Study on the Withdrawal Way of Silk Road Fund under the Belt and Road Initiative Based on Game Theory Model

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Abstract. The Silk Road Fund is an important financial support of The Belt and Road Initiative, it has a strict investment operation process to realize the capital appreciation, so the withdrawal is crucial. This paper models the utility game and finds the game mechanism between Silk Road Fund and target enterprise. And then we put forward some referential suggestions such as choosing suitable withdrawal opportunity, perfecting talent team and information transmission mechanism, strengthening cooperation with local government, making effective use of gambling agreement and actively exploring new exit mode.

1 Introduction

Silk Road Fund mainly bases on equity investment, through diversified investment and financing methods such as equity, debt, and loans, focusing on commitment to the Belt and Road Initiative to provide investment and financing support of economic and trade cooperation and bilateral multilateral interoperability between the countries within the Belt and Road Initiative Frame, then it can promote China and the countries and regions along the Belt and Road Initiative to achieve common development and prosperity.

2 The importance of the Silk Road Fund withdrawal mechanism

Silk Road Fund has a strict investment operation process, “financial, investment, management, retirement” the four links complement each other, any problem on any part will affect the normal operation of the Silk Road Fund. Silk Road Fund’s ultimate goal is to achieve capital appreciation, rather than to always hold shares of enterprises. Silk Road Fund’s profit does not rely on the control of enterprise management, but through participation in project management to gain long-term capital earnings, it is a capital cycle and value-added process. The exit of the fund can also provide the basis for judging the success of the target project. And the investment return rate of the Silk Fund can be used to measure the investment efficiency of the target project. In order to maximize the benefits, the fund manager must choose the appropriate exit mode according to the target enterprise’s operating conditions and their own situation.

3 The classification of Silk Road Fund withdrawal way

At present, Private Equity fund exit methods are mainly IPO, target corporate repurchase, external transfer, liquidation and so on.

(1) the IPO. IPO way can obtain the largest value and the highest degree of return, the investment rate of return can be substantially more than expected, it can bring maximum economic benefits to the Silk Fund and the target companies. For the Silk Road Fund’s commercial projects, it tends to use the IPO withdrawal way.

(2) the target corporate repurchase. This approach is simple, and its time is short, the fund can quickly and completely exit, it’s more suitable for small investment projects.

(3) external equity transfer. Through the equity transfer the Silk Fund and the target companies can seek capital appreciation. This approach is simple, low cost, good capital mobility, high flexibility and low risk. But for the Silk Road Fund is a special PE funds to service the Belt and Road Initiative, there may be local government participation in the situation.

(4) bankruptcy liquidation. Bankruptcy liquidation means the failure of fund investment. Since bankruptcy liquidation is the sign of investment failure, the game analysis of the follow-up exit mode does not include bankruptcy liquidation.

4 The impact factors of Silk Road Fund withdrawal way

Silk Road Fund is a long-term development investment fund to achieve the Belt and Road Initiative,it is also a financial innovation under the Belt and Road Initiative. The Belt and Road Initiative advocates “all-dimensional,multi-level” interconnection, Silk Road Fund withdrawal way will inevitably be affected by various factors.

First of all,from a macro point of view,the withdrawal of the Silk Road Fund is mainly affected by three aspects:(1)business cycle.Silk Road Fund is an open investment platform,the countries and regions within the Belt and Road Initiative are likely to benefit.(2)capital market conditions.The capital market of each country and region along the route is characterized by its own characteristics.The higher the perfection of the capital market system,the greater the advantage of the equity transfer. (3)laws and regulations.The laws and regulations of the countries and regions within the Belt and Road Initiative to a certain extent impact the Silk Road Fund exit,strict laws and regulations can increase the difficulty of the Fund to withdraw.

Secondly,from the microscopic point of view,the withdrawal of the Silk Road Fund is mainly affected by two aspects:(1)the Fund’s own preferences.Return on investment (ROI) is a factor that fund managers often need to

		Silk Road Fund	
		α_1	α_2
target	β_1	$[I-F+M-(1-\pi)N, (1-\pi)N-C+rI]$	$[\pi(I-F)+M, (1-\pi)(I-F-C)+rI]$
enterprise	β_2	$[I-(1-\pi)N, (1-\pi)N]$	$[\pi I, (1-\pi)I]$

Figure 1 The Utility Game Matrix of Target Enterprise and Silk Fund

consider.(2)the status of the target enterprise itself.The industrial characteristics of the target enterprise,the development stage,the financial status and team changes and other factors also affect the withdrawal of the Silk Road Fund.

5 The game theory model of Silk Road Fund withdrawal way

As a important financial support of the Belt and Road Initiative,Silk Road Fund’s investment success or failure is related to the implementation of the strategy.On the choice of withdraw methods,the purpose of the Silk Road Fund and the target enterprise is not the same.The game theory is mainly to study the conflict of interest and consistency of the main body how to make decisions,as well as the interaction and impact of these decisions.Therefore,the withdrawal of the Silk Road Fund can be seen as a game between the Fund and the target enterprise.Since IPO and stock transfer are the most common and the most profitable two exit methods,this paper uses the two methods as the basic assumptions for game analysis.

5.1 Basic assumptions

- (1)Suppose the man-made Silk Road Fund and target enterprises.
- (2)Assume that The Silk Road Fund has two exit strategies:non-convertible securities (denoted as strategy α_1) and converted securities (denoted as strategy α_2); The target firm has two kinds of exit strategies:IPO (denoted as strategy β_1) and equity transfer (denoted as strategy β_2).
- (3)Assuming under the IPO exit mode,the total cost of the target enterprise to be listed is F,the Silk Road fund as a national strategy to support the financial innovation, due to the particular nature of their own,in order to assist the successful listing of the target business will also have some labor costs,time costs and opportunity costs,then it can be denoted by C($C<F$);Equity transfer’s cost of the two sides is very little,then it can be ignored.
- (4)Assume that the expected total return after the withdrawal of the Fund is I.And under the IPO,Silk Road Fund can get a reputation earning denoted by R, assume R is a linear function of I,then $R=rI(r>0)$;As the equity transfer is not open to market transactions,therefore the equity transfer’s reputation earning can be ignored.
- (5)Assume that before the exit,the Silk Road fund’s share is $1-\pi$,the target enterprise’s share is π .
- (6)Assume that the revenue of the target firm under the control right is M;when the Silk Road Fund does not implement the conversion of securities,the gain is $(1-\pi)N(N<I-F-C)$.

5.2 Game utility matrix and model analysis

According to the above hypothesis,the utility combination matrix of the exit strategy choice between the Silk Fund and the target enterprise is established.As shown in Figure 1.

As can be seen from Figure 1,(1) from the perspective of the target enterprise analysis: under the $\alpha_1\beta_1$ combination strategy,the gain is $I-F+M-(1-\pi)N$,under the $\alpha_1\beta_2$ combination strategy,the gain is $I-(1-\pi)N$.If $I-F+M-(1-\pi)N>I-(1-\pi)N$,that is when $M>F$,the target company will select the IPO withdraw way;If $M<F$,it indicates that the listing fee is too high,the target companies tend to choose the stock transfer withdraw way. under the $\alpha_2\beta_1$ combination strategy,the gain is $\pi(I-F)+M$,under the $\alpha_2\beta_2$ combination strategy,the gain is πI .If $\pi(I-F)+M>\pi I$,that is when $M>\pi F$,The target enterprise choose IPO,on the contrary it choose stock transfer.(2)From the perspective of the Silk Road Fund analysis: under the

$\alpha_1\beta_1$ combination strategy, the gain is $(1-\pi)N-C+rI$, under the $\alpha_1\beta_2$ combination strategy, the gain is $(1-\pi)N$. If $(1-\pi)N-C+rI > (1-\pi)N$, that is when $rI > C$, the reputation earning is larger than the additional costs, then the Silk Road Fund can choose IPO withdraw; on the contrary it choose stock transfer. Under the $\alpha_2\beta_1$ combination strategy, the gain is $(1-\pi)(I-F-C)+rI$, under the $\alpha_2\beta_2$ combination strategy, the gain is $(1-\pi)I$. If $(1-\pi)(I-F-C)+rI > (1-\pi)I$, that is when $rI > (1-\pi)(F+C)$, the Silk Road Fund can choose IPO withdraw; on the contrary it choose stock transfer. (3) For the whole market, the sum of the two sides of the game to be maximize is the best strategy. Under the $\beta_1\alpha_1$ combination strategy, the sum of the two sides of the game is $I-F+M-(1-\pi)N+(1-\pi)N-C+rI=I-F-C+M+rI$, denoted as U_1 ; under the $\beta_1\alpha_2$ combination strategy, the sum of the two sides of the game is $\pi(I-F)+M+(1-\pi)(I-F-C)+rI=I-F-(1-\pi)C+M+rI$, denoted as U_2 . For $1-\pi < 1$, then $U_2 > U_1$. It indicates that through the IPO way out, the Silk Road Fund should choose to convert securities, and now the total utility is U_2 . Under the $\beta_2\alpha_1$ combination strategy, the sum of the two sides of the game is $I-(1-\pi)N+(1-\pi)N=I$, denoted as U_3 ; under the $\beta_2\alpha_2$ combination strategy, the sum of the two sides of the game is $\pi I+(1-\pi)I=I$, denoted as U_4 ; then we can see that $U_3=U_4$. It indicates that through the stock transfer way out, it is just the redistribution of utility between the Silk Road fund and the target enterprise, and now both parties should make an integrated decision based on the financial situation or other performance indicators to arrive at an optimal exit plan.

Through the above analysis, we can see that reputation and listing fees is great impact factors when the fund managers to make decision. In theory, if the Silk Road Fund withdraw from the IPO, the total utility of the conversion of securities is greater than the total utility of not converting securities. The result may be caused by the social effect of the IPO exit and capital realization effect. If the Silk Road Fund to exit through the equity transfer, whether converse securities or not, the total effect is the same, and now, the financial situation or other performance indicators are also factors that fund managers should take into account when make the decision.

6 Summary and recommendations

The successful withdrawal of the Silk Road Fund is the end of the current round of capital cycle, but also the beginning of the next round of capital circulation. In view of how the Silk Road Fund could improve its exit mechanism, this article put forward some reference suggestions from the following several aspects. (1) the appropriate exit timing is very important. Under the IPO withdraw way after the target business growth period is the ideal high-speed exit time. Under the equity transfer withdraw way, the general selection is the maturity of the target enterprise to exit. (2) strengthen their own management, improve the personnel, perfect the information transfer mechanism. As the important financial innovation support of the Belt and Road Initiative, the Silk Road Fund should break the original economic and management model, attract interdisciplinary top-level talents and rich practical experience professional talents, establish a more sound, efficient comprehensive information access and delivery mechanism. (3) strengthen cooperation with the national and regional government within The Belt and Road Initiative. Silk Road fund's investment of large-scale projects usually has a certain social benefits to the countries and regions within The Belt and Road Initiative. This a mutually beneficial and win-win cooperation model. (4) make the effective use of the gambling agreement. Gambling agreements can be risk neutral and can reduce losses in the event of a capital appreciation failure at the end of the round. (5) actively seek other new withdraw ways. Silk Road Fund's political, economic and cultural environment is more complex and changeable, with the continuous development of the Silk Road Fund, we can follow the traditional withdrawal of the road while moving forward, and at the same time we can continue to explore more new withdraw ways which is suitable for the Silk Road Fund itself, meets the requirements of the new financial era, adapt to international capital market demand. This is in line with The Belt and Road Initiative strategy's requirements.

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