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# Efficiency of the City Councils Using Cross-Sectional Model: Challenges in Times of Change and Political Tension

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## Abstract

The efficiency of city councils is a matter of concern in public discussion in Chile, due to the growing political relevance that citizens demand of them for social and economic management, in the face of the effects of the pandemic and recent social unrest. Despite the marked historical centralization of power in the capital city, the efficiency of the Chilean municipalities will be key to improving the quality of life of the communities, especially in times of political tension, greater social needs and discredit toward national institutions, not well the local ones. A cross-sectional econometric regression model was developed to explain the determinants of the efficiency of the municipalities and identify the variables that have the greatest impact on said efficiency. City councils that are regional capitals with more than 50,000 inhabitants were selected for this study.

**Keywords:** econometric model, city council, efficiency, life quality, social unrest

## 1. Introduction

City councils in Chile have taken on an increasingly prominent role in the political-economic and public-media spheres, especially after the emergence of the unexpected outbreak of the pandemic and the social unrest prior to Covid-19. The analysis of these institutions becomes relevant, as well as the need to establish interdisciplinary and econometric instruments, that can provide public policies with better data, in order to optimize the perspectives of local government efficiency in situations of high instability and global-local complexity.

In a country with a centralized administration system, the attributes of which intensified after the 1973 coup d'état and subsequent dictatorship of Augusto Pinochet, municipalities have since become bureaucratic units that are fundamental in the life and control of the population, due to a range of responsibilities assigned to them in their communal territories.

With the arrival of democracy in 1990, a number of political and participative adjustments were implemented that impacted the municipalities. However, the challenges continued to multiply as social and cultural transformations were taking

place in these territorial areas, all of a different nature and stretching across more than 4000 km on the mainland and islands of Chile.

Nevertheless, the Chilean political system maintains its marked presidentialism and has not been able to move forward towards a decisive decentralization. High-ranking officials, such as regional and provincial governors, continue to be designated in accordance with criteria defined in the country's capital or by elite groups.

The OECD [1] points out that Chile has a long tradition of centralism, with an administration system associated with economic efficiency and political stability. However, there are discussions on the need to improve regional performance and competitiveness from a necessarily decentralizing role [2], capable of bringing the country, that received international recognition for its political and economic transition in the nineties, into line with the new challenges.

The objective of the following research is to select municipalities that are regional capitals with over 50,000 inhabitants, in order to determine the factors that influence the efficiency of these city councils in Chile, based on the quality of life index of the districts. To do so, an econometric model was developed to explain the specific factors of the efficiency of city councils in Chile, as well as the variables with the greatest impact on such efficiency.

We believe that this is a necessary yet seldom addressed dimension in Chile, in terms of the inputs that econometrics can provide, to move forward with better interdisciplinary perspectives in order to empower regional governments that promote human development in pursuit of sustainability and the best possible democratic and social conditions.

## **2. Theoretical framework**

In 2019, Chile experienced an outbreak of social unrest that began in October 2019, and was only interrupted by the arrival of the Covid-19 pandemic, in March 2020. This period of mobilization prior to the coronavirus, marked by ongoing protests throughout the country, demanded a new social and political pact, substantiated on the lost credibility of government institutions, politicians, business people and the clergy.

The crisis was felt with unexpected force and presence in the streets and major public areas of the regional capitals, particularly in those with larger populations.

The citizenry demanded better conditions for old-age pensions, access to healthcare, protection against market abuse and gender-based violence, among other things. These social causes have tended to come together under feelings of indignation that have sparked off a demand to end the most urgent inequalities and to bring greater dignity to the population. This has led to articulating the need for a more systematic change, driven by the demand for a new Political Constitution.

During the most critical times of the social unrest, between October and December 2019, with episodes of public violence and obvious problems of governance at the central level, the city councils proved to be a strategic political space by building bridges to address the citizens' malaise. They showed a greater sensitivity and capacity for participation with different stakeholders and organizations of the local territories. The municipalities also made their resources available to help unblock the lack of social dialog and revert an increasing political polarization.

With the onset of the health emergency in Chile in March 2020, the city councils once again became important spheres for social and political-media leadership, requesting the central government to implement quarantine measures, for greater coordination with the public health system, and urgent economic support plans for Covid-19, in response to public concern about the quick propagation of the virus.

The city councils also focused their resources on meeting the people's most immediate and actual demands, complementing the efforts of the ministries involved in managing the crisis.

During both of the episodes described (social unrest and Covid-19), that is, within the scope of a political and a health crisis, various surveys and public opinion polls showed that the Chilean city councils were among the most valued government institutions by the people.

Indeed, the potential that this kind of municipal organization has for future political, health or economic challenges could be crucial for the efficiency of the State and the identity of the territories. Therefore, we stress the need for a more in-depth study of the context and the variables that could improve the living conditions of the communities located within the municipalities.

## **2.1 Political reality of the city councils**

At present, there are 345 municipalities in Chile and they are defined in the Constitution as "autonomous public law corporations with legal status and their own assets. Their objective is to satisfy the needs of the local community and ensure their participation in the economic, cultural and social development" [3].

The Constitutional Organic Law of Municipalities N°18.695 specifically regulates the most important aspects of the communal administration. For instance, it establishes the existence of a mayor and a city council, along with their respective functions and powers. However, there are numerous laws that regulate other aspects.

According to political theory, Chile's municipalities constitute a public service that operate as a decentralized State body and are the State's closest visible face for its citizens [4]. However, the concentration of the Chilean political system is evident in the difference established between the government and the administration.

The government has the capacity for political decision-making, while the administration is a more limited concept and is further removed from political power. In fact, government powers in the territories are in the hands of the regional and provincial governors (chosen by the president in office) and those of the mayors are only for the municipal administration of their communes or cities [4].

A local government, as a political body of representation and not only of the administrative kind, is vested with the right of its municipalities to take certain decisions without the authorization or interference of the central government. In other words, [5] with its actions, a municipality can have independent effects on significant aspects of a specific community.

## **2.2 In search of decentralization**

In 2009, a process began to implement territorial decentralization through a series of legal changes, in pursuit of the election of regional counselors (regulated in 2013) and governors (suspended due to Covid-19, although regulated in 2018), along with establishing a system to transfer competences to regional governments (formalized in 2018). For some authors, this has meant progress, from a model of deconcentrated transiting towards one of territorial decentralization, as these laws would allegedly favor the modification of regional administration and the relationship of vertical political power [2, 6].

However, the Regional Authority Index [7], which compares the degree of decentralization between different countries, ranks us in 52nd place out of 63. This position is similar to nations of a smaller scale and population such as Ireland and Lithuania. Explanations could argue that Chile is compared with countries

of a very different size and institutional regime. But if we limit the comparison to OECD unitary states with more than 3 million inhabitants, the results do not improve [8].

Maintaining a tendency towards centralization may bring about negative effects. For example, it creates administrative inefficiencies when requesting permits that need to be approved at the central level, hindering the possibility of innovation in public policies, due to the lack of competences and economic resources. It also limits economic growth and productivity, generating territorial imbalances and inequalities, where some regions are winners and others lag behind [8].

One of the most specific aspects for true decentralization, that seeks to favor the power of municipalities, lies in transferring the competence and decision-making capacity, including, most notably, on budgetary matters, which “are fundamental and unavoidable” [9].

The efficiency of the Chilean State’s resources should focus on a better connection with local spheres and study, in turn, what municipalities are doing with their administrations and how their decisions are impacting their respective communities. In fact, the OECD [1] pointed out that, in Chile, centralization hampers the development of the country.

### **2.3 Economic dimension**

As for the economic situation, municipalities have several sources of income that can be differentiated between own funds and external funds [10]. While own funds consist of the Municipal Common Fund and Permanent Own-Source Income, external funds include those transferred to municipalities for programs or projects promoted by the central government and executed by local governments [11].

The Municipal Common Fund (FCM) is regulated by Law N°20.237, the above-mentioned Constitutional Organic Law of Municipalities (LOCM) and Decree N°1293 of the Ministry of the Interior of 2009. Law N°20.033 established that, as of 2005, a fixed monetary contribution from the central government for 218.000 UTM (approximately 11 billion Chilean pesos, or US\$13.5 million) would be made to the FCM [11].

It is worthwhile mentioning that the Municipal Common Fund is defined by the Political Constitution of the Republic (Article 122) as a “mechanism for the solidary redistribution of own incomes among the municipalities of the country” [11].

### **2.4 Political efficiency**

The concept of efficiency applied to interdisciplinary dialog from the point of view of political and administrative theory, becomes especially important in times of crisis and empowerment of the people in their local setting.

Political efficiency is linked to “a government’s capability, competence or potential to establish guidelines that lead to objectives considered to be valid by a society at a specific time” [12]. City councils, on this level, are an institutional and operational power that, within their areas of impact, enables to achieve socially accepted and legally enshrined objectives.

At the level of public management, administrative efficiency is legitimized when it receives public recognition [13]. Citizen support of a State is largely the result of a performance that is perceived as efficient and effective, as for example, when it reduces poverty, unemployment or inequality. Hence, the democratic apparatus is strengthened and the people perceive that the performance of a municipality is coherent or fair. Public management creates a value [12], as long as there also is



political communication that sets out these advances or achievements in a credible and plain way.

The discussion between efficiency and democracy, under the perspective of legitimacy [14], understood as the capacity of political systems to generate, on the one hand, citizen representation and political responsibility (input-oriented legitimacy), and on the other, satisfactory results of public policies (output-oriented legitimacy) [15], is still valid in the current contexts we are analyzing.

In fact, there is a third dimension of legitimacy that refers to the decision-making procedure (throughput legitimacy), given by transparency, the degree of openness and of inclusion [16]. The concept of representative democracy expands when examining in-depth analyses on how decisions are taken and whether they include deliberative democracy instruments that allow greater participation of all public and private stakeholders [17].

### 2.5 Efficiency model

This study determines the factors that influence the efficiency of city councils in Chile, in terms of the Quality of Life Index of the communities. To do so, an econometric model was developed to explain the determinants of the efficiency of city councils in Chile, and to identify the variables that have the greatest impact on such efficiency. Municipalities that are regional capitals, with over 50,000 inhabitants, were selected for this study.

The efficiency model of the city councils demonstrates that, as described earlier, there is a growing interest in these entities in search of decentralization in Chile, as a way of strengthening the regions and to stop holding back the country's development [18], which to a large extent could be carried out through efficient city councils. Therefore, arriving at the factors that determine the efficiency of the city council is of great importance, as it shows us the aspects that require special attention. New public policies focused on these aspects would increase the favorable perception of municipal management and, more importantly, the quality of life of the people.

For the purposes of this research, a series of variables that are linked to the efficiency of Chilean municipalities will be included. Within this selection, variables stand out that have been a priority concern of citizens and that have tried to be incorporated into the country's public policies. We refer, as shown in the final model (**Table 1**), to the Municipal Common Fund (FCM), Permanent Own-Source Income (IPP), rate of domestic violence, average University Selection Test (PSU) score, overcrowding and density.

Variable	Coefficient	Std. error	t-Statistic	p-Value
RateDomesticViolence	-0.013222	0.004051	-3.263793	0.0016
OwnIncomesIPP	1.12E-07	3.26E-08	3.433896	0.0009
FCM	-2.15E-07	7.71E-08	-2.789977	0.0065
Overcrowding	-79.50409	17.53457	-4.534135	0.0000
Average PSU	16.36778	4.456570	3.672732	0.0004
PopulationDensity	-0.000430	0.000117	-3.668260	0.0004
C	59.43797	4.688335	12.67784	0.0000

Source: Own creation.

**Table 1.**  
Final model parameter estimation.

### 1. Municipal Common Fund (FCM):

The FCM is the solidarity redistribution mechanism of own income in the municipalities of all Chile. In this regard, there is debate in political sectors of the country, about whether costs that are in line with resources would mean greater efficiency, since it would not translate into better provision of public services [19]. This is known in the literature as the “flypaper effect” [20], which could have a negative effect in the city councils of Chile.

### 2. Permanent Own-Source Income (IPP) [21]:

This is the budget of a city council, composed of the following accounts of the budget classifier: territorial tax, municipal benefit vehicle permits, municipal benefit licenses, sanitation taxes, other duties, property rentals, driver's licenses and the like, fines and interests, concessions, aquaculture patents, mining patents and casinos. The probability that the inefficiency of public officials and local politicians increases, when there is a higher level of income that favors an increase in the fiscal capacity of the municipalities, is an aspect that the literature describes [22]. Meanwhile, the fiscal deficit could also have a negative impact on the efficiency of the city council as a variable of the IPP. If a municipality spends more than it can, it is exposed to financial vulnerability [23].

### 3. Overcrowding:

This variable is the result of the absence of urban development, both in infrastructure and housing. It affects the minimum conditions of people, integrated into a commune or political-administrative and territorial space. For the purposes of the study, it represents the average level of overcrowding in households, expressed as a percentage. It is a “different type of factor that influences the efficiency of the city council” [24], since it is associated with the characteristics of local residents and how these citizens coexist with their vital environments.

### 4. Population Density:

Population density considers, for these purposes, the number of inhabitants per km<sup>2</sup>. It has been shown [25] that a smaller number of inhabitants per square kilometer can increase the average cost of supplying goods and services, so that a municipality could be more efficient if its population density were higher.

### 5. Rate of Domestic Violence:

This is the rate of complaints of domestic violence reported per 100,000 inhabitants. According to studies on the subject, such violence ultimately harms an individual's health and quality of life without distinction of gender, race or ethnicity around the world. This is supported by UNICEF's definition of domestic violence, which includes that it is an affront to the quality of life [26].

### 6. Average University Selection Test (PSU) Score:

This is defined as the percentage of PSU scores equal to or greater than 450 points in municipal establishments. This score was defined, for the purpose of this research, under the assumption that each citizen who takes the University Selection Test (PSU) has a certain level of education and that he or she could potentially choose to improve that level. According to [25], it determined that the citizen participation variable, in relation with the educational level of the adult population, has a positive impact on the degree of city council efficiency. Along this same line are [23, 25, 26], which reinforce these results.

## 2.6 Efficiency of Chilean city councils

The research that explain the efficiency of the city councils, usually focus and limit themselves on socioeconomic, demographic and fiscal factors. In this sense, the literature is not abundant and tends to be obsolete, above all, because the local dimension in countries like Chile has undergone various changes in the last decade, being culturally and productively diverse.

The models that are reiterated in the theme of the efficiency of city councils also present a special interest in resources. For example, there are authors [27] that maintain that the material well-being and the quality of life of a person do not have a direct correlation, varying this relationship by the level of income of citizens, the satisfaction or dissatisfaction of basic needs, as well as other factors [28]. According to [29] the interrelation between needs, satisfaction and economic goods, is of a permanent and dialectical nature. This can be explained, on the one hand, because economic goods can affect the efficiency of satisfaction; on the other, they are decisive in the generation and creation of these factors.

Therefore, taking into account that the municipalities are responsible for the administration of economic assets, obtained by the redistribution of resources, management has a direct impact on efficiency, as well as on factors that influence the quality of life in its set. Therefore, the planning and budget of each local reality is relevant.

Different authors point out that, as Chile is analyzed from North to South, the indicators improve [30]. However, the most prominent indicators are located in the central area of the country. Meanwhile, [19, 25, 31] consider that the higher the population density of the commune, the more efficient the city council will be.

These hypotheses will be tested by the proposed final model, to determine the behavior of the Chilean municipalities and if it is related to what is presented in the literature.

## 3. Methodology

The research and analysis of efficiency in city councils in Chile, evidenced in the literature, is usually carried out from microeconomic theory, which evaluates two aspects of municipal efficiency: inputs and output.

In fact, municipal efficiency is considered optimal when it reaches its maximum level of production, compared to certain inputs and the minimum level of inputs in a given product [24, 32].

In the case of Chile, the studies and methodology applied to the efficiency of the city councils are few and focused on resources, not addressing other aspects of importance and complexity for the economic reality.

In relation to the methodology, the analysis was applied to 93 communes in Chile, incorporating a diverse sample of the country, both in its political-administrative and geographical configuration. In other ways, the study integrates communes from the northern, central and southern macro-zones of the national territory. A cross-sectional econometric regression model was developed to explain and predict the effect over the municipal efficiency measured by Quality of Life Index (QLI) [33–36]. This is validated by the assumptions of the residual before proceeding with the second objective, which is the estimation and interpretation of results [36, 37].

In order to build the database to be used to forecast the efficiency of city councils in Chile [38], the National Municipal Information System was consulted, together



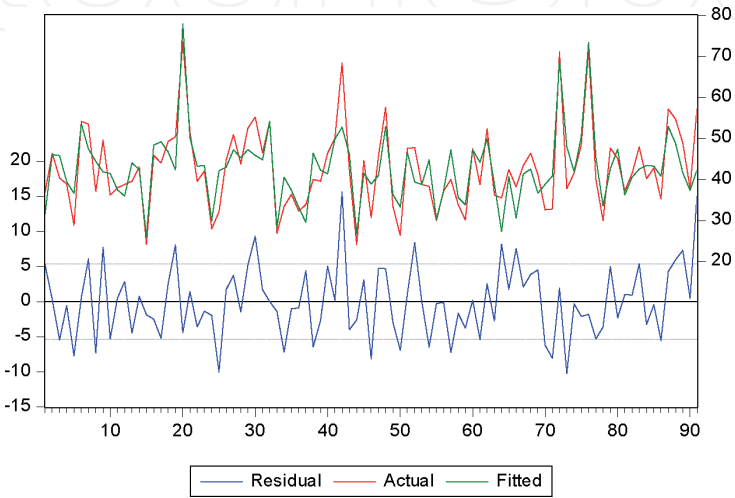
with the Library of the National Congress of Chile (BCN), as well as an approximation based on the Urban Quality of Life Index (QLI) for the year 2018, while bearing in mind the different areas of the country. The model estimate specified in Eq. (1) is presented in the following **Table 2**.

$$\begin{aligned} QLI_i = & \alpha + \beta_1 * AveragePSU_i + \beta_2 * PopulationDensity_i \\ & + \beta_3 * Overcrowding_i + \beta_4 * RateDomesticViolence_i \\ & + \beta_5 * FCM_i + \beta_6 * OwnIncomesIPP_i + \beta_7 * HealthBudget_i \\ & + \beta_8 * Scholarship_i + \beta_9 * OtherIncomes_i + \beta_{10} * GreenAreas_i \\ & + \beta_{11} * Poverty_i + \mu_i \end{aligned} \tag{1}$$

After estimating the tentative model using Stepwise Econometric Regression Models, and considering all of the variables studied to determine the quality of life of the inhabitants of a commune, the variables relevant to the determination of the study’s approach, such as municipal efficiency, were selected (see **Table 1**). The variables that were greater than the minimum level of confidence (p-value ≤0.05)

Variable	Coefficient	Std. error	t-Statistic	p-Value
RateDomesticViolence	-0.012964	0.004200	-3.086408	0.0028
Health Budget	0.076376	0.053567	1.425805	0.1579
Scholarship	-0.000210	8.57E-05	-2.445162	0.0167
OwnIncomesIPP	2.89E-07	1.05E-07	2.752694	0.0073
Other Incomes	-3.70E-07	2.59E-07	-1.431423	0.1563
FCM	1.64E-07	2.15E-07	0.762711	0.4479
PopulationDensity	-0.000564	0.000130	-4.355540	0.0000
Green Areas	1.84E-06	1.15E-06	1.598367	0.1140
Average PSU	12.81732	4.457474	2.875466	0.0052
Overcrowding	-57.43565	18.52834	-3.099881	0.0027
Poverty	-22.91616	13.88977	-1.649859	0.1030
C	59.64198	4.667443	12.77830	0.0000

**Table 2.**  
*Estimation of general model parameters.*



**Figure 1.**  
*Residual from the final model. Source: Own creation by means of EViews statistical program.*

F-statistic	0.391564	Prob. F(2.82)	0.6773
Obs*R-squared	0.860859	Prob. Chi-Square(2)	0.6502

Source: Own creation by means of EViews statistical program.

**Table 3.**  
Breusch-Godfrey serial correlation LM test.

F-statistic	0.462869	Prob. F(27.63)	0.9852
Obs*R-squared	15.06367	Prob. Chi-Square(27)	0.9685
Scaled explained SS	15.65709	Prob. Chi-Square(27)	0.9592

Source: Own creation by means of EViews statistical program.

**Table 4.**  
Heteroscedasticity white test.

adopted for this study were eliminated from the model. In addition to this method, what was stated in the literature and determination of the endogenous variable was also considered.

Given the estimates of the variables described earlier in this chapter, a final econometric model was proposed that better and more up-to-date (**Table 1**) represents the factors that involve the efficiency of city councils in Chile.

According to the Quality of Life Index (QLI), the variability in the efficiency of Chilean municipalities is explained by 71% (R-squared) of the following variables: Municipal Common Fund (FCM), Permanent Income from own source (IPP), Overcrowding, PSU average, population density and rate of domestic violence. As for the hypotheses associated with the residues of the model, which can compare its behavior with **Figure 1**, they do not present problems of self-correlation of the residues, using the Breusch-Godfrey test<sup>1</sup> (**Table 3**), nor problems of normality of the residues,<sup>2</sup> nor problems of heteroscedasticity (**Table 4**) of the aforementioned.<sup>3</sup>

As illustrated by **Figure 1**, we can see the distribution of the residuals, considering the data obtained through QLI, as the estimation of efficiency through the final model proposed, with the difference shown on the graph explained by the R2 adjusted for the 71.29% model. By the way, the final model for the Urban Quality of Life Index (QLI) is [Eq. (2)].

$$\begin{aligned} QLI = & 59.44 + 16.37 * AveragePSU - 0.00043 \\ & * PopulationDensity - 79.51 * Overcrowding - 0.013 \\ & * RateDpmesticViolence - 2.15 * 10^{-7} \\ & * FCM + 1.12 * 10^{-7} * OwnIncomesIPP \end{aligned} \tag{2}$$

4. Conclusions

This study provides us with contrasts between different municipalities that allow us to reach conclusions on the current situation in northern, central, and southern Chile. It also allows us to find and tear down certain prejudices, such as the centralization of the country, showing the variables that are influential to a greater

<sup>1</sup> Breusch-Godfrey F Test: 2.82; P-value = < 0.1.  
<sup>2</sup> Jarque-Bera Test: 4.4654; P-value = < 0.1.  
<sup>3</sup> White Test F-statistic: 27.63; P-value = < 0.1.

degree, according to our econometric model, and raises new aspects to consider in municipal management.

According to the literature reviewed, there are references that indicate that the quality of life can be interpreted from economic growth, which in various studies is considered a factor in determining the efficiency of city councils. The authors also indicate that the quality of life must be decoded by development, from a necessary environmental and social efficiency. For this, he points out [39] it is important to consider the factors that allow a “greening” of the economy, but also a closer relationship with politics. In this way, a set of criteria oriented to equity and distribution can be determined, which would reduce interterritorial imbalances, considered elements of high entropy. In sum, for a better quality of life for the citizens of a territory in which the city council manages resources, social variables, such as domestic violence in a given commune, should be considered, along with economic variables such as the Municipal Common Fund (FCM) and the Permanent Income from own source (IPP).

Therefore, although any variable, from economic matters to population density, can increase the efficiency of city councils, when linked closer to the quality of life of the inhabitants belonging to a certain commune, this factor tends to slightly decrease that efficiency, counteracting to some level what was raised by the literature. Indeed [37] rectifies the fact that the changes produced through economic development and well-being or the structural transformation in human development, in a study on the quality of life and how the environment and, ultimately, the changes that occur in it, can contribute positively or negatively in each individual, that is, how the administration and management of resources are implemented. This contributes to the efficiency of city councils in Chile, which in turn affects the quality of life of the inhabitants in each of the communes under study, concluding that, according to the data, findings and the existing literature, both factors mentioned are very closely related.

Regarding the assumptions made, it can be concluded that they are acceptable. In other words, there are better indexes in the central zone of Chile and the rates improve when advancing from North to South of the country, according to what is observed in the graphs and as predicted by the model.

Based on this study, it was concluded that the characteristics of the people who inhabit the communes cannot be excluded from this type of analysis, due to the cultural transformations and political demands that are taking place in countries like Chile. The efficiency levels of city councils cannot be limited by the information available only on a group of economic factors, but must integrate other aspects of social sensitivity.

The management of the social and economic crisis that the pandemic situation has generated, needs to integrate the reality of the territories, which is urgently demanded in Chile by civil society itself, which perceives imbalances in the responses provided by city councils. If the quality of life of individuals, as well as their characteristics, were taken into account, this would provide a more integrated and real result regarding the efficiency of city councils in Chile and their administration of resources. Therefore, based on the variables that make up the final model of this research, it can be shown that economic factors, typical of the management of resources that the network of city councils carries out throughout the country, as well as factors that characterize the population, are both a greater concern of those determinants that influence the quality of life of the inhabitants and their real impact on efficiency.

The results described above, obtained through econometrics and interdisciplinary dialog, can contribute towards the design and improvement of political-administrative models being demanded by the Chilean population, insofar as

decentralizing power and managing the crises that are currently creating tension and polarization, the likes of which the country has not experienced for decades.

## Acknowledgements

Claudio Elórtegui Gómez and Hanns de la Fuente-Mella are supported by Grant NUCLEO DE INVESTIGACION EN DATA ANALYTICS/PUCV VRIEA/039.432/2020.

## Conflict of interest

The authors declare no conflict of interest.

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