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Bankarization and Determinants of Availability of Banking Services in Argentina

Central Bank of Argentina

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Executive Summary

The level of *bankarization* (access to and use of banking services) is relatively low in Argentina both in historical terms and compared with similarly developed countries. This is shown by indicators both of access to and use of banking services. This paper analyzes a unique database containing information on availability and use of regulated banking services at locality level for the 1998-2005 period. Evidence shows a sharp discrepancy among provinces, both in access to and use of formal banking services. As a result of the 2001 economic, social, and financial crisis, there was a decline in the bank loan and deposit/GDP ratio. While the use of banking services has declined, the availability of banking infrastructure has increased, especially through ATMs and mainly concentrated in already financially developed localities.

The analysis of the economic determinants of availability and use of banking services indicates a significant correlation with population and socio-economic situation of the locality, district area, economic activity level and business environment of the province. These determinants depend on bank's ownership structure (public, foreign or domestic private), thereby reflecting their different business strategies. In fact, public banks usually operate in relatively smaller localities, foreign banks mainly operate in urban centers, whereas domestic private banks largely depend on the business environment of provinces. Finally, a Bayesian econometric approach shows that the use of banking services is characterized by spatial dependence, which suggests the importance of extending access to bank financial services locally in order to foster *bankarization*.

JEL Classification: C10, C11, G21, G28
Key words: *bankarization*, access to and use of banking services, locality, regulation.

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Summary

Economic theory and international evidence show that financial depth bears a direct and positive relationship to the level of economic development. In a scenario of financial stability with appropriate consideration of potential banking risks, the financial sector plays a crucial role both in promoting savings and allocating productive resources to more profitable investments. *Bankarization*, defined as access to and use of financial services generally and banking services particularly, has a positive impact on income distribution and poverty reduction. However, most countries have some social sectors or geographic regions which face major restrictions in gaining access to banking services with the ensuing unwanted macro and socio-economic impact.

This paper deals with the economic determinants of *bankarization* in Argentina, by analyzing a unique database with information on access to and use of regulated bank financial services as measured by locality for the 1998-2005 period. In Argentina there are good reasons to be interested in the current *bankarization* level, since it is relatively low, both in terms of historical standards and compared with similarly developed countries. However, this scenario changes depending on the selected benchmark: the use of banking services is comparatively low against comparable countries, and very low vis-à-vis developed countries. Additionally, if the geographic area is considered, figures are similar to averages from middle-income countries. In fact, over the last eight years, the number of bank agencies grew more than 33% (even though 36 banks closed or merged), since the increase in available ATMs offset the reduction in the number of branch offices. This process implied that most of the new bank outlets were opened in already financially developed localities.

Evidence also shows a sharp discrepancy among provinces in both use of and access to formal banking services. On one hand, less developed provinces show lower *bankarization* level and, on the other hand, Buenos Aires City –as the country's financial center- has a significantly higher level than the average figure nationwide. Nevertheless, several indicators on the degree of access to and use of banking services show a reduction in their dispersion during the 1998-2005 period. Substantial progress was also made in the provision of banking services in provinces with lower *bankarization* levels.

The characteristics of each locality, as well as the type of bank (according to its ownership structure defined as public, domestic private, or foreign), have an impact on the level of *bankarization*. One of the main elements conditioning the degree of availability of banking services is the number of inhabitants. Data show that more than 90% of localities with less than 2,000 people have no supply of banking services. This percentage drops to 5% in the case of localities with a population exceeding 25,000 inhabitants. Likewise, the probability of a locality having more than one bank agency (which does not necessarily indicate the presence of two banking institutions) exceeds 60% in the case of populations ranging between 5,000 and 10,000 and amounts to 98% for localities with more than 25,000 inhabitants.

Although the number of agencies does not differ significantly among the various types of banks, public banks are present in a greater number of localities (in 70% of localities with a single bank branch, 74% of those with 2 bank branches, and 95% of those with more than 2 bank branches). Conversely, foreign banks only participate in 3% of localities with 1 or 2 bank agencies. Even thought the number of localities with bank branches increased between 1998 and 2005, only public banks operate in a larger number of localities. Ownership transfers, mergers and acquisitions occurred within the period explain to some extend this process.

Empirical regularities observed in the descriptive analysis were studied with different econometric techniques. Thus, the analysis of determinants of availability and use of banking services shows a positive correlation with population and socio-economic condition of locality, district area, economic activity level and business environment of the province. In particular, the existence of bank agencies in a locality is positively associated with population size and activity level of province. Consistently with the theoretical opposite relationship between poverty and access to banking services, socio-economic variables show expected signs, (i.e. the lower the quality housing index and the higher the unemployment rate, the smaller the probability of having a bank agency). Bank's ownership structure, which reflects different business strategies, also has an effect on the provision of banking services. Public banks usually operate in relatively smaller localities, foreign banks mainly operate in urban centers, whereas domestic private banks largely depend on the business environment of provinces.

Regarding the use of bank services, population size and province output level are major determinants at locality level. Social indicators show greater elasticities than other determinants. The educational level of a locality seems to have a significant impact on banking system, even though it displays an opposite sign to the one normally expected. This result might be explained by a different behavior according to the type of bank. Educational level is an economically important determinant in the case of domestic private and foreign banks. Focusing on public banks determinants, unemployment is largely and negatively associated with the volume of banking business within the locality.

Finally, a Bayesian spatial econometric approach shows that use of banking services presents spatial dependence, which suggests the importance of extending access to bank services locally in order to foster *bankarization*. Hence, regulations, according to proper bank's risk management policies, should:(i) encourage the reduction of entry barriers to new banks, in particular those specialized in less *bankarized* segments, (ii) facilitate agency network expansion , and (iii) promote diversified banking service accessibility.

In this regard, action taken by the Central Bank of Argentina focuses on different capital requirements by geographic location, new regulation on Credit Cooperatives (*Cajas de Crédito Cooperativas*), admission of temporary bank branches in localities without banks (formerly allowed only to public banks), expansion of low-value loan trading, and other measures under study, such as outsourcing some operational services, the creation of a basic universal bank account, among others.

1. Introduction

Bankarization, broadly defined as access to and use of financial services generally and banking services particularly, is a subject of interest due to its significant implications for financial stability and its relation to economic growth and welfare. Comparative country studies find a long-term positive correlation between financial services depth (effective use) and economic development. There are economic theories which advocate that *bankarization* is positively associated with an efficient allocation of resources and a higher GDP growth rate in the long run. Finally, greater financial depth is related to better income distribution, lower poverty levels, and higher economic welfare.

Economic literature indicates that most countries have some social sectors or geographic regions which face major restrictions in gaining access to banking services. Differential costs that banks find when they try to provide services and the presence of entry barriers might be a feasible explanation. Areas with higher income levels and population density will in general, be more attractive markets for the provision of bank services.

In order to study the determinants of *bankarization*, it is important to distinguish the legal, regulatory, and tax issues which constitute the institutional incentive framework within which banking services are provided. Banking services scope and characteristics, as well as the role of regulators are delimited by the legal framework.

In Argentina, there are several reasons to be particularly interested in analyzing access to and use of banking services.[3] *Bankarization* in Argentina is low for a country having its per capita income, with deposits and loans that represent 20% and 10% of GDP, respectively The history of economic and financial crises, in conjunction with government intervention on the banking sector might explain to some extend this fact. Macroeconomic volatility pushed savers to find non-bank solutions, including foreign-currency denominated asset holdings being kept out of reach of formal and/or local financial services. The significance of the informal economic sector and tax evasion are major reasons for which agents would rather not choose to be *bankarized.*

Regulatory framework should be consider as one of the potential causes of low *bankarization* in our country. As far as banking rules are designed to promote the soundness of banking system, they might be restrictive and/or costly in terms of the benefits. In particular, some regulations designed for banks located in densely-populated, high-income urban areas might not be suitable for banks located in less densely-populated, relatively lower-income areas.

Not only laws and regulations, but also tax structure (VAT, income tax and, particularly, tax on financial transactions) exert a significant influence on the scope and use of banking services. Tax structure may also create differences among localities (for instance, tax rates on gross income at province level and/or residential rates at municipal level may not be homogeneous). Financial information as an instrument for tax oversight and control impacts directly on the use of banking services by those agents

[3] Including not only services provided by banks, but also by non-bank financial entities under the scope of BCRA regulation.

who evade taxes. In a context of high tax evasion and significant informal economy, the above-mentioned taxation and tax administration issues may act against a higher level of *bankarization*.[4] Therefore, it is necessary to strike a balance which may possibly imply a temporary trade-off in terms of the aim of *bankarization*, if it is taken into account that the use of financial information plays an important role as an ancillary tool for tax administration purposes.

Disclosure, transparency and financial education are issues that the bank regulator and the banking industry should not oversee in order to strengthen *bankarization.* Financial data on availability, benefits and costs of operating with formal banking services, as well as the protection of consumer rights, are essential components of *bankarization.*

Beyond general considerations, there are many aspects at microeconomic, local, and regional levels that are worth analyzing in detail. Considering type of service (payment, saving, and credit), ownership structure (public, domestic private, and foreign), and using a data base at locality level (smallest geographic unit), this paper focuses on matters related to access, availability, and geographic reach of banking services regulated by the Central Bank of Argentina (BCRA). Even though a thorough explanation on the *bankarization* determinants is not the main goal of the paper, some conclusions on local banking services determinants are drawn in order to consider their implications in terms of both access to and use of such services.

This paper is divided as follows: Section 2 introduces basic definitions, stating the goals of this study properly and summarizing theories and international micro/macroeconomic empirical evidence. The importance of deepening banking services arises as the main lesson. Section 3 considers evidence for the Argentinian case, in comparison with other countries, examining also the type of banking services delivery points. Section 4 analyzes the availability of banking services locally, taking into account physical infrastructure (branches and agencies) and business volume (deposits and loans). Section 5 deals with the determinants of deposit and credit to private sector at district level, introducing the concept of spatial dependence. Section 6 concludes with a discussion on some policy options which, in light of empirical evidence, might be relevant for banking services deepening.

[4] It should be taken into account that not only society as a whole, but also banking services and *bankarization*, would benefit from a lower level of tax evasion, more equitable tax burden, and a lower degree of informality in the economy.

2. *Bankarization*: Definition and Scope of Analysis

Bankarization is regarded as the level of access to and the degree of use of financial services generally and banking services particularly, so that its definition is confined to aspects that are included in the regulatory and policy scope of the Central Bank. On analyzing the definition of *bankarization*, one should clearly distinguish between (i) the level of access to banking services, considering their availability as well as direct and indirect costs, (social, geographic, etc.) constraints and barriers; and (ii) the level of real use of such services. Economic agents could have a wide range of available banking services, and yet do not make any use of them. At the same time, a distinction may also be drawn between legal, regulatory and tax implications and policy recommendations depending on whether they affect access or incentives to use banking services. In this regard, the regulatory authority's task should not only focus on facilitating access to or expanding the boundaries of banking services, but also on making the use of such services easier for certain population groups that are excluded.[5] In other words, narrowing the gap between the spectrum of possibilities and the effective use of banking services.[6]

The definition of *bankarization* adopted in this paper goes in line with the one developed by the most recent literature,[7] where there is a distinction between *access to* and *use of* banking services. *Access* is defined as the availability and supply of quality banking services at reasonable cost, where the term cost encompasses pecuniary as well as non-pecuniary costs. *Use* is defined as the level of real consumption of banking services. In terms of supply and demand analysis, *access* would represent the supply curve, whereas *use* would reflect the equilibrium or intersection between supply and demand. It should be noted that some economic agents have available access to banking services but do not demand them for different reasons and therefore do not make use of them, whereas other agents may potentially demand them but do not have available access thereto. The various scenarios that may occur depending on the different groups of economic agents are shown in Table 2.1:[8]

Table 2.1: Access to and Use of Banking Services

Consumers		**Excluded**			
		Voluntarily		Involuntarily	
Full usage	Voluntarily or unvoluntarily restricted in use	No use at current prices/conditions	Self-excluded by expectations	Rejected	Lack of access
Access				No access	

As shown in the Table above, there is a group of economic agents who have access to financial services, even though scenarios are different in terms of effective service use. In particular, one may distinguish between agents making full use of services and agents who voluntarily or involuntarily restrict their use. Fostering an enhanced use of

[5] For example, in the United Kingdom, the Financial Services Authority implemented the so-called *Basic Bank Accounts* to promote the use of financial services by *unbanked* population groups.
[6] See Schmukler (2006)
[7] Claessens (2005)
[8] Based on Claessens (2005)

financial services in these cases mainly depends on the banking institutions which already provide some kind of services to economic agents. However, there are instances in which increased use of financial services by the already *banked* population may require the introduction of regulatory changes, by either reducing constraints or creating appropriate incentives.

Beyond the potential constraints imposed by the legal and tax framework, the segment where the regulator has a major role to play is that of economic agents who are excluded both on a voluntary and an involuntary basis. Individuals may voluntarily exclude themselves whenever conditions for price, costs and/or service format lead them not to demand banking services. Additionally, there are agents who choose self-exclusion because they consider that they are not eligible for banking services, either on the grounds that they are not economically attractive to financial institutions or for cultural and/or socio-economic reasons. In both cases, the regulator may facilitate competition and efficiency in the provision of services, by reducing those constraints which make access difficult and promoting financial education and advocacy for users' rights.

Finally, there are economic agents who are involuntarily excluded from access to banking services. These individuals are rejected because they fail to meet formal requirements (set by the BCRA or determined by financial institutions themselves) for risk-related reasons or information asymmetries which derive into rationing situations. There are also barriers to access arising from issues associated with geographic location, gender, and/or socio-economic situation. Obviously, the regulator's role in fostering the *bankarization* of such population segments is crucial not only for the potential impact on poverty, income, and economic growth, but also because in many cases financial regulation itself directly or indirectly affects the degree of effective *bankarization*.

It should be noted that, although Table 2.1 allows for a first approach, it does not encompass all the dimensions involved in the problem of *bankarization*. In this regard, if one incorporates the population's income level, it is expected that higher-income economic agents will appear on the left of this table, whereas lower-income ones will be shown on the right. However, if one adds the regional dimension, the situation may be different if there are populations located in regions with inadequate provision of banking services that are affected beyond their level of income.

Another dimension that must be considered at the time of analyzing the difference between access to and use of banking services has to do with the applicable definition. In principle, one may distinguish three basic types of banking services: (1) means of payment or transactional services; (2) savings; and (3) credit.[9] This is not a minor distinction since there can be economic agents who have access to means of payment but cannot access to credit or viceversa, depending on availability of services, level of income, geographic location, etc. For example, the type of available bank branch in any locality will, for economic, technological, and regulatory reasons, determine the range of available services within such jurisdiction. Thus, if a branch office is replaced with an ATM, the service supply will change within the locality.

Even if access to credit services has traditionally been one of the most crucial aspects partly because of its role in the promotion of economic growth, savings and means of

[9] Some studies include other services such as, for example, insurance, contractual savings. Claessens (2005) and Stone (2005).

payment services are no less relevant, as pointed out by the latest economic literature.[10] Access to means of payment can be important for economic agents who have volatile or seasonal income, since it allows smoothing consumption and reducing risks and costs associated with the need to maintain liquid savings. At the same time, the possibility of using means of payment facilitates trade, access to formal economy, and also reduces risks associated with liquid asset holdings.[11] Furthermore, savings and means of payment services play a major role if they are evaluated dynamically. Holding a bank account enables clients to have a history record and build a relationship with the banking institution, which may in the future derive into the offering of other bank products, such as a credit facility.[12] As clients show good credit performance overtime, they could benefit from access to more services under better conditions.[13]

Finally, it is necessary to consider that measuring the depth of the three basic types of banking services under study may be executed in different ways. First, at micro level, where measuring focuses on access of individuals or households, generally through surveys designed for individuals or households and/or companies. Secondly, at macro level, where measuring hinges on access of the country as a whole or by regions with aggregate indicators. Thirdly, where measuring can be performed through indirect indicators, both theoretical and empirical.[14] An extensive paper including data from 99 countries by Beck *et al.* (2005) shows bank deposit/loan indicators correlate positively with the percentage of households having bank accounts and the percentage of small companies with bank loans, respectively. This implies that in absence of specific data on *bankarization* procured from user-oriented surveys allowing to quantify the level of access to and real use of banking services,[15] the use of alternative indicators considered in this paper such as availability of bank agencies, level of deposits and loans, constitute a reasonable approach to the topic under study. Final conclusions and inferences shall necessarily take into account these limitations.

2.1. Why access to banking services is important?

2.1.1. Macroeconomic Aspects

Banking services play a major role in the economy because they allow to mobilize saving and channel it toward investment,[16] by managing to use expert knowledge and reduce information costs,[17] and to facilitate transactions favoring diversification to minimize risks and maximize yields. The endogenous growth model by Greenwood and

[10] Holden and Prokopenko (2001)
[11] Including some cost reductions, for example, within inflationary contexts.
[12] This may particularly be important for small enterprises which tend to finance themselves with their own funds. In this case, the provision of liquidity services becomes significant to manage the company's own funds and, at the same time, it allows to create history records which may facilitate access to financing whenever there are appropriate channels.
[13] For example, lower cost (interest rate) for borrowing money.
[14] Stone (2005)
[15] Surveys which are usually costly, Stone (2005)
[16] Gurley and Shaw (1955) consider a transaction cost model, and emphasize the role of financial services in intermediating terms between short-term saving and longer maturity term investment with the ensuing positive impact on economic growth.
[17] Literature based on information asymmetries and imperfections allocate a significant role to financial services (Akerlof (1970), Stiglitz and Weiss (1981)), thereby setting the perfect theoretical framework to analyze the role of financial services in the economy.

Jovanovic (1990) shows that better allocation of resources and risks arising from greater financial depth generates economic growth.[18]

The importance of this role of banking services is reflected on empirical evidence which shows a positive correlation between economic growth and financial depth. Papers authored by King and Levine (1993), Levine, Loayza, and Beck (2003) demonstrate that a higher level of financial depth[19] positively correlates with a higher growth in per capita income. However, in this type of models, causality is a difficult issue to be empirically resolved because economic growth also generates financial development. In this regard, Levine (2005) argues that a higher level of financial depth positively correlates with a higher growth in per capita GDP and productivity, even though such robust relationship is not applicable to saving. According to this author, this relationship is "causal, robust, and large",[20] even though there is no unanimous view on this issue, mainly in relation to causality.[21] Nevertheless, due to the fact that it facilitates access to financing for companies facing financial constraints, the development of financial services contributes to the emergence and growth of a greater number of firms and industries, thereby expanding the possibilities of all economic agents, as shown by several studies at industry and/or firm level.[22] The paper by La Porta *et al.* (1997) adds evidence in terms of causation between development of financial services and economic growth, since these authors focus on analyzing the importance of the institutional and legal framework of each country and its implications for the development of financial services. In this way, they manage to isolate a determining factor of the level of financial depth which does not necessarily correlate with the level of economic growth.

2.1.2. Microeconomic Aspects

The process of financial deepening would have a major impact initially on those economic agents and enterprises having productive skills and projects, but restricted access to financing because they cannot provide sufficient guarantees or belong to the informal economy, i.e. small entrepreneurs and/or low-income agents. In such cases, access to financing could generate significant increases in productivity and therefore in prospects for growth and development in the economy.[23] Beyond any difficulties in the access to banking services by some economic agents, using corporate data for several

[18] It should be noted that growth initially creates a negative impact on income distribution, whenever only the most affluent economic agents have access to financial services. There is a trend reversal in the long term, as growth and access improve the opportunities for all agents by increasing productivity in the economy.

[19] The most commonly used yardstick is the level of private sector credit as a percentage of GDP, even though for Levine (2004) generally-accepted measurement units do not strictly match the relevant counterparts in theoretical models.

[20] The author also emphasizes the significance and complementary capacity of the capital market, Levine (2005). In this regard, evidence shows that there is no difference between countries having financial systems based on banks or otherwise on capital markets, except for countries with very low degree of institutional and economic development where capital markets are unable to develop.

[21] As mentioned by Levine himself (2004), Kaplan and Zingales (1998) underscore that the relationship between economic and financial development may result from the presence of the omitted variables which determine both variables at the same time, or from the fact that financial markets are inherently procyclical and therefore somehow anticipate growth and development.

[22] For example Rajan and Zingales (1998) show that enterprises which need foreign funding in order to grow have a higher relative development in those countries with a higher level of financial development, indicating that causation would go from financial development to economic growth.

[23] De Soto (2002)

countries, the available evidence[24] shows that the level of financial constraints reported by such companies declines with a greater availability of banking services, as measured by the number of branch offices and ATMs.[25]

On the other hand, access to financial services provides liquidity and allows economic agents to smooth their consumption overtime, thereby improving their economic welfare . However, the provision of liquidity by financial intermediaries makes them prone to bank runs and financial crises. These financial crises generate substantial costs in terms of economic welfare. In this regard, Loayza and Ranciere (2000) find that, although there is a correlation between economic growth and development of financial services in a broad country sample, the same does not hold true for countries which have, like Latin-American nations, been subject to strong financial and banking crises. In this case, the authors underscore the need to distinguish between short-term and long-term effects, demonstrating that private credit growth has a positive relation with GDP growth in the long run, even though such relation is generally negative in the short run due to the impact that a rapid increase in credit facilities might have on the collection capacity of banks and, therefore, on their solvency.

It should be noted that, if financial constraints are particularly significant for the poor, reducing such barriers would also create a positive effect because, in fact, countries with less financial depth tend to present a more inequitable distribution of income. In turn, greater financial depth would tend to equalize possibilities by minimizing the financial constraints which confine funding access to certain economic agents, and also by enabling a productivity increase in the economy. Thus, Beck and Demirguc-Kun (2004) show that financial development has a positive correlation with economic growth and this effect is more than proportionate in the lower-income population segment, being thus reflected on changes both in poverty and income distribution. Other studies show that financial depth contributes to reduce inequitable income and poverty levels[26] by minimizing credit restrictions on poorer agents and/or enhancing the financial, regulatory and legal structure.

An additional channel through which the difficulties in gaining access to financing would affect economic development originates in a negative impact on the accumulation of human capital. Evidence shows that this channel would be particularly harmful to lower-income populations, for primary as well as higher education. In fact, for the first case, Jacoby (1994) shows that the presence of financial constraints in poor households reduces the time devoted to schooling by children in Peru. In a subsequent paper, Jacoby and Skoufias (1997), using data on families in rural areas of India, make a thorough study of the role of financial intermediation as a mechanism to facilitate investment in human capital.[27] Financing constraints may create a more harmful effect

[24] Beck, Demirguc-Kunt and Martinez Peria (2005)

[25] The manner in which the degree of *bankarization* is measured has major implications when one compares its level between countries. Easy access to and use of banking services often lead to different conclusions in terms of *bankarization* degree across countries. For example, Stone (2005) shows the difficulty in measuring access to financial services by comparing information on Brazil and India. While in Brazil less population is covered by bank branch, India shows less surface area and lower GDP by branch office.

[26] Stone (2005)

[27] In absence of financial restrictions (with full-fledged financial markets) investment decisions depend on relative rates of return only, and this includes investment in education. But in presence of financing

on access to higher education, where intangibility of human capital and information asymmetries play a major role in conditioning access to financing.

Ultimately, theoretical and empirical evidence, both of a micro and macroeconomic nature, is conclusive on the positive correlation between financial depth/*bankarization* and economic growth, enhanced income distribution, and reduced poverty; which is therefore conducive to an improvement in overall socio-economic development .

restrictions, consumption and investment decisions cannot be separated, and investment in education becomes more dependent on current income.

3. *Bankarization* Level in Argentina

3.1. International Comparison

Evidence shows that there is a low level of banking and financial depth in Argentina. In fact, the various dimensions presented in Table 3.1 indicate that the level of *bankarization* is not only lower than the one corresponding to developed countries but also in relation with similar developed countries, even in terms of their recent evolution. Evidence mentioned in the foregoing section, which emphasizes the potential effect of strengthening of the banking sector on economic development, is a driving force to conduct a more thorough study of the level of access to and use of banking services in our country.

Table 3.1: Several *Bankarization* Measures

Country	Total Deposits / GDP (average 99-03)	Credit to private sector / GDP (average 99-03)	Number of branches per 1,000 km2	Number of branches per 100,000 persons	Number of ATMs per 1,000 km2	Number of ATMs per 100,000 persons	Per Capita GDP (US$ 2003) based on PPP
High Income countries	79.5	96.1	75.6	34.5	221.5	71.2	27,684
Spain	83.0	105.0	78.9	95.9	104.2	126.6	23,788
Italy	53.3	81.4	102.1	52.1	131.7	67.2	27,323
Canada	60.5	67.8	1.6	45.6	4.6	135.2	31,347
Australia	68.7	92.4	0.8	29.9	1.7	64.2	28,519
Latin American Middle-Income countries (average)	30.8	32.7	4.5	7.5	9.1	13.0	6,522
Mexico	25.7	16.6	4.1	7.6	8.9	16.6	9,272
Chili	37.8	61.0	2.0	9.4	5.1	24.0	10,379
Colombia	22.4	19.5	3.7	8.7	4.1	9.6	6,641
Brazil	23.5	28.5	3.0	14.6	3.7	17.8	7,727
Argentina	24.7	18.6	1.4	10.0	2.1	14.9	11,688
Middle-Income countries excluding Latin America (average)	53.5	44.1	10.0	9.3	15.0	16.2	9,430

Source: BCRA based on data from Beck *et al.* (2005), IMF, and WB.

Table 3.1 includes both indicators of access to and use of banking services for various countries grouped by level of per capita income. As regards access and availability, it also presents data on physical infrastructure, bank branches and ATMs by km^2 and relative to population. As to use of banking services, this Table shows aggregate deposit/loan data against GDP for each economy. These indicators, however limited,[28] allow making an international comparison with a more detailed level of analysis than mere collation of aggregate data.

As shown below, Argentina presents similar figures to those recorded by middle-income countries in relation to number of branches and ATMs per inhabitant. Moreover, if indicators per km^2 are considered, Argentina's figures are not very different from Canada's or Australia's,[29] countries which are also characterized by low population

[28] For example, as this paper intends to demonstrate, a greater number of branches and ATMs are not indicative of their geographic distribution, which is generally concentrated in urban areas. There may also be economic agents with more than one bank deposit account and, therefore, the indicator would not be an appropriate yardstick for the number of people using bank financial services.

[29] These country data suggest that extensive use of ATMs may be a relatively cost-effective way of increasing access to banking services.

density. However, both bank deposits and loans relative to GDP show values that are under those relevant to comparable countries and much lower than those of developed countries.

Table 3.2: Evolution of *Bankarization* Indicators

Year	Banks	Branches and other offices	ATMs	Savings Accounts (thousands)	Time Deposit Accounts (thousands)	Checking Accounts (thousands)	Loans (thounsands)	Private Sector's Deposits (GDP %)	Loans to private sector (GDP %)
1993	206	4,164	-	4,876	1,179		3,978	11.7	16.7
1994	205	4,258	-	5,932	1,318	1,862	4,989	14.3	18.8
1995	157	4,084	-	6,059	1,305	1,704	4,514	13.9	19.6
1996	147	4,059	1,632	6,713	1,522	1,881	5,518	15.9	19.2
1997	138	4,171	2,556	8,742	1,643	2,287	7,494	18.1	20.2
1998	125	4,422	3,701	12,084	1,849	2,909	9,592	21.5	22.8
1999	116	4,511	4,229	13,197	1,928	3,222	9,783	24.8	25.0
2000	113	4,779	5,156	13,215	2,080	3,262	10,890	25.9	24.2
2001	106	4,762	5,795	17,533	1,636	3,261	11,686	25.8	22.8
2002	99	4,278	5,577	11,220	726	2,638	7,039	20.8	16.6
2003	96	4,322	5,813	9,231	867	2,317	6,930	19.2	11.4
2004	91	4,252	6,097	9,267	824	2,488	7,644	17.7	9.6
2005	89	4,299	6,526	8,683	901	2,401	8,799	18.0	10.4

Source: BCRA

In the last years, as shown in Table 3.2, Argentina has recorded a dramatic change in the supply of banking services. In particular, the impact of economic crises can be seen both in the number of banks and the volume of intermediation. Specifically, the effect of the economic, financial, and social crisis of late 2001 had different consequences according to the dimension used to measure its impact on *bankarization*. If one considers the volumes of bank deposits and loans, it is obvious that they declined sharply. But if one takes into account the availability of banking services, there was only a temporary decline in the number of bank outlets, in spite of the reduction in the number of banks. Even the number of bank agencies in 2005 exceeded pre-crisis figures, as a result of the number of ATMs. An additional point to underscore is the crisis impact on the number of bank accounts. The restrictions imposed on the withdrawal of cash from financial institutions by the end of 2001 ("*corralito*") prompted the opening of savings accounts. Action taken in the form of deposit rescheduling and *pesification* ("*corralón*") generated a sharp reduction in the number of time deposits.

It should be noted that this paper defines bank agency as any point of provision of banking services in the country, including registered office and operating affiliates, offices within the firms of bank clients, and ATMs.[30] Bank agencies were divided into branches and sub-branches. The former consist of traditional operating affiliates, including the registered office, which may provide overall banking services. The latter include ATMs, offices within the firms of bank clients, and those affiliates which operationally report to other registered office, such as mobile agencies or bank delegations. Sub-branches provide reduced banking services, in terms of either permitted transactions[31] or business hours (mobile agencies).[32]

[30] No consideration was taken of premises opened to provide services such as payment of retirement benefits or collection of taxes (Chapter II – Licensing Criteria, Section 7) since they do not generally give the possibility of executing traditional bank transactions.

[31] For example, the opening of bank accounts is not permitted at bank offices, whereas ATMs, due to its inherent nature, only provide those banking services which do not require the intervention of individuals.

[32] Bank delegations may, even though they administratively report to another house, provide core banking services as a whole.

Ultimately, the latest trend in the evolution of bank agencies reflects an increase on one hand, and a compositional change on the other. The effect is growth in the supply of banking services which do not require the intervention of individuals with extended banking hours and even coverage.[33] However, because of their nature, these agencies restrict access to certain type of banking services, such as the granting of loans, the opening of new bank accounts, as well as the remainder of banking services for agents who prefer to be given customized treatment. In particular, this aspect may be significant from an economic viewpoint as far as bank-client relations are lost.[34]

3.2. Mapping Availability of Banking Services Locally

With the purpose of making an appropriate analysis of the determinants of availability to banking services in our country, a data base was set up with information from the BCRA, SEFyC, INDEC, and other sources. In order to adequately cover the issue of availability, and examine the conditioning factors for access to and use of banking services, the data base starts from the smallest geographic unit, that is to say, locality level. The term locality[35] is considered to be a "spatial concentration of buildings, connected to one another by streets, that is to say, a populated center, generally associated with a local government division (municipality, commune, etc.)". Taking as reference the encoding of localities performed by the INDEC in the first half of 2005, a data base was set up with information on the 1998-2005 period.

The data base by locality includes, for each bank regulated by the BCRA, information on the number and type of bank agency (availability and access indicators), volume of private sector deposits and credits, as well as number of bank accounts (use indicators)[36]. This banking data base received input of information on the people of each locality pursuant to 1991 and 2001 censuses and other variables relating to the socio-economic conditions of such population (number of people[37] by age group, educational level, unemployment rate and employment by type of trade, quality of materials used in house building). In order to enhance the econometric analysis, variables were added with a different geographic opening (department or province) because this information was not available at locality level, inter alia, land area, gross geographic product, proportion of rural population, and business environment in the provinces.[38]

The data base analysis shows that there is a series of material facts in terms of the recent evolution of the supply of banking services locally which allow inferring the possibilities of access to and use of such services. In particular, as mentioned before, there is a replacement of bank branches with ATMs which may be discriminated by type of bank. After the 2001 crisis, and with the changes that occurred in the structure of the local banking system, one can see that foreign institutions significantly reduced their

[33] In cases where ATMs are installed outside a bank branch and/or bank office.
[34] Additionally, over the last years and on an infant basis, there has been an increase in the use of banking services via the Internet.
[35] Definition by the Statistics Bureau (INDEC).
[36] It should be noted that deposits and credits by locality reflect transactions executed within such jurisdiction irrespective of bank client's place of residence.
[37] Population growth rate by locality was predicted from 1991 and 2001 data.
[38] Buenos Aires City is regarded as an unique jurisdiction comparable to a province.

network of bank branches and even of ATMs.[39] For their part, public and domestic private banks increased both the number of branches and ATMs. Many of these changes respond to a process of mergers and acquisitions relevant to that period. Nevertheless, nearly 50% of the expansion of the customer service network was concentrated in six banking institutions.

Table 3.3: Customer Service Network's Evolution

	1998	1999	2000	2001	2002	2003	2004	2005
Banking System								
Agencies	8,122	8,740	9,935	10,549	9,851	10,129	10,343	10,825
Branches	3,871	3,993	4,282	4,259	3,911	3,888	3,838	3,867
Sub-Branches	4,252	4,747	5,653	6,298	5,944	6,247	6,511	6,958
ATMs	3,701	4,229	5,156	5,795	5,577	5,813	6,097	6,526
Other Offices	551	518	497	503	367	434	414	432
Public Banks								
Agencies	2,039	2,137	2,363	2,844	3,706	3,755	3,879	3,795
Branches	1,225	1,217	1,265	1,310	1,646	1,654	1,656	1,560
Sub-Branches	814	920	1,098	1,534	2,062	2,103	2,225	2,235
ATMs	676	781	959	1,389	1,901	1,950	2,077	2,080
Other Offices	138	139	139	145	161	153	148	155
Private Banks								
Agencies	3,276	2,454	2,572	2,459	2,569	2,636	3,057	3,478
Branches	1,551	1,272	1,233	1,079	1,115	1,110	1,233	1,344
Sub-Branches	1,727	1,182	1,339	1,380	1,456	1,526	1,824	2,134
ATMs	1,565	1,117	1,281	1,332	1,417	1,479	1,769	2,069
Other Offices	162	65	58	48	39	47	55	65
Foreign Banks								
Agencies	2,807	4,149	5,000	5,246	3,576	3,738	3,407	3,552
Branches	1,095	1,504	1,784	1,870	1,150	1,124	949	963
Sub-Branches	1,711	2,645	3,216	3,384	2,426	2,618	2,462	2,589
ATMs	1,460	2,331	2,916	3,074	2,259	2,384	2,251	2,377
Other Offices	251	314	300	310	167	234	211	212

Source: BCRA

Availability of Banking Services by Province

In turn, as shown in Table 3.4, comparing the degrees of availability of bank financial services at the level of provinces one can see that there are significant differences. As one may expect, the indicators used to analyze the customer service network (number of bank agencies by inhabitant and by km^2) show that Buenos Aires City is the jurisdiction with the greatest supply of banking infrastructure. However, the province which ranks second changes depending on the selected indicator: Buenos Aires when one analyzes coverage by km^2, and La Pampa if one takes into account the number of bank agencies every 100,000 people. Finally, one can see that the number of agencies grow above the average level in the period under study for 14 provinces, those in Patagonia being the provinces which show the most significant improvements in availability of banking services.

The degree of diversity among provinces remains unchanged, even if one considers a different indicator, such as the number of localities without supply of banking services.

[39] In this case, the number of ATMs increased in the last year, even though it is still below the level of the year 2001. However, this reduction is connected with the exit of several foreign institutions since the average number of ATMs by bank goes from 61 in 2001 to 68 in 2005.

Excluding Buenos Aires City,[40] the only province standing out is La Pampa where less than 25% of its localities do not have banking services.[41] The percentage corresponding to this province represents nearly 1/3 of the country average for 2005, i.e. 70.3%. At the other end, 90% of the localities in the provinces of Catamarca and Jujuy have no presence of banks. These differences would be related not only to socio-economic characteristics, geographic reach, and type of bank operating in the region, but also to regulations affecting or limiting the type of service that may be offered. It should be noted in this regard that province-owned Banco de La Pampa covers a significant number of localities through mobile branches. Regulation has implications in this case, because the possibility of opening a mobile branch is currently limited to province-based public banks and restricted to the sphere of their province.[42] Nevertheless, as from September 2006, the Central Bank authorized the opening of temporary customer service offices, which are only allowed to operate in a locality where there is no bank branch.[43]

[40] According to the INDEC encoding, Buenos Aires City is considered as a single locality.
[41] Even despite having reduced the number of localities with banking infrastructure between 1998 and 2005.
[42] See CREFI regulation (Chapter II – Section 10).
[43] These bank agencies may execute all the transactions allowed for branches, except for the opening of checking accounts.

Table 3.4: Evolution of Number and Type of Bank Agency by Province

	Number of Agencies			Agencies / 1.000 km2		Agencies / 100.000 persons		Branches / 1.000 km2		Branches / 100.000 persons		ATMs / 1.000 km2		ATMs / 100.000 persons	
	1998	2005	var.%	1998	2005	1998	2005	1998	2005	1998	2005	1998	2005	1998	2005
Bs.As. city	2,198	2,548	15.9	10,827.6	12,551.7	77.6	94.2	3,822.7	3,842.4	27.4	28.8	6,261.1	8,118.2	44.9	60.9
Bs.As. province	2,679	3,677	37.3	8.7	12.0	20.0	25.5	3.9	4.1	8.9	8.6	4.2	7.4	9.6	15.8
Catamarca	32	65	103.1	0.3	0.6	10.3	17.7	0.2	0.2	8.1	4.9	0.1	0.4	2.3	12.0
Cordoba	710	814	14.6	4.3	4.9	23.9	25.3	2.6	2.4	14.5	12.3	1.6	2.5	9.0	12.8
Corrientes	94	145	54.3	1.1	1.6	10.6	14.6	0.7	0.7	7.4	6.2	0.3	0.9	2.9	8.3
Chaco	83	139	67.5	0.8	1.4	8.9	12.9	0.6	0.6	6.8	5.7	0.2	0.8	2.0	7.1
Chubut	110	166	50.9	0.5	0.7	27.9	37.6	0.2	0.2	11.4	12.2	0.2	0.4	9.4	20.0
Entre Rios	212	259	22.2	2.7	3.3	19.1	21.1	1.5	1.5	10.7	9.6	1.1	1.7	7.6	10.6
Formosa	32	62	93.8	0.4	0.9	7.0	11.7	0.2	0.2	3.9	3.4	0.2	0.6	3.1	8.1
Jujuy	45	117	160.0	0.8	2.2	7.8	17.7	0.4	0.5	3.6	4.4	0.3	1.6	2.4	12.7
La Pampa	124	166	33.9	0.9	1.2	43.4	52.0	0.3	0.4	17.1	16.6	0.1	0.3	5.2	15.7
La Rioja	29	52	79.3	0.3	0.6	10.9	16.0	0.2	0.3	7.9	7.7	0.1	0.3	3.0	8.0
Mendoza	324	356	9.9	2.2	2.4	21.3	21.5	1.1	0.9	11.1	8.2	0.8	1.5	7.9	13.1
Misiones	94	147	56.4	3.2	4.9	10.3	13.8	1.9	2.0	6.3	5.6	1.2	2.9	4.0	8.1
Neuquen	83	172	107.2	0.9	1.8	18.7	33.0	0.5	0.5	10.8	9.6	0.4	1.2	7.4	22.1
Rio Negro	119	159	33.6	0.6	0.8	22.3	27.7	0.3	0.3	12.7	9.7	0.2	0.5	8.6	17.2
Salta	85	164	92.9	0.5	1.1	8.4	13.9	0.3	0.3	4.3	4.2	0.3	0.7	4.1	9.5
San Juan	75	109	45.3	0.8	1.2	13.3	17.2	0.4	0.4	6.5	5.2	0.4	0.8	6.4	12.0
San Luis	80	96	20.0	1.0	1.3	24.2	24.1	0.5	0.5	12.1	10.1	0.5	0.7	12.1	13.6
Santa Cruz	45	97	115.6	0.2	0.4	25.0	45.9	0.1	0.2	18.9	17.5	0.0	0.2	6.1	27.9
Santa Fe	650	969	49.1	4.9	7.3	22.2	31.2	3.3	3.2	14.9	13.6	1.4	3.9	6.5	16.9
S. del Estero	48	99	106.3	0.4	0.7	6.3	11.4	0.2	0.3	3.7	4.8	0.1	0.4	1.1	6.2
Tucuman	150	192	28.0	6.7	8.5	12.2	14.0	3.2	2.9	5.9	4.8	3.2	5.5	5.9	9.1
T. del Fuego	21	55	161.9	0.0	0.1	23.3	46.7	0.0	0.0	8.9	12.7	0.0	0.0	14.4	34.0
Total country	8,122	10,825	33.3	2.2	2.9	23.2	28.5	1.0	1.0	11.1	10.2	1.0	1.7	10.6	17.2

Source: BCRA

Availability of Banking Services by Locality

Another aspect of particular significance which necessary supplements the foregoing information is the one relating to the number of residents in localities without banking infrastructure. On considering this matter, which is reflected in Table 3.6, one can notice that 12% of the country's population resides in localities where no banking services are provided locally,[44] this percentage has been declining in the last years.

Table 3.5: Percentage of Localities without Banking Infrastructure

Province	1998	1999	2000	2001	2002	2003	2004	2005
Bs.As. city	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bs.As. province	64.8	64.8	64.5	62.3	62.3	62.7	62.7	62.5
Catamarca	92.3	91.6	91.6	91.6	91.0	91.0	91.0	91.0
Córdoba	71.8	71.4	70.9	71.2	71.2	71.4	71.2	71.4
Corrientes	54.1	54.1	62.2	62.2	62.2	62.2	62.2	62.2
Chaco	72.8	72.8	72.8	72.8	71.7	71.7	70.7	69.6
Chubut	45.5	45.5	45.5	45.5	45.5	43.9	43.9	42.4
Entre Ríos	67.5	67.5	65.7	65.7	65.7	68.0	68.6	68.6
Formosa	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
Jujuy	93.8	93.0	91.5	90.7	90.7	90.7	89.9	89.1
La Pampa	21.8	21.8	21.8	21.8	21.8	21.8	21.8	23.0
La Rioja	83.3	83.3	83.3	83.3	83.3	83.3	81.9	81.9
Mendoza	77.2	79.2	79.2	79.2	79.2	79.2	79.2	78.5
Misiones	77.5	77.5	76.7	76.7	75.8	75.0	73.3	72.5
Neuquén	65.5	65.5	61.8	58.2	56.4	47.3	45.5	41.8
Rio Negro	85.5	84.8	83.3	84.1	84.1	84.8	84.8	83.3
Salta	89.2	87.7	86.2	84.6	83.8	83.1	81.5	80.8
San Juan	87.5	87.5	87.5	86.3	86.3	83.8	83.8	82.5
San Luis	81.0	81.0	79.8	79.8	78.6	78.6	78.6	78.6
Santa Cruz	48.1	48.1	48.1	48.1	48.1	48.1	48.1	48.1
Santa Fe	60.6	60.9	60.1	60.6	61.2	61.4	61.4	61.2
S. del Estero	86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7
Tucumán	82.8	82.8	82.8	82.8	82.8	82.8	80.8	77.8
T. del Fuego	66.7	66.7	50.0	50.0	50.0	50.0	50.0	50.0
Total country	72.1	72.0	71.6	71.2	71.0	71.0	70.7	70.3

Source : BCRA

It is necessary to underline that the preceding information is not a measure of the percentage of *unbanked* population, but it is only indicative of the percentage of localities and populations which might have restricted access to banking services because they do not have direct service available in their usual place of residence (including rural population). However, international evidence mentioned in Section 2 as

[44] If one also considers cooperative entities and credit unions registered with the National Institute of Partnering and Social Economy (INAES) which are not regulated by the Central Bank of Argentina (BCRA), one can derive that there are approximately 400 entities. Out of such figure, only 8 entities are settled in localities without a bank agency. Considering these entities, the number of localities without banking infrastructure would be reduced by 8 and the population without banking coverage by 0.3%. The following Table summarizes information on those localities which, without having a bank agency, indeed have a cooperative entity.

Province	Without Bank Agency		
	# Localities	# People By Locality	% Province Population
Buenos Aires	2	910	0.01
Santa Fe	6	1620	0.31

Source: BCRA data based on INAES information.

well as determinants of the supply of banking services examined in Sections 4 and 5 allow inferring the importance of local availability of banking services as a determinant of their level of use.

Table 3.6 also allows contrasting the link between regional economic development and financial depth (in this case measured as the percentage of population with no access to banking services in their locality of residence.) In this regard, NOA and NEA provinces in North-Western and North-Eastern Argentina show the lowest levels of supply of banking services, whereas Buenos Aires and Patagonia are in an opposite position.

On the other hand, the indicator's evolution has not been similar in all the provinces. The percent changes recorded between 1998 and 2005 in the provinces with less supply of banking services have been higher than the rest, landmark cases being Jujuy, Salta, Chaco, and Tucumán. The only case showing a negative dynamics is Mendoza, whose population with no access to banking services has declined slightly.

Table 3.6: Percentage of Population without Banking Service Coverage

Province	1998	1999	2000	2001	2002	2003	2004	2005
Bs.As. city	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bs.As. province	4.0	3.9	3.7	3.4	3.3	3.3	3.2	3.1
Catamarca	30.6	30.3	30.0	29.8	29.1	28.9	28.7	28.5
Córdoba	14.2	13.9	13.6	13.7	13.7	13.7	13.5	13.5
Corrientes	22.5	22.1	23.1	22.7	22.4	22.1	21.8	21.5
Chaco	32.4	31.8	31.3	30.8	27.5	27.0	25.8	24.7
Chubut	8.7	8.7	8.8	8.8	8.9	7.3	7.3	6.1
Entre Ríos	18.2	17.8	17.1	16.7	16.4	16.8	16.7	16.4
Formosa	35.3	34.7	34.1	33.6	33.0	32.5	32.0	31.6
Jujuy	34.3	33.5	25.2	24.8	24.6	24.5	24.3	24.1
La Pampa	9.7	9.3	8.9	8.5	8.2	7.9	7.5	7.4
La Rioja	22.2	22.0	21.8	21.6	21.3	21.1	18.9	18.7
Mendoza	23.1	23.4	23.4	23.4	23.4	23.4	23.4	23.3
Misiones	39.6	39.3	38.4	38.1	36.7	36.1	34.6	33.9
Neuquén	12.2	12.1	11.4	10.5	10.3	9.0	8.7	8.2
Rio Negro	21.6	20.3	19.2	20.0	19.8	20.0	19.9	19.3
Salta	30.6	28.8	26.7	25.6	24.6	23.6	23.0	22.4
San Juan	29.0	28.8	28.7	28.3	28.1	27.5	27.4	26.7
San Luis	15.5	15.3	14.8	14.6	11.9	11.7	11.4	11.3
Santa Cruz	1.7	1.6	1.6	1.5	1.5	1.5	1.6	1.6
Santa Fe	12.0	12.0	11.6	11.6	11.7	11.7	11.6	11.5
S. del Estero	38.8	38.5	38.1	37.8	37.5	37.2	36.9	36.6
Tucumán	32.6	32.6	32.5	32.5	32.5	32.5	29.4	28.5
T. del Fuego	2.9	2.9	1.8	1.7	1.7	1.6	1.6	1.6
Total country	13.4	13.3	12.9	12.8	12.5	12.4	12.2	12.0

Source: BCRA

Availability of Banking Services by Type of Bank

Another dimension to the analysis of availability of banking services is that associated with the type of entities operating in the different provinces. In this regard, evidence produced in Table 3.7 shows that as of December 2005 only 3 entities were operating in all the provinces, and about 12 entities were present in more than 9 provinces. For their part, most foreign banks operate in a single jurisdiction because their main activity generally focuses on large clients and therefore do not require a great number of bank

outlets for customer service. On the other hand, domestic private banks operate in 2 to 5 provinces on average. On analyzing province-based public banks, one should bear in mind that their extended operation in other provinces is usually very limited. Finally, and despite changes occurring in recent years, the proportion of entities operating in less than 5 provinces remained virtually unchanged between 1998 and 2005.

Table 3.7: Regional Bank Participation

Number of Banks					Number of Banks				
	Total	Public	Domestic Private	Foreign		Total	Public	Domestic Private	Foreign
1998					2005				
Number of Provinces					Number of Provinces				
24	2	2	0	0	24	3	1	1	1
23 to 20	5	0	2	3	23 to 20	4	0	3	1
19 to 10	8	0	2	6	19 to 10	8	0	5	3
9 to 5	14	2	9	3	9 to 5	10	3	5	2
5 to 2	41	7	25	9	5 to 2	27	8	17	2
1	55	5	29	21	1	37	2	11	24
Number of Localities					Number of Localities				
Greater than 200	1	1	0	0	Greater than 200	2	2	0	0
200 to 100	5	2	2	1	200 to 100	8	2	4	2
100 to 50	8	1	2	5	100 to 50	6	2	2	3
50 to 5	40	5	24	11	50 to 5	28	6	16	6
5 to 1	71	7	39	25	5 to 1	45	2	18	25

Source: BCRA

On analyzing information by type of bank and number of localities, one can notice that presence in the provinces does not directly imply a level of significant coverage in terms of localities (and population) in such provinces. As can be seen in Table 3.7, in 2005 only 2 entities were operating in more than 200 localities in spite of the fact that 15 entities were covering more than 9 provinces. Likewise, one of the entities with the greatest number of bank-covered localities is a province-owned bank. Finally, it should be mentioned that, even though between 1998 and 2005 the number of agencies increased in about 650 localities, only in the 20% of cases such increase was associated with the appearance of a new bank operating in the locality. Furthermore, evidence under study shows that competition at locality level is not too extensive since only 239 localities have more than 3 different entities in activity, whereas only 58 localities have more than 10 different entities operating there.

Dynamics of Supply of Banking Services

In order to analyze changes occurring in the availability of banking services in localities which, at beginning of period, already had a banking infrastructure four locality categories are defined consistently with the number of established bank agencies: no agency (0), one agency (1), two agencies (2), and more than two agencies (3). Localities grouped into categories 1 and 2 have therefore low banking presence, whereas localities included in category 3 have medium and high level of presence, including markets with a higher level of competition between entities. Table 3.8 validates the foregoing statement in that, within the period under study, the customer service network increase largely occurred in localities which already had banking infrastructure. In most

provinces, the number of Type-1 localities has decreased, and even in several provinces a similar performance can be seen in Type-2 localities. Inversely, the number of Type-3 localities has been increasing in 20 out of the 24 provinces. In turn, the population living in localities with limited access to banking services has reduced from 5% to 3%.[45]

[45] This analysis highlights the cases of San Juan and Santa Cruz, two provinces where all the localities having a single bank agency in 1998 increased the number of bank agencies in 2005, which sharply reduced the population with low availability of banking services.

Table 3.8: Evolution of Localities by Supply of Banking Services

	Type 0 Localities		Type 1 Localities				Type 2 Localities				Type 3 Localities			
	1998	2005	1998		2005		1998		2005		1998		2005	
	# Loc.	# Loc.	# Loc.	% Pop.	# Loc.	% Pop.	# Loc.	% Pop.	# Loc.	% Pop.	# Loc.	% Pop.	# Loc.	% Pop.
Bs.As. city	0	0	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	1	100.0
Bs.As. prov.	389	375	58	1.5	35	0.5	33	1.4	51	1.3	120	93.1	139	95.0
Catamarca	143	141	7	14.1	4	2.6	4	13.2	7	19.9	1	42.1	3	49.0
Cordoba	377	375	81	10.3	69	7.8	32	6.8	25	6.1	35	68.7	56	72.6
Corrientes	40	46	22	12.7	9	5.7	6	10.8	7	8.1	6	54.1	12	64.8
Chaco	67	64	10	6.0	6	6.6	11	19.8	7	6.2	4	41.8	15	62.6
Chubut	30	28	30	8.6	27	9.8	0	0.0	5	2.5	6	82.7	6	81.6
Entre Rios	114	116	25	6.9	14	3.4	11	6.9	13	5.5	19	67.9	26	74.8
Formosa	47	47	6	9.2	0	0.0	3	16.0	5	7.9	1	39.5	5	60.5
Jujuy	121	115	3	3.9	4	1.0	3	19.0	2	2.4	2	42.8	8	72.5
La Pampa	19	20	50	19.3	42	10.6	16	23.1	14	13.2	2	48.0	11	68.9
La Rioja	60	59	10	18.7	6	7.4	1	10.2	1	0.8	1	48.9	6	73.2
Mendoza	115	117	15	3.0	9	1.5	5	2.5	9	3.4	14	71.4	14	71.7
Misiones	93	87	15	8.4	11	7.3	5	6.9	12	8.7	7	45.1	10	50.0
Neuquen	36	23	10	9.1	13	3.1	3	9.0	7	6.7	6	69.7	12	82.0
Rio Negro	118	115	4	2.2	6	3.6	4	3.9	3	2.3	12	72.4	14	74.8
Salta	116	105	6	8.5	10	7.4	4	4.8	6	5.8	4	56.2	9	64.3
San Juan	70	66	4	24.8	4	1.6	2	18.1	5	29.7	4	28.1	5	42.0
San Luis	68	66	9	8.9	10	10.4	3	4.6	3	4.6	4	70.9	5	73.8
Santa Cruz	13	13	5	15.3	0	0.0	6	18.1	5	9.8	3	65.0	9	88.6
Santa Fe	231	233	69	8.2	45	3.5	37	6.6	22	3.5	44	73.2	81	81.5
S. del Estero	143	143	14	8.7	9	6.1	6	12.4	5	3.5	2	40.1	8	53.8
Tucuman	82	77	6	2.9	7	4.7	1	0.2	4	2.4	10	64.2	11	64.4
T. del Fuego	4	3	0	0.0	1	1.5	0	0.0	0	0.0	2	97.1	2	96.9
Total country	2496	2434	459	5.1	341	2.9	196	4.9	218	3.8	310	76.5	468	81.2

Source: BCRA and INDEC

Certainly, as shown in Table 3.9, the process of bank agency network expansion mainly based on the installation of ATMs entailed a major change in the localities provided with a single (Type 1) agency. In fact, between 1998 and 2005 there was a reduction in the percentage of Type 1 localities with bank branches, and an increase in the proportion of localities with sub-branches, particularly ATMs. In 1998 only 7 out of these localities would have access to banking services through an ATM, whereas in 2005 the number grew by 78. Although this movement has been common to almost all provinces, the substitution process was more significant in the provinces of Buenos Aires and Neuquén.

Table 3.9: Type of Agency Based in Type 1-Localities

	Type 1 Localities					
	# localities		With Bank Branches		ATMs and Other Sub-branches	
	1998	2005	1998	2005	1998	2005
Bs.As. city	0	0	0	0	0	0
Bs.As. province	58	35	54	19	4	16
Catamarca	7	4	7	0	0	4
Córdoba	81	69	81	64	0	5
Corrientes	22	9	21	9	1	0
Chaco	10	6	9	3	1	3
Chubut	30	27	7	8	23	19
Entre Ríos	25	14	19	13	6	1
Formosa	6	0	6	0	0	0
Jujuy	3	4	0	0	3	4
La Pampa	50	42	7	2	43	40
La Rioja	10	6	10	5	0	1
Mendoza	15	9	9	7	6	2
Misiones	15	11	15	5	0	6
Neuquén	10	13	10	0	0	13
Rio Negro	4	6	2	0	2	6
Salta	6	10	6	3	0	7
San Juan	4	4	3	0	1	4
San Luis	9	10	9	8	0	2
Santa Cruz	5	0	5	0	0	0
Santa Fe	69	45	67	42	2	3
S. del Estero	14	9	2	9	12	0
Tucumán	6	7	6	2	0	5
T. del Fuego	0	1	0	0	0	1
Total country	459	341	355	199	104	142

Source: BCRA

The level of supply of banking services depending on the population of each locality is shown in Table 3.10. It should be noted that when the population exceeds 10,000 people, localities tend to have more than three bank agencies. Likewise, the supply in localities with a population lesser than 2,000 people is generally provided through a single bank agency, with a high incidence of sub-branches (mostly ATMs). However, there are cases of localities with more than 10,000 people which do not have any banking infrastructure whatsoever, and localities with less than 2,000 people which indeed have a significant supply of banking services. A more detailed analysis of this "outlier" cases indicates that those localities that would be expected to, but do not have, banking services are located nearby a locality of relative importance (size), for example,

the province's capital.[46] In turn, localities with low population density and relatively high supply of banking services are usually tourist centers or large business locations. The opening of new bank agencies has not only been concentrated in localities classified as Type 2 and Type 3, but also in those with populations ranging between 5,000 and 25,000 people.

Table 3.10: Population Density and *Bankarization* Level

	# localities				% Population			
	Tipe 0	Tipe 1	Tipe 2	Tipe 3	Tipe 0	Tipe 1	Tipe 2	Tipe 3
	1998							
Less than 2,000 inhab.	2,281	194	16	4	80.4	17.7	1.5	0.4
Between 2,000 and 5,000 inhab.	165	171	56	13	39.5	40.8	15.7	4.0
Between 5,000 and 10,000 inhab.	38	66	77	46	15.5	28.9	33.1	22.5
Between 10,000 and 25,000 inhab.	9	22	39	97	4.8	11.9	22.7	60.5
More than 25,000 inhab.	3	6	8	150	0.4	1.1	1.4	97.0
Total	2,496	459	196	310	13.4	5.1	4.9	76.5
	2005							
Less than 2,000 inhab.	2,189	156	36	9	82.3	13.0	3.6	1.2
Between 2,000 and 5,000 inhab.	180	124	88	39	39.6	28.3	21.2	10.9
Between 5,000 and 10,000 inhab.	54	46	57	99	45.5	18.2	18.2	18.2
Between 10,000 and 25,000 inhab.	9	13	32	137	4.3	5.9	15.2	74.6
More than 25,000 inhab.	2	2	5	184	0.3	0.3	0.9	98.6
Total	2,434	341	218	468	12.0	2.9	3.8	81.2

Source: BCRA and INDEC

On analyzing evolution by type of locality and type of bank, one can notice substantial differences between the latter, as shown in Table 3.11. On the one hand, foreign banks have a substantially smaller geographic reach, being especially present in localities with a higher level of supply of banking services (Type 3). For their part, public banks are more present in localities with a low level of supply of banking services, especially in Type 1 localities, even though these are concentrated in Cordoba, La Pampa, and Buenos Aires, in these cases accounting for the strong influence by province-owned public banks. Likewise, domestic private banks are present in Type 1 localities in those provinces where their public banks were privatized, such as Misiones, Salta, San Luis, Jujuy, Santiago del Estero, and Tucumán.

[46] The following Table shows the number of people in terms of total population of department, in the case of localities which have more than 10,000 people and zero or low access to the supply of banking services for the year 2005.

	# Cases	Participation of pulation in department (*)
Localities w/more than 25,000 people		
Without bank agency	2	18.9
With 1 bank agency	2	18.5
Localities between 25,000 and 10,000 people		
Without bank agency	9	18.1
With 1 bank agency	13	17.4

(*) Should it be adjacent, it shall include the department where the province's capital is located

Table 3.11: Number of Localities with Supply of Banking Services by Type of Bank

	Type 1 Localities			Type 2 Localities			Type 3 Localities		
	Public	Domestic Private	Foreign	Public	Domestic Private	Foreign	Public	Domestic Private	Foreign
1998	270	156	33	159	101	26	297	250	177
1999	270	143	36	148	97	28	319	255	202
2000	252	110	75	120	68	32	365	278	243
2001	232	91	67	119	52	31	411	285	258
2002	279	89	15	144	54	5	426	282	147
2003	277	84	11	142	54	6	433	282	161
2004	267	86	11	149	63	4	436	293	148
2005	243	88	10	161	70	5	449	306	151

Source: BCRA

Considering all the localities covered with banking services, it can be noticed that between 1998 and 2005 the only entities showing an increase in the number of localities in which they provide services are public banks, because domestic private as well as foreign banks operate in a smaller number of localities. Public banks increased their presence in Type 3 localities, the same as domestic private banks, even though the latter did not manage to offset the reduction in the other types of localities.

Financial Intermediation depending on Locality Characteristics

Participation in resource intermediation by type of bank changes substantially depending on whether localities have a low or a high level of *bankarization.* Table 3.12 shows private sector deposit taking by groups of entities. Aggregate country data reveal that foreign banks are of greater importance, even though with a declining trend. However, conclusions are different if the analysis is made by type of locality. Public banks, reflecting their greater presence in localities with a single bank agency, take more than 70% of deposits in such places. For their part, foreign banks have virtually no influence on deposit taking in localities classified as Type 1 and Type 2, thereby showing that their presence concentrates in large urban centers.

Table 3.12: Private Sector Deposit Participation by Type of Bank (%)

	Total			Type 1 Localities			Type 2 Localities			Type 3 Localities		
	Public	Domestic Private	Foreign	Public	Domestic Private	Foreign	Public	Domestic Private	Foreign	Public	Domestic Private	Foreign
1998	30.5	28.8	40.7	70.2	22.8	7.0	78.6	14.8	6.6	29.6	29.0	41.4
1999	29.5	20.7	49.9	75.1	20.0	4.9	77.0	15.2	7.8	28.5	20.7	50.7
2000	25.4	22.0	52.7	68.4	18.8	12.8	78.2	12.4	9.4	24.6	22.1	53.3
2001	28.3	14.9	56.8	63.4	22.1	14.5	74.5	15.5	10.1	27.8	14.8	57.4
2002	38.8	14.6	46.5	81.4	18.6	0.0	86.3	13.7	0.0	38.2	14.6	47.2
2003	41.0	17.3	41.7	81.0	19.0	0.0	85.5	14.5	0.0	40.3	17.3	42.4
2004	36.9	23.0	40.1	81.5	18.5	0.0	81.6	18.4	0.0	36.1	23.1	40.8
2005	34.6	26.7	38.6	74.0	26.0	0.0	74.1	20.1	5.9	33.9	26.8	39.3

Source: BCRA

As an element to analyze the use of banking services, Table 3.13 summarizes the level of per capita deposits and credits.[47] The situation by province does not differ from the data shown by the indicators of availability of banking services, that is to say, there is still presence of great dispersion among provinces. Only in two provinces per capita private sector deposits exceed national average which, in turn, relates to the predominance of Buenos Aires City as the country's financial center. Evolution within each of the jurisdictions responds to the changes occurring in aggregate levels as a result of the default crisis and subsequent recovery. In the pre-crisis period, private sector credit was financed with private sector deposits and other sources, which reflects on the fact that in most provinces and the country on average, the amount of bank deposit was lower than that of per capita credit. This scenario changed in 2005. Likewise, the reduction in the use of banking services (measured by the evolution of per capita deposit) can be noticed at aggregate level and in the provinces with greater economic development. Yet, in some Northwestern (NOA) provinces and Patagonia (precisely where it was recorded the highest relative increase in the number of agencies) one can see some degree of increase in the level of private deposits.

Table 3.13: Evolution of Per Capita Deposits and Credits

	Per Capita Private Sector's Deposits (at 2005 prices)		Per Capita Private Sector's Credits (at 2005 prices)	
	1998	2005	1998	2005
Bs.As. city	20,713	18,543	26,858	11,100
Bs.As. province	1,794	1,511	1,283	664
Catamarca	845	623	1,251	288
Córdoba	2,234	2,040	1,916	818
Corrientes	551	653	824	302
Chaco	564	698	1,125	457
Chubut	1,741	2,136	2,486	1,250
Entre Ríos	1,116	1,130	1,372	644
Formosa	317	290	532	306
Jujuy	611	744	509	318
La Pampa	2,879	2,021	3,311	1,128
La Rioja	847	586	1,425	660
Mendoza	1,941	1,578	1,747	749
Misiones	539	547	766	423
Neuquén	1,814	1,702	2,616	1,153
Rio Negro	1,381	1,524	1,432	575
Salta	793	681	951	476
San Juan	1,126	1,078	1,002	420
San Luis	3,012	970	713	373
Santa Cruz	1,350	1,991	2,030	1,032
Santa Fe	1,775	1,941	1,733	1,007
S. del Estero	502	542	447	229
Tucumán	1,010	933	1,324	597
T. del Fuego	3,837	3,383	5,195	1,830
Total country	3,118	2,615	3,446	1,410

Source: BCRA

When evolution is analyzed at locality level, it derives that 15% of the localities with supply of banking services do not take deposits because they do not have bank agencies

[47] As a measure to evaluate the level of regional financial intermediation, private sector deposits and private sector credit are used in the study to avoid the kind of distortion that might be generated by municipal, provincial, and/or federal government transactions.

which allow executing such transactions.[48] Likewise, the change in the type of agency used by the entities to expand their customer service network has an impact on this variable. Between 1998 and 2005 the number of localities with supply of banking services increased by 62 but only 3 localities started to take deposits. However, there was a dramatic change in the size of per capita deposits. Up until the 2001 crisis very few localities recorded values higher than country averages. As from 2003 and the return of bank deposits to the financial system, there has been a significant growth in the number of localities with per capita deposit being higher than the average. These localities are concentrated in the provinces of Buenos Aires, Córdoba, and Santa Fe, with greater predominance in agriculture and industry.

Table 3.14: Number of Deposit-Taking Localities

	1998		2005	
	# Deposist Taking Localities	# Loc. W/Dep. greater than the Country Average	# Deposist Taking Localities	# Loc. W/Dep. greater than the Country Average
Bs.As. city	1	1	1	1
Bs.As. province	207	16	205	113
Catamarca	12	1	10	0
Córdoba	148	4	145	72
Corrientes	33	0	27	0
Chaco	25	0	25	1
Chubut	13	0	17	7
Entre Ríos	45	0	52	4
Formosa	10	0	10	0
Jujuy	8	0	10	0
La Pampa	23	4	23	15
La Rioja	12	0	12	0
Mendoza	28	2	30	4
Misiones	27	0	27	1
Neuquén	19	2	19	2
Rio Negro	17	0	15	7
Salta	13	0	16	1
San Juan	9	1	8	2
San Luis	16	3	16	3
Santa Cruz	14	0	14	8
Santa Fe	144	3	145	63
S. del Estero	22	0	22	0
Tucumán	17	0	17	1
T. del Fuego	2	1	2	2
Total country	865	38	868	307

Source: BCRA

[48] In some cases this only reflects an accounting effect.

4. Determinants of Availability of Banking Services Locally

The data base detailed above allows to empirically evaluate some of the regularities found in the previous descriptive analysis, by considering the joint effect of the different variables, including the impact and interrelation deriving from geographic location. In fact, there is abundant empirical literature internationally which examines determinants of availability of banking services locally. Most of these studies analyze the impact of the liberalization of the opening of bank branches in the U.S.A., such as the cases of Evanoff (1988)[49] and Gunther (1997),[50] among others.

In a more general study, Radecki (1988) also takes account of the regional dimension of markets. Other papers have focused on the relationship between presence of bank branches and characteristics of demand, paying special attention to the population excluded from access to traditional services. For example, Avery (1991) and Caskey (1992) examine the link between residence areas of lower-income segments or predominantly non-white population and presence of commercial bank offices in U.S. localities;[51] Medina and Núñez (2006) replicate the exercise in the sphere of the Bogota municipality in Colombia. Generally, there is a differentiated behavior in the supply of financial services, with greater participation of small and/or cooperative entities in less economically developed locations or with poorer sectors. Similarly, Santomero and Seater (1997) consider that income level, consumer patterns, and other socio-economic features of potential clients are the main determinants of choice of location of banking services, and therefore less assistance to marginal zones may be socially optimal. It must be considered that decisions on the opening and closing of bank agencies imply costs and benefits that entities must evaluate very carefully.[52] However, choice of location may comprise additional factors, relating to diversification strategies, market segmentation, supra-regional competition, regulatory constraints,[53] link between real and financial activity,[54] distances and costs of access to markets, and even informational factors which may generate herd-like behavior. [55]

[49] The author proposes a model which includes as a dependent variable the number of bank delegations per square mile, controlling by population variables and a series of dummies related to prevailing regulation in each State. Availability of banking services is taken as a proxy for access, the results supporting the positive effect of deregulation both for rural and metropolitan areas.

[50] The author uses an OLS model to analyze determinants of growth logarithm in the number of offices on the basis of a set of explanatory variables (number of people, income by individual, state loan loss provision, etc.), and adds a *Probit* model to study the variation in the total number of bank branches.

[51] The former (Avery), stemming from an OLS model, lays emphasis on the unequal location of banks, and examines the reasons for the closing of commercial bank offices. The latter (Caskey) uses a *Logit* model to observe the possibility that there may be at least one financial entity branch, and a *Poisson* model to perceive the influence of the number of agencies by district.

[52] For this purpose, entities generally make use of studies on the potential for business locally, usually sustained by socio-economic and competition surveys of the geographic environment, which may be approximate based on socio-economic condition and level of competition within such scenario.

[53] Clearly observable in the case of privatizations of province-owned banks, where in many cases it is impossible to close certain bank agencies, even if they are not profitable from the private standpoint.

[54] Ennis (2004)

[55] In fact, when Chang *et al.* (1997) analyze the presence of bank branch *clusters* in highly *banked* areas of New York, they find a positive correlation between the probability of opening a branch facility and the number of bank branches in the area despite the fact that profitability may have a negative relation. For the authors, this is compatible with a "rational herd behavior."

There are also more recent papers focusing on the issue of regional distribution of banking services in countries with low level of *bankarization*, such as Brazil[56] and Mexico.[57] In line with the specified bibliography, this study is conducted taking into account, on the one hand, determinants of the supply of banking services locally, that is to say, the probability of location of a bank agency (or branch)[58] and the number of agencies; and, on the other hand, the level of private sector credit and deposits by locality. Each of these explanatory variables has specific characteristics, which requires the use of different estimation methods. The availability of population and socio-economic data allows performing an analysis by locality for the year 2003,[59] and by department for the years 1998 y 2003. In the latter case, as mentioned in the following section, the use of information by department will permit the application of spatial econometrics techniques considering that determinants include the effect resulting from the geographic distribution of banking services.

The following tables show the outcomes of the regressions made for the year 2003 at the level of locality.[60] These include information on the number of people, segregated by age group, level of education, quality of housing and employment situation. The data base is supplemented with land area figures relevant to each department. Finally, the outcomes include the characteristics of each province, such as GGP, percentage of rural population, and IPAN (business environment by province) index.[61]

Presence of Bank Agencies in a Locality

Table 4.1 shows the outcomes of regressions on the possibility that there may be a bank agency and a bank branch in a given locality as a function of the socio-economic characteristics particular to such spatial environment. Additionally, it reflects the analysis made by type of bank (public, domestic private, or foreign.) In order to study this type of regressions where the explained variable takes outlier values (0 or 1), it was chosen the *Probit*[62] Model.

On analyzing regression outcomes one must consider the signs, rather than the absolute value, of parameters since the probability derivative changes with the value of independent variables. For such reason, it is usually shown the values of marginal effects analyzed in the means of such variables.

[56] World Bank (2004)
[57] Martinez Peria *et al.* (2003)
[58] According to definition in Section 3.1.
[59] Socio-economic data relate to those collected through the 2001 Population and Housing Census.
[60] Buenos Aires City is not considered in the econometric analysis by locality, even though it is included in the analysis by department.
[61] Index designed by FIEL weighing economic, fiscal, social, and legal variables from various sources at province level.
[62] Linear approximation (OLS) to binary election models is not appropriate because it does not limit the above-mentioned values between 0 and 1 while it assumes constant marginal effects. In order to correct the first problem, the linear model can be transformed by using a distribution function which may limit the above-mentioned values in the target interval. The *Probit* model applies a logistic distribution function to make such transformation. These functions are not linear but globally concave and they may be solved by using maximum likelihood methods.

Table 4.1: Estimation Model: *Probit*

	Dependent Variable = 1 if agencies > 0				Dependent Variable = 1 if branches > 0			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	0.557***	0.588***	0.500***	0.809***	0.593***	0.628***	0.501***	1.032***
	[0.070]	[0.061]	[0.037]	[0.065]	[0.067]	[0.062]	[0.038]	[0.092]
Housing Quality (precarious)	-3.662***	-4.344***	-0.201	-1.869***	-3.750***	-4.244***	-0.569*	-2.687***
	[0.347]	[0.392]	[0.297]	[0.612]	[0.353]	[0.392]	[0.304]	[0.935]
Prop. pop. w/inc.primary ed.	-0.08	0.494	-2.448***	-4.174***	0.158	0.551	-2.466***	-4.436**
	[0.712]	[0.732]	[0.677]	[1.367]	[0.721]	[0.741]	[0.663]	[1.809]
Unemployement	-1.548**	-0.886	-0.021	1.464	-1.459**	-1.213*	-0.08	0.439
	[0.680]	[0.669]	[0.562]	[1.083]	[0.667]	[0.677]	[0.571]	[1.177]
Constant	-2.780***	-3.691***	-4.221***	-7.849***	-3.381***	-4.077***	-4.251***	-9.950***
	[0.584]	[0.549]	[0.382]	[0.684]	[0.570]	[0.550]	[0.390]	[0.985]
	Marginal Effects on Mean Values							
Population	0.144	0.213	0.186	0.081	0.184	0.235	0.176	0.031
Housing Quality (precarious)	-0.948	-1.577	-0.075	-0.187	-1.163	-1.586	-0.200	-0.081
Prop. pop. w/inc.primary ed.	-0.021	0.179	-0.910	-0.419	0.049	0.206	-0.867	-0.133
Unemployement	-0.401	-0.322	-0.008	0.147	-0.453	-0.454	-0.028	0.013
Observations	1055	1055	1055	1055	1055	1055	1055	1055
Pseudo R2	0.35	0.36	0.2	0.51	0.35	0.36	0.22	0.62

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

In the first instance, the presence of bank agencies in a locality is associated positively with the amount of population, thereby validating evidence shown in Table 3.10. In turn, socio-economic determinants show the expected signs, thereby indicating that the lower the housing quality index and the greater the unemployment index in a locality, the lesser is the probability that there may be a bank agency, consistently with the theoretical statements on the opposite relationship between poverty and access to banking services. The level of education does not prove to be significant, partly due to its high correlation with the variable measuring quality of housing.

In an attempt to verify the different behavior of the bank groups arising from the preceding section, an analysis was also made for these groups of entities. As expected, regressions validate such differences. Thus, the variable reflecting level of education is not significant for total entities, even though it may be observed that the proportion of population with incomplete primary education is a significant and negative determinant of the likelihood that foreign and domestic private entities place a bank branch or agency in a given locality.

Finally, despite the fact that there are no differences in the level of significance and/or the sign of explanatory variables in the case of branch branches (compared with those relevant to bank agencies), one may notice greater sensitivity to explanatory variables in the former case; which might be capturing the difference implied by the decision to open a “brick and mortar” office versus any other type of agency.

An additional way of studying this difference consists in analyzing an orderly model where it may be possible to discriminate between the various types of bank agency, differentiating between agencies generally and branches particularly. This is achieved by applying an estimation method based on the *ordered logit* model[63] which takes into

[63] When the explained variable has an “orderly response”, i.e., that its realizations are not arbitrary (*y* takes values {0, 1, 2, ... ,J}) the fact that 2 is better than 1 from an ordinal viewpoint provides useful information that may be exploited by means of the ordered logistic model.

account the marginal effect which affects the change occurring between the different scrutinized categories. As shown in Table 4.2, the resulting outcomes reinforce previous findings. It should be noted that unemployment is significant and negative not only at the level of total entities but also in the case of public banks, whereas for the rest of the entities the level of education gains more importance.

Table 4.2: Estimation Model: *Ordered Logit*

Dependent Variable = 1 if agencies > 0				
	Total	Public	Domestic Private	Feoreign
Population	1.157***	1.130***	0.819***	1.599***
	[0.140]	[0.115]	[0.064]	[0.127]
Housing Quality (precarious)	-6.465***	-7.439***	-0.503	-3.784***
	[0.634]	[0.692]	[0.482]	[1.281]
Prop. pop. w/inc.primary ed.	0.782	1.344	-3.944***	-8.827***
	[1.287]	[1.330]	[1.116]	[2.584]
Unemployement	-3.314***	-2.089*	-0.083	1.753
	[1.175]	[1.163]	[0.939]	[1.880]
Marginal Effects on Mean Values (Dependent Variable = 2)				
Population	0.198	0.257	0.174	0.036
Housing Quality (precarious)	-1.105	-1.691	-0.107	-0.085
Prop. pop. w/inc.primary ed.	0.134	0.305	-0.837	-0.198
Unemployement	-0.567	-0.475	-0.018	0.039
Observaciones	1055	1055	1055	1055
Pseudo R2	0.31	0.33	0.18	0.48

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

In order to analyze the determinants of the number of agencies and/or branches by locality, the *Poisson* Model, which take into account the kind of variable to be analyzed[64] is applied. As shown in Table 4.3, the resulting outcomes generally coincide with those corresponding to previous implementations, even though in this case it is noticeable that the level of unemployment presents a positive sign for foreign entities in the determinants of location of a bank agency (since the variable is no longer significant in the analysis of the presence of bank branches). As pointed out in the foregoing section, this outcome would relate to the fact that such entities are generally located in large urban conglomerates which, for the period under study, record high rates of unemployment in relation to other smaller localities.

[64] In this specification, variables take non-negative integer values with two important features: (i) there is no obvious value which may *a priori* be considered as upper limit of the integer variable of interest; (ii) the integer variable takes a value equal to zero for at least some members of the population of interest. In this case, the linear model presents a similar limitation to the probability study, since the same is not constrained to take non-negative values. A specification which solves this problem is the *Poisson* regression model, which assumes that the conditional probability function of Y in X is *Poisson.*

Table 4.3: Estimation Model: *Poisson*

	Dependent Variable = no. of agencies				Dependent Variable = no. of branches			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	0.946***	0.802***	0.895***	1.077***	0.881***	0.714***	0.842***	1.096***
	[0.033]	[0.028]	[0.035]	[0.071]	[0.040]	[0.046]	[0.037]	[0.074]
Housing Quality (precarious)	-3.195***	-4.541***	-0.151	-4.923***	-3.687***	-4.602***	-1.457***	-4.960***
	[0.469]	[0.381]	[0.524]	[1.219]	[0.379]	[0.343]	[0.438]	[1.258]
Prop. pop. w/inc.primary ed.	-4.853***	-1.183	-7.360***	-13.703***	-2.338**	0.805	-4.964***	-11.213***
	[1.104]	[0.840]	[1.199]	[3.145]	[0.988]	[0.799]	[1.024]	[3.104]
Unemployement	-2.386***	-3.093***	-1.961***	3.365**	-3.132***	-3.128***	-2.045**	1.965
	[0.763]	[0.631]	[0.722]	[1.592]	[0.936]	[0.975]	[0.853]	[1.495]
Constant	-5.627***	-5.125***	-6.494***	-8.596***	-5.902***	-5.264***	-6.853***	-9.950***
	[0.437]	[0.356]	[0.508]	[1.064]	[0.365]	[0.350]	[0.404]	[1.120]
	Marginal Effects on Mean Values							
Population	1.302	0.733	0.420	0.086	0.691	0.404	0.216	0.034
Housing Quality (precarious)	-4.400	-4.149	-0.071	-0.393	-2.892	-2.604	-0.373	-0.152
Prop. pop. w/inc.primary ed.	-6.683	-1.081	-3.450	-1.093	-1.834	0.456	-1.272	-0.344
Unemployement	-3.285	-2.826	-0.919	0.268	-2.457	-1.770	-0.524	0.060
Observations	1055	1055	1055	1055	1055	1055	1055	1055
Pseudo R2	0.9	0.74	0.78	0.92	0.8	0.55	0.67	0.89

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

The Use of Banking Services by Locality

Table 4.4 analyzes the determinants of use of banking services by locality. With the purpose of capturing the potential bias deriving from the presence of zero observations for these variables, the *Tobit*[65] Model is applied. The resulting outcomes indicate that the amount of population continues to be a significant determinant, whereas social indicators show greater elasticities than those in previous regressions. It can be noticed that the level of education in the locality seems to have a significant effect for total entities, even though the sign is opposite to that expected. A possible explanation lies in a differentiated behavior depending on the type of bank. In fact, the level of education presents the expected sign in the case of foreign and domestic private banks, at the same time being economically important, whereas for public banks such level has a positive effect. In turn, unemployment is associated negatively in a significant manner with the volume of banking business in the locality for public banks.

[65] The *Tobit* method is specifically designed to address cases in which the dependent variable is partly continuous, i.e., that certain value limits can occur with no-zero/non-null probability (for example, cases are presented in which observable results are "corner solutions"). Under these conditions, the linear least squares estimator is biased, since the regression function is not linear, and therefore this method uses maximum likelihood assuming a normal distribution.

Table 4.4: *Tobit* Model

	Dependent Variable = Ln (1+deposits)				Dependent Variable = Ln (1+credits)			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	2.204***	2.488***	3.396***	6.112***	2.155***	2.322***	3.105***	5.203***
	[0.100]	[0.125]	[0.240]	[0.435]	[0.096]	[0.119]	[0.208]	[0.355]
Housing Quality (precarious)	-15.292***	-19.914***	-3.950*	-15.723***	-13.345***	-16.921***	-3.525*	-13.747***
	[0.958]	[1.272]	[2.163]	[4.483]	[0.913]	[1.192]	[1.870]	[3.708]
Prop. pop. w/inc.primary ed.	3.730**	5.423**	-13.626***	-28.661***	2.617	4.202*	-13.439***	-23.861***
	[1.893]	[2.389]	[4.543]	[8.768]	[1.805]	[2.256]	[3.941]	[7.253]
Unemployement	-6.819***	-6.666***	-2.725	1.052	-7.305***	-6.688***	-5.943*	2.542
	[1.746]	[2.177]	[4.077]	[6.842]	[1.667]	[2.060]	[3.542]	[5.606]
Constant	-9.863***	-13.445***	-28.273***	-58.070***	-10.393***	-12.940***	-24.967***	-49.622***
	[1.071]	[1.343]	[2.634]	[5.055]	[1.022]	[1.272]	[2.260]	[4.156]
	Marginal Effects on Mean Values							
Population	2.204	2.488	3.396	6.112	2.155	2.322	3.105	5.203
Housing Quality (precarious)	-15.292	-19.914	-3.950	-15.723	-13.345	-16.921	-3.525	-13.747
Prop. pop. w/inc.primary ed.	3.730	5.423	-13.626	-28.661	2.617	4.202	-13.439	-23.861
Unemployement	-6.819	-6.666	-2.725	1.052	-7.305	-6.688	-5.943	2.542
Observations	1055	1055	1055	1055	1055	1055	1055	1055
Pseudo R2	0.14	0.14	0.09	0.31	0.15	0.14	0.11	0.33

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Presence of Bank Agencies in a Locality: Regional and Provincial Characteristics

The foregoing analysis developed at locality level is enhanced by the incorporation of the aggregate variables by department and by province, as shown in the following tables. Additionally, the country is divided into regions in order to study potential differential effects.[66] First, it is considered the Autonomous City of Buenos Aires (Region 1), since in its capacity as the main financial center in the country, it clusters the greatest number of entities and coverage in terms of availability of services. Secondly, the other provinces are grouped into:

- Region 2: High Development (Buenos Aires, Córdoba, Santa Fe, Mendoza)
- Region 3: Middle Development (San Luis, San Juan, Entre Ríos, Salta, Tucumán)
- Region 4: Low Development (Catamarca, Corrientes, Chaco, Formosa, Jujuy, La Rioja, Misiones, Santiago del Estero)
- Region 5: Low Population Density (Tierra del Fuego, Santa Cruz, Chubut, Río Negro, La Pampa, Neuquén).

Lastly, data from IPAN are used at province level with the purpose of verifying the potential impact arising from the rule of law as to choice of location and use of financial services locally.

Table 4.5 shows that locality's population as well as department's land area and province's GPP have a significant and positive effect on the probability that there may be a branch agency available in the locality, whereas the impact on the level of unemployment in the province is also significant and, as expected, of a positive sign.

[66] Geographic division is based on a research paper by Nuñez Miñana (1972).

The more detailed analysis by bank groups shows that in the case of domestic private banks there is a negative ratio between GPP and number of agencies. A reasonable explanation could be associated with the processes of privatization and merger occurring in the period. Generally, domestic private banks acquired a large portion of the small entities in the interior of the country which exited the financial market and the province-owned banks which were privatized in those years, thereby expanding itself in less economically developed provinces.

Table 4.5: *Probit* Model

	Dependent Variable = 1 if agencies > 0				Dependent Variable = 1 if agencies > 0			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	1.255***	1.030***	0.786***	0.943***	1.250***	1.077***	0.774***	1.036***
	[0.111]	[0.069]	[0.049]	[0.082]	[0.112]	[0.075]	[0.048]	[0.097]
Prop. pop. w/inc.primary ed.	-0.673	-0.628	-0.469	-4.322***	-0.561	0.128	-1.410*	-1.585
	[0.737]	[0.677]	[0.697]	[1.358]	[0.793]	[0.743]	[0.846]	[1.549]
Unemployement	-6.242***	-5.405***	-0.96	-0.211	-6.203***	-5.123***	-0.944	0.387
	[0.791]	[0.730]	[0.610]	[1.193]	[0.796]	[0.746]	[0.632]	[1.217]
Area	0.362***	0.302***	0.069	0.164***	0.368***	0.232***	0.140***	0.007
	[0.060]	[0.053]	[0.045]	[0.059]	[0.066]	[0.058]	[0.049]	[0.064]
GPP (t-1)	0.264***	0.560***	-0.348***	0.117*	0.491***	0.628***	-0.206***	-0.004
	[0.067]	[0.064]	[0.058]	[0.063]	[0.102]	[0.093]	[0.079]	[0.098]
Ipan (t-1)	0.278	-1.199***	2.289***	-0.493	0.672*	-1.369***	2.876***	-1.319*
	[0.335]	[0.323]	[0.345]	[0.390]	[0.401]	[0.401]	[0.459]	[0.695]
Region 3					1.188***	0.871***	0.159	0.512
					[0.328]	[0.286]	[0.266]	[0.361]
Region 4					0.714**	-0.159	0.583**	-1.008**
					[0.278]	[0.252]	[0.256]	[0.397]
Region 5					0.817**	-0.086	0.917***	-1.440**
					[0.346]	[0.330]	[0.347]	[0.585]
Constant	-16.590***	-12.793***	-12.807***	-9.879***	-22.506***	-13.193***	-18.413***	-4.09
	[1.776]	[1.350]	[1.438]	[1.786]	[2.921]	[2.491]	[2.816]	[4.059]
	Marginal Effects on Mean Values							
Population	0.213	0.334	0.288	0.098	0.209	0.343	0.282	0.090
Prop. pop. w/inc.primary ed.	-0.114	-0.204	-0.172	-0.447	-0.094	0.041	-0.513	-0.137
Unemployement	-1.058	-1.752	-0.352	-0.022	-1.036	-1.632	-0.343	0.034
Area	0.061	0.098	0.025	0.017	0.061	0.074	0.051	0.001
GPP (t-1)	0.045	0.181	-0.127	0.012	0.082	0.200	-0.075	-0.000
Ipan (t-1)	0.047	-0.389	0.839	-0.051	0.112	-0.436	1.046	-0.114
Region 3					0.106	0.206	0.059	0.063
Region 4					0.087	-0.052	0.223	-0.052
Region 5					0.102	-0.028	0.348	-0.075
Observations	1041	1036	1036	1036	1040	1035	1035	1035
Pseudo R2	0.46	0.4	0.3	0.53	0.47	0.42	0.31	0.57

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

The coefficient relevant to the business environment of the province appears as significant for total banking entities only when one considers the effects of binary variables by region, being positive in this case, as it should be expected. However, on analyzing by type of bank, it is evident that the impact of this variable is significant and positive only in the case of domestic private entities (it records negative figures for both public banks and foreign entities.) Note that as IPAN is a province-related index, the marginal effect is somehow influenced by the bank agency/branch network extension which, as mentioned before, changes depending on the type of bank. In fact, province-owned public banks do not generally have a branch structure reaching out beyond the boundaries of their own province, and therefore the parameter could be biased.

Something similar happens with foreign entities, which are usually located in a selected group of cities and work with segmented markets. This argument would lead us to conclude that the analysis of the IPAN significance and sign is essentially relevant in the case of domestic private entities, precisely where the variable takes positive values and with a high elasticity relative to the rest of the determining factors.

In relation to regions, there is greater prevalence[67] of public bank agencies in localities within Region 3, private entities in Regions 4 and 5 (a reflection of the above-mentioned factors) and minor presence of foreign entities in Regions 4 and 5.

Table 4.6: *Ordered Logit* Model

	Dependent Variable = 1 if agencies > 0				Dependent Variable = 2 if branches > 0			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	2.149***	1.813***	1.320***	1.885***	2.152***	1.903***	1.305***	2.054***
	[0.160]	[0.125]	[0.088]	[0.153]	[0.164]	[0.136]	[0.087]	[0.185]
Prop. pop. w/inc.primary ed.	0.185	-0.815	-0.767	-9.699***	0.391	0.376	-2.881*	-3.829
	[1.225]	[1.188]	[1.176]	[2.613]	[1.297]	[1.295]	[1.486]	[3.123]
Unemployement	-10.962***	-10.098***	-1.796*	-1.752	-10.833***	-9.800***	-1.725	-0.525
	[1.336]	[1.315]	[1.048]	[2.072]	[1.351]	[1.328]	[1.083]	[2.097]
Area	0.509***	0.491***	0.168**	0.343***	0.492***	0.375***	0.297***	0.097
	[0.097]	[0.095]	[0.077]	[0.108]	[0.107]	[0.104]	[0.086]	[0.120]
GPP (t-1)	0.612***	0.922***	-0.585***	0.214*	0.824***	0.959***	-0.341**	0.108
	[0.108]	[0.106]	[0.103]	[0.117]	[0.170]	[0.159]	[0.140]	[0.196]
Ipan (t-1)	0.256	-1.894***	4.036***	-1.138	0.528	-2.440***	5.262***	-2.637**
	[0.561]	[0.552]	[0.648]	[0.745]	[0.647]	[0.690]	[0.931]	[1.279]
Region 3					1.138**	1.063**	0.325	1.278*
					[0.488]	[0.476]	[0.487]	[0.759]
Region 4					0.581	-0.477	0.998**	-1.495*
					[0.457]	[0.438]	[0.476]	[0.792]
Region 5					0.685	-0.494	1.769***	-2.297**
					[0.572]	[0.580]	[0.674]	[1.155]
	Marginal Effects on Mean Values (Dependent Variable = 2)							
Population	0.271	0.360	0.269	0.041	0.272	0.372	0.262	0.036
Prop. pop. w/inc.primary ed.	0.023	-0.162	-0.156	-0.213	0.049	0.073	-0.578	-0.068
Unemployement	-1.382	-2.006	-0.366	-0.038	-1.370	-1.913	-0.346	-0.009
Area	0.064	0.098	0.034	0.008	0.062	0.073	0.059	0.002
GPP (t-1)	0.077	0.183	-0.119	0.005	0.104	0.187	-0.068	0.002
Ipan (t-1)	0.032	-0.376	0.822	-0.025	0.067	-0.476	1.055	-0.047
Region 3					0.104	0.165	0.069	0.039
Region 4					0.064	-0.100	0.223	-0.018
Region 5					0.076	-0.102	0.397	-0.027
Observations	1041	1036	1036	1036	1040	1035	1035	1035
Pseudo R2	0.38	0.37	0.26	0.5	0.39	0.39	0.27	0.53

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

The estimation of the Ordered *Logit* Model validates the foregoing effects, as reflected in Table 4.6. It should be noted the impact that the IPAN index shows in the case of domestic private entities, since it is positive and particularly significant from the economic and statistical viewpoint. In turn, the sign of this variable for foreign and public entities is still significant and negative, education becoming the variable with the greatest impact for foreign banks and employment for public banks. There are also different degrees of significance by region depending on the type of bank; public banks

[67] In the making of this analysis Buenos Aires City was not included, and therefore prevalence relates to Region 2, corresponding to developed provinces.

and foreign institutions have a significant and positive sensitivity in Region 3, whereas domestic private banks have it in Regions 4 and 5.

As shown in Table 4.7, among the determinants of the number of bank agencies by locality the amount of population preserves its relevance and significance. For its part, the land area factor does not seem to be a determinant as robust as in the remaining cases. In these circumstances, socio-economic factors show the expected sign and high significance. Finally, the IPAN index has a positive character and a high degree of significance, solely explained by the effect of this variable in the case of domestic private entities.

Table 4.7: *Poisson* Model

	Dependent Variable = no. of agencies				Dependent Variable = no. of agencies			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	0.952***	0.870***	0.924***	1.043***	0.933***	0.866***	0.929***	1.033***
	[0.030]	[0.030]	[0.040]	[0.066]	[0.031]	[0.043]	[0.046]	[0.065]
Prop. pop. w/inc.primary ed.	-2.093***	-0.416	-2.894***	-10.889***	-1.681***	0.15	-2.748**	-10.347***
	[0.637]	[0.673]	[0.999]	[2.010]	[0.583]	[0.727]	[1.072]	[1.939]
Unemployement	-5.276***	-6.609***	-2.294***	-1.834*	-4.260***	-6.179***	-2.467**	-0.377
	[0.530]	[0.748]	[0.553]	[1.093]	[0.603]	[0.760]	[0.963]	[1.340]
Area	-0.075**	0.059*	-0.102**	-0.139**	-0.066	0.049	-0.096**	-0.147*
	[0.036]	[0.036]	[0.045]	[0.063]	[0.042]	[0.034]	[0.048]	[0.078]
GPP (t-1)	0.035	0.201***	-0.231***	0.08	0.02	0.148**	-0.287***	0.17
	[0.026]	[0.038]	[0.045]	[0.050]	[0.063]	[0.072]	[0.065]	[0.113]
Ipan (t-1)	1.071***	0.21	2.000***	0.504	0.540**	-0.241	1.846***	0.062
	[0.211]	[0.370]	[0.389]	[0.419]	[0.263]	[0.500]	[0.472]	[0.475]
Region 3					0.164	0.06	-0.397*	1.236***
					[0.173]	[0.196]	[0.219]	[0.352]
Region 4					-0.158	-0.363	-0.13	0.069
					[0.171]	[0.221]	[0.193]	[0.371]
Region 5					-0.278	-0.464*	-0.283	0.228
					[0.200]	[0.272]	[0.295]	[0.439]
Constant	-10.883***	-10.479***	-12.288***	-10.561***	-8.318***	-7.503***	-10.626***	-10.496***
	[1.341]	[1.948]	[2.212]	[1.731]	[2.016]	[2.463]	[2.736]	[3.500]
	Marginal Effects on Mean Values							
Population	1.842	1.015	0.516	0.171	1.881	1.010	0.521	0.164
Prop. pop. w/inc.primary ed.	-4.049	-0.485	-1.616	-1.781	-3.390	0.175	-1.540	-1.643
Unemployement	-10.208	-7.704	-1.281	-0.300	-8.591	-7.203	-1.383	-0.060
Area	-0.146	0.069	-0.057	-0.023	-0.134	0.057	-0.054	-0.023
GPP (t-1)	0.068	0.234	-0.129	0.013	0.040	0.173	-0.161	0.027
Ipan (t-1)	2.073	0.245	1.117	0.083	1.089	-0.281	1.035	0.010
Region 3					0.354	0.072	-0.191	0.345
Region 4					-0.303	-0.376	-0.070	0.011
Region 5					-0.522	-0.480	-0.147	0.039
Observations	1041	1036	1036	1036	1040	1035	1035	1035
Pseudo R2	0.9	0.74	0.8	0.91	0.82	0.64	0.7	0.82

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Use of Banking Services by Locality: Regional and Provincial Characteristics

As Table 4.8. shows total private sector deposits by locality are affected not only by definitely local factors but also by aggregate variables at province and department level. Likewise other variables of availability of banking services locally, In particular, it can be noticed that the amount of population has a significant and positive impact, showing greater elasticity for foreign entities. These entities also have greater sensitivity to educational variables, but the same does not hold true for the unemployment rate.

However, the weight of local unemployment is still significant and negative for total entities, both for public and domestic private banks. The positive impact of better conditions for legal certainty is shown by the significance and sign of the parameter relevant to the IPAN variable. This index seems to be dominated by the case of domestic private entities, since foreign and public banks present negative values in such variable.

Table 4.8: *Tobit* Model

	Dependent Variable = Ln (1+deposits)				Dependent Variable = Ln (1+deposits)			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	2.996***	3.210***	4.418***	6.803***	3.018***	3.238***	4.411***	6.849***
	[0.108]	[0.139]	[0.260]	[0.487]	[0.111]	[0.142]	[0.266]	[0.491]
Prop. pop. w/inc.primary ed.	2.032	-1.666	-0.71	-37.306***	2.765	0.785	-7.027	-22.276**
	[1.734]	[2.275]	[4.111]	[9.517]	[1.884]	[2.447]	[4.550]	[9.755]
Unemployement	-19.654***	-21.811***	-8.154**	-6.583	-19.762***	-21.549***	-8.179**	-6.192
	[1.718]	[2.232]	[3.832]	[7.483]	[1.778]	[2.289]	[4.041]	[7.424]
Area	0.794***	1.113***	0.495**	1.519***	0.745***	0.949***	0.728***	0.901***
	[0.110]	[0.141]	[0.233]	[0.357]	[0.117]	[0.149]	[0.249]	[0.342]
GPP (t-1)	0.743***	1.533***	-1.759***	0.877**	0.811***	1.469***	-1.497***	0.662
	[0.114]	[0.145]	[0.253]	[0.398]	[0.192]	[0.240]	[0.426]	[0.598]
Ipan (t-1)	3.426***	-2.739**	20.828***	-10.943***	3.594***	-3.084**	22.550***	-10.693***
	[0.892]	[1.142]	[1.990]	[3.415]	[0.960]	[1.232]	[2.143]	[3.568]
Region 3					0.73	1.258*	-1.386	5.100***
					[0.601]	[0.753]	[1.354]	[1.890]
Region 4					0.132	-0.572	0.505	-2.585
					[0.551]	[0.703]	[1.214]	[1.949]
Region 5					0.084	-0.879	2.762*	-3.546
					[0.680]	[0.865]	[1.499]	[2.427]
Constant	-50.742***	-39.485***	-111.859***	-38.985***	-52.650***	-36.251***	-125.002***	-34.673*
	[3.926]	[5.036]	[9.205]	[14.315]	[5.845]	[7.468]	[13.252]	[19.737]
	Marginal Effects on Mean Values							
Population	2.996	3.210	4.418	6.803	3.018	3.238	4.411	6.849
Prop. pop. w/inc.primary ed.	2.032	-1.666	-0.710	-37.306	2.765	0.785	-7.027	-22.276
Unemployement	-19.654	-21.811	-8.154	-6.583	-19.762	-21.549	-8.179	-6.192
Area	0.794	1.113	0.495	1.519	0.745	0.949	0.728	0.901
GPP (t-1)	0.743	1.533	-1.759	0.877	0.811	1.469	-1.497	0.662
Ipan (t-1)	3.426	-2.739	20.828	-10.943	3.594	-3.084	22.550	-10.693
Region 3					0.730	1.258	-1.386	5.100
Region 4					0.132	-0.572	0.505	-2.585
Region 5					0.084	-0.879	2.762	-3.546
Observations	1041	1036	1036	1036	1040	1035	1035	1035
Pseudo R2	0.16	0.15	0.14	0.33	0.16	0.15	0.15	0.35

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

On analyzing the results obtained from using credit at locality level as dependent variable (see Table 4.9), it derives that the number of people is still a significant determinant having greater impact on foreign entities, even though sensitivity regarding population is lower than the one recorded in the field of bank deposits. The IPAN index parameter is significant and positive, and it has the greatest elasticity within the variables considered for domestic private entities.

It should be mentioned that unemployment is a significant and negative factor globally and by group of entities, except for foreign institutions which, as mentioned before, are generally located in urban centers with high unemployment. For their part, Regions 4 and 5 seem to be relevant in the case of deposits and credits for domestic private as well

as foreign entities, even though with different signs. In fact, the latter record a negative sign, whereas the former a positive one.

Table 4.9: *Tobit* Model

	Dependent Variable = Ln (1+credits)				Dependent Variable = Ln (1+credits)			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	2.882***	2.991***	4.039***	5.801***	2.860***	2.969***	4.043***	5.860***
	[0.102]	[0.130]	[0.228]	[0.400]	[0.104]	[0.133]	[0.234]	[0.406]
Prop. pop. w/inc.primary ed.	1.675	-1.327	-1.374	-31.008***	1.663	-0.286	-5.874	-18.490**
	[1.638]	[2.120]	[3.598]	[7.920]	[1.771]	[2.275]	[3.972]	[8.175]
Unemployement	-18.785***	-19.759***	-10.806***	-3.981	-18.433***	-19.275***	-10.598***	-3.536
	[1.630]	[2.082]	[3.377]	[6.142]	[1.676]	[2.129]	[3.553]	[6.125]
Area	0.756***	1.033***	0.582***	1.267***	0.750***	0.967***	0.725***	0.766***
	[0.103]	[0.131]	[0.200]	[0.295]	[0.110]	[0.139]	[0.214]	[0.284]
GPP (t-1)	0.733***	1.312***	-1.279***	0.704**	1.107***	1.701***	-1.242***	0.463
	[0.107]	[0.135]	[0.216]	[0.328]	[0.179]	[0.225]	[0.364]	[0.495]
Ipan (t-1)	2.048**	-2.743***	16.652***	-8.062***	2.886***	-1.970*	17.752***	-7.999***
	[0.834]	[1.062]	[1.697]	[2.806]	[0.895]	[1.142]	[1.828]	[2.954]
Region 3					1.820***	2.501***	-1.323	3.951**
					[0.561]	[0.701]	[1.151]	[1.570]
Region 4					0.894*	0.822	-0.32	-2.336
					[0.516]	[0.657]	[1.044]	[1.615]
Region 5					1.433**	1.22	1.533	-3.225
					[0.637]	[0.808]	[1.282]	[2.017]
Constant	-43.926***	-34.536***	-96.726***	-38.520***	-54.268***	-44.603***	-102.814***	-33.546**
	[3.688]	[4.686]	[7.961]	[11.895]	[5.482]	[6.981]	[11.345]	[16.441]
	Marginal Effects on Mean Values							
Population	2.882	2.991	4.039	5.801	2.860	2.969	4.043	5.860
Prop. pop. w/inc.primary ed.	1.675	-1.327	-1.374	-31.008	1.663	-0.286	-5.874	-18.490
Unemployement	-18.785	-19.759	-10.806	-3.981	-18.433	-19.275	-10.598	-3.536
Area	0.756	1.033	0.582	1.267	0.750	0.967	0.725	0.766
GPP (t-1)	0.733	1.312	-1.279	0.704	1.107	1.701	-1.242	0.463
Ipan (t-1)	2.048	-2.743	16.652	-8.062	2.886	-1.970	17.752	-7.999
Region 3					1.820	2.501	-1.323	3.951
Region 4					0.894	0.822	-0.320	-2.336
Region 5					1.433	1.220	1.533	-3.225
Observations	1041	1036	1036	1036	1040	1035	1035	1035
Pseudo R2	0.17	0.15	0.16	0.35	0.17	0.15	0.17	0.37

Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Ultimately, the results of the analysis of determinants of availability of banking services locally validate the theoretical approximations since population is an important factor, not only in terms of probability that there may be a bank agency, but also in relation to use of banking services. The socio-economic factors of the locality prove to be substantial. The GGP is a proxy for the activity level which shows significance, while business environment proves to be relevant statistically and economically, specifically in the case of domestic private entities. Finally, land area of the department where the locality is situated is a significant and positive determinant, indicating the relevance of the market's geographic coverage, especially for variables relating to use of banking services. This last characteristic is analyzed with greater detail in the following Section, dealing with spatial dimension of the supply of banking services.

5. Spatial Dimension and Empirical Analysis at Department Level

Developments in the field of spatial econometrics give account of the fact that when data arise from a particular spatial structure (as those applied in this paper), there may

arise spatial dependence and/or heterogeneity that cannot appropriately be managed within the framework of traditional econometrics.[68] Spatial dependence arises when the value of an observation is influenced by the observations contiguously located in space.[69] This aspect may become relevant on analyzing those decisions where location and distance are determining factors (for example, due to the presence of spillover effects or economies of scale)[70] and/or cases in which real spatial dimension of the phenomenon under study does not coincide with formal dimension.[71] This section makes an approximation in this regard, taking into account that decisions on location of banking services and degree of use thereof are generally influenced, and even constrained, not only by socio-economic factors, but also by location and distance-related matters.

Spatial econometric analysis first requires delimiting observations to geographic space. For such purpose, it is used a *W* matrix which weighs observations according to the contiguity patterns of geographic units. The matrix has a diagonal consisting of zeros and positive values in the cells corresponding to adjacent geographic units. This matrix is standardized by row, so that all of them aggregate one. The weighting can be given by simple contiguity relationship[72], length of frontiers or distance to the center of the adjacent region, among others[73]. The usefulness of this *W* matrix for econometric analysis derives from the fact that when it is multiplied by each observation y_i a value is obtained which is the weighted average of the values that such variable takes in the adjacent geographic units. The basic input to build this matrix, spatial location of the units under study, is obtained in a relatively simple manner from the use of georeferenced maps.[74]

The first aspect that should be examined when spatial dimension is considered within econometric analysis is the presence of spatial dependence in relevant data. A first piece of evidence arises from Figure 5.1 showing a map which summarizes the spatial configuration by department of the so-called *Moran Diagram*[75] for the logarithm of total private credit within the sphere of the department.

This scheme[76] indicates the ratio between the standardized value of the variable under study compared with its weighted average (by the *W* matrix) in the rest of the units (departments in this case.) In presence of spatial dependence, the observations that are above the standardized average should be surrounded by observations that are also above such average. The Figure can be divided into four quadrants, where the

[68] In presence of spatial dependence OLS estimations generate biased and /or inefficient estimators. Anselin (1988).

[69] The observation y_i with $i \varepsilon S$, will be related to y_j corresponding to another spatial unit also belonging to the set which contains all spatial *S* units.

[70] Decisions on location for marketing of goods and services are in general strongly influenced by these aspects.

[71] In such case, data collected (by census reach, department, etc.) may contain errors correlated between geographic units.

[72] With binary values, unit ones for adjacent geographic units and zero for the rest.

[73] Cliff, Ord (1981)

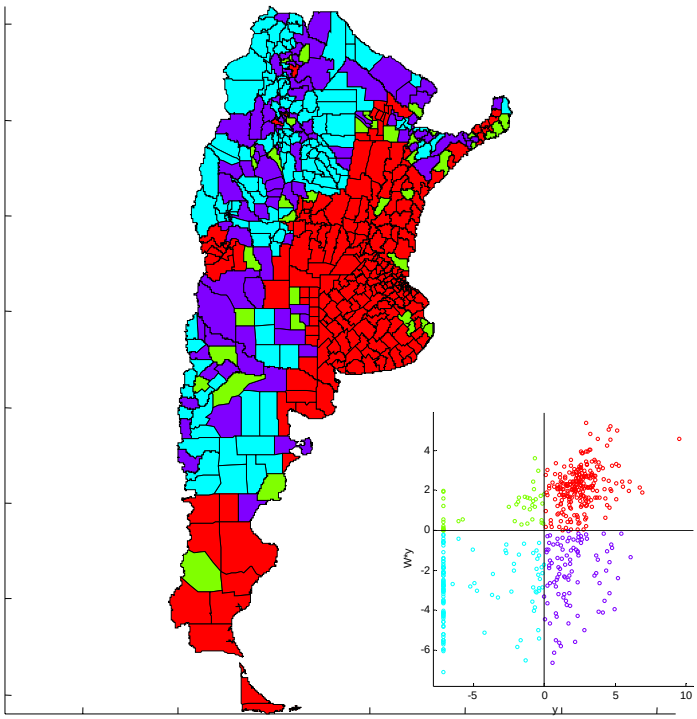
[74] This paper includes maps of Argentina with information at department level, using *Matlab* software, through which *W* contiguity matrices are derived. See function xy2cont( ). These weighing elements can also be calculated by using other software, such as Arcview.

[75] *Moran Scatterplot*.

[76] Note that the colors on the map coincide with the observations in the Moran Diagram, thereby highlighting location by department in the different quadrants.

observations that are located in the Northeastern and Southeastern quadrants indicate departments with high (low) level of credit surrounded by departments with high (low) level of credit. However, there are exceptions situated in the Southeastern quadrant with jurisdictions which have a relatively high level of credit and are surrounded by departments with an average level below such credit level. Finally, we can see those departments located in the Northwestern quadrant with a lower level of loans and surrounded by departments that have higher values on average.

Figure 5.1: Spatial Correlation. Moran Diagram



Source: BCRA. Private Credit Logarithm. Year 2003.

The existence of spatial dependence can be validated from various statistical tests based on the errors of regressions performed with Ordinary Least Squares.[77] Such spatial dependence can be incorporated in the econometric regression by making use of the weighing matrices, at least through two models, a process of spatial correlation, or through spatial correlation between errors.

Thus, the first model to be estimated is given by the following equation,

$$y = \rho W y + X\beta + \epsilon$$

where coefficient ρ measures spatial correlation. This model assumes a spatial dependence which arises from a direct functional relationship between the observations of the dependent variable and the values of the same parameter in adjacent geographic units.

[77] Moran's test (Moran´s I), as well as maximum likelihood estimation and likelihood ratio, do not reject the spatial correlation null hypothesis in errors with a marginal probability below 1% in every case (for log private credit and log private deposits in the two years to be considered).

The second model to be considered is shown in the following equations,

$$y = X\beta + u$$
$$u = \lambda Wu + \epsilon$$

In this case, coefficient λ is known as spatial autoregressive coefficient, and it indicates that spatial dependence arises from correlation between errors corresponding to adjacent geographic units.

In both models, spatial dependence coefficients require to be estimated through maximum likelihood methods since OLS estimators present problems.[78] An additional complication of the analysis made in this section, which should be taken into account, is related to the use of dependent variables with zero-truncated values. In fact, Figure 5.2 shows the map of distribution by department of the credit logarithm,[79] thereby showing the existence of departments with zero values.[80] An appropriate treatment of this data truncation requires the use of econometric techniques that may take into account the special nature of these data, such as *Tobit* model. LaSage (1998) shows that in presence of limited dependent variables and spatial dependence, the application of the *Tobit* estimation method required the use of Bayesian procedures to achieve an appropriate inference.[81]

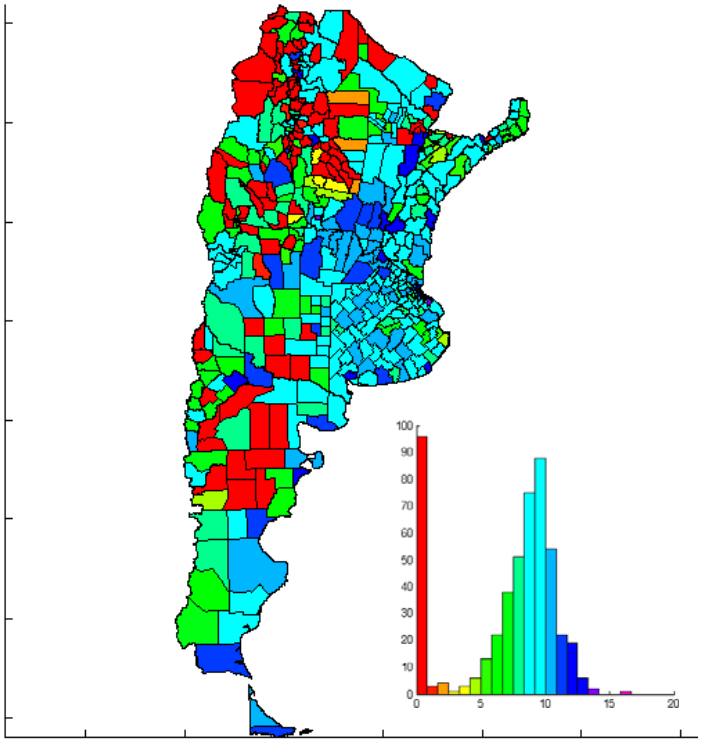
[78] See Anselin (1988). Estimations were performed by applying functions specifically designed by La Sage (1998) using *Matlab*.

[79] A similar distribution can be observed in the case of deposit logarithm.

[80] There are 85 departments without deposits and 90 without credit in the year 1998. For the year 2003, there are 86 departments without deposits and 95 without credit.

[81] It should be considered that Bayesian techniques may be implemented so as to replicate the results of a Maximum Likelihood Estimation (La Sage (2000), Canova (2006)). However, maximum likelihood methods rely on the assumption that the underlying processes in the model follow a normal distribution, whereas Bayesian techniques may be applied even in those cases where such normality guesswork is not fulfilled, or whenever there is evidence on the value of a given parameter (*prior*). Likewise, Bayesian techniques are applied to estimate the subsequent multivariate distribution where it is assumed that there is heterocedasticity in errors or in presence of extreme observations (*outliers*) in small samples. In these cases, the Gibbs sampling method may be applied to approximate the subsequent distribution with Bayesian techniques. This method starts by assuming a conditional distribution for parameters, taking out of them random samples which converge into the limit to the real subsequent distribution of parameters. Thus, taking an adequately large sample, inference can be drawn about the mean and moments of the subsequent distribution of parameters. Robust Bayesian techniques allow to make better inferences in presence of heterocedasticity, *outliers*, or absence of normality in the distribution of errors. In order to solve the problems presented in the case under study, La Sage (1998) proposes a Bayesian spatial autoregressive *Tobit* method, which generates consistent and robust estimations, thereby ensuring a more accurate inference. The procedure consists in replacing latent observations with estimated values, and then applying non-censored sampling estimation methods. In the Bayesian case the replacement of such values is performed through the Gibbs sampling method, which facilitates the approximation of the subsequent joint probability distribution of parameters by increasing consistency and enhancing inference.

Figure 5.2: Spatial Distribution of Credit Level. Year 2003



Source: BCRA

Table 5.1: Determinants of Deposit Level by Department. Year 1998

Dependent Variable = Ln Deposits					
	OLS	Spatial Autocorrelation Model	Bayesian Spatial Autorrelation Tobit Model	Spatial Autoregressive Error Model	Bayesian Spatial Autoregressive Error Tobit Model
Constant	-19.950***	-17.94***	-18.26***	-16.82***	-14.84***
	[-12.402]	[-17.03]	[1.9427]	[-15.98]	[2.2738]
Population	1.7157***	1.6362***	1.7264***	1.7584***	1.7189***
	[22.873]	[21.649]	[0.0852]	[21.344]	[0.0845]
Area	0.2650***	0.2701***	0.2791***	0.1440**	0.1144**
	[4.652]	[5.4397]	[0.0645]	[2.4622]	[0.0657]
GPP	0.5892***	0.4218***	0.3797***	0.4150***	0.3387***
	[7.850]	[13.462]	[0.0951]	[8.0349]	[0.1160]
Housing w/freshater access	0.0030**	0.0047	0.0060	0.0073	0.0090**
	[0.672]	[1.3398]	[0.0050]	[1.4984]	[0.0052]
Iliteracy	-0.078***	-0.073***	-0.095***	-0.088***	-0.097***
	[-3.316]	[-5.186]	[0.0264]	[-3.498]	[0.0285]
Rho	-	0.1679***	0.1761***	-	-
	-	[4.1428]	[0.0435]	-	-
Lambda	-	-	-	0.4839***	0.5002***
	-	-	-	[22.370]	[0.0574]
Observations	504	504	504	504	504
R2	0.729	0.7209	0.7057	0.7697	0.7696
Censored Values	-	-	85	-	85

OLS and Spatial Autoregressive: Stadistical t between square brackets
Tobit: Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5.2: Determinants of Deposit Level by Department. Year 2003

Dependent Variable = Ln Credits					
	OLS	Spatial Autocorrelation Model	Bayesian Spatial Autorrelation Tobit Model	Spatial Autoregressive Error Model	Bayesian Spatial Autoregressive Error Tobit Model
Constant	-21.37***	-17.70***	-18.75***	-15.51***	-14.11***
	[-11.32]	[-11.47]	[2.2237]	[-8.191]	[2.6938]
Population	1.6807***	1.5565***	1.6609***	1.7356***	1.6981***
	[19.104]	[18.225]	[0.0985]	[18.776]	[0.0972]
Area	0.3568***	0.3401***	0.3704***	0.1381***	0.1279*
	[5.3393]	[6.0161]	[0.0743]	[2.3379]	[0.0813]
GPP	0.6391***	0.3511***	0.3202**	0.3339***	0.2862**
	[7.2602]	[5.6049]	[0.1085]	[3.0754]	[0.1393]
Prop.Pop w/Inc.Univ.Educ	0.0061	0.0086**	0.0110**	0.0121**	0.0134**
	[1.1443]	[2.1895]	[0.0059]	[2.2241]	[0.0060]
Unemployement	-0.066**	-0.061***	-0.080***	-0.086***	-0.096***
	[-2.401]	[-4.456]	[0.0304]	[-3.030]	[0.0328]
Rho	-	0.2759***	0.2993***	-	-
	-	[6.6112]	[0.0457]	-	-
Lambda	-	-	-	0.6039***	0.6011***
	-	-	-	[14.041]	[0.0498]
Observations	504	504	504	504	504
R2	0.6544	0.6337	0.6204	0.7403	0.7394
Censored Values	-	-	90	-	90

Tables show comparison of the OLS regression with the regressions which take into account spatial dependence (through both the above-mentioned models) for the deposit logarithm[82] (tables 5.1 and 5.2) as well as for credits (tables 5.3 and 5.4), using data for the years 1998 and 2003.[83] The results obtained are generally consistent with those found in the regressions at locality level, indicating in both periods that number of people, land area, and level of economic activity have significant and positive effects on the level of deposits and loans. Likewise, socio-economic variables have significance and record the expected signs. In particular, variables relating to level of education have a positive influence; because data for 1998 show that the level of illiteracy by department was negatively affected, whereas in the year 2003 the proportion of population having completed secondary education had a positive impact.

Table 5.3: Determinants of Deposit Level by Department. Year 1998

Dependent Variable = Ln Deposits					
	OLS	Spatial Autocorrelation Model	Bayesian Spatial Autorrelation Tobit Model	Spatial Autoregressive Error Model	Bayesian Spatial Autoregressive Error Tobit Model
Constant	-25.08***	-23.25***	-25.52***	-23.07***	-21.63***
	[-19.39]	[-35.04]	[1.6319]	[-24.07]	[1.8090]
Population	1.9594***	1.8814***	2.0217***	2.0167***	1.9894***
	[23.061]	[21.828]	[0.0959]	[23.407]	[0.0884]
Area	0.2164***	0.2269***	0.2208***	0.1391***	0.1178**
	[3.6587]	[7.3862]	[0.0641]	[2.5430]	[0.0673]
GPP	0.6903***	0.5488***	0.5452***	0.5680***	0.4999***
	[10.524]	[28.549]	[0.0864]	[10.428]	[0.0959]
Prop.Pop w/Inc.Univ.Educ	4.8458***	4.5803***	6.4888***	4.1806***	4.5443***
	[7.5107]	[7.1830]	[0.7333]	[6.3512]	[0.6761]
Unemployement	-8.760***	-7.993***	-9.321***	-7.034***	-7.115***
	[-4.973]	[-4.736]	[1.8929]	[-3.877]	[1.9053]
Rho	-	0.1389***	0.1311***	-	-
	-	[3.3664]	[0.0427]	-	-
Lambda	-	-	-	0.4219***	0.4323***
	-	-	-	[26.798]	[0.0626]
Observations	504	504	504	504	504
R2	0.72	0.7146	0.7197	0.7506	0.75
Censored Values	-	-	86	-	86

[82] In reality of (1 + value of variable).

[83] It should be mentioned that measurement of socio-economic variables differs in both periods because they were surveyed differently at census events.

The results indicate that spatial autocorrelation coefficient ρ proves to be significant and positive, whereas the effect on the signs and the significance of the remaining estimated coefficients remain virtually unchanged. The incorporation of coefficient ρ in the estimation does not improve overall adjustment either. The situation is different regarding spatial autoregressive coefficient λ. In this case, the level of overall significance increases, and the values of coefficients slightly change, thereby increasing the economic significance of the specific parameters of the socio-economic variables. In tables 5.2 and 5.4, showing regressions for the year 2003, it is evidenced that even though the Bayesian spatial autocorrelation model implies an improvement in the overall adjustment of regressions, once again it is the Bayesian spatial autoregressive model the one which records a higher overall adjustment.

Table 5.4: Determinants of Credit Level by Department. Year 2003

Dependent Variable = Ln Credits					
	OLS	Spatial Autocorrelation Model	Bayesian Spatial Autorrelation Tobit Model	Spatial Autoregressive Error Model	Bayesian Spatial Autoregressive Error Tobit Model
Constant	-24.09***	-21.87***	-25.32***	-21.00***	-19.94***
	[-17.91]	[-26.48]	[1.6348]	[-21.23]	[2.0619]
Population	1.9020***	1.8056***	1.9935***	1.9380***	1.9239***
	[219.525]	[20.286]	[0.1021]	[21.739]	[0.0941]
Area	0.2326***	0.2409***	0.2555***	0.1286**	0.1167*
	[3.7801]	[7.4807]	[0.0667]	[2.2006]	[0.0732]
GPP	0.6115***	0.4501***	0.4648***	0.4444***	0.3895***
	[8.9651]	[15.573]	[0.0847]	[8.0877]	[0.1127]
Prop.Pop w/Inc.Univ.Educ	4.9179***	4.4999***	6.7377***	3.6573***	3.9204***
	[7.3299]	[6.7797]	[0.7962]	[5.3901]	[0.7266]
Unemployement	-9.567***	-8.315***	-10.02***	-5.885**	-5.872**
	[-5.223]	[-4.718]	[2.0665]	[-3.129]	[1.9851]
Rho	-	0.1709***	0.1713***	-	-
	-	[4.0448]	[0.0454]	-	-
Lambda	-	-	-	0.4709***	0.4839***
	-	-	-	[24.441]	[0.0614]
Observations	504	504	504	504	504
R2	0.6686	0.6706	0.6916	0.7203	0.7204
Censored Values	-	-	95	-	95

OLS and Spatial Autoregressive: Stadistical t between square brackets
Tobit: Robust Standard Errors between square brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Finally, the estimations made for both periods and for the two variables under study show that consideration of spatial (geographic) dimension is relevant, even though it does not significantly change the outcomes shown in the preceding section. The presence of significant and positive spatial correlation allows to somehow validate previous outcomes, where it was stressed the importance of location and spatial distribution of availability of banking services regarding use thereof, both from the theoretical and empirical viewpoint.

6. Conclusions

This paper analyzes the determinants of availability and spatial distribution at local level of banking services regulated by the BCRA. Data allow inferring the number of localities and the percentage of population without supply of regulated banking services locally. However, it is not possible to estimate the percentage of population which effectively uses such services. Despite the foregoing, data allow drawing some relevant conclusions about the level of *bankarization*.

First, *bankarization* indicators, both those relating to the expansion of the customer service network (access) and the amount of deposits or credit (use), show that the country presents relatively low levels not only compared with countries having similarly developed economies, but also in historical terms. The economic and financial crises, particularly the one which took place by the end of 2001, dramatically affected the use of banking services. Nevertheless, the exit of entities from the market did not translate into a reduction in the number of bank agencies due to the transfer of customer service centers to other entities.

Evidence shows that in the last eight years the number of bank agencies has grown by more than 30%, thus increasing the availability of banking services. Two aspects of this change deserve special attention: (i) the main avenue of customer service network expansion has been the installation of ATMs, and (ii) the opening has largely taken place in localities which already had banking infrastructure. In this regard, localities with more than 5,000 people record high probability of having at least two bank agencies. However, *bankarization* of localities without availability of services constitutes a major challenge which is still pending, especially in some provinces where banking infrastructure is available only in 10% of their localities, and taking into account that there are still localities with more than 10,000 people which do not have any formal banking infrastructure.

The supply of banking services at locality level shows important differences consistently with ownership structure of financial entities. Public banks present a more extensive infrastructure, have a greater number of bank agencies, and operate in more localities, many of which only have such entities as suppliers of banking services. At the same time, they record more sensitivity to local socio-economic conditions, such as the level of education or unemployment. On the contrary, foreign banks tend to be located in major urban centers nationwide, the number of people being the most relevant variable for the location of bank agencies, with an expansion into already *banked* markets. In turn, domestic private entities show greater relative sensitivity to business environment at province level. Thus, one may conclude that the groups of entities are different not only due to the origin of their capital but also because of the different manners in which they tackle banking business.

Regional econometric analyses validate the link between level of banking activity and poverty mentioned in specialized literature. The country's zones with more access to and use of banking services are precisely those showing higher relative economic development (measured through GGP) and better business environment at province level. Likewise, the detected spatial dependence reflects the importance of the availability of banking services at local level in terms of the effective use of such services.

The conclusions of this paper allow inferring that an increase in the availability of banking services locally is highly relevant to the depth of such services in our country. In such regard, the regulations that could have a significant and positive impact would be those which, taking adequate consideration of risks, shall:

- tend to diminish barriers to entry of new entities, specifically those of a local and/or regional character, or specialized in specific low-*banked* segments,
- facilitate the expansion of the customer service network in its different ways;
- promote diversifying channels to access banking services.

In this sense, recent actions taken by the Central Bank of Argentina aimed to increase *bankarization* consider the importance of the above mentioned issues. For instance, segregation of capital requirements by geographic location, new regulation on Credit Cooperatives (*Cajas de Crédito Cooperativas*), admission of temporary bank branches allowing any type of entities to open mobile branch facilities, expansion of low-value loan trading, and other measures under study, such as the possibility of outsourcing some operational banking services, the creation of a basic universal bank account, among others.

These specific measures which seek to enhance the availability of banking services must necessarily go in conjunction with a monetary policy which would contribute to macroeconomic stability and sustainable economic growth. Finally, it should be noted that shared efforts between regulator and banking entities concerning issues such as financial education, transparency, and adequate safeguard of the rights of consumers of banking services might have a strong impact on *bankarization.*

APPENDIX: Partial Elasticities

Table A.1: *Probit* Model

Partial Elasticities								
	Dependent Variable = 1 if agencies > 0				Dependent Variable = 1 if agencies > 0			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	2.097***	4.0249***	7.5614***	17.346***	2.0513***	4.0846***	7.5280***	19.877***
Prop. pop. w/inc.primary	-0.0297	-0.064	-0.119	-2.095***	-0.024	0.0128	-0.361*	-0.803
Unemployement	-0.302***	-0.612***	-0.267	-0.112	-0.295***	-0.564***	-0.266	0.2154
Area	0.5535***	1.0771***	0.6031	2.7485***	0.5518***	0.8050***	1.2419***	0.1305
GPP (t-1)	0.7911***	3.9217***	-5.998***	3.8492*	1.4466***	4.2781***	-3.593***	-0.122
Ipan (t-1)	0.2440	-2.463***	11.579***	-4.763	0.5801*	-2.734***	14.711***	-13.31*
Region 3					0.0210***	0.0354***	0.0166	0.1054
Region 4					0.0218**	-0.011	0.1043**	-0.356**
Region 5					0.0336**	-0.008	0.2239***	-0.694**

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A.2: *Poisson* Model

Partial Elasticities								
	Dependent Variable = no. of agencies				Dependent Variable = no. of agencies			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	8.641***	7.774***	8.512***	9.462***	8.305***	7.724***	8.279***	9.247***
Prop. pop. w/inc.primary	-0.532***	-0.074	-0.741***	-2.76***	-0.417***	0.038	-0.724***	-2.395***
Unemployement	-1.484***	-1.681***	-0.769***	-0.593**	-1.077***	-1.595***	-0.537**	-0.1
Area	-0.608**	0.453	-0.735**	-1.069**	-0.501	0.368	-0.565	-1.149*
GPP (t-1)	0.48	2.691***	-3.917***	2.212**	0.409	2.399**	-4.331***	2.73
Ipan (t-1)	3.604***	2.198	7.148***	-1.307	1.98	1.066	5.88***	-2.085
Region 3					0.0206	0.0159	-0.028	0.104***
Region 4					-0.0195	-0.0413	-0.00735	-0.0102
Region 5					-0.0496	-0.0626	-0.042	0.00242

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A.3: *Tobit* Model

Partial Elasticities								
	Dependent Variable = Ln (1+deposits)				Dependent Variable = Ln (1+deposits)			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	4.781***	7.081***	4.484***	6.742***	4.822***	7.17***	4.476***	6.796***
Prop. pop. w/inc.primary	0.0709	-0.0925	-3.183	-35.34***	0.101	0.0658	-9.578**	-19.17**
Unemployement	-0.905***	-1.405***	-7.618*	-6.805	-0.913***	-1.403***	-7.913*	-6.535
Area	1.192***	2.24***	0.702***	1.411***	1.133***	1.871***	1.011***	0.774**
GPP (t-1)	2.185***	6.238***	-1.864***	0.862*	2.458***	5.658***	-1.269***	0.531
Ipan (t-1)	1.622**	-2.334**	13.58***	-6.932**	1.802**	-3.67***	16.64***	-9.806***
Region 3					0.0142	0.019	0.0825	3.954*
Region 4					0.00788	-0.0442	2.48*	-3.803*
Region 5					0.00848	-0.0925*	4.652***	-5.609

* significant at 10%; ** significant at 5%; *** significant at 1%

Table A.4: *Tobit* Model

	Partial Elasticities							
	Dependent Variable = Ln (1+credits)				Dependent Variable = Ln (1+credits)			
	Total	Public	Domestic Private	Feoreign	Total	Public	Domestic Private	Feoreign
Population	5.462***	7.675***	4.091***	5.765***	5.453***	7.691***	4.087***	5.825***
Prop. pop. w/inc.primary	0.0606	-0.108	-3.227	-29.29***	0.0679	-0.00445	-7.955*	-16.21**
Unemployement	-1.035***	-1.491***	-10.35***	-4.3	-1.017***	-1.464***	-10.39***	-3.835
Area	1.364***	2.47***	0.741***	1.177***	1.351***	2.249***	0.95***	0.669**
GPP (t-1)	2.763***	6.632***	-1.413***	0.646*	3.917***	7.757***	-1.047***	0.367
Ipan (t-1)	0.629	-3.633***	11.36***	-4.677*	1.768**	-2.964*	13.43***	-6.843**
Region 3					0.0392***	0.0599***	-0.0353	3.248*
Region 4					0.0361*	0.0209	1.39	-3.104*
Region 5					0.0746**	0.0411	3.164**	-4.509**

* significant at 10%; ** significant at 5%; *** significant at 1%

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