

Research on financial risk management based on international

contracted projects

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Abstract: With the continuous development of domestic construction projects and the growing economic strength of the country, China is playing an increasingly important role in the field of international engineering construction. International project contracting has gradually become one of the key paths for the transformation of China's construction industry. Compared with other industries, international project contracting has characteristics such as long construction periods, uncertain political impacts, high social risks, and high asset requirements. From an operational perspective, financial security is the most critical risk point that needs attention. The financial uncertainties in international contracting projects include inflation, exchange rate fluctuations, and changes in bank interest rates. This paper focuses on the risks associated with exchange rate fluctuations and inflation factors, and conducts theoretical and empirical analysis on the management essentials of international contracting projects using the VAR parameter model. It also proposes basic strategies and measures for financial risk management. The research indicates that the new contract amount for international contracting projects increases with the rise of exchange rates and the Consumer Price Index (CPI), but an increase in the CPI will reduce the profitability of international contracting projects. Therefore, companies need to pay attention to the profit level of their projects. Enterprises can analyze the changes in the relative value of currencies in advance and adopt delayed or accelerated settlement strategies to mitigate the impact of exchange rate changes, improve profit levels, and ensure financial security. As for inflation, companies can reduce operating costs and minimize the negative impact of inflation by cutting internal expenses and expanding the market strategy. Key words: international contracting, financial risk, inflation, exchange rate change, VAR model.

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Introduction:

International contracting projects refer to engineering projects managed in accordance with the International Engineering Contracting Management Regulations. Based on the contracting models, they can be classified into PPP, EPC, BOT, etc. These projects are characterized by the multinational nature of participants, diversity in currency payments, long construction periods, and high risks associated with construction funds. In the project management of international contracting, there will inevitably be business interactions and capital currency flows between different countries, making the risks related to project finance and economics, market environment, etc., more complex than other economic forms. Since 1990, China's international contracting projects have spread to more than 130 countries, including residential engineering, bridges, tunnels, and other sectors. International contracting is a significant strategy for China's economic opening up, effectively driving the external demand for materials and equipment. Studies have shown that for every additional billion yuan in international contracting volume, China's GDP growth is nearly contributed by 5 billion yuan, highlighting the important role and strategic significance of the development of international contracting for the country's current economic growth.

With the continuous implementation of the 'Belt and Road' initiative, although international engineering contracting projects have been built, they have also exposed numerous operational issues, with financial security being particularly prominent. For example, the financial systems of many countries are not sound, leading to high capital risks; additionally,



the long construction periods of projects result in huge uncertainties in investment returns. As a capital-intensive economic form, international contracting projects are significantly affected by financial risks. Taking the 2008 financial crisis as an example, the decline in the US dollar and euro exchange rates alone led to losses of up to 100 million yuan due to foreign exchange. Meanwhile, domestic inflation caused the procurement costs of materials and equipment to rise continuously, eroding the profit margins of project operations. Furthermore, delayed payments in international contracting projects have prolonged construction periods and even led to work stoppages. Therefore, studying the financial security of international engineering contracting projects and improving companies' ability to respond to financial risks can not only stabilize the construction of international contracting projects but also drive domestic economic growth, achieving high-quality economic development in China. This paper takes Project A as an example, starting from the perspective of financial security management in international contracting, selects exchange rate change data, CPI data, and international contracting rolects and refers to the VAR parameter model to study the operational impact of financial risks arising from exchange rate fluctuations and inflation. It also proposes countermeasures. The research results can serve as a reference for international contracting enterprises in financial security management.

1. Research process of financial risk management of international contracted projects

1.1 Study on the impact of exchange rate change on international contracted projects

At present, experts and scholars have two different views on whether the exchange rate changes will affect the development of international contracted projects. Khim-sen Liew, Kan-ping, Lim and other scholars studied the currency exchange rate fluctuations data of Asian countries from 1986 to 1999, and found that the exchange rate fluctuations of domestic currencies did not have a significant impact on the amount of international contracted projects; William T Wilson counted the financial data of Singapore and the US from 1970 to 1996, and analyzed the VAR parameter model, the study showed that the exchange rate fluctuations did not lead to significant changes in the international trade data. In addition, many scholars believe that exchange rate changes have a great impact on international economy and trade, and have different effects on different countries. Choudhry, Bohara and others find that the impact of exchange rate fluctuations is different on developed and developing countries.

Domestic scholars have also conducted extensive research on the relationship between exchange rate changes and the development of international contracting project trade. Through comparative research, Feng Sixian, Chen Long, Chen Liufu and others found that the exchange rate change is negatively related with the international contracted project trade. When the exchange rate risk occurs, it will have a serious negative impact on the enterprise. Wu Xiaogang, Huang Youliang, Yang Feng and others analyzed the risks brought by the growth of RMB exchange rate from the dimensions of project cost, financing cost and profit of international contracted projects and put forward the measures to be taken. The appreciation of RMB will increase the cost of project investment, but also reduce the profit space of the project. Enterprises can use advance payment of project funds, exchange rate conversion and fixed exchange rate to reduce the impact of exchange rate fluctuations on project income and cost.

1.2 Study on the impact of inflation on international contracted projects

As for the impact of inflation on the development of international contracted projects, the causes of inflation should be mainly concerned. Li Nan et al. made an empirical analysis of the causes of inflation in China, and concluded that the growth rate of money supply has no obvious promotion effect on inflation, inflation is mainly affected by the growth rate of consumer demand, so credit expansion and interest rate increase are not enough as the key causes of inflation. Through the empirical analysis of China's CPI data, Zhu Yuan and others found that the main causes of inflation were: monetary factors, structural factors and demand factors, and the stronger the enterprises, the stronger the ability to resist inflation. International contracted projects are faced with complex and changeable risks, inflation will cause changes in international trade, and have an impact on the operation of international contracted projects. For inflation will affect how the international contracting project, research focus on the qualitative analysis of financial risk, to put forward more practical scientific measures, some scholars through empirical analysis combined with econometrics established the VAR parameter model, quantitative research of the inflation on the specific impact of international contracting project.

2.Empirical study on the impact of financial safety management on international contracted engineering projects

2.1 Analysis of the causes of financial risks of international contracted projects

Based on the theory of elasticity and the characteristics of international contracting projects, the influence of inflation and exchange rate changes on international contracted projects is analyzed from the static and dynamic level. When the RMB appreciates, if the international contracted project is expressed by RMB, the price converted into foreign currency will rise; in the actual operation of the project, the the price increase will make the contracted project more difficult, so the change of RMB exchange rate will affect the international project contract, and the price elasticity of the project demand. From a dynamic perspective, international contracted projects can drive the export of a large number of mechanical and electronic equipment, whose price elasticity is low, and the price elasticity of export engineering services is also low; the demand elasticity of international contracted projects is insufficient, resulting to the pressure of RMB appreciation, but the amount of international projects will not change significantly, but enterprises need to consider the change of project cost caused by inflation and exchange rate change. In order to obtain the best bidding effect, international contracting engineering enterprises can adjust the quotation strategy when external quotation, and obtain a larger contracting share by reducing the cost and profit.

2.2 The impact mechanism of financial security management

In theory, the impact of inflation and exchange rate change on international contracted projects is somewhat correlated. In order to make quantitative demonstration, econometrics analysis methods such as OLS, mathematical modeling, vector autoregression and error correction model can be used for verification. In this paper, the new international contract amount (EP), RMB effective exchange rate (REEP) and consumer price index (CPI) are considered comprehensively, and the VAR model analysis method is used to study the impact of exchange rate change and inflation. In order to study the impact of RMB appreciation, the data is the amount of international contracted projects, real effective exchange rate and consumer price index from 2004 to 2015. The data of the real effective exchange rate of RMB comes from the website of the Bank for International Settlements, the amount of newly signed international contracted projects, the data comes from the website of the Ministry of Commerce, the consumer price index, and the data comes from the website of the National Bureau of Statistics.

Table 1: Data of China from 2004 to 2015								
time	New contract amount	real effective exchange rate	consumer price index					
2004	238.4	85.57	103.9					
2005	296	84.667	101.8					
2006	660	85.814	101.5					
2007	776	88.991	104.8					
2008	1046	96.518	105.9					
2009	1262	100.717	99.3					
2010	1344	99.999	103.3					
2011	1423.3	102.505	105.4					
2012	1565.3	108.604	102.6					
2013	1716.3	115.929	102.6					
2014	1917.6	118.827	102					
2015	2100.7	129.805	101.4					
	基建水平	road	城市道路里程/地区总面积					

In order to analyze the relationship between the data more accurately, this paper tests the stationarity of the unit root and variable of the original data. Calculcalculations by EVIES software are shown in Table 2. Data with unstable time series were then subjected to the ADF test for differential terms. It can be seen from the table that the three variables are all second-order differential stationary sequence, so the co-integration can be tested by constructing the VAR model.

Table 2: Results of the unit root test



variable	ADF test values	1%	5%	10%	conclusion
LNEP	-3.043	-4.121	-3.144	-2.713	non-stationary
LNREER	-3.452	-4.886	-3.828	-3.362	non-stationary
LNCPI	-3.976	-4.121	-3.144	-2.713	non-stationary
ddLNEP	-16.052	-5.295	-4.008	-3.460	steady
ddLNREER	-3.526	-2.792	-1.977	-1.602	steady
ddLNCPI	-3.918	-2.847	-1.988	-1.600	steady

2.3 The VAR model construction

According to the results of the root of unit and variable stability test, the VAR model is established by the software. The model equation is shown in 2-1:

D(LNEP)=2.034(LNCPI(-1)-0.012LNEP(-1)+0.097LNREER(-1)-4.997)-2.035DLNCPI(-1)+0.066DLNEP(-1)+0.259(2-1)

According to the analysis and calculation of VAR model, the influence of CPI index on international contracted projects is negative, indicating that inflation will increase the cost of international contracted projects; LNEP data is negative, indicating that the impact of CPI on the new contract amount of international contracted projects is negative, which will lead to the decline of the rate of return of international contracted projects. In this case, enterprises should reduce costs to improve operational efficiency, change business strategies, and improve profit margins. An increase in the real effective exchange rate has significantly promoted the volume of new contracts signed for international contracting projects.

3. Financial security management measures

Financial risk mitigation in international contracting projects requires safety management measures. According to the existing research and enterprise research, several measures are obtained:

For the risk of exchange rate change, the exchange rate can be fixed by signing forward agreements with domestic financial institutions to fix the exchange rate for forward settlement and the actual market, sign the foreign currency payment contract, accelerate the risk management, ensure the project delivery on schedule or in advance, recover the remittance in time or in advance; pay close attention to the exchange rate change, timely adjust the amount of foreign currency funds and purchase a certain amount of foreign currency financial products to improve the ability to resist financial risks. In addition, it is also necessary to pay attention to the risk of inflation and optimize the cost of the key parts of the contracted projects.

4.Conclusion

The risks should be studied and control, financial security is one of the key factors for the profitability of international contracting projects. This paper analyzes the impact of exchange rate change and inflation on international contracted projects, includes the actual effective exchange rate (REER), new contracted amount (EP) and consumer consumption index (CPI) into the VAR parameter model, conducts the unit root and co-integration test, and obtains the financial safety management measures. The study results are as follows:

1. The exchange rate change has a positive correlation with the international contracted projects, and the increase of the actual effective exchange rate will promote the new value of international contracted projects; the CPI rise will increase the new value of international contracted projects; meanwhile, the increased project quotation due to the cost does not affect the business expansion. However, An increase in the CPI index reduces the return rate of the project and decreases the net profit of the project. From the empirical analysis results, enterprises have taken effective measures to deal with the inflation and exchange rate changes.

2.Enterprises can control the income or expenditure according to the forecast of exchange rate changes, accelerate the collection of accounts receivable, delay the expenditure of accounts payable, and adopt the strategy of delay or advance settlement to improve the operating efficiency according to the actual market situation.

3.For inflation risk, enterprises can improve internal management level, reduce cost, improve operating efficiency, strengthen market expansion and share fixed cost; in addition, enterprises can use financial risk management tools such as



foreign exchange forward management contract to avoid risk.

References

[1]Yin Lin. Practice and Reflection on lean management of international general contracting projects - Taking PKG synthetic ammonia urea project in Indonesia as an example [J].China Engineering Consulting. 2024 (10).

[2]Zhang Boyuan. Research on the optimization strategy of international financial cooperation under the demand orientation of infrastructure construction in "one belt and one road" countries [J]. Industrial & Science Tribune. 2023, 22 (21).

[3]Wang Boyi. Enterprise financial risk management and its development trend [J]. Business Observation. 2023, 9 (16).

[4]Zhang Guoli. A study on the Influencing Factors and Countermeasures of China's OFDI Financial Risks to ASEAN Countries [D]. Beijing Foreign Studies University. 2023.

[5]Hou Huili. Research on Risk Management of Western Huanshan Road Project in W City [D]. Shandong University. 2023.

[6]Feng Jun.Study on risk management of EPC general contracting project of A company [D]. Nanchang University. 2020.

[7]Liu Jingfeng Financial risk management and avoidance strategies in enterprise financial project engineering[J]. Journal of Guangxi Normal University for Nationalities. 2020, 37 (02).

[8] Ren Shuang. Management of Financial risks of International Engineering Project [D]. Zhejiang University, 2018.