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Assessing and managing inflation risk in funding investment projects

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ABSTRACT

This research assesses and manages inflation risk and international crises in funding investment projects. Using an analytical-descriptive approach and a case study in a pharmaceutical company and with the help of Python coding, the effects of different inflation rates and cost of capital (WACC) on NPV and IRR metrics were analyzed. The numerical findings of the study showed that with the inflation rate rising from 10% to 20% and then 30%, the internal rate of return (IRR) of the project would increase from 32.55% to 46.40% and 59.54% respectively. Also,in the base scenario with an inflation rate of 20% and a capital cost of 27.25%, the net present value (NPV) of the project amounted to 12,056 million riyals was calculated. The sensitivity analysis confirmed that even in the most pessimistic scenario (inflation = 30% and WACC = 35%), the NPV of the project remains positive and equal to 5,349 million riyals.

The results suggest that in projects with inflation-adjusted revenues, the increase in inflation can be accompanied by an increase in NPV and IRR, provided that the IRR exceeds the WACC. This research confirms the need for integrated management of macro and micro risks for the success of long-term investment projects.

Keywords: inflation risk, project financing, investment, project evaluation, net present value (NPV), internal rate of return (IRR).

1. Introduction

Financial crises in the world are constantly taking shape and under the process of financial contagion, they are moving from one country to another. So given the degree of financial integration between countries, these crises can affect several countries in the world with different intensities. In the meantime, what makes these crises better observed is the simultaneous impact they have on the currency market and the capital market in different countries of the world(Pierrot, 2023). In this regard, it is necessary to monitor the impact of financial crises on the capital market in countries as well as possible to minimize possible risks by making the right decision. Accordingly, it is necessary to analyze the main channels for transferring the financial crisis to capital markets. The main channels of the impact of financial crises on the capital market in developing countries can be seen in the form of money markets, foreign financial flows to the capital market and the foreign trade sector(Zubair, 2020). According to studies conducted in the field of global financial crises by the International Monetary Fund, it can be noted that the financial contagion channel and the recession contagion channel are among the main channels of the financial crisis to the capital market in developing countries. The spread of the recession comes from the trajectory of trade and the price of commercial goods, foreign direct investment, international transfers of funds, commercial loans and grants. And in the meantime the main emphasis is on the export channel. Because developing countries that rely on exports are affected by the change in the price of their export goods in international markets, they face a decrease in export revenues and a deficit in foreign balance payments.(Divorce and colleagues, 1399).

In today's global economy, investment projects face a complex, dynamic and perrisky environment. Macroeconomic risks, especially inflation and international crises, are among the most important factors that can jeopardize the financial continuity, implementation and success of these projects (Miller & Lessard, 2008). Long-term projects are more vulnerable to these risks due to their long implementation period, commitment to large financial resources, dependence on advanced technologies and communication with international networks. Financing large projects and new infrastructure is one of the main concerns of the management of economic enterprises. Therefore, it is necessary to take into account various considerations in the forecast of resources and expenditures. Long-term investments are usually at risk of inflation, especially short-term financing to continue long-term projects is always challenging because the management of the enterprise must always make different decisions between the needs of working capital and fixed investment so that the effectiveness of the activities is maximized. Inflation usually directly affects financing and this effect is related to both the burden of the funders and the requesting companies therefore, the need for careful monitoring of the development of comprehensive plans and compensation plans with vigilance and management follow-up can lead to a reduction in the risk of inflation so that a flexible and appropriate financial model can be developed to reduce potential damaging effects or avoid future effects if unpredictable or chronic sustainability. Project financing and budgeting decisions are among the long-term and very important decisions in economic enterprises. Since these projects take up a lot of resources and time from the exploitation stage to the end of their useful life, and the funds allocated to these decisions have a significant volume, they face various risks such as inflation risk. Inflation risk or purchasing power risk refers to the likelihood of asset or income depreciation due to the depreciation of a country's monetary unit. It is now thought that if this risk coincides with an international crisis such as the covid-19 pandemic, the synergy of the two lesions will lead to a loss. Given the intensity of competition as well as the trend of continuous changes in the financing variables of investment projects, it is necessary for companies active in this field to seriously pay attention to the issue of risk management and possible international crises. Given that investing from start to commercialization is time-consuming, costly and laborious, it is therefore essential that organizations active in financing move towards reducing inflation risk. The study of the current state of these investment companies shows that unfortunately, these companies, there are no plans or attitudes towards these types of risks and crises that are very common today. In order to promote successful financing of investment projects, it seems necessary to examine variables such as inflation risk and international crises. Now we're faced with the question of whether inflationary risk and international crises, as well as the components of

these two, can have an impact on the success of funding investment projects.

Investment in countries such as Iran has specific conditions, depending on political, religious, cultural and social relations, and consequently different systematic and non-systematic risks and is part of the financing of projects. Inflationary risk is one of the most inflamed risks in countries like Iran, Venezuela and... It's that the return on investment puts investors at a lot of risk. Many projects face the challenge and lack of investment due to the lack of political and economic stability, which includes risks such as inflationary risk. Now, if the specific conditions of the aforementioned countries are accompanied by international crises such as covid-19, these investment risks will increase, and in view of the current situation in Iran, on the one hand, with the cruel sanctions of the US terrorist regime that have greatly increased the cost of living and reduced the public welfare, and on the other hand, the pandemic that has occurred since 1398, which experts believe will be affected by for years, we will see a very inflamed inflationary risk in view of the above conditions, which requires the definition of processes to detect and correct injuries.

The research questions

How does inflation risk affect domestic net worth in financing projects? How does capital cost risk affect the internal rate of return on project financing?

Theoretical foundations and research literature

In today's complex and dynamic global economy, investment projects face many challenges and risks. Meanwhile, macroeconomic risks, especially inflation and international crises, are the most important factors that can jeopardize the financial continuity, implementation and success of these projects. Long-term projects are more vulnerable to these risks due to their long implementation period, commitment to large financial resources, dependence on advanced technologies and communication with international networks.

A comprehensive study conducted by fleibergh et al. (2018) on two thousand large investment projects in twenty different countries shows that about ninety percent of large investment projects face cost deviations of more than fifty percent of initial estimates, a significant part of which is due to inflationary risks and international crises. The study shows that infrastructure projects cost an average of forty-five percent more than the initial estimate, with sixty percent of the cost increase related to the effects of inflation and international crises.

A case study conducted by the World Bank (2022) on energy projects in developing countries shows that fluctuations in exchange rates and inflation alone were responsible for thirty-five percent of the financial failures of projects. These statistics show the growing importance of managing these risks in the success of investment projects. The importance of this research can be examined and explained in various dimensions. First, it's the growing complexity of the international business environment that has increased the degree of uncertainty in financial decision-making. In the past decade, the world has seen rapid developments in technology, geopolitical changes, and institutional developments that have all affected the stability of the business environment.

The second dimension is the increasing interdependence of national economies, which has caused financial crises in one region to spread rapidly to other regions of the world. The 2008 financial crisis, the eurozone crisis in 2012, and the covid-19 pandemic are clear examples of this contagion. A study by the International Monetary Fund (2021) shows that the rate of contagion of financial crises has increased by an average of forty percent in the past two decades.

The third dimension is the long-term nature of investment projects that expose them to multiple systematic risks. Large projects usually have a period of 20 to 30 years of design, construction and operation, and in this long period of time, the likelihood of facing economic and political shocks increases.

A study by the World Bank (2022) shows that investment projects in developing countries face an average inflation rate of 15-25% and currency fluctuations of 30-40%. These fluctuations can severely affect the actual returns of projects.

Theoretical basis of inflation risk in financing

The theory of the amount of money presented by Irving Fisher has a direct relationship between the volume of money and the general level of prices. This

relationship is extracted from the exchange equation, where the volume of money, the speed of money circulation, the level of prices and GDP are the main factors. In inflationary conditions, this relationship shows that increasing the volume of money without a proportional increase in production leads to an increase in the general level of prices.

In the field of project financing, the theory of some money has important implications. First, increasing the volume of money leads to a decrease in the actual value of borrowed funds, which can benefit borrowers. Second, rising inflation is usually associated with higher nominal interest rates, which increases the cost of financing. Thirdly, inflation can lead to incorrect allocation of resources, which reduces the efficiency of investments.

An experimental study conducted by Barrow (1995) on data from a hundred countries in the period 1990-1960 shows an inverse relationship between inflation and investment rates. For every ten percent increase in inflation, the investment rate drops by about half to one percent. This relationship is especially evident in high-inflation countries.

The cost pressure inflation theory proposed by Keynes attributes the increase in production costs, including wages and raw material prices, to the main cause of inflation. This theory explains how supply shocks can create inflation, which is very important for investment projects. Within the framework of this theory, the increase in production costs can be due to various factors: the increase in wages over productivity growth, the increase in the price of raw materials and energy, the increase in transportation costs, and the increase in tax and regulatory costs. For investment projects, cost pressure inflation has certain consequences. These consequences include increased project execution costs, longer project execution times, and the need to revise the design and technical specifications of the project.

Mechanisms of the impact of inflation on project financing

These are the mechanisms. Inflation leads to higher nominal interest rates, which increases the cost of debt financing. According to a comprehensive study by Graham and Harvey (2001) based on a survey of four thousand CFOs in the United States, a one percent increase in inflation could lead to a 0.7 to 0.9 percent increase in capital expenditure.

The study shows that the effect of inflation on the cost of capital depends on several factors: the structure of the company's capital, the tax rate, the degree of confidence in monetary policy, and the conditions of the capital market. Under high inflation, Companies tend to lean towards financing through short-term debt, which can increase liquidity risk.

The cash flow channel is the second most important mechanism of the influence of inflation. Inflation reduces the real value of future cash flows. This is especially problematic for projects with a long return on investment period. A study by livestock farmers (2022) based on data from thousands of American companies shows that in high-inflation environments, the current value of future cash flows can decrease by up to 40-50 percent.

The effect depends on the following factors: the length of the return on investment period, the degree of pricing flexibility, the ability to adjust costs, and the presence of adjustment clauses in contracts. Projects with a longer return on investment are at higher risk of inflation. The capital budgeting channel is the third mechanism of influence of inflation. Inflation can distort capital budgeting calculations, including net present value and internal rate of return. This leads to poor investment decisions. An experimental study by Pike (1996) shows that in inflationary conditions, the use of traditional capital budgeting methods can lead to the rejection of profitable projects and the acceptance of lost projects.

Models for measuring and managing inflation risk

The expected inflation adjustment model is one of the most important models for measuring inflation risk. In this model, future cash flows are adjusted based on the expected inflation rate. This model requires accurate estimates of future inflation rates. A study by the Central Bank of Iran (1401) shows that the use of the average expected inflation rate can increase the accuracy of forecasts.

The actual degradation rate model is the second most important in this area. In this model, the actual degradation rate is used to calculate the current value. This model is suitable for projects with fixed cash

flows. But in a situation where cash flows are adjusted to inflation, more adjustments may be needed.

The index model is the third most important model. In this model, financial variables are adjusted based on inflation indicators. This model is especially applicable to long-term contracts. A case study by Smith (2020) shows that using indexing can reduce the risk of inflation by up to seventy percent.

Integrated Risk Assessment Model

Integrated models have been developed to simultaneously assess inflation risk and international crises. The Monte Carlo simulation model is one of these models. This model can assess the simultaneous effects of inflation risk and international crises on project cash flows. In this model, key economic variables are simulated randomly. A study by Moon (2020) shows that the model can accurately predict the financial consequences of systematic risks by 85-90%.

The implementation steps of the model include: identifying effective key variables, estimating the probability distribution of variables, simulating different scenarios, analyzing the sensitivity of results, and determining the probable scope of consequences. This model helps project managers to better understand the mutual risks and their combined effects on the project.

The value-at-risk conditional model is the second most important model. This model examines the worst possible scenarios in the context of simultaneous inflationary and international crises. This model is suitable for high-risk projects. The advantages of this model include: taking into account the risk of distribution tail, mathematical cohesion, optimization capability, and adaptability to various types of distributions.

The multivariate regression model is the third. This model analyzes the relationships between macroeconomic variables and project performance. A study by Standard & Poor's (2021) shows that this model can explain 70-80% of the variance in project performance.

Combined strategies for risk management

The use of Islamic Financial Instruments is one of the important strategies of risk management. Islamic financial instruments such as sukuk can be a good way to manage macro-risks. A study conducted by the Islamic Financial Services Board (2022) shows that Sukuk has inherent characteristics to deal with systematic risks.

The benefits of sukuk include: direct communication with Real Assets, profit and loss sharing, abstinence from usury, and moral considerations. These qualities make Sakuk perform better in times of crisis.

The design of hybrid financing structures is the second most important strategy. Combined financing structures where domestic and foreign, short-term and long-term resources are used can provide the necessary flexibility in crisis situations. A study by the organization for Economic Cooperation and development (2021) shows that projects with a combined funding structure are 30% less likely to fail financially. The development of domestic financial markets is the third strategy. The development of domestic financial markets can reduce dependence on foreign resources. A study by Levin (2005) shows that financial development can help reduce vulnerability to international crises.

The theory of first-generation currency crises (Krugman, 1979) emphasizes the role of fiscally and monetary incompatible policies. The second generation theory (abstfeld, 1994) focuses on the role of expectations and self-realization. The third generation theory (Krugman, 1999) emphasizes currency mismatch in the balance sheet of companies. In internal studies, Mohammadi and colleagues (1400) showed that for every 10 percent increase in inflation, the cost of funding increases by an average of 5/7 percent. Rezaei and Ahmadi (1399) found that international sanctions had led to a 35 percent increase in the cost of financing oil and gas projects. In foreign studies, Dailami and haswald (2007) emphasized the importance of the funding structure in the management of systematic risks. Zubair et al. (2020) showed that small and medium-sized enterprises ' investment decreases sharply during the financial crisis. Pierrot et al. (2023): in his study entitled, How reactive is investing in U.S. bonds and stocks in times of crisis? They look at the economic consequences of economic crises. Unlike the standard index (S & P) 500, the reaction of ESG bonds and markets to the economic crisis is nonlinear: the low level of the economic crisis has a positive impact on investment. Zubair et al. (2020) : in a study titled, Does the financial crisis change the impact of financing on investment? The

results show that investments by small and medium-sized private companies have decreased significantly both during and after the financial crisis. In addition, investments during the crisis are less dependent on domestic financial resources than on foreign financing. Duchin et al. (2010): in their study titled, costly foreign financing, corporate investment, and the lower mortgage credit crisis, they examine the consequences of the financial crisis and study the impact of the financial crisis on corporate investment . The crisis represents an unknown negative shock to the supply of foreign financial resources for companies. After the crisis begins, corporate investment decreases significantly by controlling the company's constant effects and the time-varying criteria of investment opportunities.

Research method

This research is considered to be applied research in terms of purpose, as it seeks to provide practical solutions for Risk Management in financing projects in crisis situations. It's descriptive and analytical in terms of the data collection method.

Sources of data

A pharmaceutical company is used to assess the effects of inflation risk. This data includes financial and accounting information of sample companies (such as cash flow, total assets, total liabilities, capital expenditures, etc ...) As well as macroeconomic data (such as inflation rates, GDP and financial crisis indicators) were collected in a library method and through references to the financial statements of companies, reports of the statistics center of Iran and the Central Bank of the Islamic Republic of Iran.

Project evaluation criteria

Model output is a rich set of data over time that acts beyond a static metric. This section describes how to extract evaluation criteria for management decisions. This section designs and implements a hypothetical case study for an investment project focusing on the impact of inflation risk on key financial metrics (such as NPV IRR) and the case head-to-head point. The model will seek to compare project
evaluation in nominal (with inflation) versus Real (without inflation) mode.

1) Balanced average cost of capital (WACC): this rate of decline indicates the cost of financing the project.
   Formula 3 (not adjusted to inflation-nominal state):

   WACC=(Ke×D+EE)+(Kd×(1−t)×D+ED)

2) Net cash flow: after-tax cash flow used to evaluate the project, taking into account the effect of inflation.
   * Relationship Formula 2: based on EBITDA and other factors: here, for simplicity, we calculate cash flow from Net Profit:

   * CFn=(ORn-OCn-Depr-Intn)×(1-t) + Depr

3) Net present value of NPV : a criterion for deciding on project acceptance.
   * Relationship Formula 3:

   NPV=n=1∑NCFn/(1+WACC)n−I0

4) Internal rate of return (IRR): the rate at which the NPV of the project is equal to zero.
5) To calculate inflation-adjusted cash flows, WACC, NPV and IRR, I use Python code.
6) Calculate the nominal WACC.
7) Calculation of annual interest share and principal of debt (assumption: principal repayment in the fifth year).
8) Adjusting operating income and expenses at an inflation rate (20%).
9) Calculation of annual cash flows (Cfns) taking into account taxes, interest, depreciation and inflation.
10) Calculate NPV and IRR.

Research findings

This section designs and implements a hypothetical case study for an investment project focusing on the impact of inflation risk on key financial metrics (such as NPV IRR) and the point of the case. A pharmaceutical company that plans to implement a new investment project with the following features. Here is the data required to evaluate the project's financial feasibility over a five year period:

Table (1) information specifications of the company

Parameter	Symbol	Value	Unit	Description
Initial Investment	I۰	۱۰,۰۰۰,۰۰۰,۰۰۰	Rials	Initial cost in year zero.
Project Duration	n	٥	Years	Useful life of the project.
Expected Annual Inflation Rate	E(۱)	۲۰٪	Percent	Average expected annual inflation rate.
Nominal t Interest Rate (loan)	Kd	۳۰٪	Percent	Nominal interest rate of the loan (fixed for the entire period)
Expected Rate of Return on Equity	Ke	۳٥٪	Percent	Shareholders' expected rate (no inflation adjustment at this stage)
Income Tax Rate	t	۲٥٪	Percent	Company tax rate.
Capital Structure	–	٦۰٪ (Debt), ٤۰٪ (Equity)	Ratio	Debt-to-Equity Ratio
Annual Depreciation (Straight Line)	Depr	۱,۰۰۰,۰۰۰,۰۰۰	Rials	Annual depreciation (based on historical cost).

Table (2) operating cash flows (excluding inflation in the base year):

Year	Operating Revenue (OR) (Rial)	Operating Cost (OC) (Rial)
۱	٦,۰۰۰,۰۰۰,۰۰۰	۲,۰۰۰,۰۰۰,۰۰۰
۲	۷,٥۰۰,۰۰۰,۰۰۰	۲,٥۰۰,۰۰۰,۰۰۰
۳	۹,۰۰۰,۰۰۰,۰۰۰	۳,۰۰۰,۰۰۰,۰۰۰
٤	۱۰,٥۰۰,۰۰۰,۰۰۰	۳,٥۰۰,۰۰۰,۰۰۰
٥	۱۲,۰۰۰,۰۰۰,۰۰۰	٤,۰۰۰,۰۰۰,۰۰۰

Results of sensitivity analysis

The model will seek to compare project evaluation in nominal (with inflation) versus Real (without inflation) mode. Sensitivity analysis shows how affected the results of NPV and IRR decision-making are by changing key project assumptions (here, Inflation Rate and cost of capital). Different scenarios are defined for the inflation rate and the WACC rate, and then the NPV and IRR results are calculated for each mode.

Change the two main project variables in three levels (bottom, base, top) :

Table (3) different scenarios

Parameter	Base Scenario	Optimistic Scenario (Low)	Pessimistic Scenario(high)
Inflation Rate	٢٠٪	١٠٪	٣٠٪
WACC	٢٧,٢٥٪	٢٠٪	٣٥٪

We will use the same basic cash flows (before inflation) and initial investment. Python code is tasked with adjusting cash flows with each combination of inflation rates, then lowering at the corresponding WACC rate and calculating NPV. (The WACC rate in this sensitivity analysis is considered as an independent input to show the direct impact of inflation changes on cash flow and WACC changes on the rate of decline.) IRR rates are solely a function of cash flows (which are only affected by the inflation rate), while NPV is a function of cash flows and WACC rates.

The analysis of the results of the sensitivity shows clearly the role of inflation on the economic evaluation and financial capacity of the project.

The result shows that in this project, whose revenues are heavily dependent on inflation, inflation risk has become a profitable opportunity. Increasing inflation increases the internal efficiency of the project and increases its margin over the cost of financing. It confirms that "net present value will be above zero if the balanced average rate of capital is smaller than the internal rate of return" .

Effect of inflation and WACC changes on net present value

The NPV benchmark is assessed at the intersection of inflation and WACC scenarios with a million riyals.:

Table (4) effect of inflation rate and WACC on internal rate of return

Inflation Rate	IRR	Analysis
١٠٪ (Low)	٣٢,٥٥٪	With decreasing inflation, the nominal cash flow growth slows down, but the IRR is still higher than the Base WACC (٢٧,٢٥٪).
٢٠٪ (Base)	٤٦,٤٠٪	In the base scenario, the project has high profitability margins.
٣٠٪ (High)	٥٩,٥٤٪	With increasing inflation, the nominal growth of cash flows (revenues), adjusted by inflation, accelerates and significantly increases the IRR.

Table (5) effect of inflation rate and WACC on present value

Inflation Rate	IRR	NPV (WACC ٢٠,٠٠٪)	NPV (WACC ٢٧,٢٥٪)	NPV (WACC ٣٥,٠٠٪)
١٠٪	٣٢,٥٥٪	١٨,٩٧٣,٩٠	٧,٦٥٤,٧٧	٦٣,٨٨
٢٠٪	٤٦,٤٠٪	٢٧,٨٧٧,٩٤	١٢,٠٥٦,٢٣	٢,٧٥٧,٢٤
٣٠٪	٥٩,٥٤٪	٣٧,٣٠٢,٥٠	١٦,٦٩٢,٦١	٥,٣٤٨,٨٨

In each WACC column, as the inflation rate increases (from 10% to 30%), the NPV of the project increases steadily. This is the strongest effect in our model, and it shows that the project is highly resistant to inflation and its value increases in inflationary conditions.

By moving from the left (optimistic WACC 20%) to the right (pessimistic WACC 35%), NPV decreases at all inflationary levels. This is normal, because increasing the rate of decline (capital expenditure) reduces the current value of future cash flows.The head-to-head study shows that, even in the worst-case scenario, from the perspective of capital expenditure (35.00% (WACC = project still has a positive NPV in all inflationary scenarios (the smallest value in inflation is 10% with NPV equal to 63.8 million riyals). This shows that the serial lead point at which the net present value reaches zero (relation 7) has not yet been realized, even in a pessimistic scenario (IRR 32.55% is still not higher than WACC 35%, but NPV has become positive, which indicates the computational accuracy that puts the exact lead point of WACC between 32.55% and 35.00%). The project is highly justified and its financial risk, influenced by changes in inflation, is low, as its internal returns are at worst also high enough to cover the cost of financing. This sensitivity analysis concludes that the project, despite its high inflation risk, is very desirable and robust for the pharmaceutical company in question.

Conclusions and suggestions

How does inflation risk affect domestic net worth in financing projects?

The sensitivity analysis is designed to assess the resilience and reliability of the project's financial model in the face of key uncertainties. The two main variables that generate the greatest uncertainty are the inflation rate and the cost of capital (WACC). For each of these variables three scenarios were defined:

- Basic scenario: based on conventional forecasts.
- Optimistic scenario (bottom): assuming more favorable economic conditions.
- Pessimistic scenario (above): assuming more challenging economic conditions.

Then, key project evaluation indicators, i.e. internal rate of return (IRR) and net present value (NPV), were calculated for each combination of these scenarios. The internal rate of return (IRR) is the rate at which the net present value of the project's cash flows is zero and is only affected by the amount and timing of the cash flows themselves. In this analysis, because cash flows are adjusted based on inflation rates, inflation changes directly affect the IRR.

In an optimistic scenario (inflation of 10%): o the internal return rate of the project was calculated at 32.55%.

even in this scenario where we have the lowest inflation rate, the project IRR is significantly higher (5.3 units per cent) than the base capital cost rate (27.25%). This suggests that even in an inflation-controlled economic environment, the core of the project's business has strong economic justification.

In the base scenario (20% inflation): o the internal return rate of the project increases to 46.40%. This scenario shows the conventional profitability of the project. The margin between the IRR (46.40%) and the WACC (27.25%), which is close to 19% units, creates a very high margin of security for the project and shows its high attractiveness.

In a pessimistic scenario (inflation of 30%): o the internal return rate of the project significantly rises to 59.54%. This result reveals the most key finding of the analysis: the project not only does not suffer from high inflation, but its profitability increases sharply. This phenomenon usually occurs in projects whose revenues (such as the selling price of products) are directly and completely adjusted to the inflation rate, while costs may increase with a lower delay or percentage. As a result, inflation risk has gone from a threat to a profitability opportunity.

How does capital cost risk affect the internal rate of return on project financing? Net present value (NPV) is the ultimate benchmark for measuring project value creation and is influenced both by cash flows (which depend on inflation) and by the rate of decline (WACC). The table presented clearly shows the interaction of these two variables.

(A) the effect of rising inflation rates

Assuming a fixed rate of decline (e.g. basic WACC 27.25%), it is observed that as inflation increases from 10% to 20% and then to 30%, the net present value of the project increases from 7,655 to 12,056 and then to 16,693 million riyals respectively.

This strong upward trend confirms the high resistance and flexibility of the project against inflation. In fact, the value of the project in extreme inflationary conditions is not only maintained, but also multiplied.

B) the effect of the increase in the rate of decline (WACC)

Assuming a fixed inflation rate (e.g. 20% inflation), it is observed that as the cost of capital increases from 20% to 27.25% and then to 35%, the net present value of the project decreases from 27,878 to 12,056 and then to 2,757 million riyals respectively.

This downward trend follows economic logic: as the rate of decline increases (capital opportunity cost), the current value of future cash flows decreases. Nevertheless, the important thing is that even at the highest rate of decline (35%) of the NPV of the project remains positive at all levels of inflation. Given the economic situation in the country where some of its major markets do not have an acceptable interactive relationship with the outside world it is inferred that the financial crisis does not affect companies but the results of the study showed that crises affect the flow of investment the following most important executive proposals can be made from the results of the model estimate.

A) policy proposals (for government and supervisory bodies):

1) Development of domestic financial markets: with the aim of reducing dependence on foreign financial resources and increasing resilience to international crises and currency shocks.
2) Transparency and stabilization of monetary policies: to reduce uncertainty and inflation risk and help predict more future cash flows for investors.
3) Introduction and development of Islamic financial instruments (Sakuk): as an efficient tool for financing projects that are more stable in crisis situations due to their relationship with real assets.
4) Establishment of a political and economic risk guarantee fund: to cover part of the systematic risks posed by international crises and to encourage private investment in infrastructure projects.

B) practical suggestions (for company managers and investors)

1) Using Dynamic models in strategy formulation: applying a dynamic systems approach to simulate the impact of various crisis scenarios on the financial structure and investment plans of the company.
2) Implementation of mandatory sensitivity analysis in project evaluation: taking into account a wide range of inflation rates and capital expenditure in the calculation of NPV and IRR to identify the top points and make stronger decisions.
3) Diversifying into the funding structure: using a combination of internal and external, short-term and long-term funding (combined funding) to increase resilience to shocks.
4) Active asset and debt management (ALM): monitoring and managing currency mismatches on the balance sheet and using risk hedging tools to mitigate the effects of exchange rate fluctuations and inflation.

C) suggestions for future research:

1) Integration of new risks: simultaneous examination of inflation risk and international crises with emerging risks such as technology transfer risk and environmental risk (ESG) in project financing.
2) Model development with the banking sector in mind: expanding the dynamic model of systems by adding a subsystem of the banking sector and credit institutions to more accurately model the crisis transmission channel.
3) Application of artificial intelligence methods: use of neural networks and other machine learning methods to more accurately predict inflation rates and complete table data in Dynamic models.
4) Cross-country comparative study: to examine and compare the effectiveness of different strategies for managing these risks in countries with similar economies to Iran and developed countries.

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