DIPARTIMENTO DI TEORIA
ECONOMICA E METODI QUANTITATIVI
PER LE SCELTE POLITICHE

SAPIENZA
UNIVERSITÀ DI ROMA

Working Paper n.4/2010

January 2010

To acquire, or to compete? An entry dilemma

Jean J. Gabszewicz, Didier Laussel and Ornella Tarola

To acquire, or to compete? An entry dilemma

Jean J. Gabszewicz*, Didier Laussel† and Ornella Tarola ‡

January 18, 2010

Abstract

In this paper we address the following question : is it more profitable, for an entrant in a differentiated market, to acquire an existing firm than to compete ? We illustrate the answer by considering competition in the banking sector.

Keywords: M&A; entry dilemma; banking.
JEL classifications: L1, L2, L8.

*CORE, 34 voie du roman pays, Belgium. E-mail address: jean.gabszewicz@uclouvain.be

†Université de la Méditerrannée; chateau La Farge, Les Milles, France. E-mail address: didier.laussel@univmed.fr

‡° (Corresponding Author) University of Rome "La Sapienza", DTE, Piazzale Aldo Moro 5, Italy. E-mail address: ornella.tarola@fastwebnet.it, Phone +39 (0)6-49910601, Fax (0)6 4453870

1 Introduction

When an individual is planning to acquire a house, he/she can hesitate between either to buy an already built one, or invest in a new building. An analogous dilemma is faced by a firm entering an existing market: either it can take the ownership of an existing firm via acquisition, or decide to enter via greenfield investment. Of course, the profitability of the decision depends on the specific industry to enter. In this paper, we analyse this dilemma in the framework of retail banking competition.

In spite of the massive liberalization of banking markets, the retail banking sector in the European Union is still fragmented along national lines and mainly dominated by local banks having established relationships with their clients. Because of the complexity and long-term perspective of some products, customers typically favour banks offering personalized services. Of course, while market characteristics affect customer choice, this in turn also contributes to define the market dynamics and particularly the competition process. Due to this consumers' attitude, retail banks typically compete on a wide range on product characteristics, not only price (the interest rates and fees for particular products), but also number of branches, ATM (Automatic Teller Machine) networks and reputation, and a face-to-face relationship is still the main way for them to meet their customers' needs (James 1987, Vale 1993, Petersen and Rajan 1994, Boot 2000)[1].

As a result of this client-centered approach, customers when changing provider are faced not only with transaction costs (like filling forms for opening a new account, closing the old one, transferring balances, setting up payment instructions), but also with the unobserved barriers deriving from the lost value of long-term customer-bank relationship (European Commission 2007, Degryse and Ongena, 2008). In particular, when leaving one bank for another, the low credit risk clients are pooled with high credit risk customers in the new bank since the latter has not yet acquired any information about them. They should be expected to be charged higher interest rates than in their previous banking institution. As a consequence of these switching barriers, the intensity of competition between existing banks turns out to be reduced and potential competitors' entry becomes difficult if not impossible. From an inquiry conducted by the European Commission (2007) on the European retail banking sector,"switching costs in banking might discourage market entry, since it may become uneconomic for new entrants to provide a sufficiently competitive offer to induce customers to switch"[2]. One way for a bank to go around this difficulty consists in promot-

[1] From an empirical analysis on switching barriers in banking conducted by Kim et al. (2003), it appears that face-to face interactions resulting in the so called "relationship banking" have a significant impact on borrowers' value**:** more than a quarter of the customer' s added value is due to lock-in phenomena. Further, about one third of the average bank's market share has to be attributed to the personal bank-borrower relationship.

[2] Also, the same inquiry shows that, in the majority of Member States, annual customers' switching rates for current accounts are quite low and stable at 5 to 10 per cent per year. As a result, when considering the balance between domestic and foreign banks in the top five banks in each European Member State, measured by gross total retail income, it emerges that the

ing entry *via* the *acquisition* of one of the existing banks, rather than trying to compete directly with the rivals. This solution might be more advantageous since acquiring a rival also implies acquiring at the same time the whole circle of its customers, avoiding thereby the problem of switching barriers which prevent their mobility in case of direct competition[3]. Of course, entry by acquisition does not entail the same effects on the intensity of competition than entry via greenfield investment. While the first does not change neither the number of rivals, nor the variety of products offered to customers, a *de novo entry strategy* affects both the number of competitors and product differentiation. From the competition viewpoint, a de novo entry strategy is unambiguously better than acquisition: while the latter privileges status-quo, the former increases the number of competitors and provides the market with a wider variety of products. Thus the question is raised whether the presence of switching barriers in the banking sector, based on successful retention of customers, can counteract the natural forces which generate competition: entry and product variety.

In order to provide some insights into this question, we introduce hereafter a formal model of the retail banking sector inspired from the traditional model of vertical product differentiation. We assume that the local retail market initially consists of two domestic banks, providing financial products to the clients. These domestic services are perceived as being different from each other due in particular to the existence of switching barriers which are met by consumers when they leave their usual provider for a new one. The magnitude of switching barriers is assumed to depend on the capacity of the providers to assist clients when they leave their traditional bank. Accordingly, we suppose that one of the national banks entail smaller switching costs than the other, making the latter more attractive than the former from the viewpoint of the clients. Then, a new bank decides to enter this local market. This bank can either acquire one of the existing banks, or enter with its own installation, via greenfield investment. Of course, and in conformity with the evidence gathered in the Report on the European retail banking sector by the European Commission (2007) referred above, we assume that the potential customers of the entrant face switching costs which exceed those they would incur when switching between existing local retail banks: they have less information on the new provider and are more suspicious with respect to the intrinsic quality of its services. We study in a three stage game when one entry mode is more profitable than the other, depending on the value of the acquisition price, the different characteristics of services offered under the two alternative scenarios, and the magnitude of switching barriers. We find that it is always better for the potential entrant to proceed by acquisition rather than competing directly with the existing banks: it turns out that *greenfield investment is never an equilibrium strategy for the foreign firm.*

Even if, to the best of our knowledge, the profitability of different entry

top banks are, in most countries, domestic. For more details, we refer the interested reader to European Commission *Report on the retail banking sector inquiry*, SEC 106, 2007.

[3] Quite interestingly, this solution seems to be preferred in service sectors where a personalized relationship matters (Norbäck and Persson, 2008).

modes has never been analyzed in the context of retail banking competition, the choice between greenfield investment and acquisition as modes of entry has been the object of several contributions in the field of trade theory [4]. Hereafter are some significant examples. Görg (2000) analyses the choice a firm has to face when entering a foreign market between setting up an entirely new plant or acquiring an existing indigenous firm. In an asymmetric duopoly in the host country, duopolists face the entry of a technologically advanced foreign firm in the market. The analysis shows how a wide range of entry costs and post-entry competition affects the foreign firm's entry mode choice. Further, according to simulation analysis, the foreign entrant will in most cases be best off by acquiring the existing high-technology incumbent and thus forming a duopoly market with the low-technology competitor. Grunfeld and Sanna-Randaccio (2006) identify the optimal foreign entry mode in a two-country, two-firm Cournot model with asymmetric firm technology levels and asymmetric market (country) sizes. In a two stage game, firms simultaneously choose between no entry, greenfield investments or acquisition of a local competitor at the first stage, and set the profit maximizing level of output at the second stage. They found that the equilibrium depends on both the asymmetry in the country-sizes and the relative technological level of firms. Raff et al (2006) build a model where firm-specific factors, interacting with industry- and country-level variables affect the entry-mode choice. In their analysis, a firm first chooses between exporting and Foreign Direct Investment (FDI), and then, if it decides to expand abroad via FDI, between greenfield investment and M&A. Finally, in the case of greenfield investment, the firm has to decide between whole ownership of its subsidiary or a joint venture with a local firm. They consider the trade-off arising when a decision has to be taken and show that these trade-offs vary with the amount of productive assets that the foreign firm owns. Raff et al. (2009) analyse the choice of FDI mode, and shows how the profitability of greenfield investment influences this choice both directly and indirectly, through affecting the option of potential acquisition targets and joint venture partners. Helpman et al. (2004), and Nocke and Yeaple (2007) stress the role of firm heterogeneity in marginal costs for the choice between FDI and exporting.

Our model may be seen as close in spirit to these works; however, it departs from them in several respects. First it applies to the entry into the retail banking sector independently from its international context. Of course, it can be applied to this context, in particular in the framework of the European Union where liberalization has entailed a large number of cross-countries acquisitions. Furthermore, the dilemma faced by the entrant in the trade context is related to the technological asymmetries existing between the foreign entrant and the local competitors. In our case, the asymmetry is essentially related to the size of the switching barriers which are assumed higher for the entrant than for the existing banks. Finally, we assume that while under the acquisition scenario,

[4] Admittedly, Lehner (2008) analyses the entry mode choice in a host country of a multinational bank. However, the main focus if this work is completely different from ours. It tries to explain how a foreign bank's entry mode choice is affected by the financial development and the size of the host banking market.

the new entrant has to pay an acquisition price which varies with the characteristics of the incumbent, in the alternative scenario of a *de novo* entry, it is penalized by a lower quality rather than by a cost of entry.

2 The model

Assume that in a covered market there are two *national* banks, say bank H and bank L, respectively, offering services to a population of consumers, identified by the parameter $\theta \in [a, b]$, $0 \leq a < b$ and uniformly distributed with density equal to 1. Let

$$u_i = \bar{u}_i - s_i$$

with $u_i, \bar{u}_i$ and s_i denoting the *perceived quality*, the *intrinsic quality* and the *switching cost* of bank $i, i = 1, 2$, respectively. The perceived quality u_i is given by two terms. The first, the intrinsic quality, $\bar{u}_i$, refers to the quality of the services provided by bank i, at the exclusion of its ability to prevent its customers from moving to the competitor. More precisely, we define the intrinsic quality on the basis of *product portfolio, number of branches and ATM network*[5]. The second term, s_i, represents the cost, for a customer of bank j, of becoming a customer of bank i, $j \neq i$. As the magnitude of these switching barriers changes depending on the ability of the new provider to assist clients during the switch, we assume without any loss of generality that switching from bank L to bank H is strictly more costly than the reverse, namely $s_H < s_L$. This can be due to the fact that bank H better assists than bank L the new clients when leaving their traditional provider, invest more in easy access programs or, more generally, in human resources for a good relationship with clients. So, depending on the difference between $\bar{u}_i$ and $\bar{u}_j$, we can have either $u_i = \bar{u}_i - s_i > u_j = \bar{u}_j - s_j$ or the reverse, namely $u_i = \bar{u}_i - s_i < u_j = \bar{u}_j - s_j$. However, let us definitely assume that $u_H = \bar{u}_H - s_H$ is strictly higher than $u_L = \bar{u}_L - s_L$.

Letting u_i and s_i be defined as above, the utility of consumer θ is given by

$$\theta(\bar{u}_i - s_i) - p_i, \ i = H, L,$$

with p_i denoting the price that customers pay for getting the whole bundle of services provided by bank i. The above description of banks' services falls naturally in the category of vertical differentiation models, with bank H selling a higher quality "product" than bank L to consumers.

Also, we assume that the average cost with respect to quality is constant and, without loss of generality, we set it equal to zero.

Finally, in order to complete the description of this model, we assume that

[5] There is a large bulk of literature which examines the factors contributing to define the services quality in the banking sector. From recent analysis, it emerges that not only the range of services provided plays a role in the differentiation process, but also the ATM network (Carletti 2007, Knittel and Stango 2004) and the branches (Barros 1999, Kim and Vale 2001).

$$\frac{a}{b} \in \left[\frac{1}{4}, \frac{1}{2}\right] : \tag{1}$$

this assumption guarantees that exactly two firms, and no more, can make strictly positive profits at an interior equilibrium. Denote by $\bar{\theta}$ the consumer who is indifferent between being served by banks H and L at prices p_H and p_L, respectively. Solving in θ the equation

$$\theta u_H - p_H = \theta u_L - p_L,$$

we obtain

$$\bar{\theta} = \frac{p_H - p_L}{u_H - u_L}.$$

Then, demand functions to bank H and L are given, respectively, by

$$\begin{aligned} D_H(p_H, p_{L)} &= b - \frac{p_H - p_L}{u_H - u_L} \\ D_L(p_H, p_{L)} &= \frac{p_H - p_L}{u_H - u_L} - a, \end{aligned}$$

so that profit functions $\Pi_H(p_H, p_L)$ and $\Pi_L(p_H, p_L)$ write as

$$\Pi_H(p_H, p_L) = \left(b - \frac{p_H - p_L}{u_H - u_L}\right) p_H \tag{2}$$

$$\Pi_L(p_H, p_L) = (\frac{p_H - p_L}{u_H - u_L} - a)p_L. \tag{3}$$

Maximization of (2) and (3) with respect to p_H and p_L, respectively, gives the equilibrium prices $\overset{\circ}{p}_H$ and $\overset{\circ}{p}_L$, namely,

$$\begin{aligned} \overset{\circ}{p}_H &= \frac{(2b - a)(u_H - u_L)}{3} \\ \overset{\circ}{p}_L &= \frac{(b - 2a)(u_H - u_L)}{3} \end{aligned}$$

or, taking in mind that $u_i = \bar{u}_i - s_i$

$$\begin{aligned} \overset{\circ}{p}_H &= \frac{(2b - a)(\bar{u}_H - \bar{u}_L + s_L - s_H)}{3} \\ \overset{\circ}{p}_L &= \frac{(b - 2a)(\bar{u}_H - \bar{u}_L + s_L - s_H)}{3} \end{aligned}$$

Notice that (1) guarantees that both equilibrium prices and profits are strictly positive and that the market is indeed covered. Substituting these prices

in (2) and (3), respectively, we obtain that profits $\overset{\circ}{\Pi}_H$ and $\overset{\circ}{\Pi}_L$ at equilibrium are given by

$$\begin{aligned}
\overset{\circ}{\Pi}_H\left(\overset{\circ}{p}_H, \overset{\circ}{p}_L\right) &= \frac{(u_H - u_L)(2b-a)^2}{9(b-a)} = \frac{\left(\bar{U}_{H,L} + s_L - s_H\right)(2b-a)^2}{9(b-a)} \\
\overset{\circ}{\Pi}_L\left(\overset{\circ}{p}_H, \overset{\circ}{p}_L\right) &= \frac{(u_H - u_L)(b-2a)^2}{9(b-a)} = \frac{\left(\bar{U}_{H,L} + s_L - s_H\right)(b-2a)^2}{9(b-a)},
\end{aligned}$$

where $\bar{U}_{i,j} = \bar{u}_i - \bar{u}_j$. We observe that both prices and profits at equilibrium result to be higher, the more significant the difference between the switching barriers.

3 The entry/acquisition game

We suppose now that a foreign bank F decides to enter the national market. As for the national banks, let u_F be defined by $u_F = \bar{u}_F - s_F$, where u_F denote the perceived quality of bank F, $\bar{u}_F$ its intrinsic quality and s_F its switching cost, namely the cost incurred by a customer of bank H or bank L to become a customer of bank F. In accordance with empirical facts summarized in the introduction, we assume that it is more costly for these customers to move from a national bank to the foreign one, than to move between the national ones, namely we assume

$$s_F > s_L (> s_H).$$

Then, according to the importance of s_F, we can have either $u_F \in [0, u_L]$, or $u_F \in [u_H, u_L]$, or $u_F \in [u_H, +\infty]$. However, we shall exclude the last case by assuming

$$u_F = \bar{u}_F - s_F < u_H = \bar{u}_H - s_H :$$

the switching cost for a national consumer to move from a national bank to the foreign one is so high that the latter never ends up at the top of the quality ladder. Accordingly, depending on the size of the switching cost s_F, two cases may arise: either the foreign bank can enter the market with a quality which is perceived as lying at the bottom of the quality ladder, or between the top and the bottom, namely case (i) $u_H > u_L > u_F$ and case (ii) $u_H > u_F > u_L$.

Payoffs of banks when the optimal entry mode is defined, are assumed to obtain as an outcome of a three stage non cooperative sequential entry/acquisition game which develops as follows:

1. at the first stage, the foreign firm F offers to buy the highest quality firm at some price P_H (notice that P_H is equal 0 if the foreign bank does not really want to acquire bank H);

2. if bank H turns down this offer, at the second stage the foreign bank offers to buy bank L at some price P_L (which can be 0 if the foreign bank prefers to enter rather than to buy);

3. finally, if bank L turns down its offer, at the third stage, the foreign bank enters the market if there is room for it[6].

In line with the literature on the entry dilemma (Eicher and Kang 2005, Muller 2007, *inter alia*), the acquisition of a local competitor allows only to provide the given quality of the acquired firm: so, even if the foreign quality is higher than the local one, the foreign firm is restricted to the acquired firm quality. In the alternative scenario, namely if the foreign bank enters via greenfield investment, it offers its own quality service.

As usual, the game is solved backward. Thus, we start from the third stage of game and consider when a *de novo entry* can take place in the market at equilibrium, depending on the switching barriers.

3.1 Third stage

Let us start assuming that neither firm H at the first stage nor firm L at the second one has been acquired by bank F, which accordingly enters the market if this is profitable.

- Let us first consider the case (i) when the switching barrier s_F is so relevant that $u_F < u_L$. As a consequence of this, the perceived quality of the service offered by the foreign provider lies at the bottom of the quality ladder. So, it is immediate to see that in this scenario there is no room in the market left at equilibrium to the foreign bank. Indeed, as no more than two firms can profitably operate at equilibrium given the size of the market, it is straightforward to show that at equilibrium the bank providing the lowest quality gets no profits, while the two banks providing qualities respectively being at the top of the quality ladder and lying in between the top and the bottom, get positive profits, namely

$$\begin{aligned}
\Pi_H^*(p_H^*, p_L^*, p_F^*) &= \frac{4b^2\left(\bar{U}_{H,F} + s_F - s_H\right)^2\left(\bar{U}_{H,L} + s_L - s_H\right)}{(b-a)\left(\left(\bar{U}_{H,L} + s_L - s_H\right) + 3\left(\bar{U}_{H,F} + s_F - s_H\right)\right)^2} \\
\Pi_L^*(p_H^*, p_L^*, p_F^*) &= \frac{b^2\left(\bar{U}_{H,F} + s_F - s_H\right)\left(\bar{U}_{H,L} + s_L - s_H\right)\left(\bar{U}_{L,F} + s_F - s_L\right)}{(b-a)\left(\left(\bar{U}_{H,L} + s_L - s_H\right) + 3\left(\bar{U}_{H,F} + s_F - s_H\right)\right)^2} \\
\Pi_F^*(p_H^*, p_L^*, p_F^*) &= 0.
\end{aligned}$$

- In the alternative case (ii), the switching barrier s_F is such that $s_F < s_L - s_H$ and thus $u_H > u_F > u_L$. Just repeating the argument developed

[6] Of course, we could have as well considered the alternative timing in which the foreign bank starts to offer to buy the low quality, and then the high quality one, in the case when bank L turns down the offer. However, restricting our analysis to this specific sequential game does not alter the main conclusions of our work.

in the previous section, it can be proved now that at equilibrium the local high quality and foreign banks get positive profits while the local low quality provider gets no profits, and thus leaves the market . We summarize the above result in the following proposition.

Proposition 1 *At the third stage of the game, the foreign bank can successfully enter the market at equilibrium only when the switching barrier s_F is not so significant and thus the perceived quality of the service provided by the foreign bank lies in between the top and the bottom of the quality ladder. However, the local bank providing the service whose quality lies at the bottom of the quality ladder is pushed away from the market.*

3.2 Second stage

Let us move now to consider the second stage of the game, namely the possible acquisition of bank L by the foreign bank F. We restrict the analysis to the case when bank F provides a quality which lies between the top and the bottom of the quality ladder. In the alternative case when the foreign quality lies at the bottom of the quality ladder, it is straightforward to show that the foreign bank can never acquire profitably. Notice that if bank F acquires the low quality incumbent, as $u_F > u_L$, it offers a service whose quality turns out to be lower than the one it would be able to provide under direct competition as its is constrained to the quality provided by the local incumbent, namely the acquired firm. Let us stress that although a priori it is far from being evident why such a type of acquisition should be proposed (as under acquisition bank F suffers a loss in its services quality), when considering the possible acquisition of L, the foreign bank F evaluates the trade-off between *offering a higher quality* ($u_F > u_L$) under direct entry and thus getting profits equal to

$$\frac{b^2 (u_H - u_L) (u_L - u_F) (u_F - u_H)}{(b-a) (3u_L - 4u_H + u_F)^2},$$

and *being faced with a less fierce competition* (as u_L is by far less than u_H) under acquisition with duopoly profits equal to

$$\frac{(u_H - u_L) (b - 2a)^2}{9 (b-a)}.$$

As far as the incumbent, bank L, would accept to sell out whenever offered a price P_L at least equal to the profits it would get, conditional on turning down the proposal, namely $P_L = 0$.

Given this, we can state the following:

Proposition 2 *Acquisition of firm L is the second-stage best strategy for the foreign firm only when the ratio a/b obtained from the consumers' types range $[a, b]$ is small and the entrant's perceived quality is not different enough from the incumbents' one so as to ensure mild competition and substantial entrant's profits.*

Proof. See Appendix. ■

This is simply because in both the above cases, competition between the entrant and one, or both, of the incumbents would be fierce, and lead accordingly to low entrant's profits. So, in both the above evoked scenarios, the gain of providing a higher quality u_F if direct entry would take place is more than countervailed by the fierce competition which would be created by such a type of choice. We can summarize the above results as follows.

3.3 First stage

Let us now study the first stage of the game implying that either bank L rejected the proposal in stage 2, or that bank F did not make it. By acquiring firm H, the foreign bank would earn profits equal to $\frac{(u_H-u_L)(2b-a)^2}{9(b-a)}$. It would have to pay a price P_H equal to the profits of bank H, if it turns down F 's offer. Of course, the value of this price depends on what is F' s best strategy, as defined in Lemma 3, when its offer to H is turned down. When F's strategy is to buy bank L, then the acquisition price P_H is equal to bank H' s duopoly profits, namely $P_H = \frac{(u_H-u_L)(2b-a)^2}{9(b-a)}$. Accordingly, the foreign bank would earn zero profits from the acquisition of bank H, whereas it obtains strictly positive profits from acquiring bank L. When the F's best strategy is to enter the market via greenfield investment and directly compete, then the acquisition price P_H must be equal to H's profit conditional on F's *de novo* entry, namely $P_H = \frac{4b^2(u_H-u_F)(u_L-u_H)^2}{(b-a)(3u_L-4u_H+u_F)^2}$. Thus, F's profits when acquiring H, equal to $\frac{(u_H-u_L)(2b-a)^2}{9(b-a)} - \frac{4b^2(u_H-u_F)(u_L-u_H)^2}{(b-a)(3u_L-4u_H+u_F)^2}$, have to be compared with its post-entry profits in the case of *de novo* entry, namely $\frac{b^2(u_H-u_L)(u_L-u_F)(u_F-u_H)}{(b-a)(3u_L-4u_H+u_F)^2}$. The sign of the difference between the former and the latter is the same as the sign of

$$\frac{b^2\Psi(\Delta-\Psi)}{(3\Delta+\Psi)^2} - \frac{(2b-a)^2}{9} + \frac{4\Psi b^2\Delta}{(3\Delta+\Psi)^2}$$

which is itself the same as the sign of the second order polynomial

$$\left(\frac{\Psi}{\Delta}\right)^2(-x^2+4x-13) + 3\left(\frac{\Psi}{\Delta}\right)(-2x^2+8x+7) - 9(x-2)^2.$$

Simple calculations reveal that this second-order polynomial is always negative in the range of admissible values ($\frac{\Psi}{\Delta} \in [0,1]$, $x \in \left[\frac{1}{4}, \frac{1}{2}\right]$). This shows that, in the first stage game, the foreign firm F always prefers to acquire firm H rather than to compete via greenfield investment. The following proposition summarizes our previous findings.

Proposition 3 *The greenfield investment strategy never belongs to the subgame perfect equilibrium path of the game.*

This argument can be extended to the case when the entrant is able to provide the market with a perceived quality which is even higher than those

already provided by the incumbents. Then, applying the same rationale, it can be proved that when the differential in quality is not very significant, it is still advantageous to avoid direct competition via greenfield investment, and rather substitute an acquisition proposal. Of course, when F's quality is by far higher in the quality ladder than those provided by the incumbents, then it may profitable for the entrant to privilege greenfield investment to acquisition, leading the foreign firm to openly compete with the incumbents. Is worth noting that, from the viewpoint of consumers'welfare, the optimal market arrangement obtains when *de novo* entry takes place. Indeed, in this case, the local low quality bank is pushed away from the market and bank F successfully competes with bank H. It is easy to prove that both prices decrease due to the replacement of bank H by bank F. Furthermore, consumers are now facing higher perceived qualities due do the same replacement and their situation is thus globally improved. By contrast, in case of acquisition, consumers' welfare is not affected whether the entrant acquires bank H or bank L since, *ex-post*, it leads to the same competition scenario as it was before acquisition took place!

4 Conclusion

In this note we have studied the entry dilemma faced by a bank desiring to enter a foreign market. First, we have shown that when the switching barriers incurred by consumers deciding to be served by the potential entrant are so high that the foreign bank can contemplate to enter only with the lowest perceived quality, there is no room left for entry. Of course, when the switching barriers are less significant, the potential entrant is able to enter via greenfield investment with an intermediate perceived quality, and directly compete with the incumbents. Also, it can acquire an incumbent when the joint profits of the entrant and the acquired bank after entry under the acquisition scenario exceed the sum of their profits realised under the greenfield investment scenario. However we show that greenfield investment is never an equilibrium strategy for the foreign firm. Although our conclusions rely on the specific structure which is used to model retail banking competition, still our findings are robust to some natural alternative scenarios. In particular, it can be shown that the timing of the sequential game can be reversed without altering our main conclusion, allowing the potential entrant to propose purchase of bank L before proposing the purchase of bank H in case the starting offer is turned down by L, or undesired by the entrant. Furthermore, the model could be changed by reverting the roles considered in this paper, allowing now one of the incumbents to propose to purchase the potential entrant. It means that, in all these frameworks, the usual economists' expectation that competition is restored by the entry of new firms, is never realised when the possibility of acquisition is opened.

The analysis performed in this paper can give useful insights in terms of regulation and competition. When the regulation authority evaluates whether to prevent firms from an acquisition activity, one major issue taken into account is the chance the merger applicant would enter the market through *de novo*

entry if the acquisition was not allowed. We have proved above that, due to switching barriers, it is never profitable for a foreign bank to pursue a *de novo* entry strategy (except possibly in the extreme case when its quality is by far the highest one in the new market). Accordingly, forcing a foreign bank to restrict its expansion to a *de novo* entry strategy may well lead to preserve the *status quo*, while this regulation decision would be motivated by increasing competition! Of course, it may be that the above debate would simply disappear due to electronic banking development. Indeed it may be conjectured that e-banking significantly weakens the entry barriers erected by personal relationships between banks and their customers (see Rhoades, 1997). Nevertheless,it remains unclear whether *de novo* entries could not promote competition in a more significant way.

Further, microeconomic insights into the problem of retail banking competition would certainly improve our understanding of this sector. For instance, the model could be enriched by combining elements borrowed from both vertical *and* horizontal product differentiation. In particular, we have in mind to embed into the model the idea that some consumers could prefer a bank located close to their own location than another one even providing a wider range of services, simply because this higher quality does not compensate for the higher transportation costs incurred when moving to this other bank. More generally, the effects of entry by acquisition versus greenfield investment on banking competition constitutes an open field for future research which has only been scratched in the present essay.

5 Appendix

Proof of Proposition 1.

Let us first consider the scenario where the quality of the variant offered by the entrant lies at the bottom of the quality ladder.

In this scenario, the consumer θ^H indifferent between being served by bank H or L at prices p_H and p_L, respectively, writes as

$$\theta^H = \frac{p_H - p_L}{u_H - u_L},$$

while the consumer θ^L indifferent between buying services provided by bank L or F at prices p_L and p_F

$$\theta^L = \frac{p_L - p_F}{u_L - u_F},$$

Accordingly, the corresponding demand functions $D_H(p_H, p_L)$ and $D_L(p_H, p_L)$ for the national banks H and L, respectively, are

$$\begin{aligned} D_H(p_H, p_L) &= b - \frac{p_H - p_L}{u_H - u_L} \\ D_L(p_H, p_L) &= \frac{p_H - p_L}{u_H - u_L} - \frac{p_L - p_F}{u_L - u_F}, \end{aligned}$$

and

$$D_F(p_L, p_F) = \frac{p_L - p_F}{u_L - u_F} - a,$$

for the foreign bank F. Thus, the respective profits functions write as

$$\begin{aligned}
\Pi_H &= p_H(b - \frac{p_H - p_L}{u_H - u_L}) \\
\Pi_L &= p_L(\frac{p_H - p_L}{u_H - u_L} - \frac{p_L - p_F}{u_L - u_F}) \\
\Pi_F &= p_F(\frac{p_L - p_F}{u_L - u_F} - a)
\end{aligned}$$

From the first order conditions, it is easy to identify the following best reply functions

$$\begin{aligned}
p_H &= \frac{1}{2}b\,(u_H - u_L) + \frac{1}{2}p_L \\
p_L &= \frac{(p_H(u_L - u_F) + p_F(u_H - u_L))}{2(u_H - u_F)} \\
p_F &= \frac{(p_L + a\,(u_F - u_L))}{2}.
\end{aligned}$$

Thus, solving the above system, we derive the candidate equilibrium prices $\tilde{p}_H$, $\tilde{p}_L$ and $\tilde{p}_F$:

$$\begin{aligned}
\tilde{p}_H &= \frac{(u_H - u_L)((a-4b)u_F + 3bu_H + (b-a)u_L)}{6(u_H - u_F)} \\
\tilde{p}_L &= \frac{(u_H - u_L)(b-a)(u_L - u_F)}{3(u_H - u_F)} \\
\tilde{p}_F &= \frac{(u_L - u_F)(3au_F + (b-4a)u_H + (a-b)u_L)}{6(u_H - u_F)}
\end{aligned}$$

Notice however that (1) implies

$$\frac{a}{b} \geq \frac{u_H - u_L}{4u_H - 3u_F - u_L}, \tag{4}$$

which, in turn, implies that

$$\frac{(3au_F + (b-4a)u_H + (a-b)u_L)}{6(u_H - u_F)} \leq 0$$

or, equivalently, $\tilde{p}_F \leq 0$. Accordingly, when (1) is satisfied, then the equilibrium value of $p_F = 0$. In that case, the value of best replies of banks H and L have

to be computed against $p_F = 0$, namely,

$$\begin{aligned} p_H &= \frac{1}{2} b\left(u_H - u_L\right) + \frac{1}{2} p_L \\ p_L &= \frac{\left(p_H(u_L - u_F)\right)}{2(u_H - u_F)}. \end{aligned}$$

Solving this system in p_H and p_L, we get the equilibrium prices p_H^*, p_L^* and p_F^*, namely,

$$\begin{aligned} p_H^* &= \frac{2b(u_H - u_F)(u_H - u_L)}{4u_H - u_L - 3u_F} = 2bs\frac{u_H - u_L}{s + 3u_H - 3u_L} \\ p_L^* &= \frac{b(u_H - u_L)(u_L - u_F)}{4u_H - u_L - 3u_F} = b\left(u_H - u_L\right)\frac{s - u_H + u_L}{s + 3u_H - 3u_L} \\ p_F^* &= 0. \end{aligned}$$

Finally, profits at equilibrium write as follows

$$\begin{aligned} \Pi_H^*(p_H^*, p_L^*, p_F^*) &= \frac{4b^2(u_H - u_F)^2(u_H - u_L)}{(b-a)\left(4u_H - u_L - 3u_F\right)^2} \\ \Pi_L^*(p_H^*, p_L^*, p_F^*) &= \frac{b^2(u_H - u_F)(u_H - u_L)(u_L - u_F)}{(b-a)\left(4u_H - u_L - 3u_F\right)^2} \\ \Pi_F^*(p_H^*, p_L^*, p_F^*) &= 0 \end{aligned}$$

Now, let us move analysing the case when the quality of the variant produced by the entrant lies in the middle of the quality ladder. Denote by $\bar{\theta}^H$ the consumer who is indifferent between being served by banks H and F at prices p_H and p_F respectively. Solving the equality

$$u_H\theta - p_H = u_F\theta - p_F,$$

we find that

$$\bar{\theta}^H = \frac{p_H - p_F}{u_H - u_F}.$$

Similarly, denote by $\bar{\theta}^F$ indifferent between buying services provided by bank F or L at prices p_F and p_L

$$\bar{\theta}^F = \frac{p_F - p_L}{u_F - u_L},$$

Accordingly, the corresponding demand functions $D_H(p_H, p_L)$ and $D_L(p_H, p_L)$ for the national banks H and L, respectively, are

$$\begin{aligned} D_H(p_H, p_L) &= b - \frac{p_H - p_F}{u_H - u_F} \\ D_L(p_H, p_L) &= \frac{p_F - p_L}{u_F - u_L} - a, \end{aligned}$$

and

$$D_F(p_L, p_F) = \frac{p_H - p_F}{u_H - u_F} - \frac{p_F - p_L}{u_F - u_L},$$

for the national bank. Given the respective profits functions, it is easy to identify from the first order conditions the following best reply functions

$$\begin{aligned} p_H &= \frac{1}{2}p_F + \frac{b}{2}(u_H - u_F) \\ p_F &= \frac{(p_H(u_F - u_L) + p_L(u_H - u_F))}{2(u_H - u_L)} \\ p_L &= \frac{(p_F + a\,(u_L - u_F))}{2}. \end{aligned}$$

Then, solving the above system, we compute the candidate equilibrium prices $\breve{p}_H$, $\breve{p}_L$ and $\breve{p}_F$, namely

$$\begin{aligned} \breve{p}_H &= \frac{(au_F - bu_F - 3bu_H - au_L + 4bu_L)\,(u_H - u_F)}{6\,(u_L - u_H)} \\ \breve{p}_F &= \frac{(b-a)\,(u_L - u_F)\,(u_H - u_F)}{3\,(u_L - u_H)} \\ \breve{p}_L &= \frac{(au_F - bu_F - 4au_H + bu_H + 3au_L)\,(u_L - u_F)}{6\,(u_L - u_H)}. \end{aligned}$$

Just repeating the argument developed in the previous section, it can be proed that these candidates are not equilibrium prices. Accordingly, it follows from above that the value of best replies of banks H and F have to be computed against $p_L = 0$.

Thus, solving this system in p_H and p_F, we get the equilibrium prices p_H^{**}, p_L^{**} and p_F^{**}, namely

$$\begin{aligned} p_H^{**} &= \frac{2b\,(u_H - u_F)\,(u_H - u_L)}{(4u_H - u_F - 3u_L)} = \frac{2sb\,(u_H - u_L)}{3u_H - 3u_L + s} \\ p_F^{**} &= \frac{b\,(u_F - u_L)\,(u_H - u_F)}{(4u_H - u_F - 3u_L)} = \frac{sb\,(u_H - s - u_L)}{3u_H - 3u_L + s} \\ p_L^{**} &= 0, \end{aligned}$$

leading to equilibrium profits

$$\begin{aligned} \Pi_H^{**}(p_H^{**}, p_F^{**}, p_L^{**}) &= \frac{4b^2\,(u_H - u_F)\,(u_L - u_H)^2}{(b-a)\,(3u_L - 4u_H + u_F)^2} = \frac{4sb^2\,(u_L - u_H)^2}{(b-a)\,(3u_L - 3u_H - s)^2} \\ \Pi_F^{**}(p_H^{**}, p_F^{**}, p_L^{**}) &= \frac{b^2\,(u_H - u_L)\,(u_L - u_F)\,(u_F - u_H)}{(b-a)\,(3u_L - 4u_H + u_F)^2} = \frac{b^2\,(u_H - u_L)\,(u_H - s - u_L)\,s}{(b-a)\,(3u_L - 3u_H - s)^2} \\ \Pi_L^{**}(p_H^{**}, p_F^{**}, p_L^{**}) &= 0. \end{aligned}$$

Q.E.D.

Proof of Proposition 2.

Let us denote by Δ the value $u_H - u_L$, Ψ the value $u_H - u_F$ and define x by $x = \frac{a}{b}$. The sign of the difference between profits from de novo entry and profits from acquiring Firm L, namely

$$\frac{b^2 (u_H - u_L)(u_L - u_F)(u_F - u_H)}{(b-a)(3u_L - 4u_H + u_F)^2} - \frac{(u_H - u_L)(b-2a)^2}{9(b-a)}$$

has the same sign as the expression

$$\frac{\Psi(\Delta - \Psi)}{(3\Delta + \Psi)^2} - \frac{1}{9}(1-2x)^2, \tag{5}$$

given that we have assumed $x \in \left[\frac{1}{4}, \frac{1}{2}\right]$, in order to ensure that two, and only two, firms can make positive profits in this market. Denote by Ψ^- and Ψ^+ the roots of the second-order polynomial

$$P(\Psi) = \Psi^2(-10 + 4x - 4x^2) + \Psi\Delta(-24x^2 + 24x + 3) + \Delta^2(-36x^2 + 36x - 9).$$

Notice now that (i) the sign of $P(\Psi)$ is the sign of (5) , (ii) $P(\Psi)$ is strictly negative for all Ψ whenever $64x^2 - 64x + 13 > 0 \Leftrightarrow x \in [\frac{1}{4}, \frac{1}{2} - \frac{\sqrt{3}}{8}]$, (ii) $P(\Psi)$ has two roots $\Psi^- = 3\Delta(\frac{1+8x-8x^2-\sqrt{3}\sqrt{-(64x^2-64x+13)}}{20-8x+8x^2})$ and $\Psi^+ = 3\Delta(\frac{1+8x-8x^2+\sqrt{3}\sqrt{-(64x^2-64x+13)}}{20-8x+8x^2})$. Thus, (i) whenever $x \in [\frac{1}{4}, \frac{1}{2} - \frac{\sqrt{3}}{8}]$ the foreign bank F prefers to buy firm L whatever the value of Ψ; (ii) when $x \in (\frac{1}{2} - \frac{\sqrt{3}}{8}, \frac{1}{2}]$, the foreign bank F chooses to buy firm L whenever $\Psi \in [0, \Psi^-)$ or $\Psi \in (\Psi^+, \Delta]$ and to enter whenever $\Psi \in (\Psi^-, \Psi^+)$. It is indifferent between the two options when $\Psi = \Psi$ or $\Psi = \Psi^+$.

References

[1] Barros, P.P., (1999). "Multimarket Competition in Banking, with an Example from the Portuguese Market," *International Journal of Industrial Organization* 17, 335-352.

[2] Boot, A.W., (2000). "Relationship banking: What do we know?" *Journal of Financial Intermediation* 9, pp. 7–25.

[3] Carletti, E., (2007). "*Competition and Regulation in Banking*" in A. W. A. Boot, and A. V. Thakor, eds.: Handbook of Corporate Finance: Financial Intermediation and Banking (North Holland, London), Forthcoming.

[4] Degryse, H., and S. Ongena, (2008). *"Competition and regulation in the banking sector: A review of the empirical evidence on the sources of bank rents"*. In A. Thakor & A. Boot (Eds.), Handbook of Financial Intermediation and Banking. Amsterdam: Elsevier.

[5] Eicher, T., Kang, J., (2005). "Trade, Foreign Direct Investment or Acquisition: Optimal Entry Modes for Multinationals". *Journal of Development Economics* 77(1), 207-228.

[6] European Commission, (2007). *Report on the retail banking sector inquiry*, SEC 106.

[7] Görg, H., (2000). "Analyzing Foreign Market Entry - The Choice between Greenfield Investment and Acquisitions". *Journal of Economic Studies* 27(3), 165-181.

[8] Grunfeld L. and F. Sanna-Randaccio, (2005). Greenfield Investment or Acquisition? Optimal Foreign Entry Mode with Knowledge Spillovers in a Cournot Game, *mimeo*.

[9] Helpman, E., Melitz, M. J., and S.R. Yeaple, (2004). "Export versus FDI with heterogeneous firms". *American Economic Review*, 94, 300-316.

[10] James C., (1987). "Some Evidence on the Uniqueness of Bank Loans". *Journal of Financial Economics*, 19, 217-235.

[11] Kim, M., and B. Vale, (2001). "Non-Price Strategic Behavior: the Case of Bank Branches", *International Journal of Industrial Organization* 19, 1583-1602.

[12] Kim, M., D. Kliger, and B. Vale, (2003). "Estimating Switching Costs: The Case of Banking", *Journal of Financial Intermediation* 12, 25-56

[13] Knittel, C., and V. Stango, (2004). "Compatibility and Pricing with Indirect Network Effects: Evidence from ATMs", *National Bureau for Economic Research, Discussion Paper*.

[14] M. Lehner (2008). "Entry Mode Choice of Multinational Banks", *Discussion Paper 2008/26*, University of Munich

[15] Müller, T. (2007). "Analyzing Modes of Foreign Entry: Greenfield Investment versus Acquisition", *Review of International Economics* 15(1), 93-111.

[16] Nocke, V., and S. Yeaple. (2007). "Cross-border mergers and acquisitions vs. greenfield foreign direct investment: The role of firm heterogeneity", *Journal of International Economics,* 72, 336-365.

[17] P.-J. Norbäck and and L. Persson (2008). "Cross-Border Mergers & Acquisitions Policy in Service Markets", *Journal of Industry, Competition and Trade*, 8, N.3-4, 269-293.

[18] Petersen, M. and Rajan, R., (1994). "The benefits of lending relationships: evidence from small business data", *Journal of Finance* 49, 3–37

[19] Raff, H., Ryan, M., and F. Stähler, (2006). "Asset ownership and foreign market entry", CESifo Working Paper 1676.

[20] Raff, H., Ryan, M., and F. Stähler, (2009). "The choice of market entry mode: Greenfield investment, M&A and joint venture", *International Review of Economics and Finance* 18 3–10

[21] Rhoades, Stephen A., (1997). "Have barriers to entry in retail commercial banking disappeared?", *The Antitrust Bulletin* (Winter), 997-1013

[22] Vale, B., (1993). "The dual role of demand deposits under asymmetric information", *Scandinavian Journal of Economics* 95, 77–95.