An Empirical study of dynamic on Chinese enterprises investing hydropower project in Southeast Asian countries1

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Abstract. On the basis of analyzing the internal investment driving forces , external investment attraction and investment binding force of Chinese enterprises investing in hydropower projects in Southeast Asian countries, We use SEM to verify and revise the conceptual model of the relationship between dynamic factors and the behavior of Chinese enterprises investing in hydropower projects in Southeast Asian countries and the interaction of latent variables. Then we obtain the path and path coefficient of the interaction between the dynamic factor and the investment behavior, so as to verify the overall structural relationship of the Chinese enterprises ' investment in the hydropower projects in the Southeast Asian countries.

1. Introduction

Overseas hydropower project investment is an important component of China's foreign investment [1]. Southeast Asian countries are rich in hydropower resources, but with a low degree of development and utilization, and lack of hydropower development necessary capital, technology, equipment. In order to solving the problem of hydropower resources shortage, countries have formulated the medium and long-term development planning in the field of infrastructure and power[2]. At present, the study of transnational investment motivation hydropower project is less, and lack of the research about influence mechanism between motivation factors and investment behavior[3-5]. In this paper, the Chinese companies to invest in Southeast Asian countries hydropower project on empirical research, aimed at seeking Chinese enterprise power of hydropower project investment of southeast Asian nations push factors and constraints, for the development of Chinese enterprise provides the reference for the relevant policies of hydropower project investment of southeast Asian nations.

2. Analysis of Chinese companies to invest in the hydropower project power factor of Southeast Asian nations

(1) The internal investment incentive factors

Relevant scholars have studied the motives of Chinese enterprises' transnational investment from the perspective of development strategy, efficiency promotion and so on[6-9]. From what has been discussed above, the internal investment incentive factors of Chinese enterprise include the need for expanding overseas markets, for optimizing their own investment structure, for avoiding domestic market competition and the development of the hydropower industry.

(2) The external investment attraction

Some scholars[10-12] have studied the external attraction of domestic enterprises' transnational investment from the resources endowment, policy environment and market environment of the host

country. The research shows that rich hydropower resources,good investment market,loose the institutional environment and strong market competitiveness is the important external investment attraction of southeast Asian nations.

(3) The investment binding factors

In view of the complex international investment environment and many uncertain risks of overseas investment, scholars have tried to find the restrictive factors, in order to provide theoretical support for risk control and crisis response[13,14]. The research found that the resistance of overseas investment includes five aspects, such as technical standards, cultural differences, cooperation goal conflict, information asymmetry and financing capacity constraints.

3. Preliminary design of the Dynamic investment model

3.1Theory hypothesis

The main motivation for transnational investment is to seek the host country's technology, markets,cheap raw materials and labour resources [15].

H1: Internal investment driving forces has a positive impact on the investment behavior.

The motivation of transnational investment is the combination of production factors.

H2: External investment attraction has a positive impact on the investment behavior.

All kinds of risk factors are the obstacles to the development of hydropower resources between the two countries, which makes it more difficult for Chinese companies to invest in Southeast Asian hydropower projects.

H3: Investment binding force has a negative impact on the investment behavior.

The overseas investment is a game between different stakeholders. If the investment constraints are too large, the internal driving force will be reduced.

H4: Investment binding force has a negative impact on internal investment driving forces.

If there are many constraints on hydroelectric projects a country, the investment attraction for Chinese companies will be reduced.

H5: Investment binding force has a negative impact on external investment attraction.

According to the above analysis, the dynamic conceptual model of Chinese enterprises investing in hydropower projects in southeast Asian countries is constructed, as shown in figure 1.

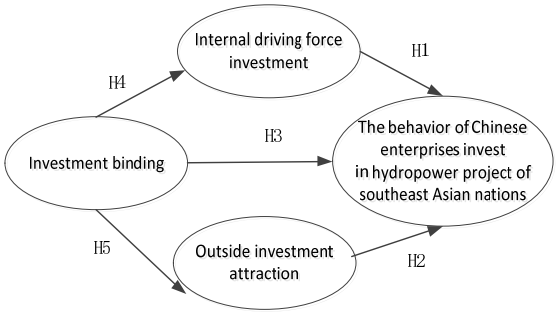

Fig. 1. The dynamic model

3.2 Measurement index

From the above analysis, we get the measurement index of dynamic factors for Chinese enterprises to invest in Southeast Asia hydropower projects, as shown in Table 1.

Table1. Measurement index of dynamic factors

No	Measurement factors	Measurement index
1.1	internal investment	Enterprises to develop overseas markets(NQ1)
1.2	driving forces(NQ)	Enterprises investment structure adjustment(NQ2)

1.3		Enterprises' own development needs(NQ3)
1.4		Companies around the domestic competition(NQ4)
2.1		Rich in hydropower resources(WX1)
2.2	external investment attraction (WX)	Good water and electricity investment market (WX2)
2.3		Loose policy environment of hydropower investment (WX3)
2.4		Higher competitiveness of investment (WX4)
3.1		Technical standards and specifications (YS1)
3.2	investment binding force (YS)	Cultural differences (YS2)
3.3		Cooperation goal conflict constraints (YS3)
3.4		Asymmetric information constraints (YS4)
3.5		Financing capacity constraints (YS5)
4.1		Enterprises under the influence of regional economic (TZ1)
4.2	the investment	The promotion of enterprise geopolitics (TZ2)
4.3	behavior	Promote enterprise by international organizations (TZ3)
4.4	(TZ)	Enterprises at home and abroad by the policy support (TZ4)
4.5		Companies seek resources and cheap Labor (TZ5)

4. Empirical analysis

The survey questionnaire is for nine Chinese companies investing in hydropower projects in Southeast Asian countries. 200 questionnaires were issued. 162 valid questionnaires were obtained which was accounted for 87.1% of the returned questionnaires.

4.1 Test of normality

We used box plots to analyze the normality test of sample data. The statistical data value is distributed between 2 and 5, which is in a normal distribution.

4.2 Test of reliability

We used the consistency index Cronbach 's alpha value to test the reliability of the sample data. The reliability of four implicit variables is 0.735. Each implicit variable was shown in Table 2.

Table 2. Test of reliability

Implicit variables	Number of measurable variables	Cronbach's Alpha
Internal investment driving force	4	0.869
External investment attraction	4	0.842
Investment binding force	5	0.925
The investment behavior	5	0.940
Total	18	0.735

We can get four Cronbach's Alpha values such as internal investment driving force of 0.869, external investment attractive of 0.842, investment binding force of 0.925, the investment behavior of 0.940. All these values are greater than 0.7. Data has a higher credibility.

4.3Test of validity

We used exploratory factor analysis to test the validity of the questionnaire, as shown in Table 3.

Table 3. Test of validity

Implicit variables	Measurement options	Factor load	KMO	Bartlett $\chi 2$	P
NQ	NQ1	0.732	0.831	149.007	0.000
	NQ2	0.700			
	NQ3	0.711			
	NQ4	0.740			
WX	WX1	0.646	0.755	135.020	0.000

	WX2	0.629			
	WX3	0.743			
	WX4	0.695			
	YS1	0.859			
	YS2	0.874			
YS	YS3	0.781	0.838	333.255	0.000
	YS4	0.728			
	YS5	0.618			
	TZ1	0.730			
	TZ2	0.823			
TZ	TZ3	0.806	0.863	361.940	0.000
	TZ4	0.807			
	TZ5	0.867			

4.4 Model correction and path interpretation

(1) Identification and correction of measurement model

We calculate that the standard error of each factor is less than 0.2, the critical ratio is greater than 7, and the standardized coefficient is greater than 0.5 and less than 0.95. The goodness of fit index of the initial model is shown in Table 4.

Table 4. The goodness of fit index of the initial model

Measurement model	CMIN/DF	CFI	GFI	NFI	RMSEA	Description
Internal investment driving force	0.276	1.000	0.997	0.996	0.000	Fitting are all meet the requirements
External investment attraction	5.218	0.936	0.937	0.925	0.23	CMIN/DF and RMSEAdoes not meet the requirements, the model need to be modified
Investment binding force	4.251	0.951	0.910	0.938	0.202	
The investment behavior	3.848	0.961	0.915	0.949	0.189	

The estimated values of the modified parameters are shown in Table5.

Table 5. Revised model parameter estimation and goodness of fit index

Model path	Standardized Coefficients	S.E.	C.R.	P	CMIN/DF	CFI	GFI	NFI	RMSEA
NQ1<--- NQ	0.803	—	—	—					
NQ2<--- NQ	0.769	0.121	7.097	***	0.276	1.000	0.997	0.996	0.000
NQ3<--- NQ	0.783	0.126	7.289	***					
NQ4<-- NQ	0.813	0.114	7.416	***					
WX1<--- WX	0.613	—	—	—					
WX2<--- WX	0.602	0.16	5.653	***	0.295	1.000	0.998	0.998	0.000
WX3<--- WX	0.892	0.28	5.371	***					
WX4<--- WX	0.822	0.25	5.529	***					
YS1<--- YS	0.905	—	—	—					
YS2<--- YS	0.956	0.069	14.379	***					
YS3<--- YS	0.845	0.084	10.885	***	1.732	0.996	0.984	0.990	0.096
YS4<--- YS	0.806	0.091	9.415	***					
YS5<--- YS	0.743	0.092	8.591	***					

Model path	Standardized Coefficients	S.E.	C.R.	P	CMIN/DF	CFI	GFI	NFI	RMSEA
TZ1<--- TZ	0.748	—	—	—					
TZ2<--- TZ	0.892	0.127	9.906	***					
TZ3<--- TZ	0.867	0.164	8.092	***	0.347	1.000	0.998	0.999	0.000
TZ4<--- TZ	0.823	0.143	8.820	***					
TZ5<--- TZ	0.953	0.156	8.807	***					

Note: * * * p < 0.01;* * P < 0.05;* P < 0.10

(2) Fitting and correction of structural model

The critical ratio between investment binding force and the investment behavior is 1.42 and P is 0.432. It is shown that the path does not reach statistical significance, that is, hypothesis 3 is not valid. Therefore, it is necessary to modify the initial conceptual model. The revised model is shown in Figure 2.

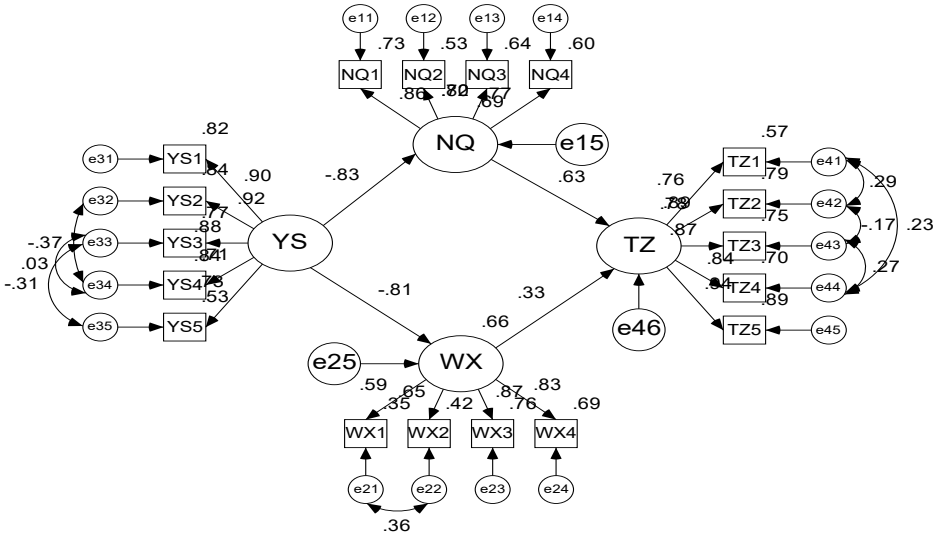

Fig. 2. Correction model

The path coefficients of the modified model latent variables are as shown in table 6. All the goodness of fit indexes meet the requirements.

Table 6. Correction model path coefficient

Model path	Standardized Coefficients	S.E.	C.R.	P
NQ<---YS	-.829	.124	-7.520	***
WX<---YS	-.810	.100	-6.836	***
TZ<---NQ	.626	.145	3.625	***
TZ<---WX	.334	.187	1.998	0.046
Goodness of fit index	CMIN/DF=1.283,CFI=.922,GFI=.905,NFI=.933,RMSEA=.065			

The effect of various dynamic factors on the behavior of Chinese enterprises investing in hydropower projects in south-East Asian countries is shown in table7.

Table7. Investment effect

	Internal investment driving force			External investment attraction			Investment binding force		
	DE	IDE	TE	DE	IDE	TE	DE	IDE	TE
Internal investment driving force	–	–	–	–	–	–	-0.83	–	-0.83
External investment attraction	–	–	–	–	–	–	-0.81	–	-0.81
The investment behavior	0.63	–	0.63	0.33	–	0.33	–	-0.79	-0.79

Note: The direct effect is abbreviated as DE, the indirect effect is abbreviated as IDE, and the total effect is abbreviated as TE.

5. Conclusion

(1) The total effect between internal investment driving force and the investment behavior is 1.42. The hydropower projects invested by a company depend on the internal investment driving force rather than the external investment attraction. Therefore, the internal investment driving force is the main foctor for Chinese enterprises to invest in hydropower projects in southeast Asian countries.

(2) The total effect between external investment attraction and the investment behavior is 0.33. This is the least of all the dynamic factors. It shows that the external investment attraction is less impetus for Chinese enterprises to invest in hydropower projects in Southeast Asia.

(3) The total effect between investment binding force and the investment behavior is -0.79. This shows that investment binding force has a great hindrance to Chinese enterprises investing in hydropower projects in Southeast Asian countries. At present, many problems have been encountered in the development of hydropower market in Southeast Asia, such as technical standard, Cultural differences.

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