

STOCK PRICES AND MACROECONOMIC VARIABLES IN VIETNAM: AN EMPIRICAL ANALYSIS

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1. Introduction

Efficient market hypothesis has been at the center of debates in financial literature for several years. The term efficiency is used to describe a market in which all relevant information is immediately impounded into the price of financial assets. If the capital market is sufficiently efficient, investors cannot expect to achieve superior profits from their investment strategies. As a result, capital asset pricing models could be useful for various investment decisions. In the economic perspective, the efficient market is even more important because it implies that the stock market is well functioning in scarce resource allocation. However, this is not always the case, especially in the emerging stock markets.

Islam and Khaled (2005) calls developing countries as 'capital starved economies', so efficient allocation of scarce resources and encouragement of private foreign investment are both of vital importance. They also stated that the success of an increasing privatization of these economies will depend crucially on the presence of an active and efficient stock market. Indeed, rational investors expectedly drive their investments into the most profitable projects, given acceptable risks. The efficient market can address the 'mixed feelings' problem, in which investors are always skeptical about the intrinsic value of any stock under consideration. This may lead their decisions based on others. In other words, this phenomenon is commonly considered as herding behavior. For foreign investors, inefficient markets are usually equivalent to high risky markets when making their investments abroad. Hence, they tend to apply

higher hurdle rates, which in turn underestimate investment opportunities in developing countries. Eventually, it is hard for any developing country with inefficient/weak stock market to attract foreign portfolio investment flows.

The efficient market hypothesis is theoretically viewed in three common forms, depending on the kind of available information embodied. These are commonly classified into weak-form, semi strong-form, and strong-form efficiency. The weak form is the lowest form of efficiency that defines a market as being efficient if current prices fully reflect all information contained in past prices only. The semi-strong form efficiency suggests that the current price fully incorporates all publicly available information. Semi-strong efficiency requires the existence of market analysts who are not only financial economists able to comprehend implications of vast financial information, but also macroeconomists, experts adept in understanding processes in product and input markets (Ross et al., 2006). The strong form efficiency states that the current price fully incorporates all existing information, both public and private (also called inside information). The main difference between the semi-strong and strong efficiency hypotheses is that, in the latter, nobody should be able to systematically generate profits even if trading on information not publicly known at the time. The rationale for strong-form market efficiency is that the stock market anticipates, in an unbiased manner, future developments and therefore the stock prices may have incorporated all relevant information and evaluated in a much more objective and informative way than the insiders. According

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to Ross et al. (2006), a very strong assumption of this form is that inside information cost is always zero. However, this assumption hardly exists in reality, so the strong form efficiency is not very likely to hold.

Despite its impressive growth, the Vietnamese stock market is really struggling with various typical weaknesses of an emerging market (Truong, 2006). As a result, trading behavior in the Vietnamese stock market may be much different from that in developed/newly emerging stock markets. Investors, especially those who have just experienced the economic downturn, may base their actions on the decisions of others who are well informed about market developments by following the market consensus (Nguyen, 2009). Thus, the question is whether the Vietnamese stock market is informationally efficient and whether the market pattern is seriously affected by the financial crisis.

The mixed evidence from the study of Truong (2006) in the 2002-2004 period may imply that the Vietnamese stock market is, to which extent, characterized by the weak-form efficiency. However, this lowest form of efficiency cannot assure the Vietnamese stock market is well functioning in scarce resource allocation and attractive enough to encourage foreign investors (Nguyen, 2007). Both investors and policy makers mostly concern if the current market prices reflect all publicly available information, such as information about inflation, economic growth, money supply, exchange rates, interest rates, annual earnings, and stock splits, etc.

Ibrahim (1999) states that significantly lagged effects of macroeconomic variables on stock prices indicate informational inefficiency of the stock market. If this is the case, individual investors can earn abnormal profits by exploiting past macroeconomic information. As a result, this exploitable opportunity would seriously distort the market's ability to efficiently allocate scarce resources. The reverse effects of stock prices on macroeconomic variables imply that stock market movements anticipate future economic conditions. Accordingly, they may be employed as a leading indicator in helping formulating current economic stabilization policies. This article will investigate these dynamic interactions for the case of the Vietnamese stock market.

In order to contribute to this line of literature for emerging markets, this paper would like to extend existing studies on the informational efficiency of the Vietnamese stock market on the following ways. First, we examine the market efficient hypothesis using a wider range of macroeconomic variables by using bivariate causality tests. In particular, we use twelve macroeconomic variables, namely, consumer price (CP), industrial production (IP), imports (IM), exports (EX), exchange rates (ER), M1 money supply (M1), M2 money supply (M2), lending rates (LR), deposit rates (DR), domestic credit (DC), foreign reserves (FR), and money reserves (MR). Second, we make every effort to compare the informational efficiency situation of the Vietnamese stock market with that of other emerging markets. Third, we will take the impact of the last financial crisis into account so as to check the robustness of market efficiency exhibition.

The organization of the paper is as follows. Then, Section 2 outlines the analytical framework. Section 3 presents the results of bivariate causality tests. Finally, our concluding remarks are contained in Section 4 by some policy implications to the stock market in Vietnam.

2. Analytical framework

The analytical framework of this paper is to employ the Granger causality tests. In doing so, we will first examine whether the variables of concern are non-stationary and cointegrated. As widely accepted, if all variables under consideration are integrated of order 1, $I(1)$, and they are not cointegrated, we must apply the standard version of Granger causality test using the first differences of the variables. If this is the case, we are just able to test whether the stock market exhibits the short-run efficiency. By contrast, if the variables under consideration are not only $I(1)$, but also cointegrated, then we should employ the cointegration and error correction (ECM) version of Granger causality tests. According to Ibrahim (1999), the ECM conveniently combines the short-run dynamics and long-run equilibrium adjustments of the variables. In the efficient market hypothesis literature, this allows us to analyze whether the stock market exhibits both short-run and long-run efficiency.

3. Bivariate causality tests

This section builds on the previous integration and cointegration tests to appropriately specify a dynamic framework for assessing the interactions between the stock prices and the macroeconomic variables of interest. Since all residuals from each cointegrating equation are stationary, the error correction version of Granger causality test is used. It is noted that although our main focus is on the informational efficiency of stock prices, we also evaluate the possible feedback from the stock prices to the macroeconomic variables. These are reported in the Table 1.

The first column of Table 1 presents two null hypotheses for each set of variables: H_{01} : Macroeconomic variable does not Granger cause stock prices, and H_{02} : Stock prices do not Granger cause macroeconomic variable. Although our main focus is on H_{01} , we also test H_{02} . Specifically, testing these hypotheses will result in one of the four patterns of causality: (1) unidirectional causality from macroeconomic variable to stock price if H_{01} is rejected; (2) unidirectional causality from stock price to macroeconomic variable if H_{02} is rejected; (3) bidirectional causality between macroeconomic variable and stock price if both H_{01} and H_{02} are rejected; and (4) no causality between macroeconomic variable and stock price if both H_{01} and H_{02} are not rejected.

The second column of Table 1 presents optimal lag lengths of dependent variable and independent variable in each VAR model. Since we have twelve macroeconomic variables, we have to run 24 VAR models. The first equation of each VAR model is used to test whether macroeconomic variable does Granger cause stock price; while the second equation of each VAR model is used to test whether stock prices does Granger cause macroeconomic variable. In order to determine the optimal lag lengths of dependent variable (or endogenous variable), this thesis employs the “VAR estimation” technique using Eviews.

Table 1: Bivariate Causality Tests (all cointegrated series)

Null Hypothesis	Optimal Lags		Granger Test		ECM
	Dep. Variable	Indep. Variable	F Stats	c ² Stats	
(a) <u>CP dnc VNI</u>	12	8	1.71	13.7***	-0.05
<u>VNI dnc CP</u>	25	1	0.10	0.10	-0.02***
(b) <u>IP dnc VNI</u>	12	8	1.56	12.46	-0.07**
<u>VNI dnc IP</u>	14	1	0.16	0.16	-0.21*
(c) <u>IM dnc VNI</u>	12	1	0.42	0.42	-0.06***
<u>VNI dnc IM</u>	18	1	0.03	0.03	-0.12**
(d) <u>EX dnc VNI</u>	12	1	2.28	2.28	-0.07**
<u>VNI dnc EX</u>	20	1	0.56	0.56	-0.07
(e) <u>FX dnc VNI</u>	12	1	3.81***	3.81***	-0.05**
<u>VNI dnc FX</u>	22	4	4.04*	16.15*	0.05
(f) <u>M1 dnc VNI</u>	12	15	2.60*	39.1*	-0.04
<u>VNI dnc M1</u>	24	1	0.53	0.53	-0.02
(g) <u>M2 dnc VNI</u>	12	4	2.05***	8.18***	-0.08**
<u>VNI dnc M2</u>	25	4	2.58**	10.32**	-0.001
(h) <u>LR dnc VNI</u>	12	2	1.73	3.47	-0.04***
<u>VNI dnc LR</u>	9	1	0.68	0.68	-0.08***
(i) <u>DR dnc VNI</u>	12	1	0.06	0.06	-0.04
<u>VNI dnc DR</u>	8	3	2.87**	8.62**	-0.07***
(j) <u>DC dnc VNI</u>	12	1	0.84	0.84	-0.08**
<u>VNI dnc DC</u>	24	4	1.57	6.28	0.005
(k) <u>FR dnc VNI</u>	12	1	0.21	0.21	-0.07**
<u>VNI dnc FR</u>	4	2	1.13	2.26	-0.03
(l) <u>MR dnc VNI</u>	12	1	0.48	0.48	-0.08**
<u>VNI dnc MR</u>	12	1	1.50	1.50	0.001

Note: *, ** and *** denote significance at 1%, 5% and 10% levels respectively. The term “dnc” means “does not Granger cause”. Entries under “Granger Tests” are F statistics and χ^2 statistics for testing the null hypothesis that the coefficients’ sums of causal variables are zero. And the underlying presents the existence of contemporaneous relationship at 15% level of significance.

The selection criteria for the appropriate lag lengths of the unrestricted VAR models employ F-tests and χ^2 tests. The selection procedure involves choosing the VAR(p) model with the highest absolute value of AIC, SIC or the Hannan–Quinn (HQ) and lowest value of final prediction error (FPE). In practice, the use of SIC is likely to result in selecting a lower order VAR model than the AIC. Similar to previous studies,

this thesis employs the AIC criterion. Once the appropriate lag lengths of dependent variable in each VAR model are selected, we then apply the simple-to-specific approach to determine the appropriate lag lengths of independent variable on the basis of AIC criterion.

The third column of Table 1 presents the Granger causality test results. These tests are simply conducted by Wald – Coefficient Restriction test in Eviews. The final column of Table 1 presents the ECM test results. In this table, we just provide π coefficients. From Table 1, we may note four important points from the regressions.

First, three out of twelve macroeconomic variables, specifically consumer prices, M2 money supply, and foreign exchange rates, have the contemporaneous relationships with the stock prices.

Second, the bivariate causality test results show that two groups of macroeconomic variables have different impacts on the stock prices. Group one, including industrial production, imports, exports, lending rates, deposit rates, domestic credit, foreign currency reserves, and money reserves, largely indicates that the lagged changes in macroeconomic variables have no significant predictive ability for the movements in stock prices. The null hypothesis that the macroeconomic variables do not Granger cause stock prices is not rejected even at the 10% significance level. It is noted that, except for consumer prices, the test results appear to be consistent with both test statistics, F and χ^2 . As for consumer price, the null hypothesis that it does not cause stock prices in Granger sense is rejected at the 10% significance level using the χ^2 statistics. Accordingly, excluding consumer price from this group is appropriate. However, the contemporaneous information about these variables is not linked to stock market returns because the hypothesis that $H_0: \beta_0 \neq 0$ is rejected even at the 15% level of significance. Thus, the failure of lagged economic values to Granger cause stock market returns should not be interpreted as implying that the stock market is semi-strongly efficient with respect to this list of variables. In other words, the stock market appears to divorce from reality of these economic activities.

For group two, including foreign exchange rates, M1 money supply, M2 money supply, and

consumer price as well, the lagged changes in macroeconomic variables really have significant predictive ability for the movements in stock prices. Saying differently, the null hypothesis for these cases is rejected at the 10% significance level. The results from this bivariate analysis, along with the existence of contemporaneous relationships, suggest that, in the short-run, the Vietnamese stock market is not informationally efficient with respect to consumer price, foreign exchange rates, and M2 money supply. For this reason, we expect that investors who traded on announcements of consumer price, foreign exchange rates, and M2 money supply might be able to earn predictably positive returns. For the M1 money supply, the fact that its current values are not linked to current equity market returns reinforces the suggestion that the market is also not efficient as conventionally understood. These findings are likely to be in accordance with the newly-emerging equity markets in Central Europe ten years ago (see Hanousek and Filer [2000]).

Third, we observe that stock price movements anticipate variations in the foreign exchange rates and the M2 money supply. This result seems to be somewhat consistent with what Ibrahim (1999) had found in the Malaysian stock market for the last decade. The striking difference between the two markets is that the Vietnamese stock prices do not provide any predictive power for real industrial production. This finding is not consistent with the hypothesis that stock prices contain the market participants' expectations of future real activities. For this reason, the Vietnamese stock market may not do its best as the capital mobilization for the economy. Saying differently, investors may not consider the stock market as their long-run investment channel. Besides the contemporaneous relationships, the causal link from stock prices to M2 money supply may reflect the importance of the stock market on the M2 money demand. We can explain this special link as follows. While functioning its role as a capital mobilization channel, the stock market may attract a majority of idle money from society. Accordingly, the stock prices may, to which extent, provide predictive power for the increase in the M2 money supply. This finding is consistent with the hypothesis that stock prices contain the market participants' expectations of future monetary

policies. In other words, these findings may indicate the policy reaction of the monetary authorities to the fluctuation in stock prices. Lastly, the effects on the exchange rates of stock price changes possibly suggest portfolio adjustments taken by investors.

Fourth, most coefficients of the error correction term reinforce our findings of cointegration between stock prices and macroeconomic variables, except for the consumer prices, the M1 money supply, and the deposit rates. They are signed as expected and are significant in at least one equation. Specifically, the results suggest that deviations from the equilibrium path are adjusted by about 4%–8% the next month through the movements in stock prices. From the estimates, the adjustment toward the long-run relationship is extremely slow. This means that, after any shock that forces the stock prices to move away from their long-run values, it takes a long time for the prices to return to their equilibrium values if there is no opposite shock to counter the initial shock. Although the results indicate the need for intervention in such a case, they also point to the danger of creating policy shocks because it may take time for a certain policy to come into effect.

The relative efficiency of the Vietnamese stock market appears to have shifted greatly over time. In other words, the financial crisis really has impact on the efficiency pattern of the stock market. Table 2 contains the same analysis as Table 1, except restricted to the period up to June 2008 (before the financial crisis). The test results indicate the relationships are very different from what we have found above. First, all lag lengths have significantly changed. If we compare with Central Europe markets, the Vietnamese stock market is unstable. The memory ability of the post-crisis stock market lasts longer. Second, the market, to somewhat lesser extent, appears to be moving backwards. Before the crisis, the Vietnamese stock market may have possessed elements of semi-strong efficiency. In particular, the stock market is informationally

efficient with respect to M2 money supply, lending rates, and deposit rates. Speaking differently, the stock market is informationally efficient with respect to monetary variables.

Table 2: Bivariate Causality Tests (all cointegrated series)

Null Hypothesis	Optimal Lags		Granger Test		ECM
	Dep. Variable	Indep. Variable	F Stats	c ² Stats	
(a) <u>CP dnc VNI</u>	1	12	1.14	13.73	-0.04
<u>VNI dnc CP</u>	14	10	1.40	14.03	-0.001
(b) <u>IP dnc VNI</u>	1	8	1.47	11.74	-0.04
<u>VNI dnc IP</u>	12	1	0.08	0.08	-0.06
(c) <u>IM dnc VNI</u>	1	8	1.92***	15.33**	-0.03
<u>VNI dnc IM</u>	13	1	0.04	0.04	-0.10***
(d) <u>EX dnc VNI</u>	1	8	1.05	8.41	-0.05***
<u>VNI dnc EX</u>	18	1	0.48	0.48	0.05
(e) <u>FX dnc VNI</u>	1	8	2.47**	19.72**	-0.03
<u>VNI dnc FX</u>	10	1	5.47**	5.47**	-0.04
(f) <u>M1 dnc VNI</u>	1	8	2.63**	21.03**	-0.04
<u>VNI dnc M1</u>	16	1	4.27**	4.27**	-0.05
(g) <u>M2 dnc VNI</u>	1	8	1.59	12.7	-0.06***
<u>VNI dnc M2</u>	1	2	4.04**	8.09**	0.003
(h) <u>LR dnc VNI</u>	1	8	1.15	9.18	-0.04***
<u>VNI dnc LR</u>	3	4	2.26***	9.03***	0.05
(i) <u>DR dnc VNI</u>	1	8	0.98	7.83	-0.03
<u>VNI dnc DR</u>	3	12	2.14**	25.7**	-0.04
(j) <u>DC dnc VNI</u>	1	8	1.49	11.93	-0.05***
<u>VNI dnc DC</u>	15	1	3.80***	3.80***	-0.01
(k) <u>FR dnc VNI</u>	1	8	0.15	1.23	-0.04
<u>VNI dnc FR</u>	1	4	1.72	6.69	-0.06
(l) <u>MR dnc VNI</u>	1	12	2.35**	28.16*	-0.04
<u>VNI dnc MR</u>	12	1	0.90	0.90	-0.05

Note: *, ** and *** denote significance at 1%, 5% and 10% levels respectively. The term “dnc” means “does not Granger cause”. Entries under “Granger Tests” are F statistics and χ^2 statistics for testing the null hypothesis that the coefficients’ sums of causal variables are zero. And the underlying presents the existence of contemporaneous relationship at 15% level of significance.

But it seems to disappear due to impacts of the financial crisis. Third, the stock prices had played an important role on almost all monetary vari-

ables, while the investors could not be able to trade on the announcements of monetary information. This feature is very significant for the economic stabilization policies. Fourth, the real economic activity seems to have impact on the stock market because the significant causal link from the imports to the stock prices may contain the market participants' expectations. Fifth, only four macroeconomic variables, including exports, M2 money supply, lending rates, and domestic credit, indicate the long-run relationship with stock prices; and the stock prices just have the long-run relationship with imports. This may imply that the isolation between the stock market and the economic reality has been established before the crisis. And this could, to which extent, result in the fact that both the stock market and the economy have weakly struggled against the attack of the financial crisis. In other words, before the financial crisis, there are no significant adjustment processes which could prevent the errors in the long-run relationships from becoming larger and larger. In terms of ECM analysis, we may say that during the crisis, the stock market and the economy have started to look together. If this is a case, we may expect that the future prospect of the stock market turn out to be much better.

In summary, while our bivariate analysis suggests that the Vietnamese stock market seems to be informationally inefficient in both short- and long-run. Generally, the stock market seems to divorce from the most part of the economy. It is still possible for a "professional" trader to make abnormal returns by analyzing good or bad news contained in some macroeconomic variables. The findings re-assure that the Vietnamese stock market is not well functioning in scarce resource allo-

cation and attractive enough to encourage foreign investors. In fact, investors of all kinds in the market only concern their short-term portfolios. In addition, instead of becoming more efficient over time, as one might expect, the Vietnamese stock market appears to have become increasingly divorced from reality. This is because the stock market used to be informationally efficient with respect to some monetary variables. Furthermore, the bivariate analysis also confirms that the financial crisis has significant impact on the efficiency pattern of the Vietnamese stock market.

4. Conclusions

This paper employs the cointegration and error correction version of Granger causality tests to investigate whether the Vietnamese stock market exhibits the publicly informational efficiency. Specifically, we investigate the lead-lag relationship between stock prices and twelve macroeconomic variables for Vietnam. Data are collected from three official sources, namely, Thomson Reuters, Bloomberg and International Monetary Fund during the period from December 2000 to June 2009.

The results from bivariate analysis suggest that the Vietnamese stock market is not informationally efficient in both short- and long-run. The stock market seems to even divorce from the most part of the economy. It is still possible for a "professional" trader to make abnormal returns by analyzing good or bad news contained in some macroeconomic variables. The findings re-assure that the Vietnamese stock market is not well functioning in scarce resource allocation and attractive enough to encourage foreign investors. In fact, in-

vestors of all kinds in the market only concern their short-term portfolios (or so-called speculators). This phenomenon is potentially risky for the economy because any shock can result in a simultaneous capital outflow. This may, in turn, create pressures on the balance of payments. For the market is not informationally efficient, especially with respect to monetary variables, it may be dangerous for policy makers to realize the role of monetary policies. However, in the investors' point of view, fundamental analysis is still significant for their investment decisions. Thus, companies with strong equity analysts would have higher comparative advantages in this inefficient market. In addition, instead of becoming more efficient over time, as one might expect, the Vietnamese stock market appears to have become increasingly divorced from reality. This also reveals that the last financial crisis has serious impacts on the Vietnamese stock market.

The informational inefficiency implies that the scarce resources have not been allocated into the best competing uses. In an inefficient stock market where stock prices do not reflect the real value of the firms, well-managed firms may be mistakenly undervalued by the market and, therefore, find it difficult to raise funds, while fundamentally dysfunctional firms may be overvalued and easily attract investors' funds. This "lemon-hazard" problem may result in not only misallocating resources but also encouraging speculation. An efficient market can eliminate price distortions and channel funds to the most efficiently managed firms. This is extremely significant for a 'capital starved' economy like Vietnam.

To properly perform its function of resource allocation, the Vietnamese stock market should be efficiently improved in terms of publicly information, of which three supplementary levels are specially considered.

First, macroeconomic information disclosure should be promptly and accurately promulgated. Most Vietnamese macroeconomic data officially published by the General Statistics Office (GSO), International Monetary Fund (IMF), and others often lag at least six to nine months. More importantly, many macroeconomic variables have never been widely reported, especially government expenditures, balance of payments, and employment. In this situation, traders who have

absolute advantages in accessing "confidential" information could dominate the market, and thus make abnormal returns by analyzing good or bad news contained in these leakages. Inversely, uninformed investors blindly act on others' decisions, formulating herding behavior. This finding implies that an improvement of national statistical system is significantly important. We should change our traditional wisdom that only public agencies need macroeconomic variables for research and policy analysis. In financial sector, however, everyone does.

Second, dissemination of information relating to listed companies is necessarily improved by means of good corporate governance and market transparency. These practices play an important role in protecting shareholders and developing the market soundly. The current status of unclear and unreliable disclosure can create invisible barriers for lasting the inefficiency longer. As we have already learned from the literature review that the probability of finding inefficiency in an asset market increases as the transaction and information cost of exploiting the inefficiency increases. The poor information from listed companies, along with unavailable macroeconomic news, turns out to be opportunities for some well-informed investors making prices. Therefore, we suggest that most listed companies must adequately, accurately and promptly announce all information updates about their management, performance, and financial health on their websites. To attract foreign investors, bilingual website should even become one of the compulsory requirements of listed companies. In addition, some accounting principles should be properly adjusted in accordance with international best practices.

Third, it is a need to promote liquidity of the stock market in order to perform its role as a real capital mobilization channel. It is said that the probability of finding inefficiencies in an asset market decreases as the ease of trading on the asset increases. In doing so, we should scale up the quantity of, and increase the quality of, and to diversify various kinds of goods, including derivatives and corporate bonds, in order to meet the demands of the market by: (i) speeding up the privatization of state-owned enterprises and corporations, economic groups and state-owned commercial banks; attaching the privatization to

listing in the securities market; and expanding the issue of new shares to mobilize capital from the market; (ii) requesting privatized enterprises to satisfy the listing conditions to be listed; concurrently reviewing and continuing the sale of state capital in enterprises in which the State is not required holding controlling shares; and (iii) converting foreign-invested enterprises into shareholding companies with their shares to be listed and traded in the securities market. However, experiences from other emerging markets suggest that the sequencing of steps is critical to eventual success and that gradualism may be preferable to a 'big bang' approach. That means we should build the stock market slowly and deliberately, adopting rules and procedures and only gradually allowing companies that comply with listing requirements to trade.

Different from developed markets, the Vietnamese stock market is being led by individual investors (account for 70-80% trading value, Thomson Reuters). These investors are mostly characterized by short-run investments and unequable mind. Consequently, the market is then characterized by high volatility and risk. This risky environment shall lead to two remarkable dangers. First, investors, especially institutional and foreign ones usually price stocks lower than they are really worth. Second, the newly listed companies are often undervalued, and this problem might be an impediment of the equalization process. Therefore, it is vitally important to de-

velop institutional investors such as investment funds. Accordingly, we suggest that only investors who have sufficient conditions such as capital and knowledge can independently join the market. Along with this restriction, some special incentives for institutional investors can help reduce a great number of uninformed individual investors■

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