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# Chinese Stock Market Efficiency of Capital Allocation Function

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**Abstract:** Using the efficiency of capital allocation function to characterize the stock market system efficiency. Using panel data analysis method, from a regional perspective empirical analysis to implement the stock market during the capital allocation function efficiency issue approval system for China. The results show: the efficiency of resource allocation of China stock market is lower, and stock market system is inefficient. Point: Chinese stock market institutional change should transform from "government-led" to "market-oriented" and increase penalties for violations to cultivate rational and mature investors in order to achieve the stock market system function better, enhance system efficiency.

Key words: The stock market, The efficiency of capital allocation function, Institutional Efficiency

## 1. INSTRUCTION

System is a series of rules to be worked out, compliance order and moral behavior, ethics. It seeks to bind main benefits or maximize the benefits of individual behavior<sup>[1]</sup>. The main role of the system is to provide the constraints of human behavior rules to reduce uncertainty. The reason why the system is selected and created by people. Because it has to meet the needs of the people behavior<sup>[2]</sup>. There are two methods for system efficiency evaluation, one choice is to assume that the service system provided for a given function or achieve, and select a lower cost of the system is more effective system; another choice is to assume the cost of the system is given, it can provide more services or systems to achieve more functionality is more effective system<sup>[3]</sup>. North pointed out, "System needs to have a valid implementation of characteristic", and proposed, "if a constraint mechanism to maximize participants' behavior to bring an increase in output, then this constraint mechanism is efficient"<sup>[4]</sup>.

Stock market plays an important role in the social economical development, institutional change of the stock markets of countries are usually induced institutional change. Stock market from disorder to order more shows that the informal system through effective market proven system gradually established as a formal system. In the economic transition and turnaround of state-owned enterprises background to establish Chinese stock market<sup>[5]</sup>. On the institutional arrangements, reflected in more mandatory system changes. But, it is undeniable that after 20 years of development, the scale of China's stock market continues to expand, construct the pace of multi-level capital market is accelerating. By evaluating the efficiency of Chinese stock market system, found defects of system design and implementation, further building efficient, reasonable, it is generally accepted and comply with relevant institutions, it has become increasingly urgent.

There are many qualitative analysis of China stock market system issue document, but the real efficiency of the system for quantitative measurement of rare literature. Liao Jingchi<sup>[6]</sup> suspension and resumption of the Chinese stock market system efficiency of an empirical test; Zhu Chongshi and Wang Hui<sup>[7]</sup> illegal analyzed China's securities market illegal disciplinary system efficiency; Gao Jianning<sup>[8]</sup>, Chen Yihua<sup>[9]</sup>, Yang Rongguo<sup>[10]</sup> studied China securities regulatory system efficiency issue. In this paper combining the view of North and scholars on the stock market system efficiency measurement methods. The system runs the "input" is defined as the cost of system, and runs the "output" is defined as the system function, the institutional efficiency of the stock market is understood as the realization degree of the system function of the stock market under the restriction of the system cost. In the three basic functions of the stock market<sup>[11]</sup>, financing - investment function is a prerequisite to achieve capital allocation function, capital pricing is the way to achieve capital allocation

function, achieve rational allocation of capital is the value of the stock market existence and development, so, this article will focus on the stock market capital allocation of the efficiency evaluation. China implemented the stock issuance approval system in March 2001, so I select 2001-2013 year time frame, the purpose is during the evaluation by the implementation of China stock issuance approval system, capital allocation function of the stock market to judge the efficiency of China's stock market system is valid and make recommendations.

## 2. EMPIRICAL ANALYSIS

### 2.1 Research methods

Capital allocation function of the stock market means guiding capital flows which can be generated by the stock price high reward industry, regions or businesses in order to achieve rational allocation of capital. At present, methods for capital allocation efficiency multi derived from American scholar Jeffrey Wurgler<sup>[12]</sup> who proposed a measure of the efficiency of capital allocation of the classic model:

$$\ln(I_{ict}/I_{ict-1}) = \alpha + \eta_c \ln(V_{ict}/V_{ict-1}) + \varepsilon_{ict} \quad (1)$$

Among them,  $I$  represents an industry stock of fixed assets,  $V$  represents the added value of the industry to achieve,  $i$  represents the industry number,  $c$  represents the country,  $t$  represents the year,  $\eta$  represents the growth rate of investment growth to increase the value of elasticity, reflecting the industry capital investment profit rate of reaction.  $\eta$  is a positive number, the larger the value the more sensitive the profitability of the industry indicates that reaction to increased investment, the higher the efficiency of capital allocation.

Chinese scholar Ma Yuming<sup>[13]</sup> references Jeffrey Wurgler's thought, by examining the different sectors of the listed company's assets growth and the relationship between the performance, which reflects the Chinese stock market efficiency to select net assets per share and earnings per share growth and other indicators substitute formula (1)  $I$  and  $V$ , and construct following a set of model:

$$Agp_{it} = \alpha_t + \beta_t Rp_{it} + \varepsilon_{it} \quad (2)$$

$$Dgp_{it} = \mu_t + \eta_t Rp_{it} + \varepsilon_{it} \quad (3)$$

$$Ncp_{it} = \varphi_t + \lambda_t Rp_{it} + \varepsilon_{it} \quad (4)$$

From (2) to (4):  $i$  indicates industry code;  $t$  represents the year;  $Agp$  represents an industry of listed companies net assets per share, the weighted average growth rate;  $Dgp$  represents a trade liabilities per share growth of listed companies;  $Ncp$  represents an industry average share listed companies to raise new capital;  $Rp$  represents a share of profit on a trade-weighted average shares of listed companies;  $\beta_t$ ,  $\eta_t$  and  $\lambda_t$  respectively represent the regression coefficient

$\alpha_t$  in year  $t$ , The regression coefficient is significantly greater than 0, show return on investment in the industry's annual high. There are more resources to flow into the sector, the low return on investment of the industry slowed or decreased flow of resources, therefore, to optimize the allocation of capital markets function significantly.

Feng Yuming built model takes into account the expansion of China's stock market has a faster, growth performance of listed companies is not obvious and overall losses may be occurred and other characteristics, avoid using logarithmic form and requires capital-output defective item must be positive, While the regression coefficients estimated yearly can reduce the impact on capital allocation efficiency of the test results in a period of significant changes in the stock market, therefore more suitable measure of capital allocation efficiency of China's stock market.

## 2.2 Index design and data sources

This paper references model Jeffrey Wurgler and Feng Yuming two scholars proposed, appropriate adjustments, and examine the efficiency of China stock market capital allocation issues from a regional perspective. Selecting return on equity (ROE) as explanatory variables, standing for "capital-output" the reason is in the stock market issue, providers of funds investors, fund raisers are issuers. As shareholders, investors are most concerned about is to maximize shareholders' equity, the measure of shareholders' funds is the efficient use of financial indicators return on net assets. Correspondingly, the dependent variable is equity financing rate (EFR), standing for "capital investment" The index is calculated based on the total area of financing divided by total shares issued net asset areas. The basic model is constructed as follows:

$$EFR_{it} = \alpha + \beta ROE_{it} + \varepsilon_{it} \quad (5)$$

In the formula (5):  $i$  represents the region;  $t$  represents the year;  $EFR$  represents ratio of net asset finance areas;  $ROE$  represents return on net assets areas;  $\alpha$  represents a fixed constant;  $\beta$  represents the regression coefficients, it reflects the efficiency of capital allocation.  $\beta$  values is significantly greater than zero, it indicates that regional changes in the profitability of capital sensitive, high capital allocation efficiency of the stock market, high rate of return of capital flows to the region, functions are to play an effective capital allocation;  $\beta$  is significantly less than zero, indicates that the stock market lower efficiency of capital allocation, low rate of return of capital flows to the region, capital allocation inefficiency.

It conducted empirical analysis of data from 2001 to 2014, "China Securities and Futures Statistical Yearbook" region according to the province, divided into 31 municipalities were summarized and organize data. Return on net assets data from 2001 to 2012 Statistical Yearbook "return on net assets" and the 2013 to 2014 Statistical Yearbook "average return on net assets" projects; net asset financing rate in total net asset data from the 2001 to 2012 Statistical Yearbook, "shareholders' equity" and the 2013 to 2014 Statistical Yearbook "net assets attributable to shareholders" project, the total share issue financing data from 2001 to 2014 Statistical Yearbook "IPO financing amount" Project Status List of Rights Offering, issuing a list. The above data entry EViews 6.0 software, get 403 two groups of panel data in 2013.

Classical regression model is built on the basis of stationary time series, Therefore, before building model requires time series unit root test<sup>[14]</sup>. LLC were chosen test method for two time series industries and regions Individual intercept, Individual intercept and trend, None testing, test results are rejected the null hypothesis containing homogeneous unit root, that each cross-section sequence does not contain homogeneous unit root. Select fisher-ADF test method of the three tests, Each time series are contain heterogeneous rejected the null hypothesis of a unit root, that each cross-section sequence does not contain heterogeneous unit root. Visible, two time series by industry and region there is neither homogeneous nor heterogeneous unit root unit root, belong to stationary time series, regression analysis can be performed.

## 2.3 Stock market capital allocation efficiency model and analysis functions

When on the Panel Data model to estimate, we need to test the model form set, in order to avoid the model set deviation, the effectiveness of the impact parameter estimation<sup>[15]</sup> Covariance analysis of test results obtained were two  $F$  statistic  $F_2=1.97$ ,  $F_1=2.30$ , Charles  $F$  distribution table, at a given 5% significance level,  $F_{2\alpha}(60,341)\approx 1.43$ ,  $F_{1\alpha}(30,341)\approx 1.64$ , because of  $F_2 > 1.43$ ,  $F_1 < 1.64$ , model should be used in the form of variable coefficients. Hausman test results rejected the null hypothesis, therefore, we should use fixed-effect model. test and analysis of covariance Hausman test, final selection of fixed-effects model with variable coefficients as the stock market area efficiency of capital allocation model, that 31 areas of the region not only affect the individual's self-financing, and the explanatory variables factor will vary with different regions. That is, The model should include the intercept  $\alpha_i$  to reflect regional differences, and the coefficient  $\beta$  should vary with the

different regions. On the basis of the formula (5), Construct the following model:

$$EFR_{it} = \alpha + \alpha_i + \beta_i ROE_{it} + \varepsilon_{it} \quad i=1,2, \dots, 31; \quad t=2001,2, \dots, 2013 \quad (6)$$

(6) In the formula:  $i$  represents the region;  $t$  denotes the year;  $EFR_{it}$  area  $i$  represents the net asset financing rate in year  $t$ ;  $ROE_{it}$  represents area  $i$  Return on net assets in year  $t$ ;  $\alpha$  represents an average level of 31 areas of financing,  $\alpha_i$  represents individual  $i$  of the affected areas, Deviation from the average funding level of spontaneous financing and regional Characterization of zone  $i$ ;  $\beta_i$  represents capital allocation efficiency coefficient of zone  $i$ , reflecting the impact of changes in Return on net assets of  $i$  region net asset finance rate.  $\beta_i$  significantly greater than 0, High efficiency of capital allocation indicate zone  $i$ ; is significantly less than 0, low efficiency of capital allocation indicate areas of  $i$ . Taking into account the data of the individual prone to inter-sectional heteroscedasticity and serial correlation characteristics, the paper selection generalized least squares conducts equation. Final results of the estimation equation is:

$$EFR_{it} = 2.6920 + \alpha_i + \beta_i ROE_{it} \quad i=1,2, \dots, 31; \quad t=2001,2, \dots, 2013 \quad (7)$$

The estimation results of spontaneous financing capital allocation efficiency coefficient  $\beta_i$  each region and each region of the average funding level of regional deviation  $\alpha_i$  as shown in Table 1.

**Table 1 The assessment result of efficiency of capital allocation coefficient  $\beta_i$  and the value of deviation  $\alpha_i$  in all regions**

Area	$\alpha_i$	$\beta_i$	Area	$\alpha_i$	$\beta_i$
Beijing	7.6830	-0.5009	Hubei	2.0466	0.2182
Tianjin	-0.6570	0.9630	Hunan	0.2627	0.6915
Hebei	-1.8279	0.9036	Guangdong	1.8542	0.1211
Shanxi	-1.7591	0.5460	Guangxi	-2.8598	0.9680
Inner Mongolia	4.2927	-0.1330	Hainan	5.6687	0.5312
Liaoning	-3.2133	0.8988	Chongqing	-4.6762	1.5567
Jilin	3.1406	0.0720	Sichuan	-0.2951	0.8393
Heilongjiang	-11.0460	3.8622	Guizhou	8.0257	-0.2139
Shanghai	2.6250	0.0867	Yunnan	7.9648	-0.1627
Jiangsu	-9.4336	1.9477	Xizang	6.4283	0.1430
Zhejiang	-9.1003	1.6043	Shanxi	6.8918	1.6158
Anhui	2.2670	0.1946	Gansu	3.8512	0.2214
Fujian	-2.7716	1.4026	Qinghai	-33.7616	5.7948
Shanxi	6.4593	-0.3537	Ningxia	4.1077	0.1648
Shandong	-1.5981	0.5624	Xinjiang	0.315	0.8926
Henan	9.1143	-0.3941			

From the estimated results of equation (7) and Table 1, the existence of obvious regional differences in capital allocation efficiency of China's stock market. In particular:  $ROE$  for  $EFR$  elasticity coefficient is significantly greater than zero provinces, there are Qinghai, Heilongjiang, Jiangsu, Shaanxi, Zhejiang, Chongqing and Fujian, higher capital allocation efficiency of these provinces;  $ROE$  for  $EFR$  elastic coefficient of less than 0 province (Autonomous regions and municipalities) in Beijing, Inner Mongolia, Jiangxi, Henan and Guizhou, lower capital allocation efficiency of these provinces (autonomous regions and municipalities);  $ROE$  for the remaining provinces  $EFR$  elastic coefficient between 0 and 1, its capital allocation efficiency is not

high. Capital allocation efficiency coefficient between provinces between 0 and 1 more, Reflects the Chinese stock market's overall capital allocation efficiency of the region is not high.

Table 2 lists the number of listed companies in China in various regions by the end of 2013 as well as in 2001 - the situation in 2013 among the regions through the issuance of shares to raise funds. Table 2 shows: ranked by amount of money raised, Beijing is in the first place. But its capital allocation efficiency is only -0.5, which is the lowest in the efficiency of capital allocation in the country's 31 provinces (autonomous regions and municipalities). Ranked second and third place in the capital allocation efficiency, Shanghai and Guangdong only 0.087 and 0.1211, closed to zero.

**Table2 By the end of 2013 the number of listed companies in various regions of China and 2001--2013 recruits total funds.**

Area	Number of listed companies (a)	The total funds raised (\$ billion)	Area	Number of listed companies (a)	The total funds raised (\$ billion)
Beijing	219	13281.45	Qinghai	10	888.61
Shanghai	201	6649.19	Heilongjiang	31	824.25
Guangdong	367	5685.34	Xizang	10	749.00
Fujian	88	2697.92	Xinjiang	39	742.53
Jiangsu	235	2665.78	Chongqing	37	694.77
Zhejiang	247	2620.39	Yunnan	28	586.43
Shandong	152	1813.98	Jiangxi	32	529.80
Sichuan	90	1394.50	Neimenggu	25	459.74
Henan	66	1142.29	Hainan	26	459.28
Anhui	77	1109.14	Jilin	38	457.27
Hebei	48	1097.10	Gansu	25	412.97
Hubei	84	1022.23	Guangxi	30	279.07
Liaoning	68	969.09	Guizhou	21	265.73
Shanxi	34	949.38	Shanxi	39	118.71
Hunan	72	924.10	Ningxia	12	92.16
Tianjin	38	906.53			

Data Source: According to 2001 to 2014, "China Securities and Futures Statistical Yearbook" data collation.

In summary, by analyzing the 2001--2013 years, the stock market allocation efficiency of China's regional capital seen, During the implementation of issuance approval system in China's stock market, Beijing, Shanghai, Guangdong, Fujian, Jiangsu and Zhejiang and other areas with better economic development to raise more funds, Less capital raised and Gansu, Guangxi, Guizhou, Shaanxi, Ningxia and other more remote, financially weaker areas. This suggests, to raise capital by issuing shares in the region to achieve a certain degree between the optimal allocation, However, the efficiency of capital allocation point of view, regional differences evident efficiency of capital allocation, Changes in regional capital allocation efficiency and shareholders' equity of listed companies a weak correlation, low efficiency of capital allocation, to a lesser extent to achieve capital allocation function of the stock market.

### 3. CONCLUSION AND SUGGESTION

As can be seen from the above analysis, Capital Allocation of Chinese stock market are very poor, The stock market does not change the capital through the stock price led to a high rate of return in the region, but there mismatches and waste of capital, Inefficient capital allocation function. Optimize the allocation of capital is the

value development of the stock market where, the efficiency of capital allocation function to some extent reflects the stock market system efficiency. According to the proposed stock market system efficiency metrics, Chinese stock market lower functional efficiency of capital allocation, it shows that China's stock market system is inefficient. Improve the efficiency of capital allocation for China's stock market, enhance system efficiency, I recommend the following:

First, the system changes from the "government-led" to "market-oriented." China's stock market is the institutional changes "government-led" pushed. This is due to the prevailing economic social environmental decision, on the stock market can be in a relatively short period of time to achieve leapfrog development of great significance, but also causes "government failure" and "policy of the city." Stock market institutional change should gradually to "market-oriented" changes, give full play to the basic role of the market in the allocation of capital, regulatory authorities should be designed on the basis of respect for the laws of the market to more effectively implement formal system system functions, while the weakening of direct intervention in the market and guide the market mechanism to achieve self-improvement and development.

Second, increase penalties for illegal stock market. One reason for the low capital allocation efficiency of China's stock market is to have a large number of issuers and intermediaries by providing false information, and other packaging market into the stock market financing, and in a very short time after the successful listing will appear decline in performance or even losses delisting. This is not only conducive to protecting the interests of investors, but also makes the stock market into a state of disorder. Therefore, regulators should strengthen information disclosure quality, and establish accountability mechanisms to recover and increase compliance costs for issuers and intermediaries to form a credible threat.

Third, cultivate rational, sophisticated investors. "Stir shares" has almost become the norm in Chinese Stock Market. This phenomenon is clearly showing that irrational investors, induce more companies to get raised funds by issuing new shares, and a waste of resources caused by inefficient use of funds by investors and ultimately the market to bear. Therefore, cultivate rational and sophisticated investors should become an important task of the stock market building. By strengthening investor education to guide investors to focus on the enterprise value judgments, so that capital flows into the real high rate of return business, and optimize the allocation of capital, improve capital allocation efficiency of the stock market, to better realize the stock market system functions, improve system efficiency.

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