Bubbles in Real State Markets: the case of Brazilian Northeastern Coastline (2005/2007)

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Abstract: The present article developed from the perception that the fast evolution of real estate prices in Brazilian Northeastern Coastline, especially in Natal (Rio Grande do Norte Capital) was worthy of investigation. Two of its components have been singled out as particularly relevant: the inflow of foreign capital in tourism and real estate and the evolution of real estate credit. The general purpose of this article is to present indicators developed in order to investigate the real estate market in Natal between 2005 and 2007. The data collected substantiates the hypothesis of a real estate bubble having been created in those years.

Key Words: Real Estate Bubble; Foreign Capital; Real Estate Credit

Introduction

Remarking that many assets have been the object of speculation over time, Kindelberger (2000) singled out the cases of investment in land, office buildings, commercial centers, condos and houses, which have risen to the status of true fads at certain times. The economic literature provides examples of recent cases of real estate speculation in Japan (in the 1980s)[5] and in the United States (for the larger portion of the first decade of the 21st century),[6] which, given their intensity, can be taken as instances of the so-called real estate bubbles.

Real estate speculation in the last decade was not restricted to the United States, but it extended to other central countries and also reached, to a larger or lesser degree, the developing nations. The spread of this phenomenon at an international scale was partly sustained by high international liquidity, which in turn was a product of the North-American monetary policy of low interest rates during a large part of the decade and of

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the reduction of barriers to the mobility of capitals resulting from processes of deregulation and financial opening in many countries.

In some countries, the real estate boom was closely associated with tourism, as made evident by the high number of building ventures aimed at foreign tourists. Examples of this phenomenon are the case of some regions of Spain, some countries in Southwestern Asia and, more recently, of portions of the Brazilian territory such as the Northeastern coastline. Many of these tourists were as much interested in making an investment as in purchasing a second residence in those destinations. The coastline of the Brazilian state of Rio Grande do Norte, and especially Natal, the capital city, attracted many visitors interested in the purchase of real estate, which contributed to warming up the local real estate market and to bringing together in the large tourism fairs in Europe construction companies and real estate agents operating in Natal. Even travel agencies innovated by maintaining real estate offices in their addresses. Following up on the boom in tourism and real estate, newspapers published a number of articles concerning the increase in prices of land and housing over the period and discussing the escalade in the development of apartment buildings.

The present article aims to develop indicators for assessing whether there were bubbles in the prices negotiated in the residential real estate market of apartment buildings in Natal between 2005 and 2007. In case the evolution of the indicators points in that direction, the article will also provide an interpretation of its causes. The main hypothesis can be formulated in the following terms: the heating of the primary and secondary markets of real estate property in Natal in the abovementioned period is a typical case of a real estate bubble and one of its main causes was the large inflow of foreign capital in the state for investment in this segment, followed by the expansion of real estate credit.

1. The phenomenon of Real Estate Bubbles

The literature on asset bubbles makes it clear that this is a challenging topic both for orthodox and heterodox economists. According to the conventional perspective, there is a bubble whenever the equilibrium price of a given asset steers away from the factors that determine its foundations,[7] thus pointing to three fundamental aspects: (i) the phenomenon is compatible with the hypothesis of rational choices (rational bubbles);

[7] Admitting the existence of a bubble implies acknowledging "speculative behavior" affecting the pricing of these assets (Black, 2002).

(ii) it may exist under exceptional circumstances, but if and when it occurs, it expands the dynamic efficiency of capital markets (bubbles in general equilibrium models) (Blanchard & Fischer, 1989: chapter 5); and (iii) the models of efficient markets (bubbles in the framework of efficient markets)[8] are highly debatable.

Theories regarding rational bubbles have suffered criticism in connection with their limited capacity to "be applied in the real world", with the fact that they "have nothing to say concerning the generation of bubbles" as well as with their *a priori* assumption of the mutual independence of the explanatory factors of an asset's fundamental value and the determinants of its speculative component (the bubble). As remarked by Canuto and Laplane (1995: P.42), "speculation still is a foreign body in the world of rational expectations". The seeming uneasiness, which is not surprising in the face of the positions voiced by the heterodox literature, has even reached manuals voicing the conventional perspective such as the one written by Miles and Scott (2005)[9].

The treatment of asset bubbles by heterodox authors also has to be assessed with care, especially concerning those who share Keynes's uncertainty principle, with its assumption that the agents' trust in their forecast can change. Thus, for Dymski (1998: P.83): "it is difficult to define 'bubbles' because the line separating solid investments from fragile ones is inconstant and changing over time". This author also notes, however, that the agents' decision-making can also be sustained in "institutional structures" generated by "behavioral conventions" that "are developed in aggregate structural scenarios that give shape to economic dynamics and determine limits for compatible results". (1998, P. 84) Nevertheless, the same conventions that in a given period promote "conditional stability" also generate "behavioral consequences" responsible for corroding the "apparent stability".

It is in this perspective that Dymski envisages the possibility of approaching economic cycles with conceptual frameworks capable of explaining the generation of asset bubbles (and their subsequent rupture) in the light of the Minskyan model. The asset bubble could be explained based on the relation between market prices (P^k) and production costs (P^I), reflecting changes in balance sheets caused by the agents' increased financial fragility in phases of expansion, the banking institutions playing an

[8] Canuto and Laplane (1995) quote models that seek to align the study of bubbles with the hypotheses of efficient markets and rational expectations. However, Oreiro (2004) points to Azaríads's work (1993) as a challenge to the hypothesis of a market's efficiency in the event of bubbles.

[9] "Many questions concerning prices in the stock market and changes in returns are difficult to conciliate with the idea that prices are the value deducted from the expected future gains and *also* that people have rational and coherent expectations". (Miles and Scott, 2005: P.447)

important role in the process. Thus, "according to Minsky, as the expansion period progresses, an asset bubble is created: specifically, a bubble is created when the ratio P^k/P^I is greater than 1 for a prolonged period of time". (Dymski, 2004: P.407)

However, other possibilities for approaching the asset bubble must be explored. The phenomenon can be related to the framework of equilibrium discussed in chapter 17 of Keynes's *General Theory*, which is sufficiently rich to encompass the analysis of the phenomenon at hand. In that chapter, Keynes explains that the demand for each class of assets is based on a consideration of the following attributes: (i) the potential generation of income from its ownership (profits, interest, dividends, rent, etc.), q; (ii) the expected cost of maintenance associated with the retention of the asset, c; (iii) the liquidity premium, l; and (iv) the expected appreciation or depreciation of its market values, a. All of these factors would be "measured by a quotient in which the denominator is the current spot price of the asset". The expected rate of return of each asset would thus be given by a + q – c + l. (Carvalho, 2007: P.5-6)

The treatment of the bubble seems to be compatible with the framework of chapter 17 of the *General Theory* provided one introduces an additional hypothesis accounting for a mechanism of interaction between attribute "a" and the price of the asset. The condition for a bubble to exist is that the expectation of appreciation, measured by this attribute, should respond to the increase in the current price. An initial increase in "a" promotes an initial increase in the rate of return of the asset and entails the expansion of its demand, which has a positive impact on its price. An additional hypothesis can be raised that the subsequent increase in prices creates the expectation of new increases, further affecting "a" and triggering another process of feedback. In this case, the creation of bubbles can be analyzed in the context of the equilibrium return rates among different assets provided such a mechanism of interaction operates by feeding back successive expectations of price increases. The appropriate concept for measuring the intensity of the feedback of price expectations is that of the "elasticity of expectations", formulated by Hick (1939).

Davidson (1972/8) proposed relevant arguments for the analysis of real estate bubbles. This author made an in-depth analysis of the components of attribute "a", identifying the mechanisms affecting the agents' investment decisions based on the attribute's variables, forward prices and spot prices. As a matter of fact, Davidson developed a theory regarding how the dynamics of spot and forward markets affect the agents' decisions and, as a consequence, the performance of the economy as seen in the prices

of assets. In this author's conceptual framework, there is a spot market whenever its corresponding price makes it possible to trade an available good produced in previous periods so that there is no excess demand or supply. In a forward market, there must be a change in the voulme of production of a given good for future supply, so as to comply with the terms of the contracts made with buyers; the forward price can also be seen as the price of the short-term supply flow.[10]

Through forward and spot prices, Davidson examines the mechanisms of stimulus to production and the effects of production on prices. He proposed that, in the short term, the spot price should be considered as equivalent to the market price for a given period, whereas the forward price should be seen as "the price that the investor envisages at the start of the production period". In this way, the evolution of demand has an impact on the levels of stocks and on the spot price. The comparison between the spot price and the forward price is thus the basis on which the investor makes his decision of production[11]. Therefore, in case the spot price is higher than the forward price, the difference induces the "restructuring of stocks" (backwardation), but, if the forward price is higher than the spot price, the increase in the levels of stocks, arising from an insufficient demand, will "decrease the level of production" (contango).

Davidson further notes that the institutional arrangements supporting spot and forward markets in some developed capitalist economies encourage people to speculate with different kinds of assets. (1978/1982; P.108) Thus envisaged, the mechanisms of spot and forward prices explained by Davidson can serve as indicators of the degree of attraction exerted by certain assets on investors seeking higher rates of return. In case the attraction is too strong, it can be seen as a stimulus speculation by itself. Davidson actually believes that speculation only finds its place in an uncertain world "in which changes in the underlying factors of the supply and demand ratio can never be anticipated with any certainty". The speculator believes he can "anticipate future events better than the market estimate can do with the currently available information." (1978/1982: P.108)

Adopting a perspective foreign to the New-Keynesians, another author that can contribute to the examination of speculative bubbles is Tobin (1969), who provides

[10] Short term "is the unit of time relevant for capital appreciation", comprising the production and negotiation periods (Macedo and Silva, 1999: P.77)

[11] The investment decision in turn requires the investor to make a comparative analysis of the forward price and the long-term supply price (in the microeconomic sense, meaning the variation in productive capacity).

subsidies for developing pertinent indicators for the analysis the phenomenon. Tobin's model analyzes the channels through which monetary policy can affect investment by distinguishing between two prices: Pk, standing for the price of preexisting capital (an indicator of the prices of stocks); and P, standing for the price of new capital goods (a general index of prices for the entire economy). "Tobin's q" is thus given by the coefficient Pk/P[12].

Besides identifying the effects of monetary policy on investment, Tobin's model can lead to another result. It shows how, by affecting the prices of assets, financial speculation has an impact on investment expenditure and on aggregate demand, thus "contaminating" the determination of production levels, real income and employment. A speculative movement affecting stocks, whose supply is inelastic in the short term, tends to increase prices, which are very sensitive to demand. It may therefore increase investment expenditure, expanding aggregate demand, production, employment and real income. By feeding back the demand for stocks, this process entails successive price increases and, over a long enough period, it can lead to the creation of speculative bubbles[13].

Taking Tobin's model as a reference, it is possible to point out that a similar mechanism exists in the real estate market. Just as in the case of stocks, the short-term supply of real estate is inelastic, since the production period corresponding to the building of real estate is relatively long, and its prices are also very sensitive to demand. Thus, if coefficient "q" is greater than 1, it signals a boom in the real estate market. If it is much greater, then it might signal a bubble.

The topic of the asset bubble raises yet another question, examined in detail by Dymski (1998, 2004), namely that it takes place in a given space, in an "economy enclosed within a frontier"[14]. According to this author, "the essential structural trait of asset bubbles is that they are inherently spatial and temporal phenomena" (Dymski, 2004:

[12] If aggregate q is greater than 1 (Pk > P), the price mechanism acts to foster the opening of new companies and/or to expand those already in operation and it inhibits the purchase of pre-existing firms in the stock market. In case q is less than 1 (Pk < P), the price system stimulates the purchase of pre-existing companies in the stock market, since it becomes relatively more expensive to establish new firms or to expand those already operating.

[13] According to the rationale of the model, such speculative processes tend to be reversed, since the perfect arbitration generated by the price mechanism expands the demand for recently built capital goods (exerting an upward pressure on their prices) and reduces the demand for pre-existing companies in the stock market (exerting a downward pressure on their prices), leading to a long-term equilibrium in which Pk = P and q = 1.

[14] According to Dymski (2004: 412), "the term is elastic on purpose: a country is an economy limited by frontiers, but this also holds true for a city in this country, a neighborhood in this city, a street in this neighborhood and even a house in this street."

P.412) This qualification entails the possibility that other phenomena than those described in Minsky's model might explain the creation of a bubble in a given economy: the absorption of (domestic and international) flows of wealth and/or population that exert pressure on the prices of assets in comparison with the real costs of production. Based on these considerations, Dymski analyses cases of creation of asset bubbles in different countries (such as Japan and Korea) and in a North-American state, California. In all cases, the price of real estate suffered upward pressures, resulting in the creation of real estate bubbles. The rupture of the bubble was invariably followed by the collapse of the prices of real estate and by severe financial turbulence.

2. The real estate market in Natal

The analysis of the factors that determine the real estate segment in Natal comprises different levels of abstraction. Firstly, at a higher level of abstraction, the general characteristics of this market must be identified in order to determine whether they point to the existence of spot and forward markets. Regarding the same question, but at a lower level of abstraction, the analysis must proceed to the regulatory framework through which public power regulates the use of land and defines the degree of scarcity of the basic input of construction, i.e. available land. The next step is the analysis of the connections between the development of touristic and real estate ventures, which recently resulted in the attraction of foreign investment to the state of Rio Grande do Norte. Finally, as construction and demand for real estate are usually also affected by the evolution of credit, the performance of the real estate credit market must be investigated so as to determine whether it stimulated or slowed down the real estate segment in the city.

2.1 Spot and forward markets and real estate regulation

Regarding the first factor affecting the shape of the real estate market in Natal, Davidson's work is the fundamental reference (1978/1982). Davidson lists the prerequisites for an asset to have well organized spot and forward markets: (i) it must be the object of a significant demand; (ii) it must be standardized; (iii) it must have a high level of replaceability (iv) it must have a reduced yearly supply flow as compared to the existing stock; (v) it must be durable; (vi) it must "be valued in proportion to its volume". The author points out, however, that the development of spot and forward markets themselves depends fundamentally on the yearly production flow being a small

proportion of the existing stock of goods and on the good being durable. The remaining conditions would be essential for these markets to become organized and perfect – including the existence of an institution that would act on the market as a residual seller and buyer (Davidson, 1978, P.94).

Based on Davidson, it is possible to say that properties traded in the large urban areas conform to the prerequisites for the development of spot and forward markets, since they are "durable goods" whose production flow represents a small proportion of the total stock of existing properties in a certain period of time. Furthermore, the institutional arrangements on which the supply and demand conditions are based are such as to ensure the existence of both markets: incorporation operations, with the consequent hiring of civil construction, represent the institutional space for the establishment of a proxy of the forward market,[15] whereas the existence of real estate companies, operating as a distribution channel by selling real estate ventures (sale of off plan properties) and by trading properties in the secondary market (third parties' properties), contributes to the depth of these markets – also by negotiating the rent of real estate property.

Therefore, although one can take real estate spot and forward markets to exist, the absence of the other attributes makes it impossible for them to have the depth and the liquidity necessary to make them perfect markets. The inexistence of an institution that operates as a market maker must be emphasized. This means that there is no agent that acts as a market stabilizer preventing prices to shoot up (by selling the necessary units to satisfy additional demand) or to drop (by purchasing when the supply of such goods is excessive).

The evolution of the real estate market in Natal can be analyzed in the light of this approach, given that the abovementioned agents act in the city to shape the spot and forward markets, imperfect as they are. The inexistence of an organized future market for these properties in Natal can be overcome for the purposes of analysis by assuming that the purchase of property off plan is a proxy of the forward market. Regarding the issue of the heterogeneity of the real estate asset, one way to circumvent the problem is

[15] Incorporators tend to plan real estate investments, negotiate the purchase of land from landowners and take on responsibility for costs associated with the incorporation process, which involves the funding of construction. The construction company, which signs a contract of construction and delivery with the incorporator, operates with an established price typically determined in forward markets. In periods of accelerated growth, in a real estate boom, the levels of prices and the availability of credit can provide a stimulus for construction companies to expand their activities and also operate in the incorporation segment.

to consider the production of properties of relatively similar characteristics, such as apartment buildings, which can be compared with each other if one takes into account the constructed area and the neighborhood in which the building is located.

At a less abstract level, an analysis of the major factors that shaped the evolution of the real estate market requires a consideration of the role of the institutions that regulate the occupation of land, since regulatory restrictions on some areas and the policies for incorporation of new urban spaces – made possible by the investment in infrastructure – also shape the availability of land for construction. As new land is a fundamental prerequisite for developing real state and is by nature non-reproducible, the supply of land determines the production rate of new real estate ventures. It therefore seems reasonable to suppose that, through their urban regulations and often with the support of environmental legislation, institutions can interfere with the level of scarcity of real estate on the market, especially in a context of sharp increase of the demand for new property.[16]

Regarding this regulatory framework, it should be noted that Natal represents a special case, with its less than 200 km^2 making it one of the smallest capitals in the country. Natal also has a high proportion of areas in which construction is forbidden – areas belonging to the armed forces (the Army, the Navy and the Air Force) and environmental reserves protected by law. The Park of the Dunes (Parque das Dunas) is an example of the latter case, occupying 15% of the total area of the city, as well as the mangrove areas. The public sector's perspective on the regulation of the city's expansion is expressed by the stipulations set forth in its Guideline Plan, such as the density of residential densification, the maximum use coefficient and Granting against Payment.[17] It ought to be noted that matters related to the regulation of urban expansion became widely discussed in the period under consideration and triggered heated polemics: in 2005, the premature saturation of the sewage system in Ponta Negra[18] as a

[16] The stocking of land for the purpose of private speculation, by ensuring the existence of empty spaces outside the market, also contributes to increase the shortage of land during the expansion of urbanization (Ribeiro, 1997). For the owners of this land, the carrying cost of these assets, including tax payment, will be compensated by the capital gains they expect to make when the land is sold at a supposedly higher price. Such an investment must be seen as part of a portfolio decision in which the opportunity cost appears as the payment of alternative assets.

[17] The density of residential densification corresponds to the maximum number of inhabitants per hectare, whereas the maximum capacity coefficient means the total area that can be occupied by the construction that preserves the permeability of the soil. Granting against Payment represents the cost incurred by the real estate investment in case it extrapolates the pre-established parameters for building in the area, provided the city council evaluates that the available infrastructure is compatible with such parameters.

[18] Ponta Negra is the neighborhood where the main sight of Natal is to be found, the *Morro do Careca*.

result of the excessive demand of the hotels on the coastline and of the recently established real estate ventures increased the control of the Secretary for Urban Regulation and the Environment (*Secretaria Municipal de Urbanismo e Meio Ambiente*, Semurb) on building permits in the neighborhood, thus contributing to the piling-up of pending requests. The northern portion of the city, identified by the incorporators as one of the most significant frontiers for the expansion of the real estate market, was the object of the city council's urban expansion regulation in the middle of the decade. Other restrictions were also enforced, such as the determination of a maximum height for apartment buildings, with the purpose of avoiding the construction of new skyscrapers.[19]

The increase in the price of land could indicate the relative restriction of new building areas in the city. Since a large number of real estate developers does not have resources to maintain stocks of land and given that financial institutions do not usually lend money for the purchase of land for real estate development, incorporators tend to resort to exchange to avoid spending money. The procedure consists of the waiving of land in exchange for a certain number of apartments, representing a portion of the total sum of real estate sales. Being frequently adopted by incorporators, this practice can be an indicator of the change in the price of land in the period under consideration. Whereas it traditionally amounted to between 10% and 12% of the total sum of sales, the exchange value reached the peak of 25% in Ponta Negra in the middle of the decade. With the increasing participation of national incorporators, it receded to 20% in late 2007 as far as the most expensive neighborhoods are concerned.[20]

The evolution of prices in Ponta Negra was not a random and isolated phenomenon. It was rather part of a larger movement that should be investigated in relation to the connection between the touristic and real estate segments. Common interests shared by these segments resulted in the promotion of an event called Boturn (*Bolsa de Oportunidades Turísticas e Imobiliárias do Rio Grande do Norte*, Rio Grande do Norte Touristic and Real Estate Opportunities Fair) in 2006, which had a second edition in May 2008.

[19] *Tribuna do Norte*, 18 August 2007.

[20] Clearly the scarcity of land can be relative, and all the more so when one compares the degree of vertical construction in a city such as Natal with those of São Paulo, Rio de Janeiro or Recife. However, the problem of cost resurfaces, since construction ventures will frequently need to purchase a further house in order to make its constructed area viable, entailing an exchange negotiation with at least two landowners, who might not have a simultaneous interest in waiving their properties against the promise of the ownership of apartments yet to be built.

2.2. Relations between tourism and real estate in Rio Grande do Norte

Regarding the explanatory elements sketched above for the understanding of the evolution of the real estate market in Natal, two aspects should be highlighted: (i) the association of the touristic and real estate segments also happened in other states of the Northeast; (ii) in some northeastern capitals, such an association also affected residential property. For the purposes of this study, the case of Rio Grande do Norte will be analyzed.

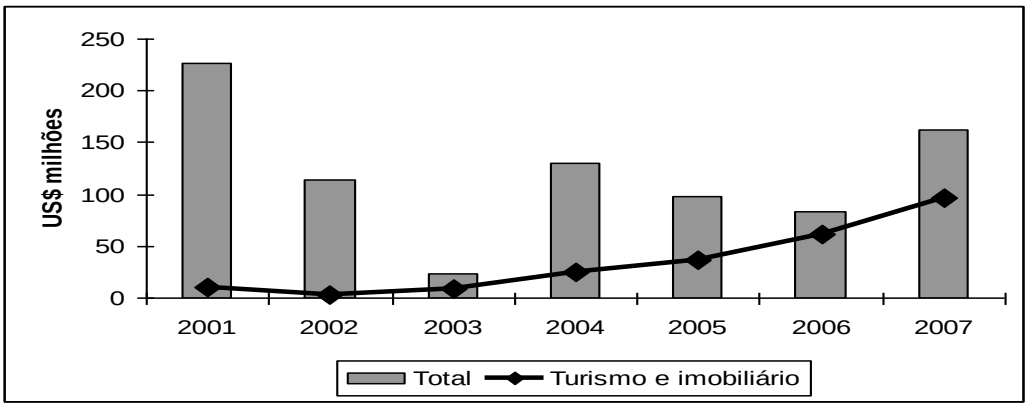
Between 1996 and 2007, there was a significant increase in the inflow of tourists to Rio Grande do Norte, both from Brazil and from abroad. The rates of growth of this inflow were of 12.55% and 18.65% in 1996 and 2007 respectively as related to the previous year. Although this is majorly a domestic market, the participation of foreigners has grown steadily and it almost doubled between 1996 and 2007. In 2007, the number of tourists that visited Natal – 2.179.925 people[21] – was 170% higher than its population of about 800 thousand inhabitants. The number of foreign tourists reached one third of the city's population. This evolution points to the development of mass tourism, necessitating a compatible supply of equipment and infrastructure and promoting significant investments in the real estate segment also by foreign investors in the last few years.

This phenomenon, which was not restricted to this one northeastern state, was stimulated by the investments of Prodetur/RN,[22] beginning in the mid-nineties, its first phase having been concluded in 2003. Data from the Brazilian Federal Bank concerning the inflow of private foreign capital in Rio Grande do Norte shows that foreign investment in tourism and real estate grew significantly in the first decade of the 21st century (Observatório das Metrópoles, 2009). According to Graph 1, the tendency of growth in the capital invested in tourism and real estate appears to be steady and independent of the oscillations in the total inflow of capital.

Graph 1 – Evolution of foreign investment in Rio Grande do Norte between 2001 and 2007

[21] Rio Grande do Norte Secretary of Tourism (2007)

[22] The Program for the Development of Tourism in the Northeast (*Programa de Desenvolvimento do Turismo no Nordeste*, Prodetur/NE) was an initiative of the governors in the region with the purpose of exploiting the touristic potential of the Northeast and inserting it in the circuit of the large national and international tourism operators. The Program received funding from the Inter-American Development Bank (IDB) and from the Federal Government (through the BNDES). In its first phase, investments contemplated basic infrastructure work, which was seen as the fundamental obstacle to the development of tourism in the Northeast and even to the attraction of private capital to fund it.



Foreign investment in tourism was mainly directed to building hotels, but also to other accommodation ventures, such as apartment hotels, condo hotels, closed condos (division of a stretch of land into horizontal lots in a condo), vertical condos, among others. (Ferreira et al, 2009: P.126)

Restricting the analysis to the years between 2005 and 2007, Table 1 shows that the participation of tourism and real estate in the inflow of foreign capital is the largest among the businesses taken into account, especially in 2006 and 2007. Activities related to these segments were consolidated as the main receivers of new foreign investments, accounting for 38% of them in 2005, 74% in 2006 and 60% in 2007. It thus came to displace oil and energy, the traditional major focus of investment in the state's economy.

Table 1 – Inflow of foreign capital in Rio Grande do Norte by segment (2005-2007, in R$)

SEGMENTS	PERIOD		
	2005	2006	2007
Oil and Energy	59.410.000,00	-	99.101.724,07
Food and Beverage	8.051.201,25	15.336.680,97	306.634,54
Agr. and agroindustry	56.015.762,61	20.861.160,99	904.181,89
Industry	2.908.694,06	1.023.419,65	484.078,58
Tourism and real estate	84.976.225,63	126.256.308,55	154.923.726,25
Electronics and hospitals	10.781.107,43	19.145,99	1.928.416,17
Others	808.218,21	6.419.042,23	1.122.574,11
Total	222.951.209,19	169.915.758,38	258.771.335,61

Source: Brazilian Federal Bank. Compiled by the Observatório das Metrópoles (Research Report).

Values converted into *reais* at the medium exchange rate and deflated by the the INCC, base year 2005.

Ferreira et al. (2009: P.129) note that from the total of foreign investment in Rio Grande do Norte in 2001-2006, 89.54% was European, Portugal being responsible for 56.41% and Spain for 13.55%. Based on data from the General Office of Immigration of the Ministry of Labor and Employment, Santos (2007: P.47) shows that between 2005 and September 2007, the increase in the inflow of foreign capital into the touristic and real estate segments in Natal was followed by an increase in the number of visas allowing the investor to operate in the state as an individual. In 2005, Rio Grande do Norte ranked at the top of the list of Brazilian states for the granting of this kind of authorization. In 2006 and up to September 2007, it occupied the third position, ranking only behind Ceará and São Paulo.

The demand for touristic and real estate ventures was manifest in a large portion of Rio Grande do Norte's coastline, including the capital city. In the words of Natal's most widely read newspaper: "Foreigners bought whatever was in front of them – lots, houses, dozens of apartments at once (...) They were not interested whether the place had any infrastructure or whether the purchase conditions were the best." (*Tribuna do Norte*, 2007) In Natal, the neighborhood of Ponta Negra, which concentrates a large portion of the city's hotel structure along with a significant part of the coastline, was particularly affected by the intense foreign demand that followed the devaluation of the real at the beginning of the decade.[23] Other neighborhoods of Natal were later incorporated in this process. Real estate agents report that about 30% of the demand for real estate in the city between 2005 and 2006 came from foreigners.

In the three years under consideration, however, the real estate market in Natal might have also been affected by the evolution of real estate credit in the state. In general terms, building ventures have significantly high costs, so that their supply and demand are sensitive to the availability funding. And funding is determined by a large number of factors, many of which are external to Natal and Rio Grande do Norte.

2.3 The evolution of real estate credit between 2005 and 2007

The recent evolution of house funding in Brazil has been associated with different factors such as the macroeconomic policy (with an impact on the interest rate), the issuing of a number of measures aimed at stimulating the segment (such as tax

[23] In an article published in the *Tribuna do Norte* in 18 August 2007, the peak of foreign demand in Ponta Negra is mentioned, when Portuguese, Norwegians, Italians and Spaniards wished to buy real estate, ensuring incorporators' profits above 40%.

reductions and institutional changes), the strategies adopted by financial institutions in the structure of their asset portfolio and finally the behavior of borrowers. After a long period of contraction in residential development – triggered by the collapse of house funding as from the mid-eighties, with a slight recovery in 1997[24] – a recovery of the cycle of growth in housing credit began to be sensed as from 2004 (Coutinho and Nascimento, 2006). For the purposes of the present paper, a few indicators that assist in sorting out the dynamics of real estate credit in Rio Grande do Norte will be reviewed.

Between 2005 and 2007, the volume of credit increased 37% in real terms, which entailed a proportional increase in relation to the GDP, from 28,1% in 2005 to 34,7% in 2007.[25] The same happened to real estate credit granted by the Financial Housing System (*Sistema Financeiro de Habitação*, SFH) and, more precisely, by the Brazilian System of Savings and Loans (*Sistema Brasileiro de Poupança e Empréstimos*, SBPE), including financial institutions that pool resources from savings accounts. The volume of housing funding rose from R$ 29.1 billion in 2005 to R$ 39.1 billion in 2007. A note should be made of the very restricted basis from which this growth began.

Table 2 shows the relative participation of real estate credit in the total credit granted in Brazil in relation to the GDP. In the years under analysis, it is noticeable that, in spite of the increase in housing loans, its proportion in relation to the total credit granted in the Brazilian economy remains low, at a little less than 5% of the total credit.[26] This restricted participation is also noticeable in relation to the Brazilian GDP, of which it represented about 1.5%.

Table 2 – Real state credit in relation to total credit and the GDP in Brazil (in %).

Years	Real estate credit/ Total credit	Real estate credit/GDP
2005	4.6	1.3
2006	4.7	1.4
2007	4.7	1.7

Source: Brazilian Federal Bank. Compiled by the authors.

[24] In 2007, the Real Estate Financial System (*Sistema Imobiliário Financeiro*, SFI) was created, whose funding "applies as much to residential as to commercial property, with resources based on the issuing of real estate receivables stemming from credit securitization by constructors and incorporators against their clients. However, this system amounts to less than 10% of the total real estate credit" (Coutinho and Nascimento, 2006: 146)

[25] The volume of credit in 2005, 2006 and 2007 was R$ 607 billion, R$ 705.8 billion and R$ 835.7 billion respectively. Data obtained from the Brazilian Federal Bank (*Banco Central do Brasil*) and deflated through the IGP-DI, base year 2005.

[26] Coutinho and Nascimento (2006) remark that the participation for private credit in housing funding amounts to 53% in Mexico, 26% in the United States and 21% in Chile.

Table 3 shows the participation of the Northeast and of Rio Grande do Norte in relation to real estate credit in Brazil.

Table 3 – Relative participation of the Northeast and Rio Grande do Norte in the total of real estate credit in Brazil in %)

Years	Northeast/Brazil	Rio Grande do Norte/Brazil
2005	5.18	0.05
2006	6.82	0.44
2007	8.04	0.38

Source: Brazilian Federal Bank. Compiled by the authors.

It is clear that the restricted number of years here accounted for demands additional care when interpreting the figures, since it is hazardous to speak of tendencies in these conditions. This having been said, it is noticeable that the participation of the Northeast increased in the granting of real estate credit over the years under consideration. The same happened in the specific case of Rio Grande do Norte, although a further proviso should be added here: Rio Grande do Norte's participation is so small that it is very risky to generalize about the evolution of this coefficient.

However, the market of real estate credit in Rio Grande do Norte underwent an expansion in the period under analysis, as did other states in the Northeast. Table 4 seeks to overcome, at least partially, one of the difficulties identified above, namely the reduced participation of Rio Grande do Norte in Brazilian housing credit, which would pose a serious obstacle to the analysis. Table 4 also makes it possible to compare the state's GDP against that of the total of the northeastern Brazilian states.

Table 4 – Rio Grande do Norte's participation in the Northeast's real state credit and GDP, in %

Years	Real estate credit (RN/Northeast)	GDP (RN/Northeast)
2005	1.12	6.37
2006	6.55	6.61
2007	4.58	6.59

Source: Brazilian Federal Bank and IPEADATA. Compiled by the authors.

It is noticeable that the state's participation in the credit granted in the Northeast grew significantly in 2006, when this proportion got close to Rio Grande do Norte's participation in the northeastern GDP. In general terms, Rio Grande do Norte's share of real estate credit was compatible with its participation in the Northeast's GDP in that year. In 2007, however, there was a significant reduction of the coefficient of real estate

loans in Rio Grande do Norte as compared to the northeastern total (about 30% in comparison with the previous year). It remained, however, significantly higher than the 2005 proportion, whereas the state's participation in the Northeast's GDP remained stable.

Table 5 shows the total volume of real estate credit granted in Rio Grande do Norte between 2005 and 2007. It reveals a significant growth, building up from a very limited initial amount. It seems reasonable to assume that the changes in real estate credit contributed to attract financial institutions and borrowers to the state.

Table 5 – Inflow of SBPE real estate credit in Rio Grande do Norte (millions of R$ in 2005 constant prices – INCC)

Years	Real estate credit	Variation (%)
2005	2.8	-
2006	39.8	1.327
2007	6.7	52

Source: Brazilian Federal Bank. Compiled by the authors.

3. Indicators concerning the real estate market in Natal

The purpose of this section is to develop indicators that can help to determine whether there was a typical process of creation of bubbles in Natal between 2005 and 2007. In those years, it was common for the city's newspapers to voice the perception of a significant increase in the prices of traded real estate property, not only in the vicinity of beaches, but also in other neighborhoods, especially those lying close to the city's main services, such as schools, universities, leisure facilities, commerce and hospitals.

As previously noted, real estate bubbles were created in central countries, especially in the US economy in those years. This process took place in a context of increased financial permissiveness, in which the search for profitability was associated with the expansion of risky credit operations, as exemplified by the market of sub-prime mortgages.

In the specific case of Rio Grande do Norte, the report concerning the inflow of foreign capital registered in the Brazilian Federal Bank demonstrates that foreign investment in the tourism and real estate segments underwent a significant growth in the current decade. (Observatório das Metrópoles, 2009)

This increase in the inflow of foreign capital invested in tourism and real estate contributed to the expansion of the supply of accommodation facilities and real estate property in the state and, more specifically, in the state's capital. It could be argued that this expansion was associated with the growing investments for the improvement of

tourism in the country as a whole, on the one hand, and with the expansion of supply as a response to the demand for housing, on the other.

Indeed one can not overlook the importance of projects aimed at improving touristic infrastructure as a significant factor attracting new investment to the real estate segment in the period, especially if one takes into account the geographical proximity between Natal and the developed countries of the Northern hemisphere, especially Europe. However, it is noteworthy that the supply of new real estate property went hand in hand with a significant increase in prices. This means that the prices of the local real estate market give signs of the creation of a bubble.

Leaving aside the question of the effect foreign agents on the real estate market in Rio Grande do Norte, representatives of the segment usually resort to the argument that prices moved upwards in Natal because of the demand for new investments. They claim that, for legal, environmental and financial reasons, the development of real estate property did not keep up with the potential demand in the 1990s. The repressed demand of that period, of hitherto unknown proportions, would have become clear only recently, when the volume of housing credit was expanded and funding conditions were improved.

However, the comparison between the characteristics of new investments in Natal – regarding the property's surface, location and price – and the state's profile of housing index, assessed by income by the Ministry of Cities and Towns,[27] requires the abovementioned explanation to be examined with caution. There is a clear mismatch of profiles, since the housing deficit is concentrated in families earning up to three minimum salaries, for which the solution resides in specific governmental programs such as the construction of popular housing.

The most conspicuous variable regarding the existence of a possible speculative bubble is the evolution of prices of real estate property, and especially of readily available property. If the neighborhood of Ponta Negra is taken as an example, there are cases in which the price of the square meter is above R$ 5,000. In the course of the period under consideration, as shown in graph 2, the variation of prices is significant, especially when the information is isolated by neighborhood. The variation of prices was in general above construction costs and inflation as measured by the period's IGP-M. In

[27] "Déficit habitacional no Brasil 2006", available on http://www.cidades.gov.br/secretarias-nacionais/secretaria-de-habitacao/biblioteca/publicacoes-e-artigos/Deficit%20-%202006%2006-05-2008.pdf/view. Accessed on 25 August 2009.

the neighborhood of Ponta Negra in particular, prices varied less, but the value of the square meter had already reached substantial values at the beginning of the period. As will be seen though the subsequent indicators, real estate speculation is more conspicuous in this neighborhood.

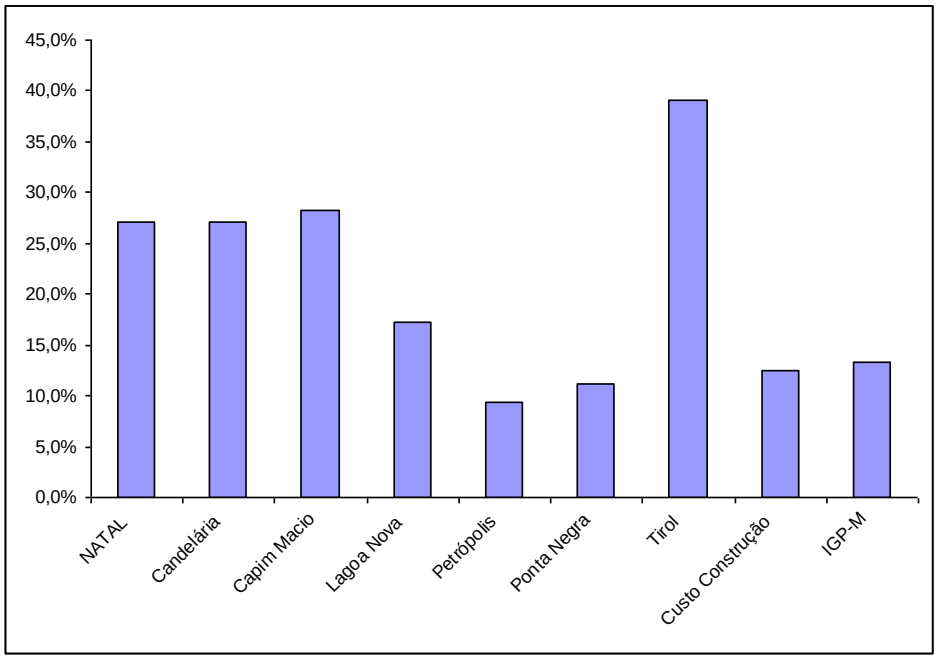
In order to make a more precise evaluation of the existence of bubbles, the indicators will take into account the evolution of readily available real estate property (spot price), that of off plan property (forward price), of rent, of construction cost in Natal as well as of the Selic Rate, taken as a reference interest rate indicator. The indicators are presented below along with the variables taken into consideration:

Real estate price Indicator (REP)

$$REP = \frac{(price\ of\ available\ property - price\ of\ off\ plan\ property)}{price\ of\ off\ plan\ property\ (1)}$$

The REP indicator will be compared to the Selic rate. Construction companies will compare this differential with the reference interest rates to assess whether it is best to sell the property only when it is ready or off plan. It should be noted that a price differential in favor of readily available property is an indicator that new constructions are an attractive business. When this difference is substantial, there might be signs of speculative movements.

Graph 2 – Evolution of readily available real estate property prices in Natal, variation of construction costs and of the IGP-M (2005-2007 %).



Rent and Prices Indicator (IR)

$$IR = \frac{rent}{price\ of\ readily\ available\ property}$$

The IR indicator aims to capture the mismatch of prices stemming from the creation of speculative bubbles in the prices of real estate property. Under normal operating conditions of the real estate market, the price of rent tends to be a constant fraction of the price of real estate property. In the presence of speculative bubbles, the price of real estate property tends to increase at a faster rate than the price of rent, thus causing a decrease in the IR indicator. It is possible to compare the evolution of this indicator and that of the interest rate, so that reductions in IR greater than reductions in interest rates indicate speculative movements.

Price and Construction Cost Indicator (IC)

$$IC = \frac{price\ of\ real\ estate\ property}{cost\ of\ construction}$$

The IC indicator provides an approximate measure of Tobins's "q" in the construction segment, since, in general terms, Tobin's "q" relates a company's market value to the cost of replacement of its assets. Values greater than 1 indicate profit-making, whereas values much greater than 1 suggest speculative movements. In Minskyan terms, a mismatch can be identified between the supply and demand prices of real estate assets.

These indicators span over the period between 2005 and 2007 and, whenever possible, are also isolated by neighborhood. The neighborhoods selected for detailed investigation here have been treated according to the principle of the sample's statistic relevance, also taking into account the dynamics of the real estate market in Natal. For this reason, our attention was particularly drawn to those neighborhoods in which a larger number of real estate properties was developed and that offer particularly attractive features, such as a developed infrastructure of touristic and other services.
According to these criteria, the following neighborhoods stand out: Ponta Negra (where the main beach in Natal is located and where many foreigners decide to invest because of the neighborhood's particularly developed touristic infrastructure); Capim Macio, Lagoa Nova and Candelária (besides being close to Ponta Negra, these neighborhoods are the major site of modernization and commercial expansion, offering a wide range of services such as shopping malls, supermarkets, universities, hospitals, etc.); Tirol and

Petrópolis (traditional upper-class neighborhoods, where the larger properties are concentrated, but also where ventures of greater commercial liquidity, namely apartments with an average surface of 100 to 150 square meters, started appearing in the period here analyzed). One should also take note of other important neighborhoods, such as Nova Paramirim (the city's expanding frontier of middle class and lower middle class real estate property, despite its being located in a neighboring municipality), Lagoa Seca and Barro Vermelho. Real estate property located in the suburbs was not included in the sample, since it is less subject to speculative movements in the terms explored in this paper.

The variables taken into account were:

Price of off plan property (determined in R$ and in R$/m^2): the data was collected from 71 real estate ventures launched in the period under consideration;

Price of readily available property (determined in R$ and in R$/m^2): some of these real estate properties are the same as the above, when those were launched and completed within our timeframe. The prices of the remaining properties were collected from the *Tribuna do Norte*,[28] the largest newspaper in Natal (regarding both its readership and the number of advertisements). Prices were collected in the weekends, in which the number of advertisements is larger, in the months of April, October and December of each year. This yielded a total of 1301 prices, 672 of which included information about the surface of the property.

Rent (measured in R$): information collected in the advertisements of the *Tribuna do Norte*. Prices were collected in the weekends of April, October and December of each year. This yielded a total of 1124 rent values.

Selic Rate: (%/year): information collected from the Brazilian Federal Bank. The yearly average was used in comparison with the properties' price indicator (REP).

Construction cost in Natal (determined in R$/m^2): information collected on the website of the *Caixa Econômica Federal*, from the survey of the National Civil Construction Cost and Indicator Survey. Annual values were obtained by calculating the average of monthly values.

Regarding the REP and IC indicators, the price of real property per square meter was used. As for the IR indicator, an approximation had to be made by comparing the price and the number of bedrooms, since very few rented properties advertised the surface in

[28] We have decided to restrict the analysis to a single newspaper, since the smaller newspapers tend to bring a smaller number of offers or the same offers found in the *Tribuna do Norte*.

the newspaper. It should be noted that indicators were established for all neighborhoods, even if for a given variable not all neighborhoods are accounted for individually in our tables.

The indicators are presented in the sequence by means of tables and graphs:

Table 6 – REP Indicator and Selic Rate

REP	Natal	Candelária	Capim	Lagoa	Ponta	Tirol	Selic Rate
2005	-0.101	insufficient data	0.18	0.120	0.209	-0.225	0.191
2006	0.180	0.125	0.18	0.061	0.116	0.058	0.153
2007	0.159	0.476	0.00	0.078	0.313	0.072	0.120

Source: the authors.

As previously argued, positive values of the REP indicator indicate an attractive potential for new building ventures. By comparing the values of the REP indicator with the Selic Rate (last column in table 6), one notices that, whereas the Selic Rate displayed a downward tendency over the period, the REP indicator moved up as much for the total of the city as for most neighborhoods. In relation to the first year in the series, only Ponta Negra and Capim Macio, neighborhoods with a high potential for attracting new investment, have an REP value suggesting the potential of new building ventures. This behavior probably means that the speculative movement was initiated in ventures located in these neighborhoods.

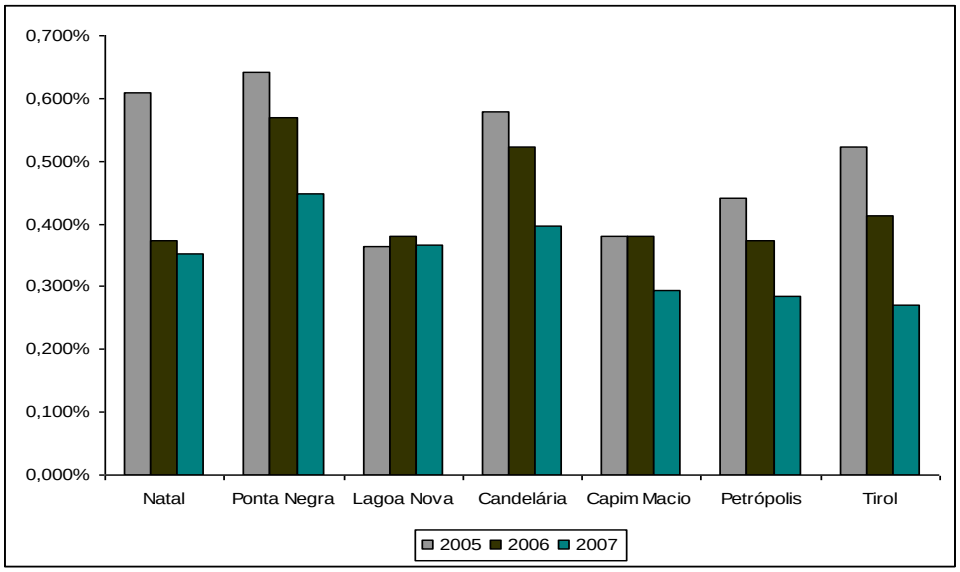
As pointed out above, in the case of Tirol there were many old and large properties, with few ventures launched before 2007. This special situation produces an overall low price per square meter for the available properties, since there is a larger number of old available properties as compared to new ones. One should not rule out the hypothesis that, among the properties advertized in the newspapers, there was a concentration of old properties with a low price per square meter in this neighborhood. However, if this was indeed the overall picture of the market in that region, there are substantial signs of an upward trend in prices for the other years, and the REP indicator becomes positive as from 2006.[29]

The overall evolution in Natal is the same for the first year of the series, probably for the same reasons sketched above. The attractiveness of new ventures increases over the period, beating the Selic Rate in 2006 and 2007. The increase in the prices of real estate properties was probably general, starting in the most expensive neighborhoods and then

[29] Under the headline "A raspa milionária", the *Tribuna do Norte* of 23 August 2008 mentioned the "glamour" of Tirol, which was then attracting large national incorporators. It advertised many ventures to be launched in the next few months in the neighborhoods in which the population had a higher purchasing power.

spreading to the others. One should note that the tendency moves towards the suburban neighborhoods: with the new route connecting Natal and the northern zone of the municipality, inaugurated in 2007, neighborhoods which had not sparked an interest in real estate ventures previously became the object of new construction ventures and saw an increase in the prices of the readily available properties.

Graph 3 – IR Indicator (Rent and Price)



Source: the authors.

In the case of the IR indicator shown in graph 3, one notices an overall decrease over the period under consideration, excepting the neighborhood of Lagoa Nova, whose value was maintained stable. Rents converged to between 0.3% and 0.4% the price of the property, which suggests that a new price range was established for rents in Natal that does not follow the evolution of purchase prices. In comparison, the prices in the largest Brazilian cities are situated within the range of 0.6% to 1% the price of the property, depending on the negotiation and on the property's state of conservation. If the prices of rent follow the evolution of purchase prices in a speculative context, they may become too high for the income of potential renters.

Furthermore, as shown in graph 2, the variation of real estate prices in Natal was superior to the variation of the IGP-M, the main index for readjusting the price of rent. The evolution of the IR indicator therefore suggests that there is a mismatch between the price of rent and the price of purchase, which is a symptom of the existence of speculative bubbles.

The graph additionally shows that, as a proportion of the price of the property, the price of rent amounted in 2007 to a little more than half of what it was in 2005 (it dropped from 0.61% to 0.35%) as much in Natal considered as a whole as in most neighborhoods taken in isolation. If compared to the evolution of the Selic Rate as presented in Table 2, the reduction of the IR is even more significant in the face of the reduction of the interest rate over the period. One can thus say that both REP and IR indicators suggest the existence of a bubble in Rio Grande do Norte's real estate market.

The price and construction cost indicator, an approximate measure of Tobin's "q" in Natal's civil construction market, was greater than 1 for the whole of the period, as seen in Table 7. Taking Tobin's "q" values being greater than 1 as an indicator of a possible boom, values much greater than 1 with a steady upward trend are sure indicators of a speculative bubble. The values observed in Ponta Negra provide an idea of the rhythm of the mismatch of prices and costs, since this neighborhood was the main focus of the speculative movement in the prices of real estate assets.

Table 7 – IC Indicator

IC	Natal	Candel	Capim	Lagoa	Petróp	Ponta	Tirol
2005	4.1	3.7	4.5	4.4	4.5	7.1	3.4
2006	4.4	3.7	3.9	3.3	3.5	5.6	3.6
2007	4.7	4.5	5.1	4.6	4.3	7.0	4.8

Source: the authors.

Phrasing the question in Minskyan terms, it could be said that the upward tendency of the price of available property in relation to the cost of civil construction indicates a strong mismatch between the supply and demand prices of real estate assets, which corroborates the hypothesis of a speculative bubble in the segment.

4. Final Remarks

Taking into consideration the evolution of all the indicators presented in this article, there is strong evidence for the existence of a speculative bubble in the price of real estate property in the city of Natal during the period under analysis. Furthermore, as pointed out at the beginning of the previous section, there was a significant expansion of the inflow of foreign investment in the segment, amounting to R$ 366 million in 2005 prices. In 2005, the inflow corresponded to 5.28% of the state's construction industry GDP, whereas in 2007 the percentage had gone up to 7.30%.

This foreign capital likely contributed to the creation and maintenance of the bubble by stimulating a remarkable appreciation of the prices of real estate assets. Furthermore, the funding made available by the SBPE for housing also rose in the period under consideration – such funding was of trifling relevance in relation to the inflow of foreign capital in 2005 and reached 32% and 35% respectively in the next two years' investments in the tourism and real estate segment.

This movement of the prices of assets was not limited to Natal and is comparable to other capital and larger cities in Brazil as well as in other countries. In the case of Natal, however, the bubble seems to have taken the form described in Dymski's model (1998), the inflow of foreign capital playing a decisive role in its generation. Additionally, one cannot offhand reject the hypothesis that the appreciation of real estate also attracted segments of the Brazilian population, thus contributing to the maintenance of a high demand and contaminating the prices of the secondary market.

Risks related to speculative bubbles are well known and have been exhaustively treated in the literature. Changes in the expectations regarding profit-making with new investments can entail movements of abrupt reversion of positions, thus weakening the agents trading in the real estate market along with other financial connections, as happened in countries that experienced comparable situations.

Surely the consequences of this process depend on the degree of risk involved in the agents' positions, these being directly associated with expectations and funding conditions, as well as with the evolution of the demand for real estate assets. From the point of view of those who simply want to purchase property for residential purposes, however, the price of the asset will remain prohibitive for as long as the bubble lasts.

A rupture of the hypothetical bubble in a touristic city such as Natal can be brought about by external as well as internal factors. Regarding the former, a steep and persistent decline in the number of foreign tourists or those from other parts of Brazil in the face of the excessive supply of touristic and real estate enterprises may trigger a deflation in the prices of these assets. The devaluation of the stock of wealth of agents that concentrated their positions in these assets may also initiate a movement of sale to liquidate the obligations stemming from the funding that was borrowed. Thus, if there is no compensation in the domestic demand for real estate in the city, a drop in the prices is to be expected. The local and/or national demand will depend on the conditions of housing credit prevailing in the country.

In this connection, it should be noted that Rio Grande do Norte had a small participation in the total residential funding made available by the SBPE in the Northeast in the period under investigation. The growth of this proportion in 2006 and 2007 resulted in Rio Grande do Norte reaching an equivalent of 30% of the loans granted in Sergipe, which is a curious number given that both states have approximately the same GDP. This might suggest that there is still a significant potential for expanding real estate credit in Natal, and therefore also for the expansion of its primary and secondary markets. However, in the event of the supposed bubble bursting, there is the tangible possibility of a restriction of credit on the part of the financial institutions, at least as far as housing funding for the middle classes is concerned.

The bursting of the local bubble might also be brought about by contractionist policies that could be adopted in Brazil and that could have a negative effect on this economy by two different means. The first of these is the steep decrease in the demand for tourism in Brazil, since it is an activity of high income elasticity. This could affect other businesses (supposing that the decrease in domestic demand is not compensated by the increase in touristic exports caused by an increase in the number of foreign visitors). The second means by which a contractionist policy could have a negative effect on this economy is through the recessive effect that such a policy would impose on the level of economic activity, employment and income in the state. Under such circumstances, it is reasonable to suppose that the demand for real estate property would drop, affecting the prices of these assets.

The preceding considerations are only preliminary remarks with the purpose of drawing attention to the fundamental property of a bubble – the fact that sooner or later it will burst.

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