

CREDIT UNIONS IN CHILE AND THEIR ROLE IN FINANCIAL INCLUSION*

CONTRIBUCION A LA INCLUSION FINANCIERA DE LAS COOPERATIVAS DE AHORRO Y CREDITO EN CHILE

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Abstract

This paper explores the role played by credit unions in financial inclusion in Chile. Using administrative individual-level data, we analyze the borrowing behavior of credit union debtors. The results find that credit unions contribute to financial inclusion: it is more likely that people with low income, elderly, women, and inhabitants of small communities, far from the large urban centers, borrow from credit unions. Also, we find that having a credit union commercial office in the county where individuals live increases their access to credit.

Keywords: *Credit unions, financial inclusion, credit.*

JEL Classification: *G21, G28, P13.*

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Resumen

Este documento explora el papel que cumplen las cooperativas de ahorro y crédito en la inclusión financiera en Chile. Utilizando datos administrativos a nivel de individuo se analiza el comportamiento de endeudamiento de los miembros de las cooperativas de ahorro y crédito. Los resultados muestran que las cooperativas de ahorro y crédito contribuyen a la inclusión financiera: siendo más probable que las personas de bajos ingresos, jubilados, mujeres y habitantes de pequeñas localidades rurales, lejos de los grandes centros urbanos, accedan al crédito gracias a las cooperativas de ahorro y crédito. Adicionalmente, se evidencia que la existencia de oficinas comerciales de cooperativas de ahorro y crédito en las comunas donde viven las personas, incrementa su acceso al crédito.

Palabras clave: *Cooperativas de ahorro y crédito, inclusión financiera, crédito.*

Clasificación JEL: *G21, G28, P13.*

1. INTRODUCTION

When discussing the role that credit unions (“Cooperativas de Ahorro y Crédito” in Spanish) have in the Chilean financial system, it is often argued that they fulfill a “social role”, understood as financial inclusion.¹ However, the hypothesis about credit unions’ social role lacks an answer based on robust statistical analysis in the related literature. The contribution of this paper is to provide such an answer by using individual-level data available at the Financial Market Commission (CMF), a statistically-based analysis, and econometric models and their results.

In this paper, we study if credit unions provide credit to individuals less served by traditional commercial banks, meaning those of low income, elderly, women, and living in counties with a small number of inhabitants, far from large cities.

The literature studying credit unions in Chile focuses on providing historical background (Hernández, 2008; Potin, 2012; Ministry of Economy, 2014), describing their market (Téllez, 2007; Matus *et al.*, 2010; Ministry of Economy, 2014), discussing the regulation (Hernández, 2008; Larraín and Larraín, 2014; Central Bank of Chile, 2017), and taking as granted the hypothesis of their financial inclusion role.

¹ According to the General Cooperatives Act of 2004, credit unions are cooperatives whose unique and exclusive purpose is to provide financial intermediation services for their partners’ benefit.

Regarding this last point, the related literature argues that these financial institutions give individuals access to financial services otherwise excluded. Thus, Téllez (2007) suggests that credit unions focus on medium and low socioeconomic segments of people and small businesses (micro-credits). In the same vein, Hernández (2008) argues that credit unions play a fundamental role in the economic revitalization of the territories where they are, allowing access to social groups postponed by the rest of the financial system, supporting entrepreneurship of micro and small economic units. For Matus *et al.* (2010), credit unions focus on low-income households, where the average amounts of credit granted tend to be lower than in other institutions of the financial system.

Later, Potin (2012) points out that credit unions still focus on the consumer credit industry, particularly on the most vulnerable segments. Ministry of Economy (2014) finds that credit unions generate opportunities for people who cannot easily access the financial system. As the requirements to access and credit risk policies usually leave many individuals and firms without access to the financial market. Last, Central Bank of Chile (2017) argues that credit unions contribute to financial inclusion by granting services to people who do not necessarily have access to credit.

In Chile, either the CMF or the Ministry of Economy supervises credit unions. The CMF regulates those credit unions whose equity exceeds a certain threshold, defined by law, and the Ministry of Economy regulates those not complying with this criterion.

In this paper, we study the credit unions supervised by the CMF. They represent more than 90% of the total assets, liabilities, and equity of the sector, thus being highly representative. The individual-level data available at the CMF allows the study of credit unions with a social-demographic view to answer if these institutions fulfill a role in financial inclusion.

Our results confirm that credit unions have a higher propensity to lend to low-income individuals, the elderly, women, and residents of regions other than the Metropolitan Region, particularly to small communities far from the country's main urban areas. Also, we find that without credit unions their debtors most likely would not have access to credit.

The rest of this document is structured as follows. Section 2 characterizes the credit unions under CMF supervision. Section 3 analyzes credit unions' role in financial inclusion, comparing them with banks, providing a statistically-based analysis of their debtors, estimating econometric models, and discussing their results. Finally, Section 4 concludes.²

² Appendix A describes the background of Chilean credit unions.

2. CHARACTERIZATION OF THE CREDIT UNIONS SUPERVISED BY THE CMF

This paper focuses on the credit unions under the supervision of the CMF for two reasons. First, these credit unions concentrate about 90% of the loans, assets, debt, and equity of the sector; therefore, they are highly representative. Second, the CMF has unique data not previously used in the literature that allows us their study with a socio-demographic view. Hereafter, when we refer to credit unions in Chile, we will address the seven credit unions supervised by the CMF.³

In this section, we use administrative data of credit unions and banks. We compare credit unions with banks because the former are the leading intermediaries in the Chilean financial sector.

Table 1 presents preliminary data on credit union debtors and bank debtors. We exclude commercial loans in all the following comparisons. By 2018 credit union debtors reached more than three hundred thousand people, meaning that there is one credit union debtor every ten bank debtors (about five million).

TABLE 1

NUMBER OF CREDIT UNION DEBTORS AND BANK DEBTORS

	Credit union debtors	Bank debtors	Ratio
2017Q2	337,340	4,814,919	7.0%
2017Q4	348,343	4,927,535	7.1%
2018Q2	359,244	4,980,805	7.2%

Source: Authors' calculations based on CMF.

Note: If an individual is a member of more than one credit union, we consider him only once. The same logic applies to banks regarding their debtors.

Credit unions in Chile's financial sector are relatively small both in terms of assets and liabilities, representing in each case less than 1% of the total banks' assets and liabilities (Table 2). However, credit unions have about 3% of the total banks' equity. In Chilean pesos, in 2018, the credit unions totaled assets for \$ 1,959 billion, liabilities for \$ 1,423 billion, and equity for \$ 535 billion.

³ Coocretal, Coopeuch, Oriencoop, Capual, Detacoop, Ahorrocoop, and Lautaro Rosas. Coopeuch is by far the system's biggest credit union with assets, liabilities, and equity equivalent to over 80%, respectively, by December 2017.

TABLE 2

CREDIT UNIONS BALANCE SHEET MAIN VARIABLES
(Percentage of the banks' balance sheet)

	Assets	Liabilities	Equity
2014	0.90%	0.69%	3.16%
2015	0.86%	0.65%	3.21%
2016	0.90%	0.69%	3.00%
2017	0.88%	0.70%	2.75%
2018	0.88%	0.70%	2.60%

Source: Authors' calculations based on CMF.

Note: Data to December of each year.

Table 3 shows the main financial products that credit union members use. On the assets side, savings and deposits are the preferred instruments by credit union members. Indeed, one out of four credit union members has a savings account. On the liabilities side, consumer loans discounted in the payroll are the preferred type of financial service by credit union members (about one out of five members has this type of financial instrument).

TABLE 3

MAIN FINANCIAL INSTRUMENTS USED BY CREDIT UNION MEMBERS (2017)

Assets	Number of members having the instrument	Percentage of the total members
Certificate of deposit	85,117	6.95%
Time deposits	27,990	2.29%
Savings accounts	346,743	28.32%
Other	35,961	2.94%
Liabilities		
Consumer loans in installments with direct payments	104,342	8.52%
Consumer loans in installments with a payroll discount	220,081	17.98%
Credit cards	41,749	3.41%
Mortgage	14,306	1.17%
Other	5	0.00%
Total members	1,224,307	

Source: Authors' calculations based on CMF.

3. DO CREDIT UNIONS PLAY A ROLE IN FINANCIAL INCLUSION?⁴

To answer this question, subsection 3.1 lists and highlights the main differences between credit unions and banks, both from a legal and a market perspective.⁵ Then, building on the information available at the CMF, an analysis of distribution and density functions is carried out (subsection 3.2). Next, subsection 3.3 estimates discrete dependent variables models (Probit type) and present their results.

Ex-ante, if credit unions play a role in financial inclusion, we should find that they provide financial services to a disadvantaged social and economic population. Individuals with low income, women, the elderly, and living far from the main urban areas. Also, we should find that a credit union commercial office in the county where people live should foster their access to credit.

Thus, we first compare the income distributions of credit union debtors and bank debtors to then characterize them according to their age, gender, and region where they live. The results we find are robust to the exclusion of Coopeuch, which is by far the system's biggest credit union.⁶

We then use econometric models to answer which variables determine whether an individual has a debt with a credit union. Hereafter we understand "debt" as any credit supplied by either credit unions or banks, meaning consumer credit and mortgages. They correspond to credit cards, consumer loans, credit account credit lines, mortgages in letters of credit, and mutual endorsable and non-endorsable mortgages.

3.1. Comparing credit unions and banks

This subsection highlights the differences between credit unions and banks, from a legal and a market perspective, characterizing credit union members' debt profile and bank debtors. Consequently, Table 4 points out that: while credit unions are not-for-profit, banks look for profits; credit union owners are their members and shareholders-owned banks; the minimum capital required for both types of financial institutions differs significantly; credit unions and banks compete in the markets of deposits and loans.

⁴ Financial inclusion could include access to credit, access to financial services, among other measures. However, in this paper, we focus on credit access as in the related literature.

⁵ An aggregate view of assets, liabilities, and equity tends to bias the analysis. Consequently, we have decided to focus on specific products where credit unions and banks compete.

⁶ Appendix B presents the results excluding Coopeuch.

TABLE 4

MAIN DIFFERENCES BETWEEN CREDIT UNIONS AND BANKS

	Credit Unions	Banks
Law	General Cooperatives Act (2004)	General Banks Act (2019)
Business purpose	Non-profit	For-profit
Owners	Members	Shareholders
Participation	One member one vote	Proportional to the number of shares
Profits	Distributed according to the participation quota of each member	Distributed according to the number of shares
Loans	Only to members	Restriction for related parties
Minimum capital required to operate	3,000 <i>Unidades de Fomento</i>	800,000 <i>Unidades de Fomento</i>
Allowed financial operations	Deposits and loans	Deposits, loans, derivatives, among others

Source: Authors' elaboration based on CMF, Ministry of Economy (2004), and Ministry of Finance (2019).

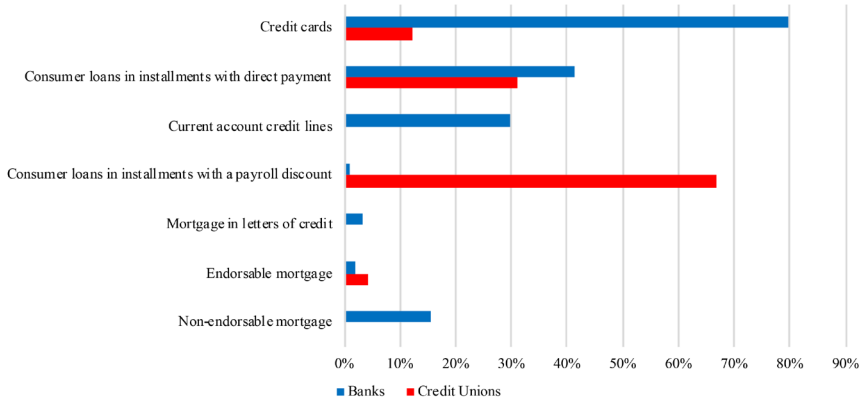
Note: The *Unidad de Fomento* is a unit of account indexed according to inflation.

Figure 1 presents the participation of the leading credit products used by credit union debtors and bank debtors.⁷ The most popular credit instrument among credit union debtors is the “Consumer loans in installments with a payroll discount” (almost 67% of credit union debtors use this instrument), followed by “Consumer loans in installments with direct payment” (31%). On the other hand, the most popular credit product among bank debtors is “credit cards” (almost 80% of the total bank debtors have debt in this instrument), followed by “Consumer loans in installments with direct payment” (41%), and “Current account credit lines” (30%). The preponderance of using payroll discount relates to reducing credit risk and that it is an essential attribution that credit unions have by law (General Cooperatives Act, 2004). This type of loan, related to the labor income or the pension, reduces the customer’s payment uncertainty.

⁷ In this comparison, we include all those products where there is at least one product in each type of institution - credit unions and banks. We make this assumption, even though credit unions must fulfill specific requirements, requested by the Central Bank of Chile, to issue financial products like credit cards.

FIGURE 1

INSTRUMENTS USED BY CREDIT UNIONS AND BANK DEBTORS (2017)



Source: Authors' elaboration based on CMF.

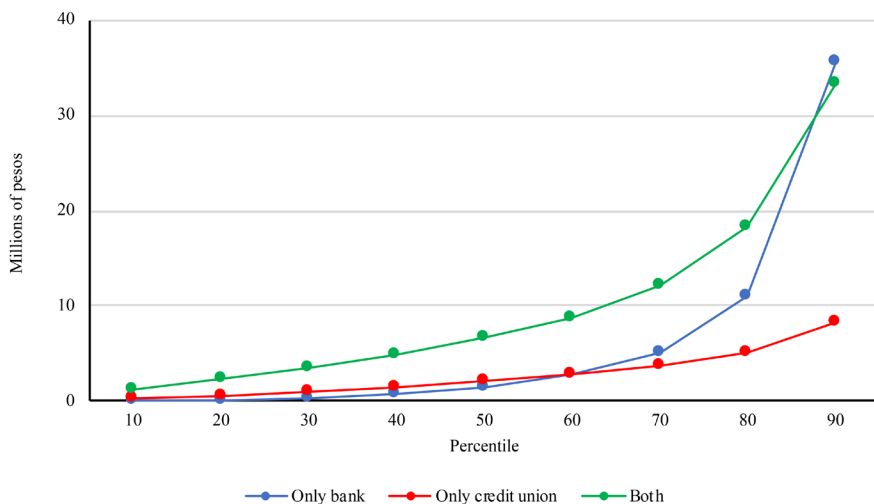
Note: The bars correspond to the ratio of credit union debtors/bank debtors with debt in a specific financial service to the total number of credit union debtors/bank debtors. We present only the leading credit products.

Figure 2 characterizes credit union debtors and bank debtors according to their amount of debt as only bank debtors (category “only bank”), both credit union debtors and bank debtors (category “both”), and credit union debtors (category “only credit union”), and their distribution in percentiles.⁸ Figure 2 shows that the type of debtors who reach higher levels of debt have liability at the same time with credit unions and banks. We can also see that the debt by “only credit union” debtors is higher than those “only bank”. Such a finding is consistent with Financial Market Commission (2020). The exception is those debtors concentrated on the 70th percentile or higher.

⁸ As of December 2017, total credit union debtors reached 348 thousand people. Of these, 40% had debt only in credit unions, and the remaining 60% also had debt with a bank. Debtors only with banks reached 4.7 million people.

FIGURE 2

DEBT DISTRIBUTIONS (2017)



Source: Authors' calculations based on CMF.

3.2. Analysis by income, age, gender, county, and region

This subsection compares credit union debtors and bank debtors according to their income, age, gender, and location (county and region where they live). As in the previous subsection, besides the categories “only bank” and “only credit union”, we include the third category composed of those individuals who simultaneously are credit union debtors and bank debtors.

Supposing that credit unions have a role in financial inclusion, in that case, we expect to find that:

- they have debtors with a lower income (for example, seniors whose source of income are their pensions);
- they serve more women (with lower labor participation than men);
- they serve individuals living in isolated areas different from cities (having more difficulty accessing financial services).

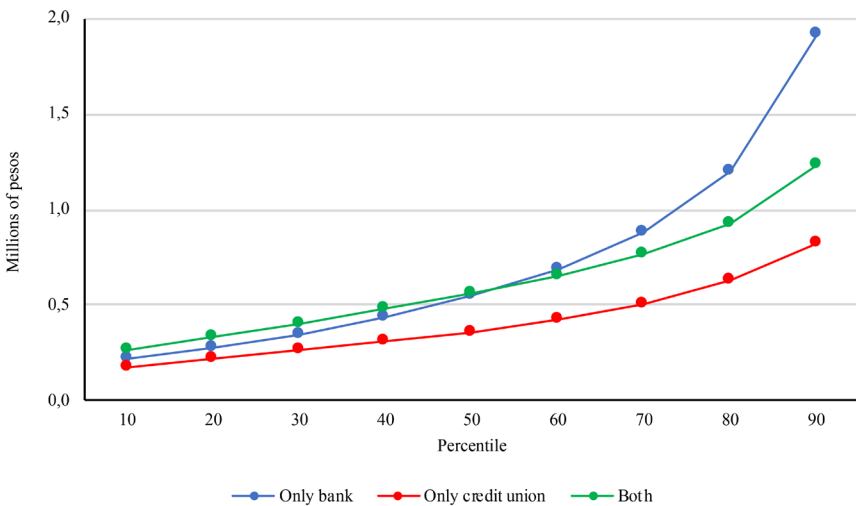
Figure 3 characterizes “only bank”, “both”, and “only credit union” debtors, according to their income, showing that for all percentiles, credit union debtors

have lower income than bank debtors and the individuals belonging to the category “both”. When comparing bank debtors with individuals in the category “both”, we find that while in the low-income percentiles, the 60th percentile and lower, bank debtors observe lower-income, the opposite occurs for high-income, above the 60th percentile, with bank debtors having a higher income. A plausible explanation is that high-income bank debtors are more likely sophisticated financial clients, demanding diversified financial instruments not provided by credit unions. For example, credit unions do not provide current accounts.

Additionally, when we observe the distribution of credit union debtors, bank debtors, and individuals in both categories (Figure 3), almost 50% of credit union debtors have an income lower than the national median (349 thousand Chilean pesos). Meanwhile, debtors in the categories “both” and “only bank” achieve this threshold at the percentile 20th and 30th, respectively. Furthermore, about 30% of credit union debtors have a monthly income below the minimum wage (276 thousand Chilean pesos in 2017).

FIGURE 3

INCOME DISTRIBUTIONS (2017)



Source: Authors’ calculations based on CMF.

This statistical evidence remarks that:

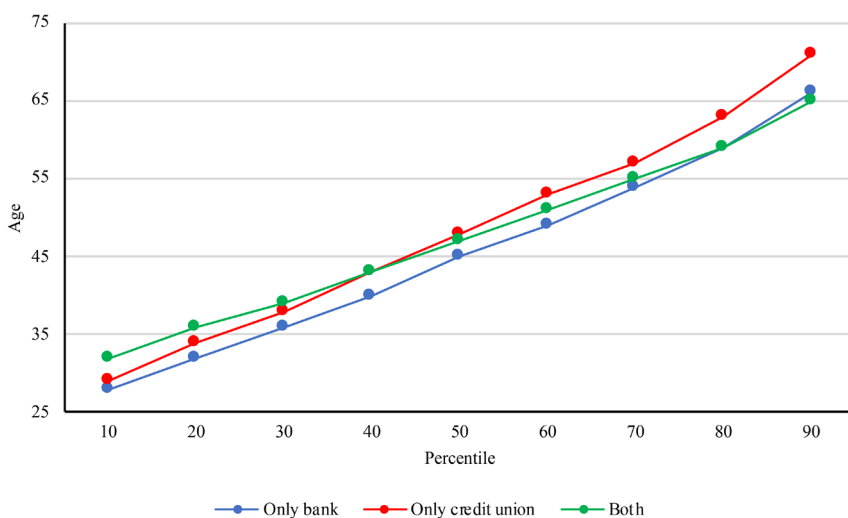
- credit unions provide financial debt services to individuals with lower income than banks debtors (both categories, “only bank” and “both”);
- the percentage of only credit union debtors with an income lower than the national median is higher than for bank debtors (both categories, “only banks” and “both”); and
- about 30% of debtors having a debt only in credit unions have an income level below the minimum wage.

Overall, credit unions focus more on low-income individuals, *vis-à-vis* banks, consequently contributing to financial inclusion.

Regarding the age variable, Figure 4 shows that for all percentiles, credit union debtors are older than bank debtors. In particular, Figure 4 shows that credit union debtors, compared to the other two types of debtors (“only bank” and “both”), show a high concentration among elderly individuals, in particular in the retired segment. Thus, credit unions would tend to provide credit to older people than banks. Such a finding constitutes a new argument regarding the financial inclusion role that credit unions seem to fulfill.

FIGURE 4

AGE DISTRIBUTIONS (2017)

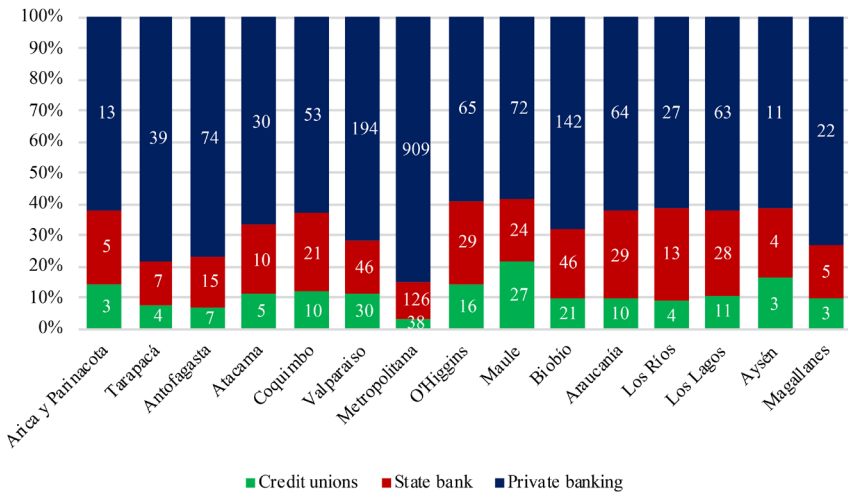


Source: Authors' calculations based on CMF.

One of the objectives declared by credit unions is to give access to people to financial products that are not business attractive for banks. In this sense, it is worth asking about credit unions’ scope in Chile at the regional level. We consider the number of commercial offices in each Chilean region as a proxy for credit unions and banks’ geographical presence.⁹ Figure 5 presents the number of commercial offices of credit unions, private banks, and the Chilean State bank in each of Chile’s regions.

FIGURE 5

NUMBER OF COMMERCIAL OFFICES PER REGION (2017)



Source: Authors’ elaboration based on CMF.

The proxy variable “commercial offices” notes that credit unions reach their most extensive presence in the Maule region with 22% (27 offices) of the total number of commercial offices in the region (123 offices). Following the regions of Aysén and O’Higgins with the participation of 17% and 15%, respectively. In the Metropolitan Region (the most populated region in the country), the 38 credit unions’ commercial offices represent only 4% of the total (1,073 offices). Whereas

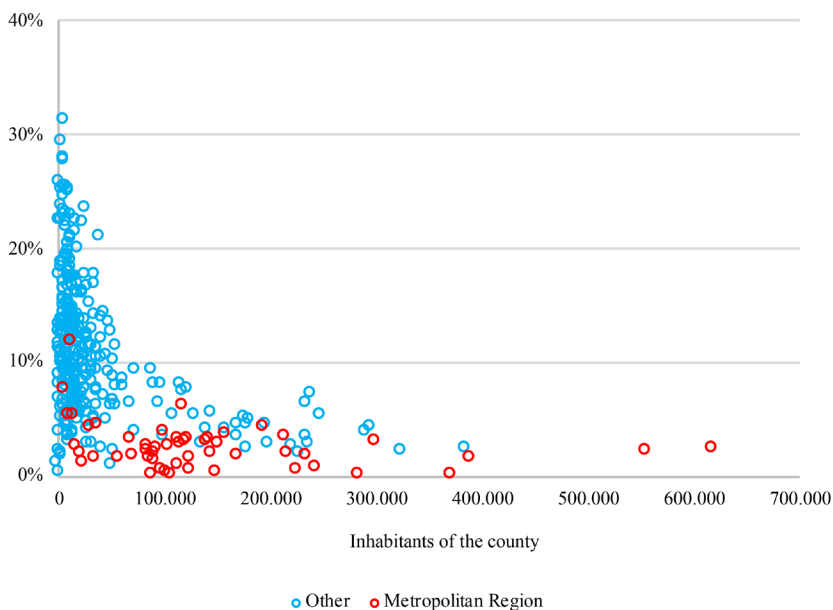
⁹ Commercial offices include head offices, branches, auxiliary branches, and support offices.

private banks only have 49% of their commercial offices outside the Metropolitan Region, the State bank has 69%, and credit unions have 80%. These results indicate that credit unions have a significant regional presence, especially in regions outside the Metropolitan Region.

To reinforce the previous point, Figure 6 presents debt information in credit unions with greater detail, by county and number of inhabitants, distinguishing between those in the Metropolitan Region (dots in red) and those in the other Chilean regions (dots in blue). It is easy to observe that the share of debt in credit unions concentrates in those counties whose number of inhabitants is less than five thousand and different than those in the Metropolitan Region. Such a phenomenon suggests the role of financial inclusion that credit unions play in small counties where commercial banks are not available.

FIGURE 6

DEBT IN CREDIT UNIONS AS A PERCENTAGE OF TOTAL DEBT BY COUNTY (2017)



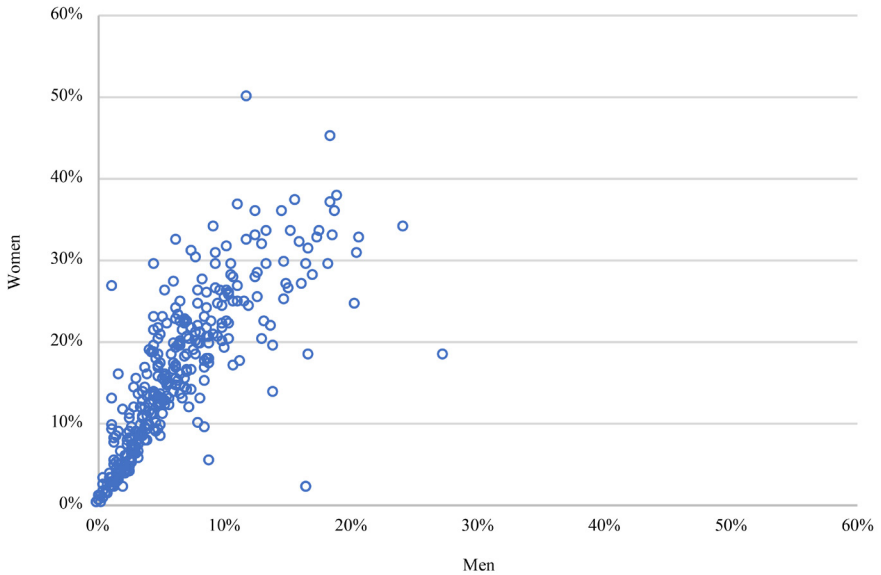
Source: Authors' elaboration based on CMF.

Note: "Other" corresponds to counties in regions different than the Metropolitan Region.

Regarding gender, information from the CMF indicates that the percentage of women debtors in credit unions (59% women versus 41% men) exceeds the share in banks (49% women versus 51% men). In almost all the counties in Chile, the ratio of women's debt in credit unions to women's total debt is higher than that of men (Figure 7). This information is interesting to study gender gaps in the credit system and how credit unions could reduce them.

FIGURE 7

DEBT IN CREDIT UNIONS TO TOTAL DEBT BY GENDER AND COUNTY
(Percentage, 2017)



Source: Authors' calculations based on CMF.

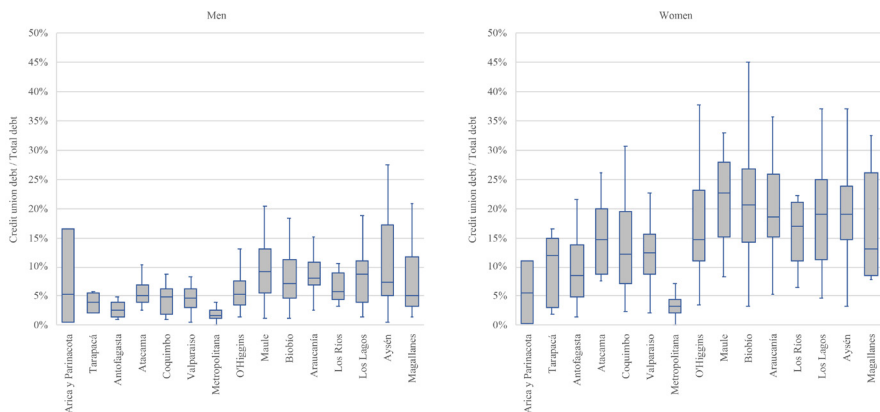
Note: Each point represents a county. The axes represent how much of the total debt each gender has in credit unions.

Next, considering the gender and regional dimension, we analyze the debt and savings at the regional/county level by gender in credit unions. Figure 8 presents the results. Panel (a) defines the ratio between the debt in credit unions to total debt, and panel (b) expresses the ratio between the savings in credit unions to total savings.

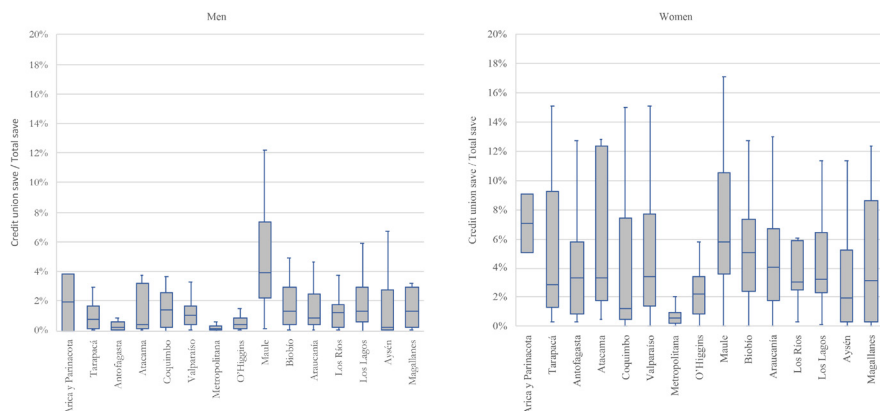
FIGURE 8

DEBT AND SAVINGS IN CREDIT UNIONS (2017)

(a) Debt in credit unions to total debt, per region and county



(b) Savings in credit unions to total savings, per region and county



Source: Authors' elaboration based on CMF.

Note: The bars denote the regions of Chile. Debt includes consumption, housing, and other debts. Saving includes term deposits and savings accounts.

Panel (a) of Figure 8 shows that credit unions have a high debt presence in Chile's center-south regions. On the contrary, debt in the credit unions located in the Metropolitan Region is significantly lower than debt in all the other regions. Panel (a) also shows that women have a higher debt percentage with credit unions in almost all regions than men. Hence, we infer that women give much more intensive use of credit unions compared to men. In the case of savings (panel (b) of Figure 8), we find a similar behavior but less accentuated. Savings in credit unions concentrate in the south-central regions of Chile, with women saving more than men. In brief, credit unions seem to fulfill financial inclusion by giving access to debt and savings to women in regions different than the Metropolitan Region.¹⁰

This subsection presents statistical evidence indicating that people with lower income, older, preferably women, and living in small counties far from the main urban areas, tend to participate more actively in credit unions. In brief, we infer that credit unions in Chile seem to contribute to financial inclusion.

3.3. Do credit unions foster financial inclusion?

This subsection complements subsection 3.2 by estimating binary variable models, where the dependent variable corresponds to the probability that an individual has a debt in a credit union. The exogenous variables are the individuals' characteristics (income, age, and gender) and that a credit union commercial office exists in the same county where the individuals live.

The data used correspond to the information of all individuals having debt or savings in credit unions or banks by December 2017, implying a cross-section analysis with about 7.8 million observations.

In our estimates, we follow the methodology in Cameron and Trivedi (2005). Hence we consider a basic binary choice model where the latent variable depends on observable variables and an error term (equation (1)).

$$y_i^* = x_i\beta + \varepsilon_i \quad (1)$$

where:

$$y_i = \begin{cases} 1, & \text{if } y_i^* > 0; \\ 0, & \text{if } y_i^* \leq 0 \end{cases}$$

Then, the probability that an individual has a debt in a credit union is:

$$E[y_i | x_i] = Pr[y_i = 1 | x_i] = Pr[x_i\beta + \varepsilon_i | x_i] = F(x_i\beta) \quad (2)$$

Where $F(\cdot)$ is the cumulative probability function.

¹⁰ Coepeuch and Capual have at least one commercial office per region.

We test the accumulated function specification using a Probit model. From here, the models estimated have the form:¹¹

$$Pr(y = 1 | X) = \Phi(\beta_1 + \beta_2 \ln(\text{income}) + \beta_3 \text{age} + \beta_4 \text{age}^2 + \beta_5 \text{gender} + \beta_6 \text{office}) \quad (3)$$

The exogenous variables included are the natural logarithm of income, the individual's age, the square of the individual's age, and gender. Moreover, we include the exogenous variable "office" representing the existence of at least one credit union commercial office in the county where the individual lives.

Table 5 presents the results for the alternative three models we estimate, where the dependent variable corresponds to the probability that an individual has a debt in a credit union.

TABLE 5
PROBABILITY OF HAVING DEBT IN A CREDIT UNION

	(1)	(2)	(3)
Ln(Income)	0.0252*** (0.000651)	0.0214*** (0.000641)	0.0423*** (0.000901)
Age	0.0393*** (0.000429)	0.0403*** (0.000430)	0.0446*** (0.000558)
Age2	-0.000363*** (4.24e-06)	-0.000372*** (4.25e-06)	-0.000402*** (5.51e-06)
Gender (Male = 0, Female = 1)	0.229*** (0.00197)	0.231*** (0.00198)	0.304*** (0.00264)
Office		0.220*** (0.0338)	0.214*** (0.0341)
Constant	-3.344*** (0.0160)	-3.524*** (0.0354)	-4.034*** (0.0377)
Region effect	Yes	Yes	Yes
Region × office effect	No	Yes	Yes
Regions	All	All	Not MR
Observations	7,809,944	7,805,844	2,550,414
Pseudo R2	0.0699	0.0728	0.0315

Source: Authors' calculations based on CMF.

Note: The variable "office" takes the value one if there is at least one credit union commercial office in the county where the individual lives, and zero otherwise. The number of observations corresponds to all individuals having a financial relationship (debt or savings) with credit unions, banks, or both. MR denotes the Metropolitan Region. Robust standard errors in parentheses.

*, **, ***, indicate statistical significance at 10%, 5%, and 1%, respectively.

¹¹ These models do not provide probabilities directly through their parameters.

The first column of Table 5 presents the exogenous variables of the models. Model (1) includes the individual's characteristics, meaning, income, age, and gender. Besides the personal characteristics, model (2) also includes the variable office. Last, model (3) intends to identify the "region effect", which means that living in a region different from the Metropolitan Region tends to affect the probability that an individual has a debt in a credit union.

The results of models (1), (2), and (3) indicate that income, age, and gender coefficients are positive, meaning that these variables have a positive effect on the probability that an individual has a debt with a credit union. In other words, the higher the income, the more likely it is that an individual has debt in a credit union.¹²

The age variable also has a positive coefficient, meaning that the older the individual, the more likely he has a debt in a credit union. The square of the age has a negative coefficient, implying that the probability of having a debt with a credit union is higher for elderly individuals but at a decreasing rate.¹³ Gender also has a positive coefficient, then the probability that women have debt with a credit union is higher than men.

On its hand, the variable office of models (2) and (3) presents a positive coefficient, suggesting that if a credit union commercial office exists in the county where the individual lives, it tends to increase the probability of acquiring debt in a credit union. Such effect is not very different when comparing the results for all regions (model (2)) and when we exclude the Metropolitan region (model (3)).

Table 6 shows an alternative specification using the only debtor sample, where the income parameter is negative. It means that, in general, credit unions serve lower-income people than banks, but in an overall specification (including non-debtors), income increases the probability of being a debtor. The result using the only debtor sample is coherent with our hypothesis of the financial inclusion role of credit unions as, in relative terms, these serve individuals with lower income than banks.

¹² The results using the information of all individuals having debt or savings in credit unions or banks find that income has a positive effect on the probability of having credit. It is also coherent because either credit unions or banks require prudential management of their credits.

¹³ It is standard to include the age square in this type of model to capture the non-linear effects (Cameron and Trivedi, 2005). The negative sign of the age square indicates that the impact of age on the probability of having a loan with a credit union starts to decrease as the individuals get older.

TABLE 6

PROBABILITY OF HAVING DEBT IN A CREDIT UNION WITH THE
SAMPLE OF ONLY DEBTORS (2017)

	(1)	(2)	(3)
Ln(Income)	-0.0665*** (0.000623)	-0.0693*** (0.000629)	-0.0588*** (0.000830)
Age	0.0181*** (0.000610)	0.0187*** (0.000611)	0.0177*** (0.000744)
Age ²	-7.62e-05*** (6.01e-06)	-7.88e-05*** (6.02e-06)	-3.71e-05*** (7.38e-06)
Gender (Male = 0, Female = 1)	0.181*** (0.00294)	0.184*** (0.00294)	0.252*** (0.00356)
Office		0.293*** (0.0499)	0.284*** (0.0500)
Constant	-1.863*** (0.0204)	-2.125*** (0.0513)	-2.418*** (0.0527)
Region effect	Yes	Yes	Yes
Region × office effect	No	Yes	Yes
Regions	All	All	Not MR
Observations	4,541,781	4,541,781	1,493,151
Pseudo R2	0.1370	0.1415	0.0624

Source: Authors' calculations based on CMF.

Note: The variable "office" takes the value one if there is at least one credit union commercial office in the county where the individual lives, and zero otherwise. The number of observations corresponds to all individuals having a financial relationship (debt or savings) with credit unions, banks, or both. MR denotes the Metropolitan Region. Robust standard errors in parentheses.

*, **, ***, indicate statistical significance at 10%, 5%, and 1%, respectively.

In summary, these results suggest that credit unions play a role in financial inclusion, as the probability of acquiring debt increases if a credit union commercial office is near where individuals live. Moreover, the elderly and women tend to ask for loans from credit unions.

4. CONCLUSIONS

This paper explores if credit unions play a role in financial inclusion.

Using a unique dataset, statistically-based evidence, and binary variable models, we confirm that credit unions have a financial inclusion role. They mainly provide credit to low-income individuals, the elderly, women, and living in counties with a small number of inhabitants, far from large cities. Also, we found that if a credit union commercial office exists in the county where individuals live, it positively

affects their credit access and financial inclusion. As previously argued, our results confirm this role not formally proved by related literature (Téllez, 2007; Hernández, 2008; Matus *et al.*, 2010; Potin, 2012; Ministry of Economy, 2014; Central Bank of Chile, 2017).

Possible areas of further research are: (i) analysis of delinquency rate, i.e., are credit unions debtors effectively better payers than bank customers, given the same amount and type of loan?; (ii) why exists a significant group of individuals having debt with both credit unions and banks? is it because the current asymmetry of information allows them to have a higher total debt?; and (iii) which growth opportunities seem to have credit unions providing financial instruments to segments served today by banks?

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APPENDIX

A. CREDIT UNIONS' BACKGROUND

HISTORICAL PERSPECTIVE

Since its inception, Chilean credit unions have experienced periods of marked boom and bust. The first credit unions in Chile have their origins in 1947, a consequence of the Catholic Church's active role and the initiative of small groups of individuals with common interests such as workers, merchants, and public servants (Hernández, 2008).

While in the sixties, credit unions experienced vital support from the State. In the seventies and eighties, they suffered a strong decapitalization due to successive and deep economic crises and high unemployment that affected their members (Potin, 2012).

During the nineties and the present century, credit unions have once again seen growth, achieving business consolidation, covering large geographical areas, providing financial services to social sectors that private banks typically do not serve (Hernández, 2008).

CREDIT UNIONS IN THE WORLD AND CHILE

Credit unions are financial institutions existent in almost every country in the world. According to data from the World Council of Credit Unions, in 2017, there were more than 89 thousand credit unions globally, with 260 million members representing 9.1% of the global workforce. In terms of assets and liabilities, credit unions total deposits and capital for US\$ 1.7 trillion and total loans for US\$ 1.5 trillion.

Credit unions level of development and market penetration (number of members over the total active population) varies in geographic terms, with the presence of credit unions (penetration) led by North America with 52%, the Caribbean with 30%, Latin America with 11%, and Africa and Europe with 9% each. In Chile, credit unions' participation reaches 10.9% of the total active population (Figure A.1).

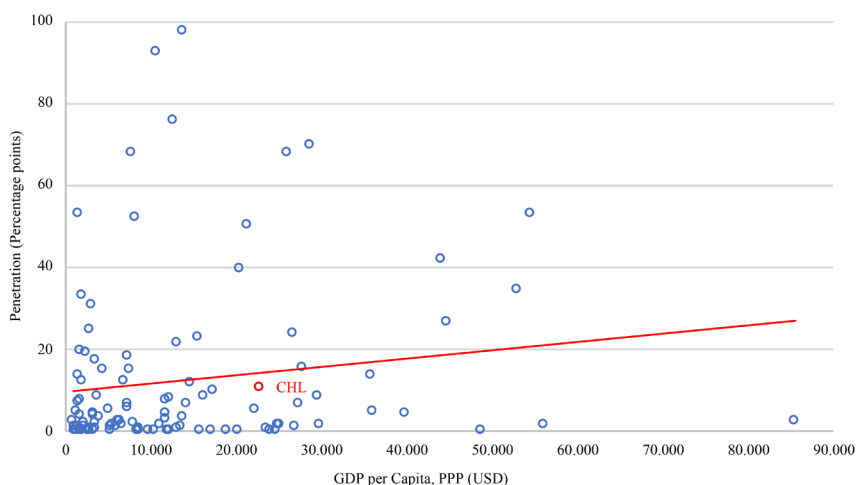
WHO REGULATES THE CREDIT UNIONS IN CHILE?

In Chile, credit unions are governed by the Decree N° 5 ("Decreto con Fuerza de Ley" in Spanish) of 2003, the General Cooperatives Act (2004), the Chapter III.C.2 of the Central Bank of Chile, and the Guideline 108 of the Financial Market

Commission (CMF). Specifically, Article 87 of the General Cooperatives Act (2004) establishes that all credit unions whose equity exceeds 400,000 *Unidades de Fomento* are under the regulation of the CMF. The Social Economic and Associativity Division (DAES) of the Ministry of Economy supervise those credit unions not complying with this criterion.¹⁴

FIGURE A.1

CREDIT UNIONS PARTICIPATION AND INCOME LEVEL (2017)



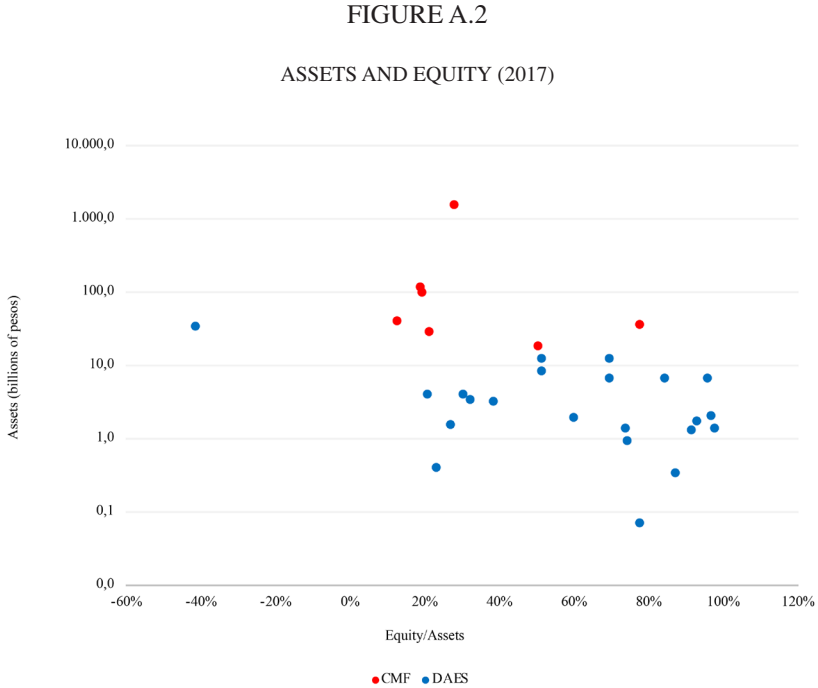
Source: Authors' calculations based on World Bank and World Council of Credit Unions.

Note: Each point represents a country. CHL: Chile. In Chile's case, the statistics of participation consider only the credit unions supervised by the CMF.

By 2018, 45 credit unions were registered in Chile. The number of credit unions not reaching the 400,000 *Unidades de Fomento* limit of equity is 38, and the DAES supervises them. The CMF regulates the seven remaining ones: Coocretal, Coopeuch, Oriencoop, Capual, Detacoop, Ahorrocoop, and Lautaro Rosas. Coopeuch is the leading credit union in the system, with assets, liabilities, and equity equivalent to 82.4%, 82.0%, and 83.3%, respectively, by December 2017. It means that the

¹⁴ The *Unidades de Fomento* is a unit of account indexed according to inflation.

“biggest” credit unions of the system are under the CMF supervision. Figure A.2 shows the credit unions supervised by the CMF (dots in red) and supervised by the DAES (dots in blue).



Source: CMF and DAES.

Note: Dots in red and blue indicate CMF or DAES supervision, respectively. The data corresponds to the last year available. Credit unions are under the supervision of the CMF if they reach a certain threshold of equity. However, those credit unions which do not maintain that threshold continue under the supervision of the CMF, meaning that this rule is a requirement for entry, not for the exit.

REQUIREMENTS TO CREDIT UNIONS AND THEIR FINANCIAL SERVICES

Among the legal requirements that all credit unions must meet are having the facilities, human resources, technology, procedures, and controls necessary to develop their functions and operations adequately and have equity not less than 10% of their risk-weighted assets. Additionally, credit unions must have a ratio of equity over total assets of at least 5% and are subject to some specific articles from the General Banks Act (“Ley General de Bancos” in Spanish).

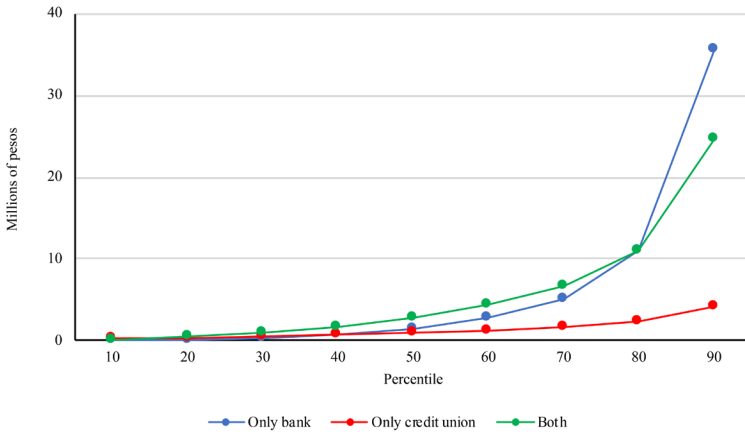
The financial services that credit unions provide are:

- Receive deposits from their members and third parties;
- Issue bonds and other types of securities open to the public;
- Contract loans with domestic or foreign financial institutions;
- Acquire, preserve and dispose of bonds issued by the State;
- Grant loans to their members and, in general, provide credit, with or without guarantee, adjustable or not adjustable;
- Discount to their members, bills, and other documents that represent payment obligations;
- Grant loans to their members, covered by collateral, and mutual endorsable mortgages; and
- Manage mutual endorsable mortgages.

B. CHARACTERIZATION OF CREDIT UNIONS EXCLUDING COOPEUCH (2017)

FIGURE B.1

DEBT DISTRIBUTIONS

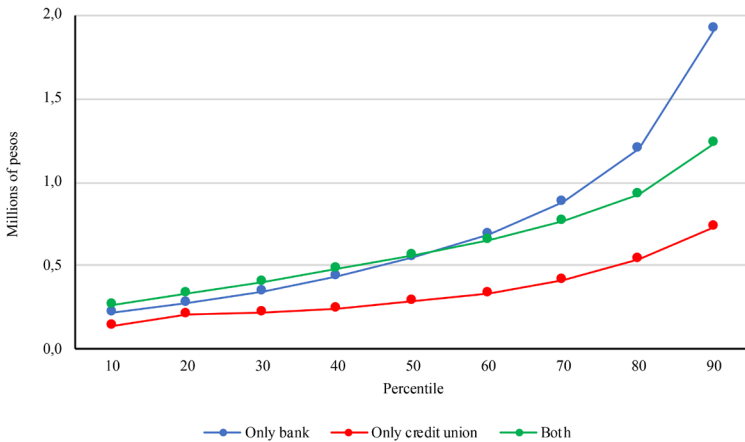


Source: Authors' calculations based on CMF.

Note: "Only credit union" denotes credit unions' members other than Coopeuch.

FIGURE B.2

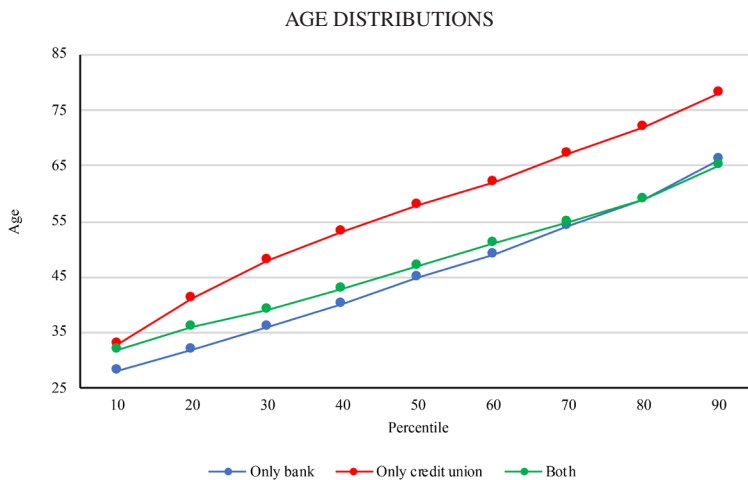
INCOME DISTRIBUTIONS



Source: Authors' calculations based on CMF.

Note: "Only credit union" denotes credit unions' members other than Coopeuch.

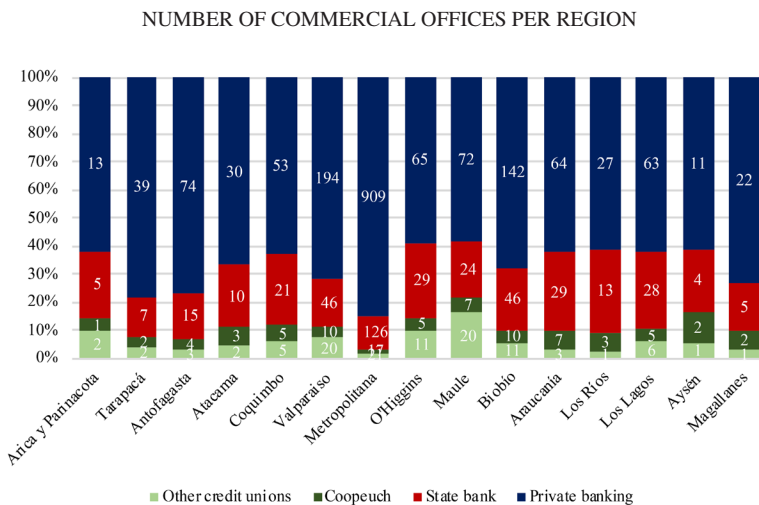
FIGURE B.3



Source: Authors’ calculations based on CMF.

Note: “Only credit union” denotes credit unions’ members other than Coopeuch.

FIGURE B.4

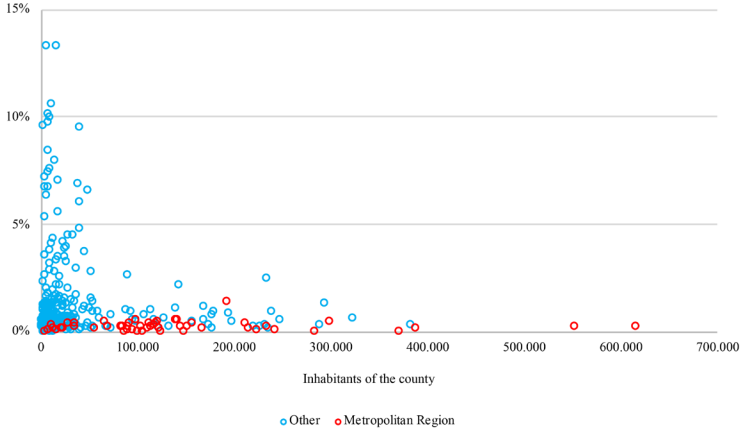


Source: Authors’ elaboration based on CMF.

Note: The offices consider: head offices, branches, auxiliary branches, and support offices.

FIGURE B.5

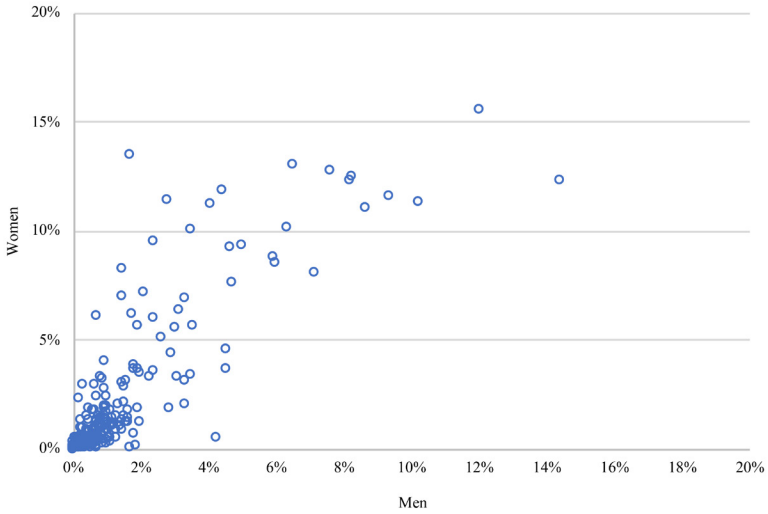
DEBT IN CREDIT UNIONS AS A PERCENTAGE OF TOTAL DEBT BY COUNTY (2017)



Source: Authors' elaboration based on CMF.

FIGURE B.6

DEBT STOCK TO TOTAL DEBT BY GENDER AND COUNTY
(Percentage)



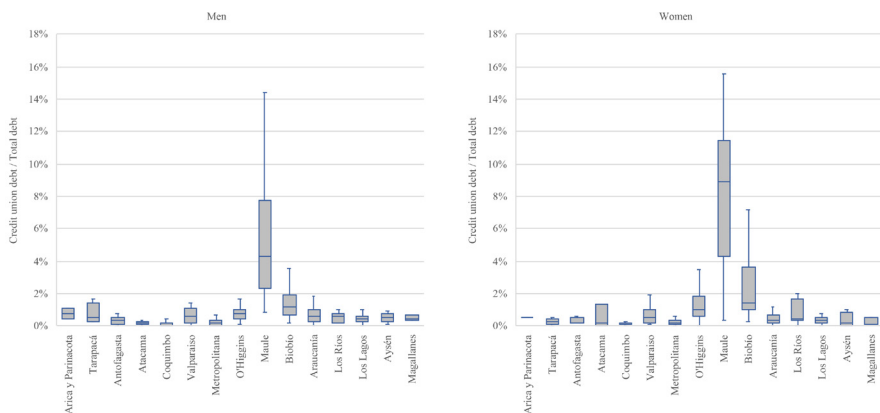
Source: Authors' elaboration based on CMF.

Note: Each point represents a county. The axes present how much of the total debt is in credit unions' debt by gender.

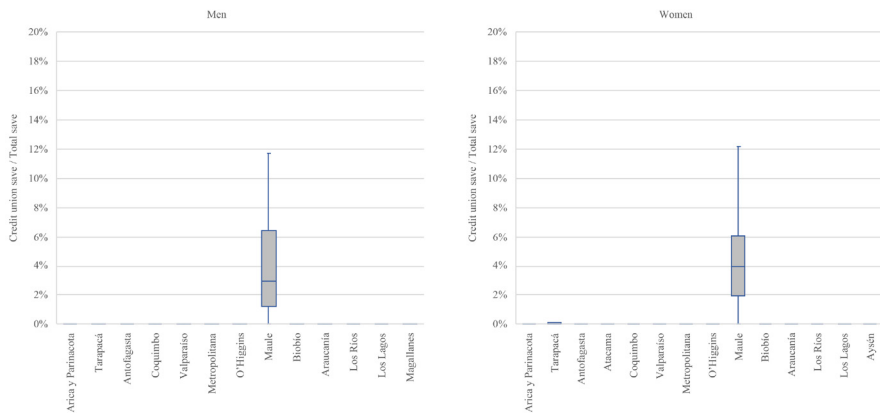
FIGURE B.7

DEBT AND SAVINGS IN CREDIT UNIONS (2017)

(a) Debt ratio in credit unions to total debt, per region and county



(b) Savings ratio in credit unions to total savings, per region and county



Source: Authors' elaboration based on CMF.

Note: The bars denote the regions of Chile.