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IGNORING THE URGENT NEEDS OF THE REAL ESTATE MARKET BY CHINESE BANKS¹

Summary

Purpose – The main purpose of this article is to demonstrate the growing gap between China's banking sector and the real estate market, and the emergence of rationality in their interaction. A related goal is to reveal the primacy of institutional reforms as a tool for solving problems of insufficient business financing.

Research method – For the analysis of the dynamics of the real estate and banking services markets, the toolkit of the optimal portfolio is used. Manipulation of financial indicators is an attempt to vary the influence of the ratio of profitability and risk. To demonstrate the comparability of the results based on other methods, the ARIMA method was used. All the mentioned tools are implemented on the basis of Python packages.

Results – At the moment, the problem of insufficient capital in the Chinese RE development market cannot be restored by the national stock market and an increasingly autonomous banking sector. At the same time, European stock markets still have a negative perception of Chinese business, which is reflected in the results of the investment portfolios. As the rules of the game (institutional environment) remain unchanged, there are no special prospects for the Chinese real estate development sector.

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Originality/value/implications/recommendations – The peculiarity of this study is the search for an alternative for the Chinese government in its attempts to resuscitate the declining dynamics of the economy through additional state injections. A change in approaches in the banking sector (at least a partial preponderance of the effectiveness of steps) suggests the possibility of institutional reforms. Application of software code and diversification of financial criteria demonstrate flexibility in approaches.

Keywords: real estate market, portfolio optimization, institutional dissimilarity

JEL classification: F23, F36, F37, G15, M21, M42

1. Introduction

Several significant bankruptcies or situations close to them have given the Chinese economy a serious shake. China Evergrande Group's alleged \$78 billion revenue overstatement has become one of the biggest financial fraud cases in history. The company drastically inflated revenue by recognizing sales in advance in the two years through 2020 that led up to its default [Bloomberg, 2024a].

Chinese provinces have massively invested in real estate development, considering this sector to be the real engine of the Chinese economy. In the end, this type of investment began to weaken dramatically. Chinese provinces widely used the instrument of LGFVs. LGFVs are firms set up by local governments to raise funds for specific urban and infrastructure projects. Now their total combined debt is estimated at about \$9.2 trillion [Bloomberg, 2024b].

As we can see, the Chinese economy increasingly finds itself in the situation of the only source of financing for business, and this source is the state budget. All other donors of the economy (foreign investors, citizens' own savings, etc.) gradually minimize their influence in the market. First of all, it is appropriate to look for confirmation of such trends in the stock market, even in the conditions of significant presence of the state in its functioning.

It is extremely important in this situation to test the state of the real estate market, its interaction with the banking sector and new opportunities or challenges in the context of modelling hardly possible institutional rapprochement with Europe.

2. Review

Li believes that it is Covid-19 that has caused problems in China's real estate market and the country's economy as a whole. "Due to the Covid-zero policy,

China's economy never returned to its full capacity in terms of work and utilization of resources in the past three years." At present, the task of the economy has become to adapt to new conditions and evolve to overcome new challenges. Local governments and central banks have to consider new monetary stimuli. For example, "lowering mortgage rates or proving other subsidies for home buying can effectively relieve some pressure on consumers and revive the real estate market as well as the whole economy." Another way could be to pull the demand "by increasing direct investment by state-owned companies" [Li, 2023, pp. 5–12].

Zhou analysed the development process of real estate bubbles in China and the United States. "Due to the different national conditions and economic systems of the two countries, the policies issued by the two countries to prevent real estate bubbles are slightly different, but the general means are the same" [Zhou, 2023, pp. 2–5].

Other authors are significantly more critical. Wang analyses the current bubble's situation of China's real estate and summarizes the possible causes of real estate bubble such as excess liquidity, the bureaucracy problem and others [Wang, 2023, pp. 1–4].

In order to solve the real estate problem in China, the author gave an example of Japan's 1990 real estate crisis. According to the author, the conceived crisis was above all caused by: the excessive expansion of credit debt in the real estate industry; the signing of the Plaza Agreement (a joint agreement signed on September 22, 1985, at the Plaza Hotel in New York City, between France, West Germany, Japan, the United Kingdom, and the United States, to depreciate the U.S. dollar in relation to the Japanese yen and a group of other currencies); declines in the bank risk management. As a result, the crisis caused a series of problems like the collapse of the stock market and others.

The Japanese government had taken a series of measures to restore public confidence in the Japanese financial system such as: a law-based administrative management mode, control of the soundness of assets, the depreciation of yen and promoting inflation.

Wang proposed the following possible solutions for the Chinese crisis: to accelerate the inflation, to intensify the crackdown on speculation in the real estate industry, very careful financial liberalization, to standardize the behavior of local governments and to reduce improper government intervention.

Rogoff and Yuanchen emphasized the Chinese economy had outperformed for decades and perhaps would continue to but its growth up to this point "has been dependent on outsize investment in real estate and infrastructure". "Now, after decades of construction, the country's capital stock in these sectors rivals that of much wealthier advanced economies, even in many of China's smaller

and poorer cities.” They provided evidence to support the view that returns were diminishing. In addition “to the reorientation and reorientation of the workforce, the transition also creates financial challenges, given the significant accumulation of local government debt that accompanied the property boom” [Rogoff, Yuanchen, 2023, pp. 517–548].

Prasad agreed that China had found a way to get a prominent result without “a well-functioning financial system, a strong institutional framework, a market-oriented economy, or a democratic and open system of government”. He concentrated attention on the fact that the capital-labor ratio in China is much lower than in advanced economies such as the United States, and China still has vast needs for infrastructure in its interior provinces. “China would benefit from a financial system that does a better job of allocating resources to more productive uses and to dynamic parts of the economy, especially the services sector and small and medium enterprises.” “This requires fixing the banking system, improving depth and liquidity in bond markets, and tightening regulation to mitigate institution-specific and system-wide risks” [Prasad, 2023, pp. 1–36].

3. Methods and data

The most popular way of decision making in investment is portfolio optimization. In frames of this approach, the authors most often calculate the Sharpe Ratio as relation between return of portfolio minus risk free rate and standard deviation of the portfolio excess return. Maximization of Sharpe Ratio allows us to choose the most appropriate weight coefficients in our portfolio. The Treynor ratio is known as the reward-to-volatility ratio. In this case, we use it in denominator portfolio's beta. This indicator is very popular and is used in Capital Asset Pricing Model (CAPM).

Some other indicators, as Sortino, Maxdd, and Calmar, can be very helpful when we intend to emphasize the role of risk. Such calculations could be done for separated companies as well as for concrete portfolio.

To demonstrate, in form of discussion, a possibility of involving other instrument in our analysis, a mechanism of the ARIMA method is proposed. ARIMA is an acronym that stands for AutoRegressive Integrated Moving Average. AR means ‘autoregression’, I – ‘integrated’, and MA – ‘moving average’. The biggest problem is to choose proper necessary p (number of lag observations), d (number of times that the raw observations are differenced), and q (size of the moving average window) parameters. In the proposed research, this problem is solved by minimizing root mean square error for all possible combinations of (p, d, q) .

The main toolkit of our research is a range of methods for determining the optimal portfolio. Python packages also allow for slightly weaker risk assessments based on the daily change in the verified share price. Cumulative income is one of the determining factors when deciding on the feasibility of investing. All the data necessary for research are extracted by the appropriate Python packages based on company tickers. Appropriate Python packages came in handy to use such tools: math, pandas, matplotlib.pyplot, statsmodels.tsa.arima_model and others.

4. Research: real estate is going down

First of all, a portfolio of shares of companies operating in the real estate market of China was formed. To do this, we chose the type of activity of real estate development. A general list of companies with types of activities is available, for example, from [www 2]. To identify trends in the market, we chose three consecutive annual periods.

TABLE 1

Optimal portfolio for market "Real Estate development"

Stock Start Date = 2021-03-01	Stock Start Date = 2022-03-01	Stock Start Date = 2023-03-01
today = 2022-03-01	today = 2023-03-01	today = 2024-03-01
(,000838.SZ', 0.27705), (,600615.SS', 0.12309), (,002244.SZ', 0.1445), (,600647.SS', 0.00059), (,200011.SZ', 0.12067), (,600773.SS', 0.1438), (,600246.SS', 0.086), (,000506.SZ', 0.1043)	(,000736.SZ', 0.20087), (,600185.SS', 0.1201), (,002486.SZ', 0.19107), (,000534.SZ', 0.11467), (,600325.SS', 0.37329)	(,600007.SS', 0.23977), (,600053.SS', 0.077), (,600621.SS', 0.15047), (,600895.SS', 0.53276)
Expected annual return: 104.5%	Expected annual return: 82.1%	Expected annual return: 41.0%
Annual volatility: 25.3%	Annual volatility: 36.6%	Annual volatility: 38.4%
Sharpe Ratio: 4.05	Sharpe Ratio: 2.19	Sharpe Ratio: 1.02

Notes: portfolio ingredients were chosen from <https://www.marketwatch.com> [www 2]. For each company, the ticker and weighting factor in the optimal portfolio are indicated. Only ingredients with non-zero weight coefficients have been presented. The portfolio statistics are presented.

Source: own elaboration based on the Efficient Frontier Method.

As we can see in Table 1, the level of choice in the optimal portfolio has become less and less diversified over the past three years. Moreover, the Sharpe ratio was rapidly decreasing. For our three time periods, the rate of return of the optimal portfolio also demonstrated negative dynamics, while the risk was constantly increasing. At the same time, let's emphasize that this approach guarantees significant attention to risk. What's happening in contrast, for example, to the maximization of utility? Or what can be performed by increasing the role of risk by using, for example, the Sortino ratio (Table 2)?

TABLE 2

Comparing the different indicators

Tickers	Sortino	Sharpe	Maxdd	Calmar
600007.SS	0.795911	0.429657	-0.203341	0.720431
600053.SS	0.505108	0.345820	-0.448335	0.507150
600621.SS	0.917210	0.596422	-0.303255	1.058181
600895.SS	2.055492	1.130126	-0.459150	1.626505
000001.SS	-1.147585	-0.713865	-0.204069	-0.285313

Notes: the Sharpe ratio uses all the observations for calculating the standard deviation, while the Sortino ratio only considers the harmful variance. Max drawdown quantifies the steepest decline from peak to trough observed for an investment. This is useful for a number of reasons, mainly the fact that it does not rely on the underlying returns being normally distributed. Drawdowns = peak-trough/peak. The Calmar ratio uses max drawdown in the denominator as opposed to standard deviation: $\text{calmars} = \text{df.mean}() * 255 / \text{abs}(\text{max_drawdowns})$.

Source: own elaboration [www 1, www 2].

However, the manipulation of the method is unlikely to significantly change our final conclusion. For example, among participants of optimal portfolios, the leaders remain the same (Shanghai Zhangjiang Hi-Tech Park Development (600895.SS) and Shanghai Chinafortune (600621.SS)), despite greater or lesser attention to risk (Table 2). Only in one very extreme case, the ratings changed (Maxdd). It is specific in the usage of the Treynor ratio because of beta – indicator in the denominator (Table 3).

In this way, the role of the market index increases significantly. A similar importance of the intra-market interactions can be found in the 3 or 5-factor Fama-French models. But even here the conclusions remain identical. All the ap-

proaches we have considered clearly indicate a crisis in the real estate market; the clear signs of which in relation to the optimal portfolio are a drop in profitability, an increase in risk and a minimal diversification of possible choices.

TABLE 3

Treynor ratio based comparing

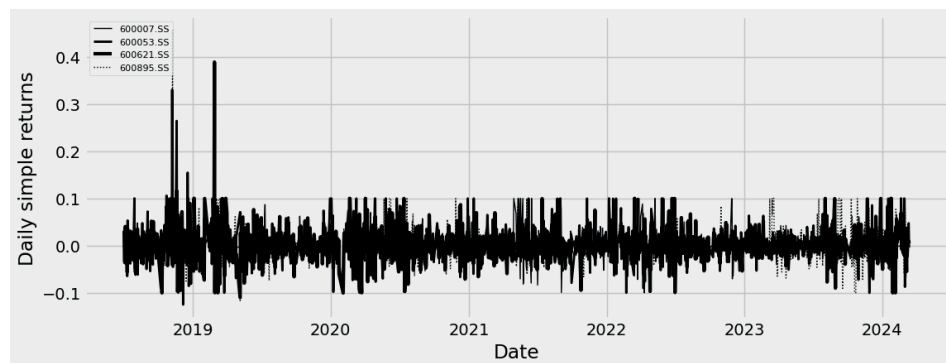
Ticker	Treynor Ratio
600007.SS	2.654875
600053.SS	0.406273
600621.SS	1.140647
600895.SS	3.972738

Notes: RFR used in calculations = 2.3; Market indicator as SSE Composite Index (000001.S). A higher Treynor Index means a portfolio is a more suitable investment.

Source: own elaboration [www 1, www 2].

CHART 1

Risk analysis



Notes: used historical data of Adjusted Close Price from finance.yahoo [www 1]. The risk level based on daily simple returns is kept at 10%.

Source: own elaboration.

Daily simple returns map clearly indicates the presence of outside interference in the market. And this is already evidence of the existence of problems (Chart 1).

TABLE 4

Daily simple return standard deviation

Ticker	Deviation
600007.SS	0.644757
600053.SS	0.614488
600621.SS	0.503281
600895.SS	0.336586

Notes: used historical data of Adjusted Close Price from finance.yahoo [www 1]. The standard deviation method is used as the most traditional risk assessment.

Source: own elaboration.

But even with such data, the traditional standard deviation approach to risk assessment provides unequivocal estimates of material risk in the market (Table 4). If the cumulative income growth even for the 4 market leaders is no more than 50% for the 5-year period (and this sector has always been the driving force of the Chinese economy), it is obvious that investment proposals will remain unanswered. We draw attention to the actually unsuccessful year 2023, which is obviously etched in the memory of domestic investors in particular (Chart 2).

5. Research: separated banking

It seems that the banking sector did not want to sink with the real estate market and chose its own path. This choice obviously consisted of minimal attention to local government whitelists, government appeals, and traditional close relationships, and above all, the risk assessment has become a priority. This is what is happening today in the market of debts of local governments and their instruments. It seems that the real estate market has also been placed in a row.

We can see in the table that even removing the two obvious leaders of the optimal portfolio does not eliminate the trend towards a significant improvement in the ratio of return and risk (Table 5).

CHART 2

Cumulative return for RE development leaders



Notes: used historical data of Adjusted Close Price from finance.yahoo [www 1]. Cumulative returns are calculated by adding up the returns earned over a specific period. Periods of recovery in the post-pandemic period and the subsequent period of uncertainty are distinguished.

Source: own elaboration.

TABLE 5

Banking sector: coexistence

Stock Start Date = 2023-03-01	Stock Start Date = 2021-03-01	Stock Start Date = 2023-03-01
today = 2024-03-01. Minus 2*	today = 2022-03-01. Minus 2*	today = 2024-03-01.
('601169.SS', 0.19269), ('601988.SS', 0.53269), ('601328.SS', 0.27462)	('601838.SS', 0.38413), ('601328.SS', 0.50594), ('603323.SS', 0.10993)	('601288.SS', 0.97376), ('601077.SS', 0.02624)
Expected annual return: 42.0%	Expected annual return: 22.5%	Expected annual return: 54.5%
Annual volatility: 20.0%	Annual volatility: 18.4%	Annual volatility: 20.5%
Sharpe Ratio: 2.00	Sharpe Ratio: 1.12	Sharpe Ratio: 2.56

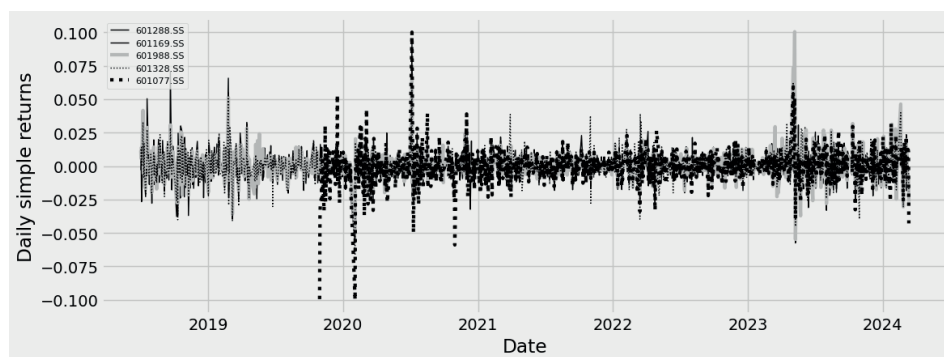
Notes: '601328.SS', 0.27462 Bank of Communications Co., Ltd. (601328.SS); '601169.SS', 0.19269 Bank of Beijing Co., Ltd. (601169.SS); '601988.SS', 0.53269 Bank of China Limited (601988.SS). * – without 2 obvious leaders of optimal portfolio. Only ingredients with non-zero weight coefficients have been presented.

Source: own elaboration [www 1, www 2].

Although it is easy to single out considerable fluctuations in the market of banking services, they are not significant (Chart 3). Just as in the real estate market, the main negative events took place in 2023 and during the pandemic. In 2024, although the risk remains somewhat higher, it is far from the previously described, obviously regulated 10% of the real estate market.

CHART 3

Banking: risk analysis



Notes: used historical data of Adjusted Close Price from finance.yahoo [www 1]. The risk analysis is made by determination of dynamic of daily simple returns. The periods 2020–2021 and 2023–2024 look almost identical in terms of vulnerability.

Source: own elaboration.

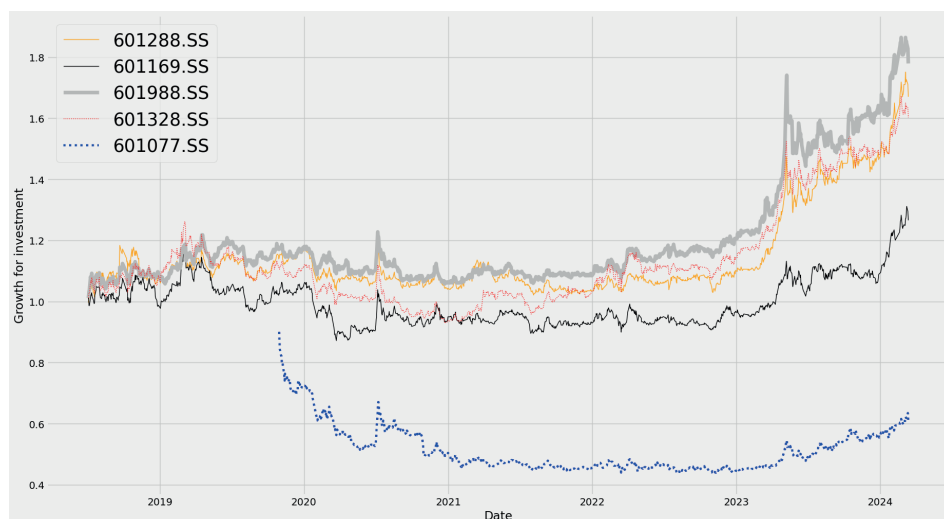
We observe a similar situation with cumulative gains as in the case of the real estate market. At the same time, a clearer growth trend can be revealed even visually (Chart 4). In the case of the description of the optimal portfolio, the differences were more recognizable.

It could be assumed that the banking sector as well as the real estate market still do not have a sufficient level of investor confidence. And this despite the fact that we conducted an analysis of income and risk based only on the leaders of the optimal portfolio.

Who is largely this investor? In our opinion, in the real estate market, this is an ordinary Chinese citizen, for whom the acquisition of a private, rather than a rented, home is one of the values of life. It is logical that a bank loan is a companion of such relationships between a person and the real estate market. The problems of any of these three are obviously reflected in the other participants.

CHART 4

Cumulative return in banking sector



Notes: used historical data of Adjusted Close Price from finance.yahoo [www 1]. For the banks selected for analysis, the curve of cumulative return bends upwards, which demonstrates a recovery trend. Contrarily, the post-pandemic period was not marked by similar dynamics.

Source: own elaboration.

A piece of information about the banks presented in Chart 4 only emphasizes these interdependencies. We covered related basic banking services only tangentially: Agricultural Bank of China Limited (601288.SS) (loans, including housing, real estate); Bank of Beijing Co., Ltd. (601169.SS) (personal housing); Bank of China Limited (601988.SS) (personal loans); Bank of Communications Co., Ltd. (601328.SS) (personal loans, housing, mortgage loans, commercial housing); Chongqing Rural Commercial Bank Co., Ltd. (601077.SS) (personal loans payment, agency funds and insurance related services). It is logical that in tightly controlled markets with the presence of private business, but such that is subject to significant regulation from the outside (for example, undoubtedly the comprehensive system of social credit, which includes more than 50 state authorities), losing one of its main functions means the bank also finds itself in a crisis situation. Therefore, it has to look for sources of additional capital.

If not domestic banking, then maybe foreign stock markets can solve the problem of additional capital?

TABLE 6

Comparing Chinese and European markets

Ticker	Sortino	Sharpe	Maxdd	Calmar
DZJ.MU	-2.334616	-1.896882	-0.788040	-1.611616
DZJ.F	0.313521	0.195405	-0.849697	0.533676
DZJ.DU	-0.854602	-0.570894	-0.822835	-0.869227
2007.HK	-2.390189	-1.341444	-0.791667	-1.325972
1918.HK	-0.404920	-0.268088	-0.810044	-0.395090
1516.HK	-0.068741	-0.029012	-0.532413	0.032789
SCNR.DU	-0.200052	-0.140021	-0.800813	-0.194527
SCNR.F	-0.144195	-0.087821	-0.815686	-0.120797
SCNR.MU	-0.709227	-0.789911	-0.787037	-0.978960
1638.HK	-1.950727	-1.542275	-0.883333	-1.696849
2168.HK	-2.196445	-1.339220	-0.755556	-1.162554
300242.SZ	-0.185625	-0.127644	-0.681063	-0.056690
KG5.BE	-1.589237	-1.291445	-0.867816	-1.552192
KG5.F	-0.358920	-0.270428	-0.950000	-0.573138
KG5.SG	-1.945798	-1.486913	-0.890710	-1.703947

Notes: the biggest indicator is the best. We chose three leaders. The tickers of companies Country Garden Holdings Co. Ltd. (first four), Sunac China Holdings Limited (next five), and Kaisa Group Holdings Ltd. (next six) presented in different stock markets have been chosen. Ratios of profitability and risk are provided for the analysis of the feasibility of staying in the market (which is determined by the ticker).

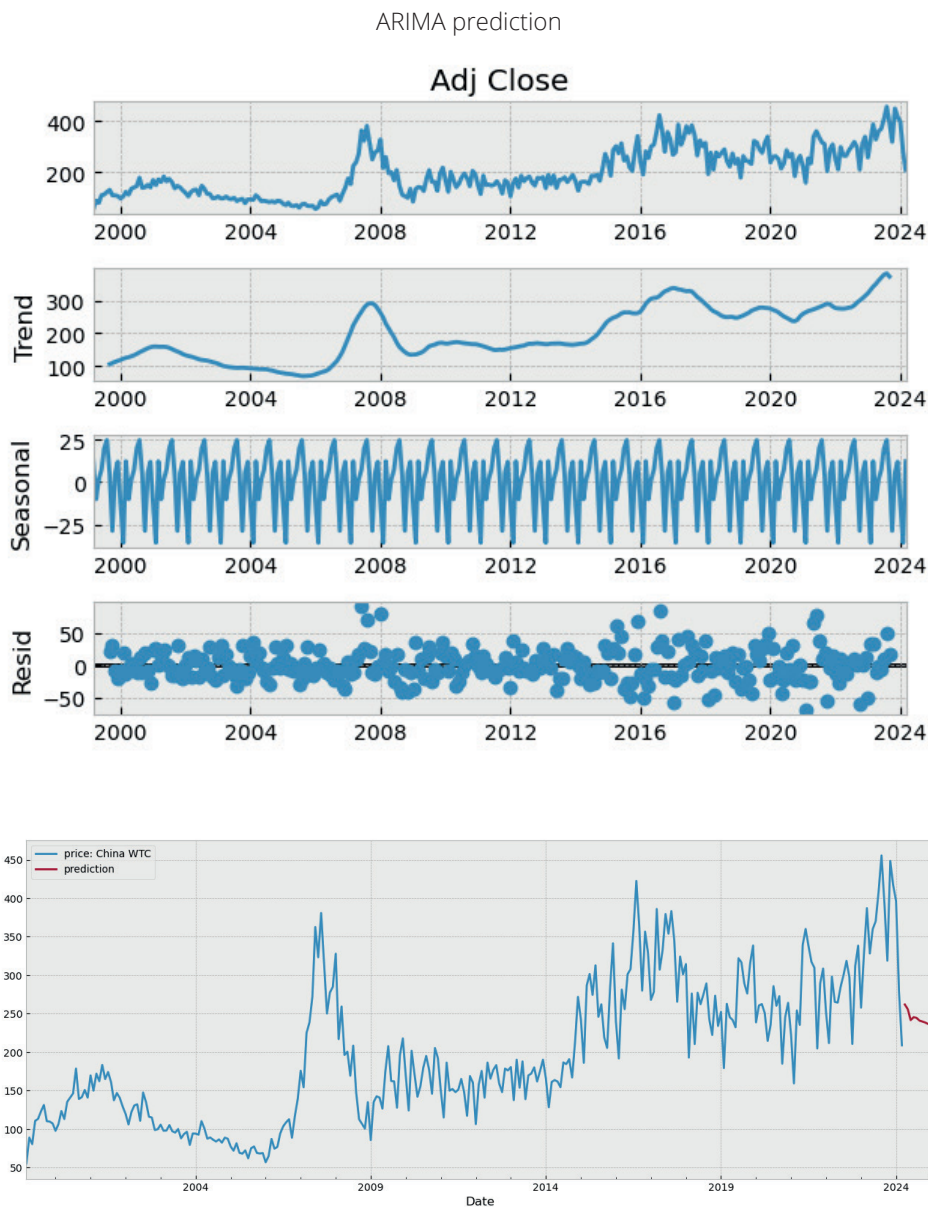
Source: own elaboration [www 1, www 2].

Let's make such a comparative analysis for several Chinese developers with shares issued both in Europe and in the domestic markets. We chose Country Garden Holdings Co. Ltd. (DZJ.MU and other tickers), Sunac China Holdings Limited (1918.HK and other tickers), and Kaisa Group Holdings Ltd. (1638.HK and other tickers). We see that only in one case the presence in the European stock market has a comparative advantage.

6. Research: alternative approach

We may not have taken into account all the peculiarities of the time series data of the companies selected for our analysis. Then it is appropriate to apply the ARIMA model with a distinction of both trend and seasonality (Chart 5).

CHART 5



Notes: used statsmodels.tsa.arima_model, prediction for Adjusted Close Price, maximum possible interval from historical data (yahoo.finance) [www 1]; $[p,d,q] = 3,0,0$ based on minimum of mean squared error of tested and predicted values, 301 monthly data. The upper part of the chart demonstrates the level of the presence of seasonality and trend. For the price prediction analysis, their influences have to be avoided.

Source: own elaboration [www 1].

However, even in this case, as shown on the example of the China World Trade Center (600007.SS), the short-term forecast for the next 10 months indicates a clear downward trend. At the same time, such a tool can be considered as an alternative to our previous analysis based on the ratios of return and risk.

7. Discussion

The image of Chinese companies in the field of real estate development in Europe is significantly worse than in the domestic market (Table 6). This obviously requires additional integrative, informative and image actions. If foreign investment perception is worse than at home, then there is no point in issuing abroad.

Therefore, initiatives are needed to improve the image of Chinese business in Europe. However, there are two major problems:

1. the non-acceptance of the Chinese institutional system by Europeans;
2. the approaches to value assets in China that are far from international accounting standards (prevailing historical value).

If the first problem cannot be solved quickly, the second one can not only contribute to the image of the business, but also offer an adequate assessment of the business currently operating in China. Under such conditions, Chinese shares can feel quite good on European markets despite the fact that they are less diversified and dynamic than the American ones.

8. Conclusions

In conditions of credit starvation, China's real estate sector will resort to finding alternative sources of capital. At the moment, this function cannot be performed by the national stock market due to the lack of acceptance of the prospects of this business. At the same time, European stock markets still have a negative perception of Chinese business, for which there is a whole range of significant reasons, including institutional dissimilarity. As the rules of the game remain unchanged, there are no special prospects for the Chinese real estate development sector.

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