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The Government Bond Effect on the Stock Performance

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Abstract: When abnormal fluctuations occur in the market, the central bank often issues monetary policies to intervene in the market and control the market fluctuations through macroeconomic means. More specifically, adjusting the government bond yield is an extremely important measure for the macroeconomic adjustments to ultimately influence the market. In fact, the yield of government bonds has become the benchmark for market variability and the signpost for investors to judge the market trends. Stock market fluctuations, combined in a barometer of macroeconomic response, have a high degree of correlation with monetary policies. In 1929, the US Federal Reserve ignored the impact of monetary policy on the stock market, adopted a contractionary monetary policy when the market was showing a sign of decline, leading to a crash of stock price and triggering the Great Depression. Thus, bonds and stocks are closely related. However, due to the disparities in market mechanisms and its efficiency, the connection between the stock and bond markets are not as simple as we predicted, from the perspective of macroeconomy. In a mature market with maximal efficiency, a closer connection could be expected between these two securities. This paper, conducts research on the S&P500, the USG 10-yr government bond, the HS300, and the Chinese government bond. It verifies both the long and short-term implicit effects, brought forth by government bonds, on the stock performances in these two countries. Our result supports that such a connection is more significant in the US market than in the Chinese market.

1. Introduction

In the financial market, bond and equity investments are two major vehicles for gaining capital. When investors allocate assets, bonds and stocks are both intrinsically important in portfolios. Therefore, theoretically, they perform as balancing components to each other with closed relationships. Furthermore, this inextricable link is also obvious is macroeconomic changes. In addition, changes in bond yields are considered as fundamental operations in monetary policy. When bond yields increase, investments will be shifted from equities to bonds, resulting in a negative change in the stock index. Vice versa, when bond yield decreases, investors will consider bonds to be less enticing, so that the stock index will naturally have a positive change. As a result, it's significant to understand the correlation and interaction between bond and equity markets. Studying the relevance of financial assets allows investors to ameliorate their ability to control risks and predict market trends, assuming they aim to minimize risk and maximize gains.

There has been a myriad of research on the correlation between bond yields and stock price. For example, through analyzing the US stock indices and bond shifts for 1800 trading days, Chordia *et al.* (2001) indicates that "the time-series properties of stock and bond liquidity possess similarities, such as common calendar regularities", showing the synchroneity of the variation of these two assets due to their strong association, in which the change of one will immediately affect the other. She also noted that the correlation coefficients in the volatility between bond and stock markets are positive and dramatically higher than zero, which implies the common influences of these two forms of assets across the markets. Moreover, for the Chinese market, Kim *et al.* (2021) argues that "the bond market is the predominant market of information transmissions because the net spillover-connectedness in this market" which is based on the research of the bond market's impact on other financial markets, mainly the stock market. In conclusion, Kim et al. and Chordia et al. show that there is a strong and statistically significant correlation between bond and stock price, both in the US and Chinese markets.

With this identical correlation among different markets, the discrepancy in the efficiency of this effect imposed by the bond changes on the stock market between different markets should be compared and analyzed. Considering the differences in market efficiencies, it could be assumed that the bond yield adjustment has a more rapid impact on the stock market if the market is more developed. If this hypothesis is correct, we can make a comparison between the US and Chinese market to verify our conjecture. In other words, due to the diverse developing degree of the US and Chinese markets, the disparity of market information and transparency leads to different effects and transmitting speed of this correlation among countries.

This essay performs an empirical comparison between the markets in China and the US to verify our hypothesis that the relationship between stock prices and government bond yields is more significant in more mature markets, where the market efficiency is higher and therefore the implementation of monetary policies is rapid. We analyzed results achieved by the Hodrick-Prescott (HP) filter, and obtained the long-term and short-term cyclical variation. Then, regression analysis was applied to analyze the market connection and the impact's significance.

2. Research Method

Given the consistency and representativeness of stocks, this essay chooses the Shanghai and Shenzhen 300 Index (HS300), from the Chinese stock market and the Standard & Poor 500 Index (S&P500) from the US. This essay compares the stocks' monthly performances in the last five years to government bond yields. Since stock variability is split between short and long term, the variability in each term is influenced by different factors. A bond's effect on stock price is generally long-term. If, in the short term, there are also a strong correlation between bond and stock index price, then it should signal that the market was mature with an efficient conducive mechanism. Since the data collected for the regression combines both long-term and short-term behavioral changes influenced by the bond yield.We used the HP filter to split the variability into short and long term, and then analyzed them respectively. Afterward, we utilized the linear regression model to determine the underlying relevance between the government bond yields and the stock prices in both long-term and short-term situations.

3. Empirical Analysis

a. The long-term effects of government bond yields on the stock index prices

After using the HP filter, we obtained both the long-term and short-term variations for both stock and bond markets in both countries. To get the overall relationship between the stock and the bond, the regression is first manipulated on the long-term market performance. The results for HS300

with Chinese government bonds and the S&P500 with US government bonds are shown below:

China Market		The US Market	
Dependent Variable	HS300 Index	Dependent Variable	S&P Index
Bond Yield	-551.776 (-3.058)***	Bond Yield	-433.241 (-6.253)***
C	5763.981 (9.766)***	C	3778.574 (26.015)***
Adjusted R2	0.124	Adjusted R2	0.392
Remark: *** reflects the 99% significant level.			

The result shows that the bond yield has a prominent effect on the performance of stock price. The adjusted R-squared is higher in the US market,which means that bond yield changes have a larger impact on fluctuation in the US stock market. In addition, in both China and the US, the coefficients of bond yield are negative and significant under the 99% level. Therefore, the negative relationship can be verified, which is consistent with our theoretical expectation. In addition, the absolute value for the coefficient for bond yields is higher in the China market, so that the monetary policy would have a larger impact in the China market if we compare it to that in the US market.

b. The short-term effects of government bond yields on the stock index prices

Next, we analyzed the short-term stock fluctuations and bond changes to see if the bond fluctuations affect the short-term changes of stock prices.

China Market		The US Market	
Dependent Variable	HS300 Index	Dependent Variable	S&P Index
Bond Yield	542.960 (1.650)	Bond Yield	300.994 (2.697)***
C	-1.381 (-0.035)	C	0.152 (0.007)
Adjusted R2	0.029	Adjusted R2	0.098
Remark: *** reflects the 99% confidence interval.			

The result of regression on short-term data shows that the short-term bond effect is prominent only in the US stock market but not in China. The p-value for the US market government bond is less than 0.1, showing a significant impact on the US stock market with a significance under the 99% level. Chinese government bonds, on the contrary, have no apparent influence on the domestic stock market. Furthermore, the coefficient of the US government bond yield is positive, reflecting a positive relationship between the bond and the stock in the US market. These results indicate that impact from bond market to stock market is more significant in the short term, having a higher efficiency in the US market.

4. Conclusion.

After using the HP filter and running linear regression to analyze the underlying relationship between the government bond yield and the stock price changes, we conclude that these two performances generally have corresponding behaviors in the long-term. This is because the stock price is the signal of a market situation, while the bond yield is a method for the government to influence the market. Hence, their relation shows how monetary policy functions to the stock market.

When it comes to the short-term, the result is different between China and the US. As shown in

the result, the impact of bond prices on stock prices is stronger in the US market than in China. This is consistent as we consider that the conductive mechanism of government monetary policies in the market is much more mature in the US market, compared with that in the new-born China market. Getting to know the fundamental relationship between the bond and the market in separate situations has important implications for investors; this helps investors to better diversify their investment choices and hedge risks based on these securities' underlying changes to market shifts. It also helps the policymakers coordinate and control the market more precisely through monetary political adjustments.

References

[1] Chordia, T., Sarkar, A., & Subrahmanyam, A. (2001). An Empirical Analysis of Stock and Bond Market Liquidity. SSRN Electronic Journal. Published. https://doi.org/10.2139/ssrn.289219

[2] Liow, K. H., Song, J., & Zhou, X. (2021). Volatility connectedness and market dependence across major financial markets in China economy. Quantitative Finance and Economics, 5(3), 397–420. https://doi.org/10.3934/qfe.2021018

[3] Inverted Yield Curve Definition. (2021, August 24). Investopedia. https://www.investopedia.com/terms/i/invertedyieldcurve.asp