Can mutual banks outperform commercial banks in the loan market?

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Abstract. This paper advances previous strategic banking literature by looking at a Cournot duopoly and a model of price competition with product differentiation in the loan market between a profit-maximizing (commercial) bank and an expense-preference (mutual) bank, where a regulatory distortion is in place in the form of a minimum capital ratio. Surprisingly, we find that in most cases mutual banks outperform commercial banks both in terms of market share and profits. Nevertheless, this supports recent empirical evidence of several European banking industries.

Resumen. Este artículo emplea el duopolio de Cournot y el modelo de competencia en precios con diferenciación de producto para explicar la conducta en el mercado de préstamos de un banco (comercial) maximizador de beneficios y una caja de ahorros que muestra preferencia por el gasto. Asimismo, se incorpora una distorsión regulatoria en forma de coeficiente mínimo de recursos propios. Contrario a lo esperado, nuestros resultados muestran que, en la mayoría de los casos, las cajas de ahorros presentan ventajas competitivas con respecto a la banca comercial en términos de cuota de mercado y beneficios. Sin embargo, nuestros resultados estén en la línea de evidencia empírica reciente de varios sectores bancarios europeos.

Key words. Profit-maximizing banks, savings banks, strategic behaviour, regulation.

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1. INTRODUCTION.

Profit-maximizing (commercial) banks compete with mutual financial Institutions[1]. A few studies have concluded that mutual banks appear to show expense preference behaviour (Akella and Greenbaum, 1988; Krinsky and Thomas, 1995). The peculiar assignment of property rights in mutual banking firms appears to be the main explanation given for the empirical evidence of expense preference behaviour in these institutions. Managers and workers of mutual banks are believed to maximize an utility function which depends upon profits and staff expenses. Orthodox theoretical thinking would indicate that these mutual institutions would be clearly outperformed when competing with efficient, profit maximizing banks. However, recent empirical evidence has shown that in several countries (i.e. Spain, Germany and Norway), savings (mutual) banks are outperforming stockholder commercial banks by gaining market share both in terms of deposits and loans in retail banking markets (Purroy and Salas, 2000)[2]. The final result may be that management and workers take effective control of these organizations. Additionally, savings banks' indicators of efficiency and profitability fare well with those of commercial banks in those countries (Carbo et al., 2002). At the same time, a distinctive feature is that savings banks in those countries are said to fulfill a social role by reducing social exclusion and by funding cultural and social events.

This paper aims to help explain this contradictory evidence. In order to analyze these related issues of bank governance, competition and performance, we employ two well-known theoretical models -a Cournot duopoly and a model with price competition and product differentiation-, where profit maximizers and utility maximizers compete in an oligopolistic (loan) market. We advance previous literature by looking at the competition in loan markets[3] and by including regulatory distorsions in the model, which makes the assumptions more realistic. We use the same technology and industry structure as some recent studies to examine the effects on banks' market shares and profits of the capital adequacy regulation (Boot et al., 2000; Rime, 2001). In the model, regulation takes the form of a simple ratio between capital and total assets. In this context a bank's loan monitoring level and corresponding cost will play an important role. We will consider the cases in which commercial and savings banks show different levels of monitoring costs and see how the

[1] Savings and loans in the US or savings banks in Europe are well-known examples of mutual banks.

[2] The Spanish savings banks have a peculiar ownership structure and it is difficult to answer the question of "who owns the savings banks?". According to the main regulation of savings banks (Ley 31/1985), the General Assembly and the Management Board of the savings banks is formed by a combination of representatives from the local and regional authorities, depositors, employees and foundation bodies. For this reason, savings banks are often viewed as non-forprofit organizations and even, as closer to workers' cooperatives.

[3] Previous studies (i.e., Purroy and Salas, 2000) focused on the deposit markets, where mutual banks have gained the largest market share in some countries (Spain, Germany and Norway). However, mutual banks have also gained a substantial market share in the loan market, which shows the convenience of studying this separate case as well.

results differ in the various cases. This paper also distinguishes between monitoring costs -associated with the lending technology of the bank- and staff costs -associated with the services offered by the bank-. Our main results show that mutual banks obtain higher markets shares and higher profits than commercial banks when the former have no greater monitoring costs than the latter.

This note is organised as follows. Section 2 presents the technology, hypotheses and relevant theory. We employ two theoretical models (a Cournot duopoly and price competition with product differentiation) to show robustness of our results as well as an attempt to capture the main empirical evidence on the competitive structure of the banking markets[4]. Section 3 presents the equilibria results for both cases when the monitoring costs are equal or different for commercial and savings banks. Section 4 discusses some welfare implications in terms of loan quantity in three alternative market scenarios in which the relative weight of commercial and savings banks changes. The conclusions are also summarized in Section 4.

2. Hypotheses, notation and models.

Commercial banks and mutual banks lend funds to firms and regulators impose capital requirements. We assume that loans are the only banking asset and deposits and capital the only bank liabilities. We consider a *minimum capital ratio regulation*, that is, we assume that, for each 1 monetary unit (m.u.) raised, $\delta \in (0,1)$ are funded by deposits and $1-\delta \in (0,1)$ are funded by equity capital. On extending a loan, a financial institution (commercial bank or mutual bank) must choose its per-loan monitoring level, $m \in (0,1)$. It will choose the monitoring level to minimize the non-staff monitoring cost of the loan, defined as the sum of the potential credit losses from defaults and other non-staff monitoring costs. Expected credit losses are a function of the monitoring level, $L(m)$, which is decreasing and concave in m. We assume that credit losses are defined as $L(m)=1-m$. The direct costs of monitoring are given by the increasing and convex function $V(m)=\alpha m^2$, where α is a positive constant (Boot et al., 2000). Depending upon the relative level of per-loan monitoring cost, the bank may be regarded as "good" or "bad" bank. The "good" bank has a per-loan monitoring cost that is lower than that of the "bad" bank. The monitoring level and its corresponding cost for each bank is only associated with the bank's corresponding lending technology. Therefore, in our framework, we assume that a bank's monitoring cost does not vary with the number of employees, that is, if m_a and C_a are the average monitoring level and cost (respectively) for bank "*a*", these values will not change even when the bank incre-

4 The strategic literature shows that competition in loan markets is usually based upon a combination of both quantity and prices, depending on the business segment, the relevant territorial market and the strategic behaviour of the banks operating in the market. Therefore, different approaches of the Cournot model and of the Bertrand model can be found in the literature when explaining the competitive behaviour in the banking industry (see, for example, Jaumandreu and Lorences, 2002; Heffernan, 2002).

ases or reducessmber of employees. Thus, we can express the expected monitoring cost of issuing a one m.u. loan as

$$C(m)= (1- \delta)\ (1- m) + \alpha m2 \qquad (1)$$

The cost function in (1) captures the idea that credit losses are only partially borne by the bank through equity capital, with the deposit insurer bearing the residual loss. Note also that, at higher levels of capitalisation, the bank internalizes more of the credit losses.

The first step is to choose m to minimize (1). We obtain[5]

$$m^* = \frac{1-\delta}{2\alpha}$$

and

$$C(m^*) = (1-\delta) - \frac{(1-\delta)^2}{4\alpha}$$

The two models we present in this paper consider a commercial bank, represented by subindex b, and a savings (mutual) institution, represented by subindex s. The optimal monitoring levels for the commercial bank and for the savings bank are denoted by m_b^* and m_s^*, respectively. At the optimal level, therefore, the per-unit expected monitoring costs of extending a m.u. loan are denoted by C_b and C_s.

In the first model, both institutions compete for loans in a Cournot duopoly and choose a quantity of loans to produce, given by Q_b and Q_s, respectively, whereas in the second one, they compete under price and product differentiation, choosing their interest rates r_b and r_s, respectively. The following are the relevant notation and hypotheses for both models[6]:

(1) We suppose $Q_b = K_b L_b$ and $Q_s = K_s L_s$, where K_b (K_s) is the average and marginal productivity of the commercial bank (savings bank) and L_b (L_s) is the number of full-time workers of the commercial bank (mutual bank). For simplicity, we assume that both firms are equally efficient, that is, $K_b = K_s := K$.[7]

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5 The regulator can affect monitoring levels through minimum capital ratios (i.e. [1 - δ]) since the monitoring choice in equilibrium (m^*) is increasing in [1 - δ].

6 Demand for loans is such that there is room for both types of banks to compete. That is, the demand structure allows for positive profits to both competitors.

7 In the case of Spain, the empirical evidence based on simple cost ratios show that savings banks are generally more efficient than private banks. However, when more sophisticated efficiency measures are employed, the evidence is not so conclusive (Pastor et al., 1997).

(2) We assume that there are two types of bank costs: technology-based monitoring costs (already defined) and staff (operating) costs. For simplicity we will assume that both types of costs are completely unrelated, which basically means that the staff costs will be associated with tasks other than loan monitoring. These staff tasks will be related to the selling of the bank loans and the different services offered by a bank. For simplicity, we also assume that there are no financial costs or any other service-based cost (apart from labor)[8]. The cost of labor per worker is in both institutions. We denote $c=\dfrac{\omega}{K}$, which is the marginal operating cost of 1 m.u. of loan.

(3) We denote by Π_b and Π_s the economic profits of the commercial bank and of the savings bank, respectively.

Stockholder commercial banks are assumed to maximize profits, but the objetive function of savings institutions is unclear. The literature on expense preference behavior assumes that the loose assignment of property rights in institutions such as savings banks allows the managers of such institutions to choose their own preference function in place of profit maximization, subject to constraint of not having operating losses. For a mutual bank, it is assumed that managers' utility function will depend on profits and labor expenses, U_s (Π_s, E_s), where $E_s = \omega L_s$ and $\dfrac{\partial U_s}{\partial \Pi_s}>0$ and $\dfrac{\partial U_s}{\partial E_s}>0$. For simplicity we assume that U_s is linear in Π_s and E_s, i.e.: $U_s = \Pi_s + \theta\omega L_s$, where θ is a positive parameter (because utility increases with staff expenses) representing the degree of expense preference[9]. We suppose $\theta \in (0,1)$[10].

2.1. The Cournot duopoly model.

In this model, we will consider the following additional hypothesis:

(4) The per-unit price of a 1 m.u. loan, P, is determined by the inverse demand function: $P(\Omega, Q) = \Omega - Q$, where $Q = Q_b + Q_s$ is the total quantity produced.

With the previous notation, the economic profit of each institution is given by:

$$\Pi_b = (\Omega - Q_b - Q_s)Q_b - C_bQ_b - \frac{\omega Q_b}{K} = (\Omega - Q_b - Q_s)Q_b - C_bQ_b - cQ_b \tag{2}$$

$$\Pi_s = (\Omega - Q_b - Q_s)Q_s - C_sQ_s - \frac{\omega Q_s}{K} = (\Omega - Q_b - Q_s)Q_s - C_sQ_s - cQ_s, \tag{3}$$

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[8] These hypotheses are in line with Boot et al. (1999) and Rime (2000).

[9] This utility function is based on Purroy and Salas (2000).

[10] Notice that if $\theta = 0$, $U_s = \Pi_s$, (a capitalist firm). According to Purroy and Salas (2000), when $\theta = 1$, the firm is a workers' cooperative. Therefore, within this framework, a savings banks is an institution between a capitalist firm and a workers' cooperative.

and the savings' bank utility function is

$$U_s = (\Omega - Q_b - Q_s)Q_s - C_s Q_s - (1-\theta)cQ_s \,.$$

Hence, we look for the Nash-Cournot equilibrium solution to the following optimization problem:

$$\max_{Q_b} \; (\Omega - Q_b - Q_s)Q_b - C_b Q_b - cQ_b \qquad (4)$$

$$\max_{Q_s} \; (\Omega - Q_b - Q_s)Q_s - C_s Q_s - (1-\theta)cQ_s \qquad (5)$$

Such solution is given by

$$Q_b^* = \frac{1}{3}(-c - 2C_b + C_s + \Omega - c\theta) \text{ and } Q_s^* = \frac{1}{3}(-c + C_b - 2C_s + \Omega + 2c\theta) \qquad (6)$$

and by substituting (6) into (2) and (3) we have

$$\Pi_b^* = \Pi_b(Q_b^*, Q_s^*) = \frac{1}{9}(-c - 2C_b + C_s + \Omega - c\theta)^2 \qquad (7)$$

$$\Pi_s^* = \Pi_s(Q_b^*, Q_s^*) = \frac{1}{9}(-c + C_b - 2C_s + \Omega - c\theta)(C_b - 2C_s + \Omega + c(-1+2\theta)) \,. \qquad (8)$$

From now on, for sake of simplicity, we will denote

$$\Phi = (-c - 2C_b + C_s + \Omega - c\theta)\,; \quad \Psi_1 = (-c + C_b - 2C_s + \Omega - c\theta) \text{ and}$$
$$\Psi_2 = (C_b - 2C_s + \Omega + c(-1+2\theta)) \qquad (9)$$

and thus,

$$\Pi_b^* = \frac{1}{9}\Phi^2 \text{ and } \Pi_s^* = \frac{1}{9}\Psi_1\Psi_2 \,. \qquad (10)$$

Observe that $\Phi = 3Q_b{}^*$ and thus, it is considered to be positive, fact that will be referred afterwards.

2.2. The model under price competition and product differentiation.

Let us now study the case where borrowers distinguish between commercial and savings banks and these institutions use loan rates as competitive variables. In this case, the demand functions are

$$Q_b = l - fr_b + gr_s \text{ and } Q_s = l - fr_s + gr_b \,, \qquad (11)$$

where *l, f* and *g* are positive parameters and *f>g* [11] . Therefore, the economic profits of both institutions are given by

$$\Pi_b = (l - fr_b + gr_s)r_b - (l - fr_b + gr_s)C_b - \frac{\omega(l - fr_b + gr_s)}{K} = (l - fr_b + gr_s)(r_b - C_b - c) \quad (12)$$

$$\Pi_s = (l - fr_s + gr_b)r_s - (l - fr_s + gr_b)C_s - \frac{\omega(l - fr_s + gr_b)}{K} = (l - fr_s + gr_b)(r_s - C_s - c) \quad (13)$$

and the utility function of the savings bank is

$$U_s = (l - fr_s + gr_b)(r_s - C_s - c(1-\theta)) .$$

Hence, we look for the Nash equilibrium solution to the following optimization problem:

$$\max_{r_b} \ (l - fr_b + gr_s)(r_b - C_b - c)$$

$$\max_{r_s} \ (l - fr_s + gr_b)(r_s - C_s - c(1-\theta))$$

Such solution is

$$r_b^* = \frac{2C_b f^2 + C_s fg + 2fl + gl + cf(2f + g - g\theta)}{4f^2 - g^2} \quad (14)$$

$$r_s^* = \frac{2C_s f^2 + C_b fg + 2fl + gl + cf(g - 2f(-1+\theta))}{4f^2 - g^2} \quad (15)$$

and by substituting (14) and (15) into the demand functions (11) and into the profit functions ((12) and (13)), we obtain

$$Q_b^* = \frac{f(C_s fg + C_b(-2f^2 + g^2) + 2fl + gl + c(-2f^2 + g^2 + f(g - g\theta)))}{4f^2 - g^2}; \quad (16)$$

$$Q_s^* = \frac{f(C_b fg + C_s(-2f^2 + g^2) + 2fl + gl + c(fg + 2f^2(-1+\theta) - g^2(-1+\theta)))}{4f^2 - g^2}; \quad (17)$$

[11] These loan demand functions are similar to those employed by Purroy and Salas (2000) for the deposit market. However, in our case, *f* has a negative sign since, the higher the own loan rates of bank "*a*", the lower the demand of its own loans will be; and *g* has a positive sign since the higher the rival's loan rate (of bank "*b*", for example), the higher the loan demand for bank "*a*".

$$\Pi_b^* = \frac{Q_b^*}{4f^2 - g^2}(C_s fg + C_b(-2f^2 + g^2) + 2fl + gl + c(-2f^2 + g^2 + f(g - g\theta))) ; \qquad (18)$$

$$\Pi_s^* = \frac{Q_s^*}{4f^2 - g^2}(C_b fg + C_s(-2f^2 + g^2) + 2fl + gl + c(fg - 2f^2(1+\theta) + g^2)) . \qquad (19)$$

3. Main results.

3.1. Cournot model.

a) Let us begin with the results for Cournot model when both commercial and savings banks have the same monitoring costs ($C_b = C_s = C$)[12]. If we substitute C_b and C_s by C into (6), (7) and (8), we have

$$Q_b^* = \frac{1}{3}(-c - C + \Omega - c\theta) ; \qquad Q_s^* = \frac{1}{3}(-c - C + \Omega + 2c\theta) ;$$

$$\Pi_b^* = \frac{1}{9}(-c - C + \Omega - c\theta)^2 \quad \text{and}$$

$$\Pi_s^* = \frac{1}{9}(-c - C + \Omega - c\theta)(-C + \Omega + c(-1 + 2\theta)) .$$

Since c and θ are positive, $-c\theta < 2c\theta$ and thus, $Q_b^* < Q_s^*$. Besides, we also have $(-c-C+\Omega-c\theta) = 3Q_b^* > 0$ and $(-c-C+\Omega-c\theta)<(-C+\Omega-c+2c\theta)$, which clearly implies $\Pi_b^*<\Pi_s^*$.

In other words, mutual banks capture a larger share of the market and earn higher profits than commercial banks. So the theory is consistent with the empirical evidence that savings banks gain share and obtain more profits than commercial banks.

So, when monitoring costs are equal for both types of institutions and as long as $\theta < 1$, expense preference implies that the mutual bank maximizes a pseudo-profit function (see (5)) with lower marginal (staff) costs of loans than the costs considered by the profit-maximizing banks (see (4)). Hence, expense preference grants mutual banks a strategic competitive advantage in terms of production costs[13]. Moreover, the higher is, the greater the competitive advantage for mutual banks.

[12] Observe that $Cb = Cs$ is equivalent to $m_b^* = m_s^*$.

[13] This finding is consistent with recent empirical evidence which shows that small, regional banks (such as the majority of savings banks) may have informational advantages and, consequently, lower informational (transaction) costs. See, for example, Petersen and Rajan (1995).

Additionally,

$$\frac{\partial \Pi_b^*(C)}{\partial C} = \frac{2}{9}(c + C - \Omega + c\theta) = -\frac{2}{3}Q_b^* < 0$$

and

$$\frac{\partial \Pi_s^*(C)}{\partial C} = \frac{1}{9}(2c + 2C - 2\Omega - c\theta).$$

We can easily check that

$$\frac{\partial \Pi_s^*(C)}{\partial C} - \frac{\partial \Pi_b^*(C)}{\partial C} = -\frac{c\theta}{3} < 0,$$

that is,

$$\frac{\partial \Pi_s^*(C)}{\partial C} < \frac{\partial \Pi_b^*(C)}{\partial C} < 0,$$

which implies

$$\left|\frac{\partial \Pi_b^*(C)}{\partial C}\right| < \left|\frac{\partial \Pi_s^*(C)}{\partial C}\right|,$$

so mutual banks profits are more sensitive than commercial banks profits to changes in monitoring costs[14]. The implication of this result is that, even when regulators can ensure that their actions affect all banks identically in terms of costs, the mutual banks will suffer a greater absolute loss in profits[15] .

b) If commercial bank monitoring costs are higher than savings banks monitoring costs ($C_b > C_s$)[16], we can easily check (see (6)) that $Q_s^* - Q_b^* = C_b - C_s + c\theta > 0$) and hence, $Qs^* > Qb^*$. On the other hand (using the notation introduced in (9) and (10)), we have $\Psi_1 - \Phi = 3(C_b - C_s) > 0$, and thus $\Psi_1 > \Phi > 0$, . Analogously, $\Psi_2 - \Phi = 3(C_b - C_s) + 3c\theta > 0$, and hence, $\Psi_2 > \Phi > 0$. As a consequence,

$$\Pi_b^* = \frac{1}{9}\Phi^2 < \frac{1}{9}\Psi_1\Psi_2 = \Pi_s^*.$$

That is, mutual banks obtain a larger share of the market and enjoy a higher expected profit.

Again,

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14 Boot et al. (2000) find that changes in regulation that manifest themselves in the cost of extending loans may hurt high-quality banks more than low-quality banks.

15 This finding appears to give support to recent empirical evidence which shows that mutual banks have more difficulties and greater costs in meeting capital adequacy standars (Altunbas et al. 2000).

16 The commercial banks is the bad bank and the mutual bank is the good bank (in terms of monitoring).

$$\left|\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b}\right| < \left|\frac{\partial \Pi_s^*(C_b,C_s)}{\partial C_s}\right|^{17}.$$

This shows that although the savings bank has the cost advantage, it is more sensitive to changes in monitoring costs.

c) Finally, in the case where savings banks monitoring costs are higher than commercial bank monitoring costs ($C_b < C_s$)[18] we distinguish the following situations:

• If $C_s \geq C_b + c$, since $\theta < 1$, we obtain

$$Q_s^* - Q_b^* = C_b - C_s + c\theta < C_b - C_s + c \leq 0,$$

and hence, $Q_b^* > Q_s^*$. On the other hand, $\Phi - \Psi_1 = 3(C_s - C_b) > 0$ and $\Phi - \Psi_2 = 3(C_s - C_b - c\theta) > 3(C_s - C_b - c) \geq 0$ and thus $\Pi_b^* > \Pi_s^*$, that is commercial banks gain larger market share and obtain higher profits.

• If $C_s < C_b + c$, we obtain:

a) If $\theta \leq \dfrac{C_s - C_b}{c}$, then $Q_b^* \geq Q_s^*$ and $\Pi_b^* > \Pi_s^*$[19].

b) If $\theta > \dfrac{C_s - C_b}{c}$, then $Q_b^* < Q_s^*$ but there is no clear relationship between profits[20]

Furthermore,

$$\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b} = -\frac{4}{3}Q_b^* < 0$$

[17] The proof is similar to the previous case.

[18] The commercial banks is the good bank and the mutual bank is the bad bank (in terms of monitoring).

[19] The proof is similar to the one in the case $C_s \geq C_b + c$.

[20] This is shown in the following numerical examples: let $C_b = 99$, $C_s = 101$, $c = 10$, $\Omega = 125$ and $\theta = 0.5$. Then, $C_s < C_b + c$, $\theta > \dfrac{C_s - C_b}{c}$, $Q_b^* = 13/3$, $Q_s^* = 22/3$ and the and the per-unit price $P(\Omega, Q) = \Omega - Q$ is positive. In this case, $\Pi_b^* = 169/9$ and $\Pi_s^* = 154/9$. However, for $\theta = 0.8$, we have $\theta > \dfrac{C_s - C_b}{c}$, $Q_b^* = 10/3$, $Q_s^* = 28/3$ and the per-unit price is also positive. But now $\Pi_b^* = 100/9$ and $\Pi_s^* = 112/9$.

and it can be shown that

* for $\theta \geq 2\left(\frac{C_s - C_b}{c}\right)$, it holds

$$\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_b} \leq \frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} < 0$$

* for $\theta \geq \frac{-2(2c + C_b + C_s - 2\Omega)}{c}$, it holds

$$\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_b} \geq \frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} > 0$$

* for $\theta < \frac{-2(2c + C_b + C_s - 2\Omega)}{c}$ and $\theta < 2\left(\frac{C_s - C_b}{c}\right)$, it holds

$$\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} < \frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s} < -\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b}$$

As a consequence

$$\left|\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b}\right| \leq \left|\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s}\right|$$

for $\theta \geq min\left\{2\left(\frac{(C_s - C_b)}{c}\right), \frac{-2(2c + C_b + C_s - 2\Omega)}{c}\right\}$ and

$$\left|\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b}\right| > \left|\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s}\right|$$

for $\theta < min\left\{2\left(\frac{(C_s - C_b)}{c}\right), \frac{-2(2c + C_b + C_s - 2\Omega)}{c}\right\}$.

Finally, observe that

$$min\left\{2\left(\frac{(C_s - C_b)}{c}\right), \frac{-2(2c + C_b + C_s - 2\Omega)}{c}\right\} = 2\left(\frac{(C_s - C_b)}{c}\right) \Leftrightarrow$$

$$\frac{-2(2c + C_b + C_s - 2\Omega)}{c} - 2\left(\frac{C_s - C_b}{c}\right) = 4\left(\frac{L - C_s - c}{c}\right) > 0 \Leftrightarrow L > C_s + c.$$

3.2. Price competition and product differentiation.

a) When both commercial and savings banks have the same monitoring costs, it can be shown that, by substituting $C_b = C_s = C$ into (14), (15), (16) and (17), we have

$$r_b^* - r_s^* = \frac{cf\theta}{2f + g} > 0,$$

wich implies $r_s^* < r_b^*$, and

$$Q_s^* - Q_b^* = \frac{cf(f+g)\theta}{2f+g} > 0,$$

which implies $Q_s^* > Q_b^*$. With respect to profits, it can be easily shown (by substituting $C_b = C_s = C$ into (18) and (19)) that if

$$\theta < \frac{g((c+C)(g-f)+l)}{cf^2}$$

savings banks will obtain higher profits than commercial banks, and if

$$\theta > \frac{g((c+C)(g-f)+l)}{cf^2}$$

then commercial banks will obtain higher profits than savings banks, and finally, for

$$\theta = \frac{g((c+C)(g-f)+l)}{cf^2}$$

the profits of both institutions coincide.

Besides,

$$\frac{\partial \Pi_b^*(C)}{\partial C} = \frac{2(f-g)Q_b^*}{g-2f} < 0$$

and

$$\frac{\partial \Pi_s^*(C)}{\partial C} - \frac{\partial \Pi_b(C)}{\partial C} = \frac{cfg\theta(g-f)}{4f^2-g^2} < 0.$$

Thus,

$$\left|\frac{\partial \Pi_b^*(C)}{\partial C}\right| < \left|\frac{\partial \Pi_s^*(C)}{\partial C}\right|.$$

Therefore, in this case and with equal monitoring costs, savings banks enjoy again a market share advantage and they offer their loans at a lower rate. However, the comparison of commercial and savings bank's profits depends upon the value of θ. Finally, again savings banks profits are more sensitive to changes in monitoring costs.

b) If commercial bank monitoring costs are higher than mutual bank costs ($C_b > C_s$), it can be easily shown that

$$r_b^* - r_s^* = \frac{f(C_b - C_s + c\theta)}{2f+g} > 0,$$

and thus, $r_b^* > r_s^*$. On the other hand,

$$Q_s^* - Q_b^* = \frac{f(f+g)(C_b - C_s + c\theta)}{2f+g} > 0,$$

which implies $Q_s^* > Q_b^*$.

$$\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s} - \frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} = \frac{f(2f^2 - g^2)(2(C_b - C_s)(f+g) + cg\theta)}{(2f-g)(2f+g)^2} < 0$$

and

$$\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} = -\frac{2(2f^2 - g^2)Q_b^*}{4f^2 - g^2} < 0;$$

as a consequence,

$$\left|\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b}\right| < \left|\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s}\right|.$$

With respect to profits, we can say that if

$$l < \frac{(f-g)(C_b + C_s + 2c)}{2} \quad \text{and} \quad l < C_b f - C_s g,$$

then $\Pi_b^* > \Pi_s^*$. whereas if

$$l > \frac{(f-g)(C_b + C_s + 2c)}{2} \quad \text{and} \quad l > f(c + C_b) - g(c + C_s),$$

it holds $\Pi_s^* > \Pi_b^*$.

In the rest of l values, one can find different relationships between profits for both institutions, depending upon the value of the different parameters.

c) Finally, if savings bank costs are higher than commercial bank costs ($C_s > C_b$), then we distinguish the following cases:

- If $\theta \le \dfrac{C_s - C_b}{c}$, then $C_b - C_s + c\theta \le 0$ and thus

$$r_b^* - r_s^* = \frac{f(C_b - C_s + c\theta)}{2f+g} \le 0$$

that is, $r_b^* \leq r_s^*$. On the other hand

$$Q_s^* - Q_b^* = \frac{f(f+g)(C_b - C_s + c\theta)}{2f+g} \leq 0,$$

and hence, $Q_s^* \leq Q_b^*$.

• If $\theta > \dfrac{C_s - C_b}{c}$, then $C_b - C_s + c\theta > 0$ from which we easily deduce

$r_b^* > r_s^*$ and $Q_s^* > Q_b^*$.

With respect to profits we can say for both cases of θ values shown above that if

$$l < \frac{(f-g)(C_b + C_s + 2c)}{2} \quad \text{and } l > f(c + C_b) - g(c + C_s),$$

then $\Pi_b^* < \Pi_s^*$, whereas if

$$l > \frac{(f-g)(C_b + C_s + 2c)}{2} \quad \text{and} \quad l > C_b f - C_s g,$$

it holds $\Pi_b^* < \Pi_s^*$.

Finally,

$$\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} = -\frac{2(2f^2 - g^2)Q_b^*}{4f^2 - g^2} < 0$$

and

* for θ ≥ 2 $\left(\frac{(C_b - C_s)(f+g)}{cg}\right)$, it holds

$$\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s} \leq \frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} < 0$$

* for θ ≥ –2 $\left(\frac{2l - (2c + C_b + C_s)(f-g)}{cg}\right)$, it holds

$$\frac{\partial \Pi_s^*(C_b, C_s)}{\partial C_s} \geq -\frac{\partial \Pi_b^*(C_b, C_s)}{\partial C_b} > 0$$

* for $\theta < -2\left(\frac{(C_b - C_s)(f+g)}{cg}\right)$ and $\theta < 2\left(\frac{2l-(2c+C_b+C_s)(f-g)}{cg}\right)$, it holds

$$\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b} < \frac{\partial \Pi_s^*(C_b,C_s)}{\partial C_s} < -\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b}$$

As a consequence,

$$\left|\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b}\right| \leq \left|\frac{\partial \Pi_s^*(C_b,C_s)}{\partial C_s}\right|$$

for $\theta \geq min\left\{-2\left(\frac{(C_b - C_s)(f+g)}{cg}\right), 2\left(\frac{2l-(2c+C_b+C_s)(f-g)}{cg}\right)\right\}$ and

$$\left|\frac{\partial \Pi_b^*(C_b,C_s)}{\partial C_b}\right| > \left|\frac{\partial \Pi_s^*(C_b,C_s)}{\partial C_s}\right|$$

for $\theta < min\left\{-2\left(\frac{(C_b - C_s)(f+g)}{cg}\right), 2\left(\frac{2l-(2c+C_b+C_s)(f-g)}{cg}\right)\right\}$.

Finally, observe that

$$min\left\{-2\left(\frac{(C_b - C_s)(f+g)}{cg}\right), 2\left(\frac{2l-(2c+C_b+C_s)(f-g)}{cg}\right)\right\} =$$
$$-2\left(\frac{(C_b - C_s)(f+g)}{cg}\right) \Leftrightarrow 2\left(\frac{2l-(2c+C_b+C_s)(f-g)}{cg}\right) +$$
$$2\left(\frac{(C_b - C_s)(f+g)}{cg}\right) \geq 0 \Leftrightarrow \frac{4(-C_s f + C_b g + c(g-f)+l)}{cg} \geq 0 \Leftrightarrow f(C_s+c) - g(C_b+c).$$

To sum up, we have seen for both theoretical models and in the various cases of different monitoring costs for commercial and savings banks, that only when profit- maximizing banks have lower costs, they show higher market shares and profits but not in all cases since, even when commercial banks have the cost advantage, under certain circumstances, savings banks produce a higher market share. As for the sensitivity of profits to changes in monitoring costs, this is again higher for savings banks than for commercial banks in most cases analysed.

4. Welfare implications and conclusions.

The results obtained above may have implications for the loan quantity produced in the various banking markets. Higher or lower weights of the different types of banking institutions in a certain market may result in different loan quantities, and, therefore, welfare levels may also differ in the corresponding territory of that market[21]. This issue seems to be of interest from the empirical perspective. As a result of historical, legal, economic or institutional factors, the relative presence of commercial and savings banks tends to vary across national, regional and local banking markets in Europe and elsewhere. Therefore, a market dominated by commercial banks may produce a different loan quantity than another market dominated by savings banks. For this reason, we consider three alternative examples which may illustrate quite a few cases of the real banking world in many regions and cities of Europe: a market with a commercial and a savings bank (whose total output is $\Theta_{bs}=Q_b+Q_s$, a market with only two commercial banks (whose total output is, similarly, $\Theta_{b_1 b_2}$)[22] and a market with only two savings banks (whose total output is $\Theta_{s_1 s_2}$)[23]. This illustrates the more general cases in which the number of banking institutions operating in the market is higher than two: respectively, markets with relative weights of the commercial banks and savings banks being quite similar; markets with commercial banks dominating the market; and markets with savings banks dominating the market[24]. We compute and compare the loan quantity obtained in the various equilibria of these three markets. We will consider that a higher loan quantity, ceteris paribus, produces higher welfare since a higher amount of loan funds available to firms and households is associated with higher level of economic growth and welfare (see Levine et al. 2000). In this welfare analysis, we only study the case of equal monitoring costs for commercial and savings banks ($C_b = C_s = C$)[25] . It is easy to check that the following relation holds for both models

$$\Theta_{b_1 b_2} < \Theta_{bs} < \Theta_{s_1 s_2} .$$

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21 Jaumandreu and Lorences (2002) show that it is relevant to distinguish among the different markets where there are different type of competitors (large banks, local banks, etc). An extension of this idea is the distinction between markets where commercial banks dominate, those where savings banks dominate and those where both type of institutions have a similar weight.

22 This case can be solved by taking $\theta = 0$ in U_s.

23 We suppose that both savings banks have the same level of expense preference θ. Anyway, we have also considered the general case of two savings banks s_1 and s_2 with expense preference levels θ_1 and θ_2, respectively. In the Cournot model, we have $\Theta_{s_1 s_2} = \frac{1}{3}(-2C + 2\Omega + c(-2+\theta_1+\theta_2)$ whereas in the price competition and product differentiation model the result obtained is $\Theta_{s_1 s_2} = f\frac{2(C(g-f)+l)+c(f-g)(-2+\theta 1+\theta 2))}{2f-g}$. It can be easily shown that, in both models, this mar-ket scenario obtains a largest loan quantity than the one formed by a commercial bank and a savings bank with expense preference level θ if $\theta<\theta_1+\theta_2$.

24 Even if the Single Market Programme and the introduction of the single currency make banking institutions operate and open branches more freely in the European Union, there is still evidence that European retail banking markets are still fragmented and most territorial markets are still regional, rather than global. See, for example, Kleimeier and Sander (2000).

25 Our focus on this section is upon the welfare implications of a higher or lower presence of a certain type of bank institutions in the market. For our purposes, the case of equal monitoring costs illustrates sufficiently the welfare implications of the competition in the different market scenarios. Specifically, the cases of different monitoring costs would have two problems within our framework. Firstly, the results are quite complex and unclear. Secondly, the results depend, to a very large extent, upon the values of C_b and C_s, which makes very difficult to disentangle the differences in loan quantity and welfare explained by the higher or lower presence of a certain type of bank institutions from those explained by the higher or lower monitoring cost of the institutions.

Therefore, in both models the smallest loan quantity is obtained in the market with two commercial banks and the largest in the market with two savings banks.

Moving on to the conclusions of the paper, we have found that expense preference behaviour does not appear to prevent mutual (savings) banks from gaining market share and obtaining higher profits in certain European countries. Using two models (a Cournot duopoly and a model with price competition and product differentiation) where profit maximizers (commercial banks) and utility maximizers (mutual banks) compete in an oligopolistic (loan) market with regulatory distorsions (a capital adequacy requirement), we show that mutual banks obtain higher market shares and higher profits than commercial banks in, at least, two out of the three cases analysed. These two cases are: (1) when both types of institutions enjoy the same per-unit expected monitoring cost of issuing a loan; (2) and when mutual banks have a lower per-unit monitoring cost of issuing a loan. Only when commercial banks have lower monitoring costs, they are shown to have greater market share and profits, but not in all cases since, even when profit-maximizing banks show a monitoring cost advantage, under certain circumstances [$\theta > \frac{C_s - C_b}{c}$], mutual banks may show greater competitiveness in terms of market share. Additionally, in most cases shown in this paper, mutual banks profits are more sensitive to changes in monitoring costs than commercial banks profits. This implies that even if regulators ensure that their actions affect all banks in terms of costs identically, the mutual banks will suffer a greater absolute loss in profits. These results appear to substantiate why savings banks are outperforming commercial banks in the retail loan markets of certain countries[26]. Additionally, we have also shown that those markets where savings banks dominate, the loan quantity available is larger than in markets with a significant presence of commercial banks or dominated by commercial banks. This higher levels of welfare obtained in markets dominated by savings banks appear to be in line with the higher “social role” played by these institutions. In countries like Spain, Germany and Norway, these institutions are said to play key social functions (i.e. by reducing social (financial) exclusion or by funding cultural and social activities) and our findings may give support to this statement and to those voices that believe that savings banks should remain mutual. Two caveats have to be mentioned in our final words that also show the need for further research. First, commercial banks could change the results obtained here by modifying the incentives of their managers. How these incentives may be implemented in the loan market is beyond the scope of this paper[27]. Second, we have shown that tougher capital regulations lead to a greater absolute fall in profits in the case of savings banks. In the present context of new bank capital regulations to be set (Basle II), the solvency of the savings bank may be affected negatively and may change the conclusions of this paper. Again this issue is beyond the scope of this paper.

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[26] For example, in Spain, the savings banks have increased their loan market share from 34,4% in 1990 to 44,4% in 2001 whereas commercial banks' loan market share has decreased from 62,6% in 1990 to 50,3% in 2001 (according to the Bank of Spain data). As for profitability, and again using Bank of Spain data, Spanish savings banks have enjoyed higher aggregate return on assets and higher aggregate return on equity than Spanish commercial banks during 1990-2001.

[27] Purroy and Salas (2000) analyze this issue for the deposit market.

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