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Asymmetric information, foreign entry and multi-period credit competition in banking industry



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ABSTRACT

In a credit market, a low-cost foreign entrant is likely less informed than a domestic bank with information endowments. We present a steady-state model in an infinite-period framework, and analyze how the informational asymmetry affects the lending equilibrium and the foreign banks' entry modes. Firstly, we show that the domestic bank's initial informational advantage from its relatively large market share at the beginning of competition is not enough to hinder the entry of a low-cost foreign bank. In addition, the foreign bank is more likely to be the winner in the steady state of an infinite-period game than that in a static game. Secondly, the comparative static analysis show that the likelihood of foreign bank becoming the winning party increases with borrower quality, project payoff and the growth rate of potential new borrowers. Thirdly, when the foreign bank wins game in the steady state, its market share is decreasing in project payoff and the growth rate of new borrowers, while changes non-monotonically with borrower quality. Finally, we extend our model to characterize the domestic bank's sustainable advantage in being relatively familiar with new market, and provide valuable explanations for the observed entry modes of foreign banks in China.

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1. Introduction

Over the last two decades, financial globalization and liberalization have significantly affected the banking industry all over the world, particularly in developing and transitional economies. During the period 1995–2006, the number of foreign banks in developing countries has increased by 58% (Claessens, Van Horen, Gurcanlar, and Mercado, 2008). The market share in terms of total assets held by foreign banks in Latin America and Asia has increased from 26% in 1997 to reach a peak of 38% in 2002 (Jeon, Olivero, & Wu, 2011). Since 2001, to fulfill its WTO commitment of full opening of the financial industry, China has accelerated the pace of banking reform and liberalization, and the government has been actively taking steps to encourage foreign institutions enter into China via various modes.¹ From 2004 to 2012, the total number of foreign institutions including the headquarters, branches and subsidiaries of locally incorporated foreign banks, and foreign bank branches

has increased from 188 to 412. Meanwhile, 35 foreign financial institutions have taken stakes in 34 Chinese banks.

Information asymmetry is a stylized fact in credit market. A stream of literature by Sharpe (1990), Rajan (1992), Berger and Udell (1995), and Petersen and Rajan (1994, 1995) and others has recognized that information asymmetry plays an important role in bank's lending decision as well as the credit competition among banks. Potential borrowers usually know more about their own credit quality than lenders. The incumbent banks in a market have informational advantage over potential outside lenders by virtue of their long-established relationships with their existing borrowers. Dell Ariccia, Friedman, and Marquez (1999) argue that the adverse-selection problem can create a barrier to entry for potential entrant banks since they have ability to distinguish newly increased borrowers from low-quality old borrowers rejected by their competitors. Using data on the top 100 multinational banks, Tsai, Chang, and Hsiao (2011) find that foreign banks do prefer to enter or further expand operations in countries where information costs are lower. Dell Ariccia (2001) and Hauswald and Marquez (2003, 2006) further analyze how the information asymmetry affects credit allocation in the lending market and the efficiency of banks' lending decision, respectively. However, due to the static nature of the previous models, the existing literature pays little attention on the dynamic of information asymmetry in the ongoing lending competition. In addition, few research studies how the changes of the

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¹ Zhu et al. (2008) point out that both the improvement of Chinese banks' competitiveness and the active participation of foreign banks are important for China to establish a healthy, well-developed and efficient banking system.

domestic banks' comparative informational advantage affect the credit equilibrium and the entry of foreign banks.

Intuitively, when a low-cost foreign bank firstly enters, it has the initial informational disadvantage due to the relatively small market share of existing borrowers. However, as the lending competition goes on, the foreign bank gradually captures more borrowers and hence its informational disadvantage weakens with the help of a lower cost than the domestic banks. As a result, it is very likely for the foreign bank to become the winning party after multi-period competition. By a simple example of a two-period game in the appendix, Dell Ariccia et al. (1999) demonstrate that their main result that informational asymmetry in banking industry can create a barrier to entry for other banks continues to hold in a finite-period setting. However, in an infinite-period competition, it is possible for two banks to collude under the credible threat of grim strategies, and hence the equilibrium may be different from that of a simple- or finite-period game. Specifically, both banks determine their bidding strategies statically in each period, and as the competition proceeds, the iteratively static games reaches a steady state in which the bank with relative advantage makes strictly positive profits on new borrowers and its competitor bank makes zero profits. Furthermore, under the threat of grim strategies, two banks would agree to collude and use the same strategies as those determined in steady states to make loans in each period, and then we can determine a possible equilibrium of infinite-period game.

The above intuition allows us to develop an infinite-period dynamic competition model built on Dell Ariccia et al. (1999) and Dell Ariccia and Marquez (2004). By analyzing the change of information asymmetry in an infinite-period competition and its impact on the entry of a low-cost foreign bank, we obtain three possible steady-state equilibriums. Our basic finding is that, with the help of sustainable cost advantage, the foreign bank's informational disadvantage weakens gradually as the competition goes on, and then it is very likely for the foreign bank to enter into domestic market and become the winning party in steady-state equilibrium of infinite-period competition. Moreover, an increase of the average quality of borrowers, the payoffs of borrowers' projects or the growth rate of new borrowers can lead to a decrease of the foreign bank's initial informational disadvantage, and accordingly result in an increase of the likelihood that the foreign bank becomes the winning party in steady states.

Based on possible steady-state equilibriums, we analyze the effects of borrower quality, payoff of borrowers' projects and the growth rate of new market on the winning party's market share in equilibrium. The results suggest that no matter which bank become the winning party in steady states, the winning party's market share decreases with the payoffs of borrowers' projects and the growth rate of new market. However, the impact of borrower quality on the steady-state market shares depends on which bank wins the multi-period game in steady-state equilibrium. There is a negative link between the winner's market share and borrower quality when the domestic bank wins the game, while market shares change non-monotonically with borrower quality when the foreign bank becomes the winning party.

Finally, to highlight the importance of sustainable competitive advantage in multi-period game and then to explain the observation of the development of foreign banks in developing and transitional economies, we extend to model a situation that the domestic bank has sustainable informational advantage because it is more familiar with new borrowers than the foreign bank does. The result suggests that this sustainable informational advantage is helpful for the domestic bank to win an infinite-period game and hinder the entry of a low-cost foreign bank. This further finding has some important implications for the entry decision of foreign banks. First, foreign banks without enough cost advantage prefer

entering through acquisition of or taking stakes in domestic banks to entering through Greenfield investment. Second, for foreign banks planning to establish locally incorporated entities, they would rather operate first as branches backed by parent banks and then update to locally incorporated banks after being familiar with domestic market than establish them directly.

Our theoretical findings provide valuable explanations for the observed entry modes of foreign banks in China. First, foreign banks having established branches or locally incorporate banks are usually those with strong financial status and those with longer experience in China. Second, locally incorporated foreign banks do have tried to reduce their informational disadvantage by having operated as branches for years or simultaneously taking stakes in Chinese banks. Third, even with a policy-orientation encouraging foreign banks to operate as locally incorporated entities in China, no locally incorporated foreign banks from countries and regions outside of Asia have been established directly between 2006 and 2012.

The paper proceeds as follows. The next section is the assumptions of lending competition in banking industry. Section 3 presents static and dynamic models of competition, respectively. Section 4 conducts comparatively static analysis of the steady states. Section 5 extends the model and discusses its implications in entry modes of foreign banks. Section 6 concludes.

2. Assumptions

Consider a credit market with patch of enterprises that live for only two periods. Each enterprise is endowed with a project that requires a capital inflow of one unit which can only be financed externally from banks because of its internal fund limit. The market is composed of two kinds of borrowers: a fraction q is called high-quality type in that these borrowers' projects will pay off an amount R and then the loans will be paid back successfully, a fraction $1 - q$ is the low-quality type because their projects are doomed to fail with zero payoffs and they cannot repay the loans.² To ensure that lending occurs in equilibrium, we assume that $Rq > 1$.³ The borrowers can only live for two periods. In each period, new borrowers with increased population and the same composition of quality as the old ones will enter into the market. The ratio between the newly increased and the old borrowers equals $(1 + \lambda)$, where λ represents the growth rate of credit market. In addition, the type of a borrower is unknown to either the borrower or banks before they enter into a credit relationship. Once a borrower obtains a loan from a given bank, that bank will learn the borrower's type but the type information will not be released to the competitors. In each period, banks try to retain their high-quality old customers and reject to continue making loans to those low-quality old borrowers who have to migrate to competitor banks for financing. Since it is unable for any bank to distinguish newly increased borrowers and those rejected by its competitor, we define the pool of all unknown borrowers applying to a specific bank as its new borrowers.

² In the real world, maybe any borrower's project will succeed with a positive probability. Dell Ariccia et al. (1999) present a model of lending competition under informational asymmetries on the credit market and demonstrates that their results do not depend on assumption of the distribution functions of success probabilities of borrowers' projects. Dell Ariccia and Marquez (2004) develop a similar model assuming that the probability of success is uniformly distributed between 0 and 1. In essence, we assume that the probability of success here is Bernoulli distributed, and it is easy to extend our model under other distribution functions.

³ It is a necessary condition for existence of equilibrium. $Rq - 1$ is the expected net proceeds of project and how to allocate the proceeds between borrowers and banks depends on the equilibrium of lending competition.

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