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Assessment of the Effects of Host Country Macroeconomics on Performance of Cross Listed Firms in East Africa

Abstract. Introduction. Stock market performance has been an issue of discussion in financial sector for both developed and developing economies. Stock market is considered to be an important component in development of the economy, since it creates integration for users and suppliers of financial resources for investment purposes. The performance of the firms listed in stock markets are affected by macroeconomic variables as it was earlier asserted by Ross (1976) in the Arbitrage pricing theory.

Purpose. This study makes assessment of the effects of host country macroeconomic factors on the performance of cross listed firms in East Africa. It uses quarterly time series from March 2010 to December 2020. The study used stock prices of five Kenyan companies that are cross listed in the stock markets of Uganda and Tanzania.

Results. The overall result of model capturing the impact of the macroeconomic factors on the average prices of stocks shows that interest rate exerts positive and significant impact on the stock market performance, while, inflation has negative and significant effects on the stock market performance in both Uganda and Tanzania. GDP is statistically not significant in influencing the stock prices in both countries. On the other hand, the model that captures individual effect provides mixed result in both Uganda and Tanzania, with the negative effect of inflation reported in three firms in Uganda and two firms in Tanzania; while, a positive effect is found in one firm listed in Uganda and two firms listed in Tanzania. Similarly, the effect of interest rate is positive for three firms in both Uganda and Tanzania; and it is negative in one firm listed in both USE and DSE. GDP negatively affect stock prices of two firms in Tanzania and positively affect the prices of one firm in Uganda.

Conclusions. The study concludes that macroeconomic variables exert effect on stock returns of the cross listed firms in East Africa. There are mixed results in terms of magnitude and direction of effect. By treating the selected macroeconomic variables as risky factors, the paper is in support of the Abitrage Pricing theory (APT).

Keywords: interest rate; stock market performance; cross listing and arbitrage pricing theory.

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Оцінка впливу макроекономіки приймаючої країни на ефективність лістингових компаній у Східній Африці

Діяльність фондового ринку є предметом обговорення у фінансовому секторі як у країнах з розвиненою економікою, так і в країнах, що розвиваються. Фондовий ринок є важливою складовою розвитку економіки, оскільки створює інтеграцію користувачів і постачальників фінансових ресурсів для інвестиційних цілей. На ефективність компаній, зареєстрованих на фондових ринках, впливають макроекономічні змінні, що підтверджено у теорії арбітражного ціноутворення.

У дослідженні наведено оцінку впливу макроекономічних факторів приймаючої країни на результативність компаній у Східній Африці. У ньому використовувалися квартальні часові ряди з березня 2010 року по грудень 2020 року. У дослідженні наведено ціни акцій п'яти кенійських компаній, які котируються на фондових ринках Уганди й Танзанії.

Загальний результат моделі, яка фіксує вплив макроекономічних факторів на середні ціни акцій, свідчить, що процентна ставка має позитивний і значний вплив на показники фондового ринку, тоді як інфляція має негативний і значний вплив на показники фондового ринку як в Уганді, так і в Танзанії. ВВП статистично не є значущим для впливу на ціни акцій в обох країнах. З іншого боку, модель, яка враховує індивідуальний ефект, дає змішаний результат як в Уганді, так і в Танзанії, причому негативний вплив інфляції було зафіксовано у трьох компаніях в Уганді та двох компаніях у Танзанії; в той час як позитивний ефект спостерігається в одній компанії, зареєстрованій в Уганді, і двох компаніях, зареєстрованих в Танзанії. Подібним чином, ефект процентної ставки є позитивним для трьох компаній як в Уганді, так і в Танзанії; і він негативний в одній компанії, що входить до списку USE та DSE. ВВП негативно впливає на ціни акцій двох компаній у Танзанії та позитивно впливає на ціни однієї компанії в Уганді.

У дослідженні зроблено висновок, що макроекономічні змінні впливають на прибутковість акцій компаній у Східній Африці. Існують неоднозначні результати щодо величини та напряму впливу. Розглядаючи вибрані макроекономічні змінні як фактори ризику, ми підтримуємо теорію арбітражного ціноутворення (APT).

Ключові слова: відсоткова ставка; продуктивність фондового ринку; перехресний лістинг і теорія арбітражного ціноутворення.

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JEL Classification: A20.

Formulation of the problem. Stock market performance has been an issue of discussion in financial sector for both developed and developing economies. Stock market is considered to be an important component in development of the economy, since it creates integration for users and suppliers of financial resources for investment purposes. The performance of the firms listed in stock markets are affected by macroeconomic variables as it was earlier asserted by Ross (1976) in the Arbitrage pricing theory.

Stocks can be listed in a single market or in multiple markets. Increasing capital market integration due to deregulation and technological advancement in equity trading across the globe has resulted to a surge in cross border listing. The preferred listing destinations for foreign firms include American Stock exchange (NYSE and NASDAQ) and the European exchanges (Dodd, 2013). The practice is also common in East Africa, where, 8 Kenyan companies have cross listed their shares in Uganda and 6 of those are also cross listed in Tanzania as of 2020. These companies contribute about 58 percent and 75 percent of market capitalization on the Dar es Salaam Stock Exchange (DSE) and Uganda Securities Exchange (USE) respectively. As compared to other exchanges in the region, the Nairobi Securities Exchange (NSE) is the oldest (established in 1954) and more developed. It has 66 listed companies compared to 38 in DSE and 17 listed in (USE), which were established in 1996 and 1997 respectively.

Cross listing of equity is associated with improving stock liquidity, overcoming investment barriers, expansion, reduction of information asymmetry and improving investor protection (Dodd, 2013; Temouri, Driffield, & Bhaumik, 2016). Cross listing also exposes the firm into domestic and foreign macroeconomic fundamentals (such as inflation, interest rate, economic growth and exchange rate) that affect the returns of the firms.

Majority of studies have analysed the impact of macroeconomic factors on the stock returns without considering whether the firms are cross listed or not (Barakat et al, 2016; Ndlovu et al. 2018; Abbas et al. 2014; Epaphra & Salema, 2018). While there are limited studies on cross listings and macroeconomics such as those by Muhammad et al (2018), Gupta et al (2016) and Nikkinnen & Salhstrom (2004), however, specific focus on host country macroeconomics received less attention, despite its importance. This study aims to fill this gap.

Host country macroeconomics are significant to be studied as cross listed firms are considered to be affected by the macroeconomic variables of the countries where they trade (Muhammad et al, 2018). The magnitude of the effects depends on the extent to which international markets are efficient and integrated with each other (ibid). Thus, macroeconomic fundamentals of Tanzania and Uganda may contribute to movement in returns of Kenyan firms that are cross listed in the respective countries. This is also supported by Nikkinen & Sahlström

(2004), asserting that firms operating in multiple markets are concerned with the economic conditions of those markets since the decision making and profitability of such firms are influenced by the economic conditions in the respective markets.

The goal of the paper is analyzing the effects of macroeconomic fundamentals of Tanzania and Uganda on the stock returns of the Kenyan firms that are cross listed in DSE and USE respectively. Specific macroeconomic determinants include, the inflation, interest rate and GDP.

The paper contributes to the existing literature in the following ways: First the study analyse the impact of host country macroeconomic variables on stock returns of cross listed firms as opposed to many studies that focus on effects of home macroeconomics. Second, the study contributes in the literature relating to regional integration and cross listings. The stock markets in Tanzania and Uganda are very similar while the fluctuations and some of the economic policies in those economies differ.

An understanding of the macroeconomic determinants in regard to stock returns involving regional cross listing is significant in the quest of understanding risk factors as full regional integration brings with it contagion and spill over risks.

The rest of the paper is organized as follows. Section 2 reviews the existing literature on macroeconomic fundamentals and stock returns. Section 3 describes the data and the research methodology used Section 4 provides the empirical results. Finally, Section 5 presents summary and conclusions.

Analysis of recent research and publications. There are various empirical studies undertaken to explain about the effect of macroeconomic factors on stock returns. Through these studies, different data types, research methods and techniques were used to analyze these factors.

Gupta et al (2016) analyzed the linkages between the American Depository Receipts (ADR) market and home country macroeconomic fundamentals. They found (ADR) prices have a significant short and long run relationship with the economic indicators of the home country. Their results support the assertion that if stock returns accurately reflect the expectation about underlying fundamentals in the future, then they should be used as leading indicators of future economic activities.

Narayan & Narayan (2012) used daily time series data to examine the impact of US macroeconomic fundamentals on the stock returns of seven Asian countries. Using GARCH model, authors found exchange rate to have negative and significant effects on stock returns for all countries studied in the short run. The relationship between US interest rate and stock returns was found to be positive and significant in the short run only one country. Apart from being conducted in the more advanced markets, the study used only exchange rate and interest rate leaving out other variables that could potentially affect the returns. But also, their study did not consider the impact at the firm level.

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Nikkinen & Sahlström (2004) analyzed the domestic and US macroeconomic variables on stock market volatilities in Germany and Finish Markets and found US macroeconomic announcements to have significant effects on the volatilities of the European markets. Their study however, did not consider the listing status of the stocks which the current study is addressing.

Choi and Kim, (2000) found underlying stock returns, world market returns and US market factor to be the major determinants of ADR returns. However, the study used US market factor instead of specific economic variables. These specific economic variables are very significant in establishing the variations in returns of the listed stocks.

US macroeconomic variables are mentioned to be among important determinant of ADR prices (Muhammed et al, 2018; Acquino and Poshakwale, 2006). In this regard, ADR are considered as extension of the underlying stock market, hence macroeconomic factors such as inflation, interest rate and GDP, that affect the underlying stock market will also affect the ADR (Gupta et al, 2016).

Formulation of research goals. This study makes assessment of the effects of host country macroeconomic factors on the performance of cross listed firms in East Africa.

Outline of the main research material. Inflation is hypothesized to have negative relation with stock returns. An increase in inflation increases the nominal risk-free rate, raising the discount rate hence lowers the stock prices. More so in a competitive economy, higher inflation raises input costs faster than the output prices, making stocks less attractive. Several empirical studies, including Kitati et al (2015) and Zaheer & Rashid (2014) support the negative relation between inflation and stock returns.

Interest rate is hypothesized to have negative relation with stock returns. Interest rate affects the cost of finance as well as firm's value of financial assets and liabilities. An increase in interest rate is associated with reduction in stock prices following the substitution effects hypothesis that people will move their funds from the stock markets to interest paying financial securities. Also, higher interest rate would result to lower present values of the cash flows of the companies making investment less attractive. Epaphra and Salema (2018); Abbas et al. (2014); Decourt (2017) are some of the authors documenting negative relationship between interest rate and stock returns.

With regard to GDP growth rate, higher rate of economic growth attracts investors since in such an economy there is cost efficiency of production, as well as availability of market (Muli et al, 2017). More so, a higher GDP growth is a measure and a signal of market demand and potential for growing profit, which further attracts investors. It is therefore hypothesized that there is a positive relation between GDP growth rate and stock returns.

The data comprises of quarterly values of inflation, interest rate and GDP growth rate of Tanzania and Uganda and returns of Kenyan companies cross listed in DSE and USE from 2010:Q1 to 2020:Q4. The cross listed firms involved include; East African Breweries Ltd (EABL), Jubilee Holdings Ltd (JHL), Kenya Airways (KE), Kenya Commercial Bank (KCB), National Media Group (NMG), and Uchumi Supermarket Ltd (UCHM).

The macroeconomic variables in Tanzania were obtained from the Tanzania National Bureau of Statistics (NBS) and the Bank of Tanzania. Those in Uganda were collected from the Uganda Bureau of Statistics. Returns of the firms were obtained from the DSE and USE.

Five different companies that include EABL, JHL, KCB, KA and NMG were studies separately. Six different models were then estimated, in which, models 1 to 5 analyses the effect of macroeconomic variables on the stock prices for the five selected companies while model 6 examines the effect of the same macroeconomic variables on the overall stock price. The macroeconomic variables selected were inflation rate, interest rate and GDP growth rate.

Operationalization of the variables is as provided in table 1.

Table 1. **Operationalization of variables**

Variable	Variable indicator	Measurement
Interest rate	91 day treasury bills	Quarterly values of 91-day Treasury bill
Inflation	Consumer Price Index	Quarterly CPI rates
GDP	GDP growth rate	Quarterly GDP growth rate
Stock market performance	Closing prices of stock	Logarithmic quarterly closing prices of stock

Source: World Bank report (2021)

The theoretical framework of the model is based on Arbitrage Pricing Theory (APT) that was developed by Ross (1976). The theory argues that, the expected return of a financial asset can be modeled as linear function of various factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. In such regard, the asset is mispriced if its current price diverges from the price predicted by the model. The theory asserts that if there are no arbitrage opportunities, the expected return on the assets can be expressed as a linear function of its exposure to the risk factors. That means there is a linear relationship between the expected return on assets and their covariance with other random variables. In that case, the covariance represents systematic risk factors and the slope coefficient between expected returns and covariance is interpreted as a risk premium. The theoretical model can be written as (1):

$$E(r_j) = r_f + \beta_1 RP_1 + \beta_2 RP_2 + \cdots + \beta_n RP_n \qquad (1)$$

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Where,

$E(r_j)$- Expected return on assets; β_n- Sensitivity of asset price to a factor n r_f- Risk free rate

RP_n- Risk premium associated with a factor n

According to this theory, expected returns of the financial asset is a function of various dynamic factors which might be subjected to sensitivity changes. By incorporating the macroeconomic variables used in the study, the following model framework is developed (2):

$$ln\, E(r_j)_{it} = r_f - \beta_1 lnIR_{1t} - \beta_2 ln\pi_{2t} + \beta_3 lnGDP_{3t} + \mu$$
(2)

Whereby; $E(r_j)$- Expected return on assets,

β_n- Sensitivity of asset price to a factor *n*,

IR – interest rate,

π – inflation rate,

GDP – GDP growth rate

From the stated model framework, the effect of macroeconomic variables on stock returns of individual firm as well as on the average prices is represented in the following (3-8):

Model 1:
$$Er(EABL) = \beta_0 + \beta_1 lnIR_{1t} + \beta_2 ln\pi_{2t} + \beta_3 lnGDP_{3t} + \mu_1 \dots\dots\dots\dots\dots (3)$$

Model 2:
$$Er(JHCL) = \propto_0 + \propto_1 lnIR_{1t} + \propto_2 ln\pi_{2t} + \propto_3 lnGDP_{3t} + \mu_2 \dots\dots\dots\dots\dots (4)$$

Model 3:
$$Er(KCB) = \gamma_0 + \gamma_1 lnIR_{1t} + \gamma_2 ln\pi_{2t} + \gamma_3 lnGDP_{3t} + \mu_3 \dots\dots\dots\dots\dots (5)$$

Model 4:

$$Er(KA) = \lambda_0 + \lambda_1 lnIR_{1t} + \lambda_2 ln\pi_{2t} + \lambda_3 lnGDP_{3t} + \mu_4 \dots\dots\dots\dots\dots\dots (6)$$

Model 5:
$$Er(NMG) = \theta_0 + \theta_1 lnIR_{1t} + \theta_2 ln\pi_{2t} + \theta_3 lnGDP_{3t} + \mu_5 \dots\dots\dots\dots\dots (7)$$

Model 6:
$$Er(Avp) = \delta_0 + \delta_1 lnIR_{1t} + \delta_2 ln\pi_{2t} + \delta_3 lnGDP_{3t} + \mu_6 \dots\dots\dots\dots\dots (8)$$

Analysis of the data involved the following steps; first, the unit root test was performed by employing the Augmented Dick Fuller test (ADF) to establish if the variables are stationary. Then diagnostic tests were performed on data to test for multicollinearity. The Auto-Regressive Distributed Lags (ARDL) regression was then employed to investigate the relationship between variables as specified by the model.

Augmented Dickey Fuller (ADF) test was employed to check for the unit root among the study variables. The null hypothesis is that the variables are stationary. Unit root test results are presented in table 2.

The unit root tests result for Tanzania indicate that only GDP growth rate was stationary at level, the remaining variables became stationary after the first differencing. In Uganda, interest rate, GDP growth rate and the returns of KCB and NMG were stationary at level. The remaining variables became stationary when converted to the first difference I(1) at 5% level of significance.

Table 2. **Unit Root Test results (ADF)**

Variable	ADF Tests	Tanzania		Uganda	
		At level	First difference	At level	First difference
EABL	t-statistic	-2.010	-7.303	-1.968	-4.559
	5% critical value	-2.952	-2.952	-2.952	-2.952
JHL	t-statistic	-1.740	-6.413	-1.643	-5.782
	5% critical value	-2.952	-2.952	-2.952	-2.952
KCB	t-statistic	-1.311	-4.987	-3.114	-
	5% critical value	-2.952	-2.952	-2.952	-
KA	t-statistic	-0.461	-8.177	-0.638	-7.609
	5% critical value	-2.952	-2.952	-2.952	-2.952
NMG	t-statistic	-0.534	-6.085	-0.536	-5.137
	5% critical value	-2.952	-2.952	-2.952	-2.952
Avprice	t-statistic	-0.401	-7.821	0.873	-8.819
	5% critical value	-2.871	-2.871	-3.000	-2.955
infl	t-statistic	-2.396	-3.940	-2.880	-3.755
	5% critical value	-2.955	-2.955	-2.958	-2.964
gdp	t-statistic	-5.526	-	-3.783	-
	5% critical value	-2.952	-	-2.952	-
int	t-statistic	-1.668	-6.893	-3.079	-
	5% critical value	-2.952	-2.952	-2.952	-

Source: author's computation

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Correlation matrix was employed to check for the multicollinearity problem among the study variables. Results are presented in table 3 and they show that the correlation indices of independent variables are less than the threshold level of 0.75. The results imply that there is no multicollinearity problem since, according to Ratner (2009) multicollinearity exists among the study variables if the correlation matrix is greater than 0.75.

Table 3. **Correlation matrix**

Variables	(1)	(2)	(3)
(1) inflation rate	1.000		
(2) interest rate	0.487	1.000	
(3) GDP growth rate	-0.176	-0.034	1.000

Source: Field data (2022)

To examine the effect of macroeconomic variables on the stock prices, the study employed Auto-Regressive Distributed Lags (ARDL) regression approach. The use of ARDL is backed up with a number of advantages including, its suitability even with small sample size unlike other regression approaches that are suitable with large sample size. Also, ARDL approach produces estimates for both short run and long run, and it accounts for potential endogeneity (Udoh et al., 2015).

Table 4 presents the effect of macroeconomic variables on the stock prices in Tanzania using ARDL regression. Findings for error correction model (ECM) reveal that there is adjustment of 40 percent per quarter back to equilibrium for model 1, while model 3 adjustment is by 44 percent, model 4 and 5 is by 39 and 66 percent respectively. As for the average price, the adjustment is about 18 percent. However, the adjustment for model 2 is around 1 percent per quarter but not statistically significant. In principle, the higher the coefficient, the more stable the long run relationship. Thus, the implication of the ECM results is such that for NMG, it will take the least amount of time to entirely return to long-run equilibrium if there is a shock to the macroeconomic variables. The study also checked for the heteroscedasticity and autocorrelation in all six models estimated and findings revealed that there is neither heteroscedasticity problem nor autocorrelation problem for this study.

Findings indicate the existence of significant effects of the selected macroeconomic variables on stock returns in the long run in Tanzania. The long run effect of inflation on stock returns using model 6, show that the average prices of the stock are negatively influenced by the inflation rate. Inflation rate coefficient indicates that a 1% increase in inflation causes the decrease in the stock price by 8.6% when average stock price of the cross listed firms is used. The results may be associated with the assertions that higher inflation is associated with increases in production cost, reduction of economic activities and reallocation of resources from investment to consumption, which will ultimately reduce the price of stocks.

There seem to be variations in the effects when specific firms are analysed using models 1-5. For instance, the inflation rate in Tanzania has a negative effect on stock returns of EABL and KCB in the long run. This means in the long run, the increases in the rate of inflation in Tanzania will lower the stock prices of the two firms supporting the Fama (1981)'s proxy hypothesis. On the other hand, the results indicate a positive and significant effect of inflation rate on the stock returns of KA and NMG in the long run. Such results are in support of the Fishers' hypothesis (1930) suggesting that investing in those equities can be used as hedge against inflation. Inflation reduces the real return of the financial asset, to compensate for this, an inflationary premium will have to be added to the real price in order to hedge against inflation.

Results of the model 6 on the overall stock prices of the cross listed firms show that a 1% increase in interest rate would result to 13% increase in the overall price. The results defy the substitution hypothesis that increases in interest rate would make investors shy away from investing in equity and move to higher interest rate paying securities. This could mean that, despite increases in the interest rate in Tanzania, the equity values of the cross listed firms would still increase which could imply that investors do not view Treasury bill as alternative investment opportunities. The results are consistent with previous works by Ferrer, Bolós & Benítez, (2016) and Kuwornu (2012) who reported a positive association between interest rate and stock market performance.

Further analysis into the specific firms yield mixed result such that prices of some firms seem to increase with increases in interest rate while those of other firms decrease while others are not significantly affected. Interest rate is found to have a positive effect on the stock returns of EABL, KCB and NMG in the long run. On the other hand, an increase in the interest by 1 precent results into decline in KA stock prices by around 22 percent in Tanzania in the long run.

The estimated coefficient of GDP growth rate shows negative effect on stock return and statistically non-significant, when the average prices were used. This means GDP of the host country seem to have no impact on the stock prices of the cross listed firms in the long run.

The analysis of model 1- 5 show that the long run effect of GDP growth rate on stock returns is found to be negative and significant for only two stocks while it is not significant for the remaining three stocks.

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Table 4. **Effects of macroeconomic variables on the stock prices in Tanzania**

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	EABL	JHL	KCB	KA	NMG	Avp
Adjustment/ECM	-0.402***	-0.00883	-0.439**	-0.386*	-0.664***	-0.177***
	(0.140)	(0.0597)	(0.149)	(0.192)	(0.218)	(0.0592)
Long run						
Inflation rate	-0.0807***	2.761	-0.416***	0.427***	0.0541**	-0.0862**
	(0.0176)	(19.94)	(0.0588)	(0.107)	(0.0201)	(0.0312)
Interest rate	0.0994***	0.764	0.197***	-0.219**	0.142***	0.132***
	(0.0235)	(4.647)	(0.0370)	(0.0922)	(0.0209)	(0.0395)
GDP growth rate	-0.137*	4.033	-0.390*	0.0193	0.0374	-0.0317
	(0.0796)	(28.69)	(0.187)	(0.422)	(0.0620)	(0.149)
Short run						
LD. (dependent variable)	-0.176	-0.409**	-0.582**	-0.299	0.264	-0.422**
	(0.164)	(0.182)	(0.226)	(0.202)	(0.210)	(0.176)
L2D. (dependent variable)	-0.376**	0.00405	-0.475**			-0.328*
	(0.146)	(0.0204)	(0.183)			(0.165)
D.inflationrate	0.0254	-0.00202	-0.148***	-0.0200		-0.0327***
	(0.0235)	(0.0254)	(0.0482)	(0.0892)		(0.0114)
LD.inflationrate	0.0142	-0.0178	-0.205**	-0.0292		-0.0279**
	(0.0292)	(0.0257)	(0.0734)	(0.138)		(0.0110)
D.interestrate	-0.0266*	-0.0357**	0.0641**	-0.0680	-0.137***	-0.0165
	(0.0154)	(0.0172)	(0.0253)	(0.0612)	(0.0450)	(0.0104)
LD.interestrate	-0.0274*	-0.0104	0.0358	-0.0362	-0.102**	0.00754
	(0.0160)	(0.0151)	(0.0274)	(0.0620)	(0.0447)	(0.0182)
D.gdpgrowthrate	0.0475**	-0.0439*	-0.144**	-0.0684	-0.0176	0.00466
	(0.0221)	(0.0228)	(0.0506)	(0.114)	(0.0386)	(0.0156)
LD.gdpgrowthrate	0.0402**	-0.0310*	-0.117**	-0.0982	-0.00417	0.00457
	(0.0189)	(0.0169)	(0.0408)	(0.0903)	(0.0348)	(0.0144)
Constant	3.679***	-0.344	-4.515***	1.436	4.062***	1.319**
	(1.239)	(0.665)	(1.270)	(1.227)	(1.329)	(0.522)
R-squared	0.606	0.593	0.807	0.420	0.490	0.552
Heteroscedasticity test	0.92	0.52	0.55	0.146	0.894	0.862
Autocorrelation test	0.13	0.06	0.06	0.176	0.865	0.804

*Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Source: Field data (2022)

With regard to short run estimates, findings show that increase in the previous quarter JHL stock prices by 1 percent results into decline in the JHL stock prices by around 41 percent in Tanzania while increase in the previous quarter KCB stock prices by 1 percent results into decline in the KCB stock prices by around 58 percent in Tanzania in the short run. If the average prices of the cross listed firms are use, the 1 percent increase in the previous quarter prices would result to the decline in the average prices by 42 percent.

Results show that inflation has a negative effect on the overall stock returns in the short run. An increase in inflation by 1% results to a decline in the average stock prices by 3.3 percent in the short run. The results are in conformity with the Fama's hypothesis that in periods of higher inflation, consumers tend to invest less but also firms running costs becomes greater causing share prices to drop.

Analysis of the individual stock reveals that, an increase in the inflation rate by 1 percent results into decline in the KCB stock prices by 15 percent in Tanzania in the short run, while it is not statistically significant for the remaining 4 regression models.

The short run effect of interest rate on the overall stock prices is found to be not significant. However, when individual stocks are examined, some of the stocks seem to be significantly affected by the changes in the interest rate. An increase in the interest rate by 1 percent results into decline of EABL, JHL and NMG stock prices by around 3, 4 and 14 percent respectively in Tanzania in the short run. Such results suggest possibility of investors to switch to higher interest paying and less risky investments in the short run when interest rate raises. On the other hand, a 1 percent increase in interest rate result into increase in the KCB stock prices by around 6 percent in Tanzania in the short run.

Similar to the long run results, GDP does not seem to have a significant effect on the overall stock prices in the short run as well. However, it is found to have significant effect on some of the firms in the short runs. An increase in the GDP growth rate by 1 percent results into increase in EABL stock prices by around 5 percent and decline in the JHL and KCB stock prices by around 4 and 14 percent respectively in Tanzania in the short run.

Findings from Table 5 reveal that there is adjustment back to equilibrium by 36, 9, 34, 34, and 42 percent per quarter for the EABL, JHL, KCB, KA and NMG models respectively in Uganda. The R squared obtained show that the independent variables explain the dependent variable by 48, 44, 54, 53, and 63 percent for the EABL, JHL, KCB, KA and NMG models respectively. Furthermore, findings show that there is neither

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heteroscedasticity nor autocorrelation problems for this study since the p-vales obtained for these tests are not significant hence the study fails to reject the null hypotheses of constant variance and of no serial correlation.

The overall results as analysed in model 6 indicate that inflation has a negative effect on the stock returns in the long run. As shown in table 4.4, a 1 percent increase in inflation results to 11.6% decline in the stock price. This suggests that at higher inflation rate, stocks become less attractive which may be caused by higher production cost, decline of economic activities and reallocation of resources from investment to consumption. Such results are similar to the ones obtained in Tanzania.

More specifically, there is a negative and significant effect of inflation on the returns of EABL, KCB and NMG while a positive effect is observed for the returns of KA. The negative effect implies that increases in inflation in Uganda would result to decreases in the prices of shares of those cross listed firms.

The study found a positive and significant long run effect of interest rate on stock returns when the average price of the cross listed firms was used. An increase in interest rate by

1 percent results to increase in returns by 11.2%. The results are similar to the ones obtained in Tanzania and they contravene the substitution hypothesis that raising interest rate would make stocks less attractive, as investors would relocate their funds to higher interest paying securities. It is thus implied that, even if the interest rate is increased, investors would still invest in stocks, causing the prices to increase as well.

The results further show a positive and significant long run effect of interest rate on stock returns for three models, while model four shows a negative and significant effect. The results are similar to the ones obtained in Tanzania and they suggest that treasury bills may not be a substitute investment avenue for investors of some stocks in Uganda.

The estimated coefficient of GDP growth rate shows positive effect on stock return and statistically non-significant, when the average prices were used. This means GDP of the host country seem to have no impact on the stock prices of the cross listed firms in the long run. Further, results show that in models 1, 2, 3 and 4 the coefficient on GDP growth rate is statistically not significant but in model 5, the coefficient is statistically significant at 5 percent level.

Table 5. **Effects of macroeconomic variables on the stock prices in Uganda**

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	EABL	JHL	KCB	KA	NMG	Avp
Adjustment/ECM	-0.361*	-0.090**	-0.341**	-0.341*	-0.422**	-0.127***
	(0.178)	(0.0632)	(0.161)	(0.172)	(0.147)	(0.0431)
Long run						
Inflation rate	-0.0544***	0.0337	-0.0730*	0.187***	-0.0822**	-0.116***
	(0.0168)	(0.105)	(0.0380)	(0.0564)	(0.0290)	(0.0372)
Interest rate	0.0624*	0.202*	-0.0973	-0.160*	0.210***	0.121**
	(0.0307)	(0.110)	(0.110)	(0.0889)	(0.0435)	(0.0525)
GDP growth rate	-0.0116	0.370	-0.0778	-0.0122	0.209*	0.108
	(0.0756)	(0.306)	(0.134)	(0.213)	(0.0999)	(0.113)
Short run						
LD. (dependent variable)	0.0224	0.126	0.0272	-0.0585	-0.631**	0.142
	(0.181)	(0.189)	(0.239)	(0.195)	(0.293)	(0.133)
L2D. (dependent variable)	-0.233		-9.59e-05	0.0229	-0.677**	-0.247*
	(0.178)		(0.237)	(0.206)	(0.252)	(0.130)
D.inflationrate	0.0107	0.00476	0.0131	-0.0371	-0.564**	-0.00809*
	(0.00950)	(0.00867)	(0.0153)	(0.0285)	(0.214)	(0.00430)
LD.inflationrate	0.0133		0.00201	-0.0267	-0.00844	-0.0219***
	(0.0116)		(0.0136)	(0.0355)	(0.0123)	(0.00539)
D.interestrate	-0.00905	-0.0280	0.0207	0.0580		0.00170
	(0.0170)	(0.0169)	(0.0269)	(0.0564)		(0.00500)
LD.interestrate	-0.0251	-0.0182*	0.0294	0.0204		0.0260
	(0.0191)	(0.0151)	(0.0256)	(0.0593)		(0.125)
D.gdpgrowthrate	0.00362	-0.0195	0.0268	0.0120	-0.0281**	0.00512
	(0.0195)	(0.0183)	(0.0300)	(0.0589)	(0.0134)	(0.0122)
LD.gdpgrowthrate	-0.00650	-0.0208	0.00889	0.0216	0.0371	0.00190
	(0.0154)	(0.0142)	(0.0259)	(0.0503)	(0.0318)	(0.00970)
L2D.gdpgrowthrate	0.0107	-0.0175	0.0201	-0.0206	0.0118	-0.0131
	(0.0131)	(0.0117)	(0.0180)	(0.0401)	(0.0265)	(0.0744)
Constant	3.121**	0.471	3.123***	2.147	-2.392**	-0.943
	(1.497)	(0.513)	(1.037)	(1.424)	(1.032)	(0.693)
R-squared	0.480	0.435	0.537	0.525	0.631	0.688
Heteroscedasticity	0.428	0.609	0.066	0.206	0.134	0.105
Autocorrelation	0.464	0.249	0.310	0.150	0.097	0.061

*Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Source: Field data (2022)

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Results in table 5 show that the inflation has a negative effect on the overall price of the stocks of the cross listed firms in the short run. Inflation influences value of financial assets determined by the firm's net earnings. Thus, in a highly inflationary economy stock prices are adversely affected due to decline in investment as a result of higher prices of factor input. Only one firm (NMG) is found to be negatively and significantly affected by the inflation.

Similar to the case in Tanzania, the short run effect of interest rate on the overall stock prices is found not to be significant. However, when individual stocks are analysed, JHL is found to be significantly affected by the changes in the interest rate. An increase in the interest rate by 1 percent is observed to results into a decrease of 1.8 percent in price of the JHL shares.

GDP growth rate has no significant relationship with the stock returns at 1%, 5% and 10% significant levels when the average prices of the cross listed firms is used. The results mean that changes in the growth rate do not have any impact on the stock prices. This could be due to the premise that the most of the cross listed companies in Uganda are not in the sectors that contributes more to the GDP. The leading contributor of GDP growth in Uganda is service industry with wholesale and retail services leading in terms of percentage share to GDP. The findings of this study are consistent with some empirical studies by Patatoukas, (2020) and Kirui et al, (2014), which also found no significant relationship exists between GDP growth rate and stock returns. This further suggests that firms are more related to the particular stock market where they are listed and less in the general economy.

Conclusions. The paper made attempt to determine the effect of the selected macroeconomic factors of the host country on the stock market performance of the cross listed firms in East Africa. This was achieved first by determining the impact of macroeconomic factors on the returns of individual firm and then establishing such an impact on the combined average prices of those firms. The study found that inflation has both short run and long run negative effect on the overall stock returns in both markets. Contrary to the general belief, the study found interest rate has positive impact on the combined average stock returns in both markets. However, analysis at individual firm level showed both inflation and interest rate, had both positive and negative effect on stock returns. GDP growth rate is found not statistically significant factor that affect stock returns.

The study concludes that macroeconomic variables exert effect on stock returns of the cross listed firms in East Africa. There are mixed results in terms of magnitude and direction of effect. By treating the selected macroeconomic variables as risky factors, the paper is in support of the APT. This study can have valuable contribution to the body of knowledge especially on the nexus between macroeconomic variables on stock returns. It also contributes to the players in the stock market including investors, companies, supervisors and regulators by shading light on the effects of the selected macroeconomic variables on performance of cross listed firms. The results obtained in this study can be used by all the group of players depending on their decision needs.

Future studies may consider modeling the home country macroeconomics and stock returns. Also, future studies may consider studying analyzing the home country versus host country macroeconomics on stock returns of the cross listed firms.

References:

1. Abbas, S., Tahir, S. H., & Raza, S. (2014). Impact of Macroeconomic Variables on Stock Returns: Evidence from KSE-100 Index of Pakistan. *Research Journal of economics and Business Studies*, *3*, 70-77 [in English].
2. Aquino, K. P., & Poshakwale, S. (2006). Price determinants of American Depositary Receipts (ADR): a cross-sectional analysis of panel data. *Applied Financial Economics*, *16*(16), 1225-1237 [in English].
3. Barakat, M.R., Elgazzar, S., & Hanafy, K. (2016). Impact of Macroeconomic Variables on Stock Markets: Evidence from Emerging Markets, International. *Journal of Economics and Finance*, 8(1), 195-207 [in English].
4. Choi, Y. K., & Kim, D. S. (2000). Determinants of American depositary receipts and their underlying stock returns: implications for international diversification. *International Review of Financial Analysis*, 9(4), 351-368 [in English].
5. Christie-David, R., Chaudhry, M., & Khan, W. (2002). News releases, market integration, and market leadership. *Journal of Financial Research*, 25, 223–245 [in English].
6. Dodd, O. (2013). Why do firms cross-list their shares on foreign exchanges? Review of cross-listing theories and empirical evidence. *Review of Behavioral Finance*, 5(1), 77-99 [in English].
7. Decourt, R. F. (2017). Stock returns, macroeconomic variables and expectations: Evidence from Brazil [in English].
8. Epaphra, M. & Salema, E., (2018). The impact of macroeconomic variables on stock prices in Tanzania. *Journal of Economics Library*, 5(1), 12-41 [in English].
9. Fama, E. F. (1981). Stock returns, real activity, inflation, and money. *The American economic review*, 71(4), 545-565 [in English].
10. Ferrer, R., Bolós, V. J., & Benítez, R. (2016). Interest rate changes and stock returns: A European multi-country study with wavelets. *International Review of Economics & Finance*, 44, 1-12 [in English].
11. Fisher, I. (1930). The Theory of Interest. New York: Macmillan [in English].
12. Kirui, E., Wawire, N. H., & Onono, P. O. (2014). Macroeconomic variables, volatility and stock market returns: a case of Nairobi securities exchange, Kenya. *International Journal of Economics and Finance*, 6(8), 214-228 [in English].
13. Kuwornu, J. K. (2012). Effect of macroeconomic variables on the Ghanaian stock market returns: A co-integration analysis. co-integration analysis. *Agris On-line Papers in Economics and Informatics*, 4(2), 1-12 [in English].
14. Muhammad, A., Rehamna, I., Qureshi, F., Hanif, W., and Anwer, Z. (2018). Modelling Asymmetric Impact of Home Country Macroeconomic Variables on American Depository Receipts: Evidence from Eurozone. *Annals of Economics and Finance*, 19(2), 703-727 [in English].

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15. Muli, W., Aduda, J., Lishenga, J., and Abala, D. (2017). The moderating effect of economic growth on the relationship between economic integration and foreign direct investment in the East African Community. *Journal of Finance and Investment Analysis*, 6(3), 85-114 [in English].

16. Narayan, S. & Narayan, P. (2012). Do US Macroeconomic Conditions Affect Asian Stock Markets? *Journal of Asian Economics*, 23, 669-679 [in English].

17. Ndlovu, B., Faisa, F., Resatoglu, N. G., & Türsoy, T. (2018). The Impact Macroeconomic Variables on Stock Returns: A Case of the Johannesburg Stock Exchange. *Romanian Statistical Review*, 2 [in English].

18. Nikkinen, J., & Sahlström, P. (2004). Scheduled domestic and US macroeconomic news and stock valuation in Europe. *Journal of multinational financial management*, 14(3), 201-215 [in English].

19. Patatoukas, P. N. (2020). Stock market returns and GDP news. *Journal of Accounting, Auditing & Finance,* 1-26 [in English].

20. Ratner, B. (2009). The correlation coefficient: Its values range between+ 1/− 1, or do they? *Journal of targeting, measurement and analysis for marketing*, 17(2), 139-142 [in English].

21. Ross, S. (1976). The Arbitrage theory of capital asset pricing. *Journal of Economic Theory*, 13, 341-360 [in English].

22. Temouri, Y., Driffield, N., & Bhaumik, S. K. (2016). A strategic perspective of cross-listing by emerging market firms: Evidence from Indonesia, Mexico, Poland and South Africa. *Journal of International Management*, 22(3), 265-279 [in English].

23. Zaheer, A. L. A. M., & Rashid, K. (2014). Time series Analysis of the relationship between Macroeconomic factors and the Stock market returns in Pakistan. *Journal of Yaşar University*, 9(36), 6361-6370 [in English].