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THE PAYBACK PERIOD METHOD IN PERSONAL FINANCE: APPLICATIONS AND IMPLICATIONS FOR FINANCIAL DECISION-MAKING

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Abstract. Personal finance represents an essential component of the financial well-being of individuals and households. In the contemporary environment, people are constantly required to make financial decisions related to education, housing acquisition, savings, investments, borrowing, and other aspects of personal financial management. The effectiveness of such decisions depends not only on the level of financial literacy but also on the ability to apply financial analysis methods to evaluate potential costs and expected benefits.

One of the simplest and most widely used methods for assessing investment efficiency is the Payback Period (PP), which measures the time required to recover the initial investment through future cash inflows. Due to its simplicity of calculation and ease of interpretation, this indicator can be applied not only in corporate finance but also in personal financial decision-making.

The purpose of this study is to analyze the applicability of the Payback Period method in the field of personal finance. The research is based on a review of academic and educational literature on personal finance, financial literacy, and investment appraisal methods, as well as on the examination of practical examples related to investments in education, energy-efficiency improvements, and lending relationships between individuals.

The findings indicate that, despite certain limitations in its practical application, the Payback Period method has several advantages and serves as an accessible tool for evaluating personal financial decisions. It enables individuals to compare alternative investment opportunities, assess the time required to recover invested funds, and support more informed financial decision-making. The results further suggest that the use of the Payback Period indicator may contribute to improving financial literacy and enhancing the quality of financial decision-making at both the individual and household levels.

Keywords: personal finance, financial literacy, investment appraisal, Payback Period, financial decision-making, household finance, cash flow, investment evaluation.

Аннотация. Персональные финансы играют важную роль в обеспечении финансового благополучия физических лиц и домашних хозяйств. В современных условиях люди постоянно сталкиваются с необходимостью принимать финансовые решения, связанные с образованием, приобретением жилья, сбережениями, инвестициями, кредитованием и другими аспектами управления личными финансами. Эффективность таких решений во многом зависит не только от уровня финансовой грамотности, но и от способности использовать методы финансового анализа для оценки возможных затрат и ожидаемых выгод.

Одним из наиболее простых и широко применяемых методов оценки эффективности инвестиций является срок окупаемости (Payback Period, PP), который показывает период времени, необходимый для возврата первоначально вложенных средств за счёт будущих денежных поступлений. Благодаря простоте расчёта и интерпретации данный показатель может использоваться не только в корпоративных финансах, но и при принятии персональных финансовых решений.

Целью исследования является анализ возможностей применения метода срока окупаемости в области персональных финансов. Исследование основано на изучении научной и учебной литературы по вопросам персональных финансов, финансовой грамотности и методов оценки инвестиций, а также на рассмотрении практических примеров, связанных с инвестициями в образование, мероприятиями по повышению энергоэффективности и организацией кредитных отношений между физическими лицами.

Результаты исследования показывают, что, несмотря на определённые ограничения практического применения, метод срока окупаемости обладает рядом преимуществ и является доступным инструментом оценки персональных финансовых решений. Он позволяет сравнивать альтернативные варианты инвестирования, оценивать сроки возврата вложенных средств и повышать обоснованность принимаемых решений. Полученные результаты подтверждают, что использование показателя срока окупаемости может способствовать повышению финансовой грамотности и совершенствованию процесса принятия финансовых решений на уровне отдельного человека и домашнего хозяйства.

Ключевые слова: персональные финансы, финансовая грамотность, оценка инвестиций, срок окупаемости, принятие финансовых решений, финансы домашних хозяйств, денежный поток, оценка эффективности инвестиций.

INTRODUCTION

The increasing complexity of modern financial markets and the growing variety of financial products and services require individuals to make numerous financial decisions throughout their lives. Decisions related to education, housing, durable goods, savings, investments, borrowing, and retirement planning can have a significant impact on an individual's financial well-being and long-term economic security. Consequently, the ability to evaluate financial alternatives and select appropriate courses of action has become an essential component of personal financial management [1–6].

In recent years, considerable attention has been devoted to improving financial literacy and strengthening individuals' capacity to make informed financial decisions. Financially literate individuals are generally better equipped to assess risks and opportunities, compare alternative options, and allocate financial resources efficiently. However, effective decision-making requires not only financial knowledge but also the ability to apply quantitative methods and financial indicators when evaluating potential investments and expenditures.

Various financial techniques and indicators can be used to assess the economic viability of financial decisions. Among them, the Payback Period (PP) is one of the simplest and most widely used methods for evaluating investment projects. This method determines the amount of time required to recover the initial investment through future cash inflows generated by a project or financial activity. Due to its simplicity, transparency, and ease of interpretation, the Payback Period can be applied not only in corporate finance but also in personal finance and household decision-making.

Despite its widespread use in business and investment analysis, the application of the Payback Period method to personal finance has received relatively limited attention in the literature. At the same time, individuals frequently make financial decisions that involve significant expenditures and future financial benefits, making the evaluation of payback periods highly relevant for personal financial planning.

Therefore, the objective of this study is to examine the applicability of the Payback Period method in personal finance and to evaluate its usefulness as a tool for supporting financial decision-making by individuals and households.

To achieve this objective, the following tasks are addressed:

1. To examine the role of financial literacy and quantitative methods in personal financial decision-making.
2. To analyze the theoretical foundations and calculation principles of the Payback Period method.
3. To identify the advantages and limitations of the Payback Period as a tool for evaluating financial decisions.
4. To demonstrate the application of the Payback Period method in various personal finance situations.
5. To compare alternative financial scenarios using the Payback Period method and assess their implications for financial decision-making.

The study contributes to the existing literature by demonstrating the practical applicability of the Payback Period method in personal finance and highlighting its potential as a simple and accessible tool for improving financial literacy and supporting informed financial decisions.

LITERATURE REVIEW

Personal finance plays an important role in ensuring the economic well-being of individuals and households. Kirtika Goyal, Satish Kumar, and Jingfei Xiao define personal finance as a field that examines how individuals, households, consumers, and families obtain, manage, and allocate financial resources to achieve their current and future financial goals [7]. In a rapidly changing financial environment, financial products and services are becoming increasingly complex, which requires individuals to possess an adequate level of financial literacy.

Khurram Rehman and Md Aslam Mia define financial literacy as the knowledge, skills, and confidence required to make sound financial decisions [8]. Throughout their lives, individuals make various financial decisions related to education, housing, consumption, savings, investments, borrowing, and retirement planning. The quality of these decisions directly affects financial stability, financial security, living standards, and the appropriate level of consumption.

Pham K. and Le V. argue that financial literacy should be considered through three key components: objective financial knowledge, subjective financial knowledge, and subjective financial ability [9]. Objective financial knowledge refers to an individual's actual level of financial understanding, measured through objective assessments of financial concepts, calculations, and investment-related knowledge. It reflects the ability to correctly understand and apply financial information in decision-making processes.

Subjective financial knowledge can be defined as an individual's self-assessment of his or her financial knowledge and ability to make financial decisions. It reflects confidence rather than actual competence and plays a significant role in shaping financial behavior, investment choices, borrowing decisions, and other financial activities. Subjective financial ability refers to an individual's perceived capacity and confidence to apply financial knowledge in real-life financial situations. While financial knowledge provides the theoretical basis for understanding financial concepts, subjective financial ability reflects the extent to which individuals believe they can effectively use this knowledge when making financial decisions.

Existing studies suggest that confidence in one's financial abilities plays a crucial role in shaping financial behavior, supporting decision-making, and promoting financial well-being. Therefore, subjective financial ability represents an important dimension of financial literacy, bridging the gap between financial knowledge and its practical application in everyday financial management.

Lusardi A. and Messy F.-A. suggest that financial literacy improves financial well-being by enabling individuals to make informed financial decisions, reduce behavioral biases, and use basic financial instruments more confidently [10].

The organization of an individual's financial relationships, including the formation, distribution, and use of personal and household financial resources, as well as the accumulation of savings and investment activities, is closely associated with the use of various financial and non-financial indicators. These indicators may be measured in monetary units, such as the national currency, as well as in other quantitative and qualitative units that help assess financial condition, financial performance, and the achievement of personal financial goals.

To manage personal finances effectively, every individual should have a basic understanding of mathematics and statistics and, in certain cases, econometric methods. The use of mathematical and statistical indicators provides an analytical foundation for evaluating financial information, comparing alternative financial decisions, assessing risks and returns, and making informed choices regarding savings, investments, borrowing, and other personal financial activities.

Among these indicators, the Payback Period (PP) is one of the simplest and most widely used methods for evaluating investment efficiency. The Payback Period measures the time required for cumulative cash inflows generated by an investment to recover the initial investment cost. Due to its simplicity, transparency, and ease of interpretation, this method can be effectively applied not only in corporate finance but also in personal financial planning and household decision-making. Therefore, examining the applicability of the Payback Period in the context of personal finance may contribute to a better understanding of individual financial decision-making and investment evaluation.

RESEARCH METHODOLOGY

This study employs a qualitative and analytical research approach. The research is based on a review of academic literature on personal finance, financial literacy, and investment appraisal methods. The analysis focuses on the applicability of the Payback Period (PP) as a tool for evaluating financial decisions made by individuals and households.

The Payback Period is one of the most widely used investment appraisal techniques in finance and financial management. It measures the length of time required for an initial investment to be recovered through future cash inflows or cost savings generated by the investment. Due to its simplicity, transparency, and ease of interpretation, the method is considered particularly suitable for personal financial decision-making, where individuals often prefer practical and easily understandable evaluation tools [11–23].

To demonstrate the practical applicability of the Payback Period method, several illustrative personal finance cases are analyzed, including investments in education, energy-efficiency improvements, and private lending arrangements. The results are used to evaluate the usefulness of the method for supporting personal financial planning and decision-making.

The application of the Payback Period method in personal finance is based on the assumption that individuals often prefer simple and understandable evaluation tools when making financial decisions. In contrast to more sophisticated methods such as Net Present Value (NPV) and Internal Rate of Return (IRR), the Payback Period requires minimal financial calculations and can therefore be effectively used by households when evaluating major expenditures, educational investments, energy-saving technologies, or income-generating assets.

The calculation procedure for the Payback Period depends on the nature of expected cash flows. When annual cash inflows are constant throughout the investment horizon, the Payback Period is calculated as the ratio of the initial investment to the annual cash inflow according to the following formula:

$$\text{Payback Period (PP)} = \frac{I_0}{CF}, \quad (1)$$

where:

- I_0 (initial investment) is the amount of financial resources invested at the beginning of the project or financial decision. In the context of personal finance, this may include expenditures on education, energy-efficient equipment, home improvements, professional training, business start-up costs, or other investments intended to generate future financial benefits;

- CF (annual cash inflow or annual savings generated by the investment) is the net annual financial benefit received as a result of the investment. This indicator can be measured as annual cash inflow or annual savings generated by the investment. It may take the form of additional income, reduced expenses, or a combination of both. In personal finance, examples include increased earnings after completing a training course, savings on utility bills resulting from energy-efficient technologies, reduced transportation costs, or additional revenue generated by income-producing assets.

In the situations where cash inflows are different across periods, the Payback Period is determined using cumulative cash flows. The annual cash inflows are accumulated until their total amount equals the initial investment. If full recovery occurs during a particular period, the fractional part of the year is calculated using the following formula:

$$\text{Payback Period (PP)} = n + \frac{(I_0 - \sum CF_t)}{CF_{(t+1)}}, \quad (2)$$

where:

- n means the number of years before break-even. It is the number of full years until the break-even point is met. In other words, it is the number of years the project remains unprofitable;

- I_0 (initial investment) – the amount of funds invested at the beginning of the project or financial decision;

- CF_t (cash flow in period t) – the cash inflow or cost savings generated during period t ;

- $\sum CF_t$ – the cumulative cash inflows or savings received from the beginning of the investment up to period t ;

- t means the number of the years from the beginning of investment period till the year the initial investment amount will be recovered;

- $(I_0 - \sum CF_t)$ means unrecovered amount that is understood to be the negative balance in the year preceding the year in which the cumulative net cash flow of the company exceeds zero;

- CF_{t+1} is the cash inflow or savings expected during the period in which the remaining unrecovered investment is fully compensated. It is the cash flow in recovery year the initial investment cost has been recovered and is now turning a profit.

- The resulting indicator shows the number of years (or other periods) required to recover the invested funds. A shorter Payback Period indicates faster recovery of financial resources and lower investment risk from the perspective of the individual decision-maker.

This study describes the possibility of the practical implementation of the Payback Period method to selected personal finance cases, including educational investments, energy-efficiency improvements, acquisition of income-generating assets, and other household financial decisions. The calculations can be based on projected cash inflows or cost savings associated with each investment alternative. The obtained results are subsequently used to evaluate the practical applicability of the Payback Period method in personal financial planning and decision-making.

ANALYSIS AND RESULTS

This section examines the applicability of the Payback Period method in personal finance by considering several investment decisions commonly faced by individuals.

The first example concerns investment in professional education, which can be regarded as an investment in human capital expected to generate future financial benefits. A practical situation can be used to demonstrate the application of Formula 1 in personal finance.

Suppose that an individual decides to enroll in a professional certification program in order to improve his qualifications and increase future earnings. The total cost of the training program is USD 2,400. Upon successful completion of the program, the individual expects to receive an annual salary increase of USD 600.

The useful life of educational investments is often associated with an individual's professional career and may range from 15 to 30 years, depending on the field of specialization, technological changes, and the need for further training. In this example, it is assumed that the newly acquired knowledge, skills, and competencies will provide economic benefits over a 10-year period by improving the individual's productivity, professional performance, and earning potential.

The Payback Period can be calculated using Formula 1 as follows:

$$\text{Payback Period (PP)} = \frac{I_0}{CF} = \frac{2,400}{600} = 4 \text{ years}$$

The Payback Period for this case is four years. Since the investment is recovered within this period, the remaining six years represent a period during which the educational investment continues to generate additional income and financial benefits.

Another practical situation can be considered to demonstrate the application of Formula 2 in the case of investment in energy-efficient home improvements. Suppose that a homeowner decides to replace old windows and install additional thermal insulation in order to reduce heating and cooling expenses. The total investment amounts to USD 3,000.

Due to seasonal factors and gradual improvements in energy efficiency, annual savings are expected to vary over time: USD 800 in year 1, USD 900 in year 2, USD 1,000 in year 3, and USD 1,100 in year 4. The useful life of energy-efficient windows and thermal insulation is estimated at 15 years. The calculations can be presented in tabular form, as shown in Table 1.

Table 1
Calculations of Payback Period for the Case of Investment in Energy-Efficient Home Improvements*

Number of Years	Annual Savings (Cash Flow), USD	Cumulative Cash Flow, USD	Remaining Unrecovered Investment, USD
0	–	0	3,000
1	800	800	2,200
2	900	1,700	1,300
3	1,000	2,700	300
4	1,100	3,800	-800

*Source: Author's own calculations.

At the end of the third year, the cumulative savings amount to USD 2,700, leaving USD 300 of the initial investment unrecovered. Now, we can use Formula 2:

$$\text{Payback Period (PP)} = n + \frac{(I_0 - \sum CF_t)}{CF_{(t+1)}} = 3 + \frac{300}{1,100} = 3 + 0.27 = 3.27 \text{ years}$$

Since the expected savings in the fourth year amount to USD 1,100, the remaining unrecovered investment is repaid after 0.27 of the fourth year. As a result, the Payback Period is approximately 3.27 years. Since the useful life of the energy-efficient improvements is estimated at 15 years, the homeowner will receive financial benefits for almost 12 years after the investment has been recovered.

As a third example, let us consider a hypothetical situation based on the practice of the Republic of Uzbekistan, with all calculations expressed in Uzbek soums (UZS). Suppose that an individual has accumulated savings of UZS 20 million. A close friend asks to use this amount for investment purposes for a period of four years and promises to repay UZS 32 million at the end of the agreed period.

Since the two individuals have a friendly relationship, they decide to discuss the most appropriate repayment arrangement. Several repayment options may be considered, each resulting in different cash flow patterns and, consequently, different Payback Periods. The results of their possible repayment arrangements are presented in Table 2.

Table 2
Alternative Repayment Options for a Private Loan Agreement*

Number of Years	Payment Options (million Uzbek soums)									
	A	B	C	D	E	F	G	H	I	K
0	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
1	0	8	5	2	4	10	1	3	6	7
2	0	8	7	4	6	8	3	5	7	8
3	0	8	9	10	8	6	8	7	8	9
4	32	8	11	16	14	8	20	17	11	8

*Source: Author's own calculations.

According to the data of Table 2, there are 10 different options for payments:

- option A – the entire amount is repaid at the end of the loan term;
- option B – equal annual repayments are made throughout the loan period;
- option C – repayments gradually increase over time;
- option D – the majority of the repayment is concentrated in the last two years;
- option E – repayments increase at a moderate rate over the loan period;
- option F – larger repayments are made at the beginning of the loan period;
- option G – small repayments are made in the initial years, followed by a substantial final payment;
- option H – repayments increase steadily from year to year;
- option I – relatively higher repayments are made during the first years of the loan period;
- option K – repayments are distributed almost evenly, with slightly larger payments made in the middle of the repayment period.

Now, we can calculate the Payback Period for each option (Table 3).

Table 3
Calculations of the Payback Period for Options A-K*

Number of Years	Annual Repayment (Cash Flow), mln UZS	Cumulative Cash Flow, mln UZS	Remaining Unrecovered Investment, mln UZS	Payback Period Calculations
Option A				
	–	0	20	$PP_A = 3 + \frac{20-0}{32} = 3.63 \text{ years}$
1	0	0	20	
2	0	0	20	
3	0	0	20	
4	32	32	-12	
Option B				
0	–	0	20	$PP_B = 2 + \frac{20-16}{8} = 2.50 \text{ years}$
1	8	8	12	
2	8	16	4	
3	8	24	-4	
4	8	32	-12	
Option C				
0	–	0	20	$PP_C = 2 + \frac{20-12}{9} = 2.89 \text{ years}$
1	5	5	15	
2	7	12	8	
3	9	21	-1	
4	11	32	-12	

Option D				
0	–	0	20	$PP_D = 3 + \frac{20-16}{16} = 3.25 \text{ years}$
1	2	2	18	
2	4	6	14	
3	10	16	4	
4	16	32	-12	
Option E				
0	–	0	20	$PP_E = 3 + \frac{20-18}{14} = 3.14 \text{ years}$
1	4	4	16	
2	6	10	10	
3	8	18	2	
4	14	32	-12	
Option F				
0	–	0	20	$PP_F = 2 + \frac{20-18}{6} = 2.33 \text{ years}$
1	10	10	10	
2	8	18	2	
3	6	24	-4	
4	8	32	-12	
Option G				
0	–	0	20	$PP_G = 3 + \frac{20-12}{20} = 3.40 \text{ years}$
1	1	1	19	
2	3	4	16	
3	8	12	8	
4	20	32	-12	
Option H				
0	–	0	20	$PP_H = 3 + \frac{20-15}{17} = 3.29 \text{ years}$
1	3	3	17	
2	5	8	12	
3	7	15	5	
4	17	32	-12	
Option I				
0	–	0	20	$PP_I = 2 + \frac{20-13}{8} = 2.88 \text{ years}$
1	6	6	14	
2	7	13	7	
3	8	21	-1	
4	11	32	-12	
Option K				
0	–	0	20	$PP_K = 2 + \frac{20-15}{9} = 2.56 \text{ years}$
1	7	7	13	
2	8	15	5	
3	9	24	-4	
4	8	32	-12	

*Source: Author's own calculations.

The Payback Period values have been calculated for all ten options from A to K. Based on these calculations, it is now possible to prepare a list of the most suitable proposals for both the investor and his friend, as presented in Table 4.

Table 4
Comparative Ranking of Repayment Options (A–K)
from Investor and Borrower Perspectives*

Option	Rank for Investor	Rank for Borrower	Payback Period (years)	Repayment Pattern
F	1	10	2.33	Larger repayments at the beginning of the loan period
B	2	9	2.50	Equal annual repayments
K	3	8	2.56	Almost even repayments with slightly larger middle payments
I	4	7	2.88	Relatively higher repayments in early years
C	5	6	2.89	Gradually increasing repayments
E	6	5	3.14	Moderately increasing repayments
D	7	4	3.25	Most repayments concentrated in the last two years
H	8	3	3.29	Steadily increasing repayments
G	9	2	3.40	Small initial repayments and large final payment
A	10	1	3.63	Lump-sum repayment at the end of Year 4

*Source: Author's own calculations.

From the investor's perspective, option F is the most attractive because it provides the fastest recovery of the initial investment, resulting in the shortest Payback Period of 2.33 years. In contrast, option A is the least attractive for the investor, as the entire repayment is received only at the end of the loan term, resulting in the longest Payback Period of 3.63 years.

From the borrower's perspective, the ranking is reversed. Option A is the most favorable because it allows the borrower to retain the funds for the longest period before repayment. Conversely, option F is the least favorable for the borrower, as it requires substantial repayments during the early years of the loan period.

The results demonstrate that although all repayment options generate the same total repayment amount of UZS 32 million, the timing and distribution of cash flows significantly affect the Payback Period and, consequently, the attractiveness of each option to both parties.

From a negotiation perspective, neither the investor nor the borrower is likely to prefer the option that is most favorable to the other party. Therefore, a compromise solution may be found among the repayment options ranked in the middle of the distribution. In the present case, options C and E appear to provide a reasonable balance between the interests of both parties. These options allow the investor to recover the invested funds within a relatively short period while avoiding excessive repayment pressure on the borrower during the early years of the loan term. Consequently, they may be considered the most mutually acceptable repayment arrangements.

The results indicate that the timing of cash flows may be more important than the total repayment amount when evaluating investment attractiveness. Although all repayment options generate identical total returns, substantial differences in Payback Periods are observed. This finding highlights the importance of considering the temporal distribution of cash flows in personal financial decision-making.

CONCLUSION AND RECOMMENDATIONS

The study examined the applicability of the Payback Period method in the field of personal finance. The findings demonstrate that this method can be successfully used not only in corporate finance but also in evaluating various financial decisions made by individuals and households. Due to its simplicity and ease of interpretation, the Payback Period method may serve as an effective tool for improving financial decision-making and promoting financial literacy.

The analysis of practical cases showed that the timing and distribution of cash flows significantly influence the Payback Period, even when the total amount of repayments remains unchanged. In particular, repayment arrangements involving earlier cash inflows result in shorter Payback Periods and faster recovery of the initial investment. Conversely, postponing repayments increases the Payback Period and reduces the attractiveness of the investment from the lender's perspective.

The results also indicate that the Payback Period method can be applied to a wide range of personal finance decisions, including investments in education, energy-efficient home improvements, and private lending arrangements between individuals. Furthermore, the proposed repayment scenarios demonstrate that

the method can assist individuals in comparing alternative financial arrangements and selecting the option that best corresponds to their objectives and financial constraints.

Based on the findings of the study, the following conclusions and recommendations may be formulated:

- the Payback Period method can be incorporated into financial literacy programs as a simple and practical instrument for evaluating personal financial decisions;
- individuals should consider not only the total expected return but also the timing of future cash flows when making investment or lending decisions;
- although the Payback Period method does not fully account for the time value of money or investment risk, its simplicity makes it particularly valuable for individuals with limited financial knowledge and experience;
- by providing a clear measure of how quickly invested funds can be recovered, the method supports more informed and rational financial behavior;
- as personal finance becomes increasingly important in modern society, the integration of straightforward analytical tools such as the Payback Period method can contribute to better financial planning, improved resource allocation, and the development of long-term financial well-being for individuals and households;
- the Payback Period method should be used together with other financial indicators, such as Net Present Value (NPV) and Return on Investment (ROI), in order to obtain a more comprehensive assessment of financial efficiency.

The study confirms that the Payback Period method has considerable potential as a practical instrument for personal financial analysis. This method can support individuals in making more transparent, objective, and financially sound decisions. In the context of increasing financial complexity and growing personal financial responsibility, the use of simple analytical techniques may play an important role in strengthening financial literacy and enhancing the quality of personal financial management.

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