

Entry Model Selection of Foreign Bank from the Aspect of Real Option

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Abstract: *According to traditional entry model theories, suitable entry model can be chosen by foreign banks through the comparison of cost and revenue. But these theories ignore the impact of entry timing to entry model selection. In this article, real option method is adopted. The conclusion is as following, when uncertainty is larger, partial invest will be preferred; the larger the first-mover advantage, the more possible to implement partial invest; if the investment become more irreversible, full investment is more possible to be carried out. According to the conclusion, this article analyzes the history, current situation and the future of foreign banks into China.*

Keywords: *Foreign Banks; Entry Model; Real Option*

1. INTRODUCTION

The most famous theories explaining the entry model selection of foreign banks including transaction cost or internalization theory, industry organization theory, organization learning theory, information economics, enterprise growth theory and agency theory. The six theories above choose the best entry model through the comparison of the cost and income of each entry model, and can be viewed as “motivation” theory. When deciding whether full entry of partial entry is better, the hypothesis is usually as following: if the difference of income and cost of full entry is larger than zero and that of partial entry, full entry is better. Otherwise, partial investment is better. But these theories ignore different entry timing can also influence the investment’s value. In some case, to wait will be better even if the NPV of full entry of partial entry immediately is bigger than zero. Therefore, researches of foreign banks’ entry mode are not enough. Influence of entry timing on entry mode selection needs much attention. Real option is a good method to deal with entry timing. This article will use real option to reconsider foreign entry mode and analyze China’s foreign bank’s entry mode decision. Stewart Mayers (1977) considers real option’s value is the NPV of all kinds of investment opportunity (or growth opportunity). Real option theory obtains promote development after the improvement from Kester, Trigeorgis, Brealey, especially Dixit & Pindyck who had written the famous “Investment under Uncertainty” in 1994. In 1990s, competition is adopted in real option theory and option game theory appeared (smets, 1991). This article will use two-stage simplified mode from Dixit& Pindyck (1994) to

analyze the foreign banks' entry mode selection. This article is arranged as following: the second part is the model. The third part is an application on China's foreign banks' entry mode. The last part is conclusion.

2. THE MODEL

Foreign banks have three choices to enter a country: full entry, partial entry or defer. When the investment is irreversible, or the recovery cost is typical high, the bank has to consider the opportunity cost of one kind of invest mode. Once the bank choose a invest mode, it will lost the other two opportunities, whose value will be the opportunity cost.

Suppose the initial investment cost is I , reversibility degree is a , and $a*I$ is the recovery value. If $a=1$, the investment is completely reversible. Suppose $a<1$, then the investment is not completely reversible. The smaller a is, the investment is more irreversible, or the recovery cost is higher. And a can be smaller than zero, which means that if the bank wants to recover to the initial status, the recovery cost is higher than the initial investment I . This is possible for bank. The investment that a bank wants to recover includes intangible assets besides tangible assets. Intangible assets, for example "reputation" is very particular. When a foreign bank quits from one country, the reputation will be destroyed if not treated suitably, which may reduce the mother bank's market value in an economic globalization environment. In order to eliminate the bad influence, the recovery cost may be higher than initial input. Suppose the reversibility degree for a full-entry foreign bank is a_F , and that for a partial-entry is $a_{F+\Delta a}$, where $\Delta a>0$. There are two reasons. The first is that, compared with partial investment, in the condition of disinvestment, solely foreign-owned bank's reputation damage is higher; The second is that, in order to protect the invisible asset, foreign bank is inclined to built solely owned enterprises, not joint venture. When such banks want to sell their assets, the buyer may obtain the business secret. So such banks are reluctant to sell off their assets and once they quit the market, the loss will be high.

Besides the initial investment cost I , both sole-ownership and non-sole-ownership foreign banks need a certain information and transaction cost to be acquainted with the local market and law, or to communicate with local authority. Because there is participation of local bank, information and transaction cost faced by partial investment will be less than that of full investment, and the less is supposed to be C_F .

If the foreign bank enters earlier, it may obtain a first-mover advantage which can also be viewed as second-mover disadvantage. P Tufano (1989), Mester(1995), Kim, Klige and Vale(2003),

Berge& Astrid A.Dick(2007) testify it is true that there is first-mover advantage in banking from the theoretical or empirical aspect. S. Ding (2014) proved that China's banking also has first-mover advantage. Suppose a foreign bank may pay ΔV more or the revenue will be ΔV less if the bank enters later.

Consider a two-stage model¹. Suppose there is exogenous uncertainty. And the present time is t_0 , the market price is P_0 ; At time t_1 , the value of the foreign bank will rise to V_u with the probability

¹ In this simplified model, we do not consider the influence of discount which will not affect the mail view point.

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of p and will decrease to V_d with the probability of $1-p$ which is shown in Fig 1. If the market situation is bad, the loss will be huge. And both the partial or full investment will quit the market and $a*I$ is the recovery residual.

Now the foreign bank will determine enter the market partly or fully, or just wait at time t_0 .



Fig. 1 Market situation at t_0 and t_1

At time t_0 , if the foreign bank enters fully, the value of this investment is

$$V_F = P_0 - I - C_F + p * V_u + (1 - p) * a_F I \quad (1)$$

At time t_0 , if the foreign bank enters partially (suppose the part that has been put into investment is $\beta * I$), it will have another investment opportunity, that is, if the market situation becomes better in the future, it can buy the remaining part $(1-\beta)*I$ of the non-sol e foreign bank and become full entry at an extra cost. When the market situation become s clearer and better, the value of the enterprise will increase and therefore, when the forei gn bank wants to buy the remaining part, it should pay more. Suppose the extra cost is C_e . When the market situation become worse, the bank can withdraw and the recovery va lue is higher than that of fully entry. The investment value of partial entry is

$$V_P = \beta(P_0 - I) + p * (V_u - (1-\beta)I - C_e) + (1-p) * \beta(a_F + \Delta P)I \quad (2)$$

At time t_0 , suppose the foreign bank defer the investment and wait to see. If the market situation becomes clearer and better in the future, the foreign bank will enter fully. If the market becomes worse, the bank will not invest. Then the value of the bank who choose to defer investment is

$$V_D = p(V_u - \Delta V - I - C_F) \quad (3)$$

Suppose there is no first-mover advantage, no extra cost and the irreversibility degree is the same for full and partial entry

Suppose the irreversibility degree is a_F . The value for full investment, partial investment and defer is as following:

$$V_F = P_0 - I + p * V_u + (1 - p) * a_F I \quad (4)$$

$$V_P = \beta(P_0 - I) + p * (V_u - (1-\beta)I) + (1-p) * \beta a_F I \quad (5)$$

$$V_D = p(V_u - I) \quad (6)$$

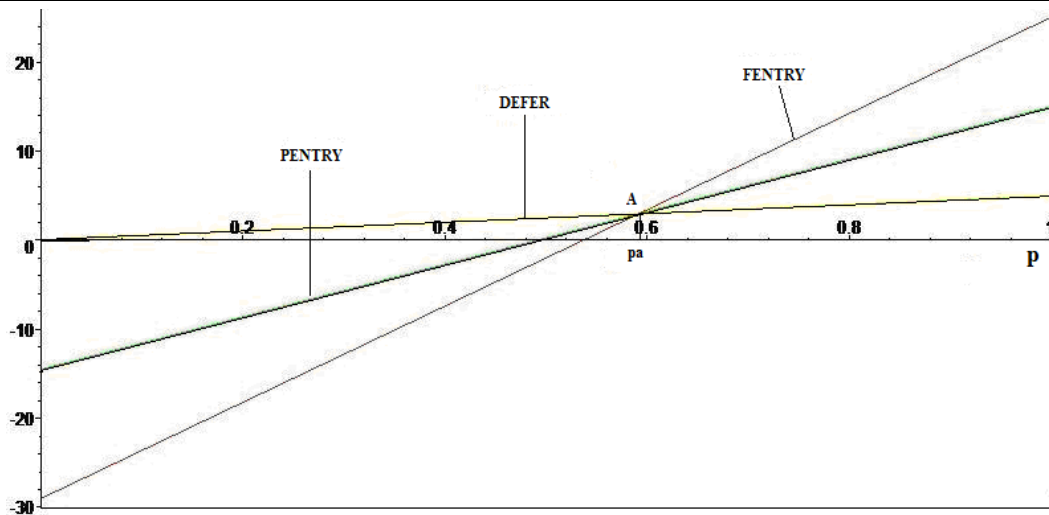


Fig.2 Value in the condition of no first-mover advantage, no extra cost and the same irreversibility degree

PENTRY represents the values of partial investment at different p . DEFER, the value of defer investment. FENTRY, the value of full entry. $p_0 = 20, I = 35, V_u = 40, a_F = -04, \beta = 0.5$

We put the value in Fig 2 supposing

$$p_0 = 20, I = 35, V_u = 40, a_F = -04, \beta = 0.5$$

From Fig. 2, A is the cross point and the probability is P_a . If $P < P_a$, the foreign bank will choose to wait. If $P > P_a$, the bank will choose to invest fully. For any p , the partial investment is not the best, but at the same time, at any p , it is not the worst. Therefore, for those investor who is not sure about the future, it is a safe way to invest.

2.1 Consider the influence of first-mover advantage

Suppose there is first-mover advantage, but no extra cost and irreversibility degree is the same. If invest later will make the foreign bank to gain less, then the value are respectively

$$V_F = P_0 - I + p^*V_u + (1 - p)^* a_F I \tag{7}$$

$$V_P = \beta(P_0 - I) + p^*(V_u - (1 - \beta)I) + (1 - p)^* \beta a_F I \tag{8}$$

$$V_D = p(V_u - \Delta V - I) \tag{9}$$

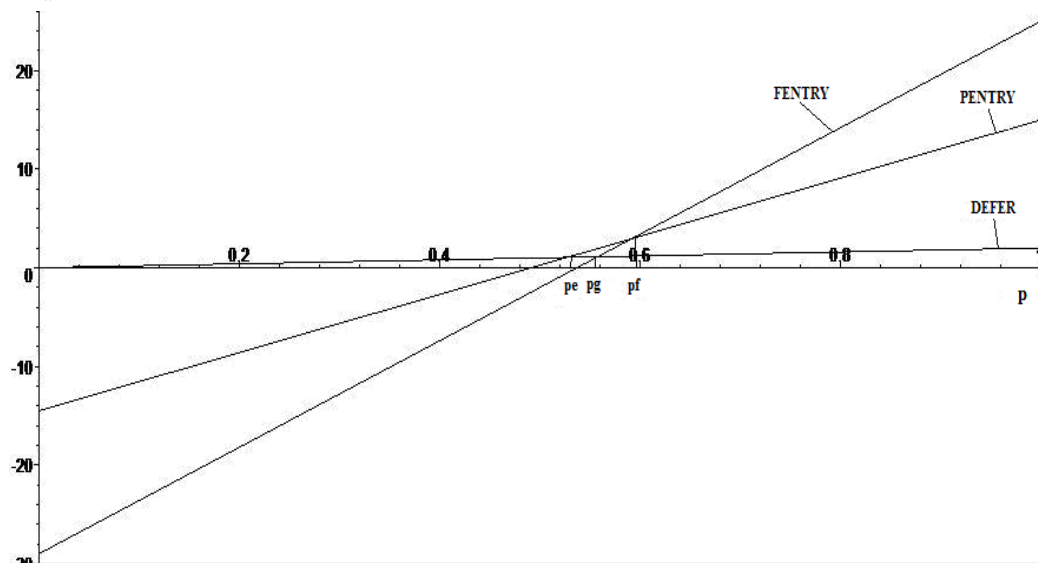


Fig. 3 The value in the condition of first-mover advantage

PENTRY represents the values of partial investment at different p. DEFER, the value of defer investment. FENTRY, the value of full entry.

$$p_0 = 20, I = 35, V_u = 40, a_F = -04, \beta = 0.5, \Delta V = 3$$

As Fig.3 shows, in the area $p_e < p < p_f$, $V_P > V_F > V_D$, then partial investment is the best. In the area $p_e < p < p_g$, to defer is better than full entry if partial investment is ignored, the bank should choose to defer but at the same time, it will lose first-mover advantage. If partial investment is considered, partial investment will be the best choice. In the area of $p_g < p < p_f$, full entry is better than defer, but partial entry is the best. p_e will move to the left gradually if the first-mover advantage ΔV becomes larger and the probability for the bank to choose partial investment is larger. In situation that the market fluctuate sharply, to defer investment may be more attractive. But if the bank is reluctant to lose first-mover advantage, partial investment may be a better choose.

2.2 Consider the Influence of Extra Cost

Assume that full entry will pay ΔC more than partial entry and there is no first-mover advantage and the irreversibility is the same. Then the value will be as following separately:

$$V_F = P_0 - I - \Delta C + p^* V_u + (1 - p)^* a_F I \tag{11}$$

$$V_P = \beta(P_0 - I) + p^*(V_u - (1 - \beta)I) + (1 - p)^* \beta a_F I \tag{12}$$

$$V_D = p(V_u - \Delta C - I) \tag{13}$$

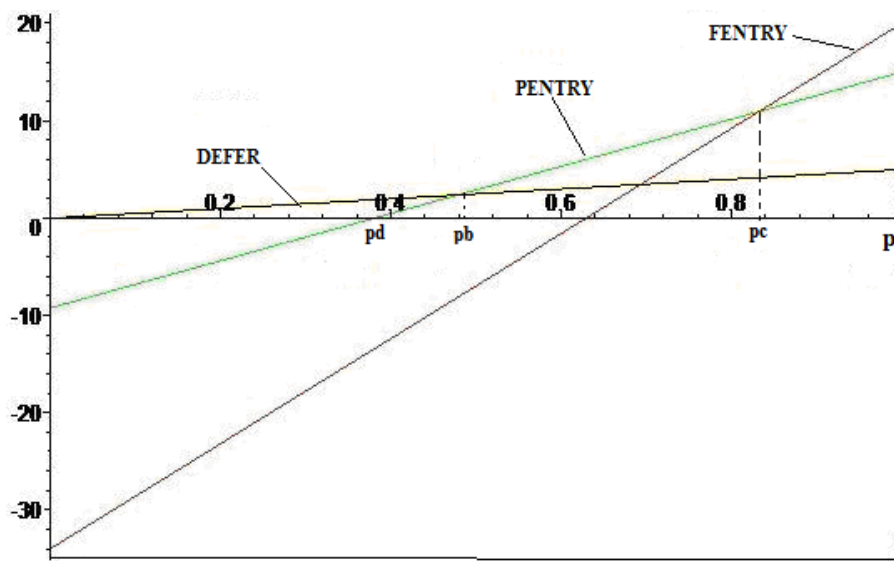


Fig.4 The value in the condition of extra cost for full entry

PENTRY represents the values of partial investment at different p. DEFER, the value of defer investment. FENTRY, the value of full entry.

$$p_0 = 20, I = 35, V_u = 40, a_F = -04, \beta = 0.5, \Delta C = 5$$

As Fig.4 shows, in the area of $p_b < p < p_c$, $V_P > V_F > V_D$, partial investment will be the best. As ΔC becomes larger, the difference between p_c and p_b is larger, and it is more possible to engage in partial entry. In the area of $p < p_b$, $V_D > V_P > V_F$, to defer is the best choice. In the area of $p_d < p < p_b$,

although V_P is larger than 0, that is if the bank enter partially, the NPV is bigger than zero, but the conclusion is still not to enter partial but to defer. The reason is that if the bank enters partially, then it will lose the opportunity to defer in the condition of irreversibility, which will be the opportunity cost of partial investment. From Fig. 4, this opportunity cost is higher than V_P , therefore, in the area of $p_d < p < p_b$, partial investment is not suitable.

2.3 Consider Different Degree of Reversibility

In this part, only the influence of reversibility is considered. Suppose the reversibility degree for full entry $a_F = -0.4$, and that for partial entry $a_F + \Delta a = -0.1$. Then the value will be as following separately:

$$V_F = P_0 - I + p^*V_u + (1-p)^*a_F I \tag{14}$$

$$V_P = \beta(P_0 - I) + p^*(V_u - (1-\beta)I) + (1-p)^*\beta(a_F + \Delta P)I \tag{15}$$

$$V_D = p(V_u - I) \tag{16}$$

Because the reversibility degree of partial investment is higher than that of full entry and in some certain area ($p_e < p < p_f$), partial investment is the best (As Fig. 5 shows). And if the difference between the two investment model's reversibility is higher, partial investment will be more possible.

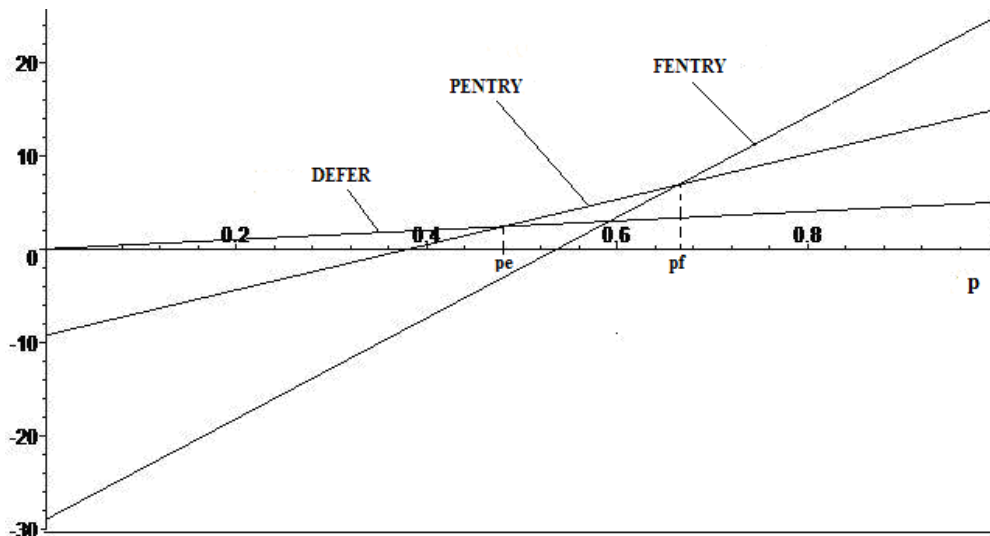


Fig.5 Value in the condition of different irreversibility degree

PENTRY represents the values of partial investment at different p. DEFER, the value of defer investment. FENTRY, the value of full entry.

$$p_0 = 20, I = 35, V_u = 40, a_F = -0.4, a_F + \Delta a = -0.1, \beta = 0.5$$

If the investment is reversible completely, the value will be as following separately:

$$V_F = P_0 - I + p^*V_u I \tag{17}$$

$$V_P = \beta(P_0 - I) + p^*(V_u - (1-\beta)I) + (1-p)^*\beta(a_F + \Delta P)I \tag{18}$$

$$V_D = p(V_u - I) \tag{19}$$

From Fig.6, the best choice is investment fully right now. There is no opportunity cost because the

bank can recover to the initial status at any time it likes. As far as the NPV of full entry is higher than 0, then the bank should enter.

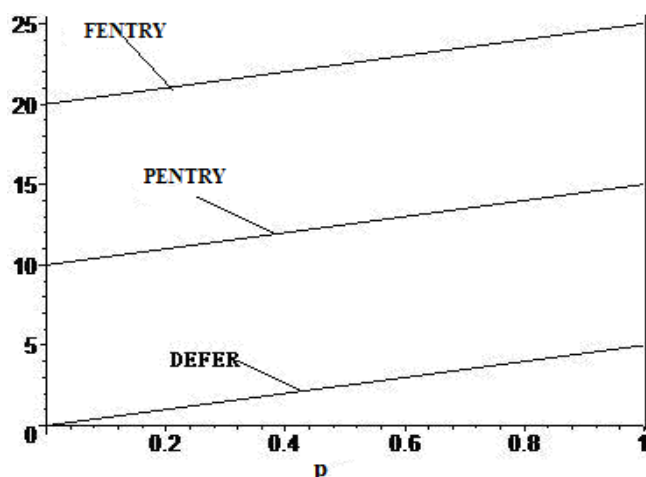


Fig. 6 Value in the condition of full irreversibility

PENTRY represent the value of partial investment at different p. DEFER , the value of defer investment . FENTRY, the value of full entry.

$$p_0 = 20, I = 35, V_u = 40, \beta = 0.5$$

From the analysis above, partial investment may be the best choice in some cases considering first-mover advantage, information and transaction cost economization, and more reversibility. It can also be concluded that in the area where P is in the middle, partial investment is more preferable. That means when the market is uncertain extremely, partial entry may be a better choice. In such circumstance, if the bank launch full investment, then the probability for the bank to be wrong is about 50%, because if the market turns down, the bank may regret for its initial decision and think defer may be better. But if the bank doesn't invest and just wait at the initial point, there is still a probability of 50% that the bank's decision is wrong. Because the market may develop for the better with the probability of 50%, and when the market become better, the banker may also regret for its initial decision and wish he had invested fully. So a compromised way, that is partial investment may be the best in such situation. But when the market fluctuation is not huge, for example, p is near to 1, full entry will be the best and the probability to make a wrong decision is little. And when p is near to 0, the best choice may be defer and the probability to make a wrong decision is also little.

3. APPLICATION IN CHINA

In China, partial entry for foreign banks includes joint-venture bank and joint-stock. From the year 1978 when China reformed and opened up, seven joint venture has been established. But three of them have changed into exclusively foreign-owned bank, two has changed into domestic bank, only 2 are left. Because the effect of joint-venture bank is small, this article will not analyze joint-venture banks but joint-stock.

In 1994, "Interim provisions on the investment in financial institutions" is released. but foreign banks are forbidden to invest in China's domestic bank. In 1999, China's banking sold their stocks to foreign banks which are called Strategic investors for the first time, Shanghai Bank accepted the stock investment from international finance corporation (IFC). In the end of 2001, foreign banks were authorized to invest in domestic bank with some restrictions, such as the individual foreign bank's stock share must be lower than 15% (which is raised to 20% since 2003), and that of all

strategic investor must be lower than 20% (which is raised to 25% since 2003). In Dec. 2003, “Regulation on foreign financial institution’s stock investment in China’s domestic banks” is issued. The regulation stipulates the qualification for a foreign strategic investor. Till 2010, there is 41 strategic investors in 32 China’s domestic banks and foreign investment reach to USD 384.2 Billion. The course for foreign banks’ stock investment in China can be divided into 4 stages. The first is from 1999 to 2000, the stock investment is rare and the investors are mostly non-profit international organization. The second stage is from 2001 to 2005. Profit foreign banks began to enter China’s Joint-stock commercial banks and City Commercial Banks. The third stage is from 2005 to 2008. Foreign banks’ partial entry becomes massively as China’s four State-owned commercial bank listed in stock market gradually and the five-years’ transitional period for China to join WTO has ended. The last stage is from 2008 till now. Some strategic investor begin to sell out Chinese bank’s stock.

Chart 1. *Foreign banks Assets in China (1998-2013)*

Year	1998	1999	2000	2001	2002	2003	2004	2005
Asset (Trillion RMB)	0.342	0.318	0.344	0.450	0.392	0.488	0.582	0.716
Proportion in Whole banking (%)	3.2	2.8	1.71	2.3	2.89	1.50	1.84	1.91

Year	2006	2007	2008	2009	2010	2011	2012	2013
Asset (Trillion RMB)	0.928	1.253	1.345	1.349	1.740	2.15	2.38	2.56
Proportion in Whole banking (%)	2.11	2.38	2.16	1.71	1.85	1.93	1.82	1.73

From Chart 1, the expanding of foreign banks in the form of full entry in China is not fast. In 2007, the market share measured by proportion in Whole banking reached the peak 2.38%, and began to decline later. Until 2013, the proportion is only 1.73%. The first reason is that when foreign banks enter, they face the second-mover disadvantage as Chinese local banks are the first mover certainly. In these years, Chinese local banks’ satisfaction degree is increasing, which increase the difficulty for foreign banks to enlarge. The second reason is that when foreign banks enter fully, the competition is intensified and the foreign banks’ full entry is deferred. But Chinese financial market is expanding fast, it is obvious that foreign banks will not be satisfied with only the 1.73% market share.

From the model in this article, when full entry is not suitable, it is not necessary to defer, the bank may enter partially. From 2001 when China opens banks’ stock to foreign investors, more and more foreign banks enter as strategic investor. Compared with full entry like building branches or subsidiaries, partial entry has many merits. Partial entry have more reversibility, may save some information and transaction cost, enter earlier to learn the market earlier, to share the profit earlier and avoid the second-mover disadvantage. When the market is unclear, partial entry is a kind of compromise; when the market become clear, partial entry has the merit of flexibility. Although in China, Chinese domestic bank’s stock share belonged to foreigner is not permitted to exceed 20%, which makes the foreign banks cannot buy the remaining share if the market becomes clear and better, partial entry still has some other advantages. The most obvious advantage is that the foreign bank can share fast-growing profit from China’s banking. The net profit growth rate for HSBC, Citi Bank, Standard Chartered, East Asia is 28%,19%,13%,12% separately, while that of the China banks they enter partially is 33.5%.

But from the end of 2008, some strategic investor began to sell out their stock shares in China's domestic banks. In the latter half of 2011, much more stock shares are reduced. Until Nov.2013, the vast majority of strategic investors have withdrew and obtain net profit of USD 27.283 billion. United Bank of Switzerland sell out all China banks share from May 2007 to the end of 2008. Goldman Sachs sell out all their stocks in ICBC in the year 2011,2012 and 2013.

One main reason for the foreign banks to reduce their stock share in China's bank is they need more capital to cater to the requirement of "Basel III

" the influence of subprime crisis and European debt crisis which came out in 2010, as the result of subprime crisis and European debt crisis. The other reason is that from 2008, the risk of China's domestic banks is enlarging. Much loans are thrown to industries of steel, photovoltaic, equipment manufacturing and shipbuilding which have been in huge loss in the first half of the year 2013. The loans to micro enterprises are also regarded as very dangerous. The withdrew of strategic investor reflect the flexibility of partial investment. When the future is bad, partial investment can disinvestment easier. Although some foreign banks withdraw from the partial investment, there are still many foreign banks want to enter this area. Temasek is increasing their share in Chinese banks in general, the same is BlackRock. And many other strategic investors show that they want to increase holding of stocks from China's city commercial banks.

4. CONCLUSIONS

When the market is uncertain extremely, partial entry may be a better choice. In such circumstance, if the bank launches full investment, then the probability for the bank to be wrong is about 50%. But if the bank doesn't invest and just wait at the initial point, there is still a probability of 50% that the bank's decision is wrong. So a compromised way, that is partial investment may be the best in such situation. But when the market fluctuation is not so huge, full entry or defer may be better. Partial entry can also obtain first-mover advantage and face lower information and transaction cost, the reversibility is higher, which all increase the attraction of partial entry. As far as China's foreign banks are concerned, from 2001, more and more foreign banks enter China partially because of the reasons above, such as uncertainty, first-mover advantage, smaller extra cost and so on. From 2008, lots of foreign banks quit their partial investment in China which reflect its merit of flexibility. But some foreign banks still want to enter partially into China's banking.

ACKNOWLEDGEMENTS

Supported by *Research on competence of commercial banks—the timing to enter (12CRJ16)*, Shandong Social Science Planning Research Project

REFERENCES

- [1] Allen N. Berger and Astrid A. Dick., Entry into Banking Markets and the Early-mover Advantage, *Journal of Money, Credit and Banking*, 39(4), Pp775-807, (2007)
- [2] Callem, P.S. and L.J. Mester., Consumer Behavior and the Stickiness of Credit-Card Interest Rates [J], *American Economic Review*, 85(5), Pp1327~1336, (1995).
- [3] Dexu He, Zhaoyang Wang, an review of motivation, form and influence of foreign banks' entry. *Contemporary finance* , issue1,(2007).
- [4] Dixit, Pindyck, *Investment under Uncertainty.*,Princeton University Press, 1994.

- [5] Kim, M., D. Kliger and B. Vale., Estimating Switching Costs: The Case of Banking, *Journal of Financial Intermediation*, 12(1), Pp25-56, (2003).
- [6] P Tufano., Financial Innovation and First-mover Advantages, *Journal of Financial Economics*, 25 (2), Pp213~240,(1989)
- [7] S. Ding, the timing to initiate banks by private capital, *Statistics and decision making*, Issue12,Pp152-154,(2014)
- [8] Smets F.,Exporting versus Foreign Direct Investment: the Effect of Uncertainty, Irreversibilities and Strategic Interaction ,Yale University,1991.
- [9] Trigeorgis, L., *Real Options: Managerial Flexibility and Strategy in Resource Allocation* [M]. MIT Press., 1996.