ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

Empirical Analysis of Factors Influencing Ten-Year Government Bond Yields in Vietnam

Le Thi Anh Tuyet[1, a]

[1]School of Economics and Management, Chongqing University of Posts and Telecommunications, Chongqing, 400065, China.

[a]tuyetle1291@gmail.com

Abstract

In recent years, the empirical study on factors influencing on governmental bond yield of investors in Vietnamese bond market is to not only come up with investment orientation for investors but also provide resources statistics for government in bond market management to attract more investors spending their own investment in governmental bond. This research is conducted with some macro variables in the concept model, including policy rate interest, expectation of inflation, expectation of exchange rate, CDS index, industrial production index by using co-integration method (Johansen, 1990) combined with VECM model. Thanks to data analysis, the results will be used to estimate short-term and long-term relationship among variables. It is evident that almost all of variables have co-integration relationship in both short term and long term.

Keywords

Vietnam; governmental bond yield; VECM; influencing factors.

1. Introduction

Empirical studies on factors impacting on government bond yield in developed and developing countries are conducted in two regression models based on the data resources for both several countries and each country. Although there has been a range of theory and previous empirical research on factors impacting on government bond yield, there are some contrast concepts and opinions.

Government bonds are an effective method in raising capital for the governmental budget and for development investment. Facts have indicated that this market plays a significant role in regulating national finance and monetary policies. In the context of Vietnam's economy, the government has faced with many challenges of macroeconomic stability, unsustainable development, as well as low competitiveness of the economy. Thus, it is extremely essential to research on the factors affecting on government bond yields for estimating and adjusting the direction of interest rates in the short term and long term, which contributes to the economic stability generally. This research is conducted based on the co-integration theory and vector error correction models (VECMs). Thanks to the results of these analysis, the author explained the economic shocks from the factors influencing on Vietnamese government bonds yield.

The structure of remaining parts is:

Part 2: Briefly summary of previous researches.

Part 3: Performing data and concept model

Part 4: Performing initial hypothesis and empirical results of macro factors impacting on government bonds yield of Vietnam in the period time of ten years, between 2009 and 2019.

Final part is about research results.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

2. Briefly Summary of Previous Researches

The In recent years, there is a range of scholars in many countries in the world conducting researches on government bonds yield. These authors concentrate on measuring how the macroeconomic factors influence on government bonds yield, estimating the impacts of gross domestic product growth, government debt, government budget deficits, short-term interest rates, inflation, exchange rate...

Baldacci and Kumar (2010) used a sample of 31 developed and emerging economies from the pre-crisis period (1980-2008) and introduced debt-to-gdp ratios into the specification in linear and quadratic form. Their estimations suggest that for every 1 percentage point increase in the ratio of government debt to GDP, the real long-term bond yields of the g20 economies, both advanced and emerging, would rise by about 0.8 basis points, while the real long-term bond yields of the g20 advanced economies would rise by about 1.7 basis points. They also argue that the exact extent of the impact depends on the initial fiscal position, institutional and other structural conditions, and the spillovers from global financial markets. Laura Jaramillo and Anke Weber (2012) found that the extent to which fiscal variables affect domestic bond yields in emerging economies depends on the level of global risk aversion. During tranquil times in global markets, fiscal variables do not seem to be a significant determinant of domestic bond yields in emerging economies. However, when market participants are on edge, they pay greater attention to country-specific fiscal fundamentals, revealing greater alertness about default risk. Tigran Poghosyan (2012) analyze determinants of sovereign bond yields in 22 advanced economies over the 1980-2010 period using panel co-integration techniques. The application of co-integration methodology allows distinguishing between long-run (debt-to-GDP ratio, potential growth) and short-run (inflation, short-term interest rates, etc.) determinants of sovereign borrowing costs. paper find that in the long-run, government bond yields increase by about 2 basis points in response to a 1 percentage point increase in government debt-to-GDP ratio and by about 45 basis points in response to a 1 percentage point increase in potential growth rate. In the short-run, sovereign bond yields deviate from the level determined by the long-run fundamentals, but about half of the deviation adjusts in one year.

Deng zhichao, Li qilin and Li gang (2017) constructed an OLS model based on the information of 74 surviving panda bonds, used the regression method to eliminate variables, and studied the influencing factors of issuing interest rate of panda bonds. The results show that the main determinants of the interest rate of panda bonds are the interest payment method, the ownership property of the issuer and the expectation of the RMB/us dollar exchange rate. Cheng zhihong (2018) used principal component analysis to study the bond yield curve, and the results showed that the bond yield curve could be explained by three principal component factors: level, slope and curvature. Through the establishment of multiple linear regression model, the influence of the principal component factor of the bond yield curve on the consumer price index, industrial added value and the leading index of macroeconomic prosperity index.

Warnock, f. and Warnock, (2005, 2009) attempted to analyze the impact of foreign capital inflows on a large developed economy. The regression model with seven independent variables was used to explain the OLS regression results for the 10-year bond yield (1984/1-2005/5) to give statistically significant results for the economic high. (the results show that foreign capital flows have a significant economic and statistically significant impact on long-term interest rates in the United States (foreign capital inflows lower long-term interest rates in the United States, with average long-term interest rates falling by 80 basis points (0.08%) in one year). The study also suggests that large foreign purchases of us government bonds have contributed significantly to low interest rates in the us over the past few years. But they also proposed other factors that the regression function might not have fully captured. A model similar to their own can be applied to other countries such as Mahmood Pradhan, et (2011). Foreign capital inflows

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

have become an important factor in determining long-term yields in many emerging market countries, and may complicate macroeconomic management. While some of these effects can be offset by the use of traditional macroeconomic tools such as policy rates, reversals in capital flows can be amplified if such flows are inherently leveraged.

3. Data and Concept Model

Based on the statistics of the International Monetary Fund (IMF), the Asian Development Bank (ADB), the General Statistics Office of Vietnam (GSO), Bloomberg LP and CEIC, the author implemented the model as WW (2009) and Mahmood Pradhan et (2011) conducted their research on macroeconomic factors affecting US government bonds yields as well as those of emerging economies. However, there are some changes in the concept model of this research which is conducted to appropriate with the economic context of Vietnam.

Then, the specific regression equation will be as follows:

Long-term:

$$\text{BY10} = \alpha_0 + \alpha_1 \text{PR} + \alpha_2 \text{IE} + \alpha_3 \text{EER} + \alpha_4 \text{CDS10} + \alpha_5 \text{IPI} + \varepsilon_t \quad (1)$$

Short-term:

$$\text{DLGBY10} = \beta_0 + \beta_1 DL\text{PR} + \beta_2 \text{IE} + \beta_3 D\text{LEER} + \beta_4 \text{ DLCDS10} + \beta_5 D\text{IPI} + \beta_6 U_{(t-1)} + \varepsilon_t \quad (2)$$

In which:

- GBY10: Vietnam's 10-year government bonds yield, is a dependent variable.
- PR: Vietnam's policy rates, is an independent variable.
- IE and EER: expectations of inflation and USD / VND exchange rate for the next 12 months are independent variables.
- CDS: Credit Default Swap spread (CDS spread), is an independent variable.
- IPI: Industrial production index, is an independent variable.
- L: is the symbol for the value of Logarithm
- D: is the symbol for first order difference
- $U_{(t-1)}$:speed of error correction of the model in the short term.

The data series were used is the monthly data series in the period time from September 2009 and September 2019.

According to the theory and previous studies, Government bonds yield has increased when there is a increase of policy rates, expectation of inflation, CDS index and industrial production index, and a decrease of expectation of exchange rate.

4. Empirical Results

4.1. Stationary Test (Unit Root Test) and Co-Integration of Data Series

Before regression, the author conducted unit root test of each separate variable to determine the stationary test by using common methods which are ADF (Augmented Dickey-Fuller) and histogram. The test results Table 1 show that all initial variables have unit root (stationary time). After that, the author calculate the first difference for all variables as well as logarits value for variables GBY10, PR, EER, CDS10 (noted that calculating the logarits value does not impact on the nature of data series). The results show that all variables are stationary after conducting

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

the first difference, with the critical value of the ADF test with the statistical significance levels of 1%, 5%, 10% are -3.486, -2.886 respectively and -2.58.

Table 1. Stationary test of data series

Variables	ADF Value	Variables	ADF Value
GBY10	0.119321	DLGBY10	-11.14622
PR	-1.624474	DLPR	-10.06689
IE	-2.218047	DIE	-4.275977
EER	-3.422072	DLEER	-14.03895
CDS10	-1.322899	DLCDS10	-9.467643
IPI	-2.768288	DIPI	-9.028276

Before conducting a new test of co-integration of variables in the model, the author calculates the optimal lag order according to Akaike Information Standard (AIC). The results show that the lag order of the research model is (2).

Co-integration test according to Johansen method. Because the variables used in the regression model are all stationary at the root chain, but are stationary after conducting the first difference. The author used the method of Johansen and Juselius (1990) to conduct the test for this hypothesis by using Eview 7 statistical software. Besides, Trace test showed a co-integration relationship at the 5% significant level Table 2.

Table 2. Results of co-integration test

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.339814	115.5396	95.75366	0.0011
At most 1	0.223751	66.54200	69.81889	0.0888
At most 2	0.159370	36.65480	47.85613	0.3640
At most 3	0.078770	16.16960	29.79707	0.7003
At most 4	0.050515	6.488213	15.49471	0.6378
At most 5	0.003145	0.371661	3.841466	0.5421

4.2 Regression Results

The author conducted Regression (1) to determine the relationship of variables in the long term, the results are shown in Table 3:

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

Table 3. Relationship of variables in the long term

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.38026	1.516345	19.3757	0.000
PR	0.235656	0.047023	5.011522	0.000
IE	0.176273	0.016208	10.87596	0.000
EER	-0.001226	0.0000608	-20.16905	0.000
CDS10	0.013563	0.001578	8.594824	0.000
IPI	-0.025953	0.027348	-0.949006	0.3446

With R2 = 93.37%, it is evident that the coefficient of the variables is valid with the previous theory.

The results show that there is evidence of co-integration among variables as Granger noted, "an co-integration test can be considered as a pre-test to eliminate situations "not true regression"; therefore, it is acceptable that the relationship of variables in this model is significant although DW test is only 0.814.

Corresponding to a co-integration relationship above, the author conducted the VECM model. Based on the results obtained from the VECM model, the author found the coefficients in the regression equation (2).

More importantly, it is evident that the results are summarized in table 4 below after applying ECM model:

Table 4. Results of ECM model

Variables	Coefficient	t-Statistic	Std. Error
LPR	-0.695645	-6.96853	0.09983
IE	-0.00422	-1.27891	0.00330
LEER	3.678866	13.6902	0.26872
LCDS10	-0.568502	-6.61996	0.08588
IPI	0.023435	4.04061	0.00580
C	-34.52982		
ECM	-0.17232	-3.72804	0.04622

From the results of Table 4, the ECM coefficient is negative and statistically significant to show that the variables in the model have an impact on long-term Government bond yields, Granger causality test shows that 4/5 variables are interest. Policy yields, expected exchange rates, CDS index and industrial production have an impact on government bond yields in the short term.

In addition, the ECM coefficient - the speed of error correction of the model in the short term shows that if the Government bonds yield changes from the long-term equilibrium value, it will be corrected back to the long-term equilibrium in 17.23%.

4.3 Model Test

Testing the stationary of residuals, the results show that the remainder of the model does not exist a unit root.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

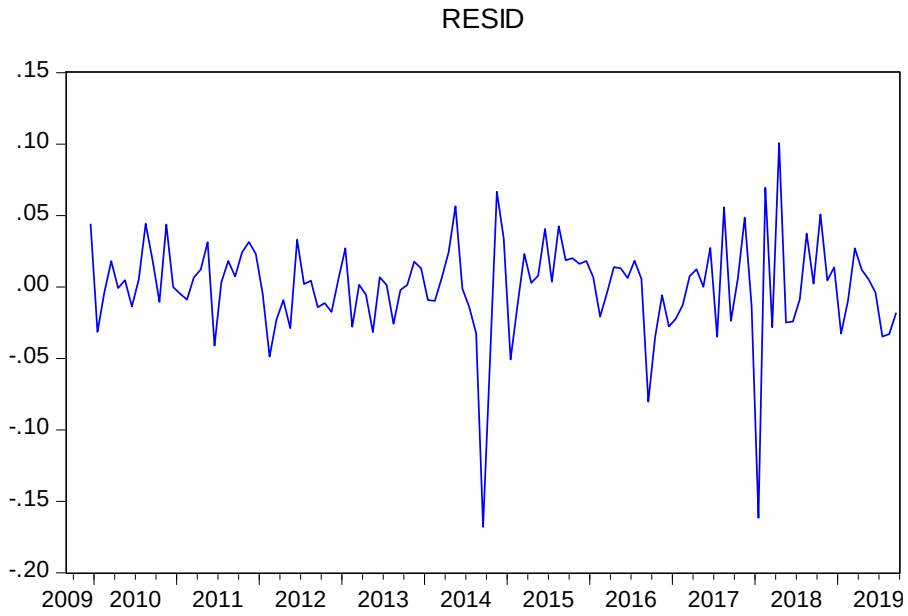

Fig 1. Testing the stationary of ECM model residues

Auto-correlation test of the model: the results of the auto-correlation test of the model by Portmanteau Tests method showed that there is no higher order autocorrelation in the regression model.

Table 5. Auto-correlation test

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	Df
1	5.519734	NA*	5.566911	NA*	NA*
2	18.21364	NA*	18.47967	NA*	NA*
3	50.55684	0.9203	51.66662	0.9019	66
4	88.11472	0.8347	90.54231	0.7844	102
5	117.3020	0.8986	121.0211	0.8477	138
6	167.6554	0.6211	174.0720	0.4842	174
*The test is valid only for lags larger than the VAR lag order.					
df is degrees of freedom for (approximate) chi-square distribution					

5. Conclusion

To achieve the objective of this research which is estimating how the policy rates, inflation and expectation of exchange rate, CDS index, industrial production index influence government bonds yield in Vietnam, the research has shown a long-term co-integration relationship by applying Johansen's co-integration testing method and VECM model for the monthly data sample in the period time of ten years, from September 2009 to September 2019 as below:

- Policy rate has positive relationship with government bonds yield, when policy rate increases by 1%, the interest rate will increase by 0.24%.

- Expectation of inflation has a positive relationship with the Government bond yield, when the inflation is expected to increase by 1%, the yield will increase by 0.18%.

ISSN: 2637-6067 DOI: 10.6918/IJOSSER.202002_3(1).0002

- Expectation of exchange rate has negative relationship with government bonds yield. When the exchange rate is expected to increase by 1% (or the VND will depreciate against the USD) this will reduce the value of Government bonds yield 0.0012%.

- CDS index has a positive relationship to Government bonds yield, when the CDS index increases by 1% (100 points), the Government bonds yield will increase by 0.014%.

However, these effects do not have immediate impact on government bonds yield in Vietnam, it requires a lag order of 2 months to affect on government bonds yield. On the other hand, any effect that changes the equilibrium curve in the long term of government bond yields will tend to move back to the equilibrium line with the error correction rate for the next period of 17.23%.

From the results of the research, the author proposed an effective evidence for investors when they have an intention to invest as well as manage government bonds.

References

[1] Warnock, F. E., and V. C. Warnock (2009), “International Capital Flows and U.S. Interest Rates”. Journal of International Money and Finance, Vol. 28, No. 6, pp. 903–19

[2] Mahmood Pradhan, Ravi Balakrishnan, Reza Baqir, Geoffrey Heenan, Sylwia Nowak, Ceyda Oner, and Sanjaya Panth , IMF, April 21, 2011 “Policy Responses to Capital Flows in Emerging Markets” . SDN/11/10.

[3] Tigran Poghosyan (2012), “Long-Run and Short-Run Determinants of Sovereign Bond Yields in Advanced Economies”, IMF Working Paper 12/271.

[4] Laura Jaramillo and Anke Weber (2012), “Bond Yields in Emerging Economies: It Matters What State You Are In”, IMF Working Paper 12/198.

[5] Cheng zhihong (2018-05-01), "Analysis of influencing factors of bond yield curve and its practical significance" [D]. [Master's thesis]. Nanjing university

[6] Deng zhichao, Li qilin, Li gang (2017), "Empirical study on influencing factors of panda bond issuance rate" [J]. World economic research. 2017(08)

[7] Baldacci, E., and Kumar, M. (2010), “Fiscal Deficits, Public Debt, and Sovereign Bond Yields,” IMF Working Paper 10/184 (Washington: International Monetary Fund).