
Annuity and Differentiated Loan Payments: What to Choose

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Abstract: The article discusses two main types of loan repayment schemes - annuity and differentiated payments, as well as their advantages and disadvantages for borrowers. The author conducts a comparative analysis of these schemes using the example of a loan with a fixed amount and term. The impact of various schemes on the amount of monthly payments, the total overpayment on the loan and the financial planning of the borrower is considered. Detailed calculations for each scheme are provided, as well as graphs and tables showing the dynamics of debt repayment by month.

The results of the study allow us to conclude that the choice of repayment scheme depends on the financial preferences of the borrower and his ability to cope with different loads during the loan term.

Key words: annuity payments, differentiated payments, loan, overpayment, financial planning, monthly payment, repayment scheme, credit conditions, interest rate, debt load.

Introduction

The choice between annuity and differentiated loan payments is an important decision for both borrowers and credit institutions. Not only the amount of monthly payments depends on this, but also the total amount paid for the entire loan term. This article provides a comparative analysis of annuity and differentiated payments, considers their features, advantages and disadvantages, as well as graphs and tables illustrating the choice between the two types of debt repayment schemes.

Methodology

The following initial data were used to carry out the analysis:

- Loan amount: 500,000 rubles
- Loan term: 5 years (60 months)
- Annual interest rate: 12%
- Payments were calculated according to two schemes: annuity and differentiated.

For each type of payment, a table of monthly payments was built and the total costs of the loan were calculated.

Results

1. Annuity payments

The annuity payment is a fixed amount that includes both interest and principal repayment. With each month, the share of interest in the payment decreases, and the share of repayment of the principal debt increases.

Formula for calculating the annuity payment:

$$A = P \cdot i \cdot (1+i)^n / ((1+i)^n - 1)$$

where:

A-annuity payment

P-loan amount

i-monthly interest rate

n-number of months.

For these conditions, calculation of the annuity payment:

$$A=500000 \cdot (1+0.12/12)^{60} - 10.12/12 \cdot (1+0.12/12)^{60} = 11377.79$$

Thus, the borrower will pay RUB 11,377.79 monthly throughout the loan term.

➤ Differentiated payments

The differentiated scheme assumes that the principal debt is repaid in equal parts every month, and interest is charged on the remaining debt. Thus, the monthly payment gradually decreases.

Formula for calculating differentiated payment:

$$A_n = P \cdot n + (P - (n-1) \cdot nP) \cdot i$$

where:

A_n - payment in

n th month

$P \cdot n$ -part of the principal debt repaid each month

For the first month:

$$A_1 = 60500000 + 500000 \cdot 120.12 = 8333.33 + 5000 = 13333.33$$

In the second month:

$$A_2 = 60500000 + (500000 - 8333.33) \cdot 120.12 = 8333.33 + 4999.99 = 13333.32$$

Payments will decrease over time as interest is calculated on the outstanding balance.

➤ Comparative analysis

Table 1. Payments by month for the annuity scheme

Месяц	Платеж (руб.)	Основной долг (руб.)	Процент (руб.)
1	11 377.79	6 377.79	5 000.00
2	11 377.79	6 441.69	4 936.10
3	11 377.79	6 506.13	4 872.66
...
60	11 377.79	11 377.79	0.00

Table 2. Payments by month for a differentiated scheme

Месяц	Платеж (руб.)	Основной долг (руб.)	Процент (руб.)
1	13 333.33	8 333.33	5 000.00
2	13 333.32	8 333.33	4 999.99
3	13 333.31	8 333.33	4 999.98
...
60	8 333.33	8 333.33	0.00

Chart 1. Comparison of payments by month: Annuity and differentiated payments

A graph showing the dynamics of payments by month shows how annuity payments remain the same, while differentiated ones gradually decrease.

Advantages and Disadvantages

Характеристика	Аннуитетные платежи	Дифференцированные платежи
Сумма ежемесячного платежа	Фиксированная	Постепенно снижается
Переплата	Меньше	Больше
Удобство для заемщика	Легче планировать	Меньше финансовая нагрузка в конце срока
Общее время погашения долга	Равномерное	Быстрее погашение основного долга

Discussion

Both options have their own characteristics. The annuity scheme is convenient for the borrower, since he knows in advance the size of monthly payments, which simplifies financial planning. However, it involves a large overpayment on the loan, especially at the beginning of the term. Graduated payments, on the other hand, decrease over time and the borrower pays less in subsequent months. This may be attractive to those who are prepared for a high financial burden at the beginning, but receive better terms in the long term.

Conclusion

The choice between annuity and differentiated payments depends on the financial preferences of the borrower. Annuity payments are convenient for people who want a stable monthly burden, while graduated payments are suitable for those who can handle higher payments at the beginning of the term and want to reduce their overall loan overpayment.

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