Peer-Reviewed Article

Jurnal Keuangan dan Perbankan
Volume 26, Issue 4 October 2022, page. 874-891
ISSN: 1410-8089 (Print), 2443-2687 (Online)
DOI: 10.26905/jkdp/v26i4.8398

Exchange Rate, Stock Return, and Bond Return in Indonesia: An ARDL Approach

Sawitri[1], Ghazali Syamni[2], Rizal Ansari[3], Rasyimah[4], Husaini[4]
[1]*BPS-Statistics of Langsa*
Jl. Tgk Chik Ditunong, Langsa, Aceh and 24415, Indonesia
[2]*Department of Management, Faculty of Economics and Business, Malikussaleh University*
Jl. Cot Tengku Nie Reuleut, Lhokseumawe, Aceh and 24355, Indonesia
[3]*Department of Management, Faculty of Economics and Business, Abulyatama University*
Jl. Blang Lama, Aceh Besar, Aceh and 24415, Indonesia
[4]*Department of Management, Faculty of Economics and Business, Malikussaleh University*
Jl. Cot Tengku Nie Reuleut, Lhokseumawe, Aceh and 24355, Indonesia
*Corresponding Author: husaini@unimal.ac.id

Abstract

The purpose of this research is to investigate the relationship between the Indonesian exchange rate, stock return, and bond return. This study uses time series data in monthly frequencies from sources Thomson & Reuters and Bank Indonesia during the period January 2010 to December 2020. This paper uses quantitative research by employing the Autoregression Distribution Lage (ARDL) approach to analyze the causal relationship between variables in this study. According to the results of the ARDL estimation, changes in exchange rates were inversely related to stock returns. Various findings were also found, demonstrating that changes in exchange rates were positively related to bond returns. Stock and bond returns, on the other hand, were inversely related. According to this study, when there is uncertainty in the stock market, investors would rebalance their portfolios. When investors move their money to safer places or safe havens, this is known as the "flight to quality" phenomena.

Keywords : ARDL method; Bond Return; Exchange rate; Stock return; Indonesia
JEL Classification : D13, I31, J22*

1. INTRODUCTION

Aftermath of the financial crisis, scholars and practitioners have been discussing the relationship between exchange rates (X-rate), the stock market, and the bond market as a topic. One of the implications faced by investors is identifying stock and bond price movements to benefit from the resulting returns (Dahir et al., 2018). In the era of integrated international financial markets, the domestic X-rate has the potential to be undervalued or overvalued, which is far from its fundamental value (Ndako, 2013). The X-rate appreciation

and depreciation are one of the investment strategies in the international market in search of additional income. The appreciation and depreciation of the domestic X-rates determine the relationship between X-rates, the stock market, and the bond market (Kal et al., 2015).

The relationship between X-rates and stock prices can be explained in two ways. The first is the classic theory, which contends that depreciation influences stock prices via the export-import track by making domestically produced items cheaper and imported goods more expensive, thereby raising domestic stock prices. (Sonic, 1987). The second is portfolio-adjustment strategy, investors used foreign capital inflows and outflows to alter their portfolios as a result of stock price movements. The sustained higher trend in stock prices will attract foreign capital inflows and lead to an appreciation in X-rates. While a drop in stock prices reduces shareholder wealth, it also reduces demand for money, resulting in reduced interest rates, capital outflows, and currency devaluation (Kal et al., 2015).

Most recent studies have documented the role of X-rates changes in shaping equity market values (Ahmed, 2019; Cuestas and Tang, 2021; Mroua and Trabelsi, 2019; Luzarraga-Goitia et al., 2020). The increasing value of equity will increase the wealth obtained by domestic investors, so that it has a direct impact on the demand for money by foreign investors because they want to invest in the domestic stock market (Bahmani-Oskooee and Sohrabian, 1992). The increasing demand for money by foreign investors will result in the appreciation of the X-rates. When investors place large investment due to optimism, market timing and speculation, it indirectly affects the appreciation of the domestic X-rate (Dar et al., 2014). As a result, the interaction of X-rates and stock returns will be positively correlated in the current period but negatively correlated in the lag period. Several research, on the other hand, have looked at causality or causal consequences (Kumar, 2019; Sikhosana and Aye, 2018; Bahmani-Oskooee and Saha, 2018; Salisu and Ndako, 2018; Tiryaki et al., 2019). Due to investor optimism about future performance, high stock returns cause an increase in domestic demand for money.

Regarding changes in X-rates and bond returns, several researchers (Francová, 2017; Hui et al., 2018; Turner (2014) provide evidence that the uncertainty of appreciation (depreciation) in the domestic X-rates can affect bond prices to rise it to fall. Research conducted by JP Morgan in 2016 found an inverse relationship between yield-to-maturity and bond prices. Every time the yield decreases, bond quality increases which can increase demand and elevate bond prices. High demand for bonds makes returns increase which also affect X-rates appreciation (Meyer et al., 2020). In addition, internal factors such as increased demand for bonds and changes in ratings and external factors including macroeconomics, inflation, interest rates and X-rates affect bond prices (Mega and Widayat, 2019). Appreciation or depreciation of the domestic X-rate can cause bond prices to rise or to fall (Patton, 2006) while the depreciation or appreciation of the X-rates will make bond yields increase or decrease (Pilbeam, 2005). This result demonstrates a link between the X-rates and bond returns.

Investigations on the correlation of stock returns and bond returns have become a major concern for investors and portfolio managers in financial markets (Baur and Lucey 2009; Li et al., 2015). The two markets have behaved differently which caused a positive or negative correlation depending on variations over time. A country's economic policy leads to the phenomenon of "flight to quality" which means high uncertainty will cause bond prices to increase compared to stock market prices and the correlation is negative (Ain and Siddiqui, 2019). Nieto and Rodríguez (2015) claimed that when crisis occur, investors will

secure investment assets to a safer place. This means investors will shift their investment from the stock market to the bond market. Connolly et al., (2005), and Baele et al., (2010) found results in the long term when a country's economy is stable will have an impact on the stability of the stock and bond markets moving in the same direction and positively correlated.

The Indonesian composite index increased by 10.08%, while the Indonesian composite bond index increased by 5.91%. (Idx, 2021). Even though the stock and bond markets are interesting for investment, evidence suggests that Indonesia's financial markets are vulnerable to macroeconomic and external shocks (Indrawati et al., 2021). Indonesia follows a flexible X-rate system in which any macroeconomic changes influence foreign investors' strategies in conducting financial market transactions due to X-rate risk and hedging (Rahman, 2021). However, it is still interesting to research how X-rate changes affect both stock and bond markets and vice versa.

Recently, the empirical literature has documented an explicit relationship between X-rates, stock markets, and bond markets. Research by Andersen et al. (2007) found that dynamic changes in X-rates and economic fundamentals have more impact on bond markets than stock markets in Germany and the US. Ahmed's research (2019) found a positive causality relationship between X-rates and stock returns in Egypt. However, Syahri and Robiyanto (2020) found a negative relationship between X-rates and the stock market in Indonesia. Nieh and Lee (2001) only found the effect of X-rates on stock returns in the short term and did not find it in the long term in the G-7 countries. Hilscher and Nosbusch (2010) found that in developing countries, changes in X-rates have a positive effect on bond returns. While megasari et al., (2019) found that negative X-rate changes on bond returns are stronger in the long run in Indonesia. Economic certainty has a positive correlation between the stock market and the bond market (Lee, 2021), but economic uncertainty has a negative correlation between the two markets (Chiang et al., 2015).

Many studies have been conducted on the impact of changes in X-rates, stock return and bond return in developed countries, but few studies have been conducted in Indonesia. Overall, there is a correlation between the X-rates, stock return and bond return. Our findings are consistent in both short and long runs. The results explain the effect of the X-rates on the assessment of the allocation of investment portfolios in the Indonesian stock and bond markets. Our findings also have implications for the determination of portfolio management to diversify portfolios, and Indonesian monetary authority should consider this relationship at determining economic policy.

This study uses the ARDL approach for cointegration developed by Pesaran et al. (2001). The advantages that ARDL has over other estimation techniques include: First, it allows variables to have different optimal lags which are practically not possible with other conventional cointegration techniques. Second, ARDL models are more valid and precise when faced with small sample sizes unlike other estimation techniques that require large data sets for validity (Ayopo et al., (2016). Third, the ARDL model allows handling non-stationary data but with an order of integration beyond cointegrated variables in the same regression. Fourth, compared to traditional cointegration techniques, the ARDL approach offers more accurate estimates when used for small sample sizes (Lawal et al., 2018). Fifth, the ARDL technique can deal with endogeneity among variables so that it doesn't affect the accuracy of the estimates and doesn't provide biased estimates over time (Pesaran et al., 2001).

2. HYPOTHESES DEVELOPMENT

Exchange Rate and Stock Return

Two theoretical techniques are used to investigate the link between X-rates and stock returns. The first is Dornbusch and Fischer's (1980) classic approach, or flow-oriented model, in which X-rates swings cause stock price movements. The increase in stock prices is influenced by the inflow of investment that causes the X-rates to appreciate. Second, Frankel (1983), Branson (1983), and Branson and Henderson (1985) proposed the portfolio balance technique, which assumes that the X-rates and market return are uncorrelated (Noman et al., 2012). Changes in stock prices, as well as supply and demand by international and domestic investors in portfolio diversification, affect the X-rates endogenously (Moore and Wang, 2014; Chkili and Nguyen, 2014).

The global financial system's increased integration has facilitated the transfer of investment capital between countries (Liang et al., 2013; Stillwagon and Sullivan, 2020). Investors with lesser returns will diversify their portfolios by investing in nations with greater stock returns (Salisu and Oloko, 2015 and Zivkov et al., 2016). The rising stock market during the economic recovery after the crisis can attract foreign investors to invest which causes the domestic X-rates to appreciate and vice versa which will have an impact on increasing stock returns (Ahmed, 2018). In four developing nations, Walid et al. (2011) discovered a negative link in which the increase in stock returns responded asymmetrically to the demand for money (Singapore, Malaysia, Hong Kong and Mexico).

Bahmani-Oskooee and Saha (2016) observed a favorable association between X-rates and stock returns (Caporale et al., 2015; Ülkü and Demirci, 2012). Several other research, on the other hand, have discovered a negative link (McMillan, 2019; Fang et al., 2017; Wong, 2017). They look at the two-way relationship in both the leading and lagging phases. The term "two-way relationship" refers to the effect of the X-rates on stock market returns and vice versa. Changes in X-rate had little effect on stock returns, according to Chkili and Nguyen (2014), whereas stock returns had a significant effect on X-rates changes in BRICS countries except South Africa. Ahmed (2018), on the other hand, discovered a positive association between X-rates and stock returns in MENA region. Based on these studies, we hypothesize the relationship between the X-rates and stock return as follows:

H1: The relationship between the X-rates and the stock return is bidirectional.

Exchange Rate and Bond Return

In conditions country's economy becomes more uncertain, the currency rate and return bonds play a larger role in investor evaluation (Gadanecz et al., 2014). Changes in a country's currency rate are heavily influenced by bond prices (Wilcox and Falozzi, 2013). Changes in X-rates can affect the bond market, causing both positive and negative emotion among investors. Changes in currency rates can be exploited by investors as opportunities to profit and foresee the hazards associated (Evans and Marshall, 1998). Any changes in X-rates likely to affect bond returns in the short and long run (Chow et al., 1997). Changes in X-rates had a favorable influence on bond returns, according to Hilscher and Nosbusch (2010). Meanwhile, Megasari et al. (2019) discovered that X-rates fluctuations had a considerable negative impact on short, medium, and long-term bond prices.

Although the empirical data suggests that the X-rate has a beneficial effect on bond returns over time (Francová, 2017), other studies have discovered evidence that the X-rate has a negative effect on bond returns in developing nations (Turner, 2014; Megasari et al., 2019). Bond prices in emerging countries will rise (dive) when the domestic X-rates

appreciates (depreciates) (Choudhry and Westcott 2019). This demonstrates that an investor's expectation of a domestic X-rate appreciation (depreciation) will cause bond prices in developing countries to rise (fall), especially following the shock of financial instability in 2013. (Choudhry and Westcott, 2019).

According to Coeurdacier and Gourinchas (2016) and Ngaruiya and Njuguna (2016), X-rates and stock returns have a reversal and bi-directional effect correlation. The rising bond prices were triggered by optimism that investors would respond with a shock demand for these bonds, resulting in more transactions, which would have an impact on increasing demand for domestic currency and making the X-rate appreciate. As a result, we develop the following X-rates and bond return hypotheses:

H2: The X-rate and the return bond have a bi-directional effect.

Exchange Rate and Bond Return

First and foremost, financial market integration permits the interconnectedness of the stock and bond markets' complicated relationships. Portfolio management, asset allocation, and hedging all benefit from financial market integration (Lin et al., 2018). There are two compelling reasons in favour of a positive correlation between stock and bond returns. The stock and bond markets, for starters, are the two main asset classes that fight for funds from both domestic and international investors. As a result, when bond returns rise, stock prices must fall in order for stock earnings to rise, ensuring stock competitiveness remains stable. Second, the stock price is the present value of future cash flows discounted at a certain rate (Zakamulin and Hunnes, 2021).

Previous studies have found a reversal and bi-directional effect on the return connection between stocks and bonds (Papadamou, 2021; Lee, 2021; Li, 2015; Keehwan, 2019; and Lin et al., 2018). The results are related to how an investor diversifies his portfolio to gain profits and minimize the risk of loss (Campbell and Ammer, 1993). In the short term, when economic uncertainty increases, the economic crisis and financial markets are notoriously volatile, and inflation concern can negatively affect stock and bond markets, leading to a flight to safety (Chiang et al., 2015). As a result, there is a negative link between stock and bond returns. Changes in the level of economic activity and improved economic fundamentals of a country, on the other hand, will make investors optimistic in the long run, increasing the flow of investment funds (Hong et al., 2011).

The empirical literature yields a bunch of outcomes. The simultaneous relationship between stock and bond returns has fluctuated over time, but it currently tends to be positive (Lin et al., 2018; Baele et al., 2010; Bansal et al., 2014). In lagging times, however, stock and bond returns are inversely connected (Andersson et al., 2008; Baur and Lucey, 2009; Connolly et al., 2005; and Gulko, 2002). Exposure to a country's macroeconomic fundamentals has an impact on financial market transmission, resulting in a link between stock and bond returns (Andersson et al., 2008). As a result, stock and bond returns can be both positive and negative. Finally, Finally, we create hypothesis H3 in the following way:

H3: Stock and bond returns have a bi-directional relationship.

3. METHOD, DATA, AND ANALYSIS

Research Methods

The simultaneous connection between X-rate, stock returns, and bond returns in Indonesia is examined in this research. In this research study, time series data is used in

monthly frequency from various sources during the period from January 2010 to December 2020. Table 1 offers an explanation of the definitions of variables and data sources.

Table 1. The description of variables

Variable	Definition	Source
Exchange Rate_t	US/IDR $ exchange rate in per cent	Thomson & Reuters
Stock Return_t	Stock returns at the aggregate market level are represented Indonesia Composite Index	Thomson & Reuters
Bond Return_t	rate return government obligation tenor 10 years	Thomson & Reuters
Inflation_t	Inflation rate, defined as the monthly percentage change in the Consumer Price Index (CPI)	Bank Indonesia
ICC_t	indicator to measure consumer confidence or doubt about the economic conditions of a country.	Bank Indonesia
EPU_t	Economic policies in the US as a proxy for fiscal and monetary policy uncertainty	Thomson & Reuters
VIX_t	Natural log of CBOE volatility index as a proxy of the global sentiment index	Thomson & Reuters

We use monthly data and sample periods from January 2010 to December 2020

Model Autoregressive Distributed Lag

Our research aims to examine the bidirectional relationship between X-rates, stock returns, and bond returns. This study reveals that these variables can be simultaneously associated with long-run and short-run periods. We also add exogenous factors of inflation, ICC, EPU, and VIX to each equation function. Several studies found that these exogenous factors are associated with excess returns (Ansari et al., 2020; Erdogan et al., 2020; Xie et al., 2020), and X-rates (Karagiannopoulou et al., 2022; Geng and Guo, 2022).

The dynamic effect can be seen by counting the lag value of the independent variable. In dynamic model, it can be done by distributed lag or autoregressive model. The combination of these two models is called Autoregressive Distributed Lag (ARDL). The ARDL model has been widely used in models that use time series data. Furthermore, this method is more effective at capturing both long-term and short-term relationships in small samples (Pesaran and Shin, 1995). When the independent variable is not stationary or I need to look at a long-term relationship, the ARDL model is used (1). Long-term coefficients generated by the ARDL estimator will be consistent. Even though the regressors are I (0) or I (1), one of the advantages of ARDL is that the resulting estimates are consistent with asymptotically normal long-term coefficients (Pesaran et al, 2001). ARDL may detrend the series and model the detrended series as a stationary distributed lag when the long-term relationship of the research object is trend stationary. Standard asymptotic normal theory can be used to make estimates and draw inferences about the model's long run behaviour.

The general model of ARDL is as follows.

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} \emptyset_i y_{t-i} + \hat{a}' x_t + \sum_{i=0}^{q-1} \beta_i * \Delta x_{t-i} + u_t \quad (1)$$

$$\Delta x_t = P_1 \Delta x_{t-1} + P_2 \Delta x_{t-2} + \cdots + P_i \Delta x_{t-i} + \varepsilon_t \quad (2)$$

Where x_t is k-dimensional, which are forcing variables I (1) which are not cointegrated among themselves. μ_t and $_t$ are serially uncorrelated disturbances that have zero mean and constant variance-covariance, and Pi is a k x k coefficient matrix such that the vector autoregressive process in Δx is stable.

A simpler ARDL model can be expressed as follows.

$$\emptyset(L)y_t = \alpha_0 + \alpha_1 w_t + \beta'(L)x_t + u_t \quad (3)$$

Where L is the lag operator and w_t is the sx1 vector of deterministic variables such as intercepts, trends, dummy variables, and exogenous variables with fixed lag. In a situation where Y_t and X_t are not stationary but have cointegration, the suitable model is the Error Correction Model (ECM). But if where Y_t and X_t are not stationary and also have no cointegration, the suitable model is the ARDL model (Rosadi, 2011). The ARDL model that is suitable for situations where Y_t and X_t are not stationary and not cointegrated is as follows.

$$Y_t = \alpha_0 + \varphi_1 Y_{t-1} + \cdots + \varphi_p Y_{t-p} + \beta_0 X_t + \cdots + \beta_q X_{t-q} + \varepsilon_t \quad (4)$$

With

Y_t= observed variable

α_0= constant

φ_1= dependent coefficient

β_0= independent coefficient

The ARDL model long run that will be tested in this study is as follows:

$$Exchange\ Rate_t = \alpha_0 + \beta_0 Bond\ Return\ _t + \beta_1 Stock\ Return_t + \beta_2 \text{Inflation}_t + \beta_3 \text{ICC}_t + \beta_4 \text{EPU}_t + \beta_5 \text{VIX}_t + \varepsilon_t \quad (5)$$

$$Stock\ Return_t = \alpha_0 + \beta_0 Bond\ Return_t + \beta_1 Exchange\ Rate_t + \beta_2 \text{Inflation}_t + \beta_3 \text{ICC}_t + \beta_4 \text{EPU}_t + \beta_5 \text{VIX}_t + \varepsilon_t \quad (6)$$

$$Bond\ Return_t = \alpha_0 + \beta_0 Exchange\ Rate_t + \beta_1 Stock\ Market_t + \beta_2 \text{Inflation}_t + \beta_3 \text{ICC}_t + \beta_4 \text{EPU}_t + \beta_5 \text{VIX}_t + \varepsilon_t \quad (7)$$

Meanwhile, the short-run ARDL equation is as follows:

$$\Delta Exchange\ Rate_t = \alpha_0 + \beta_0 \Delta Bond\ Return\ _t + \beta_1 \Delta Stock\ Return_t + \beta_2 \Delta\text{Inflation}_t + \beta_3 \Delta\text{ICC}_t + \beta_4 \Delta\text{EPU}_t + \beta_5 \Delta\text{VIX}_t + \varepsilon_t \quad (8)$$

$$\Delta Stock\ Return_t = \alpha_0 + \beta_0 \Delta Bond\ Return_t + \beta_1 \Delta Exchange\ Rate_t + \beta_2 \Delta\text{Inflation}_t + \beta_3 \Delta\text{ICC}_t + \beta_4 \Delta\text{EPU}_t + \beta_5 \Delta\text{VIX}_t + \varepsilon_t \quad (9)$$

$$\Delta Bond\ Return_t = \alpha_0 + \beta_0 \Delta Exchange\ Rate_t + \beta_1 \Delta Stock\ Market_t + \beta_2 \Delta\text{Inflation}_t + \beta_3 \Delta\text{ICC}_t + \beta_4 \Delta\text{EPU}_t + \beta_5 \Delta\text{VIX}_t + \varepsilon_t \quad (10)$$

4. RESULTS

An overview of descriptive statistics is presented in Table 2 on endogenous variables (X-rate, Stock Return, and Bond Return) and exogenous variables (Inflation, ICC, EPU, and

VIX) used in this study. From the table, it can be seen that the average value of the stock return is positive (0.007), and the bond return is negative (-0.002). The lowest and maximum values for the stock return variable are -0.168 and 0.136, respectively. The lowest and maximum values for the bond return variable are -0.126 and 0.172, respectively. While the minimum stock return is greater than the bond return, the maximum bond return is bigger than the stock return. This shows that investing in bonds yields more returns than doing so in stocks. This indicates that investing in the bond market provides higher returns than in the stock market. The results of the minimum and maximum values on the stock return and bond return variables show that stock returns have more extreme values than bond returns.

Table 2. Statistics Description

Variables	N	Mean	Std Dev	Min	Max	Jarque-Bera
Exchange $Rate_t$	132	0.332	2.491	-9.050	13.670	286,839***
Stock $Return_t$	132	0.007	0.043	-0.168	0.136	23,235**
Bond $Return_t$	132	-0.002	0.058	-0.126	0.172	12,069**
$Inflation_t$	132	0.366	0.493	-0.450	3,290	684,124***
ICC_t	132	113,250	10,763	67,900	128,200	113,119***
EPU_t	132	116,243	71,592	46,395	503,012	621,411***
VIX_t	132	2,959	26,463	-45,900	134,570	225,905***

*, **, and *** indicate that the percentage is significant at 10%, 5%, and 1%, respectively.

Results of Unit Root Test

Table 3. Stationary test

Variables		ADF Stat.	P-VALUE
Exchange $Rate_t$	LEVEL	-11.8017***	0.0000
Stock $Return_t$	LEVEL	-10.2969***	0.0000
Bond $Return_t$	LEVEL	-10.784***	0.0000
$Inflation_t$	LEVEL	-9.9701***	0.0000
ICC_t	LEVEL	-2.6169*	0.0921
	FIRST DIFF	-9.4641***	0.0000
EPU_t	LEVEL	-3.7321***	0.0046
VIX_t	LEVEL	-13.2499***	0.0000

This table shows the results of the unit root test used to look for stationary circumstances. There is no unit root for the time-series unit root test. *, **, and *** indicate that the percentage is significant at 10%, 5%, and 1%, respectively.

The findings of the Fisher type unit root test report are shown in Table 3. that six variables (X-rate, Stock Return, Bond Return, Inflation, EPU, and VIX) proved to be stationary with a critical value of 1% at the level. While the ICC variable proved to be stationary in the first difference with a critical value of 1%. We conclude that all variables do not move at the level. Because the variables are stationary at the level or first different, the ARDL method can be continued. We therefore have no doubts about the spurious association in Autoregressive Distributed Lag (ARDL) regression.

Results of bounds test of co-integration

Table 4. Bound Test

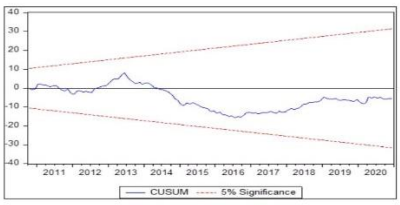
Variables Dependent	F-statistics	Level of significance (%)	I(0)	I(1)
Exchange $Rate_t$	43,1681	1%	2,88	3,99
Stock $Return_t$	38,0149	1%	2,88	3,99
Bond $Return_t$	36,7721	1%	2,88	3,99

This table reports the Bound test. H0 for time-series Bound test is that there is no cointegration within variables.

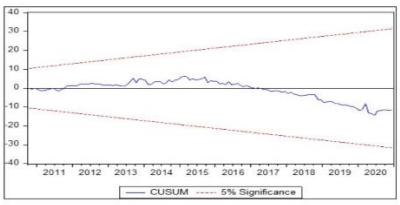
A Bound test must be performed before to the ARDL test to determine the presence of long-term cointegration between variables. The Bound test's null hypothesis is that no long-term cointegration exists between variables. The results of the Bound test for the three distinct models are shown in Table 4. The value of F is more than the upper limit (I (1)), as seen in table 4. This reveals that the null hypothesis of the Bound test is rejected for all models, implying that each model has long-term cointegration.

Stability Test Results

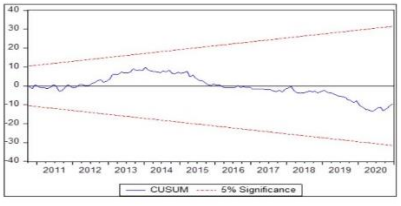
Furthermore, the coefficient stability test of the long-term model is carried out using the cumulative sum (CUSUM) of the recursive residuals. The cumulative sum test can be seen in Figure 1. The figure above shows that the CUSUM test plots for the three models are within the critical limit of 5% significant, Because the cumulative number is fixed and the residual variation is stable in the 95% confidence interval, this suggests that the models in the study were not incorrectly determined, and there were no unexpected structural changes in the model over time, it can be assumed that the coefficient of the model is stable. From previous diagnostic test, The ARDL model was found to pass all of the required tests. As a result, the model developed in this study can be utilized to interpret testing in both the long and short-term using the ARDL technique.



a. BOND RETURN



b. EXCHANGE RATE



c. STOCK RETURN

Results of the ARDL regression estimation

The results of the ARDL regression estimation of a two-way relationship in the short and long run periods are presented in Table 5. Short-term and long-term relationships, the

X-rate and the stock return have a negative effect at a significant level of 5%, causing value depreciation to increase the reallocation of investments to profitable places, thereby reducing demand in the stock market which results in a decline in stock prices. Furthermore, at a large level of 5%, the link between the X-rate and bond return has a positive effect on investors' decisions to move their investments to low-risk assets or save. The appreciation of the currency rate will be affected by an increase in investment flows into the bond market. While stock and bond returns are inversely associated, we might conclude that if a country's economy is unstable, there is a conflict of quality between markets.

Table 5. The result of system ARDL estimation

	Exchange Rate$_{it}$	**Stock Return$_{it}$**	**Bond Return$_{it}$**
Panel A: Short Run			
Exchange Rate$_t$		-0,0058***	0,0078***
Stock Return$_t$	-20,8229***		-0,2721****
Bond Return$_t$	14,0175***	-0,5291****	
Inflation$_t$	-0,1864	0,0029	0,0160*
ICC$_t$	0,0163	-0,0001	-0,0004
EPU$_t$	0,0004	-3,28E-05	-0,0001
VIX$_t$	0,01241*	-0,0003**	-0,0001
C	-1,3238	0,0297	0,0551
Panel B: Long Run			
$Exchange\ Rate_t$		-0,0063***	0,0078***
$Stock\ Return_t$	-19,5236***		-0,5329****
$Bond\ Return_t$	13,1428***	-0,2919****	
$Inflation_t$	-0,1747	0,0031	0,0161*
ICC_t	0,0153	-0,0002	-0,0004
EPU_t	0,0004	-3,51E-05	-0,0001
VIX_t	0,0116*	-0,0003**	-0,0001
C	-1,2412	0,0318	0,0555

This table reports Autoregressive Distributed Lag (ARDL) regressions. Panel A shows estimation short run. Panel B shows estimation long run. *, **, ***, and ****denote significant at 10%, 5%, and 1% respectively.

5. DISCUSSION

Based on the statistical results of ARDL testing in the short and long run, it was discovered that the X-rate and stock returns had a substantial negative causal relationship. These findings back with the portfolio balance theory developed by Branson and Henderson (1985), Branson (1983), Frankel (1983), and Ding and Ma (2013), according to which a negative relationship becomes appealing to investors. The portfolio balance effect happens when investors see a chance to profit in a country due to a stock market bubble or financial crisis, resulting in an influx of investment flows into the stock market and outflows, affecting the X-rate significantly. Shocks in one market can quickly spread to

other markets, affecting investors' portfolio rebalancing (Dahir et al., 2017; Leung et al., 2017).

In the long run equilibrium implies that the appreciation of the Indonesian currency encourages international capital to enter the stock market because it seeks investment opportunities and portfolio management to diversify its investment. In addition, when investors see profitable opportunities to invest in the stock market at a time when stock prices are declining, investors reallocate their capital flows by diversifying their portfolios by buying stocks that have performed profitably in the past, which has an impact on the appreciation of the domestic currency (Salisu and Ndako). , 2018). The negative relationship between X-rates and the stock market is not surprising to investors, as the Indonesian stock market is becoming increasingly attractive to foreign investors.

The findings of this research support the previous about causality X-rates and bond returns. Coeurdacier and Gourinchas, for example, carried out research (2016). Returns in the stock and bond markets are influenced by changes in X-rates. When the equity market has a negative correlation with returns and the bond market has a positive correlation with returns, investors will restructure their portfolios to safeguard their investment risk. Changes in currency rates influenced bond return prices positively, according to Francova (2017) and Ngaruiya and Njuguna (2016). As a result, in this analysis indicating that the X-rate and bond return variables have a statistically significant positive relationship.

Economic iuncertainty increases, many investors tend to be risk averse by diversifying risks that are more efficient to shift their investments to the bond market which makes the price of government bonds rise. foreign investors investing in Indonesia will also move investments to the bond market to hedge X-rate risk (Coeurdacier and Gourinchas, 2016). Bond prices will rise as the domestic stock market Bearish as investors have shifted investments to the bond market to diversify their portfolios as much as possible. Government bonds are an important hedge when investing in financial markets to lower the risk and reweturn that investors will get.

In the long and short term, empirical evidence reveal a negative causation between stock and bond returns. The negative relationship is typically regarded as a flight to quality phenomena, in which investors move their money to a safer or more secure location (Lin et al., 2018). The movement of these two assets is greatly reliant on the economy's stability. Economic volatility continues to be a major threat to developing country markets. During stock market falls, government bonds tend to strengthen, resulting in a negative correlation between stock and bond returns, implying that government bonds provide excellent diversification when needed.

These results provide new insights that the stock market and union market are mutually correlated. when investors are pessimistic about a country's economic prospects thereby influencing their investment decisions (Papadamaou et al., 2021). The increased risk makes investors switch from risk assets to fewer risk assets (flight-to-safety effect), resulting in a negative correlation between stock and bond returns. The pessimistic behavior of investors towards the stock market will cause a decline in stock prices as investors sell their stock holdings and shift their investments to the bond market so that the bond market tends to be bullies as investors switch to government bonds that offer more profitable diversification.

6. CONCLUSION, LIMITATIONS, AND SUGGESTIONS

The results of short-term and long-term changes in X-rates on the stock and bond markets are investigated in this article. Portfolio balance is a straightforward response to hedging from the systematic risk of their assets, as seen by the negative association between changes in X-rate and stock returns. As a residual risk received by investors while investing, an investor's portfolio in the stock market would be on equilibrium level. Furthermore, because changes in X-rates and bond returns are positively connected, investors will use the bond market to hedge against X-rate risk because the risk is very low. Stock and bond returns, on the other hand, have a negative correlation. When there is a crisis or an X-rate shock, investors who can invest in both the stock and bond markets will shift their investments from the stock market to the bond market, or the so-called flight to quality phenomena.

Policymakers, domestic and international investors, and investment managers should all be aware of these findings. Different intervention measures can be adopted when knowing the consequences of depreciation and X-rate appreciation, and the monetary authority plays a vital role in stabilizing the macroeconomy and financial markets. The dynamic interaction between the X-rate, stock market, and bond market will encourage investors and investment managers to diversify their investments or portfolio balance by using X-rate variations as a primary reference point. Thus, the inter-market dependency structure will help investors and investment managers to diversify assets and minimize risk in investing in negatively correlated markets. Upcoming innovative work can be continued by improving private stock and bond data. Another way is to increase the multinational sample by applying panel data.

REFERENCES

Ahmed, N. (2018). The effect of the financial crisis on the dynamic relation between foreign exchange and stock returns Empirical evidence from MENA region. *Journal of Economic Studies*, 45(5), 994-1031. https://doi.org/10.1108/JES-10-2017-0308

Ahmed, W. M. (2019). Asymmetric impact of exchange rate changes on stock returns: evidence of two de facto regimes. *Review of Accounting and Finance*, 19(2), 147-173. https://doi.org/10.1108/RAF-02-2019-0039

Ain, Q. U., & Siddiqui, D. A. (2020). Analyzing Stock-Bond Correlation in Emerging Markets. *Research in Applied Economics*, 11(3), 83-110. http://dx.doi.org/10.2139/ssrn.3510934

Andersen, T. G., Bollerslev, T., Diebold, F. X., & Vega, C. (2007). Real-time price discovery in global stock bond and foreign exchange markets. *Journal of International Economics*, 73(2), 251-277. https://doi.org/10.1016/j.jinteco.2007.02.004

Andersson, M., Krylova, E., & Vahama, S. (2008). Why does the correlation between stock and bond returns vary over time?. *Applied Financial Economics*, 18(2), 139-151. https://doi.org/10.1080/09603100601057854

Ansari, R., Al Hashfi, R. U., & Setiyono, B. (2020). Examining Causality Effects On Stock Returns, Foreign Equity Inflow, and Investor Sentiment: Evidence From Indonesian Islamic Stocks. *Indonesian Capital Market Review*, 12(2), 120-136. https://doi.org/10.21002/icmr.v12i2.12750

Ayopo, B. A., Isola, L. A., & Olukayode, S. O. 2016. Stock Market Response to Economic Growth and Interest Rate Volatility: Evidence from Nigeria. *International Journal of Economics and Financial Issues*, 6(1), 354-360.

Baele, L., Bekaert, G., & Inghelbrecht, K. (2010). The determinants of stock and bond return comovements. *Review of Financial Studies*, 23(6), 2374-2428. https://doi.org/10.1093/rfs/hhq014

Bahmani-Oskooee, M., & Sohrabian, A. (1992). Stock prices and the effective exchange rate of the dollar. *Applied Economics*, 24(4), 459-464. https://doi.org/10.1080/00036849200000020

Bahmani-Oskooee, M., & Saha, S. (2016). Do exchange rate changes have symmetric or asymmetric effects on stock prices?. *Global Finance Journal*, 31, 57-72. https://doi.org/10.1016/j.gfj.2016.06.005

Bansal, N., Connolly, R. A., & Stivers, C. (2014). The Stock-Bond Return Relation, the Term Structure's Slope, and Asset-Class Risk Dynamics. *Journal of Financial and Quantitative Analysis*, 49(3), 699-724. https://doi.org/10.1017/S0022109014000258

Baur, D. G., & Lucey, B. M. (2009). Flights and contagion–An empirical analysis of stock–bond correlations. *Journal of Financial Stability*, 5(4), 339-352. https://doi.org/10.1016/j.jfs.2008.08.001

Branson, W. H. (1983). Macroeconomic determinants of real exchange rate risk, in Herring, R.J. (Ed.), Managing Foreign Exchange Rate Risk. Cambridge: Cambridge University Press, MA, 33-74.

Branson, W. H., & Henderson, D. W. (1985). Chapter 15 The specification and influence of asset markets, Handbook of International Economics, Vol 2, 749-805. https://doi.org/10.1016/S1573-4404(85)02006-8

Caporale, G. M., Ali, F. M., Spagnolo, F., & Spagnolo, N. (2017). International portfolio flows and exchange rate volatility in emerging Asian markets. *Journal of International Money and Finance*, 76, 1-15. https://doi.org/10.1016/j.jimonfin.2017.03.002

Chkili, W., & Nguyen, D. K. (2014). Exchange rate movements and stock market returns in a regimeswitching environment: evidence for BRICS countries. Research in International Business and Finance, 31, 46-56. https://doi.org/10.1016/j.ribaf.2013.11.007

Choudhry, M., & Westcott, C. (2019). Analysing and Interpreting the Yield Curve. 2nd Ed. New Jersey: John Wiley & Sons. DOI:10.1002/9781119444695

Coeurdacier, N., & Gourinchas, P. O. (2016). When bonds matter: Home bias in goods and assets. Journal of Monetary Economics, 82, 119-137. https://doi.org/10.1016/j.jmoneco.2016.07.005

Connolly, R. A., Stivers, C. T., & Sun, L. (2005). Stock market uncertainty and the stock-bond return relation. The Journal of Financial and Quantitative Analysis, 40(1), 161-194. doi:10.1017/s0022109000001782

Cuestas, J. C., & Tang, B. (2021). Markov switching SVAR analysis on the relationship between exchange rate changes and stock returns in China. *International Journal of Emerging Markets*, 16(3), 625-642. https://doi.org/10.1108/IJOEM-06-2019-0463

Dahir, A. M., Mahat, F., Ab Razak, N. H., & Bany-Ariffin, A. N. (2018). Revisiting the dynamic relationship between exchange rates and stock prices in BRICS countries: A wavelet analysis. *Borsa Istanbul Review*, 18(2), 101-113. https://doi.org/10.1016/j.bir.2017.10.001

Dar, A. B., Bhanja, N., & Tiwari, A. K. (2014). Exchange rate and stock price relationship: A Wavelet analysis for India. Indian Economic Review, 125-142. http://www.jstor.org/stable/24583410

Ding, L., & Ma, J. (2013). Portfolio reallocation and exchange rate dynamics. *Journal of Banking & Finance*, 37(8), 3100-3124. https://doi.org/10.1016/j.jbankfin.2013.02.035

Dornbusch, R., & Fischer, S. (1980). Exchange rates and the current account. *The American Economic Review*, 70(5), 960-971. https://doi.org/10.1017/CBO9780511818233.015

Erdogan, S., Gedikli, A., & Çevik, E. İ. (2020). Volatility Spillover Effects Between Islamic Stock Markets And Exchange Rates: Evidence From Three Emerging Countries. *Borsa Istanbul Review*, 20(4), 322-333. https://doi.org/10.1016/j.bir.2020.04.003

Evans, C. L., & Marshall, D. A. (1998). Monetary policy and the term structure of nominal interest rates: evidence and theory. Carnegie-Rochester Conference Series on Public Policy, 49, 53-111. https://doi.org/10.1016/S0167-2231(99)00004-4

Fang, L., Yu, H., & Li, L. (2017). The effect of economic policy uncertainty on the long-term correlation between US stock and bond markets. *Economic Modelling*, 66, 139-145. https://doi.org/10.1016/j.econmod.2017.06.007

Francová, B. (2017). Valuation of government bonds: The exchange rate is an important aspect. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 65(6), 1911-1916. doi:10.11118/actaun201765061911

Frankel, J. A. (1983). Monetary and portfolio-balance models of exchange rate determination. In: Economic Interdependence and Flexible Exchange Rates. United States: Massachusetts Institute of Technology.

Gadanecz, B., Miyajima, K., & Shu, C. (2014). Exchange rate risk and local currency sovereign bond yields in emerging markets. BIS Working Papers 474, Bank for International Settlements.

Geng, X., & Guo, K. (2022). The spillover effect of VIX and oil price on the exchange rate volatility among Belt and Road countries. *Procedia Computer Science*, 199, 765-772. https://doi.org/10.1016/j.procs.2022.01.095

Gulko, L. (2002). Decoupling. *The Journal of Portfolio Management*, 28(3), 59-66. https://doi.org/10.3905/jpm.2002.319843

Hilscher, J., & Nosbusch, Y. (2010). Determinants of sovereign risk: Macroeconomic fundamentals and the pricing of sovereign debt. *Review of Finance*, 14(2), 235-262. https://doi.org/10.1093/rof/rfq005

Hong, G., Kim, Y., & Lee, B. S. (2014). Correlations between stock returns and bond returns: income and substitution effects. *Quantitative Finance*, 14(11), 1999-2018. https://doi.org/10.1080/14697688.2011.631028

Hui, C. H., Lo, C. F., & Chau, P. H. (2018). Exchange rate dynamics and US dollar-denominated sovereign bond prices in emerging markets. *The North American Journal of Economics and Finance*, 44, 109-128. https://doi.org/10.1016/j.najef.2017.11.005

Idx. (2021). Outperforming Expectations amidst Uncertainties. www.idx.co.id

Indrawati, S. M., Diop, N., Ikhsan, M., & Kacaribu, F. (2020). Enhancing Resilience to Turbulent Global Financial Markets: An Indonesian Experience. *Economics and Finance in Indonesia*, 66(1), 47-63.

Kal, S. H., Arslaner, F., & Arslaner, N. (2015). The dynamic relationship between stock, bond and foreign exchange markets. *Economic Systems*, 39(4), 592-607. https://doi.org/10.1016/j.ecosys.2015.03.002

Karagiannopoulou, S., Giannarakis, G., Galariotis, E., Zopounidis, C. & Sariannidis, N. (2022). The Impact of Dow Jones Sustainability Index, Exchange Rate and Consumer Sentiment Index on Carbon Emissions. *Sustainability,* 14(19). https://doi.org/10.3390/su141912052

Kumar, S. (2019). Asymmetric impact of oil prices on exchange rate and stock prices. *The Quarterly Review of Economics and Finance*, 72, 41-51. https://doi.org/10.1016/j.qref.2018.12.009

Lawal, A. I., Somoye, R. O., Babajide, A. A., & Nwanji, T. I. (2018). The effect of fiscal and monetary policies interaction on stock market performance: Evidence from Nigeria. *Future Business Journal*, 4(1), 16-33. https://doi.org/10.1016/j.fbj.2017.11.004

Lee, H. (2021). Time-varying comovement of stock and treasury bond markets in Europe: A quantile regression approach. *International Review of Economics & Finance*, 75, 1-20. https://doi.org/10.1016/j.iref.2021.03.020

Leung, H., Schiereck, D., & Schroeder, F. (2017). Volatility spillovers and determinants of contagion: Exchange rate and equity markets during crises. *Economic Modelling*, 61, 169-180. https://doi.org/10.1016/j.econmod.2016.12.011

Li, X. M., Zhang, B., & Gao, R. (2015). Economic policy uncertainty shocks and stock–bond correlations: Evidence from the US market. *Economics Letters*, 132, 91-96. https://doi.org/10.1016/j.econlet.2015.04.013

Liang, C. C., Lin, J. B., & Hsu, H. C. (2013). Reexamining the relationships between stock prices and exchange rates in ASEAN-5 using panel Granger causality approach. *Economic modelling*, 32, 560-563.

Lin, F. L., Yang, S. Y., Marsh, T., & Chen, Y. F. (2018). Stock and bond return relations and stock market uncertainty: Evidence from wavelet analysis. International Review of Economics & Finance, 55, 285-294. https://doi.org/10.1016/j.econmod.2013.03.001

Luzarraga-Goitia, J., Regúlez-Castillo, M., & Rodríguez-Castellanos, A. (2021). The dynamics between the stock market and exchange rates: Spain 1999–2015. *The European Journal of Finance*, 27(7), 655-678. https://doi.org/10.1080/1351847X.2020.1832024

McMillan, D. G. (2019). Cross-asset relations, correlations and economic implications. *Global Finance Journal*, 41, 60-78. https://doi.org/10.1016/j.gfj.2019.02.003

Mega, A., & Widayat, W. (2019). Effects of Bond's Interest Rate, Rating and Maturity Time Toward Bond's Yields. *Manajemen Bisnis*, 9(1). https://doi.org/10.22219/jmb.v9i1.9446

Megasari, D., Siregar, H., & Syarifuddin, F. (2019). Asymmetric volatility and macroeconomic factors on Indonesian government bond returns. *Jurnal Keuangan dan Perbankan*, 23(3), 430-442. https://doi.org/10.26905/jkdp.v23i3.2613

Meyer, D. F., & Hassan, A. S. (2020). Analysis of The Impact of Exchange Rate Volatility on The South African Government Bond Market. *International Journal of Economics and Finance*, 12(2). Doi: 10.34109/ijefs.202012202

Moore, T., & Wang, P. (2014). Dynamic linkage between real exchange rates and stock prices: Evidence from developed and emerging Asian markets. *International Review of Economics & Finance*, 29, 1-11. https://doi.org/10.1016/j.iref.2013.02.004

Morgan. (2016). The relationship between yields and prices. New New York: JP Morgan Chase.

Mroua, M., & Trabelsi, L. (2020). Causality and dynamic relationships between exchange rate and stock market indices in BRICS countries: Panel/GMM and ARDL analyses. *Journal of Economics, Finance and Administrative Science*, 25(50), 395-412. https://doi.org/10.1108/JEFAS-04-2019-0054

Ndako, U. B. (2013). Dynamics of stock prices and exchange rates relationship: evidence from five sub-Saharan African financial markets. *Journal of African Business*, 14(1), 47-57. https://doi.org/10.1080/15228916.2013.765322

Ngaruiya, M., & Njuguna, A. (2016). Influence of Inflation on Bond Prices: A Survey of Bonds Listed at the Nairobi Securities. *American Journal of Economics*, 1(2), 50-63. http://erepo.usiu.ac.ke/11732/4245

Nieh, C-C., & Lee, C.-F. (2001). Dynamic relationship between stock prices and exchange rates for G-7 countries. *The Quarterly Review of Economics and Finance,* 41(4), 477-490. https://doi.org/10.1016/S1062-9769(01)00085-0

Nieto, B., & Rodríguez, R. (2015). Corporate Stock and Bond Return Correlations and Dynamic Adjustments of Capital Structure. *Journal of Business Finance & Accounting*, 42(5-6), 705-746. https://doi.org/10.1111/jbfa.12114

Noman, A. M., Kabir, S. H., & Bashar, O. K. (2012). Causality between stock and foreign exchange markets in Bangladesh. *Studies in Economics and Finance*. https://doi.org/10.1108/10867371211246849

Papadamou, S., Fassas, A. P., Kenourgios, D., & Dimitriou, D. (2021). Flight-to-quality between global stock and bond markets in the COVID era. *Finance Research Letters*, 38, 101852. https://doi.org/10.1016/j.frl.2020.101852

Park, K., Fang, Z., & Ha, Y. H. (2019). Stock and bond returns correlation in Korea: Local versus global risk during crisis periods. Journal of Asian Economics, 65, 101136. https://doi.org/10.1016/j.asieco.2019.101136

Patton, A. J. (2006). Modelling asymmetric exchange rate dependence. *International economic review*, 47(2), 527-556. https://doi.org/10.1111/j.1468-2354.2006.00387.x

Pesaran, M. H., & Shin, Y. (1995). An autoregressive distributed lag modelling approach to cointegration analysis. Cambridge Working Papers in Economics.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326. https://doi.org/10.1002/jae.616

Pilbeam, K. (2018). Finance & financial markets. London: Palgrave Macmillan Education.

Rahman, R. E. (2021). Understanding Indonesia's exchange rate behavior. *Studies in Economics and Finance*, 38 (2), 189-206. https://doi.org/10.1108/SEF-09-2018-0296

Rosadi, D. (2011). Ekonometrika dan Analisis Runtun Waktu Terapan dengan EViews. Yogyakarta: ANDI.

Salisu, A. A., & Ndako, U. B. (2018). Modelling stock price–exchange rate nexus in OECD countries: A new perspective. *Economic modelling*, 74, 105-123. https://doi.org/10.1016/j.econmod.2018.05.010

Salisu, A. A., & Oloko, T. F. (2015). Modelling spillovers between stock market and FX market: evidence for Nigeria. *Journal of African Business*, 16(1-2), 84-108. https://doi.org/10.1080/15228916.2015.1061285

Sikhosana, A., & Aye, G. C. (2018). Asymmetric volatility transmission between the real exchange rate and stock returns in South Africa. *Economic Analysis and Policy*, 60, 1-8. https://doi.org/10.1016/j.eap.2018.08.002

Solnik, B. (1987). Using financial prices to test exchange rate models: A note. *The journal of Finance*, 42(1), 141-149. https://doi.org/10.2307/2328424

Stillwagon, J., & Sullivan, P. (2020). Markov switching in exchange rate models: will more regimes help?. *Empirical Economics*, 59(1), 413-436. https://doi.org/10.1007/s00181-019-01623-6

Syahri, A., & Robiyanto, R. (2020). The correlation of gold, exchange rate, and stock market on covid-19 pandemic period. *Jurnal Keuangan dan Perbankan*, 24(3), 350-362. https://doi.org/10.26905/jkdp.v24i3.4621

Turner, P. (2014, November). The World Long-term Interest Rate, Exchange Rates and Macro-Prudential Policies. In Presentation at the Conference of Central Bank of Argentina, Buenos Aires.

Tiryaki, A., Ceylan, R., & Erdoğan, L. (2019). Asymmetric effects of industrial production, money supply and exchange rate changes on stock returns in Turkey. Applied Economics, 51(20), 2143-2154. https://doi.org/10.1080/00036846.2018.1540850

Ülkü, N., & Demirci, E. (2012). Joint dynamics of foreign exchange and stock markets in emerging Europe. *Journal of International Financial Markets, Institutions and Money*, 22(1), 55-86. https://doi.org/10.1016/j.intfin.2011.07.005

Walid, C., Chaker, A., Masood, O., & Fry, J. (2011). Stock market volatility and exchange rates in emerging countries: A Markov-state switching approach. *Emerging Markets Review*, 12(3), 272-292. https://doi.org/10.1016/j.ememar.2011.04.003

Wilcox, J. W., & Fabozzi, F. J. (2013). Financial Advice and Investment Decisions: A Manifesto for Change. John Wiley & Sons.

Wong, H. T. (2017). Real exchange rate returns and real stock price returns. *International Review of Economics & Finance*, 49, 340-352. https://doi.org/10.1016/j.iref.2017.02.004

Xie, Z., Chen, S. W., & Wu, A. C. (2020). The foreign exchange and stock market nexus: New international evidence. *International Review of Economics and Finance*, 67, 240–266. https://doi.org/10.1016/j.iref.2020.01.001

Zakamulin, V., & Hunnes, J. A. (2021). Stock earnings and bond yields in the US 1871–2017: The story of a changing relationship. *The Quarterly Review of Economics and Finance*, 79, 182-197. https://doi.org/10.1016/j.qref.2020.05.013

Živkov, D., Njegić, J., & Pavlović, J. (2016). Dynamic correlation between stock returns and exchange rate and its dependence on the conditional Volatilities–The case of several Eastern European countries. *Bulletin of Economic Research*, 68(S1), 28-41. https://doi.org/10.1111/boer.12059