

Based on the DEA model of security housing construction efficiency research

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Keywords: Data Envelopment Analysis (DEA) Security Room Construction Efficiency

Abstract. Social indemnificatory housing is in the construction of house of our country town with relatively particularity a type of housing, it is usually refers to according to the national policy and legal regulations, unified planning, by the government as a whole, to provide specific people use, and on this kind of housing construction standards and sales price or rent standard to limit, the social security function of housing. The paper USES data envelope analysis method, in order to hebei province various administrative city in January 2012 to August safeguard room construction progress data as the research object, analyses the related statistics and analysis, compare the city in hebei province administrative safeguard room construction progress, obtain the progress development not balanced result, among them, the individual administrative city obviously lag behind other locally administrated level. We hope that this paper to ensure room construction efficiency is evaluation provide guidance.

Introduction

The implementation of the housing assignment currency policy after that, along with the rapid development of real estate industry, people with the appearance of new housing problem, the price of the house had higher causes of housing shortage situation caused the party and the government's high attention. In order to alleviate the residents' housing's pressure, the central government puts forward security room construction thoughts and real estate development direction.

" Twelfth Five Year Plan" period, the central government has formulated the corresponding state policies and laws and regulations, and put it in 2011, the local government to build 10 million sets of security housing task. From the current research situation, affordable housing research include: supply, distribution two aspects. Chinese scholars despite of the two aspects have research, however, in the indemnificatory housing construction efficiency in domestic are rarely discussed. Security room construction efficiency problem is for the people as soon as possible can equal reform development achievement, further narrow the gap between rich and poor, effective ease social contradictions of the key factors. This paper will use data envelopment analysis (dea) to ensure room in building efficiency on certain exploration.

2 Affordable housing construction efficiency evaluation index

In the current policy and economic environment, influence of affordable housing construction efficiency indicators are many, such as the policy factors, basic economic factors on the impact, but from the data selection, we easily available and also the most direct impact indicators into:

Input indicators: government investment funds (government in low-income housing construction to raise funds, unit) for million; social financing amount (via social financing channels to raise funds for low-income housing construction), unit for the million yuan; construction land (have been

identified for security housing construction project land scale), unit for mu; these indicators represent the low-income housing construction process of capital, land and other key resources input;

Output indicators: affordable housing construction volume (the volume of work, statistical data to complete the formalities have been started in low-income housing projects completed), unit is set; affordable housing completion (referred to as completed, by displaying the current data has been completed to low-income housing projects completed), unit is set; these indicators represent the low-income housing construction to carry out specific implementation.

3 Affordable housing construction efficiency evaluation method selection

The study of input output model, we mainly apply data envelopment analysis. Data envelopment analysis (Data Envelopment Analysis, referred to as DEA) is a famous strategist of A.Charnes and W.W.Copper and other scholars to " efficiency " concept as the basis, according to the input and output indicators indicators for the same type of unit relative validity or effectiveness evaluation of a new method of system analysis ^[1]. This method is often used in the production life of the input output system to make management decision and benefit, efficiency evaluation, has become a management science and system engineering is widely used as an effective analysis tool ^[2].

DEA uses mathematical programming methods, to assess a group with multiple input and multiple output " unit " (referred to as the decision making unit, Decision Making Unit, DMU DMU, in Hebei province for the administrative city) performance and relative efficiency based on ^[3], through the DMU collection analysis and comparison, the DMU observation whether the DEA effectively, to determine the " efficient production frontier ", and points out that the invalid DEA, guiding the improvement direction and degree.

4 Based on the sample data of affordable housing construction efficiency evaluation

4.1 Samples and data selection

This article take the Hebei province each administrative city in 2012 January ~8 months low-income housing construction schedule data as the research object, the main sources of data in Hebei Province, housing and Urban-Rural Construction Department official website (<http://www.hebjs.gov.cn/hbzfbz/>). Some data through the Excel software that, model establishment and analysis of the use of DEAP software implementation.

4.2 Affordable housing construction efficiency evaluation process

Using DEAP software to establish the model of DEA process is as follows:

4.2.1 and 4.2.2

4.2.1 DEA input model of input and output index

As shown in table 1.

Table 1 DEA model of input and output index system table

	Shi jia zhuang	Cheng de	Zhang jia kou	Qin huang dao	Tang sha	Lang fang	Bao ding	Cang zhou	Heng shui	Xing tai	Han dan
Start volume, set	15048	4026	19252	4471	26647	9923	15908	24838	4244	19589	32392
Complete volume, set	10228	4812	12727	6340	27577	7076	9947	11351	4096	8736	12979
Government investment, million	146489	68620	83933	54273	396901	144948	152382	142694	65452	120331	220843
Social financing amount, million	38.4	0	0	17	34.5	15	3.3	15	0	14	38
Construction land, Mu	2409	1001	1594	715	3269	1179	1805	3267	881	1607	2801

4.2.2 The results' analysis

The use of DEA software, and used to output index oriented analysis method, in the input indicators remain unchanged, in Hebei Province on the administration of city low-income housing construction starts and the completion of the following analysis, analysis results are shown in the following table.

Table 2 Analytical results of CCR model efficiency

EFFICIENCY SUMMARY:

	firm	crste	vrste	scale
1	1.000	0.509	1.966	-
2	0.509	0.174	2.915	-
3	0.174	0.647	0.270	drs
4	0.647	0.230	2.814	-
5	0.230	1.000	0.230	drs
6	1.000	0.339	2.951	-
7	0.339	0.529	0.641	drs
8	0.529	0.781	0.676	drs
9	0.781	0.156	5.004	-
10	0.156	0.614	0.254	drs
11	0.614	1.000	0.614	drs
mean	0.544	0.544	1.667	

Note: crste = technical efficiency from CRS DEA
 vrste = technical efficiency from VRS DEA
 scale = scale efficiency = crste/vrste

The efficiency analysis of results, without taking into consideration the returns to scale when technical efficiency (efficiency) is relatively effective to the city of Shijiazhuang, Langfang two city; in considering scale income (technical efficiency pure technical efficiency) is relatively effective to the city of Tangshan, Handan two city. This shows, four City in low-income housing construction progress, basic in efficient production frontier, relative to other city high efficiency, good progress of the project.

In addition, Tangshan, Langfang, Zhangjiakou, Baoding, Xingtai, Handan returns to scale is decreasing, it said, in 2012 January ~8 months during the construction of low-income housing has gradually slowed down or even reverse the situation, the city needs the relevant government departments to raise vigilance, to identify the key issues and proposed solutions.

Table 3 CCR model output indicators slack variable analysis results

SUMMARY OF OUTPUT SLACKS:

firm output	1	2
1	0.000	0.000
2	3574.473	0.000
3	0.000	0.000
4	7199.560	0.000
5	0.000	0.000
6	0.000	0.000
7	0.000	0.000
8	0.000	0.000
9	0.000	0.000
10	0.000	0.000
11	0.000	0.000

Through to the output index of the slack variable analysis, Hebei province overall low-income housing starts not just as one wishes, among them Chengde, Qinhuangdao two cities that is most evident, as DMU is invalid, and in low-income housing, devoted inadequacy is closely related to, among them, Chengde City Hall raise money amount is 686200000 yuan, Qinhuangdao city the government to raise funds 542730000 yuan, respectively, in the cities of Hebei province with the index of the bottom second and reciprocal the first.

Thus, two city should increase government support construction investment, broaden sources of income and reduce expenditure, ensure capital adequacy. In addition, the two also needs to increase the working efficiency of low-income housing attention and supervision, so that timely initiation of low-income housing projects and complete the tasks throughout the year.

Table 4 CCR model unit target value analysis results**SUMMARY OF OUTPUT TARGETS:**

firm output	1	2
1	29585.897	20109.287
2	26647.000	27577.000
3	29757.915	19672.189
4	26647.000	27577.000
5	26647.000	27577.000
6	29282.234	20880.892
7	30094.296	18817.448
8	31783.530	14525.117
9	27177.288	26229.541
10	31900.970	14226.703
11	32392.000	12979.000

Based on the unit target value analysis, Tangshan, Handan city for the two DEA relatively effective, its target value in the efficient frontier, 11 in Hebei Province Administration, performance is relatively good, and other administrative city of Hebei province are poor performance. In land, capital and other resources quantity invariable situation, Chengde City low-income housing starts, the completion of all differs very much, and effective production frontier considerably, indicating Chengde on low-income housing construction efficiency situation holds enough, need to strengthen the construction of low-income housing project efficiency supervision, to ensure the smooth progress of projects and acceptance.

Summary

This paper uses DEA model in Hebei Province on the administration of city low-income housing construction efficiency is evaluated and analyzed, found that each city low-income housing construction efficiency is not all, uneven. Through specific discuss various administrative city in relation to the other administrative city in low-income housing and construction work have due effect, reach Tangshan, Handan two administrative city in low-income housing construction efficiency in the province's leading position, and the city of Chengde in low-income housing construction efficiency control of efficiency to be greatly improved, the corresponding Chengde City, city hall on the engineering efficiency should strengthen efficiency supervision, ensure annual low-income housing construction task is finished smoothly.

In addition, we found increased affordable housing construction efficiency is the key is to increase capital investment and the land supply, only in the elements of the input increase strength to ensure efficiency, which will force the local government benefit, and the real estate market caused certain impact, this is we need to further explore the issue.

Reference:

- [1]Chmes A,Cooper WW,Phodes EM.Easuring the Efficiency of DMU[J].European Journal of Operational Research,1978,11(6):429—44
- [2] Zhang Yuping DEA based Dalian City Human Settlements sustainable development capacity evaluation [D]. Liaoning: Dissertation of master degree of Liaoning Normal University, 2007:26 - 30 (In Chinese)
- [3] Zhu Yanke, Yang Huiyao. Guangdong saves each city economy to develop the relative efficiency of DEA [J]. southern economy, 2002, 11 (3), 42 - 43(In Chinese)