AHP for Checking and Ratifying Responsible Business Contracts

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Abstract

Checking and ratifying a business contract is a difficult task. This paper introduces the AHP to establish the appropriate models to perfect business contracts. The model developed here has achieved good results in practical applications.

1. Introduction

Responsible business contracts are a major economic tool being used today in China. It combines the planned economy with a market economy. It plays an important role in many aspects, such as changing the single planned economy relationship between the state and enterprises, making enterprises go to the market, facilitating companies changing from the pure production type to the management type, vitalizing others and so on.

Its implementation, however, due to the negative effects and drawbacks that it had, created theoretical arguments and negative feelings about it. Major components of a responsible business contract is the concept of fairness and tradeoff. Two concepts hard to quantify. Therefore, checking and ratifying the tradeoffs scientifically and rationally have become the key to perfecting the responsible contract system. Nowadays, China is transforming the old economic system into a new one. Inner-outer environments of an enterprise have been changing a great deal. This has increased the number of factors involved in the responsible contract system. There is a lot of uncertain and unknown information. The

enterprises vary between districts, departments and industries. Even if they are in similar situations, the differences between them are still large. So a model or a reference system which could synthesize various factors needs to be set up in order to optimize knowledge, experiences and judgments of both experts of the contracts and to scientifically estimate inner-outer environments and measure divergences within them, to providing an equitable basis for determining tradeoffs. This paper successfully uses AHP to make a relatively overall analysis of numerous factors to restrict the check of the tradeoffs, and to establish such a model.

2. Systems Analysis for the Restricted Factors of Checking and Ratifying Tradeoffs

A. Influences of inflation

(1) The effect of producer price increases on the bearing capabilities of an enterprise.

Because of inflation, the prices of such producer goods as raw materials and supplies, powers fuels, and so on, rise. This results in an enterprise increasing expenses and product costs. The bearing capabilities differ among enterprises. One way of measuring these capabilities would be to evaluate the degree of shifting of burden according to the changes in prices of an enterprise's products with the changing range of prices of the producer goods.

(2) The effect of price increases on the cost of compensation of an enterprise.

Under inflationary circumstances, the non-monetary assets of an enterprise will increase in value with the rises in prices. Because the Chinese accounting system is based on historical costs, stock appreciation caused by price increases makes not producing profitable. But when an enterprise buys producer goods for reproduction with the compensation assets drawn by the historical costs, after products having been sold and profits having been

distributed, they may be difficult to buy equal materials due to price increases, and the compensation of the product costs can not be realized. The depreciation is drawn from the fixed assets by the original costs and the replacement fixed assets can not be compensated either. One can investigate it according to the effects on non-monetary assets of an enterprise and the changes in prices on the cost compensation.

(3) The effect of price increases on product inventories (or commodities)

Profits are the main part of contracted projects. Under inflation conditions, because accounting is based on historical costs and is calculated by value, how many products or commodities of an enterprise at the beginning will cause more differences in realizing profits and will surely affect counting and checking of the profit index during the contracted period, will result in much more distortion of economic benefits, which can be determined by nonoperating profits varying with prices of opening inventories.

(4) The effect of price changes on profits of a contracted enterprise

At present, the operating fund of a contracted enterprise is controlled by wages linked mainly to economic benefits. But under inflation condition, the realized profits contain a great many nonoperating price profits that are linked in part to total wages; those false profits promote price increases and inflate expenses. The result has negative effects on wages that do not reflect the real results of an enterprise.

B. Influences of markets in the future

Change in supply-demand of markets directly affects management, and it is related to the existence and development of an enterprise. In recent years, Chinese markets have gone up overheating, weakened and stabilized, alternately. Under the conditions governing any of these markets, how products sell, the type of line they establish, and how they are managed, these are factors that have different effects on production and sale, and they must be judged by the relationship between supply and demand.

C. Influences of macro-economic policies

(1) A fiscal retrenchment policy

The fiscal retrenchment brings about increases in taxes and cuts in expenditures which result in a reduction in benefits which are used by an enterprise to investment on fixed assets. Tax increases and the decrease of investments affect a contract enterprise. Its influences might be greater or lesser depending on the company history, its current situation, its developing policies, its capacity cushion, its capital and technical capability and markets, and son.

(2) The credit squeeze policy

The credit squeeze brings about decreases in loans and the rise of interest rates. The former directly reduces the credit capital and the latter directly enhances the credit-capital costs which cause the rise of product costs and the shortage of liquid assets to the detriment of growth. The influence of this policy might be different depending on trade policies, abundance of capital and so on.

(3) A price policy

The price policy plays a role which cannot be ignored. Currently, because the Chinese price police is not stable enough, sometimes the prices of some commodities are tightened up, sometimes restrictions are relaxed. The adjustment appears frequently, and it does not create an equal competitive condition for enterprises. Under these circumstances the state carries out planned and market adjustments to the economy. Part of the commodities prices are set by both the state and by markets. The price policy presents different contrasts among the profits of enterprises. There are enterprises that supply materials and its commodities have higher discriminatory pricing of purchases and sales, that are able to not only keep the product costs constant, but also earn good profits from the price adjustments of the state. The enterprises that are struck more heavily because its materials and commodities are also supplied by markets are those whose prices are limited strictly by the policy, and materials must be purchased at market prices.

(4) Import and export policies

Import and export policies carried out by the state have a special influence on the economic benefits of enterprises engaging in the export of planned-produce or fixed-produce products, because they enjoy favored treatments such as tax credits and fiscal subsidies. But among them some have lower product costs, higher prices, and better profits; and others have higher costs, lower prices and profits low. The enterprises whose production relies completely on imported materials, have high costs and low profits, have poor benefits because of the influences of limited import policies and the adjustment of exchange rates.

(5) The effect of resource allocation

At present, a variety of enterprises use national resources because they are free. There are three products, crude oil, natural gas and coal, that are taxed and it cannot be adjusted so that differential profits are formed by the enterprises for the use other natural resources and energy resources. The enterprises which produce products in the range of the taxed resource, due to the tax adjustment, only obtain normal profits, but the enterprises whose products are out of the range may get superprofits.

D. Influences of industrial policies

Industrial influences should be taken into account from two aspects. Firstly, to favor a coordinated implementation of the contract system and industrial policies, through tradeoffs to decide if the industrial structure and production could be inclined to be reasonable. Secondly, for the enterprises which are supported by the state, the state adopts a series of ensuring measures, so that they have better working conditions. However, for other enterprises, particularly for enterprises having low profits or losses, their working conditions must change a lot.

E. Capitals

(1) Asset/Liabilities

How many liabilities an enterprise has is an important condition for its existence and growth. After the reform of the

investment system, analyzing from the main body of investment, the fixed assets of an enterprise fall mainly in three main categories:

1. Enterprises whose fixed assets are formed entirely by the national investment, and have no debt.
2. Enterprises whose fixed assets are formed partly by the national investment and partly by loan investments, and have certain debt.
3. Enterprises whose fixed assets are formed completely by loans, and have a heavy short term and long term debt burden at present and within a long period.

F. Self capacities of an enterprise

(1) Enterprise qualities

(2) Capacity

Capacity strategies, technology and the equipment employed are also an important factor deciding the future growth of enterprises. For old enterprises and new ones, their capacity should be analyzed.

3. A Case of AHP for Checking and Ratifying Contract Tradeoffs

Here, we present the case of the Prefabricated Component Factory of the Changchun Institute of Optics & Fine Mechanics as a concrete application of AHP for checking and ratifying contract tradeoffs.

A. Analysis and determination of the factors

Some factors may be added or deleted (as has been said in part 2 of this paper) according to different trades or industries.

B. Determination of the programs

(1) Make decisions on the present situation of the inner-outer conditions of an enterprise, and its affected degrees of the development in the future.

(2) Make prior-sequenced decisions on the methods or programs to choose for checking and ratifying the tradeoffs, under the

action of inner-outer restricted factors.

(3) Sequence the affected degrees among varieties of trades in a department and among varieties of enterprises in a trade in order to provide a basis to transversely compare for checking and ratification of tradeoffs.

(4) Rationally determine various ratio values (e.g. a progressive increase ratio,a ratio of accomplished profits,etc.).

(5) Revise the formula of a tradeoffs to determine under the lack of statistics data and its reliability, the coefficients to choose for a series of programs.

C. To establish the graded hierarchy structure (see Figure)

D. To structure judgment matrices

After analyzing and understanding all factors and determining the governing and subordinate relations among the factors, one can start a quantitative process. For this, both of the contracts work out all initial judgment matrixes, which will fully reflect unanimity through consultation. Finally, by computer one can obtain the degrees of the influences of all restricted factors on the contract tradeoffs.

E. Decision analyses

(1) The influence of the restricted aspects on the degree of checking and ratification of tradeoffs. By computer, one gets the Weights of A -- C (see Table 1):

W1:0.0862; W2:0.4272; W3:0.2253;
W4:0.0311; W5:0.1792; W6:0.0510.

This shows the sum of the weights of the markets in the future, the macro-economic policies and the capitals make up 83% of the total weight, so one should mainly take the three and the capitals into account and then determine the tradeoffs.

(2) Influence of the restricted factors on the degree of checking and ratification of the tradeoffs:

Weights of $C_1/(F_1-F_2)$:

W_1:0.5347, W_2:0.2630, W_3:0.0594, W_4:0.1429

Weights of $C_2/(F_5-F_7)$:

W_5:0.6406; F_6:0.2926; W_7:0.0668

Table 1. Judgement matrix of A--C

A.	C_1	C_2	C_3	C_4	C_5	C_6	Wi
C_1	1	1/5	1/3	4	1/4	3	0.0862
C_2	5	1	4	7	3	6	0.4272
C_3	3	1/4	1	5	3	4	0.2253
C_4	1/4	1/7	1/5	1	1/6	1/3	0.0311
C_5	4	1/3	1/3	6	1	5	0.1792
C_6	1/3	1/6	1/4	3	1/5	1	0.0510

R.I. = 1.24 C.R. = 0.0971

Weights of $C_3/(F_8-F_{10})$:

W_8:0.0819; W_9:0.6817; W_{10}:0.2363

Weights of $C_4/(F_{12}-F_{13})$:

W_{12}:0.1667; W_{13}:0.8333.

Weights of $C_5/(F_{14}-F_{15}$:

W_{14}:0.4352; W_{15}:0.5648.

Weights of $C_6/(F_{16}-F_{17})$:

W_{16}:0.8333; W_{17}:0.1667.

This proves that in a set of the restricted factors, one should pay much attention to the factors: the inflation and the bearing capabilities of the enterprise, its markets being stable, the credit squeeze, its own current asset, its belonging to other trades and its enterprise quality. (see Table 2)

After comprehensive analyses of all the restricted factors for realizing the general goal, one can integrate those factors with

awaiting programs, as space is limited and this paper only makes a prior-sequenced decision for the methods or programs of rationally selecting the tradeoffs to check and to ratify. From the Weights of A--M:

W_5 :0.2788; W_2 :0.2429; W_4 :0.2078; W_1 :0.1958; W_3 :0.0746

One can make out that the optimal program of checking and ratifying the tradeoffs is M_5 : the Method of Marginal Rate of Interest.

It is a system engineering function to check and ratify the tradeoffs, along with complicated and careful decision process. Only by following the scientific laws and methods can one change the blindness in checking and ratifying the tradeoffs and reduce the brushes between both of the contracts, make tradeoffs to determine both scientific and rational, and if it is also convenient to operate.

REFERENCES

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Table 2 Weights of C--F and A--F

C-F / C_i / F_i	C_1 0.0862	C_2 0.4272	C_3 0.2253	C_4 0.0311	C_5 0.1792	C_6 0.0510	A--F
F_1	0.5347						0.0461
F_2	0.2630						0.0227
F_3	0.0594						0.0051
F_4	0.1429						0.0123
F_5		0.6406					0.2737
F_6		0.2926					0.1250
F_7		0.0668					0.0258
F_8			0.0819				0.0185
F_9			0.6817				0.1536
F_{10}			0.2363				0.0533
F_{12}				0.1667			0.0052
F_{13}				0.8333			0.0260
F_{14}					0.4352		0.0780
F_{15}					0.5648		0.1012
F_{16}						0.8333	0.0425
F_{17}						0.1667	0.0085

Table 3 Prior--sequenced model of the contract programs

F--M / A--F	M_i	Code Names					C.R.
		M_1	M_2	M_3	M_4	M_5	
F_1	0.0461	0.2676	0.4771	0.0474	0.0808	0.1272	0.0651
F_2	0.0227	0.2624	0.1231	0.0859	0.0455	0.4831	0.0441
F_3	0.0051	0.0727	0.1317	0.0400	0.2553	0.5003	0.0622
F_4	0.0123	0.0632	0.1359	0.0369	0.4846	0.2794	0.0997
F_5	0.2737	0.0682	0.4955	0.0381	0.2636	0.1347	0.0711
F_6	0.1250	0.4609	0.0739	0.2889	0.0437	0.1362	0.0898
F_7	0.0285	0.5001	0.2504	0.0363	0.1333	0.0799	0.0910
F_8	0.0185	0.0788	0.1503	0.0429	0.2610	0.4980	0.0757
F_9	0.1536	0.1520	0.0712	0.0362	0.2680	0.4726	0.0956
F_{10}	0.0533	0.1746	0.0895	0.0354	0.2474	0.4532	0.0730
F_{12}	0.0052	0.2000	0.2000	0.2000	0.2000	0.2000	0.0000
F_{13}	0.0260	0.5008	0.2453	0.0379	0.0809	0.1351	0.0949
F_{14}	0.1012	0.1499	0.0844	0.0410	0.2602	0.4646	0.0909
F_{15}	0.0537	0.1314	0.0853	0.0454	0.2636	0.4742	0.0560
F_{16}	0.0085	0.1314	0.0853	0.0454	0.2636	0.4742	0.0560
F_{17}	0.0425	0.2607	0.4752	0.0366	0.0859	0.1416	0.0888
A--M		0.1958	0.2429	0.0746	0.2078	0.2788	0.0562

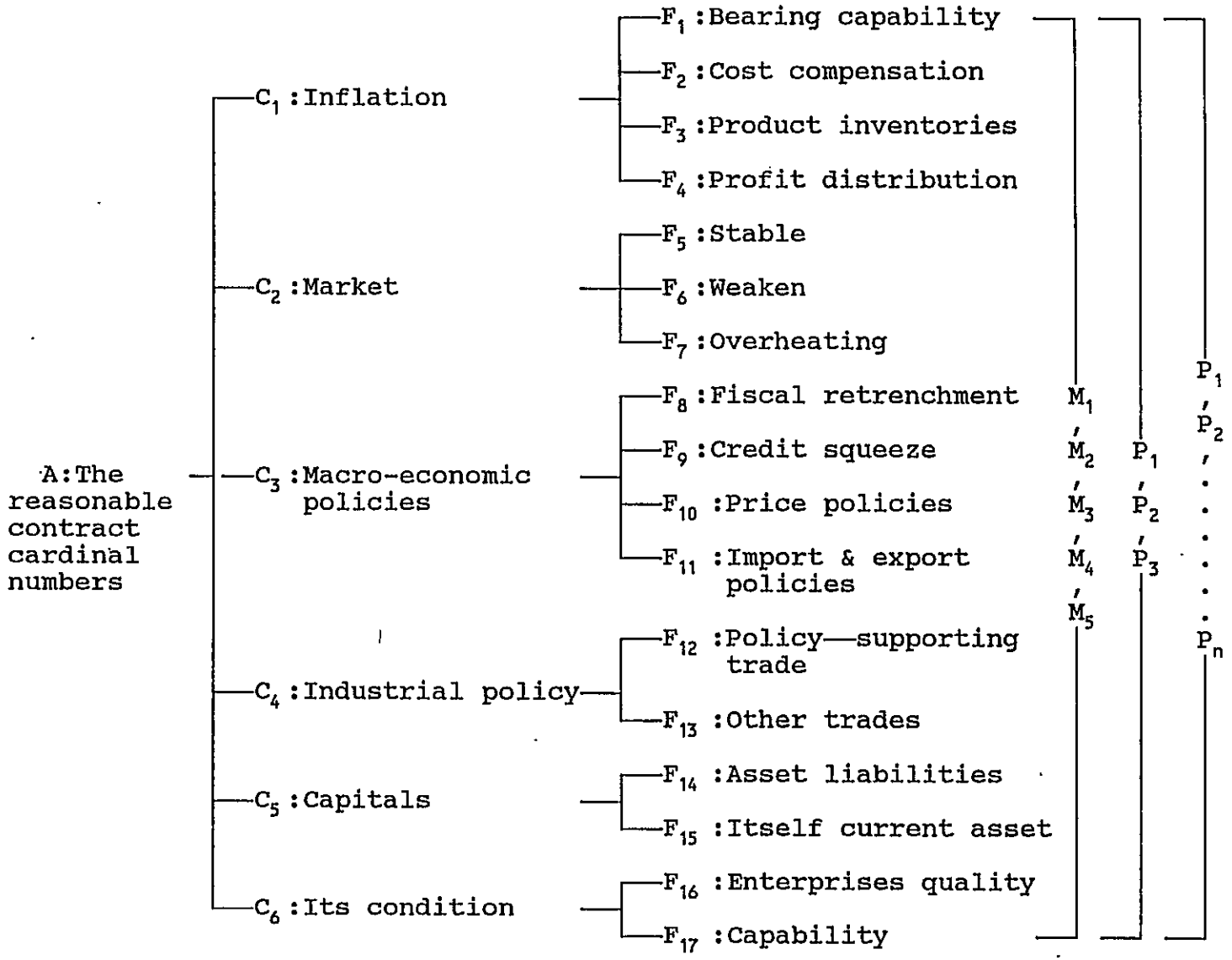

Figure. The graded hierarchy structure for reasonably checking and ratifying the contracted cardinal numbers