URBAN DETERMINING FACTORS OF HOUSING PRICES IN CHILE:

A STATISTICAL EXPLORATION[1]

DETERMINANTES URBANOS DEL PRECIO DE LA VIVIENDA
EN CHILE: UNA EXPLORACIÓN ESTADÍSTICA

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A partir de la implementación del Consejo Nacional de Desarrollo Urbano en Chile se ha puesto en marcha un Sistema de Indicadores y Estándares de Desarrollo Urbano. Uno de los principales problemas urbanos que enfrentan las ciudades chilenas es el aumento del precio de la vivienda. A raíz de ello, el presente estudio busca informar cómo los atributos urbanos influyen en los precios de las viviendas. Con tal fin, se catastran 2047 proyectos de vivienda para revisar cuáles indicadores de estándares de desarrollo urbano explican en mejor medida sus precios. Se aplica un análisis de componentes principales y regresiones lineales múltiples con las variables. Los resultados muestran una alta dependencia del precio sobre la autonomía financiera de las comunas e indican que la segregación residencial es incidental en cuanto a formación de valor de compra de viviendas.

Palabras clave: vivienda, precios, regresión, desarrollo urbano, evaluación económica

Starting from the implementation of the National Urban Development Council in Chile, an Urban Development Indicators and Standards System has been put in motion. One of the main urban problems faced by Chilean cities is the increase in housing prices. From this, the study looks to find how urban attributes influence housing prices. For this purpose, 2047 housing projects were surveyed to review which urban development standards indicators best explain their prices. An analysis of main components and multiple linear regressions are applied, together with the variables. The results show a high price dependence on the financial autonomy of the communes, and indicate that residential segregation is incidental to the formation of housing price value.

Keywords: housing, prices, regression, urban development, economic evaluation

I. INTRODUCTION

Housing prices in Chile are putting great pressure on household incomes (Vergara-Perucich & Boano, 2018). In 2019, the Chilean Chamber of Construction presented evidence to indicate that housing is becoming an unattainable asset for families (CNN Chile, May 10th, 2019). The lack of public housing provision systems, the increased role of financial entities in the real estate world, and the absence of price regulation systems, have allowed these values to exceed the payment capacity of an important part of households, generating a structural deficit that between 1998 and 2017 increased by 0.12%, despite that 498,444,111 UF being injected in the same period (Ministry of Housing and Urbanism [MINVU], 2021). Different approaches have presented findings about the way certain urban attributes explain part of house pricing. Cortés and Iturra (2019) state that facilities provided by the State tend to reduce the housing price, while those provided by the market tend to increase them. Encinas, Marmolejo-Duarte, Wagemann and Aguirre (2019) suggest meanwhile, that qualities related to sustainability are less relevant for consumers than the housing price, while the monopoly condition of the location allows explaining a large part of the sale price (Encinas, Aguirre, Truffelo & Hidalgo-Dattwyler, 2019). The commercial housing price in Chile is a critical aspect for households, but this is an issue that is lacking study. Specifically, this article explores housing prices considering the Urban Development and Standards Indicators System of the National Urban Development Council (SIEDU, in Spanish). Different studies have analyzed the makeup of Chilean house pricing using its built elements (Figueroa & Lever, 1992), typological qualities (Sagner, 2009), economic potential of the attributes (Iturra & Paredes, 2014; Quiroha, 2013), interest rates (Parrado, Cox & Fuenzalida, 2009), or the construction prices index (Silva & Vio, 2015). However, these works did not have access to the recently launched SIEDU, unlike what is expressed here, which mainly uses urbanistic elements. The findings of this research seek to complement previous approaches, privileging essential indicators for urban studies.

The purpose of this article lies in reporting the fundamental drivers of housing prices in Chile, starting from the urbanistic aspects reflected in the indicators for the 90 chosen communes. For this, 2047 new dwellings were recorded in Chilean cities with projects for sale in 2021. Complementarily, SIEDU indicators, which have data of the communes revised, were used to generate three approaches: a summary of variables with analysis of the main components, generated 11 synthetic components; a multiple linear regression to see which of the 11 components best explains the housing price; and a second regression with the 37 original variables.

The results indicate that financial self-sufficiency of communes, residential segregation, and deficit are predominant factors that push the housing price up. These data can contribute to econometric studies that work with hedonic prices to theorize the fundamentals of each preparation, apart from giving information to other types of studies that explore the makeup of the new housing price in Chile.

II. THEORETICAL FRAMEWORK

One of the most addressed topics in urban economics is the pricing of the property market. There are different approaches with different, though convergent, methodological emphasis (Evans, 1985). One of the precursors was Johann von Thünen, who set out the guidelines to understand the importance of location to define the value of a property (García Ramón, 1976), assumptions that would later be applied in the city and its centralities by William Alonso in **Bid Rent Theory** in 1964. These initial assumptions indicated that housing prices depend on demographic factors, like the purchasing power of the households (Taltavull, 2003). From a view that focuses on urbanistic factors, Berry and Garrison (1958) state that the attributes of each neighborhood contribute towards defining the value of properties. In a large part of the specialized literature, there is consensus about the link between housing price, location, and urban attributes (Fujita, Krugman & Venables, 1999).

Econometrics have allowed understanding the relationship between the produced space and the commercial value of the city. Said relationship can be virtuous when it influences developers to seek optimal urban designs. This was one of the contributions of Case and Shiller (1990), who demonstrated the spatial self-correlation between housing prices and urban qualities, linking the attributes of the housing with those of the neighborhood. The study of housing prices is nourished by the theory of consumption and the economics of behavior, starting from the contributions of Michael Ball (1973), who explains these values through "fundamental" traits, i.e., the attributes of each dwelling that determine their sale value. Later, Allen Goodman (1978) -inspired by the ideas of Sherwin Rosen (1974)- prepared a hedonic housing price index, demonstrating how the qualities of the neighborhoods explain a good part of the prices. Currently, this is the most used commonly method to explain housing prices (Sheppard, 1999; Yavuz Ozalp & Akinci, 2017). It is worth adding that Ball (1973) emphasizes the importance of generating broad statistical guidelines to carry out this type of studies, with
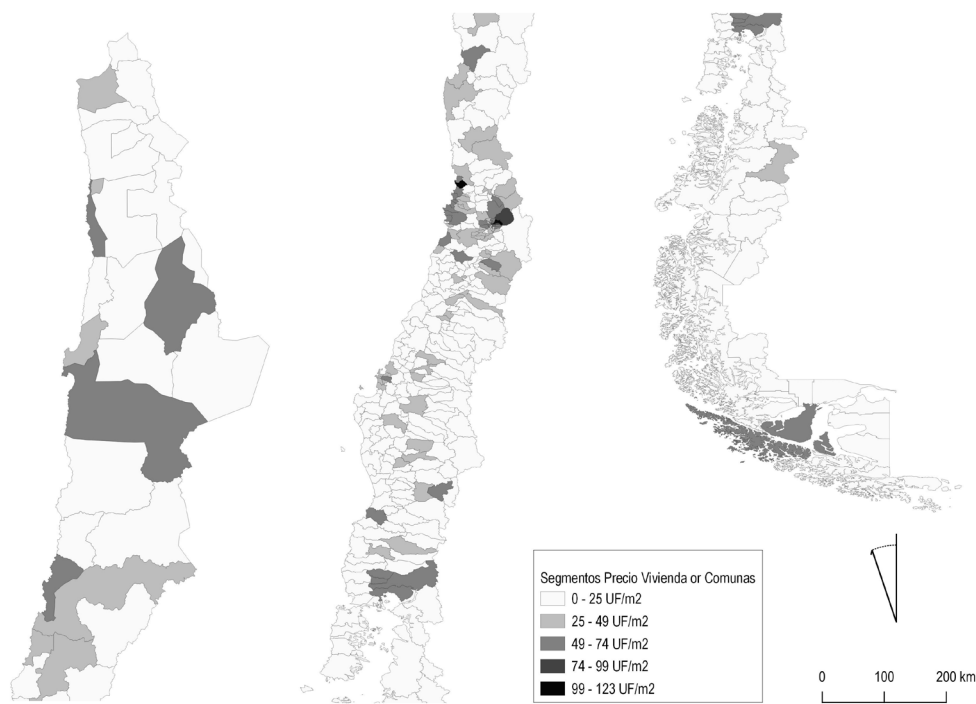
Figure 1. Price of new housing for Chilean communes, listed in UF/m2. Source: Preparation by the Author.

a sample representation that is statistically suitable for the tests, so that the conclusions generated are actually relevant in an issue as sensitive as housing.

In Chile, Figueroa and Lever (1992) propose as fundamental attributes in Santiago house pricing, the land surface, the presence of services and the socioeconomic level of the neighborhood, as well as the construction density. In 2009, Sagner identified the age of the dwelling and its surface area, as essential variables. Meanwhile, Paredes and Iturra (2014) say that this is about rental price, the number of bedrooms and bathrooms, the global housing quality index, the square meters, as well as the school level, age and gender of the dwelling's inhabitants (Iturra & Paredes, 2014). According to Quiroga (2013), there are less hierarchical variables of the dwelling, like the number of bathrooms or owners that live in their own home, which affect the price of a neighborhood. For Parrado et al (2009), the interest rates and the increased income of households are key, along with a good balance between supply and demand of housing units. In this same vein, Silva and Vio (2015) highlight the influence of macroeconomic variables like available rent, interest rates, and construction costs in the housing price.

The expectation of the future housing price is a vector for pricing, despite the fact that this phenomenon could leave room for future property bubbles if there are no suitable regulations in place (Cohen, Ioannides & Wirathip Thanapisitikul, 2016; Cohen & Zabel, 2020). Financial players have been taking a leading role in the land market, which may generate a problem of accessibility to housing (Gasic, 2018), since land value is a driver given their monopolistic condition (Encinas, Aguirre et al., 2019). The role of the subsidiary State in injecting resources to the property market more than participating in the system as a housing production player is added to this (Hidalgo, Dattwyler, Paulsen Bilbao & Santana Rivas, 2016; Razmilic, 2010).

The relationship between housing prices and urban variables, like those of the SIEDU, has not yet been explored. This becomes relevant when factors are added to housing pricing from urbanistic aspects, which is key to foresee how urban improvements with public funds increase prices, without capturing the gains (Vergara-Perucich & Aguirre-Núñez, 2020). Understanding housing pricing is, in fact, essential. Facing inequality of negotiation in free market economies, property prices

Distance to public squares	Average important intersections every 1.44 km2	Percentage of homes with family crowding situation
Public square surface area per inhabitant that complies with the distance standard (400 meters)	Number of casualties in traffic accidents per 100,000 inhabitants	Percentage of population in situation of poverty (income poverty -Ministry of Social Development (MDS))
Distance to public Parks	Number of people injured in traffic accidents per 100,000 inhabitants	Percentage of population in situation of poverty (multidimensional poverty - MDS).
Percentage of population attended by public square system	Amount (kg) of final urban solid waste disposal per capita	Advanced human capital segregation index
Percentage of population attended by public parks system	Residential electricity consumption per capita	Number of crimes reported in the public space per 100 inhabitants
Public green areas surface per inhabitant	Non-residential electricity consumption per capita	Percentage of non-built surface area (barren sites) in urban areas
Distance to primary healthcare centers	Rate of fixed internet residential connections per 1,000 private homes	Difference between highest and lowest land value, in homogeneous (urban) areas defined by the Internal Revenue Service
Number of full shifts of primary healthcare physicians per 10,000 inhabitants	Unavailability of electricity supply – Annual SAIDI indicator	Percentage of domestic investment at a communal scale where the council takes part as contracting institution
Distance to primary education establishments	Percentage of blocks with paving in good condition	Updated communal regulatory plan
Ratio between effective availability of openings and potential demand for primary education.	Percentage of private homes that require improvements of materials and/or utilities	Participation of Municipal Common Fund (FCM, in Spanish) in the total municipal revenue (discounting transfers)
Distance to preschool education establishments	Requirement of new urban housing	Communal Regulatory Plan (PRC) acknowledges historic conservation properties and/or areas
At least 8 blocks from public transportation	Percentage of dwellings in an overcrowding situation	Percentage of participation in municipal elections, by commune
Percentage of public investment destined to projects that have heritage property restoration intervention processes over the total investment destined to projects with favorable recommendation		

Table 1. SIEDU indicators used for the study. Source: Preparation by the author based on CNDU (2020).

will depend greatly on the class leadership financial players with great purchasing power transferred to property equity take, which will even be accepted by the market as a symptom of profitability, although it reduces access to houses for households with limited purchasing power (Harvey, 1985). An excellent way to identify speculation in the housing market is by measuring the distance between price and fundamental attributes (Coskun & Jadevicius, 2017; Dreger & Zhang, 2013; Gil-Alana, Dettoni, Costamagna & Valenzuela, 2019). With Chile being in a housing access crisis (CNN Chile, May 10th, 2019), acknowledging how separated its housing price is

from its essential variables, requires identifying the factors that determine that relationship.

III. CASE STUDY

The research focused on 90 communes where the average prices of new housing was recorded, for houses and apartments. The data was collected from the websites, TOCTOC.com, Portalinmobiliario.com and Pabellon.cl, between December 2020 and January 2021. 2047 offers were listed: 554 houses and 1493 apartments. The average

new housing price at a national level was 48.4 UF/m². The values at a communal level are summarized in Figure 1.

IV. METHODOLOGY

To evaluate the urban drivers of housing prices, work has been done using the Urban Development Standards and Indicators System, SIEDU. These indicators emerge from an agreement between the National Urban Development Council (CNDU, in Spanish), the Ministry of Housing and Urbanism (MINVU, in Spanish) and the National Statistics Institute, to measure urban quality of life to reduce inequalities, as well as to monitor the effectiveness of urban and housing policies (Spatial Data Infrastructure [IDE], 2021).

SIEDU considers 76 indicators for 117 communes with more than 50,000 inhabitants (CNDU, 2020), but not all the communes register data for the 76 indicators, so the number of indicators being analyzed had to be reduced, to allow a higher number of communes to enter the study. As some communes did not have projects, the decision was made to work with the 90 that did allow completing the sample of the 37 indicators. Despite the reduction, the sample continues to be varied and offers richness for the analysis, which could be compared in the future with new studies, similar to that presented in this article, but that use updated versions for all communes and all the variables of the SIEDU. It was later determined to recalculate the "Segregation index of vulnerable population" indicator with census data, applying a dissimilarity index. SIEDU did not have complete information on public transportation, so the CASEN 2017 survey was used, through which the proportion of homes at least 8 blocks from bus stops was identified. Ultimately, the indicators used in the end, are shown in Table 1.

Once this is defined, the principal component analysis technique (PCA) was applied as well as multiple linear regression. PCA is a study of the variables, whose purpose is to verify which of these have least correlation, breaking down self-values into matrices (Lalloué et al., 2013). The resulting factors generate new groups of variables, reducing the sample size, to thus facilitate the regression study (Addendum 3). A multiple linear regression was made with the main components (Cai & Liu, 2015; Rebelo, 2009), testing the influence that components have on the average housing price by commune, using the following formula:

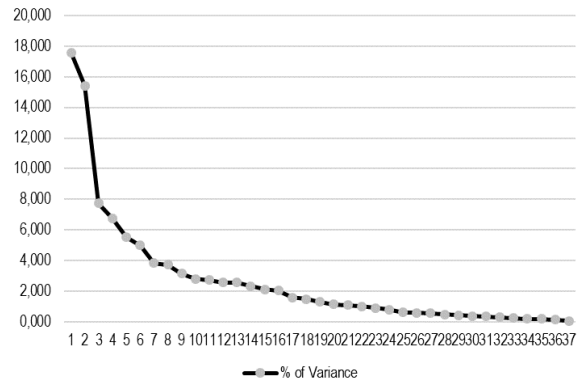$$Y = (\beta_0 + \beta_1 X_{1i} + \beta_2 X_{1i} + \cdots + \beta_n X_{ni}) + e_i \qquad (1)$$

Figure 2. Variance percentage explained for each resulting component. Source: Preparation by the Author.

Where,
β_0: the value of variable Y when all predictors are 0
β_i: the weighted effect of the increase of a unit of variable Xi over variable Y
e_i: residual between the observed and estimated value of the model.

V. RESULTS

The application of PCA generates 11 components that summarize 71.6% of the variables analyzed, which are represented in Figure 2. The Kaiser-Meyer-Olkin test on the sample is 0.67, which indicates a suitable composition.

Starting from these components (Table 2), a multiple linear regression is made (Table 3), that generates 10 different models, where the model with the best fit integrates 10 components and explains 76% of the variations of the new housing price. The most relevant component is the condition of self-sufficient commune -FAC4-: communes with maintained green areas; with educational establishments; and low dependence on the municipal common fund; with low number of people in situation of multidimensional poverty. This is an original finding for the Chilean case. The following component that is highlighted, is the socioeconomic homogeneity of low incomes -FAC3.- related to the reduction of the housing price, against the high socioeconomic homogeneity -FAC1-, associated to the increase of value. This indicates that segregation does have an impact on the housing price, result that

FAC1: High socioeconomic homogeneity of the neighborhood	Concentrates socioeconomic homogeneity indicators for high income classes
FAC2: Significant motorized private vehicle transit	Communes that have suburban areas and where the roads and vehicle transit is relevant
FAC3: Low socioeconomic homogeneity of the neighborhood	Concentrates socioeconomic homogeneity indicators for low income classes
FAC4: Self-sufficient communes	Communes with good municipal budget, homes with technology and with good access to public property
FAC5: Suitable public spaces	Good distribution of public properties and services
FAC6: Urban periphery border	Made up of spaces with barren sites within urbanizations, low access to electricity supply, segregation, and presence of precarious dwellings
FAC7: Urban governance	Communes with updated regional planning tools
FAC8: Public safety	High numbers of crime reports
FAC9: Heritage neighborhoods	Heritage management in central areas
FAC10: Zones under urban renewal	Heterogenous land value without historic property and with a social mix
FAC11: Moderate density	High housing demand, high production of solid waste, with family crowding and overcrowding situation

Table 2. Main components of the study. Source: Preparation by the Author.

Model and Components		Non-standardized coefficients		Typified coefficients	t	Sig. (<0.05))	Collinearity		R	R2	R2 adjusted
		B	Standard error	Beta			Tolerance	VIF			
10	(Constant)	50,333	0,877	-	57,391	0,000			0,889j	0,790	0,763
	FAC4_1_Self-sufficient communes	9,857	0,882	0,577	11,177	0,000	1,000	1,000			
	FAC3_1_Low socio-economic homogeneity of the neighborhood	-7,222	0,882	-0,423	-8,189	0,000	1,000	1,000			
	FAC1_1_High socioeconomic homogeneity of the neighborhood	4,817	0,882	0,282	5,462	0,000	1,000	1,000			
	FAC8_1_Public safety	3,888	0,882	0,228	4,409	0,000	1,000	1,000			
	FAC5_1_Availability of quality public spaces	3,493	0,882	0,204	3,960	0,000	1,000	1,000			
	FAC2_1_Significant motorized private vehicle transit	-3,174	0,882	-0,186	-3,599	0,001	1,000	1,000			
	FAC6_1_Urban periphery border	-2,767	0,882	-0,162	-3,138	0,002	1,000	1,000			
	FAC11_1_Shortage of affordable housing	2,306	0,882	0,135	2,614	0,011	1,000	1,000			
	FAC7_1_Urban governance	2,020	0,882	0,118	2,290	0,025	1,000	1,000			
	FAC9_1_Heritage neighborhoods	-1,898	0,882	-0,111	-2,152	0,034	1,000	1,000			

Table 3. Multiple linear regression results for model 10. Source: Preparation by the Author.

Model	Non-standardized coefficients		Typified coefficients	t	Sig. (<0.05))	Collinearity		R	R2	R2 adjusted
	B	Standard error	Beta			Tolerance	VIF			
(Constant)	18,377	6,262		2,934	0,004					
Residential electricity consumption per capita	0,055	0,006	0,684	9,948	0,000	0,395	2,529			
Average important intersections every 1.44 km2	0,132	0,041	0,193	3,253	0,002	0,531	1,883			
Participation of the Municipal Common Fund (FCM) in the total municipal revenue (discounting transfers)	-0,133	0,055	-0,155	-2,400	0,019	0,451	2,219			
Surface area of public squares per inhabitant that complies with distance standard (400 meters)	-0,885	0,321	-0,162	-2,760	0,007	0,540	1,851	0,919	0,920	0,834
Requirement of new urban housing	0,001	0,000	0,156	2,992	0,004	0,692	1,446			
Ratio between effective availability of openings and potential demand for primary education	-10,671	3,644	-0,138	-2,929	0,004	0,847	1,180			

Table 4. Sounder regression model. Source: Preparation by the Author.

Regression Variables	B	Average	La Pintana	i. La Pintana with more public square surface area	ii. La Pintana with less dependence on the Municipal Common Fund	iii. La Pintana with more housing demand
(Constant)	18,377	47,68	36,96	35,91	42,23	41,60
Residential electricity consumption per capita	0,055	751,000	567,02	567,02	567,02	567,02
Average number of important intersections every 1.44 km²	0,132	30,000	33,38	33,38	33,38	33,38
Participation of the Municipal Common Fund (FCM) in the total municipal revenue (discounting transfers)	-0,133	39,17	79,48	79,48	39,74	79,48
Public square surface area per inhabitant that complies with the distance standard (400 meters)	-0,885	4,86	2,81	4	2,81	2,81
Requirement of new urban housing	0,001	2459	4680	4680	4680	9360
Razón entre disponibilidad efectiva de matrículas y demanda potencial por educación básica	-10,671	0,85	0,82	0,82	0,82	0,82

Table 5. Three urbanistic change hypotheses in La Pintana that would alter housing price. Source: Preparation by the Author.

dialogs with the previous findings of Figueroa and Lever (1992), and with those of Sagner (2009). Another factor is the lack of affordable dwellings -FAC8-, from which an increase of value in those consolidated neighborhoods, with good quality public spaces -FAC5-, can be inferred. It is important to observe this result in light of the subsidiary logic of the State, as has already been said by Hidalgo Dattwyler et al. (2016) and by Razmilic (2010). Housing prices are linked to the reduction before dominant vehicle transit – FAC2-, periphery location -FAC6- and, to a lesser extent, to the presence of heritage neighborhoods -FAC9-. Finally, other elements linked to the price increase are the moderate density -FAC11- and a good system of urban governance -FAC7- with updated tools and public investment.

Complementarily, a multiple linear regression is made with the 37 SIEDU indicators. In this model (Table 4), the variables explain 83.4% of the price variance, although in this case, some of them are at the collinearity tolerance limit, i.e., the explicative arguments could repeat. Among the variables related to price increase, are the residential electricity consumption, the important road intersections for every 1.44 km^2, and the new housing demand in the commune. On the other hand, factors associated to reducing housing price, are the budgetary dependance on the Municipal Common Fund, the surface of public squares at 400 meters, and the availability of openings for primary education.

Finally, taking the commune of La Pintana as an example, starting from the model, a housing price of 36.9 UF/m^2 is projected, only 6% different from the market value. Using the regression formula, three hypotheses expressed in Table 5 are proposed.

In the first hypothesis (i), if La Pintana doubles public square areas, the housing price is reduced by 7%. To explain this counterintuitive result, it can be stated that the presence of public squares does not necessarily guarantee their upkeep by municipalities and that, as a result, the drop in price expressed is a reflection of the deterioration of the public space. In the second hypothesis (ii), if La Pintana reduces its dependence on the Municipal Common Fund by half, the housing price increases by 14%, which is the effect of the municipality's financial autonomy, as indicated in the regressions results. In the last hypothesis (iii), if the housing demand is doubled, the price increases by 13%, which is explained by the supply and demand dynamic (Nordhaus & Samuelson, 2006). It is worth mentioning that news on an extension of the Metro to La Pintana, would be accompanied by an increase in housing requirements, so it would be key to check whether the inhabitants of this commune could afford to stay there.

VI. DISCUSSIONS

The results presented provide novel elements to progress in the understanding of the definition of housing prices, as well as the financial capacity of communes and their independence from the Municipal Common Fund. To illustrate this characteristic, it is necessary to mention that the communes with the highest values in FAC4 are Santo Domingo, Providencia, Santiago, Casablanca and Vitacura: wealthy municipalities that mark an increase in the values, starting from which, socioeconomic exclusion is generated. Likewise, it must be underlined that the housing price has a clear relationship with the socioeconomic homogeneity of the commune, a situation that reveals the importance of generating inclusive affordable housing mechanisms to break segregation. This is just as has been shown in other studies that have sought to explain this phenomenon from other approaches (Hidalgo Dattwyler et al., 2016).

In general, neighborhoods with easy access to goods and services, which are peri-central, socioeconomically homogeneous, pedestrian friendly, and in a resident renewal process, seem to be linked to an increase in housing prices. While spaces with a predominance of roads on the urban borders, or in abandoned centralities, are left linked to the reduction of said price. This ratifies an observation made by Encinas, Aguirre et al. (2019): the monopolistic condition of the land is key in the definition of housing prices. Based on these results, it is possible to detail the most profitable attributes of those locations, that are features from which capital gains could be a regional equality alternative to be explored (Vergara-Perucich & Aguirre-Núñez, 2020).

On the second regression, the statements of Cortes and Iturra (2019) on that the services provided by the State negatively affect housing prices compared to those provided by the market, match the results of this analysis, although this is not the same for all types of State services. It can be inferred that specific public services are linked to a lower housing price, which can refer to uses where the market has a lesser role, such as public schools or squares. However, there are more desirable public services, such as road quality and electricity.

SIEDU must complete its variables with financialization and subsidiarity measures if it seeks that the diagnoses point to an inclusive and integrated city. In the theoretical framework presented here, it was indicated that previous studies considering macroeconomic data are fundamental to explain the housing price (Parrado et al., 2009; Silva & Vio, 2015). These aspects have a difficult material representation, but not because of this are they less urbanistic. On this point, the study has not been able to revise whether the financial entities with land ownership put pressure on housing prices, or if the presence of projects with subsidies reduces them. It is recommended to include in SIEDU, the outstanding payment rate, the local mortgage interest rate, the number of dwellings acquired with financial instruments, the local or regional CPI, and the concentration of ownership in people who do not live in the area, to monitor potential financial crises starting from urban processes (Gil-Alana et al., 2019). Likewise, it is necessary to include health and mortality factors from the Ministry of Health. The latter, is part of the lessons that the pandemic leaves behind: health problems are territorial (Mena et al., 2021; Vergara-Perucich, Correa-Parra & Aguirre-Núñez, 2020).

VII. CONCLUSIONS

Chilean housing prices have been addressed from urban economics, but few studies have done so from urbanism. Nor has this been addressed in architecture schools. The price in housing design and planning must not be outside the knowledge of those working in the profession, even more so in cities segmented by purchasing power. Understanding how housing prices are determined, allows knowing how to add value to the habitat, considering that economic factors segregate the population. This work seeks in this context, to contribute with an urbanistic view focusing on linking the city with household budgets.

As main findings, self-sufficient communes, regarding the set of variables behind housing prices, indicate that a commune with resources is also a commune that tends to concentrate a high property value. On the contrary, the high motorization of neighborhoods tends to explain part of a lower housing price. It is confirmed that neighborhoods with low socioeconomic levels tend to have a lower housing price. On the other hand, it is interesting to see that electricity consumption is associated to a higher housing price, which can reveal greater access to technology or to neighborhoods with lower fuel use in daily life. Likewise, it is interesting how factors like the presence of public squares or communes where the educational offer does not cover the demand, i.e., there

are more students per classroom, would explain a lower housing price. These findings allow dialoging with another kind of research that explores both the SIEDU, and the drivers of urban life quality in Chilean communes.

It is important to highlight that this is an exploratory study on existing variables that do not necessarily determine causality, but rather review whether the relationships between the SIEDU indicators and the housing price are consistent when it comes to providing useful reflections for urban economy studies, which they do. In this way, this work takes advantage of the SIEDU to take part in a key discussion on the affordable housing crisis, from an urbanistic approach, which rarely goes into the field of prices as a study problem.

Although the regressions results are conclusive, it is key to remember that housing prices can have multiple factors behind them, like the internal attributes, interest rates, or demographic, environmental or health variables. Possibly, many of these factors offer other explanations and, an inter-sectorial research would provide valuable findings. A qualitative research of the spatial characteristics of those communes with better explicative attributes of housing prices would also be valuable to review how this situation is represented in the built environment.

Just as was mentioned at the beginning, purchasing power and monopolistic land conditions have been relevant for the results presented here, but to understand how this affects the housing price, the recent contribution of SIEDU has been fundamental. This system of indicators must be complemented at some point with new data, where similar research to that presented here will provide new interpretations that complement these results.

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