Research on the Average Capital and Average Capital Plus Interest of Financial Management of Logistics Enterprises

Li Dan  
Wuhan Donghu University Faculty of management  
Wuhan, China  
50444936@qq.com

Du Chengzhi  
Wuhan Donghu University Faculty of management  
Wuhan, China

Abstract— The average life expectancy of SMEs in China is 2.5 years, and the life expectancy of group companies is 8 years. The difficulty of financing and the high cost of financing can be said to be one of the factors that cannot be underestimated. As a logistics company, it needs financing when it is newly built, expanded, restructured or settled, and as an alternative way of repaying loans in financing, the average capital plus interest and the average capital. How to calculate? Which kind of repayment is cost-effective? What is the application status of each? In view of this, Literature Review Method, comparison method, and case method, and explores the average capital plus interest of the principal and interest, which are repaid in each period during the repayment period, which are equal to the principal and interest, and the principal and interest repaid in each period during the repayment period. The principal and interest are equal and the principal and interest repaid in each period are gradually reduced to the characteristic equal principal, and the equal principal and interest are mined. The calculation of the respective repayment quotas is derived by using the equivalence series and the equal principal. Item, Analysis of the interest on the equal principal and interest is NA-P, The interest of the average capital is \((N+1)^nP/2\), The characteristics of principal and interest in the two repayment methods are finally suitable for the logistics enterprise in the financing, the decision of the equivalent principal and interest or the equal principal and interest repayment loan, the same amount of principal repayment interest is equal to the equivalent principal and interest, and the equivalent principal is more suitable when repaying the loan in advance. However, the pressure on repayment of loans in previous periods was slightly higher than the conclusion that the principals were larger. In order to facilitate the logistics companies to choose the method of repaying loans in financing decisions, and promote the financing of logistics enterprises financing.

Keywords—logistics enterprise, financing, the average capital, the average capital plus interest, interest

I. INTRODUCTION

Logistics companies are popular in this sentence, logistics companies are faced with three mountains, volcanoes of profit, mountains of tax-bearing, icebergs of financing. It can be seen that the difficulty in financing and the financing of logistics enterprises has always been a normal problem. How to gradually manage it is a breakthrough in the development bottleneck of logistics enterprises and a problem that has to be faced with the better development of logistics enterprises. The article explores the average capital plus interest and the average capital method of repaying loans during financing in logistics financial management.

First, the underlying color mining: the consignment of the average capital and the average capital plus interest of the financial management of logistics enterprises

In the face of repayment of loans during the financing of logistics enterprises, it can be said that it is necessary to understand the average capital and the average capital plus interest, in order to decide which kind of loan repayment method is to be combined with the actual situation of the enterprise.

II. THE PRINCIPAL AND INTEREST ARE EQUAL: THE CONCEPT OF THE AVERAGE CAPITAL PLUS INTEREST

The average capital plus interest repayment loan refers to the sum of the principal and interest paid in each period when the loan is repaid during the loan period, that is, the principal and interest are constant and consistent. But in this composition, the change in principal and interest is not the same. With the passage of time, that is, the increase in the number of repayment periods, the principal is increasing, and the interest is getting less and less. The sum of the two and the principal and interest have indeed remained unchanged.

III. THE PRINCIPAL IS EQUAL: THE PASSWORD OF THE AVERAGE CAPITAL

The average capital plus interest repayment loan means that the principal and interest and interest paid in each period are gradually reduced during the repayment of the loan period, but the principal of each period of repayment is constant. It can be seen that the average capital amount is gradually reduced by the amount of repayment I, and it is more suitable for repayment in advance, because in the principal and interest that it pays back, the principal is always unchanged. In short, the amount which the average capital repay the loan, the increase in the number of concomitant repayment periods, the principal remains unchanged, and the interest reduction and interest rate are gradually reduced.

Second. Pre-conditions: Prerequisites for the study of the average capital and the average capital plus interest of the financial management of logistics enterprises
In the study of the average capital plus interest and the average capital of the financial management of the logistics enterprise, the preconditions were set, that is, the average capital plus interest and the average capital were subject to the final Principle, the two-point normalization principle, and the use of the nominal interest rate.

Assumption Premise: Final Principle and Two-point Normalization Principle

First of all, when calculating the repayment amount of the average capital plus interest and the average capital, one year is not the accounting year, and from January 1th to December 31th, there is no January, March, May, or July, August, October, and December are 31 days of the big month. April, May, June, September, and November are 30 days. In February, you have to look at the moon to decide whether it is 28 days. And very different, one year is 360 days, each month is 30 days.

That is, the loan repaid on any day of the month is equivalent to being repaid on the last day of the month, that is, on the 30th.

Finally, two-point Normalization Principle. That is, the I day of the month is the same as the last day of the previous month, and it belongs to the same point on the cash flow statement. For example, on March 30th and April 1st, is the same in the cash flow statement. It can also be expressed as the same time point at the end of March and the beginning of April.

IV. INTERPRETATION OF TOOLS: NOMINAL INTEREST RATE AND CASH FLOW STATEMENT

1. Exploring the monthly nominal interest rate and annual interest rate

In the interpretation of the repayment of the loan which the average capital plus interest and the average capital of the logistics enterprise carry out, the use of interest rates is defined. Generally given is the annual interest rate is $i_{\text{year}}$, and we calculate is to use the monthly interest rate $i_{\text{month}}$. Take the compound analysis for one year, \([(1 + i_{\text{month}})^{12}] = 1 + i_{\text{year}}\), we can get $i_{\text{month}} = \frac{1}{12}i_{\text{year}}$, this is the actual interest rate. However, in the case of equal principal and interest and equal principal analysis, the single interest analysis used directly: $i_{\text{month}} \times 12 = i_{\text{year}}$, $i_{\text{month}} = \frac{i_{\text{year}}}{12}$, and this is the nominal interest rate.

2. The use of cash flow statement tools

When conducting the financial management of the logistics enterprise, the median principal and interest and the equal principal analysis and repayment of the loan, for the convenience of analysis, usually use a tool, a simple cash flow statement, as shown below:

![Figure 1 Cash Flow Statement](image)

$P$ is the abbreviation of present, which is the loan amount and the meaning of the present value. $F$ is the abbreviation of future, which is the value of the loan amount in the future, and it is also the final value. $A$ is the abbreviation of average, which is the amount of each period of the equivalent principal and interest loan period, which is the sum of principal and interest and principal and interest. The nominal interest rate is used in $i_{\text{month}}$ (in order to facilitate derivation, $i_{\text{month}}$ after the article is the nominal interest rate, and is simply written as $i$), $N$ is the total loan period, calculated according to the month, such as loan 30 years, $N=30*12=360$, $n$ is the number of periods $\leq N$, which is the meaning of the I period.

3. The general term analysis: the calculation of the average capital plus interest of the loan repayment of the logistics enterprise and the repayment amount of the average capital

The logistics enterprise needs to analyze the amount of the average capital plus interest and the amount of the average capital to repay the loan in each way, so as to analyze the pressure of the equal amount of the average capital before repaying
the loan, is greater than the average capital plus interest, and the duration of them. The repayment amount is almost the same, which is convenient for decision-making of both decisions.

4. The calculation of the average capital plus interest based on the geometric progression

![Figure 2 Derivation of the average capital plus interest terms with the zero point as the research time point](image)

As can be seen from Figure 2-1, with 0 points as the research time point, all the periods, that is, the money returned in each period, will be discounted to 0 points during the loan period. For example, the discount on the 30th of January, the money A is discounted to:

\[ A \times \left( 1 + i \right)^{-1} \]

On February 30th, the money A is discounted to:

\[ A \times \left( 1 + i \right)^{-2} \]

on March 30th, the money A is discounted to:

\[ A \times \left( 1 + i \right)^{-3} \]

then the money in the nth period is discounted to:

\[ A \times \left( 1 + i \right)^{-n} \]

In this way, the amount of the loan, P, can be expressed as follows:

\[ P = \sum_{n=1}^{N} A \times \left( 1 + i \right)^{-n} \]

Obeying the law, this is an equal ratio series regards a1 = A as 1 item, whose common ratio q is \( \frac{1}{1+i} \). Formula using summation series summation S=

\[ S = a_1 \times \frac{1-q^n}{1-q} \quad (q \neq 1) \]

can be drawn that:

\[ P = A \times \frac{1}{1+i} + A \times \frac{1}{(1+i)^2} + A \times \frac{1}{(1+i)^3} + \ldots + A \times \frac{1}{(1+i)^n} \quad (n \leq N) \]

\[ = A \times \frac{1}{1+i} \times \frac{1}{1+i} = A \times \left[ 1 - \frac{1}{(1+i)^n} \right] \quad (n \leq N) \]

This is the general derivation process of the average capital plus interest of the financial management of logistics enterprises. Based on 0 points, the use of equal ratios. drawing that: \( P = A \times \left[ 1 - \frac{1}{(1+i)^n} \right] \quad (n \leq N) \) can directly roll out the monthly reimbursement quota: \( A = \frac{P \times i}{(1+i)^n-1} \quad (n \leq N) \).

5. The calculation of the equivalent principal amount based on the arithmetic progression

As can be seen from Figure 2-3, when the average capital of logistics enterprise repays the loan in the middle of the financial management, the principal in the principal and interest of each period is constant: \( P \times N \). The principal and interest of
the first month is: \( \frac{P}{N} + P \times I \), The principal and interest of the second month is \( \frac{P}{N} + \left[ \frac{P - P}{N} \right] \times I \). The principal and interest of the third month is: \( \frac{P}{N} + \left[ \frac{P - P}{N} \right] \times I \).

Based on this observation, it can be concluded that the general formula for the average capital repay loans can be expressed as: \( A_n = \frac{P}{N} + \left[ \frac{P - P}{N} (n - 1) \right] \times I \quad (n \leq N) \)

V. INTEREST COMPARISON: CALCULATION OF THE AVERAGE CAPITAL PLUS INTEREST AND THE INTEREST OF THE AVERAGE CAPITAL OF LOGISTICS ENTERPRISES REPAYING LOANS

What the businessman pursues is the interest, which is also determined by the nature of the enterprise of the logistics enterprise, that is, the organizational entity that is responsible for profit and loss and self-management for the purpose of making profits. Therefore, comparing the equal principal and interest of the loan repayment of the logistics enterprise with the interest of the equal principal amount is beneficial to the decision of the economic man who rationally pursues its own interests when financing.

1. Analysis of interest on repaying the loan by the average capital plus interest

When the loan is repaid in equal amount, the interest is the interest generated by the unpaid principal. Therefore, it can be seen that it is a “rolling” type of profit, and interest also generates interest. The total interest on the loan repayment is the sum of the total amount minus the sum of the sums: \( I_{total} = NA - P \)

2. Interpretation of interest on repaying the loan by the average capital plus interest

When the average capital plus interest is repaying the loan, the interest in the sum of the principal and interest of each period is the interest generated by the unpaid principal within one month, and the total interest can be derived from the following:

\[
I_{total} = P \times i + \left[ \frac{P - P}{N} \right] \times i + \left[ \frac{P - P}{N} \right] \times i + \ldots + \left[ \frac{P - P}{N} (n - 1) \right] \times i \quad (n \leq N)
\]

Analysis of the above arithmetic formula, we can find that the total interest is an arithmetic progression which regards \( a_1 = P \times i \) as first item, whose tolerance is \( d = -\frac{P}{N} \). Therefore, the summation formula of the arithmetic progression can be used:

\[
S = na_1 + \frac{n \times (n - 1)}{2} \times d \]

to derive the formula for calculating the total interest of the average capital:
\[
I_{total} = P \times i + \left[ P \times \frac{P}{N} \times i \times N \right] = \left[ P \times \left( \frac{P}{N} \right) \right] \times i \times \left( \frac{P}{N} \times (n-1) \right) \times i \quad (n \leq N)
\]

From the above formula, you can withdraw. If you want to calculate the total interest of the total repayment period, take \(n=N\), so the average capital’s repayment of the loan can be calculated as follows:

\[
I_{total} = P \times i + \frac{n \times (n-1)}{2} \left[ \frac{-P}{N} \right] \times i \quad (n \leq N)
\]

It should be pointed out that this formula: \( \frac{n+1}{2} \times P \times i \) this can only be used when \(n\) is equal to \(N\).

3. Practical drills: analysis of the average capital and the average capital plus interest’s repayment of a logistics enterprise loan

In order to expand the warehouse of the distribution center, a logistics company now makes a commercial loan of 2 million yuan to the Industrial and Commercial Bank of China in the form of mortgage, with a 10-year interest rate of 4.9%, and conducts a comparative analysis of the two methods of repaying by the average capital plus interest and the average capital.

4. Analysis of loans with the average capital plus interest repayment of 2 million 120 periods

It can be understood as \(P = 1.2\) million, \(N = 120\), \(i_{\text{month}} = 4.9\% / 12 = 0.00408\).

The monthly repayment amount \(A\) is 21115.48 yuan, the total interest \(I\) is 533857.49 yuan, and the total repayment amount is \(N \times A = 240 \times 21115.48\) yuan = 2533857.49 yuan.

Analysis of loans with the average capital repayment of 2 million 120 periods

The repayment amount for the I month is 24,833.33 yuan, the repayment amount for the II month is 24,765.28 yuan, the repayment amount for the III month is 24,697.22 yuan, and the repayment amount for the fourth month is 24,629.17 yuan, the fifth The repayment amount for the month is 24,561.11 yuan, and the repayment amount for the sixth month is 24,493.06 yuan, which is a equal difference series whose I item with 24,833.33 yuan, and the tolerance is equal to 68.05 yuan, \(N=120, P=1.2\) million. \(i_{\text{month}} = 4.9\% / 12 = 0.00408\). The total interest \(I\) is 494,083.33 yuan, and the total repayment amount is 2,940,083.33 yuan.

5. Comparison of the average capital plus interest and the average capital’s repayment

First of all, in terms of interest, 2 million yuan, 120, According to \(i_{\text{month}} = 4.9\% / 12 = 0.00408\), the interest of the average capital plus interest is 533857.49 yuan, and the interest of the average capital is 494083.33 yuan. Quantitative analysis, the average capital plus interest’s repayment of loan saved 39774.16 yuan than the average capital’s repayment of loan.

Furthermore, the pressure of repayment can be analyzed. The first month of repayment of the average capital’s amount is 24,833.33 yuan, and the repayment of the first month of the same amount of the average capital plus interest is 21,115.48 yuan and 3,718.85 yuan. And the repayment amount of the two ways of repaying the loan is relatively close, you can use the formula to analyze: \(21115.48=24833.33-68.05 \times (n-1)\), we can get \(n=54.634\). That is to say, in the 55th period, the average capital’s repayment, that is, the principal and interest, began to be less than the average capital plus interest. And this is the 55 repayment pressure, the average capital is greater than the average capital plus interest.

6. Mechanism Construction: Decisions on the average capital plus interest and the average capital’s repayment of the financial management of logistics enterprises

As the only scholar who won the Nobel Prize in management, Herbert Simon proposed management as decision-making, decision-making as management, and advocating the principle of satisfaction in making decisions. Then, when the logistics enterprise encounters the choice of loan repayment method during financing, how to choose the average capital plus interest or the average capital to repay the loan under the pre-condition of bounded rationality, the article has constructed its mechanism.

7. Factors for selecting the average capital plus interest

If the logistics enterprise is in the initial stage, according to the enterprise life cycle theory, the enterprise needs funds in the development stage. Therefore, more interest can be sacrificed to ease the pressure of repaying the loan. It is possible to choose
the same amount of principal and interest to repay the loan. After all, during the period of the loan, the repayment amount of all the periods is the same, although the principal of this A is gradually increased with the increase of the repayment period, and the interest is with the repayment period. The increase is gradually less, but A is constant, so it does not affect the logistics companies have more funds to invest in other matters or to ease their own repayment pressure.

8. Considerations for selecting the average capital

If the logistics enterprises own funds are still available, after the loan, there is a certain solvency, and the pressure to repay the loan can be assumed. Generally, according to enterprise life cycle theory, the logistics enterprise is mature and stable, and the average capital can be

After all, the way to repay the loan, after all, said that the pressure on repaying loans was higher than the average capital plus interest, but in general, the interest can be saved a lot.

VI. CONCLUSION

The article systematically analyzes the average capital plus interest of the loan repayment method of the logistics enterprise and the average capital. The cash flow statement is used from the assumption of the final principle and Two-point Normalization Principle, 360 days a year, that is, the nominal interest rate and other preconditions. Combining the principle of geometric progression and arithmetic progression, the average capital plus interest and the average capital calculation are deduced, and the equivalent principal and interest are obtained. Among them: $P = \frac{A}{i} \times \left[1 - \frac{1}{(1+i)^n}\right] \quad (n \leq N)$, $A_n = \frac{P}{N} + \left[P - \frac{P}{N} (n - 1)\right] \times i \quad (n \leq N)$ And the interest calculation formula of the two is calculated, $I_{\text{total}} = NA - P$ and $I_{\text{total}} = \frac{N+1}{2} \times P \times i$ . And combined with the example to analyze the logistics company in the financing, its the average capital amount of interest is less than the average capital plus interest to repay the loan, although the previous period of repayment pressure is higher than the average capital plus interest. The article uses the enterprise life cycle theory to propose the use of the average capital plus interest in the initial period, and the proposal to use the average capital in the mature stable period, taking into account the financing costs of the logistics enterprises and their own cash reserves.

REFERENCES