Eliminating entry barriers for the provision of banking services: evidence from 'banking correspondents' in Brazil*

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Draft: January 12, 2012

This paper shows that the contractual arrangement of 'banking correspondents' has eliminated entry barriers for the provision of banking services. The evidence is based on the estimation of an entry model of financial providers in Brazilian municipalities. I estimate a zero population entry threshold for banking correspondents for the period from 2002 to 2007. The estimated population entry thresholds for bank branches in the same period are relatively stable at approximately 8,000 to 9,000 people. The population entry thresholds for the second to fifth players for banking correspondents are also consistently lower than those for bank branches.

JEL: G20 O16

Keywords: Development and finance, Banking

* I would like to thank Arthur Bragança and Juan River for excellent research assistance. I have also benefited from discussions with Luiz Feltrim, Arminio Fraga and Ignacio Mas-Ribo and the members of the Consortium on Financial Systems and Poverty at the University of Chicago (CFSP). Financial support from the CFSP and the CNPq is gratefully acknowledged.

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I. Introduction

Access to bank facilities is essential to economic development. This access assists individuals in improving their living conditions and overcoming poverty (Pande and Burgess 2005), enhances risk sharing (Suri and Jack 2011*b*), promotes more start-up businesses and enables established firms to growth (Bruhn and Love 2009), and improves technology adoption (Mukherjee 2011). Physical access is one of the major barriers that prevents small firms and poor households to use banking services. Even in the context of recent technological improvements, access to bank branches remains important for key transactions. Relevant variation in the density of branch networks can be found across countries: Ethiopia has fewer than 1 branch per 100,000 people, and Botswana has 1 branch per 10,000 square kilometers, whereas Spain has 96 branches per 100,000 people and 790 branches per 10,000 square kilometers (Demirgüç-Kunt, Beck and Honohan 2008). How can we improve access to banking services and thereby reduce the entry barriers for banking services in poorer and less populated areas? The identification of new forms of increasing banking access through feasible and scalable policies can have positive effects on the welfare of these poorly served areas.

This paper studies a new institutional arrangement for the distribution of banking services in Brazil. In 1999, the Central Bank enacted a resolution that allowed banks to establish agreements with non-banking firms to provide financial and payment services. Under this agreement, firms become 'banking correspondents and work as bank branches with some restrictions.

The number of banking correspondents has increased rapidly. By the end of 2007, the number of banking correspondents was approximately 80,000, which is four times the number of bank branches in the country. Banks began to recognize that banking correspondents constitute an important part of their distribution network. Indeed, in May 2011, Banco do Brasil paid approximately USD 1.75 billion for a contract with *Correios* (The Brazilian Post Offices) to use their

network of 6,195 points of sale to distribute their banking products until 2015. [1]

Banks initially considered the use of banking correspondents as a method of expanding access to less populated and poorer municipalities; the number of banking correspondents in comparison with the number of regular branches was negatively correlated with population and per capita income. This correlation became positive over time, and banks have recently begun to increase their networks of banking correspondents in more populated and richer municipalities.

I investigate the extent to which banking correspondents reduced the barriers for the provision of financial services and improved the outreach of the banking network in Brazil. This analysis is based on the estimation of a simple entry model for the period between 2000 and 2007 based on Bresnahan and Reiss (1991). The estimates indicate that the entry barriers were reduced to zero in 2002 for banking correspondents. However, for bank branches, the entry barriers remained stable and comprised population levels from 8,000 to 9,000 for the first entrant of a municipality. The entry population thresholds for the second to fifth banking correspondents in each municipality also decreased sharply over time.

These results suggest that banks can serve all of the 2187 municipalities (out of 5507 municipalities) without any bank branches in 2000 by using banking correspondents to connect approximately 20 million people to the financial sector. Actually, our data reveal that only 217 municipalities did not have banking correspondents in 2007. In 2010, Banco Central do Brasil (2010) shows that this number is further reduced to 30 municipalities without the use of banking correspondents.

Consequently, the new institutional framework that is facilitated by banking correspondents is shown to substantially reduce the fixed cost of entry. In fact, banking correspondents can rely on the pre-existent infrastructure to provide

[1] The price of the operation was established in an ascending auction with the participation of private commercial banks. The highest bid was BRL 2.8 billion, and the second highest bid was BRL 2.75 billion by Bradesco, a large commercial bank that has held the contract since 2001. Under the agreement, *Correios* will also retain 50% of the fees that are collected by Banco do Brasil from the banking correspondents.

financial and payment services and thus substantially reduce the fixed costs of expanding the banking distribution network. In addition to the recent mobile money technology, as described by Suri and Jack (2011*a*), banking correspondents represent an innovative and feasible means of increasing the outreach of banking services at low set-up costs. Although they differ in their operations, mobile money technology and banking correspondents are similar in that they benefit from pre-existing network infrastructure.

This paper is organized as follows. Section II presents a historical background regarding banking correspondents in Brazil. Section III describes the simplified version of the model of (Bresnahan and Reiss 1991) that is used in this analysis. The empirical results are presented in section IV. Section V concludes the paper. A description of the data description is found in the appendix.

II. Historical background

In 1999, the Brazilian Central Bank enacted Resolution #2640/99, which enabled the increased presence of banking correspondents. In 2000, which is the first year of my working sample, approximately 40% of the municipalities (2187 out of 5507) did not have bank branches. In the absence of other alternatives, almost 20 million people that lived in these municipalities without banks could not access financial services without traveling to other cities. The motivation behind the initiative of the Central Bank was to increase access to a financial system by creating alternative pathways based on non-banking distribution networks.

A banking correspondent is established as a contractual agreement between a bank and a non-bank firm. Contracts can be either exclusive or non-exclusive. The legislation allows banking correspondents to receive applications (forms and documents) for opening checking accounts and savings accounts; collect deposits and provide payments for checking accounts, savings accounts and investment funds; implement payments for the hosting institution (bank); receive credit applications; perform credit evaluation; and other services that are subject to the

approval of the Central Bank.

Banking correspondents can act as regular bank branches for most retail banking operations and are thus able to manage different types of accounts and provide loans and payment services. The main difference between banking correspondents and regular bank branches is that banking correspondents do not carry any of these operations on their balance sheets. In practice, these arrangements provide banks with a means of outsourcing the distribution of banking services to other firms through a contractual agreement.

[Figure 1 - Expansion of the average number of bank branches and banking correspondents per municipality in Brazil]

The adoption of the new framework was rapid. Figure 1 shows the expansion of banking correspondents in comparison with bank branches. Although the number of bank branches remained stable from 2000 to 2007, with an average of approximately 3 branches per municipality, the number of banking correspondents increased rapidly from 1.1 in 2000 to almost 15 banking correspondents per municipality in 2007. In 2002, three years after the legislation change, the number of banking correspondents surpassed that of bank branches.

[Table 1 - Distribution of municipalities according to the number of banking correspondents and bank branches]

Table 1 shows that the expansion of banking correspondents since 2000 dramatically reduced the number of municipalities without any points of sale for financial products (branches or banking correspondents). The number of municipalities without branches remained relatively stable in the period from 2000 to 2007; this number varied between 2021 and 2187. However, the number of municipalities without any correspondents decreased from 3461 in 2000 to 117 in 2007.

[Table 2 - Profile of municipalities with banking correspondents]

The profile of municipalities with at least one banking correspondent also changed in this period, as shown in table 2. Over time, there was a reduction in the average population and an increase in the distance to the state capital. This evidence shows that the expansion of banking correspondents was largely determined by the incorporation of smaller, more isolated municipalities.

The sharp expansion of the banking correspondent network, especially in municipalities without bank branches, suggests that the costs of delivering banking services through this distribution channel is lower than those of regular branches. A key feature of this new arrangement is that the incremental cost for a firm that agrees to operate as a banking correspondent may be low because most of the capital expenditure and staff have already been established for its main activities (lottery houses, post office branches and small retailers).

Table 3 maps the relative use of banking correspondents and bank branches based on market characteristics, such as population, GDP per capita and distance to the capital. I consider two different measures of relative distribution channels: panel (A) considers the difference between the number of banking correspondents and the number of bank branches per municipality, whereas panel (B) considers the fraction between these two measures. Because panel (B) considers only municipalities with at least one bank branch, the number of observations is systematically lower. I estimate one regression for each year.

[Table 3 - Banking correspondents versus bank branches as alternative distribution channels]

In panel (A), in which all municipalities are included in the regressions, the use of banking correspondents in comparison with the use of branches is negatively correlated with population and GDP per capita in 2000. Banks appear to have been using correspondents to serve smaller and poorer municipalities at that time. However, these correlations increased over time and even became positive in 2003. After expanding into smaller and more isolated municipalities, banks

began to increase the use of correspondents in larger cities. Panel (B) shows a similar pattern after 2002.

III. A simplified entry model

A. Structure

This analysis is based on a simplified version of the analysis of Bresnahan and Reiss (1991). The model is used to derive the likelihood of observing a given number of banking correspondents, depending on the market size of each municipality. Based on this likelihood, an estimate of structural parameters that is related to the entry decisions of banking correspondents is derived.

Consider a market for banking services for which size is denoted by S. For instance, S can represent the population of a municipality. I denote $\Pi_c(S)$ as the profit of each banking correspondent in a market of size S and c players. The profit function of a banking correspondent is written as follows:

$$\Pi_c(S) = \alpha_c S - \gamma_c - \epsilon, \tag{1}$$

where α_c is the per capita variable profit, γ_c is the fixed cost of operating in a market with c players, and ϵ is a random term with a zero mean and a distribution function Φ. Following Bresnahan and Reiss (1991), I assume that competition may increase with the number of players. As a consequence, profits are non-increasing with c: $\Pi_c(S) \geq \Pi_{c+1}(S)$, $c = 1, 2, ...$ A sufficient condition this assumption, also considered in Bresnahan and Reiss (1991), is that $\alpha_c \leq \alpha_{c+1}$ and $\gamma_c \geq \gamma_{c+1}$ for $c = 1, 2, ...$

Entry occurs when expected profits are non-negative. Thus, the expected entry threshold for private banks in a market with c banking correspondents is given by the following:

$$\overline{S}_c = \frac{\gamma_c}{\alpha_c}. \tag{2}$$

Note that $\overline{S}_1$ is the entry threshold for the first banking correspondent. For example, markets with $S < \overline{S}_1$ are expected to have no access to financial services through banking correspondents, and markets with $\overline{S}_1 < S < \overline{S}_2$ are expected to have only one banking correspondent. A similar analysis can be reproduced for bank branches.

B. Deriving the likelihood

The model determines the expected number of players for each market of size S. The likelihood of observing a particular number c of banking correspondents is given by the following:

$$\Pr(c = 0|S) = \Pr(\Pi_1(S) < 0) = 1 - \Phi(\alpha_1 S - \gamma_1),$$

$$\Pr(c|S) = \Pr(\Pi_c(S) \geq 0, \Pi_{c+1}(S) < 0) = \Phi(\alpha_c S - \gamma_c) - \Phi(\alpha_{c+1} S - \gamma_{c+1}),$$

for $c = 1, 2, ...$

Consider a sample of N markets that are indexed by $i = 1, ..., N$. For each market, we observe the market size S_i and the number of banking correspondents c_i. We can write the log-likelihood function as follows:

$$\ln L = \sum_{i=1}^{N} \ln(\Pr(c_i|S_i)). \tag{3}$$

IV. Results

The model that is presented in section III is estimated separately for banking correspondents and bank branches in each year of the period from 2000 to 2007. Table 4 presents the estimated entry thresholds $\overline{S}_c$ for each year, and figure 2 shows the evolution of the entry thresholds for banking correspondents and bank branches.

[Table 4 - Estimated entry threshold for banking correspondents and bank

branches]

Table 4 shows that the entry barriers for financial provision were eliminated for banking correspondents in 2002, when the entry threshold $\overline{S}_1$ became 0. According to 2, this result implies that $\gamma_1 = 0$. The fixed cost for the entry of the first banking correspondent is estimated to be zero. Under the new institutional framework, banks are allowed to rely on the existing infrastructure of the banking correspondents to distribute their services. The fixed cost is covered by the main activities that are undertaken by the banking correspondents, which typically include post offices, lottery houses and small retailers. This cost may explain the results that were estimated for the first player. The entry thresholds for other players (e.g., second, third) also decline substantially over time.

For the bank branches, the entry threshold $\overline{S}_1$ remains relatively stable in the range of 7,818 to 9,333 individuals. The result for bank branches is compatible with the general rule that is used by banks, who consider opening an initial branch only in a municipality with a population of at least 10,000 individuals. This stability is also observed for the other players.

Since 2003, the entry thresholds for banking correspondents have become consistently lower than those of bank branches. The new contractual arrangements that are provided by the banking correspondents are effective in reducing the costs of delivering banking services.

[Figure 2 - Estimated entry thresholds for banking correspondents and bank branches]

V. Conclusion

In this paper, I provide evidence that banking correspondents have eliminated entry barriers for the provision of banking services in Brazil. Banking correspondents are established through contractual arrangements that allow banks to

outsource the distribution of their services to partner firms. The parameters that were estimated based on a structural model suggest that the fixed cost for the entry of the first banking correspondent in a municipality is 0 after 2002. This result is compatible with situations in which a partner firm uses its existing capital and infrastructure to operate as a banking correspondent. Consequently, banking correspondents can assist in increasing the outreach of banking services, especially in less populated and more isolated regions.

Appendix: Data description

We use data from two different sources at the municipality level for the period between 2000 and 2007. From the Brazilian Central Bank, we use data on the locations of banking correspondents and bank branches. From Ipea (Applied Economics Research Institute), we gather data pertaining to population and distance from the state capital (in kilometers) for each municipality.

The data for banking correspondents include the complete addresses of the 20 largest financial institutions with banking correspondents. These institutions account for more than 90% of the banking correspondents in the country. Most of the banking correspondents that were excluded from the analysis are located in state capitals; thus, these exclusions do not significantly affect our analysis of the provision of financial services for small municipalities. However, the data on bank branches comprise all branches in the country.

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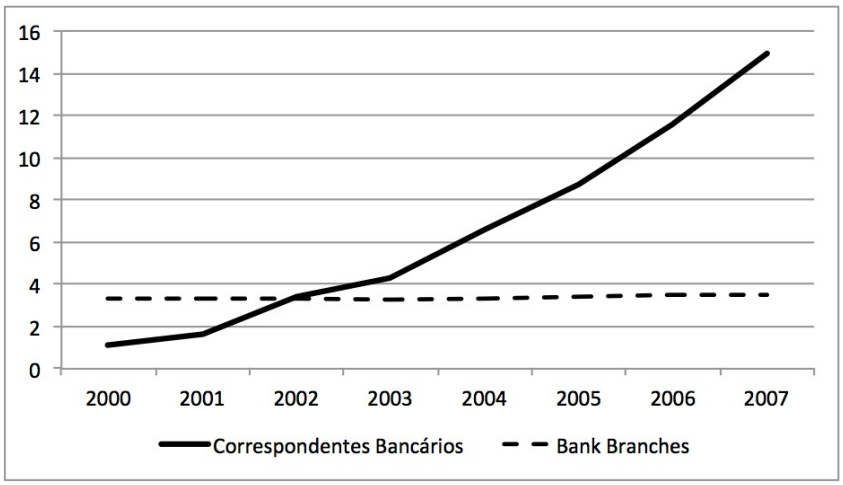
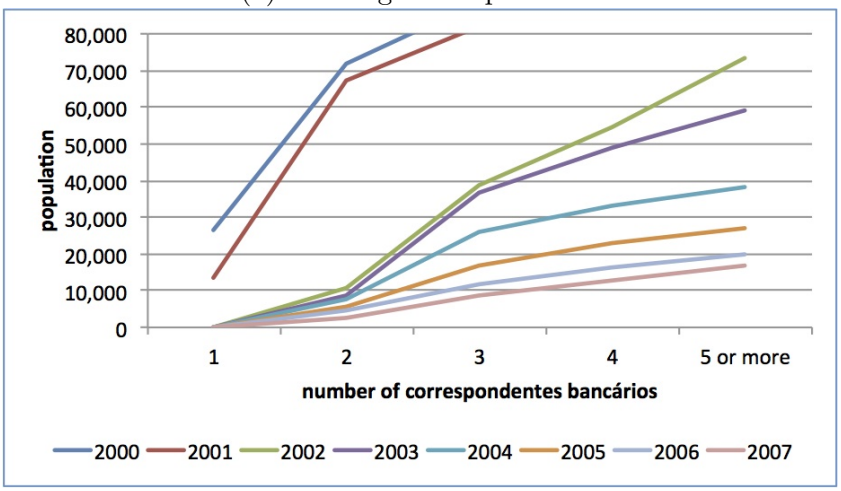


FIGURE 1. EXPANSION OF THE AVERAGE NUMBER OF BANK BRANCHES AND BANKING CORRESPONDENTS PER MUNICIPALITY IN BRAZIL

Source: Brazilian Central Bank.

(a) Banking Correspondents



(b) Bank Branches

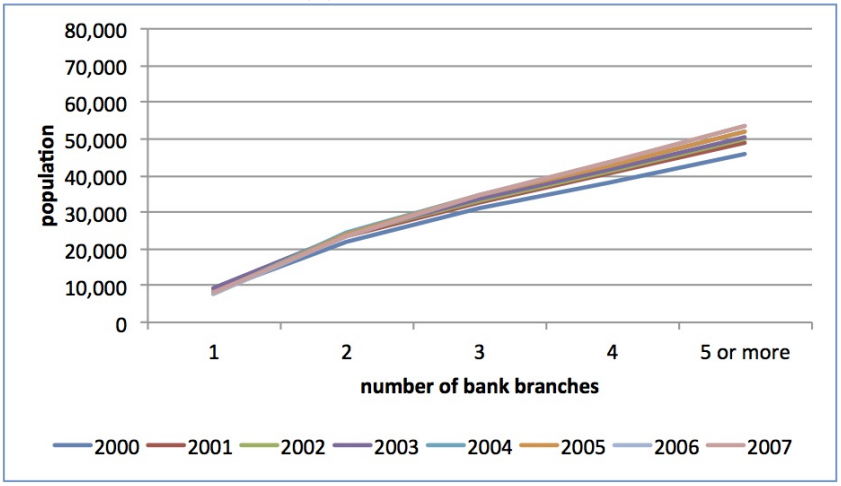


FIGURE 2. ESTIMATED ENTRY THRESHOLDS FOR BANKING CORRESPONDENTS AND BANK BRANCHES

Table 1—Distribution of municipalities according to the number of banking correspondents and bank branches

	Number of banking correspondents				Number of bank branches			
	0	1	2	3 +	0	1	2	3 +
2000	3461	1598	166	282	2187	1342	689	1289
2001	2606	2322	187	392	2241	1394	636	1236
2002	216	1760	2616	915	2230	1405	640	1232
2003	195	1423	2715	1174	2238	1395	638	1236
2004	180	1168	2455	1704	2033	1580	652	1242
2005	163	903	1845	2596	2028	1526	696	1257
2006	138	748	1421	3200	2021	1493	721	1272
2007	117	525	1031	3834	2039	1475	718	1275

Source: Brazilian Central Bank.

Note: Each cell represents the number of municipalities with the specified number of banking correspondents or bank branches. There are 5,507 municipalities in the sample. All columns of a row in each category (banking correspondents and bank branches) sum up to 5,507.

Table 1 presents a rapid increase in the number of banking correspondents and a relatively stable picture for the distribution of bank branches in the period. Also show how banking correspondents increase the access to financial services in many municipalities - in 2007, there was still 2,039 municipalities without bank branches in contrast to only 117 without banking correspondents.

Table 2—Profile of municipalities with banking correspondents

	Municipalities with no banking correspondent		Municipalities with 1 banking correspondents		Municipalities with 2 banking correspondents		Municipalities 3+ banking correspondents	
	population	distance to state capital	population	distance to state capital	population	distance to state capital	population	distance to state capital
2000	11722	261	19475	256	63858	211	297057	170
2001	12119	261	15562	261	45620	212	244386	175
2002	10635	289	9427	260	14275	259	129014	215
2003	11492	291	8445	267	12981	259	108187	218
2004	12185	295	7400	272	12073	257	82585	231
2005	12839	293	5939	284	9314	259	61309	235
2006	14421	289	5482	286	7974	254	52799	244
2007	16225	291	5075	287	6930	252	45921	248

Source: Brazilian Central Bank.

Note: Each cell represents the average of each variable (population and distance to state capital) among the municipalities in each group (0, 1, 2 and 3+ banking correspondents). Distance to state capital is measured in kilometers.

Table 2 shows that the expansion of banking correspondents reached less populated and more isolated municipalities over time. This change is so intense that the average population of municipalities with 1 or 2 banking correspondents is less than the average population of municipalities without banking correspondents.

Table 3—Banking Correspondents versus Bank Branches as alternative distribution channels

	2000	2001	2002	2003	2004	2005	2006	2007
Panel (A) - Dependent variable: Number of Banking Correspondents – Number of Branches								
ln(population)	-1.471***	-1.232***	-0.566***	0.196*	2.308***	4.085***	6.446***	9.309***
	(0.078)	(0.068)	(0.060)	(0.105)	(0.234)	(0.289)	(0.373)	(0.470)
ln(GDP per capita)	-1.604***	-1.340***	-0.658***	0.1	2.340***	4.117***	6.556***	9.614***
	(0.091)	(0.078)	(0.069)	(0.090)	(0.192)	(0.253)	(0.350)	(0.460)
ln(distance to capital)	-0.02	-0.129**	-0.233***	-0.487***	-1.060***	-1.157***	-0.858***	-0.594
	(0.069)	(0.059)	(0.063)	(0.097)	(0.208)	(0.264)	(0.328)	(0.404)
Constant	14.225***	12.726***	7.752***	1.633*	-16.502***	-33.281***	-58.174***	-88.262***
	(0.717)	(0.632)	(0.575)	(0.891)	(2.051)	(2.768)	(4.006)	(5.292)
Observations	5395	5452	5452	5452	5452	5452	5452	5452
R-squared	0.38	0.34	0.12	0.02	0.2	0.3	0.35	0.4
Panel (B) - Dependent variable: Number of Banking Correspondents / Number of Branches								
ln(population)	0.014**	-0.005	-0.183***	-0.132***	0.053***	0.216***	0.376***	0.538***
	(0.007)	(0.008)	(0.012)	(0.014)	(0.021)	(0.028)	(0.040)	(0.054)
ln(GDP per capita)	0.013***	-0.005	-0.180***	-0.133***	0.052***	0.168***	0.306***	0.481***
	(0.005)	(0.006)	(0.008)	(0.010)	(0.015)	(0.021)	(0.030)	(0.039)
ln(distance to capital)	-0.020**	-0.046***	-0.068***	-0.146***	-0.242***	-0.294***	-0.189***	-0.075
	(0.009)	(0.010)	(0.016)	(0.022)	(0.032)	(0.043)	(0.058)	(0.070)
Constant	0.248***	0.709***	3.610***	3.642***	2.458***	1.625***	0.16	-1.109
	(0.093)	(0.107)	(0.154)	(0.198)	(0.278)	(0.383)	(0.560)	(0.730)
Observations	3244	3226	3237	3229	3432	3437	3444	3427
R-squared	0.01	0.01	0.11	0.05	0.05	0.06	0.04	0.05

Source: Brazilian Central Bank.

Note: Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Each panel shows the changes in the profile of the presence of banking correspondents in comparison to bank branches. Panel (A) shows the results for the number of banking correspondents minus the number of branches, while panel (B) presents the estimates for the ratio between the number of banking correspondents over the number of branches at the municipality level. Differences in the number of observations between the two panels are due to municipalities with zero branches in the sample.

Table 3 suggests that the distribution channel of banking correspondents in comparison to bank branches, at the early years, was concentrated in poorer and less populated areas. However, after 2003 or 2004 (depending on the specification), the pattern changed and the banking correspondents were more prevalent than bank branches in more populated and richer areas.

Table 4—Estimated critical entry thresholds for banking correspondents and bank branches

Panel (A) - Critical population entry threshold								
Banking Correspondents								
	2000	2001	2002	2003	2004	2005	2006	2007
1	26,470	13,530	0	0	0	0	0	0
2	71,890	67,320	10,661	8,903	7,880	5,606	4,409	2,793
3	88,680	82,110	38,947	36,575	26,150	16,737	12,000	8,595
4	102,130	95,340	54,789	49,102	32,938	22,989	16,345	12,762
5 or more	123,440	109,930	73,187	59,264	38,463	27,109	19,757	16,609
Bank branches								
1	8,418	9,219	9,174	9,333	7,818	7,795	7,782	8,132
2	21,726	23,636	23,759	24,020	24,282	23,849	23,345	23,382
3	30,969	32,809	33,279	33,730	34,552	34,749	34,703	34,510
4	38,301	40,936	41,165	41,837	42,628	43,021	43,731	43,827
5 or more	45,858	49,153	49,854	50,631	51,745	52,211	53,326	53,509
Panel (B) - Critical population entry threshold per firm (2nd to 5th player)								
Banking Correspondents								
	2000	2001	2002	2003	2004	2005	2006	2007
2	35,945	33,660	5,331	4,452	3,940	2,803	2,205	1,397
3	29,560	27,370	12,982	12,192	8,717	5,579	4,000	2,865
4	25,533	23,835	13,697	12,276	8,235	5,747	4,086	3,191
5 or more	24,688	21,986	14,637	11,853	7,693	5,422	3,951	3,322
Bank branches								
2	10,863	11,818	11,880	12,010	12,141	11,925	11,673	11,691
3	10,323	10,936	11,093	11,243	11,517	11,583	11,568	11,503
4	9,575	10,234	10,291	10,459	10,657	10,755	10,933	10,957
5 or more	9,172	9,831	9,971	10,126	10,349	10,442	10,665	10,702

Note: Each cell in panel (A) presents the estimated entry thresholds, measured in terms of population, for banking correspondents and bank branches, based on Bresnahan and Reiss (1991) model. Panel (B) presents the entry threshold per firm.

Table 4 shows that the banking correspondents eliminated the fixed cost associated with the provision of financial services after 2002, when the entry threshold becomes equal to zero. From 2004 to 2007, all entry thresholds for banking correspondents become substantially lower than those for bank branches.