HOUSE PRICES IN LOCAL MARKETS IN ITALY: DYNAMICS, LEVELS AND THE ROLE OF URBAN AGGLOMERATIONS

by Luca Casolaro* and Cristina Fabrizi**

Abstract

The national pattern of house price dynamics masks considerable heterogeneity across local areas and markets; disparities are even higher looking at house price levels. In this paper we describe these structural differences across Italy, with particular focus on the role of metropolises and metropolitan areas over the last 50 years. Our analysis shows that housing cycles differ across geographical areas and urban agglomerations both in depth and length. The synchrony with respect to the national cycle is indeed higher for the North-West and the Centre and lower for the South and the North-East. Cycles reflect metropolises' price dynamics in all the macro-areas except the South, where the biggest cities and the other towns exhibit similar dynamics. Geographical disparities are even stronger if we turn to price levels: following a period of relative convergence in the second half of the 1990s, the gap between areas widened again. House prices in the Centre approach those in the North excluding metropolises, but this does not happen for the South. Finally, using data covering the last decade, we analyse house price heterogeneity across areas, including the hinterland of metropolises, taking into account the contribution of a set of relevant socio-economic characteristics, the first one being income, to the distribution of house prices.

JEL Classification: R10, R21, R31.
Keywords: housing cycles, urban agglomeration, geographical house price gap.

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1. Introduction[1]

House prices are becoming a crucial issue in the analysis of the business cycle, of households' economic conditions and as a *trait d'union* between the real and financial markets. A significant part of the economic literature focuses on house prices as national averages, without exploiting local heterogeneity. However, housing markets are fundamentally 'local' markets, in the sense that the forces driving house price equalization are weak, not only at the macro level but even more so among apparently similar cities and in the long run.

The literature provides strong evidence of geographical heterogeneity in housing markets, especially for North America and the UK: data available at local (state and city) level in these countries document robust differences in local housing market conditions. For example, Allen et al. (2006) show that house prices in Canadian cities from 1981 to 2005 are weakly related in the long run and only a few city-specific variables are consistently correlated to house prices, suggesting that the study of aggregate house price indexes alone does not lead to a better understanding of the housing market. A recent work by Sinai (2013) highlights that, despite the sizeable boom-bust pattern experienced at the national level in the US in the 1990s and 2000s, local housing markets exhibit considerable heterogeneity in terms of the depth and even the timing of their cycles, with a large share of local housing markets experiencing no booms or busts whatsoever.

Focusing on sub-national data and exploiting the deep heterogeneity at regional and even city level could help to explain some important geographical features, such as disparities in labour market mobility (see, for Italy, Cannari, Nucci and Sestito, 1997), or households' wealth and consumption behaviour (see, among others, Browning et al. (2013), Cooper (2013) and Campbell and Cocco (2007)). It could also improve our understanding of the transmission of aggregate shocks, such as an unanticipated change in the interest rate (Franantoni and Schuh, 2003). More recently, the analysis of local housing market has become a major topic in the literature on urban agglomerations: indeed, Hsieh and Moretti (2015) indicate the growing constraints to housing supply in high-wage cities as a major impediment to a more efficient spatial allocation of labour in the US (and accordingly to aggregate gains in output and welfare), due to the limits imposed on the number of workers in the most productive American metropolises.

Italian data were analysed, among others, by Muzzicato, Sabbatini and Zollino (2002 and 2009), Cannari and Faiella (2008) and Cannari and D'Alessio (2016). Other analyses of price dynamics at intra-Italy level can be found in Panetta et al. (2009) and Fabrizi et al. (2015). More recently, Manzoli and Mocetti (2016) examined the variability of house prices among Italian cities, focusing on the gradient from the centre to peripheral areas and found that price differentials inside the main urban areas are even greater than those between the Centre-North and the South of the Country.

In this paper we add new descriptive evidence on the structural differences in housing markets across Italian areas. We first analyse both the dynamics and levels of prices in local housing markets in Italy in a long-run perspective. The goal is to describe the patterns in the various geographical areas, with particular focus on the differences between big cities and other towns. Looking at the housing cycles, we observe huge differences between the North West and the Centre, on the one hand, and the South and North East, on the other. These differences are closely linked to those among big and smaller towns. Also in terms of house price levels we document the dramatic gap between the different areas along all time horizons. We then delve deeper into the

[1] The views expressed in this paper do not necessarily coincide with those of the Bank of Italy. The authors wish to thank Antonio Accetturo, Sauro Mocetti, Paolo Sestito and the participants to the workshop 'Sviluppo urbano, agglomerazioni produttive e crescita economica' for their insightful comments and suggestions. They are responsible of all the remaining errors.

issue of local house price distribution across Italy and the role of urban agglomerations in the last ten years by exploiting a database containing a consistent set of indicators at municipal level, while taking account of characteristics such as size, income, labour market conditions and quality of life. Our empirical results confirm the existence of a sort of 'metropolitan areas price gap'. In the final part of the paper we try to quantify the share of the geographical gap that can be attributed to structural differences in the observable characteristics. We find that the gap is largely driven by differences in income and labour market conditions, while the geographical distribution of metropolises plays a minor role once we control for these characteristics.

The paper is organized as follows. In Section 2 we present the data and the methodology adopted. In Section 3 we describe patterns in house price dynamics both at national level and in Italian areas and document heterogeneity in the depth and length of the housing boom/bust. Section 4 examines house price cycles in metropolises with respect to smaller towns. In Section 5 we turn to house price levels, describing the striking heterogeneity among Italian areas and between metropolises and other towns. In Section 6 we perform the same analysis on an income-adjusted price measure – the number of income annualities needed on average to buy a house – and observe the persistently high levels of heterogeneity. In Sections 7 and 8 we report our empirical results on house price levels and the gap between metropolitan areas and other municipalities. Section 9 concludes.

2. House price data

Since 2004 the primary source of data at territorial level (areas, regions, municipalities) has been the Osservatorio del Mercato Immobiliare (OMI) of the Italian Tax Office, which records the biannual selling prices of properties for almost the entire set of Italian towns (nearly 8,000 Italian municipalities). The main limit of this dataset is the lack of historical depth of the information; moreover, we use average unit values, which are affected by variations in the quality composition of the properties sold. For 1970-2010 we had at our disposal only provincial capitals' house price levels constructed by Muzzicato, Sabbatini and Zollino (MSZ, 2008) using data from Il Consulente Immobiliare (CI).

The latter is an industry-specialized review published by Gruppo24Ore. Since 1965 it has collected information twice yearly from market operators on average house prices. The data are divided into two property categories (new and recently built) and three locations (centre, semi-centre and outskirts). The CI surveys are available from the second half of 1965 onwards for a limited set of cities, comprising 29 provincial capitals and a changing, poorly documented group of other municipalities. The survey has gradually increased its coverage of provincial capitals and since 1980 has embraced all of them. Coverage of other municipalities has also grown and become more systematic, stabilizing at around 1,400 since 1998. In the years before 1980, for the provincial capitals still not included in the survey, prices were imputed by MSZ (2008) as follows: 1) of the 29 provincial capitals covered from the outset, the 8 largest were excluded on the grounds that they were not plausibly comparable with the smaller provincial capitals for which data were unavailable; 2) the data on the selected cities were then grouped into 6 geographical areas and for each area the average price of houses was calculated in 3 different locations (centre, semi-centre and outskirts) with weights based on the stock of housing units as derived from census data; 3) the rates of change in the prices of the 3 aggregates so obtained for each area were used to plot backwards any incomplete time series.

For the sake of homogeneity, in our long-run dynamics we used only provincial capitals' data from both the CI and OMI series. Using OMI data, in Figure a1 we compare house price dynamics in provincial capitals and in all the municipalities: the differences are greater for the North, lower for the Centre and South. The methodology for the use of CI data is the same as in MSZ (2008) for provincial capitals, while for OMI data the methodology is the same as in Cannari

and Faiella (CF, 2008).[2] In both cases, prices were weighted using annual data on the stock of housing units derived from inter-census linear reconstruction from 1970 to 2011; for locations (centre, semi-centre and outskirts) we used CF (2008) weights, taken from the SHIW survey. After calculating our own indexes (at both territorial and national levels) we then ensured they were consistent with the Italian house price index (HPI) estimated by MSZ up to 2009 and subsequently published by Istat.

For metropolises we defined three different aggregates: 1) the 12 cities counting more than 250,000 inhabitants in 2001 and 2011 census data; 2) the first 5 most populous cities in each of the 4 Italian areas (20 cities in total); 3) the first 20 most populous cities. In Table a1 we report the cities included according to the three definitions. Owing to little differences in the dynamics (see Figure a2 in the Appendix), we choose the first definition.

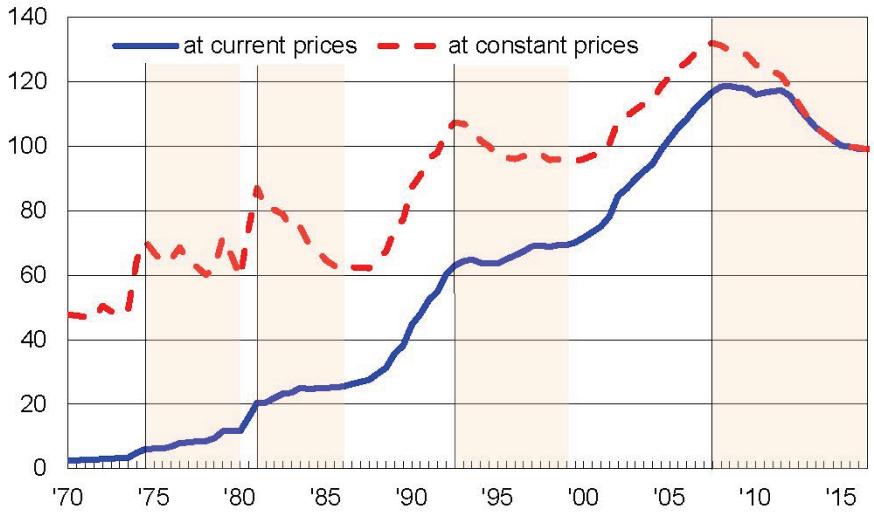
House price levels are defined starting from OMI data in the second half of 2013 and backward calculated using the indexes; for the average level both for Italy and for the 4 areas we refer to all municipalities (not only provincial capitals); the same holds for the aggregate defined as 'other towns'. Constant prices series are obtained using the consumer price index for Italy. For the 2004-13 analysis we use OMI levels *tout court* (i.e., all municipalities and no imposed time coherence with HPI).

3. Heterogeneity in housing cycles across Italy

In the last five decades the Italian real estate market recorded considerable growth: real house prices more than doubled between 1970 and 2016. Following the analysis of Muzzicato et al. (MSZ, 2008), this growth has developed in 5 cycles: the first, presumably already under way when CI data collection started (in 1965), concluded with the peak reached at the end of 1974; the second went from the end of 1974 to mid-1981; the third lasted up to the second half of 1992; the fourth began at the end of 1992 and lasted up to 2007; the fifth is under way (Figure1).

Figure 1

House price dynamics in Italy (1)
(index 2015=100)



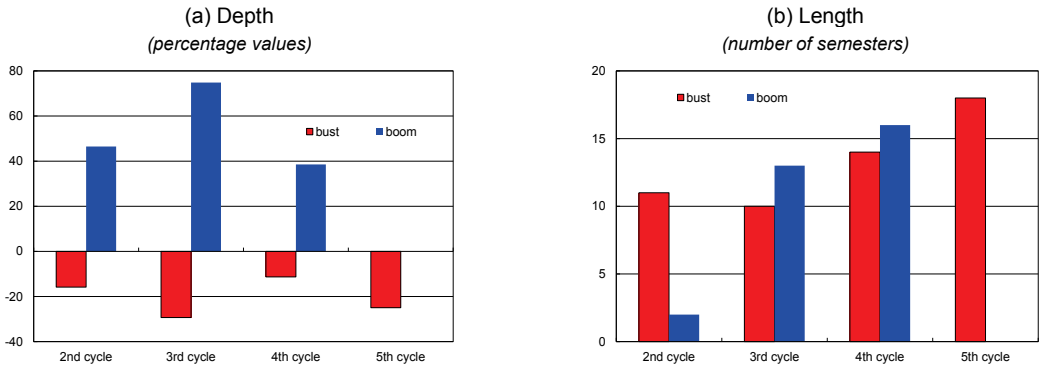
Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

[2] For a comparison of house price time series constructed based on different sources, see Cannari, D'Alessio and Vecchi (2016).

Even if a thorough evaluation of national cycles and their peculiarities is beyond the scope of this paper[3] – which is focused on local and territorial differences – a quick glance at the aggregate national pattern reveals a considerable amount about the dynamics of housing markets in this period. Starting from the second cycle (the first complete cycle in our data), we can highlight some stylized facts. Firstly, house price peaks always exceed the previous level: if we compute real house price growth between peaks it is always around 23 per cent. The same does not hold for troughs: in the third and last cycle, in particular, troughs are similar to those of the previous cycle, exhibiting strong declines which nearly offset the previous increases. Only in the fourth cycle is the lowest point after the peak of the 1992 well above (by more than 50 per cent) the previous trough of 1986.

Figure 2

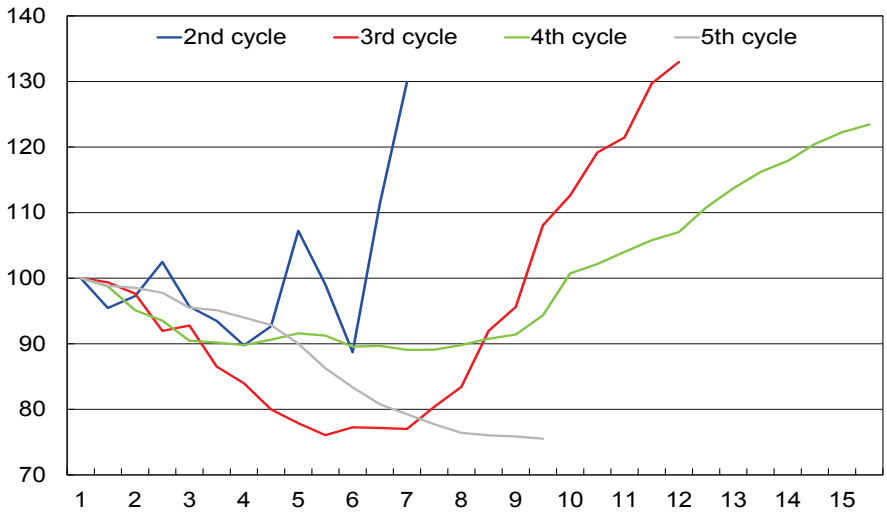
Depth and length of housing market cycles in Italy



Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data at constant prices.

Figure 3

Depth and length of housing market cycles in Italy (1)
(percentage values)



Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data at constant prices.
(1) Number of semesters on the x-axis.

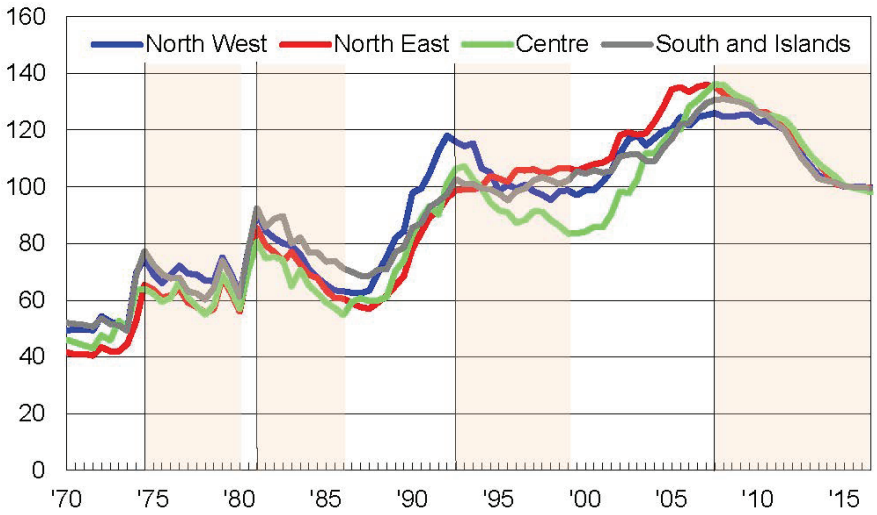
[3] Explaining the causes of housing cycles is the subject of much current research. See Sinai (2012) for a set of references to potential explanations of the boom and bust in house prices (e.g., the role of demand fundamentals – such as rents, income and employment –, changing interest rates, subprime lending, irrational exuberance on the part of home buyers, a shift to speculative investment in housing, contagion and fads, and international capital flows). A more detailed analysis of Italian housing market dynamic is in Muzzicato et al. (2008) and Cannari at al. (2016).

Moreover, while there is no evidence of a long-run trend in the depth of housing cycles, the length of both booms and busts shows a progressive increase: looking at Figure 2 (where we consider the depth and length of the phases of each cycle)[4] and Figure 3 (where we plot the four cycles separately, placing equal to 100 the maximum value reached at the end of the previous cycle) it is clear that the pattern of the fluctuations displays a progressive change, with cycles characterized by higher length and lower annual growth rates.[5]

If we now turn to Italian areas and look at house price dynamics, there is strong heterogeneity especially from the second half of the 1980s (Figure 4). In the North West and in the Centre the housing cycles are quite striking and the turning points coincide with the national ones, exhibiting a similar progressive lengthening of the phases. In the South and in the North East, on the contrary, prices dynamics in the last 30 years are much smoother: in particular, for the North East we could even talk of a single 20 year-long positive phase between 1987 and 2007, leading to a strong catching-up process with respect to the other areas. As we shall see, this peculiarity is linked to the weight and the role of big cities.[6]

Figure 4

House price dynamics in Italian areas (1)
(index 2015=100)



Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data at constant prices.
(1) Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

In order to gain a clearer idea of the heterogeneity in local housing cycles, we must identify (through an algorithm)[7] the peaks and troughs in each area's time series. There are several methods used in the literature, applying procedures ranging from the simple visual inspection of the series to

[4] The data do not allow us to compute a complete trough-to-peak measure for the last cycle.

[5] The 1981-92 cycle (the third in our analysis) exhibits the highest price growth in the sample period (75 per cent), lasting for more than 6 years (13 semesters). The fourth cycle displays a longer negative phase (7 years), although it is characterized by the lowest magnitude in the time span (-11 per cent), followed by continuous moderate growth lasting 8 years (the cumulative growth in the period was almost 40 per cent). Finally, the last cycle began with a negative phase, which has not yet come to an end and which in 9 years has eroded almost all the growth recorded in the first part of the last decade (-25 per cent).

[6] As we wrote at the very beginning, we do not set out to explain the causes of divergent housing market dynamics: there are many possible explanations for house price movements, which are hard to disentangle. In the South of Italy, in particular, it is plausible that both demand (low growth, high migration, etc.) and supply factors (as evidenced in Accetturo et al (2017), the elasticity of housing supply is on average higher in the South than in the North and Centre) could have contributed to the smoother dynamic in house prices.

[7] The algorithm was not applied for the identification of national house price cycles, because we adopted the MSZ definition. In any case, the result is the same.

the implementation of very sophisticated statistical analysis (see Burnside, Eichenbaum, and Rebelo (2016), Ferreira and Gyourko (2011), Davidoff (2013)). In our analysis, we exploit the simple method applied by Harding and Pagan (2002) and originally proposed by Bry and Bochan (1971).

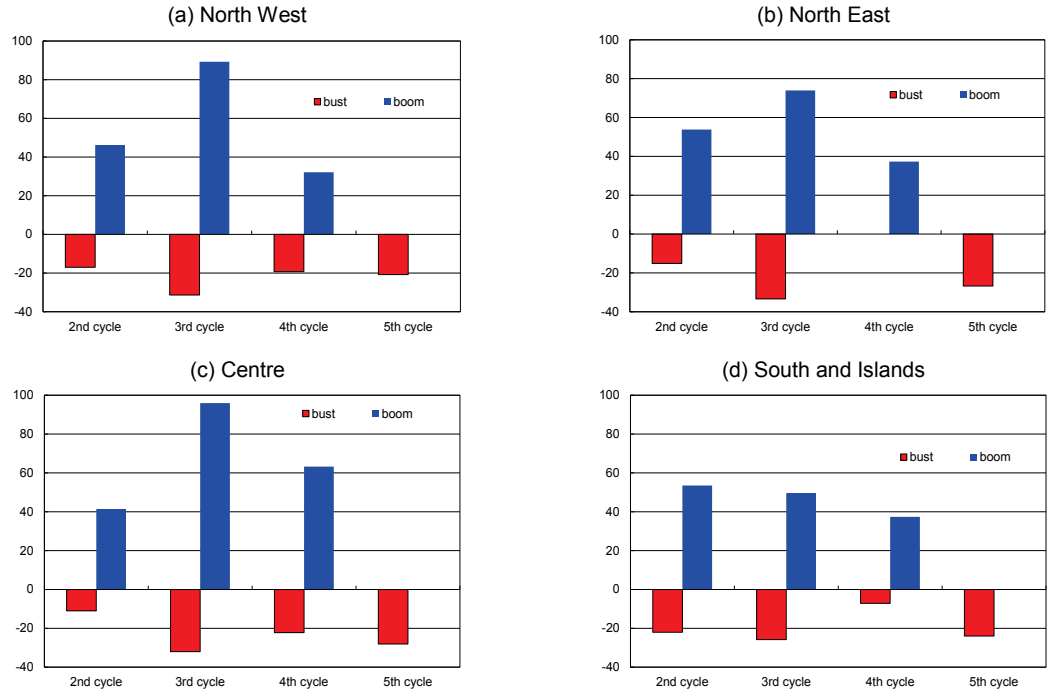
The basic idea is to isolate the turning points of our series and to use it to locate the phases of expansion and contraction. In the algorithm they use, a local peak at time t occurs if $y_t > y_{t+k}$, where $k = 1,...,K;$ the reverse holds for the troughs. In the standard business cycle analysis, the scalar K is chosen in order to ensure the complete cycles have a minimal duration of 15 months. In our case the empirical observation suggests that the housing cycles are much longer than the business ones, so we set K=8 (our analysis is based on biannual data); in this way, we set the length of a housing cycle to exceed 4 years. Once we find the local maxima and minima, the turning points are mapped by imposing the alternation between peaks and troughs.

The representation of the depth and length of each area's cycle is shown in Figures 5 and 6. For better comparison, we impose the presence of 4 cycles (from 2 to 5), even if in the North East the fourth one doesn't exist (in Figure 5b there is no red histogram in the fourth cycle).

Following Harding and Pagan (2002) we then calculate a synthetic index that measures synchrony in house price cycles in Italian areas with respect to the national one. The index can vary between 0 (no synchrony at all) and 1 (perfect synchrony). As shown in Figure a4, the real estate cycles in the North West and Centre are very similar to the national ones (with an index equal to 0.93) while concordance is lower in the South (0.83) and especially in the North East (0.75).

Figure 5

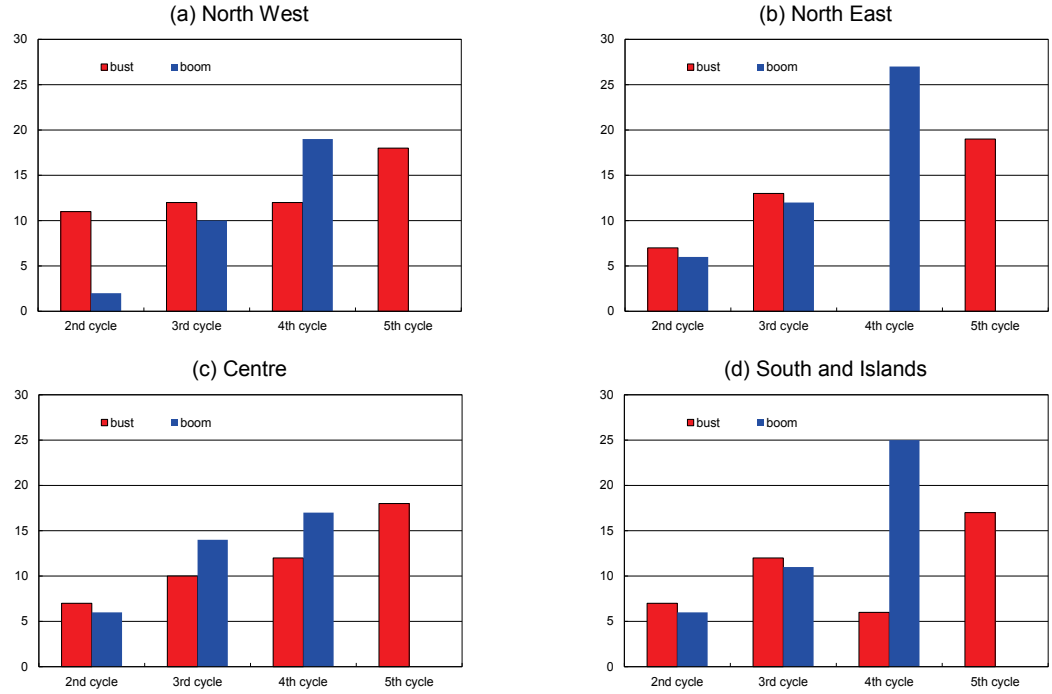
Depth of housing market cycles in Italian areas
(percentage values)



Sources: Based on Bank of Italy, CI, OMI and Istat data.

Figure 6

Length of housing market cycles in Italian areas
(number of semesters)



Sources: Based on Bank of Italy, CI, OMI and Istat data.

4. Price dynamics and cycles in Italian metropolises

In Figure 7 we draw real house price dynamics for the 12 most populous Italian cities (metropolises, i.e. those with at least 250,000 inhabitants in 2001 and 2011) and compare them with those of smaller towns.[8]

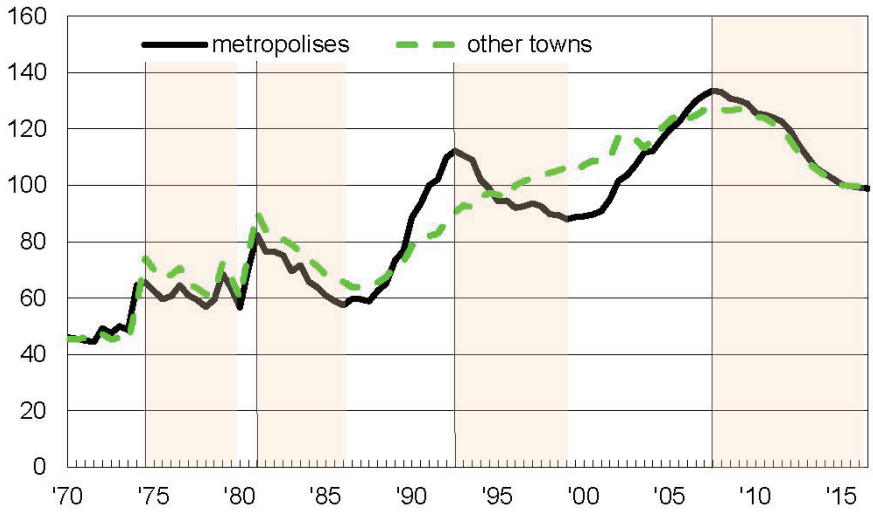
The picture clearly shows that, from the second half of the 1980s until the end of the last upward phase in 2007, the cyclical dynamic of prices was determined exclusively by the metropolises:[9] prices in the biggest cities exhibited high growth in the positive phases (96 per cent in the period 1986-92, 52 per cent between 1999 and 2007) followed by sharp reductions (of -22 and -26 per cent, respectively). By contrast, for all the other towns the drop in the early 1980s was followed by continuous, moderate growth lasting 20 years and leading to a doubling of house values. From 2007 to 2016 the reduction was comparable to that recorded in the biggest cities.

[8] The results of this analysis also hold even for the other definitions of metropolises (see Figures a2 and a3 in the Appendix).

[9] This is in line with some findings in the housing market literature: for example, Sinai (2013) has highlighted how larger cities in the US experienced higher average house price growth rates during the boom and larger declines after the peaks. Bogin et al. (2016) document the incidence of acceleration episodes in the US within and across cities starting from the early 1980s: they observe (among other things) that price accelerations are more frequent in large versus small cities and that price levels post-acceleration are most sustainable in large cities, especially near city centres, i.e. following several years of acceleration declines in prices tend to occur everywhere, but the centres of large cities and areas are more resilient to price corrections, while small cities, suburbs of large cities (and low-regulation areas) are most vulnerable. Finally, heterogeneity in house price patterns might also be affected by different housing supply elasticity across cities (for administrative or geographical reasons) and, therefore, by heterogeneous responses of house prices to the same demand shocks (Accetturo et al. (2017)).

Figure 7

House price dynamics in metropolises and other towns in Italy (1)
(index 2015=100)

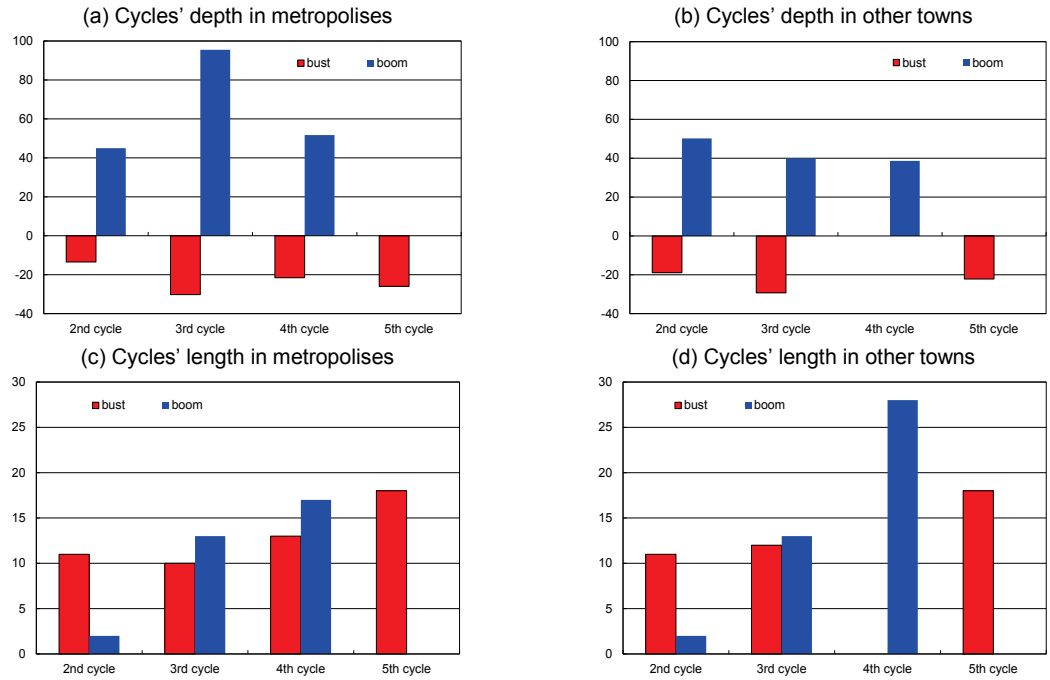


Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

In Figure 8 we apply the same algorithm described previously for detecting housing cycles in metropolises and other towns; as for the North East, here we impose the fourth cycle for smaller towns (but red histograms in the fourth cycle are zero).

Figure 8

Depth and length of housing market cycles in Italian metropolises and other towns
(percentage values)

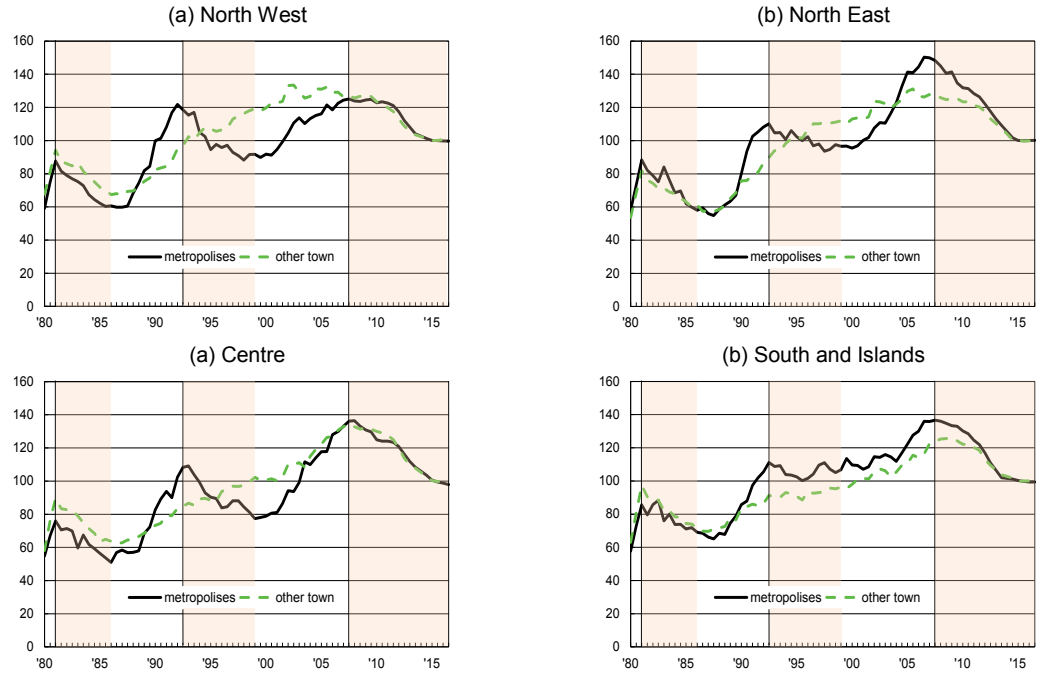


Sources: Based on Bank of Italy, CI, OMI and Istat data.

Applying the same analysis to the different areas, we register similar dynamics in the northern regions and partially in the Centre – even with significant differences in the magnitude of the fluctuations – while the southern regions diverge substantially. Indeed, in the South, the biggest cities and the other towns exhibit more similar dynamics, especially in the fourth cycle, when the index for metropolises registered a short (3 years; 6 in the North West and in the Centre; 5 in the North East) and moderate (-10 per cent; nearly -30 per cent in the North West and in the Centre; -15 per cent in the North East) negative phase, remaining for the entire period above the one for the other towns (Figure 9).

Figure 9

House price dynamics in metropolises and other towns in Italian areas (1)
(index 2015=100)



Sources: based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle. The time series starts from 1980 because of methodological issues regarding the method of data construction.

The concordance index for house prices in metropolises and other cities computed for each area (Figure a5 in the Appendix) confirms that the cycle mismatch is greatest in the North West (0.68) and Centre (0.77), due to the presence of the largest cities, while it is smaller in the North East (0.82) and especially in the South (0.87).

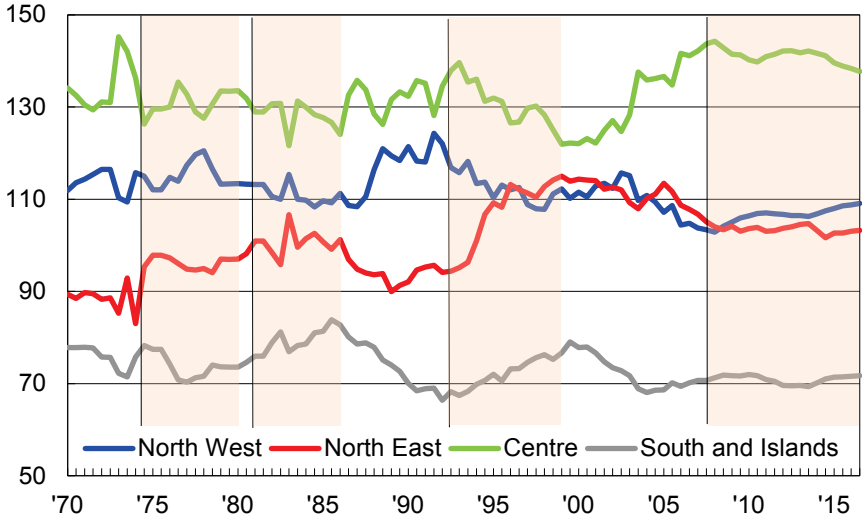
5. House price level disparities in Italian areas and metropolises

Geographical disparities are even greater if we turn to price levels. In Figure 10 we report the house price gap (per square meter) of Italian areas with respect to the average Italian level. At the beginning of the 1970s, house prices in the Centre exceeded the Italian average by more than 30 per cent (more than 10 per cent in the North West), while in the North East and especially in the South prices were below the Italian average (10 and 25 per cent below, respectively).[10]

[10] If we use Cannari and Faiella's *benchmark* (2008) for house price levels in Italian areas at the end of 2002 and apply it to our indexes, the gaps are still similar; major differences emerge for the North East (see Figure a6 in the Appendix).

Figure 10

Disparities in house prices per square meter in Italy (1)
(percentage values)



Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Ratio between the average house price per square meter in the areas and the national average. Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

In our sample period we observe a strong convergence of house prices for the North East, apparently uncorrelated with the boom or bust phases. In the second half of the 1990s the differences almost vanished with respect to the North West and became smaller with respect to the Centre; during the last positive phase beginning at the end of the 1990s, the prices in the two Northern areas remained similar, while we observe a strong relative increase for the Centre, related to the jump in the city of Rome. On the contrary, the price gap with respect to the South remained almost unchanged in the last 45 years, with fluctuations mostly related to the phase of the cycles: during the booms the index for the South tends to drop because the increase in prices is smoother with respect to other areas; conversely, negative phases are less violent, determining a rise in the index (i.e., a drop in disparity).

We expect this high heterogeneity to be related to the huge disparities in several structural socio-economic factors in Italy (in Panels a, b and c of Figure a7 in the Appendix we reported the most important of these: GDP, employment ratio and population).[11] One additional factor that can explain these disparities could be the distribution of metropolises in Italian areas, affecting house prices both directly – given that prices in big cities are much higher and follow different dynamics – and indirectly through the effect on suburbs. In Panel d of Figure a7 in the Appendix we reported the percentage of total population in the 4 areas living in metropolises and their suburbs: there is great heterogeneity both in the relevance of metropolitan areas across Italy (higher in the North West and in the Centre, lower in the South and in the North East) and in the distribution of resident populations (which are more concentrated in the main cities in the Centre than in the other areas).

The role of metropolises. – In Panel a of Figure 11 we plot the price ratio between metropolises and other towns: it remains constant in the long run at around 2.2, with large

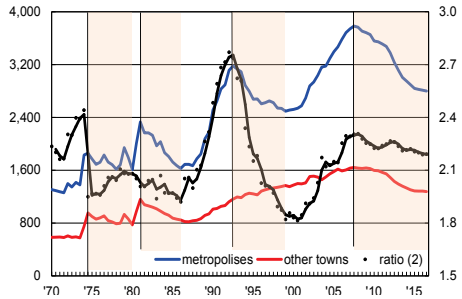
[11] The gap in per capita GDP between the Centre-North and the South is persistently large and, following a slight decline after the second half of the 1990s with respect to the North, it turned upward again after the great recession of 2009. The same holds for the employment ratio. Population dynamics are also quite different across Italian areas: in particular, at the end of the 1990s the population stopped rising in the South, while it accelerated in the other areas, with a large contribution from both internal and external migrations.

fluctuations following the real estate cycles: indeed, the variability of the index reflects differences between big cities and other towns in reaction times to upswings, as we described before.

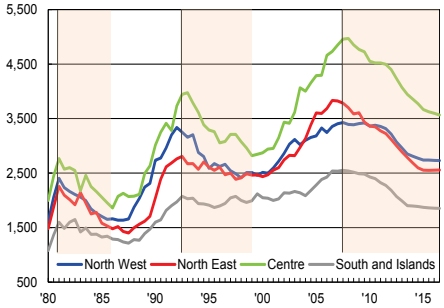
Figure 11

Local price levels: metropolises and other towns (1)
(prices per square meter)

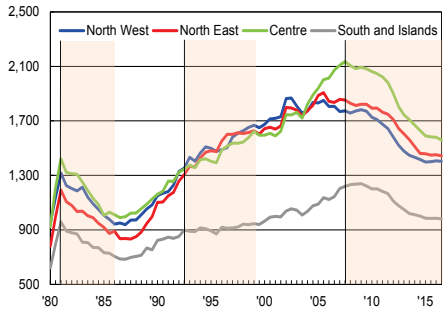
(a) Levels and ratio metropolises / other towns in Italy



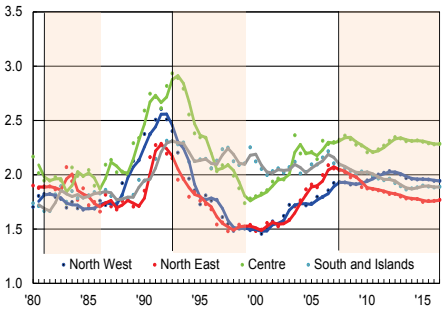
(b) Levels in metropolises across areas



(c) Levels in other towns across areas



(d) Ratios metropolises / other towns across areas (3)



Sources: based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle. – (2) House prices ratio between metropolises and other towns: rough values (black dots) and mobile averages of two terms (black line). Right-hand scale. – (3) Rough values (dots) and two terms mobile averages (lines). The time series starts from 1980 because of methodological issues regarding the method of data construction.

Looking at house prices in metropolises and other towns across the different areas (Figures 11b and 11c), there is high heterogeneity among metropolises, while other towns' prices are more homogeneous among the North and Centre.

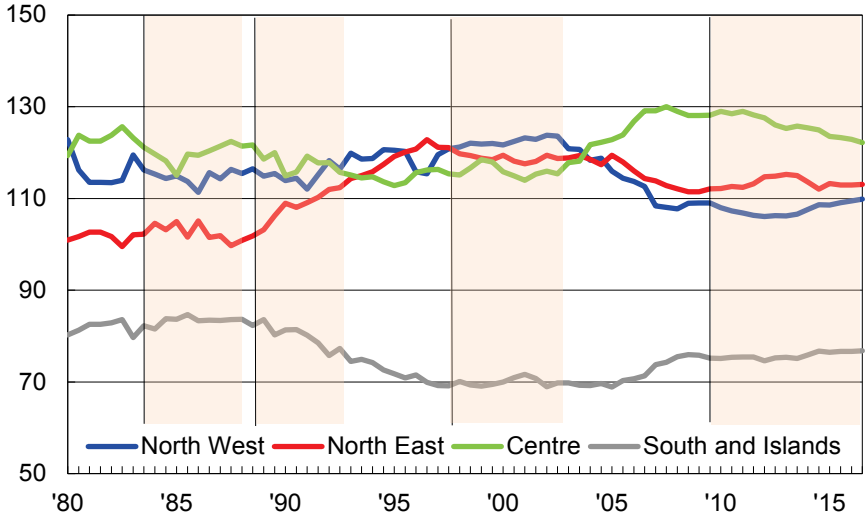
If we compute the price ratio between metropolises and other towns for the different areas (Figure 11d), the pattern is quite homogeneous up to the second half of the 2000s between the North and Centre, though with differences in the depth of the fluctuations and in levels (due to the inclusion of Rome and Milan), while the dynamic is different for the South between 1992 and 2007. Large heterogeneity is also apparent in the last declining phase, with the North West and Centre on the one hand (where the ratio was almost stable from 2007 up to 2016) and the North East and South on the other (where the ratio was declining).

It is clear that the presence of metropolises has a direct impact on the average house prices of a region or even of an entire area (especially in the case of Rome for the Centre). If we compute again the average price level of Figure 10 excluding the metropolises (accounting for about 14 per cent of houses), we get a significant downward shift for the Centre, as expected; the North West and the South are almost stable in position (but with a change in the dynamics) and the North East

shifts upwards (Figure 12). Overall, the decline in price heterogeneity is sizeable, especially among Northern and Central areas, but important differences nonetheless remain.

Figure 12

Disparities in house prices per square meter in Italian areas excluding metropolises (1)
(percentage values)



Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Ratio between the average house price per square meter in the areas and the national average, metropolises excluded. Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle. The time series starts from 1980 because of methodological issues regarding the method of data construction.

Metropolises and metropolitan areas in the last cycle. – The presence of some big cities in an area may also have an indirect impact on house prices in the hinterland, due to the permeability of housing demand between metropolises and their satellite towns. This way, in order to quantify correctly the price gap between metropolitan and non-metropolitan municipalities and to evaluate these effects on areas' price gaps, it is helpful to exploit the concept of metropolitan area (defined as the sum of the metropolis and its satellite towns). To perform this analysis we restrict our sample period to 2004-13 [12] and adopt the definition of urban municipality based on the density of inhabitants per square kilometer as in OECD and Eurostat methodology.[13] In 2011 Italy counted 8,092 municipalities[14] distributed in 611 LMAs. As before, we define as metropolises the 12 urban municipalities with more than 250,000 inhabitants: these account for nearly 15 per cent of the national total population (almost 30 per cent when we consider the 612 satellite municipalities, i.e. those towns located in the LMA of the metropolises as well).

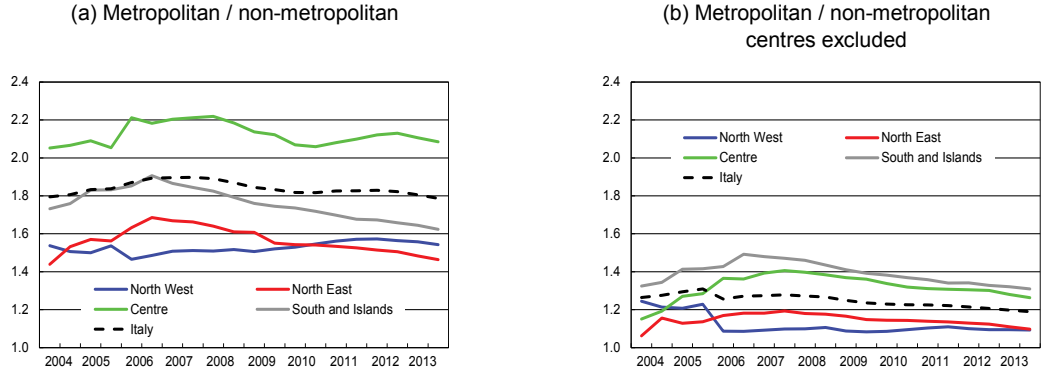
As highlighted before, living in a metropolitan area is more expensive than living outside one (the house price ratio is around 1.8 on average in Italy), but this extra cost is not of the same

[12] The OMI series starts in 2004 and has a break in the first half of 2014 due to a change in the definition of the 'market homogeneous zones' to which municipal prices refer.
[13] For more details see Lamorgese and Petrella (2015). As before, those cities with more than 250,000 inhabitants are defined as metropolises. Metropolitan areas are defined by exploiting Istat labour market areas (LMAs; local labour systems in Italy; LMAs are sub-regional geographical areas where the bulk of the labour force lives and works and where establishments can find the largest share of the labour force necessary to occupy jobs. See Istat (2014) for more details): we consider as a metropolitan agglomeration all the municipalities belonging to a metropolitan LMA (that is a LMA whose centre is an urban municipality with more than 250,000 inhabitants).
[14] After including data on house prices, income and other municipal characteristics, we obtain a dataset containing information on 7,994 municipalities. The main difference with the 'universe' of municipalities is the exclusion of the L'Aquila province, due to historical discontinuity in house price data for the seismic event in 2009.

magnitude across the country. Indeed, the inclusion of satellite towns changes the ranking between areas: the extra cost is highest in the Centre and lowest in the North (with little differences between the North West and the North East; Figure 13a). If we take into account satellite towns only (i.e., if we exclude the centres from the metropolitan areas, the 12 metropolises *tout court*), the comparison is more homogeneous (the size of the towns is similar) and the picture partially changes (Figure 13b): the price gap becomes larger in the South than in the Centre, though it converges during the crisis at around 1.3; the North East also converges towards the North West's ratio (which is fairly stable from 2007), at 1.1. This evidence indicates that house prices in the Centre and above all in the South are greatly affected by urban agglomerations and especially by proximity to a big city, while this characteristic tends to be less important for the North. Thus, for example, prices in the centre of Milan are of course much higher than in the suburbs, but when we compare suburbs belonging to Milan's LMA with other non-metropolitan towns, the differences are very small; instead, living in a metropolitan area in the South (and not necessarily in the centre) makes all the difference in terms of house prices with respect to living elsewhere.

Figure 13

Differences in house price levels inside areas
(ratios)



Source: Index based on biannual data from OMI and tbe Bank of Italy. Ratios between the average house prices per square meter.

These asymmetric price gaps could reflect two features of the socio-economic structure for the different areas in Italy. First, higher polarization in terms of job opportunities, amenities and essential services in the South with respect to the Northern regions. Second, the higher mobility costs related to the lower quality of the transport system. Given these characteristics, for a household living in the North settling down in a metropolitan area turns out to be less important, given that on average living in a town outside a metropolitan area does not preclude access to essential amenities and opportunities. In the South, on the contrary, living in a metropolitan area is going to prove crucial, thus affecting the demand for houses and their prices.

6. Price disparities in Italian areas and metropolises: the role of income

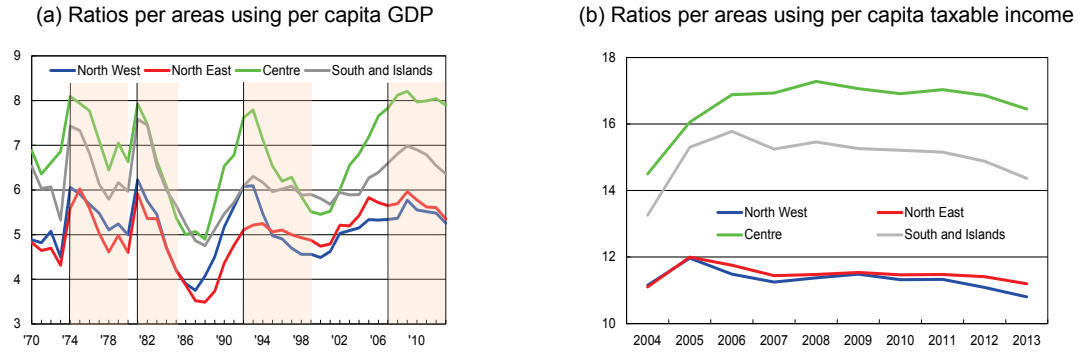
Income level within a geographical area is a key variable affecting, on the one hand, decisions about settling down (and therefore the demand for houses) and, on the other, the amount of resources to devote to house purchase, again strictly related to house price formation. Indeed, income affects the demand for housing either because richer agents can afford to spend more on

houses or because higher income relaxes credit constraints.[15] For these reasons we expect income to be highly correlated with local house prices. The scatter diagrams presented in Figure a8 in the Appendix display a clear positive correlation between income and house prices at regional and provincial level.

In order to exclude this income effect and to deepen our understanding of structural differences in local price levels, we compute an income-adjusted price measure given by the number of income annualities needed on average to buy a house in a generic town. This way, if a flat in the North West costs twice as much as one in the South and income is also double, the price normalized for the income gap will be the same. This measure is calculated as the ratio between the average house price (for a house measuring 100 square meters) and the annual per capita taxable income (Figure 14a)[16]. In order to look at price dynamics in a long-run perspective, we use per capita GDP at current values as a proxy for income (Figure 14b). Although the two series present obvious differences in scale, the scenario depicted is coherent in displaying a dramatic change in the relative positions of the different areas.

Figure 14

Disparities in house prices per square meter in Italy



Sources: CI, OMI, Istat and Bank of Italy for house prices; Istat and Crenos for per capita GDP; Italian Tax Office and Istat for per capita taxable income. Average annual prices. In Panel a the vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

As expected, the index in Panel a of Figure 14 exhibits severe fluctuations during the cycles; however it always assumes the smallest values in the Northern regions, while it is much higher in the South and above all in the Centre. The pattern is confirmed by the more precise index for the decade 2004-13 (Figure 14b), exhibiting strong growth for the Centre and South during the last housing market boom, which was not entirely compensated by the subsequent decline. In 2013 purchasing a house in the North took on average about 11 revenue annualities, against 14 and 16 respectively in the South and Centre.

These results confirm that a large part of house price heterogeneity is related to income distribution. If we combine these characteristics with those related to urban status, we obtain interesting results.

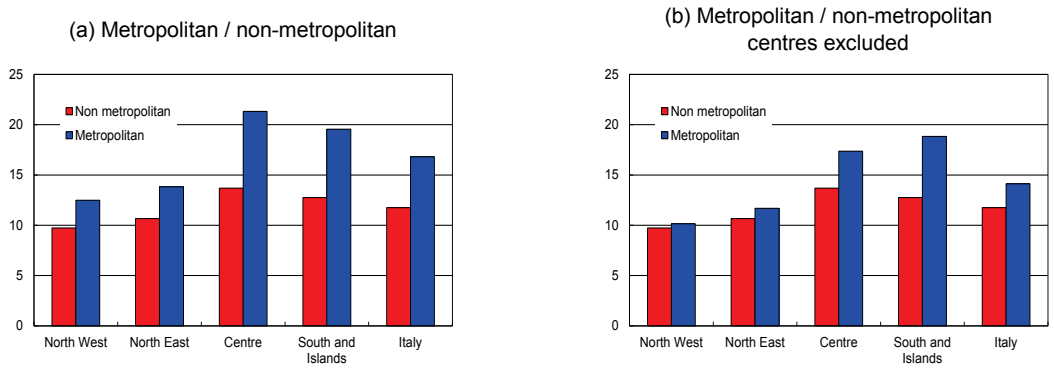
[15] According to other authors (for example, Gyourko, Mayer and Sinai (2006)) it is not only the level, but also the dispersion of income that affects house prices: the interaction between an inelastic supply of houses and the skewing of the income distribution generates significant price appreciations in superstar cities (i.e., cities with unique characteristics preferred by the majority of the population) because wealthy agents are willing to pay a financial premium to live in these areas, bidding up prices in the face of a relatively inelastic supply of houses.

[16] Taxable income at municipal level comes from the Italian Tax Office. The ratio between house prices and taxable income at areas (and regional) levels is obtained weighting municipal data by population in each year. Average per capita income in the 2004-13 period is computed as the ratio of taxable income to the municipal population (from Istat's reconstruction of inter-census data between 2001 and 2011; for the population after 2011 we apply Istat growth rates of the residential population at the beginning of each year).

If we look again at the metropolitan price gap using this income-adjusted measure of prices, we get a stronger geographical polarization. In 2013 in the Centre and in the South households needed on average around 20 annualities to purchase a house in a metropolitan area, nearly 6 more than in other areas. In the North West and in the North East both the level and the differential among municipalities are lower (Figure 15a). Once we exclude the centres we again observe a sizeable fall in the index and in the differential for the Centre, driven by the city of Rome, while the price gap remains large in the South and almost vanishes in the North (Figure 15b). These results confirm that in the North differences in house prices between metropolitan areas and other towns are small and solely driven by differences in income: households are indifferent about settling down close to a metropolis (where they have higher earnings but houses are also more expensive) or in other towns (where the housing market is more affordable but income is also going to be lower). On the contrary, in the South differences in income do not explain all the heterogeneity in house prices between metropolitan areas and other municipalities: living close to a big city in the South is not just an opportunity but a crucial choice in order to gain access to a vital labour market, amenities and other important services for the family.

Figure 15

Price/income ratios across areas in 2013, by municipalities
(index)



Sources: Annual data from OMI, Istat and Bank of Italy for house prices and Italian Tax Office and Istat for per capita taxable income at municipal level.

7. House prices, district features and metropolitan areas: an empirical estimation

The descriptive analysis presented in the last paragraph reveals strong differences in house price levels across Italy, suggesting that at least part of this heterogeneity can be related to income disparities and to the location of metropolitan areas within the country. In this section we integrate these previous results by performing, again in a descriptive framework (given the strong endogeneity of the relation), an econometric analysis at municipal level. Our objective is to capture the correlation of prices with the main urban characteristics and socio-economic features. We estimate a regression on a cross section of almost 8,000 municipalities for the average house prices over the period 2004-13, using as a dependent variable the log of the average house price level of the municipality *i*.

The equation we estimate is the following:

$$P_i = \alpha + \beta_1 S_i + \beta_2\ SOIL\_CONS_i + \beta_3 INC_i + \beta_4\ LM_i + \beta_5\ Q_i + \beta_6 TOUR_i + \varepsilon_i$$

where:

- *S* is a vector of variables related to the size of the municipality. Given that the positive correlation between house prices and a town's size is undisputed, we control for this by

including in the regression the log of population (POPULATION). Moreover, we are interested in investigating the existence of a house price gap in metropolitan areas even after controlling for size, following the idea that metropolises are something more than just outsize municipalities and instead represent a specific phenomenon with particular characteristics. For this reason, we introduce a dummy named MA (metropolitan area) equal to one if the municipality belongs to a metropolitan area.

- *SOIL_CONS* is the average number of houses per square kilometer obtained by the 2001 census, a proxy for soil consumption in the municipality, which is expected to capture elements related to housing supply (in towns with high soil consumption it is harder to increase the housing stock).
- *INC* stands for INCOME, which is expected to be a key variable in explaining the heterogeneity of house prices (Harter-Dreiman, 2003). The relation could be driven by different effects. On the demand side, households would prefer to be situated in districts with higher income in order to enhance their standard of living. On the other hand, part of the effect could be due to the fact that people living in higher income areas can afford more expensive houses. In the regression we use the average taxable income available at town level; in order to control for illegal work, we exploit the paper by Marino and Zizza (2012) estimating a correction term for areas.
- *LM* is given by two covariates related to the specific features of districts in terms of the labour market: the UNEMPLOYMENT RATE, reported by Istat at LMA level, and the level of COMMUTING towards other municipalities, included in the '8milaCensus'[17] database. This last variable is given, for each municipality, by the percentage of residents working or studying outside the municipality over total residents aged under 65. The two variables are expected to be strongly related to the demand for houses, given that, when it comes to decisions about settling down, households are expected to prefer, *ceteris paribus*, municipalities with a higher probability of finding a job and where commuting costs are minimized.
- *Q* is a group of variables reflecting the quality of housing in the municipality: the average age of the recent (post 1962) real estate (BUILDING_AGE) and the percentage of buildings in good conditions (BUILDING_QUALITY), both included in the '8milaCensus' database. Again, we expect house prices to be higher in towns offering a better quality of buildings both in terms of age and maintenance.
- *TOUR* is the percentage of people employed in touristic activities, such as restaurants, hotels, etc. Indeed, we want to control for these touristic municipalities, because the latter usually exhibit prices that are, *ceteris paribus*, much higher than elsewhere. The presence of a higher number of touristic towns could be one of the main drivers of the differences observed among areas and regions.
- Finally, we add area dummies in order to account for idiosyncratic geographical differences not explained by covariates.

In Table 1 we display our results, referred to an OLS regression on a cross section of average prices over the period 2004-13; we also estimate the same regression separately for 2004 and 2013, in order to check for the stability of the relations. The estimates should not be interpreted as casual effects but just as simple correlations.

[17] http://ottomilacensus.istat.it/.

Table 1

House price level's correlations

	Average 2004-13	2004	2013
POPULATION	0.110***	0.110***	0.102***
	(26.91)	(27.26)	(23.52)
MA	0.134***	0.103***	0.112***
	(12.39)	(9.69)	(9.94)
SOIL_CONS	0.314***	0.323***	0.305***
	(13.68)	(14.01)	(13.57)
INCOME	0.364***	0.257***	0.448***
	(15.81)	(13.23)	(16.90)
TOUR	0.011***	0.010***	0.012***
	(22.24)	(20.90)	(22.23)
BUILDINGS_AGE	-0.006***	-0.006***	-0.005***
	(-7.45)	(-7.51)	(-5.95)
BUILDINGS_QUALITY	0.012***	0.010***	0.013***
	(7.23)	(5.93)	(7.43)
UNEMPLOYMENT_RATE	-0.012***	-0.017***	-0.009***
	(-11.92)	(-16.09)	(-8.54)
COMMUTING	-0.002***	-0.0004	-0.003***
	(-3.62)	(-0.74)	(-5.12)
Area FE	YES	YES	YES
R^2	0.61	0.62	0.57
Observations	7,717	7,717	7,656

Sources: OMI, Istat, Italian Tax Office. OLS estimation. T-values (standard errors clustered for municipality in brackets). ***: coefficient significant at less than 1 per cent; **: coefficient significant at 5 per cent; *: coefficient significant at 10 per cent.

The results confirm that house prices are positively related to population and income. The estimated elasticities exhibit a high level of significance and strong economic impact: taking two municipalities with other similar characteristics and located in the same area, if one has a population double the size of the other its prices will be 11 per cent higher. In terms of income, a 20 per cent difference will lead to a price gap of 7 per cent. Even after controlling for these key demand factors, house prices in metropolitan areas remain significantly higher: the 12 metropolises and their satellite municipalities display a price gap which is positive and exceeds 13 per cent. Looking at the other covariates, as expected we find that houses are more expensive in touristic zones and in towns characterized by a higher quality of housing; municipalities with a high level of soil consumption exhibit, *ceteris paribus*, a higher level of house prices. Turning to labour market characteristics, there is as expected a strong and negative correlation between house prices and the rate of unemployment; prices tend to be lower in commuting towns too.

The other two columns of Table 1, presenting the same regression run at the beginning and at the end of the sample period (2004 and 2013), show that the signs of the coefficients are the same in the two periods, confirming the stability of our estimates during the decade. Looking at the magnitude of the correlation, we can see significant differences in income and commuting: the

coefficient for income in 2013 is almost double what it is in 2004, confirming that in the years of crisis a growing emphasis was assigned to income in households' decisions about settling down. Similarly, in 2013 we can see a strong increase in the negative coefficient for commuting, not significantly different from zero in 2004; this result is consistent with the sharp deterioration in labour market conditions during the crisis, leading to the expansion of the job search area and making commuting one of the key variables in the settling-down decisions of households.

Table 2

Price level determinants by areas and urban status

	Centre-North	South	Metropolitan areas	Other towns
POPULATION	0.101***	0.140***	0.113***	0.095***
	(19.9)	(20.3)	(12.6)	(20.2)
MA	0.136***	0.130***		
	(11.2)	(5.2)		
SOIL_CONS	0.273***	0.298***	0.513***	0.528***
	(8.3)	(9.3)	(3.7)	(15.0)
INCOME	0.401***	0.334***	0.703***	0.339***
	(12.4)	(10.2)	(10.9)	(14.4)
TOURISTIC	0.011***	0.009***	0.001	0.011***
	(19.6)	(7.6)	(0.8)	(21.5)
BUILDINGS_AGE	-0.007***	-0.001	0.002	-0.007***
	(-7.62)	(-0.4)	(1.2)	(-7.6)
BUILDINGS_QUALITY	0.010***	0.016***	0.009**	0.011***
	(4.5)	(7.1)	(2.1)	(6.9)
UNEMPLOYMENT_RATE	-0.020***	-0.007***	0.005	-0.013***
	(-13.1)	(-5.7)	(1.6)	(-13.2)
COMMUTING	-0.004***	0.002**	0.002	-0.003***
	(-6.4)	(2.5)	(1.3)	(-5.5)
Area FE	YES		YES	
R2	0.62		0.63	
Observations	7,717		7,717	

Sources: OMI, Istat, Italian Tax Office. OLS estimation; the dependent variable is the log of house prices. T-values (standard errors clustered for municipality in brackets). ***: coefficient significant at less than 1 per cent; **: coefficient significant at 5 per cent; *: coefficient significant at 10 per cent. The first two columns refer to the same estimation, where interaction for geographical areas (Centre-North and South) have been introduced; the following two columns refer to a second estimation, where the interaction term is the MA dummy. The results are expressed in different columns to facilitate the comparison of the coefficients for different areas.

In Table 2 we repeat our analysis, splitting the covariates for area and for urban status in order to test for (comparable) geographical and urban heterogeneity in the estimated coefficients. The first two columns in Table 2 refer to the same regression, where for the sake of clarity the results for the two macro areas (Centre-North and South) – obtained by interacting each covariates with the area dummies – are placed beside each other. The results confirm the high level of stability of our estimates even in geographical terms. The estimated coefficients are similar between areas as regards size, income and soil consumption. In particular, we find no significant

differences in the coefficients of the dummy for belonging to a metropolitan area: this result confirms that the heterogeneity in the metropolitan price gap observed in paragraphs 5 and 6 was driven by structural North-South differences in the characteristics of the satellite towns and is going to vanish when we include municipal-specific variables related to the labour market or to the quality of housing.

The greatest differences in the coefficients concern the labour market: the correlation between house prices and the unemployment rate in the Centre-North is on average 3 times higher than in the South, while the negative relation estimated for commuting does not hold for districts located in the South, which exhibit a positive relation. These findings, not intuitive at first sight, could be related to the higher incentive for Southern households to settle down around metropolitan areas, characterized by a higher level of commuting. Similarly, the result for the unemployment rate could be biased by the LMA dimension, which rules out the metropolis-satellites relation that appears stronger in Southern regions.

Looking at the estimated parameters by urban status, we observe strong heterogeneity between municipalities located in different urban contexts. The results of the last two columns of Table 2 show that the coefficient for income in metropolitan areas is more than double what it is for other towns, confirming that the decision to settle down in municipalities located near a metropolis is closely related to greater income opportunities. Looking at the labour market we find, as expected, that the effect on house prices of the rate of unemployment is negligible in municipalities located within a metropolitan area, while it is highly negative in the other towns. In the same way, the effect of commuting is negligible in metropolitan areas, where the high flows towards the metropolis are at the basis of the agglomeration, while it is highly negative in the other towns. Finally, looking at the quality of housing, the results show that the correlation with house prices is stronger in the municipalities located outside of the metropolitan areas, which are presumably less affected by improvements in the housing capital.

8. House price gap and municipal characteristics for areas and urban status: a linear breakdown

In Sections 5 and 6 we produced some descriptive evidence suggesting that part of the geographical price gap observed in the Italian housing market appears to be related to local disparities in term of income and to the spatial distribution of the biggest cities. In Section 7 we performed a multivariate analysis in order to compute the magnitude of the correlation of some key socio-economic features of a municipality with local house prices levels. In this Section we use these results to estimate how much of the observed geographical price gap (North-Centre versus South) can be explained by differences in the observable characteristics included in the regression. To perform the breakdown we use the linear method developed by Oaxaca (1973) and Blinder (1973), originally used to analyse earnings gaps and to estimate the level of wage discrimination in the labour market, which also allows us to evaluate each covariate's contribution to the price gap.

The results in Table 3 (first column) show the predicted value of the log of house prices for the two geographical areas. Given the estimated gap, it can be entirely connected with differences in our covariates (in fact, the sum of the covariates exceeds the estimated gap, meaning that, on the basis of the endowments for the two areas, the gap should be even larger). The effect of town size is significant and negative meaning that, on the basis of the municipal population in the Centre-North and South, the house price gap should be even higher. The effect of being part of a metropolitan area is positive (i.e. helps explain the gap) but very small (less than 1 per cent), as are the effects related to the quality of housing. Looking at the labour market, about one fifth of the estimated price gap is related to differences in the unemployment and commuting rates. The key factor that can explain the geographical house price gap is per capita income, whose structural differences between the Centre-North and South account for about 80 per cent of house price

disparities: in other words, if the municipalities located in the South had the same level of income as those of the Centre-North, the price gap would virtually vanish.

We perform the same breakdown on the basis of urban status and estimate again a large price gap in favour of municipalities located in a metropolitan area. The structural differences between metropolitan areas and other municipalities explain two thirds of the price gap: of these, differences in size account for 40 per cent of the gap, while a further fourth can be imputed to the higher level of income registered in metropolitan areas. The differences related to the labour market and to the quality of housing are both negligible.

Table 3

Explanation of price differences across areas and cities

	Centre-North / South	Metropolitan areas / other towns
PREDICTION_1	6.989***	7.208***
PREDICTION_2	6.489***	6.810***
DIFFERENCE	0.500***	0.397***
EXPLAINED DIFFERENCE		
SIZE	-0.044***	0.158***
MA	0.004***	
INCOME	0.412***	0.107***
LABOUR MARKET	0.111***	0.011
BUILDINGS QUALITY	0.013***	0.003
OTHER VARIABLES	0.008***	0.001

Sources: Istat, Italian Tax Office. Oaxaca-Blinder decomposition; the dependent variable is the log of house prices (cross section over the period 2004-13). The size group contains the log of population, the MA is the dummy variable equal to one for municipalities belonging to metropolitan areas, income is the average income per capita; the labour market group contains the unemployment and commuting variables; buildings quality includes the building's_age and quality. The other variables include touristic and soil consumption variables. ***: the coefficient is significant at less than 1 per cent; **: the coefficient is significant at 5 per cent; *: the coefficient is significant at 10 per cent.

9. Conclusion

In this paper we present a descriptive analysis of local house price dynamics and levels in Italy. Looking at the differences in the housing cycles at the local level, while in the North West and in the Centre the housing cycle is quite evident and the turning points coincide with the national ones, with a similar progressive lengthening of the phases, in the South and in the North East price dynamics in the last 30 years are much smoother, particularly in the North East. This is connected with the lower weight and role of big cities.

Indeed, from the second part of the 1980s until the end of the last upward phase in 2007 in Italy the cyclical dynamics of prices was determined exclusively by the metropolises (with fast growth in the positive phases followed by sharp reductions), while for all the other towns the drop in the first part of the 1980s was followed by continuous, moderate growth lasting 20 years. Similar dynamics are apparent in the northern regions and Centre, while in the southern regions the biggest cities and other towns also exhibited similar dynamics, with smooth growth between 1987 and 2007.

When we turn to house price levels, geographical heterogeneity follows the typical North-South divide. Dwellings in the South are indeed much cheaper than in the North (in 2013 the average cost was about 40 per cent less than in the North West and 30 per cent less than in the North East) and above all in the Centre (about half). Our results show that house price levels are strongly affected by differences in household income: if we use an income-adjusted measure (i.e. the number of income annualities a household needs, on average, to purchase its own house) we observe a different scenario: while remaining very high in the Centre, prices in the North are one third lower than in the Southern regions. Price heterogeneity is also driven by the location of the metropolises: our results show that, if we exclude data from the 12 metropolises, income-adjusted prices register their highest value in the South, due to the exclusion of the Rome effect on the Centre.

Our results also show a heterogeneous effect of the presence of metropolises in different areas: once we exclude the effect of the centres (the 12 metropolises), the price gap between municipalities located in metropolitan areas and other towns is greatest in the South and smallest in the North. This finding corroborates the idea that given the higher concentration of amenities and job opportunities, households located in the South would perceive living in a metropolitan area as essential, thus affecting the demand for houses and their prices. On the contrary, for opposite reasons, settling down in the North in a metropolitan area turns out to be less critical, given that living in a town outside a metropolitan area does not preclude, on average, access to a number of amenities and opportunities considered as essential.

Finally, we perform an econometric analysis on a cross-section of municipal data in order to pinpoint the main correlations between economic structural parameters and house price levels. As expected, we find that municipalities with higher levels of income and population exhibit, *ceteris paribus*, higher house prices. Our findings confirm that living in a metropolitan area is associated with higher house prices, probably due to greater opportunities, in terms of amenities and income, given by proximity to a metropolis. Finally, we use a linear breakdown method based on the above regression to isolate the contribution of each covariate to the observed difference in house price levels between the Centre-North and South. Our results confirm that a large part of the gap is related to differences in income endowments, but also underline a strong effect of labour market conditions (unemployment rate and commuting).

REFERENCES

Accetturo A., Lamorgese A., Mocetti S. and Pellegrino D. (2017), 'Housing supply elasticity and growth: Evidence from Italian cities', Banca d'Italia, *mimeo*.

Adelino M., Schoar A. and Severino F. (2012), 'Credit supply and house prices: evidence from mortgage market segmentation', NBER Working Paper, 17832.

Allen J., Amano R., Byrne D. P. and Gregory A. W. (2006), 'Canadian City Housing Prices and Urban Market Segmentation', Bank of Canada, Working Paper, 2006-49.

Blinder, A.S. (1973), 'Wage discrimination: reduced form and structural estimates', *Journal of Human Resources,* 8, 436–455.

Bogdon A.S and Can A. (1997), 'Indicators of Local Housing Affordability: Comparative and Spatial Approaches', *Real Estate Economics*, V25 1: pp. 43-80.

Bogin A., Doerner W. and Larson W. (2016), 'Local House Price Growth Accelerations', FHFA Working Paper, 16-02.

Browning M., Gørtz M. and Leth-Petersen S. (2013), 'Housing Wealth and Consumption: a Micro Panel Study', *The Economic Journal*, 123 (May), 401–428.

Bry G. and Boschan C. (1971), 'Cyclical analysis of time series: Selected procedures and computer programs', NBER volume.

Burnside C., Eichenbaum M. and S. Rebelo (2016), 'Understanding booms and busts in housing markets', *Journal of Political Economy*, 124,4, 1088-1147.

Cannari L., D'Alessio G. and Vecchi G. (2016), 'I prezzi delle abitazioni in Italia, 1927-2012', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers) 333.

Cannari L. and Faiella, I. (2008), 'House Prices and Housing Wealth in Italy', Banca d'Italia, *Household Wealth in Italy*, Papers presented at the conference held in Perugia, 16-17 October 2007.

Cannari L., Nucci F. and Sestito P. (1997), 'Mobilità territoriale e costo delle abitazioni: un'analisi empirica per l'Italia', Banca d'Italia, Temi di Discussione (Working Papers), 308.

Cooper D. and Dynan K. (2013), 'Wealth Shocks and Macroeconomic Dynamics', http://www.brookings.edu/~/media/research/files/papers/2013/07/wealth-shocks-macro-dynamics-dynan/wealth-shocks-macro-dynamics-dynan.pdf.

D'Alessio G. and Gambacorta R. (2007), 'L'accesso all'abitazione di residenza in Italia', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 9.

Davidoff T. (2013), 'Supply Elasticity and the Housing Cycle of the 2000s', *Real Estate Economics*, Vol. 41, Issue 4, 793-813.

Fabrizi C, Pico R. et al. (2015), 'Mercato immobiliare, imprese della filiera e credito: una valutazione degli effetti della lunga recessione', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 263.

Favara G. and Imbs J. (2015), 'Credit supply and the price of housing', *American Economic Review*, 105(3): 958-992.

Ferreira F. and Gyourko J. (2011), 'Anatomy of the Beginning of the Housing Boom: U.S. Neighborhoods and Metropolitan Areas, 1993-2009', NBER Working Paper, 17374.

Fitzpatrick, T. and Mcquinn K. (2011), 'House Price Fluctuations: The Role of Housing Wealth as Borrowing Collateral', *Journal of Money, Credit and Banking*, Volume 43, Issue 1, 55–79.

Frantantoni M. and Schuh S. (2003), 'Monetary Policy, Housing and Heterogeneous Regional Markets', *Journal of Money, Credit and Banking*, 35.

Gyourko, J., C. Mayer and T. Sinai (2006), 'Superstar Cities', NBER Working Paper 12355.

Harding D. and Pagan A. (2002), 'Dissecting the cycle: a methodological investigation', *Journal of Monetary Economics*, vol. 49, issue 2, 365-381.

Harter-Dreiman M. (2003), 'Drawing Inferences about Housing Supply Elasticity from House Price Responses to Income Shocks', Ofheo Working Papers, 03-2.

Hsieh C. T and Moretti E. (2015), 'Why Do City Matter? Local Growth and Aggregate Growth', NBER Working Paper, 21154.

Lamorgese A and Petrella A. (2015), 'Le città italiane: definizioni, caratteristiche e crescita', Banca d'Italia, *mimeo*.

Manzoli E. and Mocetti S. (2016), 'I prezzi delle case e il gradiente centro-periferia: evidenze dalle città italiane', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 348.

Marino, M.R. and Zizza R (2012), 'L'evasione dell'IRPEF: una stima per tipologia di contribuente', Banca d'Italia, mimeo.

Muzzicato S., Sabbatini R. and Zollino F. (2008), 'Prices of residential property in Italy: Constructing a new indicator', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 17.

Nobili and Zollino F. (2012), 'A structural model for the housing and credit markets in Italy', Banca d'Italia, Temi di discussione (Working Papers), 887.

Oaxaca, R. (1973), 'Male-female wage differentials in urban labor markets', *International Economic Review*, 14, 693–709.

Panetta F. et al. (2009), 'L'andamento del mercato immobiliare italiano e i riflessi sul sistema finanziario', Banca d'Italia, Questioni di economia e finanza (Occasional Papers), 59.

Rondinelli C. and Veronese G. F. (2010), 'Housing rent dynamics in Italy', Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), 62.

Sinai T. (2013), 'House Price Moments in Boom-Bust Cycles' in *Housing and the Financial Crisis*, Glaeser E.L. and Sinai T. editors, NBER/University of Chicago Press.

APPENDIX

Table a1

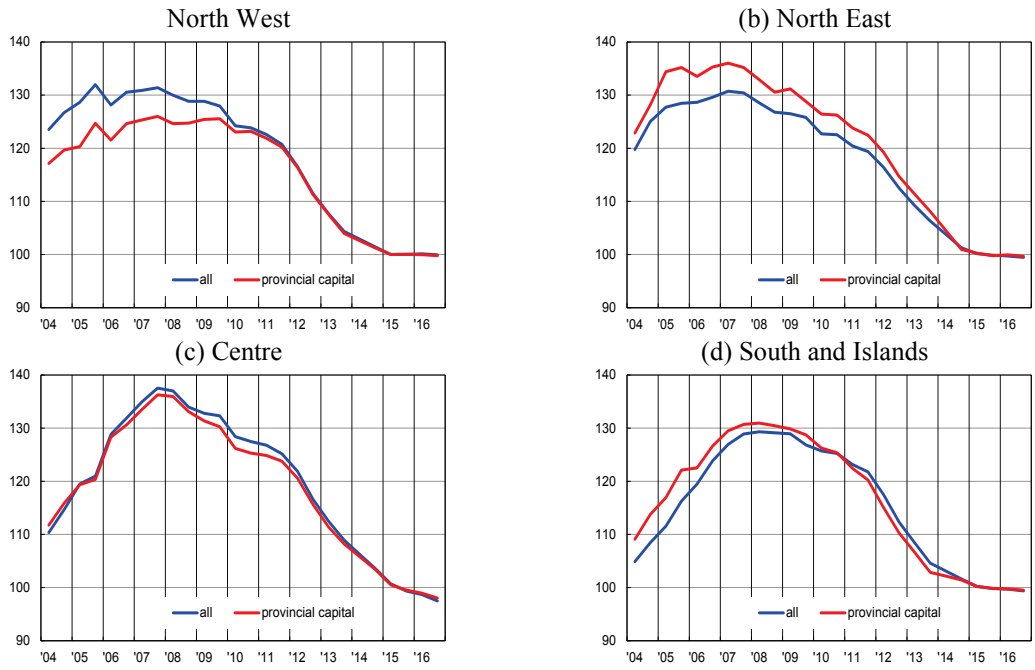
Metropolises in Italy

	1 def.	2 def.	3 def.
Rome (CE)	*	*	*
Milan (NW)	*	*	*
Naples (SI)	*	*	*
Turin (NW)	*	*	*
Palermo (SI)	*	*	*
Genoa (NW)	*	*	*
Bologna (NE)	*	*	*
Florence (CE)	*	*	*
Bari (SI)	*	*	*
Catania (SI)	*	*	*
Venice (NE)	*	*	*
Verona (NE)	*	*	*
Messina (SI)		*	*
Trieste (NE)		*	*
Padova (NE)		*	*
Taranto (SI)			*
Brescia (NW)		*	*
Reggio Calabria (SI)			*
Modena (NE)			*
Prato (CE)		*	*
Perugia (CE)		*	
Livorno (CE)		*	
Bergamo (NW)		*	
North West (NW)	3	5	4
North East (NE)	3	5	6
Centre (CE)	2	5	3
South and Islands (SI)	4	5	7
Italy	12	20	20

Figure a1

Comparison of house price indexes for provincial capitals and all towns

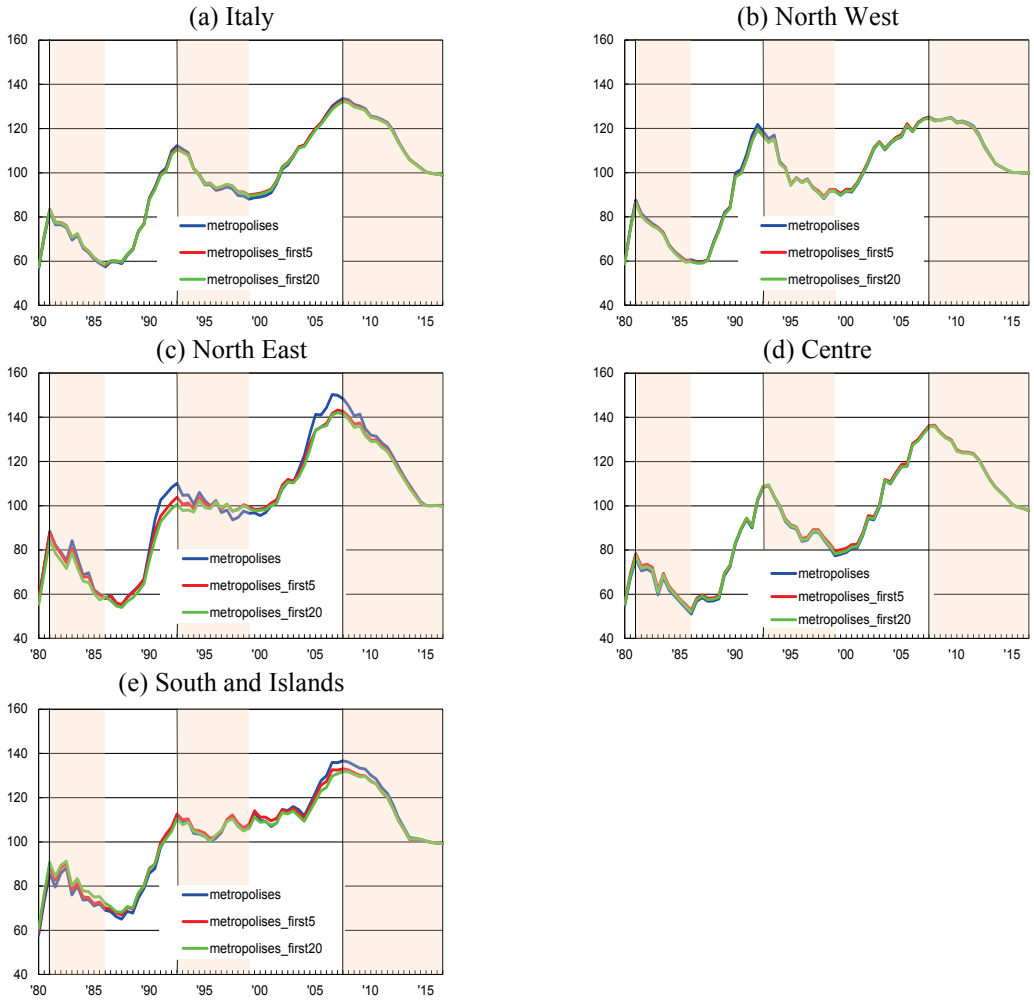
(index 2015=100)



Sources: Based on Bank of Italy and OMI data.

Figure a2

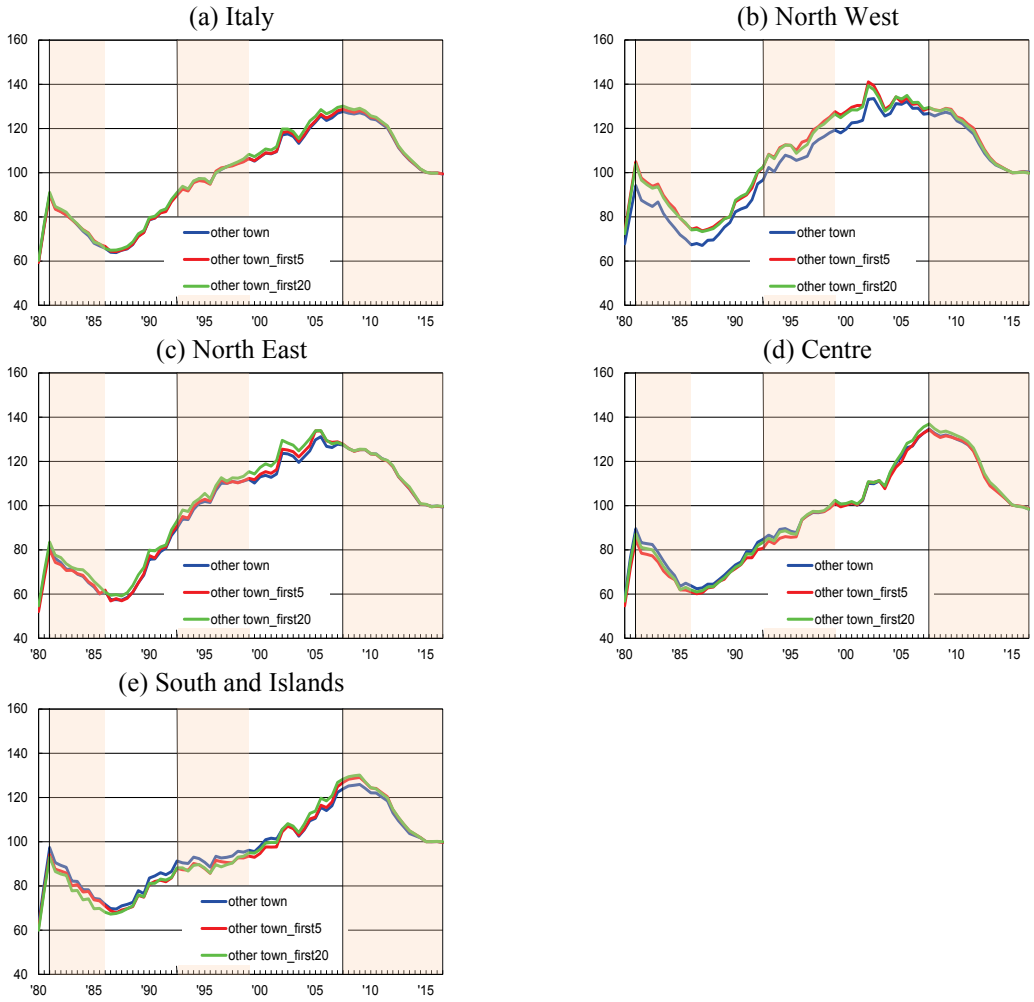
Definition of metropolises: dynamics (1)
(index 2015=100)



Sources: Based on Bank of Italy, CI and Istat data. Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle. The time series starts from 1980 because of methodological issues regarding the method of data construction.
(1) Metropolises are defined according to their dimension in term of inhabitants in 2001 and 2011 (last two Census data). Metropolises: towns with at least 250,000 inhabitants; metropolises_first5: first 5 most populous towns per area; metropolises_first20: first 20 most populous towns in Italy.

Figure a3

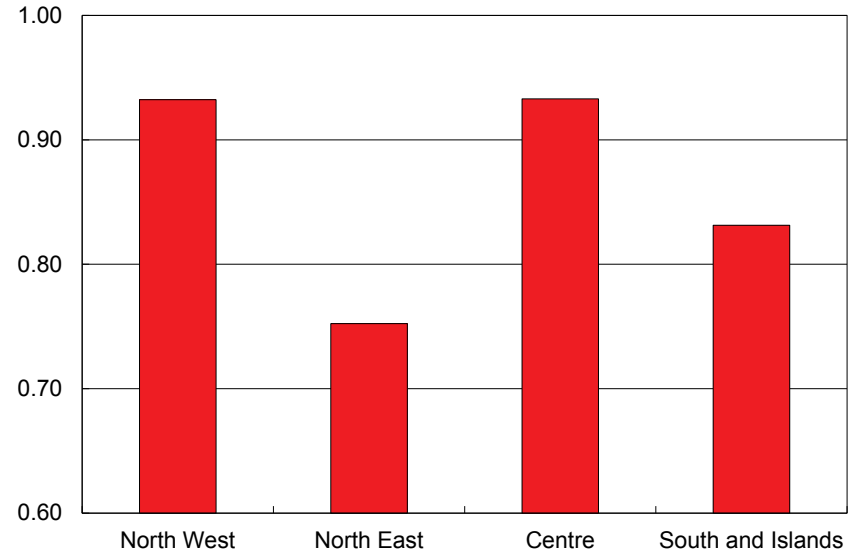
Definition of other towns: dynamics (1)
(index 2015=100)



Sources: Based on Bank of Italy, CI and Istat data. Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle. The time series starts from 1980 because of methodological issues regarding the method of data construction.
(1) Other towns are towns not considered metropolises according to the definition in Figure a2.

Figure a4

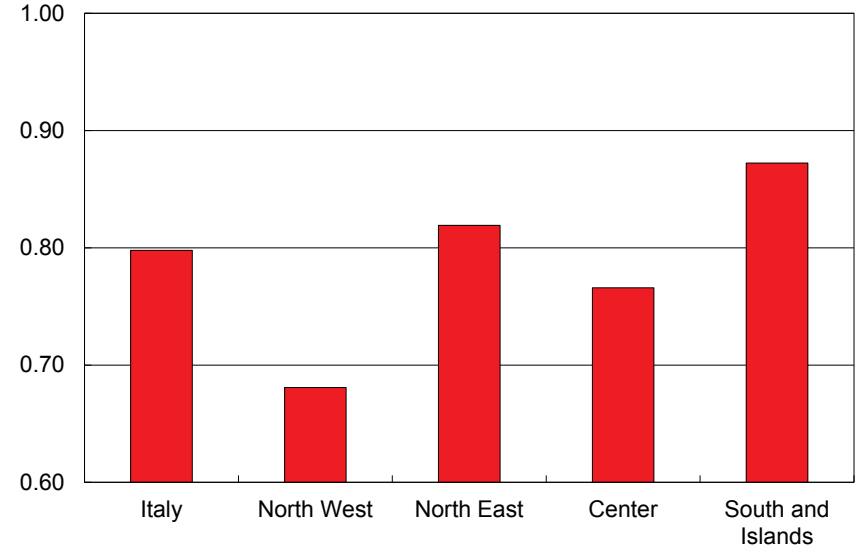
Synchrony in house price cycles in Italian areas with respect to the national one
(index)



Sources: Based on Bank of Italy, CI, OMI and Istat data.

Figure a5

Synchrony in house price cycles in metropolises and other towns in Italy and Italian areas
(index)

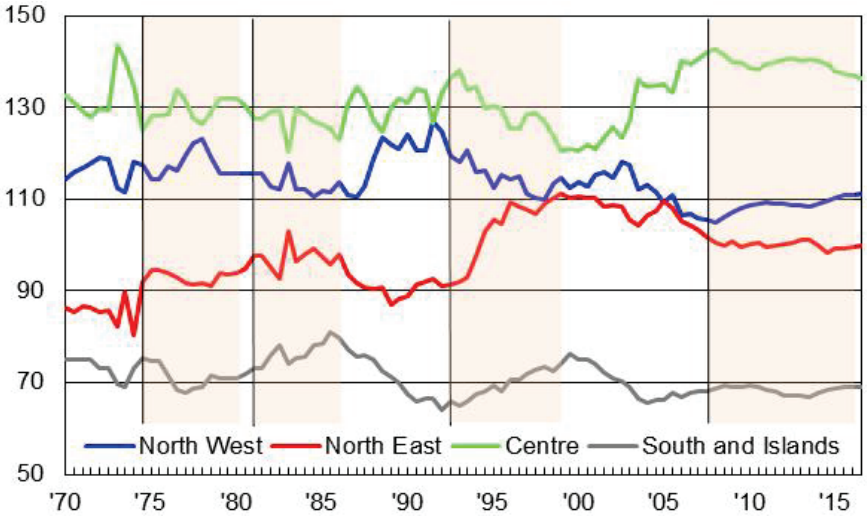


Sources: Based on Bank of Italy, CI, OMI and Istat data.

Figure a6

Disparities in house prices per square meter in Italian areas

(percentage values)

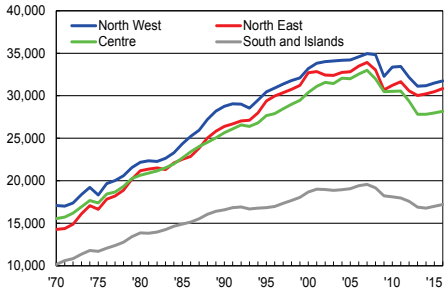


Sources: Based on Bank of Italy, CI, OMI and Istat data. Biannual data.
(1) Ratio between the average house price per square meter in the areas and the national average. House prices are coherent with Cannari-Faiella's benchmark for 2002. Vertical lines identify Italian housing market cycles; pink areas delimit the downward swing of each cycle.

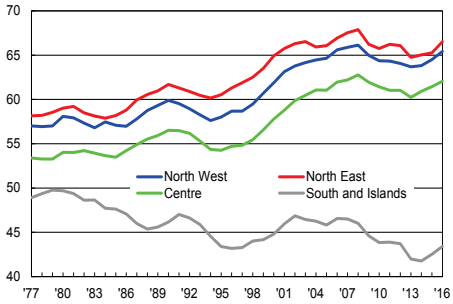
Figure a7

GDP, employment and population in Italian areas

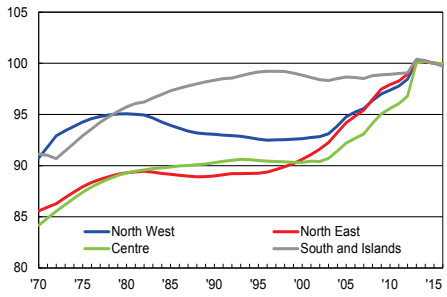
(a) Per capita GDP (1)
(euros)



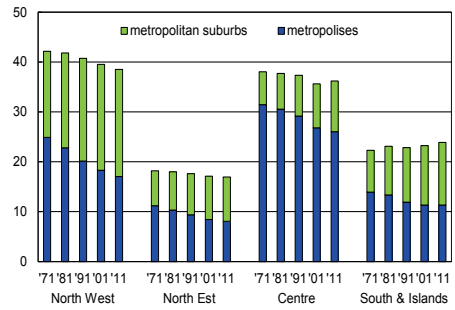
(b) Employment rate (2)
(percentage values)



(c) Population (3)
(index 2015=100)



(d) Population in metropolitan areas (4)
(percentage values)

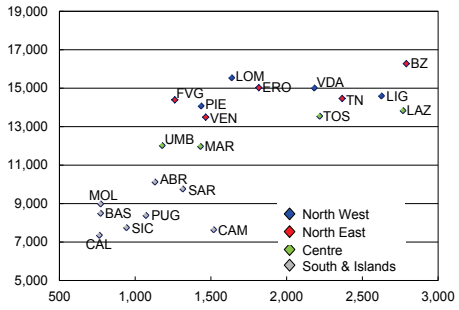


Sources: Our calculations on data from Istat and Crenos.
(1) Per capita GDP at constant prices obtained as GDP/population. For GDP Istat data from 1995 to 2015 and first estimates for 2016. Variation from Crenos' reconstruction between 1970 and 1995; for population Istat data as indicated in the note to Panel c. – (2) Population in 15-64 years cohort. – (3) Istat intercensual reconstruction of population between 1970 and 2011. Variation of residential population at the end of the year for 2012-16 years. – (4) Census data. Percentage of total population.

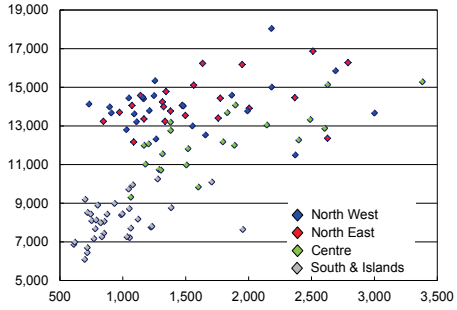
Figure a8

Income/house price correlation at regional and provincial level in 2013

(a) Regions



(b) Provinces



Sources: OMI for house prices (x-axis) and Italian Tax Office for per capita taxable income (y-axis). Average prices for the year.