

**YEDITEPE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES**

**EFFECT OF MACROECONOMIC NEWS ANNOUNCEMENT ON
BOND MARKET**

Ezgi Gülbaş

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YEDITEPE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES

EFFECT OF MACROECONOMIC NEWS ANNOUNCEMENT ON BOND
MARKET

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by

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in

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Supervisor

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DECLARATION OF ORIGINALITY

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ABSTRACT

EFFECT OF MACROECONOMIC NEWS ANNOUNCEMENT ON BOND MARKET

THESIS TITLE

The primary aim of this dissertation is to explain the factors effecting the behavior of the bond markets, with a specific focus on the elements affecting the local currency-denominated government bond yields in emerging markets. This analysis involves distinguishing the impact of both domestic and international factors and explaining the connections between foreign ownership and worldwide risk appetite.

The first research question of this dissertation examines how foreign participation and global risk appetite affect the yields of government bonds with long-term maturity issued in local currencies within emerging markets. A novel approach by utilizing the panel two threshold variable model will be used. The analysis of panel data shows that foreign participation in the domestic government bond market leads to a decrease long-term government yield, and there is a threshold level in foreign participation. The interaction of global risk appetite with the level of foreign participation will also be examined. The analysis incorporates 19 emerging market countries, contributing to an understanding of the factors driving bond yields in these economies. This study concludes at the Federal Reserve's interest rate hike in 2015. The timing is pivotal, as it marks a shift in global financial conditions, offering a natural boundary for the analysis of emerging market economies' bond yields in relation to foreign ownership and debt levels.

The second research question explores the impact of macroeconomic news and risk appetite on local currency government bond yields in Türkiye, utilizing an event study with data from 2005 to 2023. The influence of unexpected macroeconomic news, monetary policy announcements, and risk events on the average and conditional volatility of Turkish bond returns will be explored. The research extends beyond the reaction of bond prices to unexpected news by exploring the dynamic response of the bond market to variations in risk appetite.

The study reveals significant impacts of inflation and other domestic indicators on bond returns, a pattern consistent with mature markets, while also highlighting the intricate interplay between domestic economic conditions and global shifts. By incorporating a Risk State variable derived from the VIX index and considering local geopolitical events, the research provides an understanding of the dynamic bond market responses to varying risk perceptions and news events.

This study contributes to the literature by utilizing a novel model to explain the determinants of domestic bond yields. The focus is emerging markets, a segment that has been relatively ignored in past research. Also, this study explores the global and local news impact of government bond markets at a country level specifically focusing on the Turkish market. This part also addresses a gap in the existing literature by examining the effects on various bond maturities, offering insights into the entire yield curve's sensitivities in Türkiye. This analysis is facilitated by utilizing a comprehensive economic forecast survey data dataset. Overall, this comprehensive approach provides insights for investors, policymakers, and academics interested in the complex dynamics of emerging market bonds and the various domestic and international factors shaping their yields.

Keywords: Emerging Market, Sovereign Bond Yield, Local Currency Bond Markets, Foreign Ownership Threshold, Global Risk Aversion, News Impact

ÖZET

MAKROEKONOMİK HABER DUYURULARININ TAHVİL PİYASASINA ETKİSİ

Bu tezin temel amacı, gelişmekte olan piyasalarda yerel para birimi cinsinden devlet tahvili getirilerini etkileyen unsurlara olarak odaklanarak tahvil piyasalarının davranışını etkileyen faktörleri açıklamaktır. Bu analiz, hem yerel hem de uluslararası faktörlerin etkisinin ayırt edilmesini ve yabancıların tahvil piyasasındaki payı ile global risk iştahı arasındaki bağlantıların açıklanmasını içermektedir.

Bu tezin ilk bölümünde, tahvil piyasasındaki yabancı yatırımcı payı ve küresel risk iştahının gelişmekte olan piyasalarda yerel para birimi cinsinden ihraç edilen uzun vadeli devlet tahvillerinin getirilerini nasıl etkilediği incelenmektedir. Yeni bir yaklaşımla panel iki eşik değişkenli regresyon modeli kullanılarak analiz yapılmaktadır. Bu analiz yurt içi devlet tahvili piyasasına yabancı katılımının uzun vadeli devlet tahvili getirisinin azalmasına yol açtığını ve yabancı katılımın bir eşik seviyesinin bulunduğunu göstermektedir. Bu bölümde küresel risk iştahının yabancı katılım düzeyiyle etkileşimi de dikkate alı. Analiz, 19 gelişmekte olan piyasa ülkesini kapsıyor ve bu ekonomilerdeki tahvil getirilerini yönlendiren faktörlerin anlaşılmasına katkıda bulunuyor. Bu araştırma, Amerikan Merkez Bankası Federal Reserve'ün 2015'teki faiz artırımlarını son nokta olarak belirliyor. Bu tarih küresel mali koşullardaki bir değişime işaret etmesi nedeniyle tercih edilmiştir.

Bu tezin ikinci bölümünde makroekonomik haberlerin ve risk iştahının Türkiye'deki yerel para birimi devlet tahvil getirileri üzerindeki etkisini incelenmektedir. Analiz 2005'ten 2023'e kadar olan verisetinde olay yöntemi (event study) kullanılarak yapılmaktadır. Beklenmedik makroekonomik haberlerin, para politikası duyurularının ve risk olaylarının Türkiye tahvil getirilerinin ortalama ve koşullu oynaklığı üzerine etkisi incelenmektedir. Araştırma, tahvil piyasasının risk iştahındaki değişimlere verdiği dinamik tepkiyi de dikkate almaktadır.

Çalışma, enflasyonun ve diğer yurt içi göstergelerin tahvil getirileri üzerindeki önemli etkilerini ortaya koyuyor. Bu sonuçlar gelişmiş ülke piyasalarındaki sonuçlarla da tutarlı olup aynı zamanda yurt içi ekonomik koşullar ile küresel değişimler arasındaki karmaşık

etkileşimi de göz önüne alıyor. Araştırma, VIX endeksinden türetilen bir Risk Durumu değişkenini dahil ederek ve yerel jeopolitik olayları dikkate alarak, değişen risk algılarına ve makroekonomik haber olaylarına tahvil piyasasının dinamik tepkilerinin anlaşılmasına katkı sağlıyor.

Bu çalışma, yurt içi tahvil getirilerinin belirleyicilerini açıklamak için yeni bir model kullanarak literatüre katkı sağlamaktadır. Odak noktası, geçmiş araştırmalarda daha sınırlı incelenen gelişmekte olan ülke piyasalarıdır. Ayrıca bu çalışma, devlet tahvili piyasalarının küresel ve yerel haber etkisini ülke düzeyinde, özellikle Türkiye piyasasına odaklanarak araştırıyor. Bu bölüm aynı zamanda çeşitli tahvil vadeleri üzerindeki etkileri inceleyerek mevcut literatürdeki bir boşluğu da ele almakta ve Türkiye'deki getiri eğrisinin tüm hassasiyetlerine ilişkin bilgiler sunmaktadır. Bu analizde, ekonomik tahmin anketi verilerinden oluşan kapsamlı bir veri seti kullanılmıştır. Genel olarak bu kapsamlı yaklaşım, gelişmekte olan piyasa tahvillerinin karmaşık dinamikleri ve bunların getirilerini şekillendiren çeşitli yerel ve uluslararası faktörlerle ilgilenen yatırımcılara, politika yapıcılara ve akademisyenlere bilgiler sunmaktadır.

Anahtar kelimeler: Gelişen Piyasa, Devlet Tahvili Getirisi, Yerel Para Cinsinden Tahvil Piyasaları, Yabancı Tahvil Piyasası Payı Eşiği, Küresel Riskten Kaçınma, Haber Etkisi

DEDICATION

This thesis is dedicated to:

My parents and my sister.



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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller test
BIC	Bayesian information criterion
CPI	Consumer Price Index
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
ISM	Institute for Supply Management Manufacturing
PCE	Personal consumption expenditures
TR	Türkiye
US	United States
EZ	Eurozone

1. INTRODUCTION

Foreign capital inflows are essential for emerging market economies since they provide critical resources to finance investments and promote economic progress. These inflows, particularly those directed towards local bond markets, play a pivotal role in enhancing economic prospects and contributing to the financial development in these economies. The impact of these capital flows on borrowing costs has gained importance as financial markets have become more interconnected. This is especially evident in the context of local currency denominated debt in emerging market debt and this trend is observed since the Lehman Brothers collapse (Ebeke and Lu, 2014).

The impact of international capital flows to emerging and developing economies is many-sided. On the one hand, foreign investors introduce a new source of demand which has the potential to reduce yields and enable countries to borrow in their local currencies. Hence, this can bolster financial stability and support the macroeconomic dynamics. On the other hand, increased foreign investments can also lead to economic overheating, currency appreciation, and financial instability, particularly if foreign capital exits swiftly during times of crisis. Therefore, foreign capital influx can result in asset price bubbles while the significant outflows can exacerbate the declines in asset prices creating a risk of market instability. Local economic conditions, political uncertainties, and global risk appetites also influence these dynamics. The increased existence of international investors can also modify the influence of domestic macroeconomic factors on bond returns.

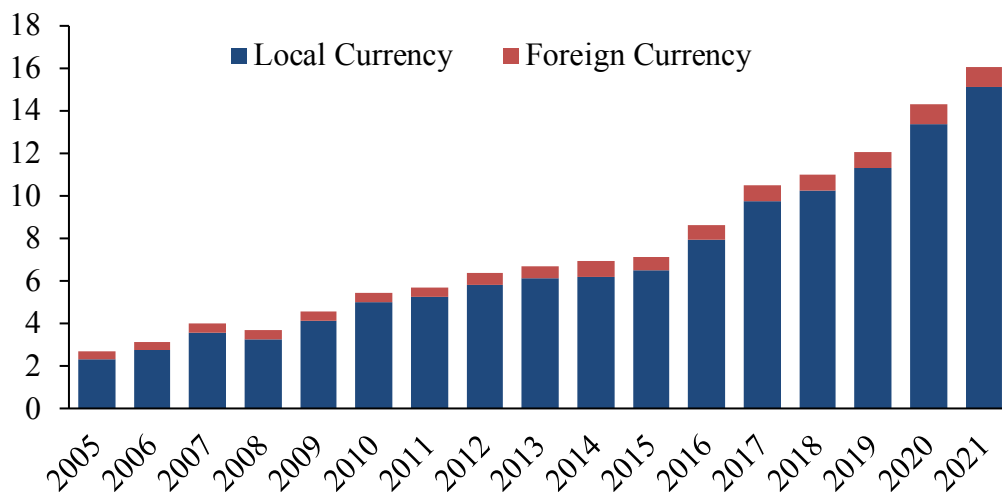
A thorough understanding is vital given the intricacies of international capital movements and their significant influence on emerging market economies. Assessing the correlation between foreign participation and bond yields is crucial in understanding the influence of these capital movements. An examination of this will provide insights regarding the effective management of the two-fold characteristics of foreign investments and the successful navigation of the corresponding economic challenges in emerging markets.

The landscape of emerging market domestic bonds has experienced significant changes over recent years. This reflects a strategic shift in how these countries manage their debt and engage with the global financial system. The first notable development is the

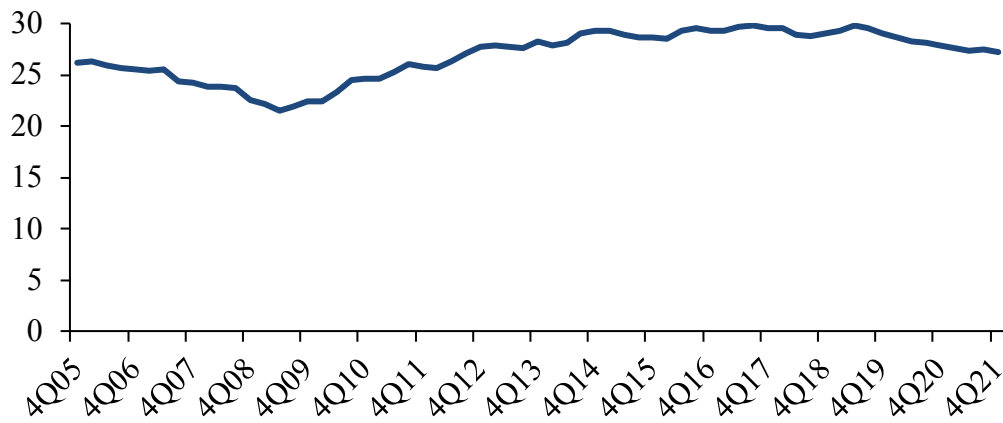
concerted effort by emerging markets to overcome the “original sin” – a term coined by Eichengreen and Hausmann (1999) to describe the incapacity to obtain loans in local currency from foreign markets. Emerging markets have made strides in developing their domestic currency-denominated bond markets to mitigate the associated currency and refinancing risks. China and India have led the way by issuing the majority of their sovereign debt in their local currencies, a trend increasingly adopted by other emerging markets. This shift is significant as it reduces dependence on foreign currency borrowing, thereby mitigating the risk of currency mismatches which historically led to increased debt burdens during times of currency depreciation. This transition has been supported by stronger macroeconomic policies, improved institutional frameworks, and enhanced economic fundamentals within these nations.

Figure 1

Emerging market sovereign bonds (Outstanding amounts USD bn)



Simultaneously, a noticeable increase in the foreigner’s share in sovereign bond of emerging markets has been observed. This change has been driven by a global search for yield, where investors, particularly from low-interest-rate environments, seek higher returns offered by emerging market bonds. Policies encouraging foreign investment, coupled with the aforementioned economic improvements, have made these markets more attractive to international investors. However, the increased foreign participation also introduces volatility, since fluctuations of international capital and the changing moods of global investors can significantly affect the stability and performance of these markets.

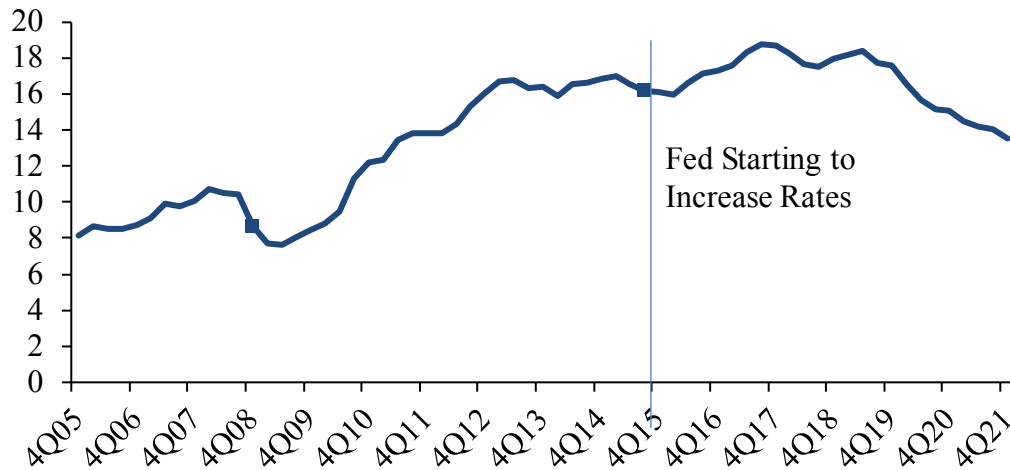
Figure 2*Foreign investors share in emerging market sovereign bonds (%)*

This trend of increasing share of international investors in domestic currency bonds indicates a growing confidence in the economic stability and currency value of emerging markets. It also reflects the diversification strategy of global investors as they expand into different asset classes and currencies. While this increases the depth and resilience of the local bond market, it also exposes these countries to the whims of international capital flows, potentially leading to volatility in times of global stress or shifts in investor sentiment.

There have been signs of stagnation and challenges despite the progress made in emerging markets. The proportion of bonds denominated in domestic currency that are owned by foreign investors experienced a sharp increase between 2009 and 2014. The initial rapid pace of transformation has slowed, with some trends even partially reversing since 2013. Fluctuations in the local currency's value during periods of stress can dampen the enthusiasm for local currency bonds, as foreign investors, who typically measure returns in major currencies like the USD, are sensitive to exchange rate losses. This sensitivity can lead to sudden and destabilizing capital outflows amidst periods of market turmoil, underlining the continued vulnerability of emerging markets to external shocks.

Figure 3

Foreign investment in domestic currency bonds emerging market (% of total)



1.1. Research Questions

The purpose of this dissertation is to explore the factors that influence the bond yields in local currency government bonds in emerging markets. The dissertation will be organized into two parts, two distinct yet interconnected segments, each addressing a critical research question aim to contribute to understanding of bond market dynamics in emerging markets.

Research Question 1: How does the participation of international investors and the global appetite for risk affect the yields of government bonds issued in the domestic currency of emerging economies?

This question seeks to comprehend the complex dynamics between international investment behaviors and the broader economic sentiment that affects bond market yields. The degree to which foreign ownership influences bond yields and how shifts in global risk appetite can cause changes in the market, thus affecting the borrowing costs for emerging economies will be explored. This question further considers how international investment and global risk preferences shape the financial landscape of emerging markets. It delves into the sensitivity of bond yields to external economic pressures and the degree to which these yields reflect broader investor sentiment and geopolitical stability. By examining these dynamics, the research aims to explain the channels through which global financial trends

and investor behaviors influence the cost of borrowing for emerging economies, potentially guiding policy formulation and investment strategy optimization within these markets.

Research Question 2: How do scheduled macroeconomic news and risk appetite in Türkiye influence the yields and volatility of local currency bonds?

This question aims to delve into the impact of macroeconomic data releases on the bond markets of a specific emerging economy, Türkiye's bond market. The focus will be on how macroeconomic announcements and prevailing risk sentiments shape bond yield dynamics and market volatility. This analysis seeks to examine the reactions of local currency bond yields to both expected and unexpected economic news, policy shifts and key financial indicators. This examination also aims to shed light on the complex interplay between local economic events and global financial sentiment, offering a detailed perspective on the responsiveness of local currency bonds to a spectrum of domestic and international news. The study contributes to an understanding of market mechanisms and investor reactions within the context of emerging economies like Türkiye. This investigation will not only add granularity to the understanding of how local market dynamics interact with global economic sentiments but also provide empirical evidence on the sensitivity of emerging markets to various domestic and international news.

1.2. Contribution to the Literature

In this section, the aim is to contribute to existing literature in international finance and economic analysis. This study fills gaps in understanding international investors' influence on local currency bond yields in emerging markets and the impact of macroeconomic news on the Turkish Government Bond Market. This will offer fresh perspectives and innovative methodologies, aiming to enrich the understanding of bond market dynamics. The findings are relevant for academia, practitioners, and policymakers navigating emerging market bond investments.

1.2.1. International Investors and the Global Risk Appetite

First research question is addressing the understanding of the factors that influence of domestic currency bond yields in the context of emerging markets. While previous studies have laid the groundwork by examining various aspects of bond yields, particularly in the context of developed economies or external sovereign bonds, the less explored area bonds issued in local currency by emerging markets will be investigated. There has been a lack of comprehensive analysis in this area despite the growing importance of local currency bond markets in emerging economies.

Dynamic Threshold Model with Multiple Thresholds will be used in the analysis. This is a new methodological approach to the bond yield analysis that captures the non-linear and regime-dependent nature of the correlation among bond yields and the factors influence them. This method takes into an account the complex interactions between global risk aversion, foreign ownership, and domestic macroeconomic variables. Using a dynamic approach to understand their yield determinants with a focus on emerging markets, this part serves to bridge a gap in the existing literature.

The joint threshold effect of global risk aversion and foreign ownership on domestic bond yields will be investigated. This could be considered as one of the main differences from the previous studies in this area. In literature, either the interaction between these two factors is not considered or only one as a threshold variable is used. The findings investigate that foreign ownership has an impact on bond yields contingent on the degree of global risk aversion, thus offering a more detailed understanding of the mechanisms at play.

The study utilizes a comprehensive dataset covering 19 emerging market economies over a substantial time period. This broad scope allows for more robust and generalizable findings. By uncovering the interaction of foreign ownership and global risk aversion on local currency bond yields, the research provides insights for policymakers and investors. Understanding these dynamics is crucial for managing debt and controlling borrowing costs for policymakers. The findings could also help in assessing the risk-return profile of investing in local currency bonds in emerging markets.

1.2.2. Macroeconomic News and Risk Appetite

Second research question is investigating the impact of macroeconomic data releases. The influence of macroeconomic data releases in the sovereign bond market has taken attention in the literature for several reasons. First, understanding the announcement's impact would provide information for portfolio managers or investors. This information would help them adjust their risk in the bond market around announcement days. Second, traders or short-term investors with different opinions on an upcoming release than market consensus would take a position on the release. Third, movements in interest rates or spreads could be used to indicate future economic activity. Fourth, measuring the level of responsiveness to a particular indicator could be an important reference for policymakers regarding the enduring costs of borrowing. (Andersson et al. 2009).

The influence of monetary policy and macroeconomic news announcements on financial markets, an area that has attracted considerable interest, is analyzed. However, the primary focus of numerous studies has revolved around the stock market and the foreign exchange market. This part undertakes an empirical investigation into a less explored area which is local currency bond markets. The aim is to look at the influence of macroeconomic news, monetary policy announcements, and risk events on the Turkish Government Bond Market, specifically focusing on local currency bond yields. This topic took less attention in empirical studies.

This analysis distinctively focuses on the Turkish Government bond market by examining the responsiveness of local currency-denominated bond yields to both domestic and global macroeconomic news on an extensive period from 2005 to 2023. This approach fills the gap in the existing body of literature, which has predominantly relied on JP Morgan EMBI bond index spread data, consisting of bonds denominated in US dollars.

This research contributes to the inclusion of various types of news, extending beyond macroeconomic announcements to encompass a broader spectrum of information, such as monetary policy decisions, risk appetite, and political uncertainties, including local elections and terror-related news. This broadened perspective acknowledges the potential impact of economic risk perceptions and subsequent bond market reactions. The influence of significant news about the macroeconomic conditions and monetary policy decisions of the

United States and Europe will also be explored. Turkish bond yields could significantly correlate with news about these markets due to the financial interconnections between these regions.

The study demonstrates innovation through its examination of the influence of news on various bond maturities, two-, five-, and ten-year government bonds. This methodology gives a comprehensive outlook on the short and long sections of the bond returns in Türkiye, enhancing the understanding of the particular sensitivities of bond yields to news according to their respective durations.

The empirical focus on Turkish local currency bond yields in response to a diverse array of news types in a longtime period represents a significant addition to the literature. It provides understanding of how emerging market bond yield in a specific market is influenced not just by economic indicators but also by monetary policy shifts and political developments. It also enhances understanding regarding the fluctuations observed in bond yields, specifically concerning domestic currency bonds. Consequently, it provides valuable insights for investors, policymakers, and academics investigating the relationship between news events and reactions of local bond markets.

1.3. Structure of the Thesis

Following this first introduction chapter, the subsequent chapters are organized as follows: Chapter 2 will offer a review of the existing literature relevant to the determinants of local currency bond yields in emerging markets and the impact of macroeconomic news on financial markets divided into two sections referring to. first and second research questions. It will cover studies focusing on foreign ownership, global risk aversion, and the responsiveness of bond markets to macroeconomic news and monetary policy announcements.

Chapter 3 will explain the methodological framework used to answer the research questions. For answering the first research question the dynamic threshold model with multiple thresholds will be explained. For the second research question, the event study approach used to analyze the impact of macroeconomic news, monetary policy announcements, and risk events on Turkish Government Bond Market yields.

Chapters 4 and 5 will present the findings will from the empirical analysis of the first and second research questions, respectively. Chapter 4 will explain the determinants of local currency bond yields in emerging markets, analyzing the role of global risk aversion and foreign ownership. Chapter 5 will focus to the Turkish Government Bond Market, exploring how local currency bond yields respond to macroeconomic news, monetary policy announcements, and risk events. In both chapters, firstly the data sources, the types of variables considered, and the initial analyses conducted will be presented. Then empirical findings will be discussed. Chapter 6 will conclude the dissertation by synthesizing findings from research questions and discuss the implications of this research.



2. LITERATURE REVIEW

This section will summarize the literature linked to the determinants affecting government bond yields and their fluctuations. The particularly focusing on contrasts and comparisons between developed and developing markets, while also shedding light on the influence of domestic versus global macroeconomic factors.

2.1. Review of Literature on the Determinants of Bond Yields in Emerging Markets

The surge in debt globally, particularly in emerging market economies, is an important phenomenon that occurred in recent years. Debt markets for emerging economies have expanded and deepened significantly in the last twenty years period. The yearly gross issuance of central government securities in emerging market economies experienced a significant increase, which surpassed USD 2.5 trillion in 2019 from USD 1 trillion in 2000. More importantly the issuance of securities by emerging market sovereigns accelerated following 2008 global financial crisis. Almost three quarters of total issuance by emerging market sovereigns has been issued since the 2008 global financial crisis (*OECD Sovereign Borrowing Outlook 2020*).

This surge in the availability of debt to emerging market economies is largely attributable to the monetary easing following the global financial crisis. While central banks implemented these policies in response to various global economic challenges, these policies have resulted in reduced interest rates globally. Furthermore, the yields on sovereign bonds of advanced economies have declined, which made investments in developed markets less attractive. This pushed investors to seek better returns in emerging market economies. Hence, this search for higher yields in the context of widespread low interest rates resulted in increased capital inflow and easier access to debt to emerging markets.

In emerging markets, the emergence of local currency denominated bond markets could be attributed to currency crises occurred in these countries during the 1990s. Prior to mid-1990s, governments and corporates in these markets primarily relied on foreign-currency denominated bonds. The phenomenon, termed "original sin" by Eichengreen and

Hausmann in 1999, refers to the heavy reliance of borrowers in emerging markets on foreign denominated bonds.

The primary reason for the original sin is the lack of domestic savings in emerging markets. This lack of savings leads to the need for foreign currency to fund investments in order to sustain steady deficits in their current account balance. Moreover, investors have shown a greater preference for bonds denominated in stable and widely traded currencies due to the high and unpredictable inflation rates. However, the heavy reliance on borrowing in foreign currencies has led to imbalances between assets and liabilities, exposing them to vulnerabilities to abrupt reversals in capital inflows and bond market volatilities.

Currently, a significant portion of the debt undertaken by emerging markets is issued in their own currencies. Between the years 2000 and 2019, emerging market sovereigns, on average, issued 90 percent of their total bonds in their own currency, signifying the maturation of their domestic currency bond markets. Recent studies, based on empirical data, suggests a direct correlation between the rise in local currency security issuance and the growing proportion of debt held by international investors.

From this standpoint, the risks associated with the problem of "original sin" has been alleviated in numerous developing economies. By establishing local currency bond markets, these economies have bolstered their strategies for managing debt. They have prolonged the duration of their investment portfolio and decreased the proportion of bonds with fluctuating interest rates, thus diminishing the risks related to currency fluctuations, interest rates, and debt refinancing. Furthermore, Arslanalp and Tsuda (2014) note that measures have been implemented to enhance the public sector's resilience to shocks stemming from exchange rate and interest rate fluctuations.

“International investors’ involvement in emerging market economies’ domestic currency bond markets can have both positive and negative impacts” (Matsuoka, 2022). Increasing foreign ownership of local debt markets is considered a catalyst for accelerating financial development. However, inflows of capital can also contribute to a rise in the value of the exchange rate and cause overheating which could hamper macroeconomic performance. In addition, foreign portfolio investments can serve as a significant channel for transmitting global shocks. The sustainability of the growth in bond issuances is vulnerable to risks associated with shifts in global risk sentiment. Therefore, foreign participation is

often regarded as a source of financial instability, leading to volatility in asset prices. Although foreign investors share in the market has increased in local currency denominated bond markets, domestic residents, commercial banks, and pension funds still have the main share. These investors face limited investment opportunities beyond domestic government bonds due to factors such as underdeveloped domestic financial systems and legal restrictions on overseas investments. Consequently, this creates domestic market that affects the pricing of local currency debt. This influence is absent in the foreign currency denominated debt which acquired by diversified global investors issued in major international capital markets. The presence of a local investors mitigates the sensitivity of local currency credit spreads to fundamental factors and shocks stemming from global investor risk aversion.

Despite the progressively significant influence of local currency financing by emerging market governments, there is a lack of understanding regarding local currency debt markets and the academic literature does not encompass measures to assess local currency sovereign risk. While many studies have examined the factors influencing yields on foreign currency sovereign bonds issued by emerging economies, the analysis of domestic currency bonds is more restricted.

There has been extensive empirical research on the factors determining bond yields. The examination of the correlation between sovereign bond yields or spreads has been a major focus in numerous empirical studies in advanced economies. Both global and country-specific factors have been examined. While the primary focus market has been the United States, there is also growing research related to European and OECD countries (Baldacci & Kumar, 2010; Beltran et al., 2012). However, studies that is addressing the specific role of international investors' role in domestic currency bond markets is still limited.

The literature reveals that foreign investors have the ability to produce both stabilizing and destabilizing effects on bond markets. Positively, foreigners investing in local market have the potential to diversify the investor base, enhance the investor appetite for local currency debt and enhance liquidity (Peiris, 2010). Furthermore, international investors' role in emerging markets is particularly significant as their investment appetite to local currency bonds allows these markets to borrow in their local currency rather than in foreign reserve currencies. By mitigating currency misalignment risks and lengthening debt maturities, this approach supports financial steadiness. However, the expanded participation

of foreign investors is often associated with enhanced market instability, given the perceived variability of their demand. During times of increased risk aversion, greater foreign ownership could lead to sudden capital outflows (Beltran et al., 2012).

One of the issues discussed is the complex connection between foreign ownership and domestic bond yields. The rapid exit of foreign capital due to escalated risk aversion can disrupt monetary policy implementation, prompting central banks to regulate government bond yields and exchange rates (Baluga et al, 2011). According to Beltran et al. (2012), the effect between foreign demand and yields likely flows both ways. Additionally, the shaping of long-term interest rates involves factors that are not directly observable, including future inflation expectations and other unknown macroeconomic elements. To address this, studies often rely on anticipated values of these variables derived from survey data or deduced from forward-looking indicators (Beltran, 2013, Kucuk, 2010).

The bond market has seen an increasing involvement from the official sector, which has been the subject of analysis in numerous research. “Warnock and Warnock (2009) analyze the impact of global investments in the U.S. Treasuries market, suggesting that such inflows have significantly lowered the 10-year Treasury yields by roughly 80 basis points. A notable inverse relationship between the U.S.'s long-term interest rates and foreign ownership of its Treasury securities has been confirmed by various empirical studies” (Warnock & Warnock, 2009).

“Foreign official holdings in U.S. Treasuries have markedly increased since the 1990s, a trend primarily attributed to the reserve-building activities of surplus-running emerging markets” (Beltran et al., 2012). According to Beltran et al., diminishing government purchases by \$100 billion monthly might result in an interim increase of 40 points in five-year treasury yields. While the decrease in prices may lead to increased purchases by foreign private investors, the long-term impact would only be around 20 basis points.

The body of literature on this subject has progressed from single-country analyses to more comprehensive panel studies that encompass both developed countries, mainly U.S., and developing countries. Existing research illustrates the link on the between the composition of investors and yields in various countries. For instance, The Japanese case has attracted substantial attention from scholars due to its unique position of maintaining

exceptionally low government debt yields, even with one of the highest debt ratios globally. In Japan, a considerable domestic investor base, resulted from the accumulation of pension savings and a strong preference for domestic investments. This is linked to the continuous low and steady yields amidst significant national debt (Tokuoka, 2010; Fidora et al., 2006). Tokuoka (2010) identifies several elements that clarifies the comparative steadiness of sovereign bond yields in Japan. These include the propensity of investors towards domestic assets, the significant accumulation of household savings, and the existence of sizeable, steadfast institutional investors.

The analysis of bond yield determinants has led to extensive research, with a particular focus on fiscal variables, especially budget balances. A consensus among researchers exists that budget surpluses tend to inversely relate to interest rates. Caselli and colleagues (1998) conducted a study that discovered that fiscal variables are highly influential in interest rates. In particular, a positive shift in the primary balance correlates with a significant decrease in the expenses related to debt servicing. Laubach (2009) used long-term projections of fiscal variables as independent variable by concentrated on the U.S market. These forecasts were contrasted with five-year-ahead forward rates. “The results indicate that an upward shift of one percentage point in the predicted deficit (% of GDP) results in a 20-29 basis point rise in the 10-year interest rate expected to prevail 5 years from now. Moreover, a one-percentage-point augmentation in the projected debt-to-GDP ratio is associated with a 3-4 basis point increase in the forward rate” (Laubach, 2009). The study conducted by Caporale and Williams (2002) provided evidence supporting the notion that macroeconomic factors influence interest rates.

Moreover, the existing body of literature has initiated efforts to address the non-linear effects of fiscal deterioration, the institutional arrangement of nations, and the spillover effects stemming from global financial markets on bond yields. In their extensive panel study encompassing developed and emerging economies, “Baldacci and Kumar (2010) quantified how fiscal deficits and public debt influence the yields on bonds denominated in dollars. Their research extended beyond just examining the effects on long-term government bond yields; they made an addition to existing studies by exploring the nonlinear impacts. The authors utilized various dependent variables in their analysis, such as the short-term nominal interest rate, CPI inflation, fiscal balance, the square of the gross general government debt, and economic growth rate. Their findings reveal that substantial deficits and debts have a

pronounced negative effect on bond yields, with the extent of this influence subject to various internal and external factors. They identified a direct correlation between increases in both the short-term interest rate and inflation, and higher bond yields. Specifically, their analysis showed that a rise of one percentage point in the fiscal deficit relative to GDP corresponds to an increase of 17 basis points in the yields of nominal dollar-denominated bonds” (Baldacci & Kumar, 2010).

In contrast to the investigation conducted by Baldacci and Kumar (2010) on bond yields, Baldacci, Gupta, and Mati (2011) focused their attention on examining the factors that influence sovereign bond spreads instead. Alongside fiscal variables, they also sought to measure the impact of political variables. Their study's findings reveal that political risk factors significantly contribute to the increase in sovereign spreads. They found that financial markets require an extra premium to offset the risks associated with political turmoil, especially during periods of financial distress when institutional risks are less tolerated. Fiscal elements of the countries also have a notable impact on these spreads. “A country's comprehensive fiscal standing is crucial, as those with substantial deficits and debt are more susceptible to default. Moreover, the results suggest that countries with robust initial fiscal conditions possess more flexibility to widen their deficits” (Ebeke et al., 2015).

Arahuetes and Gomez-Bengoechea (2019) investigate the macroeconomic factors influencing sovereign bond yield spreads within the Eurozone. Their results indicated that the link between sovereign risk and economic basics is shaped by a notable effect of sentiment. Moreover, they found that the influence of this on sovereign risk is particularly heightened in the countries with larger spreads.

Broos and Haan (2012) explored the bond spreads in Euro Area countries in relation to Germany and government debt. Their objective was to examine the influence of foreign ownership on the responsiveness of government bond yields to variations in government indebtedness. To achieve this, they employed the pooled ordinary least squares method. The results revealed a positive correlation between bond spread and a country's debt and deficit. On the other hand, a negative correlation was observed with the short-term interest rate and the square of the deficit and. However, the impact of foreign ownership on bond spread was statistically insignificant in the overall sample. Nevertheless, the authors divided the sample into a subset comprising countries with substantial debt burdens (specifically Greece,

Ireland, Portugal and Spain). In this subset, it was discerned that the incremental effect of debt on spread was positively associated with external ownership of borrowing.

Carvalho and Fidora demonstrated that the increase in foreign ownership of euro area bonds is associated with decrease in long-term rates. Specifically, increase in foreign ownership reduced in euro area long-term interest rates by approximately 1.55 percentage points between the years 2000 and 2006. The results of this study is consistent with earlier research that have documented. Beltran et al. (2012) utilized an instrumental variables approach to estimate the impacts of a decline in foreign official inflows on 5-year Treasury rates both in the short and long-term. According to their results, a monthly decrease of international official inflows by \$100 billion results in approximately 40-60 basis points increase in 5-year Treasury rates in the short run. However, in the case when the shock coming from stop of international official flows, private foreign investors respond to this shock and there is a long-run effect on yields. Unlike prior studies, Beltran et al. (2012) also considered the endogeneity of foreign inflows, which results in a more negative impact on yields.

For emerging markets, Peiris (2010) found that a higher fiscal balance (as % of GDP) increases bond yields. “However, the influence of domestic monetary aggregates and real economic activity is minimal. On the other hand, long-term yields are affected by the changes in policy interest rates and inflationary expectations. In addition, an increased share of foreigners in bond markets lowers long-term yields” (Peiris, 2010).

Baldacci and Kumar (2010) conducted an estimation on a panel data including 31 countries during the period of 1980-2007. They had both advanced and developing countries in their sample. They analyzed the impact of fiscal deficits and public debt. Their findings indicate that when the fiscal position deteriorates, if the country has high public debt and fiscal deficit, this would lead to more significant rises in bond yields.

Marcilly (2010) conducted an analysis on international investors’ share effect on the long-term local currency denominated government bonds. The study covers Indonesia, Thailand, Malaysia, and India. They used Vector Auto Regression (VAR) model. The rationale behind selecting this model was based on the author's hypothesis that both bond yields and the foreign investors’ share are endogenous variables. Among the selected countries, Indonesia exhibited a noteworthy result, indicating that a one percentage rise of

the share of international investors was related with a reduction of 50 basis points in bond yields. This suggests a strong negative relationship between foreign investor participation and yields in the Indonesian context. In the case of India, while there was an observable impact of an increase in the share of foreign investors on bond yields, the effect was less pronounced compared to Indonesia. However, the results were not statistically significant in Indonesia and Malaysia. Notably, the study found that fluctuations in bond yields appeared to influence foreign capital flows in countries where nominal yields were relatively high. However, Malaysia deviated from this pattern, as fluctuations in bond yields did not follow the same trend in this country. Additionally, Granger causality tests were conducted, revealing that the share of foreign investors Granger-caused changes in bond yields in three out of the four Asian countries studied.

Andritzky (2012) conducted an examination of the effects of an increase in foreign inflows on yields. The results confirm that a greater proportion of international investors is correlated with lower bond returns. Through the examination of panel VAR, a surge of 10 percentage points in the stake held by non-domestic individuals results in a decline of yields that fluctuates between 32 to 43 basis points. The model incorporates various control factors, including the short-term rate, the growth of real GDP, the ratio of government debt to GDP, and the budget deficit. Nevertheless, commonly utilized control factors, such as the aggregate amount of outstanding debt, inflation, exchange rates, and the VIX, were discovered to have no significance. The study also provides evidence that the presence of non-resident investors leads to an increase in volatility. Furthermore, it is found that lower yields are linked to domestic institutional investors, but not linked to public sector investment. Andritzky's analysis suggests that in G20 advanced economies, if international investors share increases by one percentage point, the bond yields is reduced by 4 basis points. However, studies focusing on EM face limitations due to the lack of consistent data.

Ebeke and Lu (2014) demonstrated that increase in foreigners' share of local currency government bonds in a sample of ten emerging countries resulted in decrease in bond yields. However, in the post-crisis period, particularly for those countries with weak fiscal and external positions, yield volatility has increased with the rise in foreigners' share. The authors conclude that when global liquidity is abundant, foreign flows lead to lower yields regardless of the countries' fundamentals.

In a study conducted by Peiris “during the post-Lehman period, spanning from 2000 to 2010, the research findings indicated that the effects of foreign participation in government bond markets became slightly more pronounced after the global financial crisis. Specifically, the study revealed that a one percentage point increase in foreign participation was associated with a reduction in bond yields of approximately 7 to 9 basis points” (Peiris, 2010). This observation aligns with the broader trend seen in Ebeke and Lu's (2014) research, which also highlighted the impact of foreign holdings on bond yields in emerging market countries during the post-crisis period.

Arslanalp and Poghosyan's (2014) research, which employed quarterly data from 22 advanced economies, categorized the investor base into two groups: foreign official and private investors. “The key finding of their study was that an increase in the proportion of government debt held by foreigners had a statistically significant effect on reducing long-term sovereign bond yields. According to the study, a one percentage point rise of general government debt held by foreigners can account up to 10 basis point reduction in 10-year bond yields. The analysis is conducted using panel fixed effects regressions” (Arslanalp and Poghosyan, 2014).

Jaramillo and Weber's (2012) study focused on the significant role played by “fiscal variables, particularly their non-linear interaction with global risk aversion, in shaping domestic bond yields in emerging markets” (Jaramillo & Weber, 2012). Their research findings unveiled a notable pattern: investors displayed increased responsiveness to a country's fiscal sustainability when global risk aversion levels were elevated. During periods of heightened global risk aversion, fiscal variables assumed greater importance in determining domestic bond yields.

Furthermore, apart from fiscal variables, the currency structure in the bond markets also affects international investors' interest. Burger and Warnock's (2004) study focused on the participation of “foreign investors in both private and public domestic currency bond markets. They conducted an analysis to explore the factors associated with “the development of local-currency bond markets” and to assess the extent to which countries attract foreign participation in these markets. Countries with a more favorable inflation history and stronger legal institutions tend to have more developed local bond markets, which is seen as conducive to the growth and maturity of domestic currency bond markets” (Burger & Warnock, 2004). In such countries with well-established local bond markets, the reliance on

foreign-currency-denominated bonds tends to be lower. This suggests that a robust domestic bond market can reduce the need for borrowing in foreign currencies. In the United States, foreign investors tended to avoid domestic currency bonds that had a historical track record of high variance in returns and negative skewness. The examination of how global factors impact financing costs in emerging economies has also involved the analysis of the factors contributing to sovereign foreign currency spreads. The yields have been found to be impacted by global risk aversion and the state of global liquidity.

Baldacci and Kumar (2010) discovered that elevated VIX index level (indicator of high financial distress) along with rising inflation, negative global liquidity trends, and fiscal weakening, influence domestic bond yields. They used a predetermined VIX threshold in their study. Conversely, Jaramillo and Weber (2013) established a VIX threshold intrinsically through maximum likelihood estimation. Their research showed that during heightened risk aversion, fiscal elements are pivotal in shaping spreads, while macroeconomic factors play a significant role during periods of diminished risk aversion. Nonetheless, the impact of foreign ownership on yields remains insignificant across both risk regimes.

Furthering this exploration, Jaramillo and Zhang (2013) “demonstrated that the notable effects of government securities’ ownership structures on borrowing costs” (Jaramillo & Zhang, 2013). Their findings highlight the stability provided by “buy and hold” investors, like national and foreign central banks, in the demand for government debt. This stability is instrumental in decreasing the yields and volatility of sovereign bonds, as evidenced through panel data analysis spanning 13 emerging markets and 30 advanced economies from 2000 to 2012.

“Dell’Erba, Hausmann, and Panizza (2013) conducted an analysis on the influence of debt composition on bond spreads across emerging markets. Their analysis suggests that an increased share of foreign debt correlates with higher spreads in these regions. However, the introduction of an interaction term involving debt composition and the total debt level diminishes this correlation's significance” (Dell’Erba, et. all ,2013).

Lastly, Ho (2019) delved into the connection between international investors’ share and yield spreads of local currency government bonds in emerging Asian countries. The study concludes that a positive correlation exists between foreign holdings and yield spreads,

particularly when foreign holdings exceed around 13%, considering the expectations of foreign exchange rates. Collectively, the existing research presents a diverse range of findings on the relative influence of local and international factors in determining government bond yields.

The latest research underscores the relationship between foreign investor participation and the stability of emerging Asian bond markets. Beirne, Renzhi, and Volz (2021) investigate the effects of local currency bond market development and foreign investor participation on capital flow volatility in emerging Asian economies, finding that bond market development mitigates capital flow volatility, while foreign investor participation increases it, especially in less developed markets. Ho (2022) and Chernov, Creal, and Hördahl (2023) extend this analysis, examining the benefits and risks of foreign participation in bond markets and the influence of local variables on sovereign credit and exchange rate risks, respectively. Ho (2022) further explores the dual role of foreign participation in emerging Asia's bond markets, highlighting both stability benefits and potential volatility pitfalls. Chernov, Creal, and Hördahl (2023) delve into sovereign credit and exchange rate risks within Asia-Pacific local currency bonds, demonstrating significant impacts of local variables on these risks and the resultant investment implications.

2.2. Review of Literature on the Role of Macroeconomic News

In the literature, significant attention has been dedicated to the influence of macroeconomic news releases in different categories of assets, such as equities, fixed income securities, and foreign exchange markets. In order to comprehend market behavior and the responses of investors, it is important to grasp the correlation between macroeconomic news and the dynamics of the bond market. The examination of the effect of macroeconomic news on bond price levels and the volatility of bond returns has been conducted in various studies. This research primarily emphasized developed economies, including but not limited to the Euro Area, Japan, the United Kingdom, and the United States.

Initial research on macroeconomic news impact on bond markets mainly used daily data. These studies provided foundational insights into how bond prices and their volatility responded to macroeconomic announcements. Early research explained the relationship between U.S. bond market, monetary supply, and macroeconomic news (Cornell (1983),

Urich and Wachtel (1984)). These early studies made clear the significant responses of bond yields to unexpected monetary news and specific types of macroeconomic news, such as trade deficits and domestic inflation. The emphasis was on daily data in these early studies and this laid the foundation for subsequent research by establishing key relationships that would guide future methodological advancements.

Research on the effects of various macroeconomic news types on U.S. bond markets have yielded diverse outcomes. Studies have examined the reaction of bond markets to monetary policy announcements, economic growth data, inflation reports, and employment figures. Goldberg and Leonard (2003) focused on how unexpected Federal funds rate changes influenced U.S. bond yields, finding a negative correlation with higher-than-expected rates. “The negative sign could suggest the degree to which expectations about monetary policy are already incorporated into financial asset prices. This also indicates that the market might not react significantly to actual rate surprises but they rather react to the elimination of uncertainty about the decisions” (Goldberg & Leonard, 2003). The qualitative aspects of the policy communication, such as the tone and the perceived economic risks, are also critical to market participants. “Fleming and Piazzesi (2005) contended that the response of long-term yields to unexpected monetary policy shifts varies with the prevailing economic conditions, specifically noting that bond yields turn negative when the yield curve is notably steep” (Fleming & Piazzesi, 2005). Baily et al. (1998) examined U.S. announcements of employment and produce prices, noting a transitory increase in returns on announcement days. The paper referred to the “calm before the storm” effect, as it is observed that financial markets exhibit particularly low trading activity preceding these announcements. The results of this paper show that the excess returns increase on announcement days, but this increase is purely transitory. The results also indicate that the announcement shocks do not affect volatility in the days following the announcements.

The evolution in research methodologies marked a significant transition from daily data to intraday data analysis. This shift allowed for a more granular understanding of market reactions to news. Different categories of data releases have been tested, including but not limited to inflation, employment, consumption, investment, trade, and Gross Domestic Product. Early investigations, such as conducted by Li and Engle (1998) used a dummy variable to for announcements days. Christiansen (2000) also applied similar dummy variable approach on bond futures.

The dummy variable approach revisited and advanced by examining a wider range of macro announcements and their immediate impact on bond market volatility, particularly focusing on U.S. Treasury bond futures contracts. Andersen et al. (2005) analyzed the immediate impact of macroeconomic announcements on 30-year U.S. Treasury bond futures, finding significant effects. Similarly, Balduzzi et al. (2001) identified significant impacts from 16 out of 26 data releases on 10-year maturities and 11 on 30-year maturities. Christie-David et al. (2003) used intraday data to investigate the effects of unexpected macroeconomic information on interest rate futures performance. The researchers developed a framework for classifying the impact of these surprises on debt markets. Furthermore, they categorized the surprises based on their magnitude, classifying them as either small, medium and large. Consequently, the surprises were identified as positive, negative, or lacking surprise.

“Altavilla, Giannone, and Modugno (2017) developed a two-step regression technique to utilize high-frequency market response data in determining the impact of macroeconomic releases and quantifying effects at lower frequencies. Their findings indicate that while macroeconomic surprises explain only a fraction of daily fluctuations in bond yields, their explanatory power significantly increases over longer periods, shedding light on the lasting effects of macroeconomic surprises compared to other factors” (Altavilla, Giannone, and Modugno, 2017).

The impact of news on bond markets varies across different regions. Studies like those conducted in the U.S. and Euro area show distinct market reactions. Fleming and Remolona (1997) discovered following the dissemination of FOMC statement releases in 1994, there is a noteworthy escalation in intraday volatility within the US bond market. Kuttner (2001) and “Ehrmann and Fratzscher (2002) examined the significant impacts of unexpected monetary policy actions and macroeconomic announcements on bond yields in the U.S. and the Euro Area over various bond maturities” (Ehrmann and Fratzscher, 2002). This investigation focused on the daily fluctuations of short-term rates in both regions. The response of the Euro Area rates to data releases from the United States was stronger compared to the reaction of the United States rates to Euro Area announcements.

Andritzky et al. (2007) studied U.S. macroeconomic news and developing country dollar-denominated bonds, analyzing a variety of macroeconomic announcements and their effects on daily bond spreads. The study focused on 12 emerging market countries and

analyzed data from the period of 1998 to 2004. “The impact of macroeconomic announcements on bond spreads analyzed in the study are fiscal and growth indicators, policy rate changes, sovereign rating decisions. Initially, authors employed ANOVA tests to compare the mean and variance of the daily spread changes on announcement days versus non-announcement days” (Andritzky et al., 2007). Subsequently, they conducted OLS regressions using dummy variables for each country as independent variables and also utilized a dynamic panel regression model to generalize their findings for the whole sample. Their research showed that global bond spreads exhibited greater sensitivity to rating actions and fluctuations in interest rates compared to responses to domestic data and policy announcements. Their conclusion was that the news did have an impact, primarily by reducing conditional volatility. This decrease in volatility can be attributed to the reduction of uncertainty resulting from the announcements. It is crucial to acknowledge that these conclusions are likely specific to the sovereign risk market of emerging nations. This market is often characterized by higher volatility, and the accessibility of relevant information can pose challenges in comparison to more established markets. In emerging countries, announcements serve as an opportunity to validate one's opinion. On the other hand, in developed countries with readily accessible information on sovereign risk, scheduled announcements introduce an additional element of risk. Studies focusing on the U.S. market often show a positive impact on volatility, dissected into two distinct factors. Andersen et al. (2005) found that long-term U.S. Treasury bond (30 year) volatility notably increases following unexpected interest rate changes by the Fed Meeting. “The euro area, the volatility after the ECB Governing Council was also examined. Ehrmann and Fratzscher (2002) and Bernoth and von Hagen (2003)’s investigations” (Ehrmann et. all, 2002 and Bernoth, et all 2003) involved an examination of rate volatility employing daily data subsequent to the release of Governing Council statements. The findings from both studies indicate that on the days of these meetings, there is a notable increase in volatility.

The reaction to macroeconomic news shows variation not only based on the content of the information, but also based on the economic stage. According to Ozatay et al. (2009), market players could interpret positive figures of inflation as a sign of overheating in the economy. “In their study on emerging market bonds, they have confirmed that the response of bond yields to macroeconomic news from the United States is significantly different in

such that the decrease in spreads following positive news is often nullified or even reversed in the case of a positive inflation gap” (Ozatay, 2009).

Beetsma, Giuliodori, de Jong, & Widijanto (2013) conducted a study to observe the impact of "news" on the interest spreads of domestic markets compared to Germany, as during the European debt crisis period. The study distinguished between the countries that experienced financial turmoil and debt crisis (Greece, Ireland, Italy, Portugal, and Spain-GIIPS) countries and other European countries. During the recent crisis, there was a discernible difference in the impact of news on GIIPS countries compared to other European nations. The study highlighted that increased news coverage generally led to a rise in domestic interest spreads in GIIPS countries and subsequently in other GIIPS nations. The transmission of negative news from GIIPS to non-GIIPS countries was also noted, though with a smaller magnitude.

Andersen et al. (2007) and Fang et al. (2008) examined the different effects of unexpected macroeconomic news on bond returns. They specifically focused on the impact of inflationary shocks and business cycles. In their study, Fang et al. (2008) identified the inflection points of Australian GDP and divided their dataset into periods of economic growth and decline. They found that bond returns are highly sensitive to unexpected inflation, with a significant increase of 11.38% in bond returns for every one standard deviation change in unanticipated CPI. However, they observed no substantial effect on bond returns during economic decline. They also noted that other unanticipated macroeconomic factors lose significance during economic decline. In contrast, in Andersen's research treasury bonds tend to experience a rise in yield in response to inflationary shocks, a trend observed irrespective of the phase of economic cycle.

Nowak et al. (2011) discussed the asymmetric nature of market reactions to macroeconomic news, particularly bad news. They proposed reasons like volatility feedback, irrationality in agents' responses, and asymmetrical reactions by policymakers. Market participants are expected to closely monitor macroeconomic data releases that are associated with the sustainability of sovereign debt. Certain researchers examine the impact of the mere existence of an announcement. Nevertheless, it seems that markets respond not just to the data releases themselves, but also to the unforeseen element of these releases.

Bartolini et al. (2008) further explored the impact of fresh economic data announcements on asset valuations in equities, fixed-income securities, and foreign exchange markets. They found that only a limited number of announcements, such as nonfarm payroll figures, advanced GDP release, and a private sector manufacturing report, lead to economically significant and measurable price reactions over time. Among these markets, bond yields show the most pronounced response, while stock prices exhibit the weakest reaction. The authors' analysis suggests that news of stronger-than-anticipated growth and inflation typically leads to an increase in bond yields.

Research by Arshanapalli et al. (2006) focused on the distinctive impact of announcement days, illustrating that market responses are shaped not only by the content of the announcements but also by their unexpected elements. They associated the elevated risk and returns on these days with the likelihood of new information surfacing.

Similarly, Savor and Wilson (2013) detected a potential uptick in the risk premiums of stocks and long-term bonds on days when announcements were made. Importantly, this increase could manifest even in situations where overall market volatility remains relatively stable, depending on specific circumstances. This surge in risk premia is attributed to investors bearing the uncertainty of potentially unfavorable economic performance revelations. Their extensive studies support the notion that US Treasury bondholders receive compensation for this risk. Additionally, Savor and Wilson (2013) found that returns on 10-year Treasury bonds are notably higher on announcement days compared to other days. Dicke and Hess (2012) also observed that long-term bond returns are significantly magnified, being around 2.7 times greater on announcement days.

Studies conducted by Ismailescu and Kazemi (2010), Afonso et al. (2012), and others focused on examining the impact of rating agency announcements on market dynamics. They highlighted the immediate spillover effects of positive and negative ratings on sovereign CDS markets and bond returns. explored the effects of rating agency announcements. The first study examined the response of the Credit Default Swap (CDS) market in emerging economies. It specifically concentrated on the immediate consequences of favorable credit ratings and their possible influences on other sovereign CDS markets. In contrast, Afonso et al. (2012) directed their study towards advanced economies, uncovering pronounced market responses.

Demiralp and Yılmaz (2010) explored the international dimension and policy implications of macroeconomic announcements, examining the responses of different sectors to IMF and EU policy announcements, as well as the effects of monetary policy decisions on capital markets. They observed that different sectors responded differently to announcements made by international organizations such as the IMF and the EU. Secondly, their study revealed that monetary policy decisions had discernible effects on capital markets.

In their analysis, Gogstad et al. (2018) examined the consequences of policy declarations issued by the International Monetary Fund (IMF) and different European Union (EU) entities during the fiscal crisis in Greece. Additionally, they evaluated the reactions of these sectors towards Rating Agencies as well as the active participation of the Greek government and public. Their findings indicate that the financial sectors respond more strongly to announcements from international institutions and the Greek government compared to the real sectors. Specifically, the banking industry showed the most significant immediate reaction, with abnormal negative returns exceeding 1.5% per day in response to EU office and troika policy announcements. Moreover, public unrest following unfavorable EU announcements led to substantial declines in the banking and financial sectors. Interestingly, the study found that positive impacts from international organization announcements could be negated by adverse public reactions and the local government's negative responses

Büchel (2013), explored the impact of political statements and other forms of public communication on sovereign bond spreads. The research primarily relied on news agency reports to validate the substantial influence of these factors on the pricing of sovereign bonds. This suggests that political developments and public messaging play a crucial role in determining the borrowing costs of governments in the bond market. Similarly, Mohl and Sondermann (2013) conducted a study that also investigated the effect of political statements and public communications on sovereign bond spreads. Similar to Büchel's research, they used news agency reports as a key source of data. Their findings affirmed that political rhetoric and public announcements have a notable impact on sovereign bond spreads. This highlights the importance of non-economic factors in shaping financial markets, particularly in the realm of government bonds.

Demiralp and Yılmaz (2010) explored the impact of the Central Bank of Türkiye's policy decisions on capital markets between 2002 and 2009. Their findings support the efficient market hypothesis, suggesting that the bond market anticipates and reacts to expected policy actions before the actual announcements. Additionally, Abad and Chulia examined the responses of bond markets to monetary policy shocks in the Euro Area and the US. They focused on the impact of unexpected interest rate changes by the European Central Bank and the Federal Open Market Committee, using data from the 20-year JPMorgan Government Global Bond Index. The study revealed that ECB policy surprises have different effects on old versus new European Union member states, while Federal Open Market Committee policy surprises affect Euro Monetary Union (EMU) and non-EMU members differently.

Recent research by Moench and Soofi-Siavash (2022), De Pooter et al. (2021), and Consoli et al. (2021) collectively underscores the intricate interplay between market perceptions, policy dynamics, and emotional responses in shaping Treasury yields and bond market volatility. These studies highlight the significant impact of yield news shocks, the role of monetary policy uncertainty, and the influence of emotions extracted from macroeconomic news on sovereign bond yield spreads, offering deep insights into the factors driving bond market behavior. Moench and Soofi-Siavash (2022) identify yield news shocks as innovations that explain a significant portion of future Treasury yield variations, highlighting the role of these shocks in affecting real activity and inflation, as accommodated by the Federal Reserve. De Pooter, Favara, Modugno, and Wu (2021) find that yields respond more pronouncedly to monetary policy shocks under low monetary policy uncertainty, influenced by investor adjustments. Consoli, Tiozzo Pezzoli, and Tosetti (2021) demonstrate that emotions from macroeconomic news significantly impact sovereign bond yield spreads in Italy and Spain, with negative emotions improving forecasting power during distressed periods.

3. METHODOLOGY

This chapter is meticulously divided into two subsections, each will address the analytical frameworks and econometric models employed to answer the respective research questions. In section 3.1, Methodology for the first research question, explains the Dynamic Threshold Panel Model to examine how foreign investment and global risk attitudes influence bond yields in emerging markets, detailing variables and thresholds integral to this analysis. Section 3.2, Methodology for the second research question, outlines the econometric models, i.e. Generalized Autoregressive Conditional Heteroskedasticity (GARCH) to analyze the influence of macroeconomic announcements and risk appetites on Türkiye's bond market dynamics.

3.1. Dynamic Panel Threshold Method

The work of Jaramillo and Weber (2013) will be expanded by using a dynamic threshold model that uses foreign ownership as a second threshold variable. The analysis will also show whether the share of foreign ownership's effect on bond yields is non-linear with respect to itself. It will also show whether the effect of the share of foreign ownership on bond yields depends on market risk appetite, and the relationship between the debt/GDP and GDP growth is connected to with the share of foreign ownership and to the level of market risk appetite.

The dynamic threshold regression model proposed by Proano et al. (2014) is used:

$$y_{it} = \mu_i + z_{it}\alpha + x_{it}\beta^L I(q_{it} \leq \gamma) + (x_{it}\beta^L + \delta^H)I(q_{it} > \gamma) + \varepsilon_{it} \quad (1)$$

“In the above model: i ranges from 1 to N represents the country-index and t ranges from 1 to T refers to the time index. Each country has a unique fixed effect, represented by μ_i , ε_{it} is country-specific random disturbance which is independently and identically distributed with zero mean and a variance σ^2 . The vector z_{it} contains both endogenous and exogenous explanatory variables that are regime independent. The function $I(\bullet)$ is an indicator that takes on the value of one if its internal condition is met and zero otherwise. Additionally, q_{it} represents the threshold variable with γ threshold level; x_{it} is an m -dimensional exogenous

variable and δ is the difference between the intercept in regime L and the intercept in regime H” (Proano et al, 2014).

In the estimation procedure, first step is removing individual effects μ_i through a fixed-effects transformation. “However, this standard approach can lead to inconsistent estimates in this model due to the correlation between the lagged dependent variable and the mean of individual errors, which consequently correlates with all transformed individual errors” (Hansen, 1999). To overcome this, the “forward orthogonal deviations transformation proposed by Arellano and Bover (1995), which subtracts the average of all future observations from each observation, thereby averting the serial correlation issue in the transformed error terms” is used (Proano et al, 2014).

“Caner and Hansen (2004) introduced an IV-estimator for the threshold model that utilizes lags of endogenous regressors as instruments to address endogenous covariates. Kremer et al. (2013) expanded this methodology for panel data through the application of forward orthogonal deviations. Proano et al. (2014) furthered this by considering two threshold variables and four regimes, applying forward orthogonal deviations to the variables” (Proano et al, 2014).

In the panel data analysis, this transformation to all variables except the threshold ones to eliminate country-specific fixed effects will be applied. Subsequently, all endogenous variables are regressed on a complete set of instruments, replacing them with the fitted values for given threshold values. This process is reiterated for all possible threshold realizations. Threshold values are then determined based on the smallest sum of squared residuals, and the estimated threshold value is evaluated using a likelihood ratio test. Finally, using the selected threshold value, slope coefficients are estimated through the generalized method of moments. This comprehensive approach ensures the elimination of correlation issues and robustness in standard errors and test statistics.

3.2. Event Study Method

In the literature, methodologies started as event studies examining announcements' effect on asset prices. Concerning the modeling of announcements, using dummy variables was the conventional approach. This method has advanced to include the surprise within the

news relying on market survey expectations. A similar method by considering the announcement's surprise content using median survey data from Bloomberg as market expectation will be used. The conventional methodology applied in previous research will be utilized. In the below equation, F_i denotes the survey median, and the actual value of announcement i is denoted as A_i . The degree of surprise in announcement i is quantified using the following method:

$$E_i = A_i - F_i \quad (2)$$

1. To normalize the varied units of measurement across economic variables, each surprise is calculated as a ratio to its standard deviation over all observations. This method ensures the impacts of different announcements are comparable. Hence, standardized surprise measure defined as:

$$S_{i,t} = (A_{i,t} - F_{i,t}) / \sigma_i \quad (3)$$

3.2.1. Methodologies for Event Studies

In this part, the influence of macroeconomic news surprises and market risk appetite on the yield and volatility of Turkish local currency government bonds across various maturities will be analyzed. Prior to the estimation of proposed models, the data will be examined to ensure stationarity and unbiasedness and applied necessary transformations where required. Four distinct analytical frameworks will be developed and the specifics of these approaches are elaborated on in the remaining of this section.

(1) Response of Bond Yields to Macroeconomic Surprises

The impact of individual macroeconomic announcement surprises on the daily change in 2-year, 5-year and 10-year government bond yields initially be analyzed. The analysis is conducted through for each macroeconomic surprise (i) separately. This separated approach ensures a detailed examination of the unique effects of distinct economic indicators on bond yields. A linear regression framework will be employed, specified as:

$$R_t = \alpha_{0,i} + \beta_{1,i} * S_{i,t} + \varepsilon_{i,t} \quad (4)$$

- R_t represents the percentage change in the bond interest rate between the closing price

on day t and the previous day $t-1$,

- $S_{i,t}$ is the standardized surprise measure for the i^{th} macroeconomic announcement at time t , reflecting the degree to which the actual announcement deviates from market expectations defined in equation (3.4),
- $\alpha_{0,i}$ is the time-invariant intercept for each surprise, $\varepsilon_{i,t}$ is the error term, capturing the unexplained variance.

(2) Response of Bond Yields to Macroeconomic Surprises and Variations in Risk Appetite

In the second model, both macroeconomic news surprises and the market's risk appetite into the analysis will be incorporated. This model provides a more comprehensive understanding of the bond yield movements to news announcement by taking into account the situation where market sentiment is volatile. In this approach, the responsiveness of bond yields to economic news is not static but varies with the risk sentiment, as reflected in the Risk State variable.

Risk State dummy variable that reflects the market's risk appetite, primarily determined by the VIX index will be included. This variable takes a value of 1 on high-risk days, defined as days when the VIX is above 20, indicating heightened market volatility and uncertainty. Conversely, it takes a value of 0 on days when the VIX is below 20, suggesting lower market risk. Additionally, to account for specific geopolitical disturbances, the Risk State also takes a value of 1 on days when there is a local terror event, marking it as a high-risk day irrespective of the VIX value. This ensures a comprehensive capture of market sentiment and local geopolitical risk.

In addition, interaction term ($S_{i,t} * RiskState_t$), which allows the effect of a macroeconomic surprise on bond yields to be different on days classified as high-risk compared to days classified as low-risk, will be added to the analysis. Consequently, model 2 is formulated as:

$$R_t = \alpha_{0,i} + \beta_{1,i} * S_{i,t} + \beta_2 * RiskState_t + \beta_{3,i} * (S_{i,t} * RiskState_t) + \varepsilon_{i,t} \quad (5)$$

- R_t represents the percentage change in the bond interest rate between the closing price on day t and the previous day $t-1$,

- $S_{i,t}$ is the standardized surprise measure for the i^{th} macroeconomic announcement at time t , reflecting the degree to which the actual announcement deviates from market expectations defined in equation (3),
- $\alpha_{0,i}$ is the time-invariant intercept independent of macroeconomic surprises and risk conditions., $\varepsilon_{i,t}$ is the error term, capturing the unexplained variance.

(3) Joint Analysis of Macroeconomic Surprises

The impact of macroeconomic surprises simultaneously on bond returns will be modelled using ordinary least squares method. Dummy variables, such as risk appetite and political risk events, will be included:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \sum \beta_i S_{i,t} + \gamma * \text{RiskState}_t + \varepsilon_t \quad (6)$$

Here R_t , $S_{i,t}$, Risk State have the same definition as previously.

(4) Bond Yield Volatility: Conditional GARCH

The effect of macroeconomic surprises extends beyond the immediate reactions in bond yields; it also potentially affects the conditional volatility. Hence, in this model the aim is to analyze how specific macroeconomic surprises simultaneously affect the returns and volatility of asset prices by employing conditional variance GARCH (1, 1) framework. In this model, macroeconomic surprise variables also enter the variance equation. This allows us to analyze the effect of macroeconomic surprises both mean and variance (volatility) of bond yields over time.

Mean equation:

$$R_t = \alpha_0 + \alpha_1 R_{t-1} + \sum \beta_i S_{i,t} + \gamma * \text{RiskState}_t + \varepsilon_t \quad (7)$$

Variance equation:

$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1} + \sum \delta_i S_{i,t}^2 \quad (8)$$

Here R_t , $S_{i,t}$, RiskState_t have the same definition as in the previous sections. h_t is the conditional variance of bond yield returns modeled in the GARCH (1,1) framework. ω , α , β are parameters of the GARCH (1,1) variance equation, reflecting the baseline variance, impact of past shocks, and persistence of volatility, respectively.

4. THE DYNAMICS OF FOREIGN PARTICIPATION AND RISK APPETITE ON EMERGING MARKET BOND YIELDS: EMPIRICAL ANALYSIS AND RESULTS

This chapter analyzes the relationship between foreign participation and global risk appetite on government bond yields in emerging markets. The section examines data patterns and correlations to understand the impact of international investor behavior on the financial stability of emerging economies. The chapter aims to provide insightful conclusions for the broader discourse on global finance and its implications for developing nations.

4.1. Data Analysis and Sources

The period up to the increase in interest rates by the Federal Reserve in December 2015, which marks a shift in global liquidity conditions. when the global liquidity is abundant. FED's announcement will be analyzed. An unbalanced panel dataset comprising quarterly observations from 2007 to 2015 for 19 emerging market countries will be used: Brazil, Bulgaria, Chile, China, Colombia, Hungary, India, Indonesia, Latvia, Lithuania, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, Thailand, and Türkiye.

Macroeconomic variables in this study include the expectation of one-year ahead real GDP growth and public debt as a percentage of GDP. For macroeconomic variables: real GDP growth expectation (one-year ahead) and debt (% of GDP) are used as independent macroeconomic indicators. Expectations for these macroeconomic variables are derived from two distinct sources: surveys among economists provided by the Eikon Datastream. The dependent variable is real government bond yields with 10-year maturity (if not available, the longest maturity) and obtained from the Eikon Datastream. The nominal government bond yields are sourced from Bloomberg, with real rates calculated by adjusting for actual inflation during the respective periods

Summary statistics of the panel dataset presented in Table 1 shows the disparities among the economic indicators for the 19 countries. The range in 10-year bond yields reflects significant divergence in borrowing costs. Similarly, divergence in the debt-to-GDP

ratios reflects differing stages of economic development. Also, the negative skewness in real GDP growth expectations highlights the presence of downturns in some countries or in some periods.

Table 1

Summary Statistics

	Bond Yield	GDP Growth Expectation	Inflation Expectation	Debt /GDP	Budget Balance /GDP	Debt/GDP
Observations	612	612	612	612	612	612
Countries	19	19	19	19	19	19
Mean	0.07	0.04	0.04	0.35	-0.02	0.07
Max	0.17	0.15	0.11	0.81	0.12	0.17
Min	0.01	-0.17	-0.03	0.04	-0.17	0.01
Standard Deviation	2.5	4.2	1.7	18.2	4.4	2.5
Skewness	0.6	-1.0	0.7	0.4	-0.1	0.6
Kurtosis	3.4	5.9	4.5	2.6	3.7	3.4

4.1.1. Threshold Variables

Threshold variables are Foreign Ownership (% of local currency government bonds) and the VIX index as the indicator of global risk aversion.

Table 2*Threshold Variables*

	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis
Foreign Ownership	0.36	0.81	0.01	0.20	-0.17	1.99
VIX	20.9	56.8	10.7	8.6	2.0	8.1

The VIX index is collected from Bloomberg and is measure of market risk. Since high VIX value typically indicates higher market volatility and a preference for risk aversion among investors, prompts them seek safer assets like government bonds. This "flight to quality" could result in lower bond yields due to increased demand. Instead, a low VIX implies that investors might favor higher-return or higher risk assets and this could lead to higher bond yields due to reduced demand for government bonds.

Foreign ownership of government bonds is collected from IMF database and it is the share of a country's government bonds held by foreign investors. When foreign ownership increases, it often results in a lowering of bond yields due to the increased demand. However, very high levels of foreign ownership could also introduce risks, such as increased sensitivity to global financial shocks, potential capital flight, and currency volatility, which can in turn affect bond yields.

The concept of a threshold level for both VIX and foreign ownership is grounded in the notion that their relationship with bond yields is non-linear. For the VIX, there could be a certain level above which the market's risk aversion is high that further increases in VIX do not lead to larger drops in bond yields. Below this threshold, the impact of changes in the VIX on yields could be more pronounced. Similarly, for foreign ownership, there might be a threshold point. Up to a certain level, increases in foreign ownership can compress bond yields, but beyond this level, the benefits may plateau or even reverse due to the risks associated with over-reliance on foreign investment. This could lead to a threshold beyond which additional foreign ownership does not significantly affect yields.

In both cases, the threshold signifies a tipping point where the incremental influence of changes in these factors on bond yields diminishes, which could be due to market

saturation, regulatory limits, risk perceptions, or other economic mechanisms. Identifying these thresholds is significant for policymakers and investors in order to gain better understanding of the dynamics of bond markets and to gauge the potential risks associated with excessive market volatility or foreign ownership.

Table 3

Threshold model with multiple threshold variables

	Y (Foreign Ownership)	
Low risk appetite, high foreign ownership	High risk appetite, high foreign ownership	
Low risk appetite, low foreign ownership	High risk appetite, low foreign ownership	X (Risk Appetite)

4.2. Empirical Results

This section embarks on an empirical investigation into the hypothesis that a specific threshold level of foreign ownership significantly influences long-term bond yields. This analysis unfolds in three distinct stages:

1. **Foreign Ownership as a Threshold Variable:** The analysis begins by examining the direct impact of foreign ownership levels on bond yields, positioning foreign ownership as the pivotal threshold variable signaling varying market behaviors.
2. **Global Risk Aversion and Foreign Ownership Interaction:** The investigation progresses by considering global risk aversion as an alternative threshold variable, analyzing its interplay with foreign ownership levels in affecting bond yields. This step is crucial for understanding the conditional impacts of global sentiments.
3. **Dual Threshold Variables Analysis:** The final stage integrates both foreign ownership and global risk aversion as threshold variables, intricately exploring their

simultaneous influence on bond yield fluctuations, with an emphasis on the specific role of foreign ownership within diverse risk aversion regimes.

4.2.1. Analyzing the Role of Foreign Ownership as a Determinant and Regime-Specific Factor in Bond Yield Dynamics

Several analyses are conducted to explore the existence of a threshold level in foreign ownership that affects long-term bond yields significantly. The investigation focuses on identifying a point at which foreign ownership's impact on lowering real bond yields starts to wane. The model estimated uses foreign ownership as a threshold variable, aiming to discern at what level its influence changes, providing insights into the dynamics between foreign investment and bond market behavior.

$$y_{it} = \mu_i + \alpha_y y_{i,t-1} + \alpha_n n_{it} + \beta_f^L f_{it} I(f_{it} \leq \gamma_f) + (\beta_f^H f_{it} + \delta^H) I(f_{it} > \gamma_f) + \varepsilon_{it} \quad (9)$$

where y_{it} is 10-year real bond yield, $y_{i,t-1}$ is lagged dependent variable, n_{it} is real GDP growth expectation, and f_{it} is foreign ownership (% of total local currency government bonds). Given the endogeneity of the lagged dependent variable $y_{i,t-1}$, its lags are used as instruments following the application of orthogonal forward transformation to the regressors. The model assumes both regime independent regressor n_{it} and regime dependent f_{it} are exogenous.

Results are shown in Table 4, titled the panel dynamic threshold GMM estimation results with the foreign ownership (both threshold variable and regime dependent regressor) and GDP growth. The coefficients for both the lagged bond yield and the real GDP growth expectation are significant, conforming to theoretical expectations. The coefficient for $y_{i,t-1}$ and real GDP growth rate expectation (n_{it}) are statistically significant and as expected.

Table 4

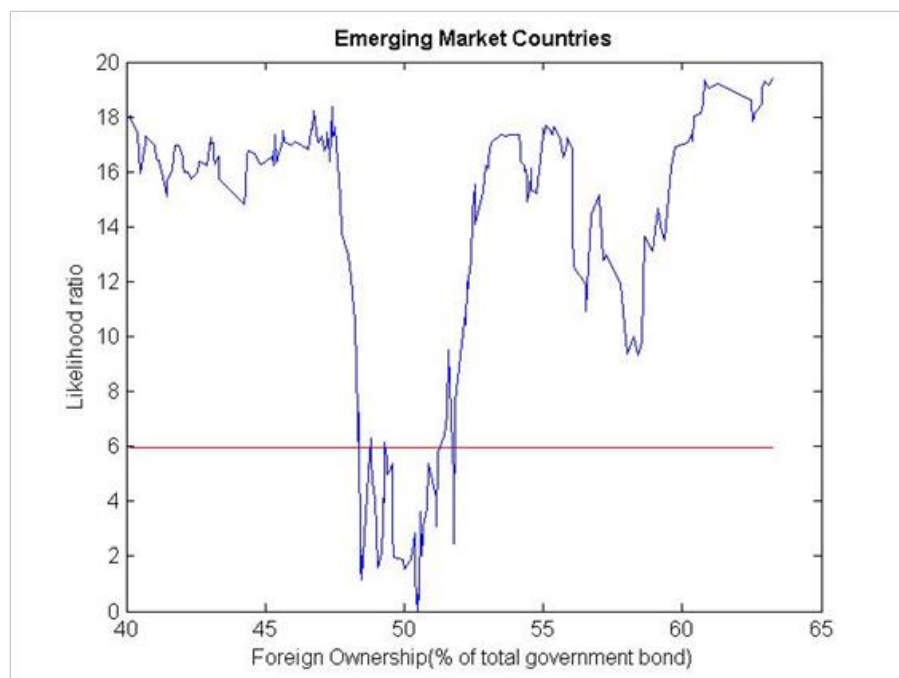
The panel dynamic threshold GMM estimation results with the foreign ownership (both threshold variable and regime dependent regressor) and GDP growth

Foreign Ownership (%)	# of Observations in Regime	# of Observations in Regime	Lagged 10-year real bond yield	Real GDP growth expectation	L Regime dependent regressor	H Regime dependent regressor
Threshold γ_f	L	H	α_y	α_n	β_f^L	β_f^H
50.5	352	188	0.87*	-0.27*	-0.002	-0.03
[40.1, 63.2]			(0.03)	(0.06)	(0.011)	(0.02)

*Standard errors are presented in parenthesis, with significance levels denoted by *, **, and *** denote the level of significance at 0.01%, 0.05% and 0.1%, respectively and the interval of feasible threshold values in parenthesis.*

Figure 4

Likelihood Ratio Analysis of Foreign Ownership Threshold Values (Table 4)



The primary focus lies on the regime-dependent variable, foreign ownership. The estimated threshold is 50.5%. Figure 1 plots the likelihood ratio for different values of the threshold ratio. Below the critical value, plotted as a line, the null hypothesis that the true threshold value is equal to γ_f for the 95% confidence level cannot be rejected.

To augment the analysis, the Debt/GDP ratio, denoted as x_{it} , is incorporated as an additional independent variable into the threshold model (equation 3). This addition aims to assess the combined impact of foreign ownership and the Debt/GDP ratio on long-term bond yields, thereby offering a more comprehensive understanding of the factors influencing bond market dynamics.

$$y_{it} = \mu_i + \alpha_y y_{i,t-1} + \alpha_x x_{it} + \alpha_n n_{it} + \beta_f^L f_{it} I(f_{it} \leq \gamma_f) + (\beta_f^H f_{it} + \delta^H) I(f_{it} > \gamma_f) + \varepsilon_{it} \quad (10)$$

Results for this estimation are presented in Table 4. Accordingly, the lagged bond yield is positively correlated with current yields, and the expectation of real GDP growth it is inversely correlated, as expected. The latter finding suggests that as growth expectations improve, bond yields tend to decrease. The foreign ownership threshold is identified at 56.5%, refers to a regime of low foreign ownership where an increase in foreign ownership by 1% corresponds to a decrease in yields by 17 basis points. This is consistent with the theoretical expectation that an inflow of foreign funds generally exerts a downward pressure on yields.

On the other hand, the correlation between the Debt-to-GDP ratio and the yields of bonds is counter to standard economic theory, which typically predicts that higher debt levels correspond to higher yields due to increased risk. In the model, however, this relationship is negative, though not statistically significant, suggesting that other factors may be influencing yields more prominently in this context.

Including additional variables, Budget Balance/GDP, b_{it} , and one year ahead inflation expectations, I_{it} , into the model results in a singular matrix, preventing the return of results. This issue indicates that the expanded model faces challenges in estimation due to multicollinearity or insufficient variation among the added regressors.

$$y_{it} = \mu_i + \alpha_y y_{i,t-1} + \alpha_x x_{it} + \alpha_n n_{it} + \alpha_b b_{it} + \alpha_i I_{it} + \beta_f^L f_{it} I(f_{it} \leq \gamma_f) + (\beta_f^H f_{it} + \delta^H) I(f_{it} > \gamma_f) + \varepsilon_{it} \quad (11)$$

Table 5

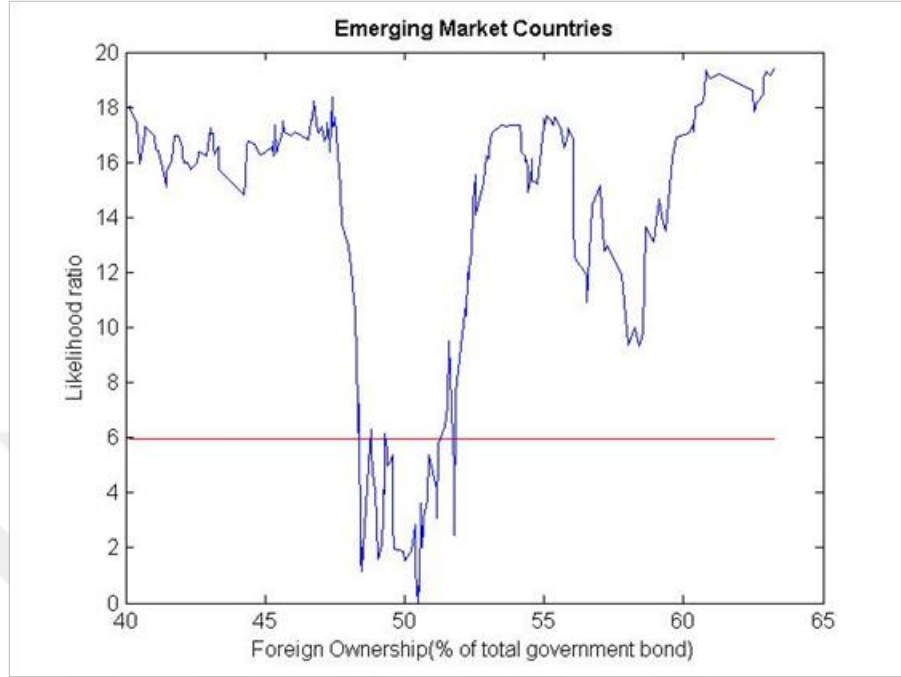
The panel dynamic threshold GMM estimation results with the foreign ownership as threshold variable and regime dependent regressor and two regressors

Foreign Ownership Threshold	# of Obs in Regime	# of Obs. in Regime	Lagged 10-year real bond yield	Debt/GDP	L Regime dependent regressor	L Regime dependent regressor	H Regime dependent regressor
γ_f	L	H	α_y	α_x	α_n	β_f^L	β_f^H
54.4	430	110	0.84*	-0.17*	-0.38*	0.04***	-0.05
[40.2, 63.1]			(0.04)	(0.04)	(0.08)	(0.016)	(0.046)

*Standard errors are presented in parenthesis, with significance levels denoted by *, **, and *** denote the level of significance at 0.01%, 0.05% and 0.1%, respectively and the interval of feasible threshold values in parenthesis.*

Figure 5

Likelihood Ratio Analysis of Foreign Ownership Threshold Values (Table 5)



4.2.2. Assessing the Impact of Global Risk Aversion on Bond Yields with Foreign Ownership as a Conditional Factor

The second question explores the nonlinear effects of foreign ownership (as a percentage of total bonds) on bond yields, employing global risk aversion as the threshold variable. This approach seeks to understand how varying levels of global risk sentiment modulate the influence of foreign investment on the yield dynamics of bonds.

$$y_{it} = \mu_i + \alpha_x x_{it} + \alpha_n n_{it} + \beta_f^L f_{it} I(VIX_{it} \leq \gamma_V) + (\beta_f^H f_{it} + \delta^H) I(VIX_{it} > \gamma_V) + \varepsilon_{it} \quad (12)$$

where y_{it} is 10-year real bond yield, x_{it} is one year ahead inflation expectation, n_{it} is real GDP growth expectation, f_{it} is foreign ownership (% of total local currency government bonds) and VIX is the indicator of global risk aversion.

Table 6

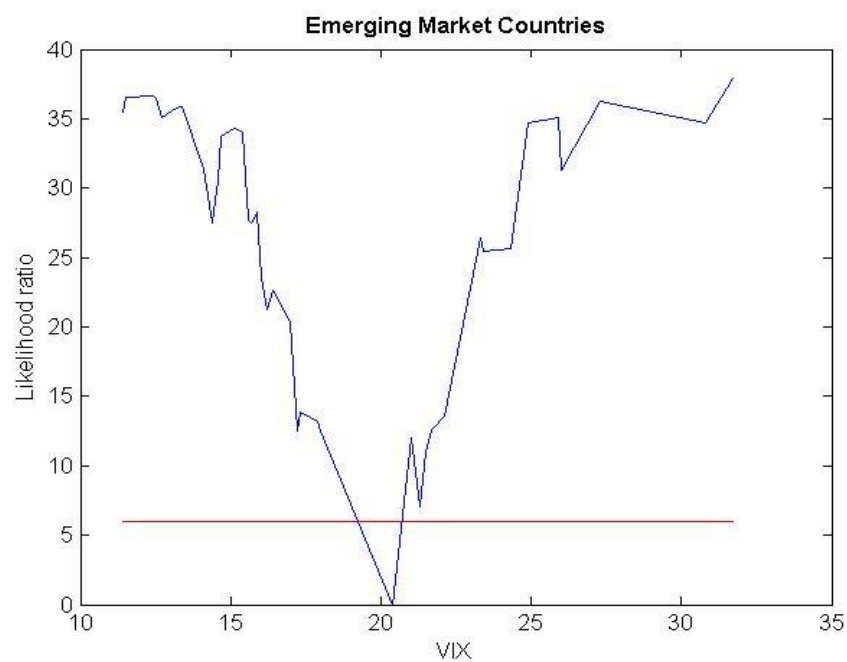
Global risk aversion: Threshold variable & Foreign Ownership: Regime dependent regressor

Risk Apetite Threshold	# of Obs in Regime	# of Obs. in Regime	Real GDP Growth	Foreign Ownership Regime dependent regressor	L Regime dependent regressor	H Regime dependent regressor
γ_v	L	H	α_x	α_n	β_f^L	β_f^H
20.4	295	245	0.88*	-0.10*	-0.0029	-0.012
[11.4, 31.7]			(0.03)	(0.03)	(0.0084)	(0.008)

*Standard errors are presented in parenthesis, with significance levels denoted by *, **, and *** denote the level of significance at 0.01%, 0.05% and 0.1%, respectively and the interval of feasible threshold values in parenthesis.*

Figure 6

Likelihood Ratio Analysis of Global Risk Aversion Threshold Values (Table 6)



Debt/GDP, denoted as x_{it} , is subsequently added as an additional regressor to the previous model, aiming to further refine the analysis by assessing its impact in conjunction with the factors previously considered. This inclusion is intended to enhance the model's capacity to capture the complex interplay between sovereign debt levels and bond yields, providing a more nuanced understanding of economic influences on bond market behavior.

$$y_{it} = \mu_i + \alpha_y y_{i,t-1} + \alpha_x x_{it} + \alpha_n n_{it} + \beta_f^L f_{it} I(VIX_{it} \leq \gamma_V) + (\beta_f^H f_{it} + \delta^H) I(VIX_{it} > \gamma_V) + \varepsilon_{it} \quad (13)$$

The coefficient for $y_{i,t-1}$ (positive) and real GDP growth rate expectation (negative, as growth expectations become more optimistic rates decline) are statistically significant. The estimated threshold for global risk aversion is 20.4, below which refers to low risk aversion. In the regime characterized by low risk aversion, there is a noticeable negative and significant influence of foreign ownership on yields. Specifically, a 1% increase in foreign ownership correlates with a 12-basis points reduction in yields, indicating a robust inverse relationship when market risk aversion is minimal. Additionally, the analysis indicates that the ratio of Debt/GDP and yields do not share a significant correlation under these conditions.

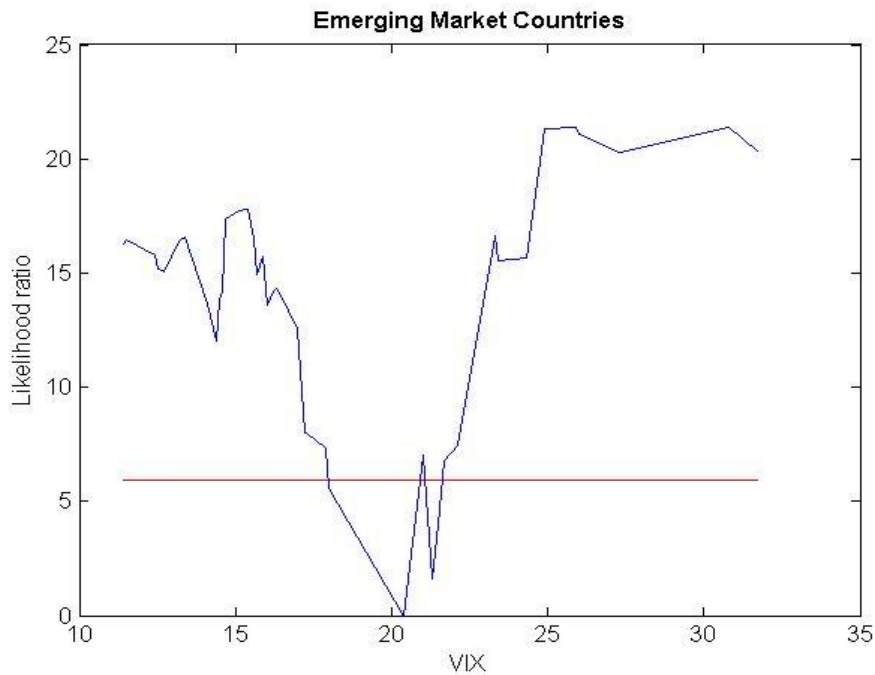
Table 7

Global risk aversion as threshold variable and Foreign Ownership as regime dependent regressor and two regressors

γ_f	L	H	α_y	α_x	α_n	β_f^L	β_f^H
20.4	295	245	0.85*	0.012	-0.12*	-0.12*	0.019
[11.4, 31.7]			(0.03)	(0.008)	(0.04)	(0.028)	(0.013)

Figure 7

Likelihood Ratio Analysis of Global Risk Aversion Threshold Values (Table 7)



4.2.3. Foreign Ownership and Global Risk Aversion as threshold variables and Foreign Ownership as regime dependent regressor

The model is refined by incorporating two threshold variables, creating four distinct regimes based on the combinations of foreign ownership and global risk aversion: low foreign ownership with low global risk aversion (LL), low foreign ownership with high global risk aversion (LH), high foreign ownership with low global risk aversion (HL), and high foreign ownership with high global risk aversion (HH). This enhanced model excludes the debt/GDP variable used in previous analyses, aiming to precisely capture the nuanced impacts of these dual thresholds on bond yields.

The model is:

$$\begin{aligned}
 y_{it} = & \mu_i + \alpha_y y_{i,t-1} + \alpha_n n_{it} + \\
 & + \beta_f^{LL} f_{it} I(f_{it} \leq \gamma_f, VIX_{it} \leq \gamma_v) \\
 & + \beta_f^{LH} (f_{it} + \delta^{LH}) I(f_{it} \leq \gamma_f, VIX_{it} > \gamma_v) \\
 & + \beta_f^{HL} (f_{it} + \delta^{HL}) I(f_{it} > \gamma_f, VIX_{it} \leq \gamma_v) \\
 & + \beta_f^{HH} (f_{it} + \delta^{HH}) I(f_{it} > \gamma_f, VIX_{it} > \gamma_v) + \varepsilon_{it} \quad \dots (14)
 \end{aligned}$$

Table 8

Foreign Ownership and Global Risk Aversion as threshold variables and Foreign Ownership as regime dependent regressor

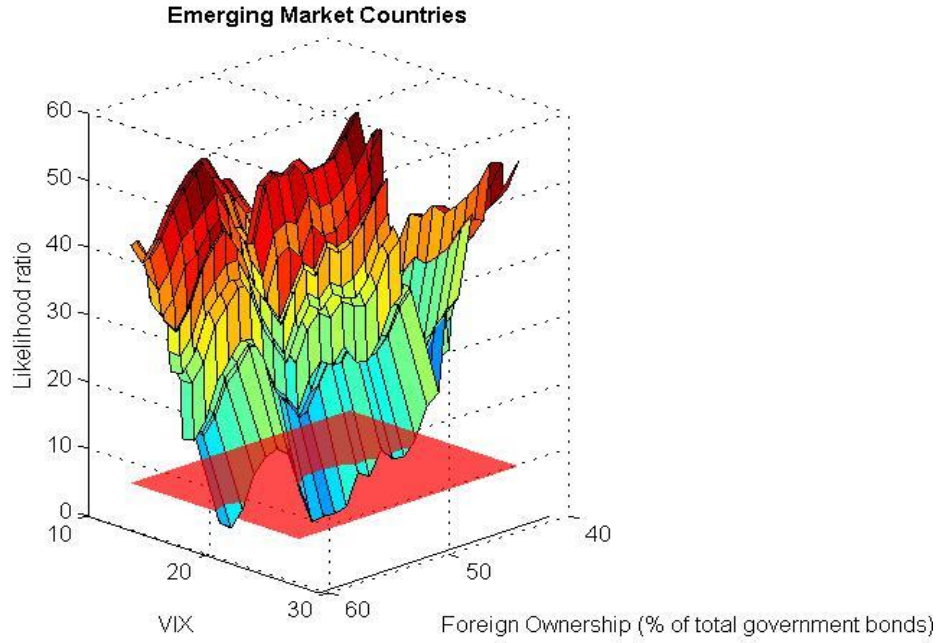
γ_v	γ_f	LL	HL	LH	HH	α_y	α_n	β_f^{LL}	β_f^{HL}	β_f^{LH}	β_f^{HH}
51	20.4	204	91	185	60	0.89*	-0.11*	-0.0004	-0.005	-0.002	-0.0054
						(0.029)	(0.025)	(0.011)	(0.009)	(0.0126)	(0.0089)

*Standard errors are presented in parenthesis, with significance levels denoted by *, **, and *** denote the level of significance at 0.01%, 0.05% and 0.1%, respectively and the interval of feasible threshold values in parenthesis.*

where y_{it} is 10 year bond yield, x_{it} is one year ahead inflation expectation, n_{it} is real gdp growth expectation, f_{it} is foreign ownership (% of total local currency government bonds) and VIX is the indicator of global risk aversion. The results show the $\square$'s to not be statistically significant.

Figure 8

Likelihood Ratio Analysis of Global Risk Aversion and Foreign Ownership Threshold Values (Table 8)



In the concluding analysis, debt/GDP ratio, denoted as x_{it} , is also integrated into the model:

$$\begin{aligned}
 y_{it} = & \mu_i + \alpha_y y_{i,t-1} + \alpha_x x_{it} + \alpha_n n_{it} + \\
 & + \beta_f^{LL} f_{it} I(f_{it} \leq \gamma_f, VIX_{it} \leq \gamma_v) \\
 & + \beta_f^{LH} (f_{it} + \delta^{LH}) I(f_{it} \leq \gamma_f, VIX_{it} > \gamma_v) \\
 & + \beta_f^{HL} (f_{it} + \delta^{HL}) I(f_{it} > \gamma_f, VIX_{it} \leq \gamma_v) \\
 & + \beta_f^{HH} (f_{it} + \delta^{HH}) I(f_{it} > \gamma_f, VIX_{it} > \gamma_v) + \varepsilon_{it} \dots (15)
 \end{aligned}$$

The coefficient for $y_{i,t-1}$ (positive) and real GDP growth rate expectation (negative, as growth expectations become more optimistic rates decline) are statistically significant. The estimated threshold for global risk aversion is 20.4, below which refers to low risk aversion and threshold for foreign ownership (% of total bonds) is 56. The low-risk aversion

and low- foreign ownership regime is related with a negative and significant effect of foreign ownership on yields. This means if foreign ownership increases by 1%, yields decline by 12 bps when the risk aversion in the markets low. Above the threshold level of foreign ownership, even if risk aversion in the markets low, the increased interest of foreign investors to the domestic bond market do not reduce the yields. In high global risk averse environment, foreign ownership and yields do not have significant correlation.

Table 9

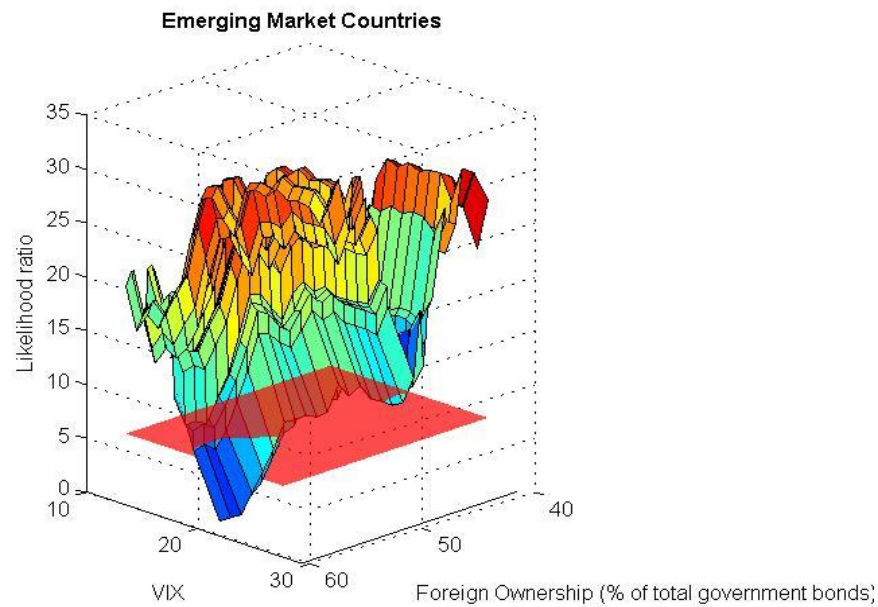
Foreign Ownership and Global Risk Aversion as threshold variables and Foreign Ownership as regime dependent regressor and two additional regressors

<table><tr><th>γ_v</th><th>γ_f</th><th>LL</th><th>HL</th><th>LH</th><th>HH</th></tr><tr><td>20</td><td>5</td><td>24</td><td>51</td><td>20</td><td>36</td></tr></table>							γ_v	γ_f	LL	HL	LH	HH	20	5	24	51	20	36
γ_v	γ_f	LL	HL	LH	HH													
20	5	24	51	20	36													
α_y	α_x	α_n	β_f^{LL}	β_f^{HL}	β_f^{LH}	β_f^{HH}												
0.85*	-0.012*	-0.11*	-0.118*	0.025***	0.016	0.010												
(0.033)	(0.006)	(0.035)	(0.028)	(0.013)	(0.0127)	(0.013)												

*Notes: Standard errors are in parenthesis and *, **, and *** denote the level of significance at 0.01%, 0.05% and 0.1% and the interval of feasible threshold values in parenthesis.*

Figure 9

Likelihood Ratio Analysis of Global Risk Aversion and Foreign Ownership Threshold Values (Table 9)



4.4. Robustness Check

To ensure the robustness of the empirical analysis, expectations for macroeconomic indicators—previously based on economists' opinions from surveys in Datastream—are re-evaluated through an alternative forecasting approach. Adopting an adaptive expectations methodology, the study recalibrates forecasts for inflation and real GDP growth. This approach bases future expectations on historical data trends, utilizing past actual data for inflation and real GDP growth from the Datastream database to generate new forecast values, thereby examining the stability of results under varied forecast assumptions.

The analysis utilizing adaptive expectations for macroeconomic variables confirms the robustness of the study's initial findings. By integrating an alternative forecasting method, the results align closely with prior observations, underscoring the stability and reliability of the conclusions across different forecasting approaches. This coherence between various methods of forecasting reinforces the validity of the study's implications regarding the interplay between foreign investment, global risk appetite, and their impact on bond yields in emerging markets.

5. THE IMPACT OF MACROECONOMICS NEWS ON TÜRKİYE'S BOND YIELDS: EMPIRICAL ANALYSIS AND RESULTS

This chapter examines how macroeconomic news affects government bond yields in Turkey. It connects theory with real-world data to show how news announcements impact bond markets. The chapter aims to understand the mechanisms that drive market reactions in an emerging economy context.

5.1. Review of Theoretical Background

The appropriate starting point for understanding the rationale behind the impact of macro and monetary policy announcements on bond yield changes is understanding fundamental bond pricing. Bond prices are determined by the present value of all its future cash flows, discounted at an appropriate rate (Y). Specifically, it encompasses the sum of all future coupon payments (C) and the bond's final redemption value (FV), all appropriately discounted to their present values:

$$P = E\left(\sum \frac{C_t}{(1+Y)^t} + \frac{FV}{(1+Y)^T}\right) \quad (16)$$

In this formula, C represents the bond's periodic coupon payments, and FV is its face value. As additional data emerges in the market, the yield to maturity has the potential to shift. Any variations in the bond's price reflect the market's updated expectations, illustrating the intrinsic relationship between yield and price in bond valuation. These fluctuations are a response to changes in market conditions, investor sentiment, and other relevant factors affecting the bond's perceived value.

It is widely recognized in finance that the valuation of assets is influenced by introducing new information. Unexpected fluctuations in fundamental variables can influence the cash flows generation and the discount rates employed to evaluate the asset's value. The present-value asset pricing model based on rational expectations. The concept of rational expectations posits that the current price of an asset mirrors the present value of its expected future fundamentals. This reflects the market's collective anticipation of the asset's performance, factoring in all currently available information and future projections. Within

this framework, information about economic fundamentals has a significant role as these factors serve as the core drivers that influence the state of the economy. These fundamentals include inflation rates, employment levels, GDP growth, and decisions made regarding monetary policy. These economic factors can directly impact the projected future cash flows of assets. For instance, news illustrating a robust economic expansion can generate expectations of higher interest rates, subsequently influencing the yields of bonds. The model suggests that any news about these fundamentals should instantaneously impact the returns on assets, including bond yields, given that new information prompts a reassessment of anticipated future cash flows. If the news conveys a positive message, implying an enhancement in economic conditions, this can increase expected future cash flows, subsequently raising the present price of the asset. Conversely, negative news can diminish the projected future cash flows and lower the present price of the asset.

Other theoretical concepts related to bond pricing are Fisher's decomposition and the Expectation Hypothesis. Interest rate is divided into two components: the real interest rate and the anticipated average inflation rate. This division is crucial as inflation expectations often correlate with forecasts about overall economic performance. Consequently, the yield for an n-period, denoted as:

$$Y_t^n = E(R^n | \theta_t) + E(\pi^n | \theta_t) \quad (17)$$

Here Y_t^n represents the nominal yield for n-periods, $E(R^n | \theta_t)$ is the expected real interest rate given the information set θ at time t , and $E(\pi^n | \theta_t)$ symbolizes the anticipated inflation based on the same information set. The expectation hypothesis asserts that the yields on long-term bonds are weighted average of present and anticipated future short-term interest rates. As central banks typically influence short-term rates, any modifications in their monetary policy will, in turn, impact long-term interest rates. For instance, if the central bank unexpectedly increases short-term rates, this will likely lead to a rise in long-term bond yields as well.

Macroeconomic circumstances have an impact on risk factors and exert influence on asset returns. Efficient and liquid markets quickly reflect new information in prices. According to Fama and French (1992 and 1995)'s efficient-market hypothesis, asset prices encompass all accessible information, and macroeconomic variables significantly influence pricing. Markets efficiently reflect all information about asset returns. The random walk

theory asserts that new information is unpredictable. Unexpected macroeconomic surprises have an effect on both the levels and volatilities of stock returns. Important macroeconomic indicators are published every month and market participants form an expectation ahead of the release through surveys. If the actual value deviates from what the market anticipates, it indicates the introduction of fresh data or insights. This deviation is referred "macroeconomic surprise" and it is related with the changes in financial market prices. Performance that falls short of analysts' expectations is interpreted as unfavorable news, augmenting the risk premium.

In conclusion, key insights into the drivers of government bond yields and their reaction macroeconomic data releases are explained in this section of the thesis. The review of the literature pertaining to the first research question shows that factors influencing government bond yields, especially in the context of emerging markets, unveils a diverse panorama. While the development of local currency bond markets has been a significant step toward financial stability and autonomy for emerging economies, the impact of foreign investors remains a complex and contested issue. On one hand, foreign participation has been accredited with developing market liquidity and offering a diversifying investor base. On the other, there is an increased market volatility and vulnerability to global economic shocks. The relationship between foreign ownership and bond yields is complicated and appears to operate in both directions, influenced by factors such as global risk aversion, fiscal health, and institutional strength. The literature review related to second research question on the impact of macroeconomic news on bond markets highlights the sensitivity of bond prices and yields to unexpected economic data and policy announcements. The research in this area is primarily centered around developed economies and shows that bond markets react distinctly to various types of news, with the magnitude of the response often depending on the economic conditions and market expectations. The findings suggest that while macroeconomic surprises account for a significant portion of bond yield fluctuations, the overall impact is highly dependent on the broader economic context, the type of news, and the market's anticipation of such news. The literature also points to an asymmetry in market reactions, particularly to bad news or heightened uncertainty, underscoring the role of market sentiment and expectations in shaping the response to new information.

5.2. Data Analysis and Sources

In this section, financial market dynamics, focusing on Local Currency Government Bonds. Utilizing daily yield data of Turkish sovereign bonds across various maturities will be analysed. This analysis spans significant economic cycles to offer a comprehensive view of bond yield movements. Through descriptive statistics, unit root tests, and an examination of macroeconomic data releases, this section lays the groundwork for understanding the factors influencing bond yields. By incorporating variables such as the VIX index and foreign participation, alongside an evaluation of market expectations through survey data, the study assesses the impact of economic and non-economic factors on bond market behaviour. This rigorous approach enables a nuanced exploration of the dynamics at play in Turkey's bond market, setting the stage for deeper econometric model estimations and insights.

5.2.1. Local Currency Government Bonds

This study utilizes daily yield data of Turkish sovereign bonds with maturities of two, five, and ten years, sourced from Refinitiv Eikon. The sample period for the two- and five-year bonds is from September 2005 to December 2023. On the other hand, the data for ten-year bonds begins in January 2010. This historical range provides a comprehensive overview of bond yield movements over various economic cycles.

Table 10 shows the descriptive statistics of the government bond yields based on their maturity periods: 2-year, 5-year, and 10-year which are obtained from Eikon Datastream. The dataset includes daily yield observations from September 1, 2005, to December 1, 2023, for the 2-year and 5-year bonds, and from February 5, 2010, to December 8, 2023, for the 10-year bond. The mean yields observed are 0.14%, 0.13%, and 0.12%, respectively, indicating a slight trend of higher yields for bonds with shorter maturities. The volatility of yields, as measured by standard deviation, decreases as the bond matures, suggesting that longer-term bonds have more stable performance. The skewness of all series is positive, suggesting a tendency for yield spikes. Notably, the excess kurtosis values indicate that all bonds exhibit distributions with heavier tails and sharper peaks compared to a normal distribution, with the 10-year bond showing the most pronounced tendency towards

extreme yield variations.

Table 10

Summary Statistics of Turkish Local Currency Bond Yields

Variable	Start Date	End Date	Mean	Std. Deviation	Min	Max	Skewness	Ex. Kurtosis
2- year bond	01/09/2005	01/12/2023	0.14	0.06	0.05	0.38	0.98	0.89
5- year bond	01/09/2005	01/12/2023	0.13	0.05	0.06	0.32	0.88	0.32
10- year bond	05/02/2010	08/12/2023	0.12	0.04	0.06	0.27	1.37	1.40

Prior to the econometric model estimations, the stationarity of dependent variables is examined through Augmented Dickey-Fuller (ADF) tests across different bond maturities (2-, 5-, and 10-year). The tests' outcomes, detailed in Table 12, show coefficients, standard errors, t-statistics, and probabilities, along with the ADF statistic and corresponding critical values, revealing all bond yield series to be non-stationary within the analyzed period, classified as I(1). Consequently, the analysis proceeds with the first differences of these series to ensure methodological rigor.

Table 11*Unit Root Results for Turkish Local Currency Bond Yields*

Variable	Coef.	Std. Error	Prob.	ADF Test-Stat
2-year bond	-0.0006	0.00092	0.50	-0.68
5-year bond	-0.0019	0.00116	0.09	-1.67
10-year bond	-0.0014	0.00110	0.21	-1.25
Diff.2-year bond	-0.8605	0.02062	0.00	-41.74
Diff.5-year bond	-1.1384	0.01472	0.00	-77.34
Diff.10-year bond	-0.8729	0.01683	0.00	-51.87

**Critical Values: 1%, 5% and 10% level: -3.431593, -2.861974, -2.567044, respectively. The model includes a constant term and two lags, determined automatically based on the Schwarz Information Criterion (SIC).*

5.2.2. Macroeconomic Data Releases

Data for the analysis is sourced from the Bloomberg Survey of Economists' Expectations, covering economic releases and market anticipations from September 2005 to December 2023. The dataset includes a range of macroeconomic variables announced monthly, for which consistent survey expectations are available throughout a significant portion of the sample period. This comprehensive and longitudinal data collection facilitates an in-depth examination of market responses over a prolonged timeframe, allowing for nuanced insights into economic trends and expectations.

The study incorporates a range of macroeconomic variables to capture the multifaceted nature of the impact of economic news. The analysis includes local consumer price inflation, current account balance, trade account balance, and policy rate announcements in Türkiye. Global macroeconomic announcements used in the study are US nonfarm payroll data, US PCE inflation, US ISM Manufacturing Index, Eurozone PMI Manufacturing Index, Eurozone CPI Index, and the Federal Funds Rate (upper bound). This

diverse selection of indicators enables an analysis that accounts for domestic and international economic influences on Turkish bond yields.

The analysis extends to evaluate the influence of non-economic factors, specifically local elections (both municipal and general) and terror events defined by incidents resulting in 10 or more fatalities. These elements are pivotal in comprehensively understanding the array of factors that impact bond market dynamics, especially in emerging markets such as Türkiye, by providing insights into how political stability and security concerns can affect investor sentiment and market behavior. The definition of macroeconomic surprise is central to the analysis. Macroeconomic surprise is defined as the difference between the released and the market median expectation. This study standardizes these surprises by scaling the standard deviation of such deviations for each series. This standardization is vital to enable comparisons across different indicators and units, providing a more accurate assessment of the relative impact of various news types.

Table 12 presents the descriptive statistics derived from the survey data on economic announcements. The statistics are categorized under 'Local' (Türkiye) and 'Global'(U.S. AND Eurozone) announcements. Among these, US Non-farm Payroll and US ISM Manufacturing announcements show higher standard deviation, indicating significant fluctuation around the mean and suggesting periods of instability or rapid change. The data periods covered vary in announcements, with the earliest data starting in 2006. This table shows a preliminary view of the data's characteristics and is a foundation for the subsequent econometric analysis.

Table 12*Summary Statistics of the News Announcements*

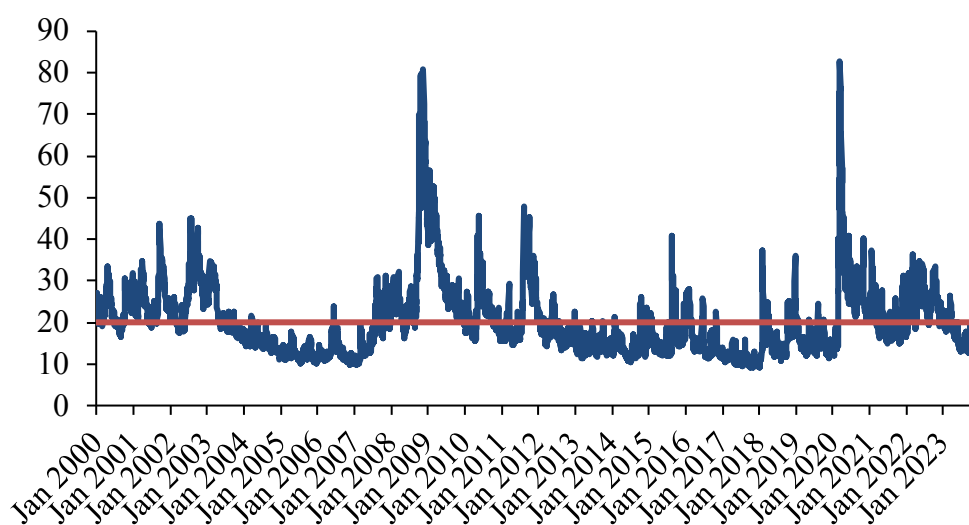
Variable	Start Date	End Date	Units	Number of Observations	Mean	Std. Deviation
<u>Local:</u>						
1. CPI	28/02/2005	30/11/2023	% change	226	0.15	0.17
2. Current Acc. Bal.	30/04/2004	31/10/2023	Billion	235	-3.02	2.20
3. Trade Bal.	31/01/2006	31/10/2023	Billion	212	-5.79	2.42
4. Monetary Policy Anc.	17/06/2010	23/11/2023	%	154	0.11	0.06
<u>Global:</u>						
5. US Non-farm Payroll	31/01/2000	30/11/2023	Thousand	287	53	1408
6. US PCE inflation	30/04/2004	31/10/2023	% Change	230	0.021	0.015
7. US ISM manufacturing	31/01/2000	30/11/2023	Level	287	52.916	5.291
8. Eurozone PMI manufacturing	30/04/2004	30/11/2023	Level	236	51.486	5.359
9. Eurozone CPI	31/03/2001	31/10/2023	% Change	272	0.021	0.019

5.2.3. Volatility Index (VIX)

The Chicago Board Options Exchange (CBOE) Volatility Index (VIX) measures the anticipated volatility of the U.S. stock market over the next 30 days. It is determined by examining the prices of S&P 500 index options. As an independent factor, the VIX signifies the market's prediction of short-term volatility, which is the opposite of investor sentiment. The VIX is frequently used in financial economics to measure risk aversion, market strain, or the uncertainty linked to equity markets. Empirically, a VIX reading above 20 is frequently interpreted as high. This level indicates that investors expect higher volatility in the stock market, which typically corresponds with a higher-risk environment and uncertainty. High and low levels of VIX provide nuanced insights into the market's risk perception, which can be pivotal for economic and investment analyses. The study employs the VIX index to define two distinct market regimes based on risk appetite: a high-risk regime, indicated by a VIX value above 20, and a low-risk regime, with a VIX value below 20. This classification serves to delineate periods of varying investor sentiment towards risk, providing a framework for analyzing the impact of market volatility on investment decisions and bond market dynamics.

Figure 10

CBOE Volatility Index, VIX, 2000 to 2023



5.2.4. Foreign Participation

The chart illustrates the involvement of foreign participation in Türkiye's local currency bond market and demonstrates a trajectory significantly influenced by major global financial occurrences. It shows a rise in foreign participation until just before the 2008 Global Financial Crisis (GFC), followed by fluctuating levels and a general decline post-crisis. The GFC, which escalated with the Lehman Brothers collapse, marks a turning point, after which the foreign participation level fluctuates and gradually declines. This trend could suggest a pullback by foreign investors as they sought to reduce exposure to emerging market risks during periods of global financial stress. The subsequent decline in foreign participation around 2013-2014 coincides with the Federal Reserve's announcement and commencement of tapering its quantitative easing program, which likely led to capital outflow from emerging markets like Türkiye as global investors repositioned in anticipation of rising U.S. interest rates and a stronger dollar. The noticeable dips and the overall declining trend post-2018 could also be reflective of geopolitical tensions, domestic economic policy uncertainties, and the global shift towards more conservative investment strategies in light of such macroeconomic events.

Figure 11

Foreign participation in Türkiye local currency bonds (%)



5.2.5. Preliminary Checks

The analysis focuses on determining if the expectation data aligns with the rational expectations theory, which assumes that forecasts are unbiased and incorporate all available information. By evaluating the unbiasedness and efficiency of the expectation data, the study seeks to assess the reliability of these data as true representations of market consensus. This involves examining whether the expectations systematically deviate from actual outcomes, indicating if market participants form their forecasts in a rational and informed manner.

In the context of relevant literature, previous studies conducted by Nowak et al. (2011) and Vrugt (2010) have utilized data from Bloomberg surveys. Data regarding expectations are obtained through an email survey that is initiated approximately one week before the announcement. Vrugt (2010) comments on the transparency of this approach, highlighting that the analyst's identity and affiliating institution being visible on the Bloomberg system promotes forecasters to provide their most accurate predictions. Forecasters revise their predictions up to three days before data release, limiting the integration of new information. Traders often consider the median of these revised forecasts as the "market consensus."

The unbiasedness of these survey forecasts is examined using the equation:

$$A_{i,t} = \alpha + \beta * F_{i,t} + u_{i,t} \quad (18)$$

represents the actual announced value of macroeconomic variable i for month,t and $F_{i,t}$ denotes the median forecast for that variable and $u_{i,t}$ is the error term.

To assess the unbiasedness of market expectations as reflected in the survey forecasts, the Wald test is utilized. In an unbiased scenario, it would be expected the parameter $\alpha = 0$ and $\beta = 1$ and the error term $u_{i,t}$ should be serially uncorrelated. To check for the presence of serial correlation in the error term, the Breusch-Godfrey test is employed, with a maximum lag length of 12. This test is specifically designed to detect autocorrelation in the residuals of a regression model, which could indicate that past errors are influencing current ones.

Table 13*Wald Test Results for Unbiasedness of Survey Expectations*

	1.TR CPI	2.TR Current Acc. Bal.	3.TR Trade Bal.	4.TR Monetary Policy Anc	5.US Non-farm Payroll
F-stat	1.44206	35.6576	2.29226	1.14242	28.2768
Prob	0.2386	0	0.1036	0.3237	0
Chi-squ	2.88413	71.3153	4.58452	2.28484	56.5537
Prob	0.2364	0	0.101	0.319	0
	6.US PCE inflation	7.US ISM man.	8.EZ PMI man.	9.EZ CPI	
F-stat	45.8343	7.66604	0.38461	0.49297	
Prob	0	0.0006	0.6811	0.6114	
Chi-squ	91.6687	15.3328	0.7692	0.98595	
Prob	0	0.0005	0.6807	0.6108	

For Türkiye's monetary policy, trade balance, and Eurozone PMI manufacturing and CPI data releases, the null hypothesis $\alpha = 0$ and $\beta = 1$ cannot be rejected, suggesting that the survey expectations are good quality. However, for several data releases, this assumption is rejected for the US data releases and Türkiye CPI and current account data releases. Even if it is not upheld, forecasts might remain unbiased. For variables that do not meet the criteria of the initial test, a supplementary regression is performed to determine the significance of the constant α . This step aims to further investigate the extent to which the expectation errors deviate from zero, providing insights into the predictive accuracy and potential systematic bias in the expectation data.

$$A_{i,t} - F_{i,t} = \alpha + u_{i,t} \quad (19)$$

In this supplementary equation, US PCE inflation and Türkiye CPI and current account data releases showed that α is statistically significant at *5% and **10% (t-statistic for α : 2.738*, 1.6668**, 6.3465* respectively). However, the results of supplementary regressions were not different than the initial test of the unbiasedness for US ISM and Nonfarm payroll change data. Nevertheless, The Bloomberg survey can be utilized as a reliable tool for understanding market expectations and consensus for several reasons: The Bloomberg consensus forecasts are derived from a wide panel of experts for these US data releases. For significant news announcements, the contribution of forecasts often involves up to 80 professionals, providing a wide array of insights and predictions. This diversity enhances the consensus forecast's representativeness and reliability. El Ouadghiri (2016) evaluated the precision of Bloomberg consensus forecasts by considering the number of forecasters in the survey. They developed a test to estimate the significance of the deviation between the forecasters' average predictions and the actual market results. This rigorous approach to determining accuracy bolsters the credibility of using Bloomberg as a reliable source for market sentiment.

If forecasts demonstrate weak efficiency, historical data from released indicators would not contribute to predicting the present forecast error. To examine weak efficiency, one approach is to assess the collective significance of $(\beta_1, \dots, \beta_k)$ within the context of the subsequent regression. Hence, to test the efficiency of the survey forecasts will be checked for each variable whether

$$\alpha = \beta_1 = \dots = \beta_k = 0$$

$$\text{when } A_{i,t} - F_{i,t} = \alpha + \beta_1 * A_{i,t-1} + \beta_2 * A_{i,t-2} \dots + \beta_k * A_{i,t-k} + u_{i,t} \quad (20)$$

Here since survey expectations are collected monthly, k=12 lags is used.

Table 14*Test Results Efficiency of Survey Expectations*

Wald Test	1.TR CPI	2.TR Current Acc. Bal.	3.TR Trade Bal.	4.TR Monetary Policy	5.US Non-farm Payroll
F-stat	1.30	2.97	0.67	0.979	119.37
Prob	0.21	0.0007	0.78	0.097	0.00
df	(12,201)	(12,210)	(12,187)	(12,129)	(12,262)
Wald Test	6.US PCE inflation	7.US ISM man.	8.EZ PMI man.	9.EZ CPI	
F-stat	11.81	1.01	2.23	1.69	
Prob	0.00	0.44	0.01	0.07	
df	(12,205)	(12,262)	(12,211)	(12,247)	

Table 14 shows the Wald test results for weak efficiency of expectations surveys. The results present a mixed picture of the joint significance of the coefficients. For ISM, the F-statistic and Chi-square values are low with high probabilities (0.4392 and 0.4353 respectively), indicating no evidence to reject the null hypothesis, suggesting that the coefficients might not be jointly significant. In contrast, Türkiye current account balance survey shows a different scenario with F-statistic and Chi-square values indicating strong evidence against the null hypothesis, implying that the coefficients are jointly significant. Eurozone CPI Wald test results are significant at 10%. The findings in line with those of Balduzzi et al. (2001), who similarly discovered biases in survey expectations for certain U.S. data releases.

5.3. Empirical Results

Model 1 is a preliminary analysis has been constructed to estimate the effects of macroeconomic announcement surprises on the daily fluctuations in government bond yields. These results are shown in Table 15. The table depicts the statistically significant relationships between bond yield changes and the respective macroeconomic surprises for 2-year, 5-year, and 10-year government bonds.

Table 15

Impact of Macroeconomic Surprises on Bond Yields Across Various Maturities

Maturity	Significant Macroeconomic		t-Statistic	Adjusted R-squared
	Announcement	Coefficient		
2-Year	US ISM Manufacturing	0.29**	2.10	0.02
2-Year	TR CPI	0.5*	3.22	0.04
2-Year	TR Trade Balance	-0.23**	-1.96	0.01
	TR Monetary Policy			
2-Year	Announcement	0.38**	2.06	0.02
5-Year	US Non-farm Payroll	-0.26**	-2.13	0.02
5-Year	TR Trade Balance	-0.43*	-2.66	0.03
10-Year	TR CPI	0.32**	2.42	0.03
10-Year	TR Trade Balance	-0.37*	-2.82	0.04
	TR Monetary Policy			
10-Year	Announcement	-0.68*	-4.32	0.11

*The table presents slope coefficients and significance levels based on t-statistics, with Adjusted R-squared values for various bond yields. Significance is denoted by *, **, and *** represents 1%, 5%, and 10% level of significance, respectively.*

In the analysis of the impact of macroeconomic surprises on two-year government bond yield changes, the coefficients for U.S. ISM manufacturing, local inflation rate, and local policy rate announcement are statistically significant. An increase in manufacturing activity in U.S. is linked with higher short-term yields, potentially due to expectations of economic growth and corresponding monetary policy tightening in U.S. and this could have impact on short end of Turkish bond yield. The positive relationship with local inflation surprises shows the sensitivity of short-term yields to inflation expectations. On the other hand, local trade balance surprises show a significant negative coefficient. This might seem as a paradox the expectation of stronger economy would lead to a lower interest rate anticipation. Hence, better-than-expected trade balance figures lead to a decrease in yields. This could show that market expectations of a reduced borrowing costs. Similarly, local monetary policy announcements have a significant positive coefficient. It has been noted that unexpected shifts in monetary policy can result in increased short-term yields, indicating a direct correlation between policy surprises and market reactions.

The regression outputs for the 5-year bond yields reveal a few points of interest. The US Non-farm payroll surprises show a significant negative coefficient. This suggests that when employment figures are better than expected in the U.S., it potentially signals an economic slowdown, leading to lower interest rate in U.S. which is also reflected in Turkish bonds yields.

Similar to 2-year bond yields, Turkish trade balance surprises also show a significant negative coefficient in 5-year bond yields, indicating significance at the 1% level. Similarly, local inflation, monetary policy and trade balance surprises are associated with a significantly impact 10-year bond yields. Overall, short-term yields appear to be more sensitive to manufacturing and inflation expectations, medium-term yields to employment and trade balance surprises, and long-term yields to inflation and monetary policy surprises.

Low R-squared values across all maturities in Model 1 imply that macroeconomic surprises alone do not fully explain the variations in bond yields. This preliminary analysis indicates that additional factors likely contribute to yield changes and should be included in future models to enhance explanatory power. While the model 1 identifies some statistically significant relationships, there are elements that require further investigation to enhance the robustness and explanatory power of the analysis that is addressed in the other models.

In Model 2, the incorporation of risk appetite aimed to enhance the understanding of bond yield dynamics is detailed, with the findings presented in Table 16. This addition provides a deeper insight into how variations in risk sentiment influence bond market behaviors, offering a comprehensive view of the factors driving yield fluctuations.

Table 16

Impact of Macroeconomic Surprises and Risk Appetite on Government Bond Yields Across Various Maturities

Dependent variable	Macroeconomic Announcement	Macroeconomic News Surprise ($S_{i,t}$)	Risk State	Interaction ($S_{i,t} * RiskState_t$)	Adjusted R-squared
2-Year Bond Return	TR CPI	0.61*	-0.34	-0.66***	0.05
	TR Current Acc.	-0.18	-	0.66**	0.02
	TR Trade Balance	-0.43*	0.35	0.82*	0.05
5-Year Bond Return	TR CPI	0.38**	-0.92**	0.13	0.01
	TR Trade Balance	-0.62*	0.89**	-0.21	0.05
10-Year Bond Return	TR CPI	0.38*	-0.35	0.11	0.02
	TR Trade Balance	-0.45*	0.52	0.31	0.05
	TR Mon. Policy Announcement	-0.6*	-1.59**	-0.49	0.13

*The table presents slope coefficients and significance levels based on t-statistics, with Adjusted R-squared values for various bond yields. Significance is denoted by *, **, and *** represents 1%, 5%, and 10% level of significance, respectively.*

The inclusion of the risk appetite dummy variable and its interaction with macroeconomic surprises generally does not lead to statistically significant changes in the coefficients for most variables for 2-year bond returns. However, the interaction terms for local inflation and trade balance are exceptions. The direction of the impact to the surprises is reversed on high-risk days, pointing to the change of market reactions to economic news in different risk environments. The presence of significant interaction terms suggests that the market's response to macroeconomic surprises depend on the risk sentiment.

In the estimations of the 5-year bond model, the inclusion of the dummy variable for risk appetite and its interactions with macroeconomic surprises produced a nuanced result. The coefficients for most variables did not display statistically significant changes, similar to 2-year bond models. However, there were notable exceptions in the significant interaction terms of some economic indicators, such as consumer inflation and trade balances. These terms displayed a change in the direction of impact on days marked by increased risk, thus uncovering a variation in market reactions to economic announcements based on the current risk climate. The significant interaction terms emphasize the market's differing response to macroeconomic surprises, which relies on the overall sentiment of risk.

In the estimations of the 10-year bond model, the inclusion of the dummy variable for risk appetite and its interactions with macroeconomic surprises did not display statistically significant changes. Interaction term was significant for only monetary policy announcement. Despite the inclusion of risk appetite and slight improvement in value, R-squared values are still low, hinting that other unaccounted-for factors may be influencing bond yields in all 2,5 and 10-year bond models.

In Model 3, a notable feature across all maturities is the significance of the lagged dependent variable, indicating that past returns are a strong predictor of current returns. This might reflect the market's momentum or the persistence of economic conditions affecting bond rates over time. However, the varying degrees of significance across different maturities suggest that this effect might be more pronounced or more immediate for some maturities than for others.

Foreign macroeconomic variables, such as US inflation, employment, and manufacturing indicators, along with Eurozone inflation and manufacturing, do not show a significant impact on bond returns across all maturities. This could imply that while global

economic conditions are essential, they may not directly influence bond returns as much as domestic factors or might be overshadowed by more immediate and localized economic news. On the other hand, local variables such as Turkish CPI, trade balance, and policy rate surprises play a more pronounced role, indicating the sensitivity of bond returns to domestic economic conditions. The negative impact of the trade balance and the varied influence of policy rate announcements and inflation on bond rates underscore the complex interplay between economic policy, market expectations, and investment environment.

The "Risk State" variable, derived from the VIX index and local terror events, serves as a proxy for market volatility and geopolitical risk in the model. It aims to capture how shifts in investor sentiment and external shocks impact bond returns. While the VIX measures market perceptions of risk, local terror events reflect specific geopolitical disturbances. In the analysis, this variable's varied influence across different bond maturities suggests a complex relationship between perceived risk and bond returns. However, its lack of statistical significance in the model indicates that the direct impact of these risk measures on bond returns might be overshadowed by other economic factors or market dynamics.

Table 17*Results of Joint Model*

Dependent variable	2-year bond Return	5-year bond Return	10-year bond Return
Lagged dependent variable	0.07**	0.09*	0.06*
US Non-farm Payroll	0.04	-0.06	0.12
US PCE Inflation	0	-0.24	0
US ISM Manufacturing	-0.22	-0.06	-0.05
Eurozone PMI Manufacturing	0.12	0.09	0.1
Eurozone CPI	0.1	0.1	0.28
TR CPI	0.1*	-0.44***	-0.15**
TR Current Account Balance	0.54	0.32	0.31
TR Trade Balance	-0.19**	-0.18**	0.09**
TR Monetary Policy Announcement	-0.37**	-0.41***	-0.37*
Risk State	0.37	-0.37	-0.7

*The table presents slope coefficients and significance levels based on t-statistics. Significance is denoted by *, **, and *** represents 1%, 5%, and 10% level of significance, respectively. The Durbin-Watson statistics of models suggests that the model residuals are independent and the F-statistics of the models show overall significance.*

In Model 4, the conditional GARCH (1,1) model outputs for two-year, five-year, and ten-year bond yields provide a view of how different factors influence bond market dynamics. In constructing the most meaningful GARCH model for bond yield volatility, various iterations of mean and variance equations were examined, incorporating different combinations of local and global macroeconomic and risk variables. The selected version is presented in the Table 18.

The model's variance equations shed light on how volatility responds to past shocks and its own persistence. The significant and positive coefficients for GARCH (-1) across all

maturities demonstrate a strong persistence in volatility, indicating that volatility shocks tend to have a lasting impact.

One interesting point is that global macroeconomic indicators, such as US PCE Inflation and Eurozone CPI, generally do not show a consistent impact on the mean bond returns but significantly influence the conditional volatility in bond markets. This suggests that while these global factors may not directly alter bond yields, they contribute substantially to the market's risk and volatility perceptions, particularly for the ten-year bond rates. On the other hand, local economic variables like Turkish CPI, trade balance, and policy announcements have a more pronounced and occasionally significant impact on bond returns, emphasizing the bond market's sensitivity to domestic economic conditions. The negative coefficients for some macroeconomic variables in the variance equation suggest that certain economic news might reduce volatility or increase stability in bond returns, possibly due to market anticipation or the resolution of uncertainty. The significant and positive coefficient for TRCPI in the two-year model reflects the sensitivity of short-term bonds to inflation expectations, whereas its diminished impact in the longer-term models suggests a more complex relationship for medium and long-term bonds. Although macroeconomic announcements from U.S. and Eurozone do not affect the bond returns, some of them have a significant effect on the volatility. This suggests global new information have impact on volatility due to the arrival of new information.

Table 18*Results of Bond Yield Volatility Model*

	2-year bond Return	5-year bond Return	10-year bond Return
Mean Equation			
TR CPI	0.69*	0.36*	0.19
TR Current Account Balance	-0.24*	-0.07	0.07
TR Monetary Policy Announcement	0.26*	-0.95*	-0.58*
TR Trade Balance	-0.19	-0.25	-0.39
RiskState	0.05	-0.34*	-0.15
Variance Equation			
ARCH (1)	0.13*	0.1*	0.13*
GARCH (1)	0.87*	0.92*	0.57*
US ISM Manufacturing	-0.1	0.38*	-1.32*
US PCE Inflation	-0.19*	-0.35*	-2.85*
Eurozone PMI Manufacturing	-0.2*		-5.69*
Eurozone CPI	0.11		-3.19*

The table presents slope coefficients and significance levels based on t-statistics.

*Significance is denoted by *, **, and *** represents 1%, 5%, and 10% level of significance, respectively. The Durbin-Watson statistics of models suggests that the model residuals are independent and the F-statistics of the models show overall significance.*

6. CONCLUSION

In this thesis, the landscape of government bond yields in emerging market economies, with a focus on foreign ownership, risk appetite and macroeconomic news, is examined. Advanced econometric models is employed to understand the interaction between market sentiment, foreign investment, and economic indicators. The purpose was to understand how these factors influence bond yields and inform policy and investment strategies. The findings from the examination of foreign ownership's threshold effects and global risk aversion on long-term bond yields, as well as the impact of macroeconomic news and risk sentiment on bond yields in emerging markets, particularly Türkiye, are highlighted. These insights offer a nuanced understanding of market dynamics and have significant implications for policy and investment strategies within these economies.

The investigation into the threshold effects of foreign ownership and global risk aversion on long-term bond yields utilized a dynamic threshold model, revealing intricate relationships between these factors and market outcomes in emerging economies. The analysis utilized a panel dataset comprising 19 emerging market countries. The key findings indicate that both foreign ownership and VIX (as a measure of global risk aversion) exhibit non-linear relationships with bond yields, where the impacts vary significantly based on whether certain threshold levels are crossed. For example, an estimated foreign ownership threshold of 50.5% indicates that beyond this point, the relationship between foreign ownership and bond yields changes notably. This is line with the theory that at lower levels of foreign ownership, increased investment can lead to lower yields, but beyond a certain point, the risks associated with over-reliance on foreign investment might outweigh the benefits.

The analysis builds upon and broadens the scope of previous research, such as that by Ebeke and Lu (2014) and Jaramillo and Weber (2012), by examining the nuanced impact of foreign ownership and global risk aversion on bond yields, highlighting the complexity of market dynamics not previously addressed in depth. These studies explored the impact of foreign ownership on bond yields but did not account for a non-linear relationship dependent on threshold levels. By introducing and identifying these thresholds, this research provides

a more nuanced understanding of when and how foreign ownership starts to influence yields differently, offering a deeper insight into the market dynamics and potential risks.

The exploration into the effects of macroeconomic news and risk sentiment on government bond yields and volatility in Türkiye, focusing on local currency bonds from 2005 to 2023, illuminates the complex dynamics within an emerging market. The study assesses how bond yields react to domestic and international economic shocks, policy changes, and geopolitical events, emphasizing the critical influence of domestic inflation and monetary policy adjustments in shaping bond return dynamics.

The analysis found that while global macroeconomic news has a lesser impact on bond returns, it significantly influences market volatility. This highlights the complex interplay between global information flows and local market reactions, underlining the sensitivity of emerging market bond volatility to international economic news. The incorporation of the Risk State variable, based on the VIX and local terror events, provided an understanding of how shifts in risk perception and external shocks impact bond markets. Although this variable did not always show direct significance, its inclusion is crucial for capturing the broader risk landscape that investors navigate. The varied impact of these factors across different bond maturities highlights the market's complex response mechanism, where past returns emerge as a persistent predictor, indicating a momentum or the enduring influence of economic conditions over time. The segmented analysis of the study reveals a shifting responsiveness of the bond market to news across different global economic and financial conditions, highlighting an evolving interplay between market reactions and worldwide economic dynamics.

This research contributes to the literature by incorporating a comprehensive dataset of both local and global factors and by examining their impacts across various bond maturities. While studies like Balduzzi et al. (2001) have investigated the biases in survey expectations and their effects on bond yields, this research extends the understanding by examining the interactive effects of risk appetite and macroeconomic surprises on bond yields. The finding that the market's response to economic news depends on the prevailing risk sentiment adds a new dimension to understanding bond market dynamics, especially in emerging markets like Türkiye. This part, looking at the specific context of Türkiye's bond market, not only contributes to the broader understanding of how local currency bonds

respond to an array of news types but also underscores the importance of considering local economic conditions and risk perceptions.

In summary, this research not only enriches the understanding of bond yield dynamics in emerging markets through empirical findings but also introduces a methodological approach that accounts for threshold effects and the complex nature of economic influences. It paves the way for future research to further dissect these relationships, possibly by integrating more granular data or exploring additional external factors. Future studies could also apply the developed framework to other financial markets or asset classes, thereby broadening the applicability and understanding of how global and local economic variables interact to shape market outcomes.

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APPENDIX: SUMMARY OF RESULTS AND METHODS IN THE SELECTED STUDIES FROM THE LITERATURE

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Andritzky (2012)	Quarterly data for G20 advanced countries (1969-2011)	Panel data: VAR Yield (10 year bond)= $\beta_0 + \beta_1 * \text{Short term interest rate} + \beta_2 * \text{real GDP growth} + \beta_3 * \text{Budget Balance} + \beta_4 * \text{Share of non-resident investors} + \beta_5 * \text{Share of private non-bank financial institutions} + \beta_6 * \text{Share of public sector}$	Short term interest rate (+) Real GDP growth (+) Budget Balance (+) Share of non-resident investors (-) Share of private non-bank financial institutions (-)
Ardagna, Caselli and Lane (2004)	Quarterly data for 16 OECD countries (1960-2002)	Panel data: VAR Yield (10-year government bonds)= $\beta_0 + \beta_1 * \text{primary deficit (\% of GDP)} + \beta_2 * \text{public debt (\% of GDP)} + \beta_3 * \text{3-month treasury bill rate} + \beta_4 * \text{inflation} + \beta_5 * \text{GDP growth} + \dots$	Primary deficit (+) Public debt (+) Inflation (+) GDP growth (+)
Arslanalp and Poghosyan (2014)	Quarterly data for 22 developed markets (2004-2012)	Panel data: Fixed Effects Yield (10 year bond)= $\beta_0 + \beta_1 * \text{Yield (2 year bond)} + \beta_2 * \text{real GDP growth forecast} + \beta_3 * \text{Inflation forecast} + \beta_4 * \text{Debt/GDP projection} + \beta_5 * \text{Share of domestic official holdings of government debt in total} + \beta_6 * \text{Foreign Investor base}$	Yield (2 year bond) (+) Real GDP growth forecast (-) Inflation forecast (+) Debt/GDP projection (+) Share of domestic official holdings of government debt in total (-) Foreign Investor base (-)

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Baldacci and Kumar (2010)	Annual data for 31 developed & emerging markets (1980-2008)	Panel Data: Fixed effects' least squares estimates $\text{Yield (10 year)} = \beta_1 * \text{short-term nominal interest rate} + \beta_2 * \text{inflation} + \beta_3 * \text{fiscal balance (\% of GDP)} + \beta_4 * \text{gross general government debt (\% of GDP)} + \beta_5 * \text{square of (gross general government debt (\% of GDP))} + \beta_6 * \text{output growth}$	Inflation (+), Short term rate (+) Fiscal (both actual and expectation)/Primary fiscal balance (+), Gross Public debt (+)
Baldacci, Gupta and Mati (2011)	Annual data for 46 emerging markets (1997-2008)	Panel Data: Random effects estimates $\text{Log of average annual bond spread} = \beta_1 * \text{political risk indicator} + \beta_2 * \text{political risk indicator} * \text{High Volatility} + \beta_3 * \text{political risk indicator} * \text{default} + \beta_4 * \text{fiscal balance} + \beta_5 * \text{fiscal balance} * \text{Volatility} + \beta_6 * \text{High fiscal balance} * \text{default} + \beta_7 * \text{Public Investment} + \beta_8 * \text{Fed Funds Rate} + \beta_9 * \text{log inflation} + \beta_{10} * \text{Reserves} + \beta_{11} * \text{current account} + \beta_{11} * \text{terms of trade}$ Dummy variables: High volatility (vix above 25), default (defaulted in the past or not)	Political risk indicator (-) Fiscal bal.* High Volatility (-) High fiscal bal.* default(-) Public Investment (-) log inflation(+) Reserves (-) Current account (-) Terms of trade (-)

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Beltran, Kretchmer, Marquez and Thomas (2012)	Monthly data for USA	Panel Data: Instrumental Variables Approach Dependent Variable: Change in term premium (5 year bond): Control Variables: Implied volatility of options on U.S. and German five-year sovereign note futures; Liquidity premium (LP) VIX Year-over-year change in industrial production VAR estimates of exogenous oil-specific demand shocks U.S. federal government budget balance; Cochrane and Piazzesi factors (CP1-5 and CP6-9) Measure of global risk appetite Foreign official, Foreign private holdings of U.S. Treasuries	Foreign private holdings of U.S. Treasuries (+) Industrial production (-) VIX (+) Cochrane and Piazzesi factors (CP1-5 and CP6-9 (+) Global risk appetite (-) Oil demand shocks (-)
Broos and Haan (2012)	Yearly data for 10 Countries in EU (1991-2009)	Pooled OLS: Yield (10 year bond spread)= $\beta_0 + \beta_1 * \text{Gross Debt (\% of GDP)} + \beta_2 * \text{Squared Gross Debt (\% of GDP)} + \beta_3 * \text{Deficit (\% of GDP)} + \beta_4 * \text{Squared Deficit (\% of GDP)} + \beta_5 * \text{Interest Rate} + \beta_6 * \text{Foreign Ownership} + \beta_7 * (\text{Interest Rate} * \text{Foreign Ownership})$	Gross Debt (+) Squared Gross Debt (-) Deficit (+) Squared Deficit (-) Interest Rate (-) Debt*Foreign Ownership (-) (significant when country dummies included)

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Caporale and Williams (2002)	G7 countries	Cross section: Error Correction Model Test for exogeneity, conintegration Y: nominal long term rate X: real short term rate, expected inflation, GDP growth, government deficit to GDP, debt stock to GDP	Significance and direction of the relationship changes depending on single country estimates
Ebeke and Lu (2014)	Quarterly data for 12 emerging markets (2009-2013)	Panel data: Instrumental variable approach $\text{Yield (5 year bond)} = \beta_0 + \beta_1 * \text{Policy rate} + \beta_2 * \log(\text{inflation}) + \beta_3 * \text{Change in real GDP growth} + \beta_4 * \log(\text{VIX}) + \beta_5 * \text{Fed Funds Rate} + \beta_6 * \text{Current Account/GDP} + \beta_7 * \text{Fiscal Balance/GDP} + \beta_8 * \text{Government Debt/GDP} + \beta_9 * \text{International Reserves/GDP} + \beta_{10} * \text{Forward Exchange Rate} + \beta_{11} * \text{Foreign Holdings Ratio}$	Foreign Holdings Ratio (+) Policy rate (+) Inflation (+) Fed Funds rate (+) Forward Exchange rate (+)

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Gadanecz, and Miyajima, (2014)	20 emerging markets (Monthly, 2005-2013)	Panel data: Fixed effects Y: Five year local currency bond yield X: country fixed effect, exchange rate factors (twelve month ahead exchange rate forecast and exchange rate volatility implied by 3month at the money options) Twelve month ahead forecasts of short-term interest rate, inflation, fiscal balance (%of GDP) and GDP growth, local currency sovereign credit rating and foreign currency sovereign credit spreads, foreign holdings of local currency bonds, VIX , estimated us 10 year term premia	Exchange rate volatility implied by 3month at the money options (+) Short-term interest rate forecast (+) Inflation forecast (+) Fiscal balance (%of GDP) forecast (-) Foreign currency sovereign credit spreads (+) Foreign holdings of local currency bonds (-) VIX (+) US 10 year term premia (+)
Gruber and Kamin (2012)	19 OECD countries (Annually, 1988-2007)	Panel data: Fixed effects Y: Implied 10 year government bond yield X: Short-term interest rate, Long-term IR (lag) interest rate, $GDP_{SEP}^{[1]}$, Inflation, Indicators of fiscal performance (used separately in four different regressions): Gross debt, Net debt, Primary balance, Structural balance	Short-term interest rate (+) Long-term IR (lag) interest rate (+) Inflation (+) Structural balance (-)

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Jaramillo and Weber (2012)	Monthly data for 26 emerging markets (2005-2011)	Panel threshold estimation: Yield (10 year bond)= $\beta_0 + \beta_1 * \text{Gross Debt (\% of GDP) projection} + \beta_2 * \text{Expected Overall Balance (\% of GDP)} + \beta_3 * \text{Expected Inflation} + \beta_4 * \text{Expected real GDP growth} + \beta_5 * \text{Domestic Treasury bill rate} + \beta_6 * \text{US 10 year bond rate} + \beta_7 * \text{Change in the stock market index} + \text{Foreign bond fund flows (\% of GDP)}$ Threshold variable: VIX	When VIX above threshold level: Gross Debt (% of GDP) projection (+) Expected Overall Balance (-) Domestic Treasury bill rate (+)
Jaramillo and Weber (2013)	Monthly data for 26 EMs (2005-2013)	Factor-augmented panel estimation Y: 10 year domestic bond yield X: Expected gross debt (% of GDP), Expected Overall balance (% of GDP), Expected Inflation, Real GDP growth, domestic treasury bill rate	Expected gross debt (% of GDP) (+) Expected Overall balance (% of GDP) (-) Domestic treasury bill rate (+)

Author	Data and Time Period	Model Specification	Significant Results (Direction)
Min, Lee, Nam, Park and Nam, (2003)	11 Ems in Latin America and Asia between 1990-1999	Panel data: Pooled estimation with dummy variable estimated by OLS Y: Spread (basis points at a fixed-rate issue yields above or below a comparable (in duration) government bond at its launch price. X: External debt (% of GDP), International reserves (% of GDP), current account (% of GDP), Debt service to exports, growth rate of imports, growth rate of GDP, growth rate of exports, net foreign assets (cumulated current account balance), terms of trade, annual inflation, nominal exchange rate, real oil price (deflated by G7 inflation), 3 month US treasury bill rate Dummy variables: issuer type(private/public), regional dummy (latin America or not), issue period (1995 or not)	Issuer type(private/public) (+) External debt (% of GDP) (+) International reserves (% of GDP) (-) Debt service to exports (+) Growth rate of imports (+) Growth rate of exports Net foreign assets (cumulated current account balance) (-) Terms of trade (-) Annual inflation (+) Nominal exchange rate (+) 3 month US treasury bill rate (+)
Peiris (2010)	Quarterly data for 10 EMs (2000-2009)	Panel Fixed effects estimation LCY Yield = β_1*policyrate+ β_2*inflation+ β_3*fiscal deficit/GDP+ β_4*debt/GDP+ β_5*moneygrowth+ β_6*real gdp growth+ β_7*US long-term nominal treasury bond yield+ β_8*Current account+ β_9*share of foreign participation	Policy rate (+) Inflation (+) Fiscal deficit (+) Foreign participation (-) US rate (+) Current account (+)

Author	Data and Time Period	Model Specification
Burger and Warnock (2004)	49 developed and em. market country (year-end 2001)	Cross section: OLS $Y = \beta_0 + \beta_1 \text{ Rule of Law} + \beta_2 \text{ Creditor Rights} + \beta_3 \text{ country size (log of GDP)} + \beta_4 \text{ growth rates (annual GDP growth over the preceding ten years)}$ $Y = \text{Local Development (the ratio of the size of the local bond market to GDP)}$ Or $Y = \text{Local Share (the share of a country's outstanding bonds that are denominated in the local currency)}$
Claessens, Klingebiel and Schmukler (2007)	35 countries (Quarterly, 1993-2000)	Panel: Feasible generalized least squares Y : Log of Local Currency Government Bonds Outstanding / GDP X : Log of GDP, Log of total deposits / GDP, Log of stock market capitalization / GDP, International investor demand, Institutionalized democracy (0-10), Inflation index, Fiscal burden, Actual exchange rate regime
Clark and Kassimatis (2015)	22 countries (Annual, 1995-2010)	Panel: Feasible generalized least squares Y : EMBI spread X : The market value of each economy annually (MV) , change in the market value of the economy (DMV), The returns to each economy (RT), The correlation coefficient between returns to the economy and the exchange rate, (CO) , The financial risk premium (FP), The risk neutral duration of all external debt (DU) , VIX, us10 year, default history, reserves/GDP, real GDP (DGDPR), Terms of trade (TT) and the change in the terms of trade (DTT), Debt over GDP (DG), years since last default (DF) to account for default history. For this variable, country rankings published by Institutional Investor (II), The default yield spread (DYS), TED spread

Author	Data and Time Period	Model Specification
Csonto and Ivaschenko (2013)	18 emerging markets in three regions (Monthly, 2001-2013)	Panel: Fixed effects panel estimation (three separate regions) Y: EMBI spread X: Economic Risk Rating (ERR), Financial Risk Rating (FRR), Political Risk Rating (PRR), VIX, U.S. Federal funds
D'Angostino and Ehrmann (2014)	G7 Countries	Panel: Fixed effects panel estimation Y: EMBI spread X: Baa-Aaa spread, VIX, Expected debt to GDP ratio, Expected current account to GDP ratio, Expected real GDP growth, Expected unemployment, Expected consumer price inflation
Habib and Stracca (2013)	Quarterly data (1990-2012)	Time series: First order autoregressive model Y: Quarterly external liabilities (flows as % of total external portfolio liabilities) X: Rise in uncertainty Rise in risk aversion Rise in US policy uncertainty Rise in the EA spread Fall in EMBIG
Hauner and Kumar (2006)	G7 countries (quarterly, 1960-2005)	Panel with numerous econometric approaches to account for potential robustness issues: OLS (with and without cross-section fixed effects) Feasible generalized least squares (FGLS) Regressions without and with a trend and squared trend and without and with an AR(1) Y: 10-year government bond yield (Quarterly average of the daily observations) X: Expected long-term inflation rate, expected return on capital, annual growth of money, government net borrowing (% of GDP), current account balance (% of GDP), Reserve accumulation

Author	Data and Time Period	Model Specification
Ichiue and Shimizu, (2012)	10 developed countries	Panel : fixed effects regression with/without restriction Y: 5-10 year forward rates X: Net government debt-to-GDP ratio, Gross government debt-to-GDP ratio, Primary balance-to-GDP ratio, Net foreign debt-to-GDP ratio, Current account balance-to-GDP ratio, Labor productivity growth rate, Working-age population ratio growth rate: Inflation expectation, Standard Deviation of Inflation Expectation Restriction: coefficient of inflation expectation = 1
Jaramillo and Zhang (2013)	Semiannual data for 45 countries (24 advanced, 21 Ems) (2005-2013)	Panel data: Fixed effects (whole sample and EM, advanced separated sample estimates) Y: 10 year government bond yield, X: short-term interest rate, One-year ahead expectations for macroeconomic variables (real GDP growth, 12-month inflation, general government gross public debt to GDP, general government primary balance to GDP, and external current account deficit to GDP), Domestic nonbank holdings of government debt, percent of GDP, lagged, National and foreign central bank holdings of government debt , (percent of GDP, lagged), Domestic bank holdings of government debt, (percent of GDP, lagged), Foreign bank holdings of government debt (percent of GDP, lagged), ECB Securities Market Program holdings of government debt, percent of GDP, lagged, Dummy for IMF program countries, VIX
Kennedy and Palern (2014)	Monthly data for 18 countries (2002-2011)	Panel data: Pooled mean group (PMG) techniques of Pesaran et al. Y: EMBI spread, Long-run: X: Foreign debt/GNI, Risk*(Foreign debt/GNI), Fiscal, Log (Political), Term structure, Debt servicing, Short-run: X: Change in (Foreign debt/GNI, Risk*(Foreign debt/GNI), Fiscal, Log (Political), Term structure, Debt servicing, treasury rate)

Author	Data and Time Period	Model Specification
Laubach, (2009)		Panel data Y: 5-year-ahead 10-year forward rate, the 5-year-ahead 5-year forward rate, and the 10-year constant maturity Treasury yield.X: 3 month Treasury bill yield, long-horizon inflation expectations, projections for the deficit/GDP and debt/GDP ratios for the current fiscal year; projections for deficit/GDP and debt/GDP ratios 5 years ahead.
Marcilly (2010)	Monthly data for 4 Asian countries Indonesia, Thailand, Malaysia and India	Panel data: VAR Model Y: 10-year local currency annual government bond yield X: CPI, logarithm of the stock of foreign holdings of local currency bonds, spot and 1-year forward exchange rate of the national currency against U.S. Dollar, , national composite leading indicators provided by national authorities or the OECD (for India and Indonesia) are used as a proxy for economic activity.
Martinez, Terceno and Mercedes (2013)		Panel data: Fixed Effects Y: EMBIG spreads X: inflation, terms of trade ratio, external debt (percentage of GDP), public debt (percentage of GDP), current account external debt (percentage of GDP), Terms of trade, international reserves (percentage of GDP), exchange rate, gov. effectiveness, rule of law, stock index, GDP growth, M2 external debt (percentage of GDP), Crisis07 or crisis08 (dummy variables representing before and after crisis)

Author	Data and Time Period	Model Specification
Miyajima, Mohanty and Chan, T (2015)	Monthly data 11 EMs (Jan, 2000-May 2014)	Panel data: Fixed Effect Y: 10 year bond yield X: Forecasts for short rates, inflation, GDP growth and the fiscal balance (of GDP), us 10 year bond yield, VIX
Miyajima, Mohanty and Yetman (2014)	Monthly data for 5 Asian Economies (Jan,2003-Dec,2013)	Panel VAR model (estimating the relationship between domestic and international variables) Y regressed on lag variable of Y and exogenous Z Y: Vector of endogenous variables: industrial production, inflation, the domestic overnight interest rate, the domestic five-year bond yield and the bilateral nominal exchange rate against the US dollar Z: Exogenous variable representing US monetary influence: US 10-year treasury yield and US 10-year term premium
Pretorius and Kabundi (2014)	38 advanced and emerging economies (2003-2012)	X: Percentage change in the 10-year government bid yield of the US (US10year), the UK (UK 10 year) and Germany (Ger10year) for long-term interest rate Four indicators of short-term interest rates: Emerging markets, the Euro market countries, the UK and US 3month rates. VIX

Author	Data and Time Period	Model Specification
Siklos (2011)	22 Ems (1998–2009)	Y: log spread X: exchange rate regime, of the inflation gap, gap in domestic credit, IMF's annual forecasts of inflation, real GDP growth and the current account balance (% of GDP), governmental factors for country, such as indicator of corruption, fiscal independence, or central bank transparency
Stracca (2013)	25 advanced and emerging economies (Jan, 2010–May, 2013)	Panel data with fixed effects model Y: daily data for 10-year government bond yields X: Gov bond yield, Equity return, Financial equity return, Change in exch. rate vs. euro, Population Public debt to GDP, Trade openness, ICRG economic risk ICRG political risk, financial risk, Export to euro area/GDP, Export to euro area/total export, Export to euro area high yield/GDP, Export to euro area low yield/total export, Private credit to GDP, Stock market capitalisation to GDP, Output growth correlation with the euro area, Fin. integr. with the euro area, Fin. integr. with the euro area, Fin. integr. with the euro area high yield, Fin. integr. with the euro area high yield, Fin. integr. with the euro area, Net Financial Assets / GDP, Financial openness (external assets and liabilities over GDP)