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REAL ESTATE MARKETS IN BRAZIL'S SECOND-, THIRD- AND FOURTH-TIER CITIES

Renan P. Almeida

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REAL ESTATE MARKETS IN BRAZIL'S SECOND-, THIRD- AND FOURTH-TIER CITIES

Renan P. Almeida
Professor do DCECO/UFSJ e do
Programa de Desenvolvimento, Planejamento e Território (PGDPLAT)
renan@ufsj.edu.br

DCECO/UFSJ
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SUMÁRIO

RESUMO

O mercado imobiliário em cidades de rápido crescimento é um aspecto fundamental dos assentamentos humanos e fundamental para fomentar um sistema urbano nacional policêntrico. Este trabalho investiga os mercados imobiliários nas cidades de segunda, terceira e quarta camadas do Brasil. Utilizando um conjunto de dados único, o trabalho explica a variabilidade e cria tipologias de mercados imobiliários nas cidades selecionadas através de métodos multivariados. Esta abordagem permite compreender as variáveis mais relevantes para estudar os mercados imobiliários e mostra semelhanças e dissemelhanças. Os resultados indicam que os mercados imobiliários são bastante segregados dentro de cada aglomeração urbana. Dentro de cada uma delas, os mercados imobiliários variam substancialmente; fora de cada uma delas, há semelhanças intrigantes. A posição da cidade no sistema urbano não é um critério chave para ser classificada em um dado cluster. Essas conclusões são relevantes para a política habitacional, para os debates migratórios e para a relação entre os ciclos macroeconômicos e os mercados imobiliários.

Palavras-chave: mercado imobiliário; rede de cidades; habitação; aglomeração; urbanização; Brasil.

ABSTRACT

Real estate markets in fast-growing cities are a fundamental aspect of human settlements and key to foster a polycentric national urban-system. This paper investigates the real estate markets in Brazil's second-, third- and fourth-tier cities. Using a unique dataset, the paper explains the variability and creates typologies of real estate markets in the selected cities through multivariate methods. This approach allows for understanding the most relevant variables to study real estate markets and shows similarities and dissimilarities. Results indicate that real estate markets are quite segregated within each urban agglomeration. Inside each of them, real estate markets vary substantially; outside each of them, there are intriguing similarities. The city rank in the urban-system is not a key criterion for being classified in a given cluster. These findings hold relevance for housing policy, migration debates and for the relationship between macroeconomic cycles and real estate markets

Key words: real estate; city network; housing; clustering; urbanization; Brazil.

Classificação JEL: R3 – R14.

1. INTRODUCTION

Human settlements are essential dimensions of the development process, although these critical dimensions are sometimes overlooked in favor of macroeconomic considerations(Storper & Scott, 2003). Simple evidence is the fact that most of the countries' GDP is generated in a few urban agglomerations, and they are the privileged site for innovation and for welfare spillover. After the 1980s, a 'spatial turn' occurred in development studies, with leading economists studying the field (Martin, 1999). Many development institutions, such as the World Bank and the Inter-American Bank, have recognized the important role that cities play in the growth rate of a country, even labeling cities as "growth machines" (Turok, 2014). In this scenario, it is fundamental that policy makers have a comprehensive understanding of the relationship between cities' potential growth and the capacity to spread these benefits across the territory.

There are empirical shreds of evidence that in the early stages of a country's development, a single urban agglomeration or a small group of it may grow fast in a growth pole-like pattern, operating as a driving force to the whole national economy (Campolina Diniz & Crocco, 2006; Parr, 1999; Perroux, 1967). These poles buy inputs (raw materials, food and other agricultural inputs) from other locations, which in turn boost the national growth through backward linkages (Caceres & Seninger, 1980; Campolina Diniz & Crocco, 2006; Hirschman, 1965)[1]. Negative agglomeration effects, such as congestion and higher housing costs, create incentives for the economic activity to flourish in other locations, forming other tiers of urban agglomerations. The dynamics of this process may lead to a national urban-system(Behrens et al., 2014)[2].

In this broad discussion, the characteristics and functioning of real estate markets in fast-growing cities is a fundamental aspect to human settlements and to foster a more polycentric national urban-system. One peril of the development process is the second-, third- and fourth-tier cities getting expansive before achieving its full development potential. It may be an obstacle for firms and families who would like to move from the primary city to these emerging centralities. Closely related, urban wages premiums and human capital migration are also key aspects of the process of deconcentration in the national urban-system(Scherer et al., 2019). Let us assume that a skilled worker desire to move from first-tier cities due to the high cost of housing and congestion. In her choice, the second-, third-, and fourth-tier cities are natural sets of options, since they may provide jobs, a good level of amenities, and a similar way of living. Nonetheless, this migration heavily depends on these cities' real estate markets. Obviously, the cost of living is a wider variable, which includes a number of variables other than housing, but housing is the most important component on it(Acolin & Green, 2017). If Florida (2002) rhetoric was right, that is, if the growth of cities in the 21th century relies on the capacity of the city to attracted skilled and creative workers, so the "creative class" needs to face the real estate market in the attractive city.

Therefore, this paper aims to describe the real estate market in Brazil's second-, third- and fourth-tier cities. I use a new dataset provided by one of the main real estate brokers companies in the selected cities in the sample. From the best of the author's knowledge, it is the first attempt to describe the real estate markets of this group of cities together in the literature, and the first to use the methodology applied here. The paper creates a typology of real estate supply in the selected cities through multivariate methods.

[1]The growth-pole strategy was one of the most important regional development theory in the 20th century (Parr, 1999).

[2] On the nature of uneven development, see Dunford and Liu (2017).

This approach allows for understanding the most relevant variables to describe real estate markets in these cities. It also shows similarities and dissimilarities in real estate markets there. As results indicate, real estate markets are quite segregated within each urban agglomeration, understood as metropolitan regions or city-regions. Inside each of them, real estate markets vary substantially; outside each of them, there are intriguing similarities. The city rank in the national urban-system is not a key criterion for being classified in a given cluster, which indicates that the selected fourth-tier cities may be considered relatively expensive comparing with their position in the national urban hierarchy. This pattern may be one obstacle to migration. These findings hold relevance for housing policy, migration debates and for the relationship between macroeconomic cycles and real estate markets(Zhang et al., 2016).

The paper is structured in four sections besides this introduction. The next section presents a short literature review clarifying the Brazilian urban-system and the selected cities. Section 3 uses principal component analysis to describe the real estate markets and cluster analysis to create typologies of real estate markets in Brazil'ssecond-, third- and fourth-tier cities. Section 4 concludes and suggests further steps in research.

2. BRAZILIANCITY NETWORK

The emergence of second-, third- and fourth-tier cities is a phenomenon that has been taking place in many developing countries. Figure 1 depicts this process in Latin America and Caribe. In the Brazilian urban-system, the São Paulo Metropolitan Region's primacy rate has been falling since the 1970s, with a sprawl of manufacturing activities over other urban agglomerations in the Southeast, South and Center-West regions. Primacy rate is commonly understood as a measurement of the demographic preponderance of the largest urban agglomeration within a country in relation to the rest of its urban network (UN-HABITAT, p. 30). As Figure 1 shows, São Paulo and Rio de Janeiro (Brazil's majorurban agglomerations) grown less than the national average in the last decade, while Belo Horizonte, Fortaleza and Recife (third-tier) had pronounced growth rates. In this paper, Brasília is the second-tier urban agglomeration selected in this paper. These classifications are based on REGIC (IBGE, 2008), Brazil's official data on urban-system.

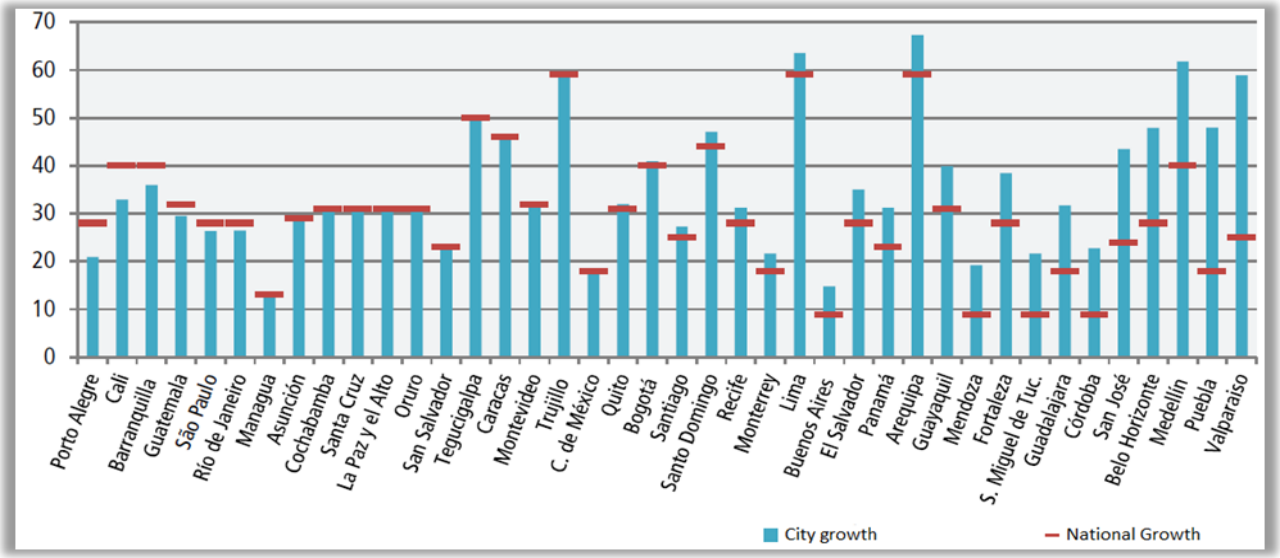

Figure1 - GDP per capita growth of the city and the country - LAC (2010)
Source: UN-Habitat (2012)

As the literature has been describing, the drop of São Paulo's primacy rate after the 1970s is not associated with a continuous concentration, either with a complete

dispersion. Indeed, the Brazilian urban deconcentrating process led to the formation of a "polygon", where the vertices are formed by the regional metropolises(Campolina Diniz, 1994).The urban agglomerations that compose the sample selected in this paper are some vertices of this polygon, such as Belo Horizonte, or are within it, such as Florianópolis. In addition, they are important enclaves or urban agglomerations that are not connected to the national urban system's main core, such as Salvador, which is also included in the sample in this paper. Although not making part of the country's core region, Salvador is a third-tier urban agglomeration. This pattern has been observed for other urban agglomerations in Brazil's Northeast(Scherer et al., 2019).

Moreover, Brazilian 'march to West' has been taking place intensely since the 1960s, with Brasília (the new planned national capital city) playing a key role as regional centrality and with the agribusiness (soya beans and cattle) invading the Center-West and the Amazon region (Castriota & Tonucci, 2018; Monte-Mór, 2014). Figure 2 shows this sort of polygon based on Campolina Diniz(1993). 23 years later, it is easy to suppose that now Brasília and Vitória are included in that Figure. As Savedoff (1990, 1991) and Scherer, Amaral, and Folch (2019) concluded, based on evidence from Brazil, the national labor market is strongly determined by the structure of the demand for labor. It means that skilled workers are more demanded in second-, third- and fourth-tier cities than in small cities.

Figure 3 shows the result of polarization analyzes based on economic linkages, geomorphological characteristics, and political and cultural identities. In this Figure, Brazilian map is reshaped according to the macro-poles; it highlights Belo Horizonte, Salvador and Brasília as macro-poles as well as it shows Vitória and Florianópolis as sub-poles within their main poles.

Figure 2 – Deconcentration axes and the industrial polygon in the 1990s
Source: Campolina Diniz (1993)

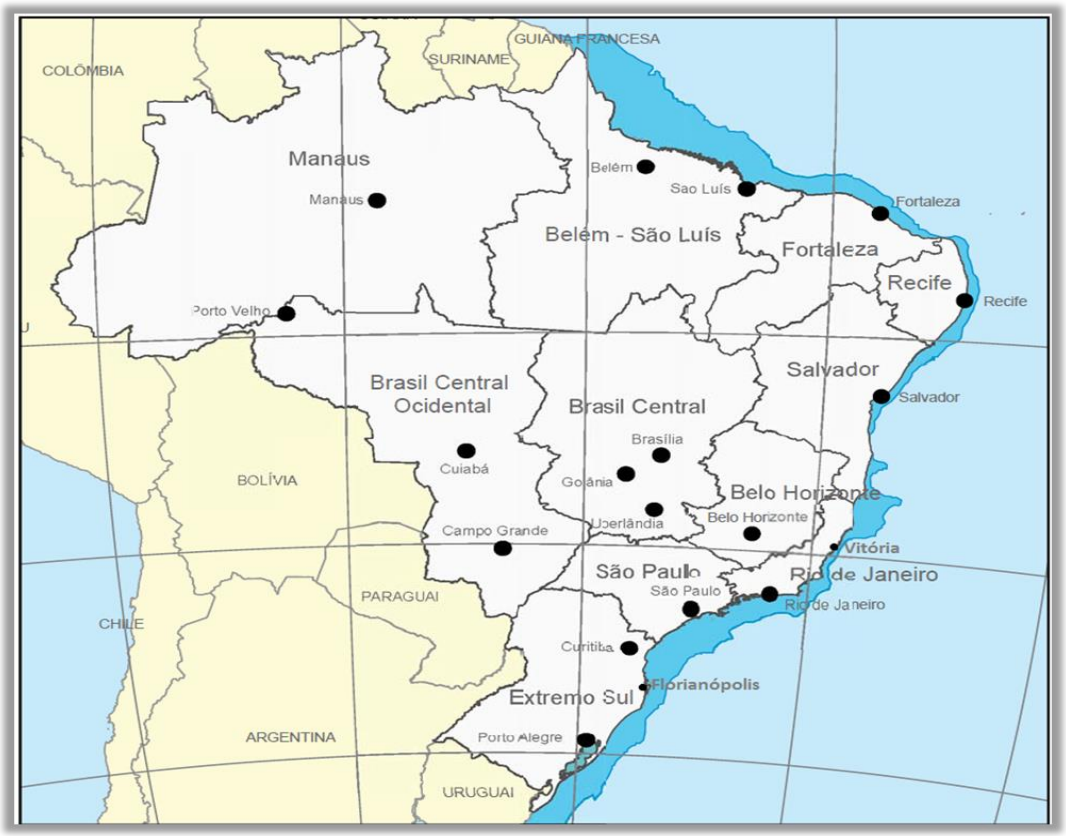

Figure 3 – Brazilian Macro and Micro-poles (2000s)

Source: Adapted from Brasil (2008)

3. REAL ESTATE MARKETS IN BRAZIL'S SECOND-, THIRD- AND FOURTH-TIER CITIES

This section shows and discusses the results of principal component analysis and cluster analysis. Before doing this, I explain the dataset and the methodology.

In the last years, a number of papers have been describing real estate markets in Brazil(Aguiar et al., 2014; Almeida et al., 2014, 2017; Campos, 2017; Furtado, 2007; Furtado, 2011; Nadalin, 2010; Paixão, 2010; Paixão & Abramo, 2008; Paixão & Luporini, 2019; Pontes et al., 2011). However, all these works focus on a specific city or urban agglomeration. Due to the author's location and data availability, all of them were about São Paulo or Belo Horizonte. Only very recent attempts for Brasília are known (Albuquerque et al., 2018).Different from the USA or China, there is no official index for Brazil's real estate markets.

Given the lack of consolidated and comprehensive data on real estate markets in Brazil, I use data from "Netimóveis", one of the biggest real estate brokers in Brazil. It provided a unique dataset with more than 30,000 observations for the selected real estate typologies. It is worth noting that this kind of sample tends to underrepresent informal markets. Moreover, Netimóveis has an uneven coverage of the national market, and that is why the selected sample has only five urban agglomerations: Brasília, Belo Horizonte, Florianópolis, Salvador and Vitória. Certainly, it would be great to have in the sample other third-tier urban agglomerations such as Porto Alegre, Curitiba, Recife, Fortaleza, Belém, Manaus and Goiânia, besides São Paulo and Rio. Within each of the selected

urban agglomerations, it was necessary to select some of the main cities. It leads to the sample exposed in Table 1.

Table 1 – Selected cities

State	Urban Agglomeration	Tier	Cities	Population	Annual Per Capita Income (BRL)	Area (km²)	HDI*
Federal District**	Brasília	2nd	Brasília	2,570,160	62,859.43	5,780	0.824
			Águas Claras	135,000	54,054.12	32	-
Minas Gerais	Belo Horizonte	3rd	Belo Horizonte	2,375,151	32,844.41	331	0.810
			Contagem	603,442	37,995.25	195	0.756
			Nova Lima	80,998	109,298.94	429	0.813
Bahia	Salvador	3rd	Salvador	2,675,656	18,264.13	693	0.759
			Lauro de Freitas	163,449	28,859.89	58	0.754
Santa Catarina	Florianópolis	4th	Florianópolis	421,240	32,385.04	675	0.847
Espírito Santo	Vitória	4th	Vitória	327,801	64,001.91	97	0.845
			Vila Velha	414,586	21,914.19	210	0.80
			Serra	409,267	33,039.02	548	0.739

Source: Author and IBGE Cities Database and REGIC (2007). *Human Development Index. **The Federal District has a different administrative structure, being Águas Claras and Brasília administrative regions/cities.

The sample included not only the capital city but also one or more cities in the urban agglomeration. This inclusion is crucial since the commuting process is getting more and more spatially extended, with the distance between the workplace and the home achieving tens of miles(Almeida et al., 2017; Soja, 2000; Sudjic, 1992). Parr(2005) defined the city-region exactly based on the commuting capacity of its residents.

Furthermore, the sample includes an urban agglomeration from each macro-region in Brazil, except North region (mostly formed by the Amazon region), which has a very particular scale and land use pattern(Monte-Mór, 2004).

I used the principal component analysis to summarize the information presented in the original dataset. I considered the following typologies: apartments, lofts, "kitchenettes" (small size apartments), houses, gated community houses, terraced houses, commercial offices, offices, stores, commercial points and industrial hangars. Each typology has two possible situations: for sale or for rent. The set of variables contains information such as price per square meter (m²), rent/m², number of rooms, number of bathrooms, parking space, and percentage of offers that accepts financing. These real estate typologies combined with the category for sale or for rent led to 27 variables, which represented the median value for these variables – the average was not used due to extreme values. Hence, PCA was a useful tool to synthesize so much information.

PCA results show that three components explain around 72% of the total variance. Figure 4 shows the variables and cities graph for two dimensions. According to Scherer, Amaral and Folch (2019, p. 13), "it is a useful tool since the angle formed by any two variables, represented as vectors, reflects their actual pairwise correlation. Also, on the graph, objects are distributed based on their similarity and attraction to each other." The direction and size of arrows represent the loadings for each one of the real estate characteristics and the position of dots represents the combination of scores of the first two components for each city. Águas Claras had no offer for renting houses, which made the software to exclude it automatically.

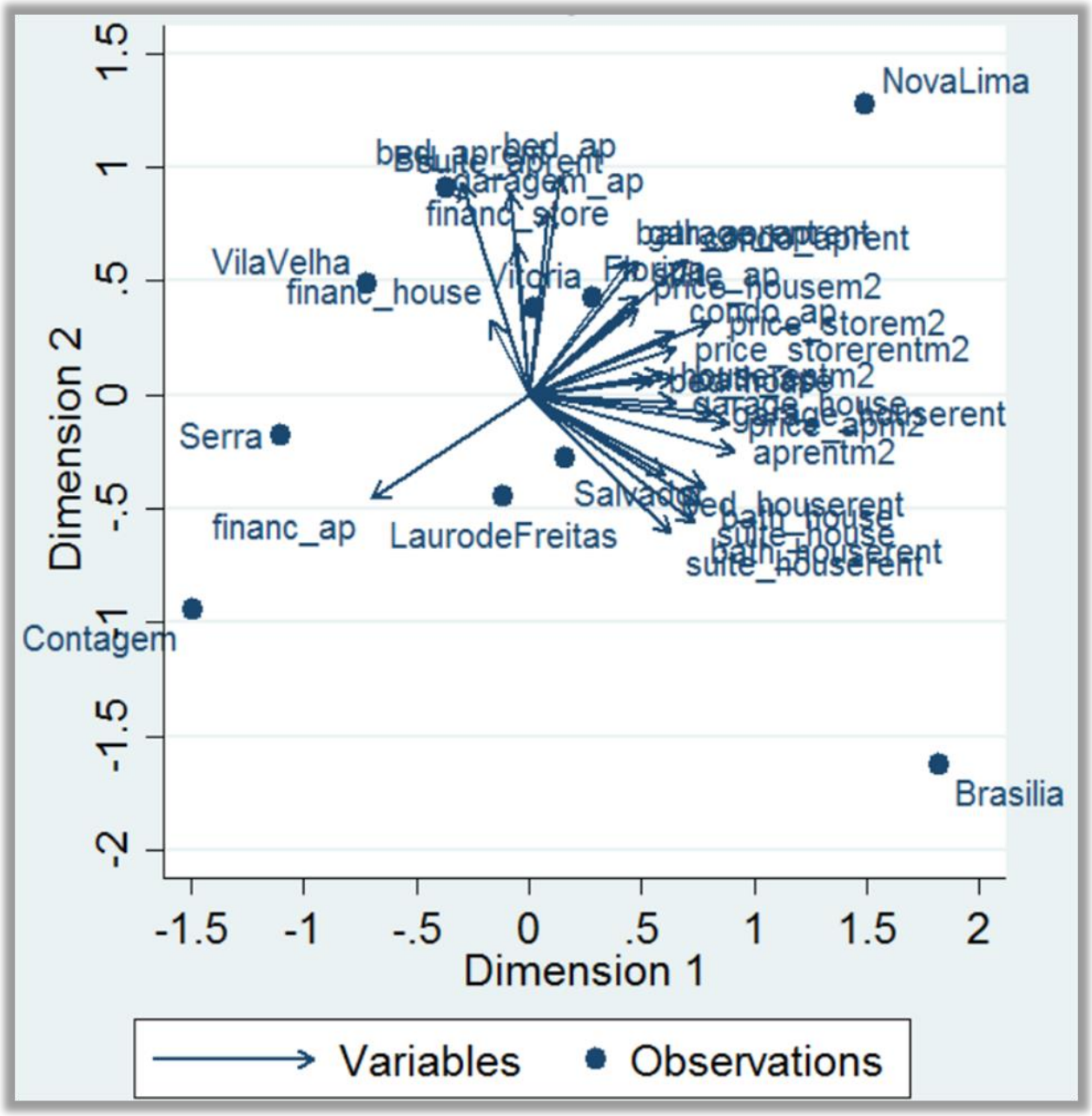

Figure 4 – PCA: variables, cities and two dimensions
Source: Author.

PCA results illustrate the distinguishing features of the selected cities' real estate market. Dimension 1 carries information regarding prices and rents as well as real estate's physical characteristics, such as the number of bedrooms and bathrooms. Cities with the highest prices/m² for residential uses have the highest values in this dimension (horizontal axis). It is the case of Brasília and Nova Lima. The former is the Brazilian capital city, and its dwellings are mostly described as expensive houses in the so-called "*Plano Piloto*", mainly close to the lake area. Nova Lima became, after the 1980s, a privileged space for Belo Horizonte's elites who decided to live in a house in a gated community(Almeida et al., 2017; H. Costa et al., 2006; S. de A. P. Costa & Perna, 2015). On the other side, cities such as Contagem and Serra are industrial cities, where dwellings are produced for middle classes and blue-collar residents. Moreover, these cities have large poor areas where the human settlements are marked by self-construction and informal land tenure.

The vertical axes (dimension 2 in Figure 4) carries information on apartments and commercial real estate. It is possible to say that it is an indicator of cities' verticalization. Some important variables in this dimension are the number of bedrooms, parking space and median rent/m² for apartments. Belo Horizonte is well known for its density (more than 7000 residents/km²), a high level for Brazilian standards. This verticalization sprawl to Nova Lima's borders, with a new centrality – "*Seis Pistas*" and "*Vila da Serra*" – having expensive apartments in high-rise buildings. That is why Nova Lima has both expensive houses (more distant from Belo Horizonte) and expensive apartments (in the border with Belo Horizonte). On the other hand, real estate markets offer more predominantly houses in Brasília. This configuration is one of the reasons that led Águas Claras to be occupied predominately for apartment buildings. Industrial and suburban cities, such as Contagem, Serra and Lauro de Freitas, are less verticalized.

Moreover, this dataset showed some other interesting characteristics of real estate markets in these locations. Vitória's and Florianópolis' (summed as "Floripa" to ease visualization) real estate markets are similar. Both are capital cities, islands, located in the state with the lowest GDP and population of its region (Espírito Santo, in Southeast, and Santa Catarina, in South). Both have expensive houses, apartments and commercial real estate.

The variable "percentage of offers that accepts financing" brought another interesting result. One could expect that high-income suppliers would be more used to deal with financing, but the result is the opposite: poorer cities have a higher proportion of suppliers who accepts financing. One possible explanation of is that people have lower incomes and wealth are not able to buy without financing. Proportionally, housing subsidies programs (such as Brazil's *My Home My Life*) are more relevant for real estate markets in cities like Contagem and Serra.

Results indicate that real estate markets are quite segregated in these cities. The variables that explain the variability in the sample do not depend much on proximity among the cities, but much more on the kind of land use or the profile of its residents. Real estate markets offer very different products in the same urban agglomeration. For instance, Belo Horizonte, Nova Lima and Contagem belong to the same urban agglomeration, but the most important variables for explaining their real estate markets are quite different. The same happens with Brasília-Água Claras and Vitória-Serra. Salvador-Lauro de Freitas is the exception in this sample. On the other hand, real estate markets offer relatively similar products in cities from different urban agglomerations.

From this discussion, a natural further step is to classify the similarities among the cities through clustering analysis. To do this, I employed a hierarchical cluster, since I did not have a previous suggestion of how many clusters I would have. Considering the full information provided by the dataset helped to have a better understanding of the similarities among these cities – better than just look in the PCA two-dimensional graph. I used the Ward method and 27 variables, including median calculations of real estate physical characteristics, prices and rents per city. The agglomeration coefficient was 0.86, suggesting a strong clustering structure.

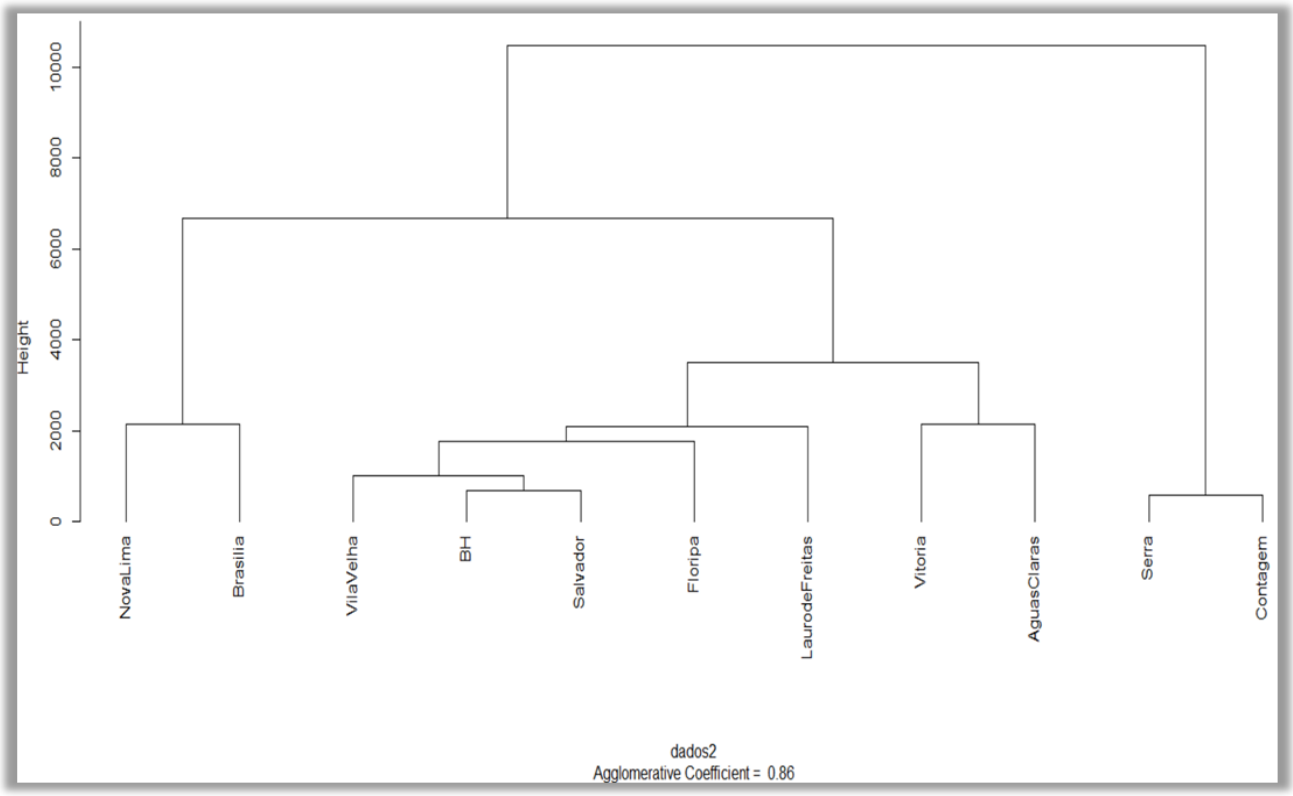

Figure 5 – Hierarchical Cluster – Selected Cities

Source: Author.

Figure 5 shows the dendrogram or treemap for the hierarchical clustering of the selected cities. Serra and Contagem form a cluster that one may call as industrial cities, have similar real estate markets with high levels of low-priced financed real estate, and humble residential houses with a low number of bedrooms and bathrooms, and large industrial real estates. On the other side, Nova Lima and Brasília illustrate cities occupied by the elites, who live in mansion houses close to lakes, and in some cases, expensive apartments. Vitória and Águas Claras are cities with small areas where the elites and the middle classes live in relatively expensive apartments.Nonetheless, Vitória is the capital city of a fourth-tier urban agglomeration while Águas Claras is a suburban administrative region in a second-tier urban agglomeration (Brasília). Real estate markets offer both houses and apartments in Vila Velha, Belo Horizonte, Salvador and Florianópolis. As the most populated city in each respective urban agglomeration, they still have diversified real estate offers in the same territory. Moreover, they are highly demanded places for commercial real estate in the respective local market. The capital cities still having relevant roles as commercial places and still offering a diversity of properties. Lauro de Freitas, as a suburban extension of Salvador, may be clustered together with these cities.

As PCA results also indicated, there is remarkable segregation in these real estate markets. Cities within the same urban agglomeration are not classified in the same cluster, whilst cities in different urban agglomerations are classified in the same cluster. A high-income homebuyer could pick a similar house in Brasília or Nova Lima, as a low-income homebuyer could pick similar housing products in Contagem or Serra. Being located in a second-, third- or fourth-tier urban agglomeration is not a key criterion for a property being classified in a given cluster. This result suggests that fourth-tier cities such as Vila Velha, Vitória, Serra and Florianópolis have relatively expensive housing offers considering their position in the national urban-system. Considering the per capita income level (Table 1), particularly Salvador (third-tier) and Vila Velha (fourth-tier) raises

concerns about their housing affordability, since they are clustered together with much more rich and developed cities such as Belo Horizonte.

Once cities of different tiers have their real estate markets clustered together, the macroeconomic policy may have mixed results over them. This result differs from Zhang's et. al. (2016) findings, who found similar impacts of macroeconomic exogenous shocks (e.g. interest rates) in cities of the same tier, in general.

4. CONCLUSIONS

This paper explored Brazil's real estate markets under the perspective of its urban-system. PCA and hierarchical cluster show how the selected urban agglomerations have a much-segmented spatial structure considering its real estate markets. Specific cities are destined to be the habitat of middle classes and blue-collar workers, such as Serra and Contagem, while in others the real estate markets produces expensive houses for the elites, such as Nova Lima and Brasília. It is a clear illustration of the division of labor in the space and of segregation. These forms of market segmentation take place both in second-, third- and fourth-tier cities.

A real estate being located in a second-, third- or fourth-tier urban agglomeration is not a key criterion for being classified in a given cluster of properties. One possible implication of it is that fourth-tier cities may be relatively less affordable than second- and third-tier cities, since cities of higher ranks in the urban-system offer higher urban wage premiums in Brazil, in general (Scherer et al., 2019).

The capital cities still having relevant roles as commercial places and still offering a diversity of properties. This fact is an evidence of how the Brazilian urbanization differs from United States, for instance, where the inner cities became decayed areas in many metropolises and the elites flew to suburban cities (Ehrenhalt, 2012; Harvey, 2014).

Further steps in this research will include more cities in the sample. As recent research had done, comparisons among different tier of cities may guide to important findings, both for macroeconomic and housing policy. For instance, the effects of interest rates on housing prices may varies in different tiers of cities(Zhang et al., 2016). In addition, spatial explicitly techniques could be employed to capture spatial effects, such as the neighborhood relation between capital cities and its urban agglomerations.

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