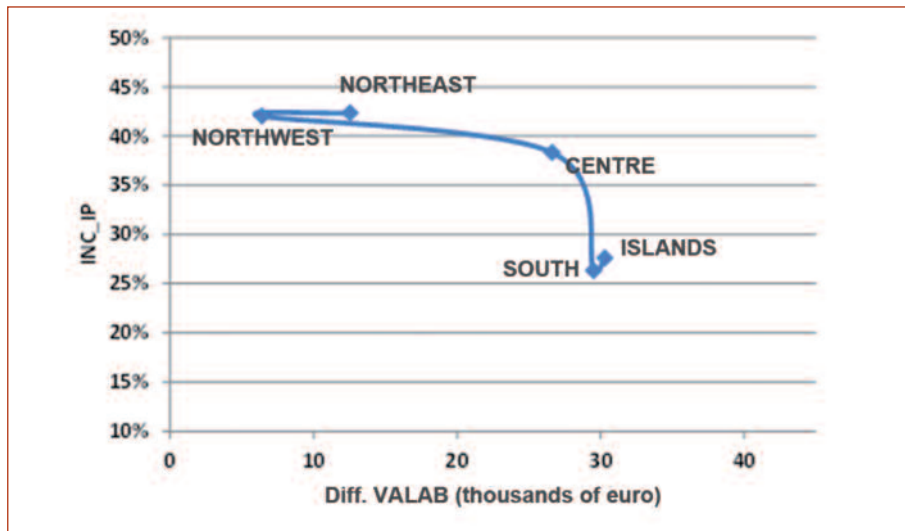


Figure 13 INC_IP and Diff VALAB by geographic area (2012)

MARKET VALUES: INC_IP BY VALUE CLASSES (2012; 2015)

The previous paragraph argued that the variability of INC_IP depends on the different values of the houses found on the territory. Figure 14 therefore reports the different levels of incidence of the number of houses purchased with loan out of the total (INC_IP) in relation to the distribution by deciles of the municipalities in order increasing with the rise of the average municipal value of the houses purchased with loan (VALAB), for the years 2012 and 2015. It is interesting to note how the INC_IP trend is rather similar between the two years for each decile, showing only that 2015's INC_IP in comparison with 2012's is systematically higher for each decile (although the divergence between the INC_IPs between the two years tends to rise as the deciles increase).

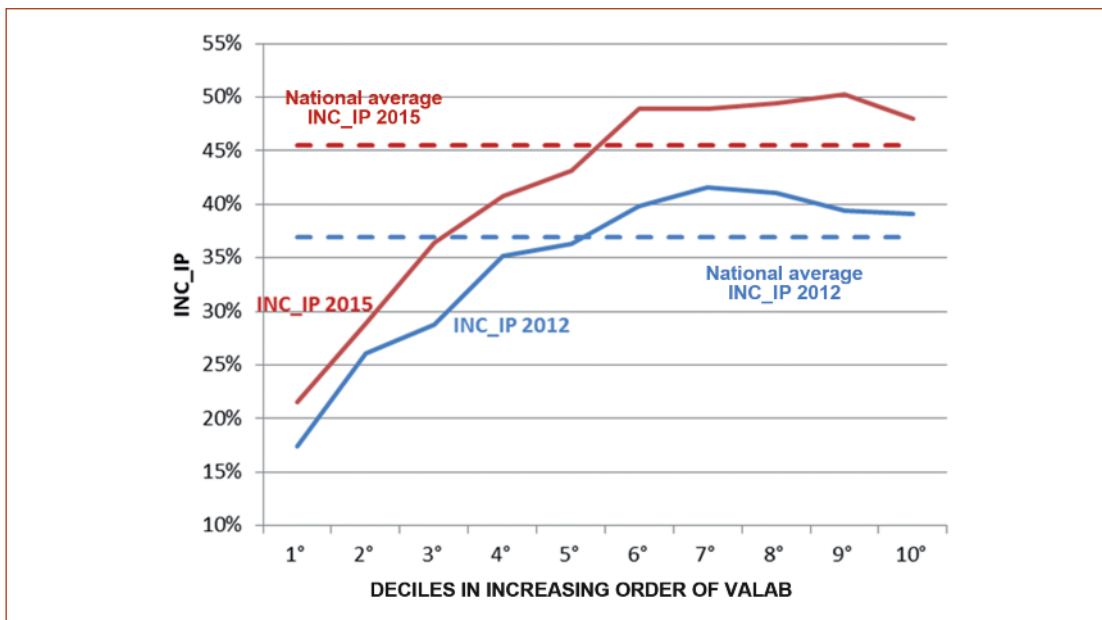


Figure 14 INC_IP by deciles of the municipalities in order increasing with the rise of the average municipal value (VALAB) of the houses purchased with loan - Source: our processing of OMI-Agenzia delle entrate data

The other element of interest is that the INC_IP is increasing up to the 7th decile (which groups together the Municipalities with VALAB between the rounded figures of € 138,800 and € 150,500), and then holds relatively steady (the maximum difference between the INC_IPs beyond the 7th decile is on the order of two percentage points). The maximum number of sold residential units belonging to the deciles above the 7th (regardless of whether with or without loan) equals 59% of the total number of purchased houses (60% in 2015). Therefore, for about 2/5 of sales, reliance on loan (measured by INC_IP) is closely correlated to the prices; once the threshold corresponding to the 7th decile is overcome, this correlation attenuates and reverses in the highest decile.

This same graphic analysis was done only for 2012, with reference to the geographic area (aggregating the CENTRE-NORTH on the one hand and the SOUTH on the other) and to the market dynamic.¹³

¹³ In this, the distribution by decile is done on the national level. For each decile, the datum by considered territorial area (Centre-North and South-Islands) was then disaggregated in order to calculate the level of INC_IP of each sub-area. In other terms, the national average of INC_IP (dotted line) for each decile represents the weighted average of the INC_IP level of the two sub-areas. The lines' trend (the dotted line moves further from the South-Islands line as the deciles rise) shows that the frequency by decile of the municipalities of the South-Islands falls as the VALAB (and therefore deciles) grows.

Figure 15 shows that the threshold decile above which INC_IP is no longer strongly correlated with the growth in the house's average value is the 6th decile, both for the CENTRE-NORTH and for the SOUTH (and ISLANDS). Moreover, but to a somewhat lesser degree, the INC_IP level is systematically higher in the CENTRE-NORTH than the SOUTH (and ISLANDS), regardless of the considered decile.

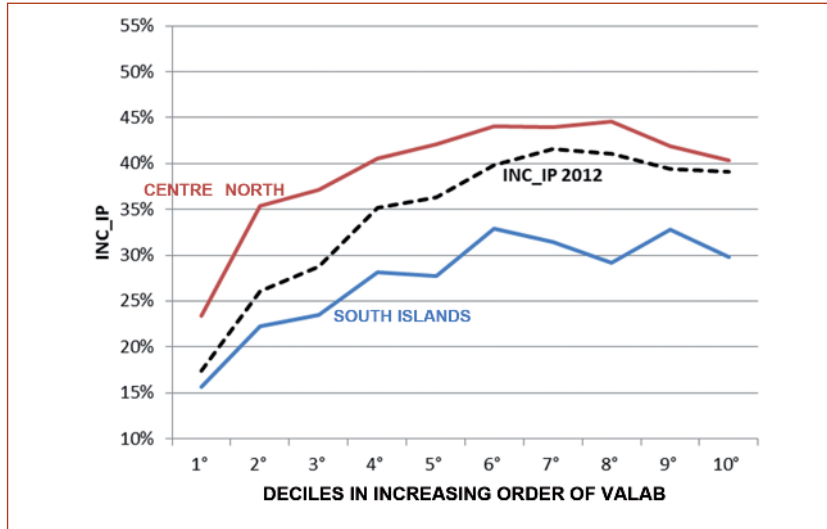


Figure 15 INC_IP by deciles of the municipalities in order increasing with the rise of the average municipal value (VALAB) of the houses purchased with loan in the Centre-North and in the South including the Islands (2012)
 Source: our processing of OMI-Agenzia delle entrate data

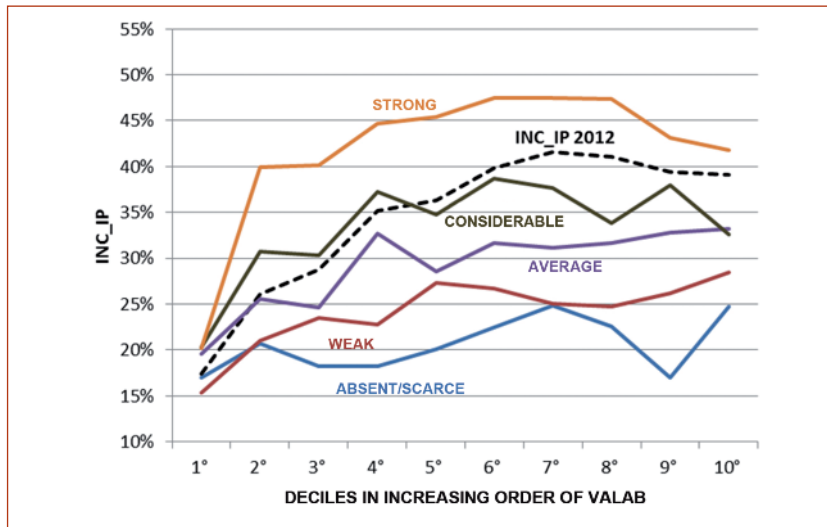


Figure 16 INC_IP by deciles of the municipalities in order increasing with the rise of the average municipal value (VALAB) of the houses purchased with loan in relation to the market dynamic (2012)
 Source: our processing of OMI-Agenzia delle entrate data

The situation differs slightly if the same analysis is done with regard to the market dynamic (see Figure 16)¹⁴

In this case the 7th decile threshold (VALAB between € 138,800 and € 150,500) is significant only for the STRONG dynamic cluster. For the other classes, the relationship between INC_IP and the municipalities in order increasing with the rise of VALAB is more fluid and less determined. To draw an example, for the cluster of the AVERAGE dynamic, the highest INC_IP is found at the 10th decile (33.2%), but two peaks are found at the 4th and 9th decile (32.7% in both cases).

In brief, the situation may be summarized as follows.

- a) the houses purchased with loan having the purchased house itself as the mortgage guarantee are a major percentage (INC_IP), variable in relation to the credit cycle (interest rates and credit policies of paying institutions), but that only in the year of maximum expansion of the real estate market (2006) did it reach 50%; there is therefore an even more considerable number of houses not purchased using this type of financing;
- b) the available data do not currently make it possible to know what part of houses purchased without loan in the particular aforementioned form is purchased with loan as well but with the mortgage guarantee registered on other owned properties;
- c) given point b), it was observed that certain local factors are likely to have influence over the average level of INC_IP; in particular, it was found that as the local market dynamic rises, the INC_IP level rises, and the INC_IP level is systematically higher in the Centre-North than in the South (and Islands);
- d) it was then argued that these local factors' influence might be connected with the average levels of the houses' values; it was in fact found that there is a systematic divergence of the values of the houses (VALAB) purchased with loan (again in the formula of mortgage guarantee registered on the purchased house itself) and those without this form of loan; this divergence of values tends to fall as the market dynamic rises, and at the same time the INC_IP level tends to rise, while, with respect to the geographic area, the divergence of values tends to decline from South to North, and at the same time the INC_IP level tends to rise;
- e) as a final note, it is lastly observed that the INC_IP level tends to rise as the deciles of the municipalities rise, in order increasing with the rise in VALAB referring to purchases with loan (again in the aforementioned form) up to the 7th decile (VALAB between € 138,800 and € 150,500 euro; beyond this threshold, the INC_IP level tends to become steady; this fact is found by disaggregating for Centre-North and for the South (and Islands), while it is less clear whether the disaggregation takes place by market dynamics, in the sense that for the lower-dynamic clusters (ABSENT/SCARCE, WEAK, and AVERAGE), the INC_IP level with respect to VALAB classes shows no certain trends.

At this point, attention will be focused on some variables determined also by the credit policies established by the financing institutions (banks, chiefly).

¹⁴ The same considerations made in the previous note regarding Figure 15 apply.

AN ESTIMATE OF LOAN TO VALUE (LTV)

An initial problem is that of estimating loan to value (LTV), which represents the amount of the capital paid, in comparison with the amount of the value estimated by the bank on the house upon which to register the mortgage as guarantee of the loan itself. This variable, along with the creditworthiness of the applying party (which may be summed up as the ratio between the amount of the instalment owed for repaying the debt, and the loan applicant's available income) is a variable determined by the credit institutions' policy, and is influenced by the policies (including supervisory policies) of the central bank. For our purposes, to estimate LTV, we should have the values of the houses put up as collateral, and of the loan extended. The latter datum, as already discussed, is available and published in the archives of the real estate observatory (OMI). For the former datum, on the other hand, the value based by using OMI's quotations must be accepted as proxy. These quotations are available for each OMI zone and as a municipal average. In order to be able to have the average municipal value of each house, however, it is indispensable to know, for each municipality, the total area of the houses sold, and, distinctly, the total area out of those purchased with loan. This datum is available only for the years 2012-2015.

Therefore, for the previous years, in order to comprehend the trend of the LTV variable over time, it was necessary to rely on an approximate estimate.¹⁵

The estimated LTV values for the different years are reported in Figure 17.

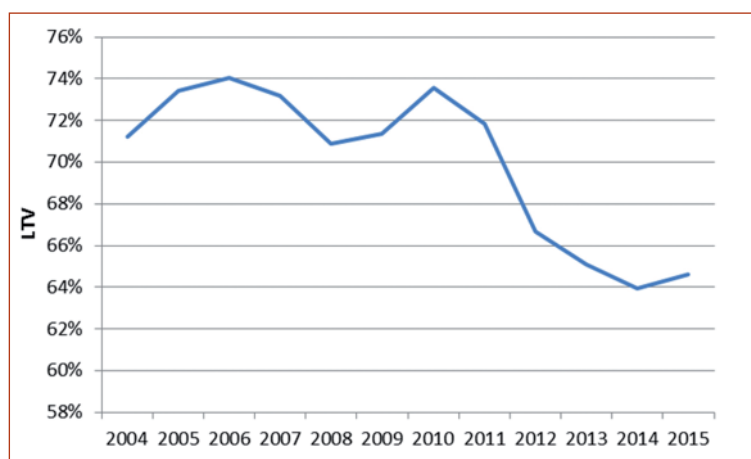


Figure 17 LTV, 2004-2015 - Source: our processing of OMI-Agenzia delle entrate data

¹⁵ The total exchange value (turnover) of all the houses for each year (OMI average municipal quotation for total municipal area of the purchased houses) is a datum known and published by OMI. Then, the turnover of only the purchases by natural persons (NTN_PF) is calculated for each municipality by means of a simple ratio between the number of houses purchased by natural persons (a known datum) and the number of the total houses purchased (NTN, a naturally known datum). Having estimated the municipal turnover with regard to NTN_PF in this manner, the turnover was then estimated for that part of purchases by natural persons carried out by means of a loan with mortgage registered on the purchased house itself (NTN_IP). In this case, for each municipality, the NTN_PF turnover was brought into proportion, on the basis of the ratio between NTN_IP (known datum) and NTN_PF. In this manner, there is an estimate in each year of the turnover for NTN_IP. LTV may be estimated for each municipality, by relating the total capital extended for loans (in the aforementioned form) in each Municipality for the estimate of the turnover for NTN_IP. However, by proceeding in this way, an error is committed, which tends to be offset in part on the aggregate level (nation and regions), due to the fact that the various turnover estimates made (for NTN_PF and NTN_IP) imply the hypothesis that the proportions between NTN_PF and NTN and between NTN_IP and NTN_PF are equal to those we would obtain if we were to use the corresponding areas, and not the number of houses. This hypothesis is not at all true. However, for the years 2012 and 2015, having the specific turnover for NTN_IP purchases (because we have the sold areas of the houses purchased with loan), it was possible to measure the error committed with this approximate estimate. The average of the errors over these four years was taken as a corrective factor of the 2004-2011 historic series (4% in each year, and therefore as the average of the years 2012-2015). This corrective factor was then recalculated for each different analyzed aggregation (market dynamic and size, geographic area, region). Therefore, for the 2004-2011 LTV, while these are data that can be used to have an order of magnitude of the trends, there is certainly room for improvement.

It may be noted that during the cycle’s growth phases (through 2006), the LTV values are on the rise: from 71% in 2004, they reach 74% in 2006. Although high, these values may still, on average, be considered prudential. To be prudential, the size of the loan (apart from DSTI) must be at a percentage of the value of the asset put up as collateral that is such that it may be reasonably expected that in the event of a decline in prices, the value of the collateral is not less than the remaining principal of the debt.

During the first phase of the crisis (2007-2010), the LTV value returned to the level of 71% in 2008, and then resumed climbing up to 73,6% in 2010. In substance, for the entire 2004-2010 period, the LTV level oscillated between 71% and 74%. It is starting from 2011-2012 that the crisis’s consequences, with the second recession, began to be felt, significantly changing the credit institutions’ policies. The LTV level in fact fell drastically until 2014 by more than 10 points, arriving at 64% and therefore aggravating the possibilities of accessing loan¹⁶ also during the phase of lowered interest rates (starting 2012). Only in 2015 did the LTV level trend upwards.

By performing a simple regression exercise and using, as a dependent NTN_IP variable and as explicative variables, LTV and interest rate (INT) for the years 2004-2015, there is a relative correlation (R2 corrected, equal to 0-67), with LTV significant and positive coefficient of LTV but not of INT. On the other hand, the figures also show that the NTN_IP trend appears more correlated with that of LTV than with that shown for INT.

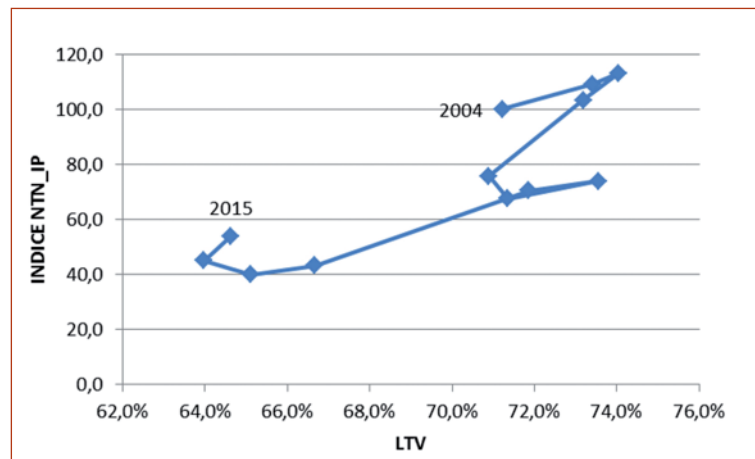


Figure 18 NTN_IP and LTV index (2004-2015) - Source: our processing of OMI-Agenzia delle entrate data

¹⁶ It is in fact obvious that house prices being equal, a lower LTV leads to the purchaser’s need to find the remaining portion of the capital necessary for the purchase. In any event, also in the event of falling prices, to maintain the absolute value of the remaining principal unchanged, this decline must be far more than proportional to the reduction of the LTV – a condition that hardly occurs.

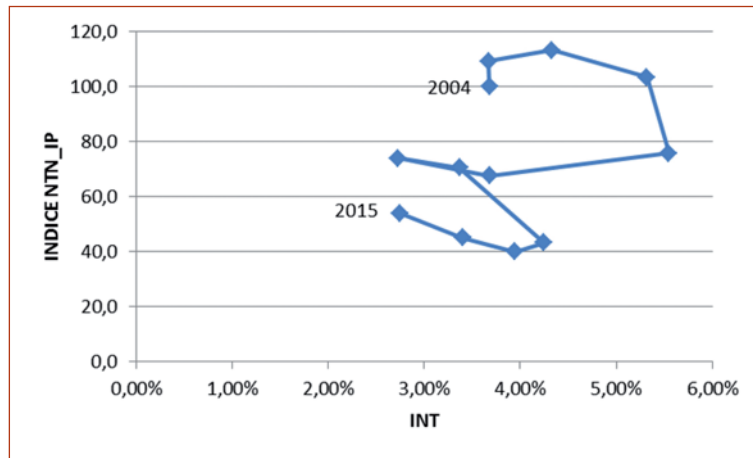


Figure 19 NTN_IP and INT index (2004-2015) - Source: our processing of OMI-Agenzia delle entrate data

In effect, Figure 18 shows that during the periods when LTV rises, house sales tend to increase, thus responding to the greater accessibility to credit (in terms of lower remaining principal necessary from the purchaser); at the same time, during the periods when LTV declines, sales also tend to decline.

This is not the case for the interest rate (Figure 19), whose influence over the purchases supported by loans appears more indeterminate.

The trend of LTV over time, disaggregated for the various local factors (market size, dynamics, demographic class, geographic area), shows no significant differences from that shown at the national average level (see Figures 20 to 23).

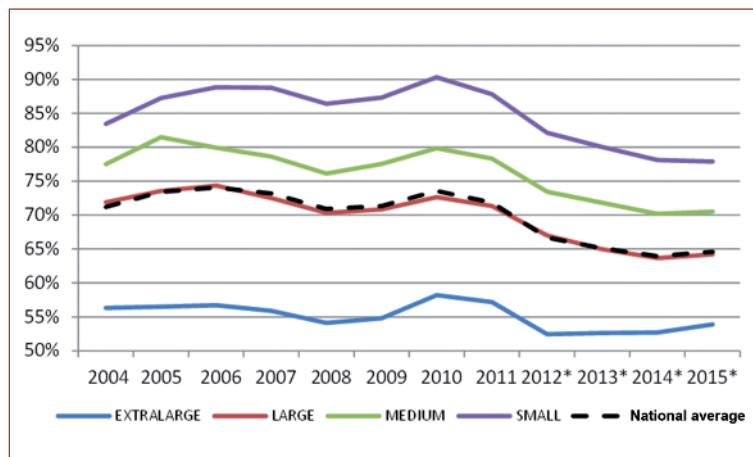


Figure 20 LTV by market size - Source: our processing of OMI-Agenzia delle entrate data

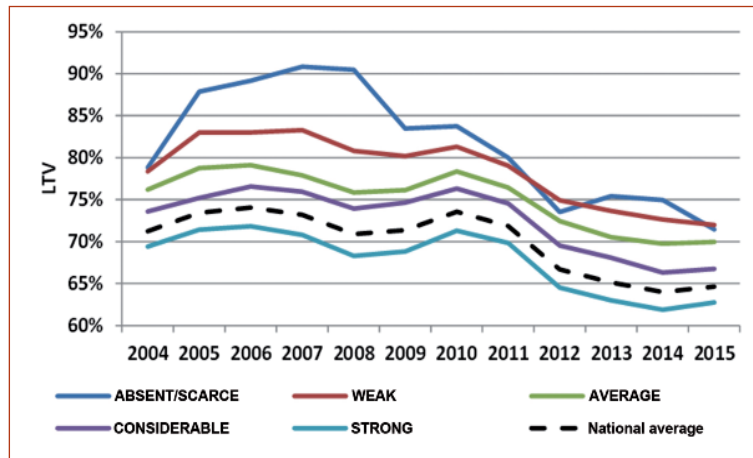


Figure 21 LTV by market size - Source: our processing of OMI-Agenzia delle entrate data

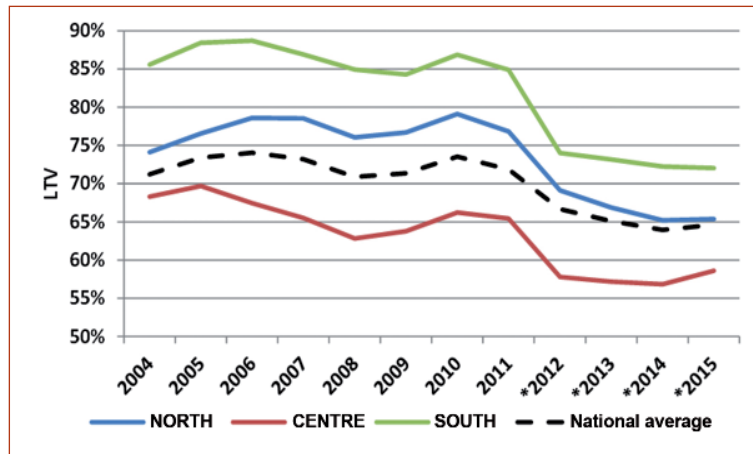


Figure 22 LTV by geographic area - Source: our processing of OMI-Agenzia delle entrate data

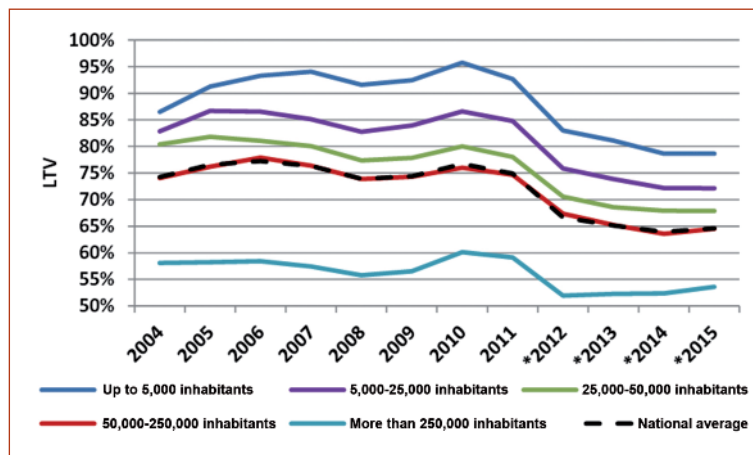


Figure 23 LTV by demographic class - Source: our processing of OMI-Agenzia delle entrate data

There are, however, some structural data that emerge. First of all, in each year, the average level of LTV is arranged in order decreasing with respect to the hierarchy of the market size (Figure 20) and of the market dynamic (Figure 21). This last datum would appear counterintuitive. In effect, in conditions of absent or scarce dynamics, providing a loan guaranteed by a mortgage on the purchased house is certainly riskier in a market with little or no sales, given the condition of the property's high illiquidity in the case of insolvency. However, the LTV level in these Municipalities with scarce dynamics is among the highest. The explanation may be that the greater risk of these markets is "taken for granted" by granting proportionally fewer loans (the incidence of purchases with loan, INC_IP, is in fact particularly low for the ABSENT/SCARCE dynamic cluster), but for those parties to which the loan is extended, the banks do not skimp on the capital needed to finance most of the price of the property, by applying a high LTV. It would appear that in these markets, the loan's mortgage guarantee is less important, if it may be put that way, than the creditworthiness for the applicant's potential to repay the loan. On the other hand, this choice is also possible because (as was seen earlier), in these settings, the properties' values are more contained and therefore, in absolute terms, the amounts of the loan principal that the banks end up extending are equally contained.

Moreover, it is found (Figure 22) that in each year, the LTV levels are higher in the SOUTH, the NORTH shows intermediate levels, while the CENTRE shows lower ones. The difference in LTV level between SOUTH and CENTRE is, as an average of the considered years, equal to approximately 19 percentage points (which is to say that the LTV level is on average about 19 percentage points more than in the CENTRE). This difference showed a growth trend through 2008 and then, with the crisis, the LTV difference fell to a level below that of 2004.

Lastly, for demographic class (Figure 23), the LTV level is structurally arranged (since this takes place in each considered year) decreasingly as the demographic class rises.

The observed structural differences of the LTV levels in relation to the different local factors considered may possibly also depend, as already discussed, on the absolute levels of the houses' average municipal prices. Figures 24, 25 and 26 in fact show that the hierarchical arrangement of the LTVs tends to decline as the dynamic (except for the passage from ABSENT/SCARCE to WEAK) and the demographic class rises, and at the same time the average municipal value of the house purchased with loan (VALAB NTN_IP) tends to increase. For the geographic area, the relationship goes from the intermediate levels of LTV and VALAB NTN_IP in the NORTH areas, to the low LTV levels and high VALAB NTN_IP levels for the Centre and, inversely, high LTV levels and low VALAB NTN_IP levels for the southern areas.

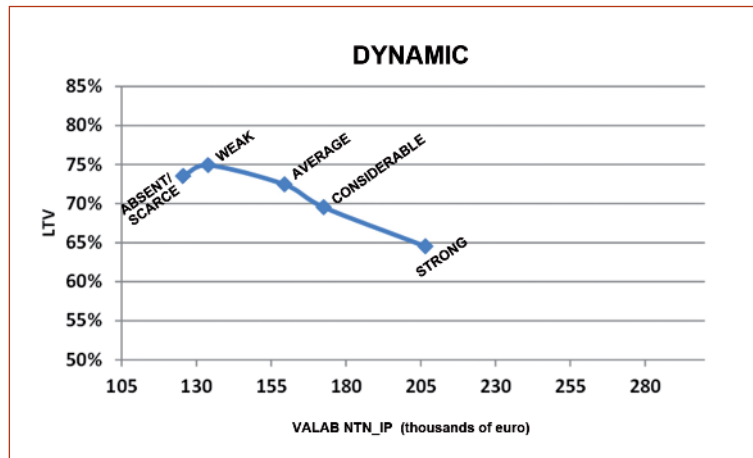


Figure 24 LTV and VALAB NTN_IP (2012) by dynamic - Source: our processing of OMI-Agenzia delle entrate data

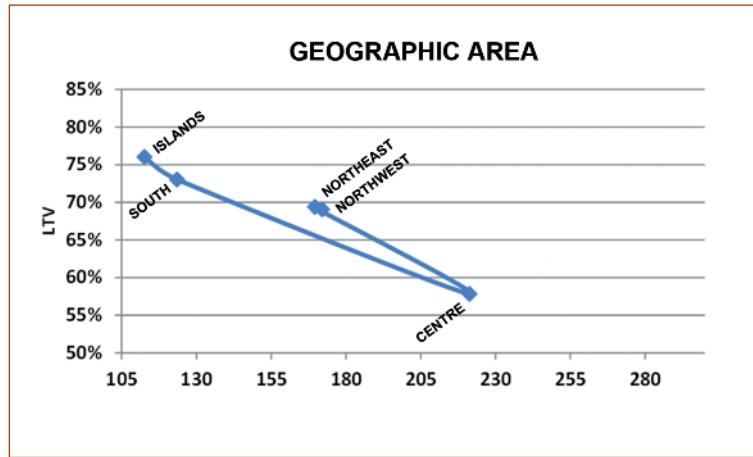


Figure 25 LTV and VALAB NTN_IP (2012) by geographic area - Source: our processing of OMI-Agenzia delle entrate data

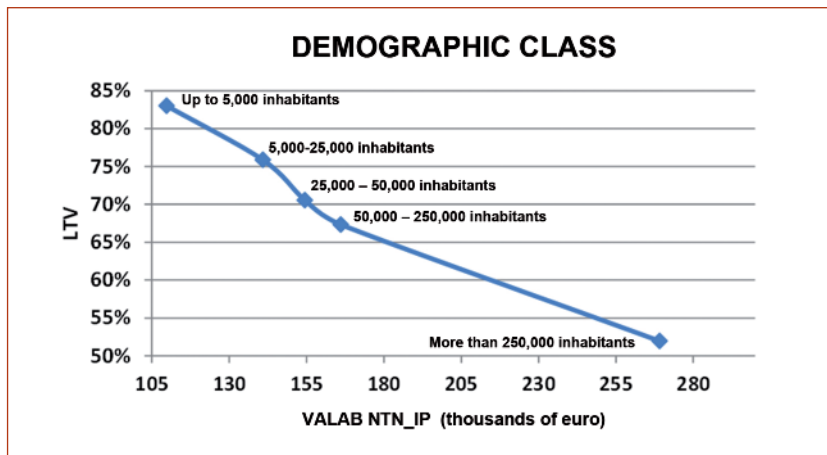


Figure 26 LTV and VALAB NTN_IP (2012) by demographic class - Source: our processing of OMI-Agenzia delle entrate data

The credit policy decided by the banks would therefore appear influenced by the local conditions of the markets acting on the front of market dynamics, territorial area, and demographic class depending on two factors: the investment's degree of illiquidity and the value of the house. In addition to this, it is possible that the ability to select the applicant's creditworthiness plays a role, but there is no way to appreciate to what extent. This ability is likely to be based upon subjective but real elements of knowledge, available in the smaller and smallest local situations, which of course tend to be dispersed as the size of the market and of the applicants increases. Lastly, Figure 27 shows a graph where the y-axis charts INC_IP and the x-axis the LTV value.

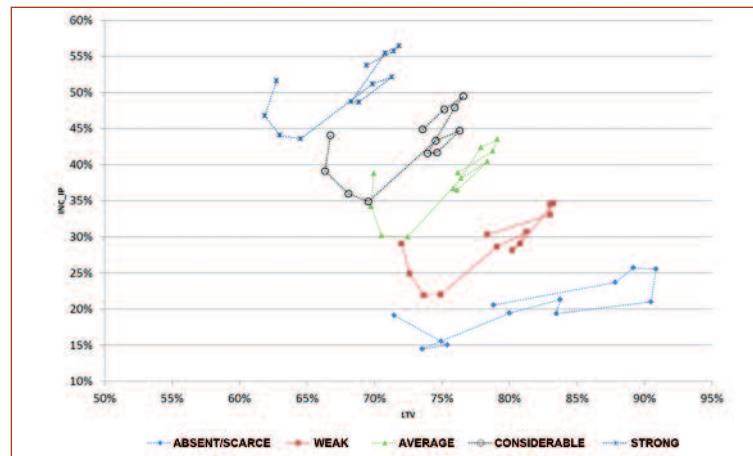


Figure 27 LTV and INC_IP (2004-2015) - Source: our processing of OMI-Agenzia delle entrate data

In the graph, the relationship between the two variables is reported for each year of the considered period and for each dynamic cluster. There is a clear inverse relationship between INC_IP and LTV as the market dynamic rises: therefore, the more intense the market dynamic, the higher the incidence of purchases with loans out of the total, and the lesser the percentage of the house's price that this loan finances. The trends during the period are relatively similar among the different dynamic clusters except for ABSENT/SCARCE which shows a form extending far more to the right. In effect, from 2004 to 2007-2008, in the presence of an INC_IP that varied by about 5 percentage points, the LTV level grew by more than 12 percentage points, and declined drastically again by more than 19 points from 2008 to 2015.

INTEREST RATES AND LOCAL CHARACTERISTICS

The other key variable of the loan payment policy is the interest rate. It is to be kept in mind that the available datum regards the interest rate applied to the first instalment of the loan, with no distinction between fixed or variable. It thus represents an indicative datum for understanding the interest rates' development over time, also with respect to the local factors used thus far.

In this last regard, Figures 28, 29 and 30 show that the interest rates' trends over time are wholly similar for geographic area, demographic class, and market dynamic.

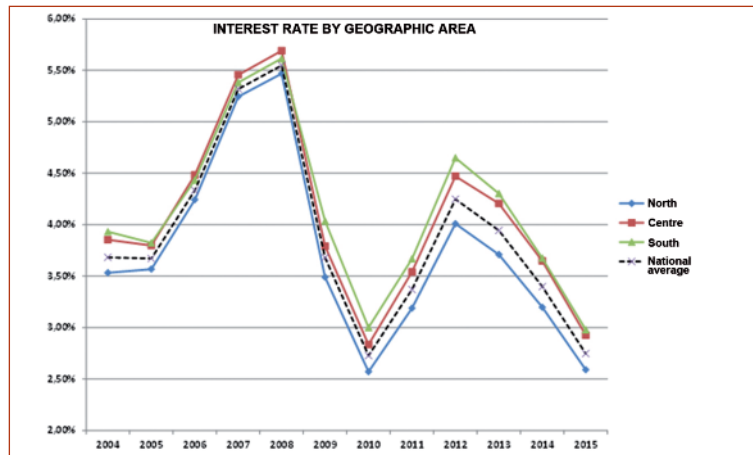


Figure 28 Interest rate by geographic area (2004-2015) - Source: our processing of OMI-Agenzia delle entrate data

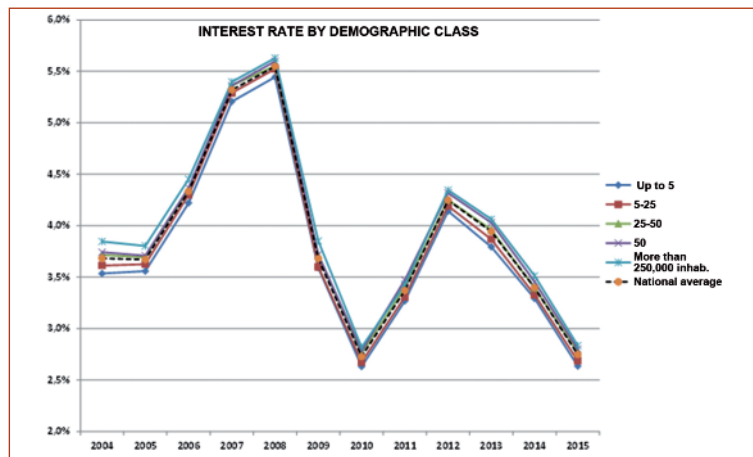


Figure 29 Interest rate by demographic class (2004-2015) - Source: our processing of OMI-Agenzia delle entrate data

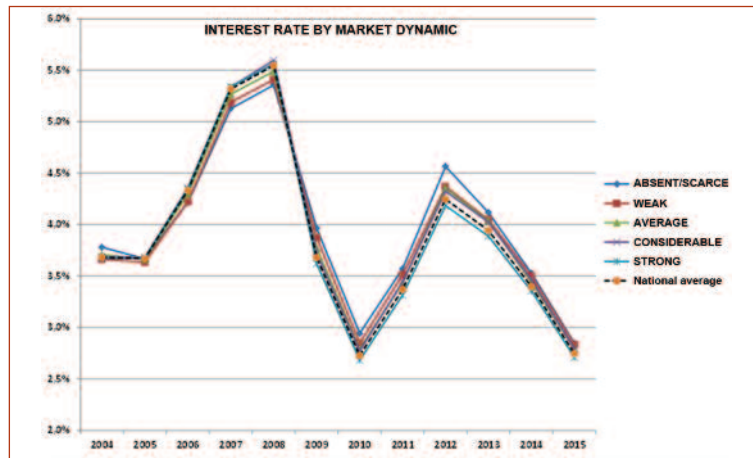


Figure 30 Interest rate by market dynamic - Source: our processing of OMI-Agenzia delle entrate data

The interest rate differentials between the different characteristics of the territories, although not particularly high, still have some particular features (Figures 31, 32, and 33).

With regard to the market dynamic (Figure 31), the interest rate differentials with respect to the national average are minimum through 2005, expand but with no hierarchy defined by market dynamic through 2008, and continue to expand significantly to 2010, but this time with a defined hierarchy, which remains substantially unchanged until 2015, marked by a differential from the average that remains higher than 1, but with a value gradually lower as the dynamic rises to the cluster of the STRONG dynamic which, on the other hand, is lower than average. In the average of the 2009-2015 period, the differential between the ABSENT/SCARCE cluster and the STRONG one was on average 0.25 percentage points of interest rate. This differential held rather steady after the start of the 2008-2009 crisis precisely because, as already argued, more dynamic markets are less risky for the bank in terms of the asset's liquidity, and therefore the differential can be representative as a proxy of the risk premium demanded by the banks.

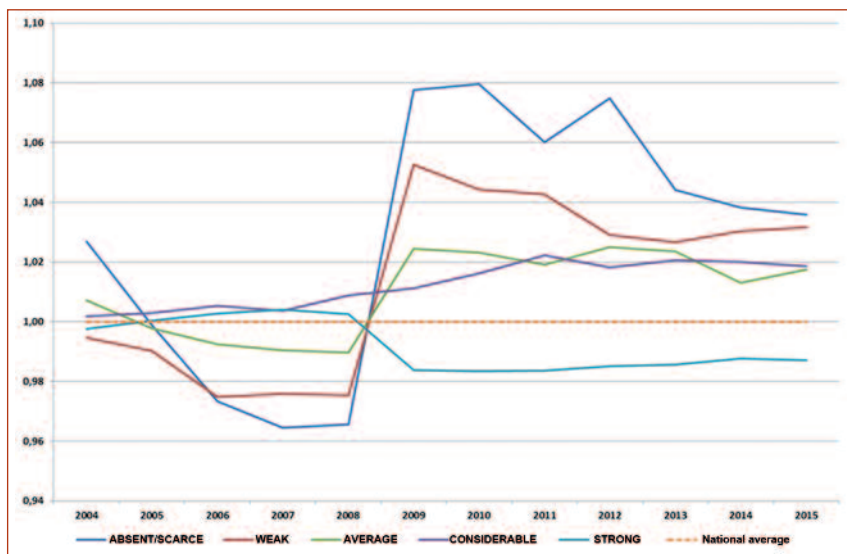


Figure 31 Interest rate differentials from the national average by market dynamic (2004-2015) Source: our processing of OMI-Agenzia delle entrate data

With reference to the demographic class (Figure 32), the interest rate differentials from the average are arranged, for the entire considered period, in a hierarchical order in which the differential rises along with the demographic class (as some intersection between the 50-250,000 inhabitants demographic class and the one of more than 250,000 inhabitants). Here, the risk premium appears to be growing as the municipality’s size increase. It is possible that in this case, knowledge of the applicants’ creditworthiness, deemed potentially more suitable in small population centres than in large ones, leads to a reduced risk premium for the lower demographic classes.

Lastly, with reference to the geographic area, Figure 33 clearly shows a clear division of the differentials between the Centre-South and the North, with the latter recording, over the entire period, a differential under 1. The interesting aspect is that while before the crisis the differentials of the various areas appeared to converge, with the explosion of the 2008-2009 crisis the rates’ differentials by geographic area tended to increase and reached their maximum divergence with the second crisis of 2012. During that year, interest rates in the NORTH were 0.46 points lower than the CENTRE, and 0.64 points lower than the SOUTH. The rates’ differential by area is to be related to the “economy” risk present in a two-faced country like ours. In other words, in the SOUTH (and with the crisis developing in the Centre as well), the applicant’s creditworthiness is potentially riskier due to the fact that, for example, in the event of a reversal of the employment situation, the possibility of finding another job is less likely in the southern areas, and therefore the potential risk of insolvency is higher.

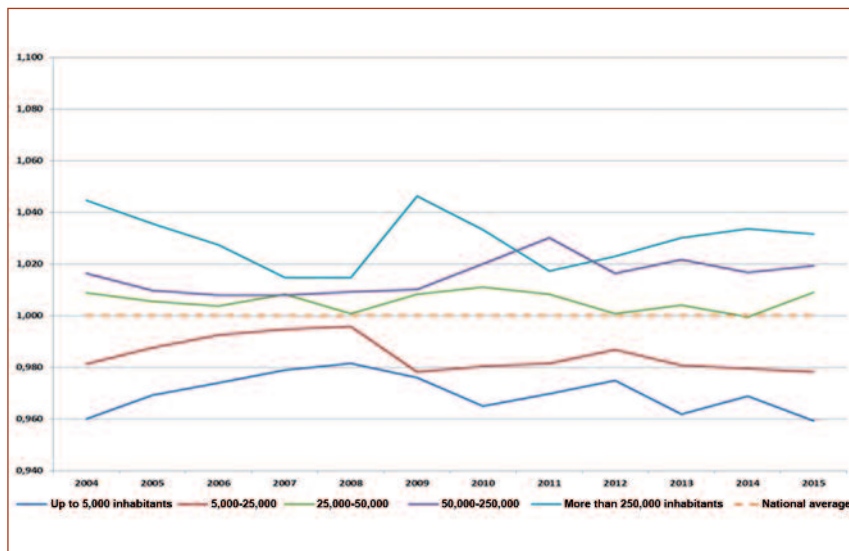


Figure 32 Interest rate differentials from the national average by demographic class of municipalities (2004-2015)
 Source: our processing of OMI-Agenzia delle entrate data

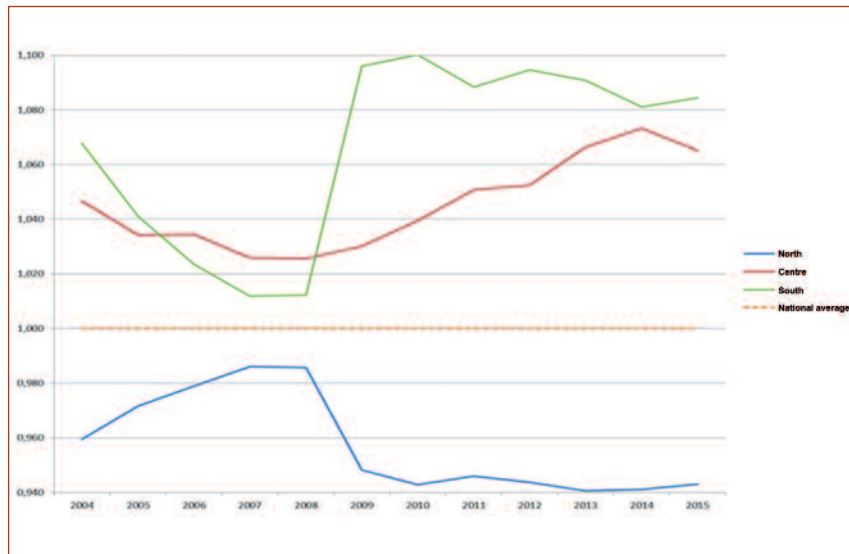


Figure 33 Interest rate differentials from the national average by geographic area (2004-2015)
 Source: our processing of OMI-Agenzia delle entrate data

Interest rates thus respond mainly to conditions of monetary and financial market competition, influenced by the policies of the central banks, which actually tend to make the rate policies uniform on a national level. This is the reason why the fluctuations over time of the rates indicator used here (the rate applied to the first loan instalment) is substantially uniform for the various local characteristics. However, there are some structural differentials among some of these characteristics, which were highlighted by the graphs' analysis.

BRIEF CONCLUSIONS

This work has aimed to describe, based on the data available at the real estate market observatory (OMI) at Agenzia delle entrate, the trend in the main variables connected with mortgage loans for the purchase of houses (in the specific form of loans paid by using the purchased house as collateral), and the local characteristics of these variables.

In general, it may be said that despite the strong uniformities dictated by competition, the central banks' policies, and the increasingly strong interconnection between financial markets (less and less national and increasingly global), certain structural differences (more or less slight), connected with the local characteristics, remain. Therefore, while the trend over time of certain crucial variables related to loans (incidence of purchases with loans out of total house purchases, loan to value, interest rate) is manifested in relatively uniform terms, although disaggregated by local characteristics (mainly: market dynamics classes, demographic classes of municipalities, geographic area), a specific order of these variables by local characteristic often emerges.

It is an order that may be defined as structural when it persists over time (at least based on what was observed in the considered period), as is the case, for example, of the interest rate that is systematically lower in the NORTH than in the other geographic areas, or for the loan to value, which is systematically higher where the market dynamic is lower. These orders sometimes change with respect to significant variations in the general economic cycle (this is still the case with the interest rate differentials).

The conducted descriptive analysis not only may be considered as preliminary to any more analytical

approaches, but it made it possible to explore the local aspects of the main variables connected with mortgage loans for house purchasing. From it, some arguments may also be drawn that would lead towards caution in using macro-prudential policies that act above all, at least for the time being, upon sectoral but national interventions. For a country like Italy, where territorial diversity represents, for better or for worse, a distinguishing characteristic, an approach by national aggregates of such policies may achieve results appropriate for certain territories, but absolutely inappropriate for others. Consider, for example, an intervention aimed at reducing the average LTV charged by each bank. In the territories with scarce or no market dynamic, this would entail an additional reduction of the purchases made with loans, whose incidence out of the total is normally quite low (in the considered 2004-2015 period, the INC_IP incidence reached the maximum with approximately 25 in 2006), with effects that may be socially undesired with regard to the possibility of purchasing houses in these Municipalities.

In any event, for the purposes of the new tasks assigned to the real estate market observatory of Agenzia delle entrate and reported in the introduction, the development of the information system regarding mortgage loans presents a necessary opportunity to be achieved as soon as possible.

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