The Impact of Stock Liquidity and Country-Wide Factors on Depositary Receipts Return and Volatility: Implications from the UK

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ABSTRACT

This thesis focuses on the impact of stock liquidity and country-wide factors on return and volatility of Depositary Receipts (DRs). As a case study, it examines the underlying stocks that are traded in the UK and their corresponding DRs that are traded in 46 markets across 25 countries, considering the impact of home/foreign country corruption. The statistical analysis is carried out by using GLS, in addition to WLS and Robust regression as a robustness check for unbalanced panel data which cover the period from 2004 to 2019. This thesis highlights the importance of combining two theories; liquidity preference theory (which asserts that investors prefer highly liquid holdings, as DRs can be liquidated quickly by selling them in one of foreign countries in which they are traded or back to their original stocks in the UK) and international diversification theory (that underlines the importance of DRs in diversifying investments internationally). Also, arbitrageurs can benefit from differences between prices of stock/DR or DR/DR till maintaining their parity when markets become efficient according to efficient market hypothesis. The findings show that; (a) Increase in trading volume, as a proxy for liquidity, of underlying stocks and DRs leads to an increase in return and a decrease in volatility,(b) Inflation has a significant positive effect on return and volatility,(c) Interest rate has a significant negative effect on return and positive effect on volatility,(d) GDP has an unexpectedly significant negative effect on most of countries return, however it has an insignificant effect on volatility,(e) Exchange rate has a significant negative effect on return of most of countries, however, its effect on volatility differs from one country to another,(f) Corruption of home/foreign countries have mostly the same significant negative effects on return, however their effects differ on volatility. Actually, previous studies focused only on these factors partially. Therefore, this thesis fills the gap in knowledge by building more comprehensive model that guides investors/arbitrageurs in their decisions concerning investments in DRs.

DEDICATION

This thesis is dedicated to my late father professor Samir Abdel Aziz, whose memory inspired me to complete this thesis, and to my beloved mother, for her unconditional love, support, and encouragement.

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GLOSSARY OF ACRONYMS

ABS	Australian Bureau of Statistics
ADR	American Depositary Receipt
Brexit	British Exit
CAPM	Capital Asset Pricing Model
CD	Certificate of Deposit
CPI	Corruption Perceptions Index
DCC-GARCH	Dynamic Conditional Correlation
DFS	Direct Foreign Share
DR	Depositary Receipt
EMH	Efficient Market Hypothesis
EPS	Earnings Per Share
ER	Exchange Rate
ETFs	Exchange Traded Funds
FCCI	Foreign Country Corruption Index
FE	Fixed Effect
FED	Federal Reserve Board
FTSE	Financial Times Stock Exchange
GAAP	General Accepted Accounting Principles
GCC	Gulf Council Countries
GDP	Gross Domestic Product
GDR	Global Depositary Receipt
GLM	Generalised Linear Model
GLS	Generalised Least Squares
GMM	Generalised Method of Moments
IDR	Indian Depositary Receipt
IOB	International Order Book
IPD	International Portfolio Diversification
IR	Interest Rate
IV	Instrumental Variable
LIQ	Liquidity

LOP	Law of One Price
LSE	London Stock Exchange
MNC	Multinational corporation
MPT	Modern Portfolio Theory
OLS	Ordinary Least Squares
OTC	Over The Counter
PORTAL	Private Offerings, Re-sales and Trading through Automated
QIB	Qualified Institutional Buyers
RADRs	Rule 144A Depositary Receipts
RE	Random Effect
REG. S	Regulation S
RESET	Regression Equation Specification Error Test
RET	Return
RIE	Recognised Investment Exchange
RNS	Regulatory News Service
SDR	Singapore Depositary Receipt
SEC	Securities and Exchange Commission
SGT	Skewed Generalised t
T-BONDS	Treasury bond
UKCI	The UK Corruption index
VAR	Vector Auto-Regression
VIF	Variance Inflation Factor
VOL	Volatility
WLS	Weighted Least Square

Chapter One

Introduction

Chapter 1

Introduction

Imagine the obstacles that faced the United States' citizens in 1920s who wanted to buy and/or collect their dividends from the London stock exchange. The journey from New York to London is 3458 miles and crossing the sea would have taken about 32 days, depending on the wind and the prevailing weather conditions. Prior to American depositary receipts (ADRs), investors had to either make this cumbersome trip themselves or hire an agent, at a significant cost, to present the share certificates required in London.

In 1927, J.P. Morgan created ADR as a means to make possible the registration and dividend collection on non-US stocks without being physically present at the foreign exchanges. Receipt holders in the US were able to collect all their payments and dividends in US dollars via US depositary banks which held the securities in the country of origin and made the money available for their citizens residing in the US.

Shares in the local market were symbolised by depositary notes representing a specific number of underlying shares. Actually, the bank can make new receipts for investors when the needed numbers of shares were deposited in their custodial account in the local market. These ADRs could be cancelled or redeemed by simply reversing the process.

In 1955 the US Securities and Exchange Commission (SEC) created a form for registering all depositary receipt programs and the form of ADRs which has continued until today. A newer version of the form has replaced the original one and is still in use nowadays. ADRs are US dollar-denominated negotiable instruments issued in the US by a depositary bank that represents ownership in non-US securities. This process is commonly called underlying ordinary shares (Depositary receipts handbook, 2003).

By using ADRs, the US investors can buy and sell non-US securities in the US dollars without having concerns about time differences for trading or even the problem of overseas markets when attempting to do business in other countries. In addition, non-US companies had access to the US capital markets, which was considered the largest domestic investor base in the world.

SEC governs various types of depositary receipts (American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs), Indian Depositary Receipts (IDRs), and European Depositary Receipts (EDRs) putting them under regulations similar to those that control domestic stocks thereby enabling them to be traded on the New York stock exchange and NASDAQ in the US currency. Dividends and share trades are also conducted in the US dollars, according to the US market procedures. Direct investments in foreign markets can be a complicated and costly process, but the use of depositary receipts streamlines and simplifies the entire process.

As well, in 1990s, the London stock exchange issued GDR which became one of the most common investment tools especially for investors who prefer to invest in foreign markets. Although GDR is similar to ADR in structure, however, the former needs less strict reporting requirements, which make it more affordable than ADR (Kim and Pinnuck, 2014).

1.1 Thesis problem

This thesis revolves around determining the impact of stock liquidity and country-wide factors on return and volatility of the depositary receipts. These important factors have a great interest to the investors as they influence significantly their decisions concerning their DRs investments. However, previous studies focused only on these factors partially. Herein lies the problem of the thesis as the investors and the arbitrageurs are not provided with a complete picture of their investments. Therefore, this thesis is an attempt to bridge the gap between these factors by examining them comprehensively to provide them with more adequate information that will guide them to take the right decisions. On the other hand, volatility is an inevitable measure of risk, and any volatility variances between the underlying stocks and their DRs that are traded in different countries should be of interest to arbitrageurs and investors. These variances could be utilised by practicing the arbitrage in light of achieving more satisfactory risk-return relationship. Also any difference in liquidity is considered a valuable opportunity for the investors to liquidate their investments into cash quickly. Actually, the underlying stock in the UK may have more than one DR in different foreign markets across different foreign countries which increase the probability of having more than one valuable opportunity to liquidate these investments quickly. Till now there is no study that clearly examines investment opportunities of holding underlying stocks and their corresponding depositary receipts for the same cross-listed company that are traded in different foreign markets across many countries. For example, HSBC underlying stock is traded in two markets in the UK along with 14 markets in five countries in which respective depositary receipts are traded[1]. This diversification across different countries improves the opportunity of liquidating their assets in one of these countries which may affect significantly their return and volatility. Hence, the current thesis focuses on these relationships especially there is no study applied the liquidity preference theory in explaining the mechanism of the underlying stocks liquidity that have more than one DR in different markets across different countries. Another critical problem still exists is that investors and arbitrageurs are not provided with data related to the categories of countries in which DRs are traded. For example, factors that affect DRs return and volatility in developed countries may differ significantly from those factors that affect DRs return and volatility in developing counties. Also, DRs return and volatility that are traded in one of the European Union countries may differ from the return and volatility of DRs that are traded in one of the non-European countries. Accordingly, the current thesis categorises DRs that are traded outside

[1] - www.investing.com

the UK into: European and non-European, as well developed and developing countries which may enhance the investors’ decisions in selecting the relevant markets of their investments.

Another problem revolves around that there is a limited number of studies that examine the impact of country-wide factors of host countries in which DRs are traded, on their return and volatility. Moreover, there is no study examines the impact of home country-wide factors on underlying stocks and their respective DRs return and volatility.

The main idea is that the stocks of cross-listed companies that operate in the home country are affected principally by its economic conditions (e.g. currency exchange rate, inflation rate and the level of country corruption) and consequently these conditions may affect the return and volatility of corresponding DRs in countries that they are traded. From this point another problem arises concerning the role of the corruption that it may play in affecting the underlying stocks and their respective DRs return and volatility.

Actually, the corruption has two sources; the first is the corruption level of the home country of the underlying stocks which may extend to affect their corresponding DRs return and volatility that are traded in different foreign countries. The second source of corruption is the one which is derived from the country in which DRs are traded. So, the problem here is about identifying the source of corruption which significantly influences the DRs return and volatility. In order to highlight these problems, the current thesis pursues the previous studies to illustrate the gap clearly that it seeks to bridge.

1.2 Thesis objectives and questions

1.2.1 Thesis objectives

This thesis seeks to provide a comprehensive understanding of depositary receipts mechanism that could assist and improve the decision making process for the stock market users, which ultimately can lead to multimarket trading, liquidity, and stability in the financial system. Hence, this thesis develops the models to empirically test the impacts of liquidity and domestic country-wide factors on return and volatility of the underlying stocks and their respective depositary receipts, taking into consideration the effect of country corruption; domestically and internationally. To compare the results across different markets in different countries, the researcher classifies the results into the following groups:

Group (1): Domestic and foreign countries.

Moreover, to obtain more detailed analysis concerning DRs' return and volatility, the foreign countries are classified into the following groups:

Group (2): European and non-European countries.

Group (3): Developed and developing countries.

Consequently, the objective of the thesis is to examine the impact of liquidity and the UK country-wide factors on the underlying stocks and their corresponding DRs' return and volatility in light of the three mentioned groups; group (1): domestic and foreign countries, group (2): European and non-European countries and group (3): developed and developing countries.

1.2.2 Thesis questions

Derived from this objective, the thesis attempts to answer the following questions:

Q1: Is there any significant impact of liquidity and the UK country-wide factors on return and volatility of the underlying stocks that are traded in the UK and their corresponding DRs that are traded in foreign countries?

To get more details about the categories of foreign countries in which DRs are traded, the following sub-question can be explored:

Q1.1: Is there any significant impact of liquidity and the UK country-wide factors on return and volatility of DRs that are traded in the following groups; European and non-European countries and developed and developing countries?

1.3 Thesis importance

The importance of this thesis is derived principally from the importance of its topic which revolves around determining the impact of liquidity and the UK country-wide factors on underlying stocks and their corresponding DRs' return and volatility. Therefore, the following are the main reasons behind the importance of this thesis:

- There is no study that explicitly examines the investment opportunities of holding underlying stocks and their corresponding DRs that are traded in different foreign markets across many countries.

- It underlines the importance of integrating two theories together; the international diversification theory and the liquidity preference theory to explain the impact of stock liquidity and country-wide factors on their return and volatility. The international diversification theory assumes that investments in well-diversified portfolios of DRs is considered one of the most popular ways to own foreign investments in different foreign countries in such a way as to offset losses and to avoid heavily concentrated investments in one country. As well, the liquidity preference theory enhances the investor preference to hold high liquidated assets as the underlying stock in the UK may have more than one DR that are traded in different countries which increase the probability of liquidating their investments quickly by selling them in one of the foreign countries as DRs or back to their original underlying stocks, which is known as 'fungibility'.

- It is the first thesis that examines all companies in the UK context which issue the underlying stocks that covered by DRs worldwide in order to determine the impact of the home country-wide factors on the return and volatility of underlying stocks and their DRs that are traded outside the UK, whereas, there are limited studies that discussed mainly the impact of the host country-wide factors in which DRs are traded. Therefore, this thesis adds to the knowledge a variety of evidence related to the impact of home country-wide factors on underlying stocks and their DR return and volatility.

- It examines the corruption as one of the barriers of foreign investments which makes them subject to high level of volatility. Actually, corruption has a significant role in affecting the underlying stocks and their DRs return and volatility as it has two different aspects; the domestic aspect (corruption of home country) which may extend to affect the countries in which DRs are traded. Another aspect of corruption is the foreign country corruption that is derived from the countries in which DRs are traded. So, this thesis examines the impact of these two aspects of corruption to determine which one of them has more significant impact on underlying stocks and their corresponding DRs return and volatility.

- This thesis can support investors and arbitrageurs who have inadequate information to take more accurate investment decisions related to DRs, as they are not provided with detailed overview of the categories of countries in which DRs are traded. Accordingly, the current thesis categorises the foreign countries in which DRs are traded outside the UK into; European and on-European and developed and developing countries.

1.4 Data and methods of estimation

For the purpose of this thesis, the researcher adopts the quantitative research which seeks to explain the impact of liquidity and country-wide factors on underlying stocks and their corresponding depositary receipts return and volatility.

Therefore, numerical data can be gathered about daily prices of the underlying stocks and respective depositary receipts, and then will be analysed by using mathematically based methods in particular statistics. Also, positivism is selected as it firstly involves selecting the theoretical research paradigm. It seeks to develop hypotheses relying on existing theories. Afterwards, these hypotheses are tested and findings are analysed and explained. In order to achieve its purposes, this thesis will adapt Descripto-explanatory research which is based mainly on secondary data**.** Practically, secondary data are extracted from the dataset covers a period from 2004 to 2019 which based on the observations of daily data for the underlying stocks that are traded in the UK, as well, their corresponding depositary receipts which are traded in stock exchanges outside the UK. Consequently, all of these daily data will be converted into annual data. The process of analysing data is based on applying panel data for 254 companies which represent the total number of companies that issue the underlying stocks and their corresponding depositary receipts in different industries and trade them at the UK as underlying stocks or internationally as DRs at all relevant stock exchanges in 25 countries; Argentina, Australia, Austria, Brazil, Botswana, Canada, Denmark, France, Germany, Hong Kong, India, Ireland, Italy, Malaysia, Mexico, Namibia, Netherlands, Norway, Qatar, Singapore, South Africa, Spain, Sweden, Switzerland, and the US.

Specifically, the depositary receipts are traded in the following 46 stock exchanges;

BATS France, BATS Italy, BATS Spain, BATS Sweden, Derived Australia, Derived Hong Kong , Derived Italy, Derived Norway, Derived South Africa, Derived Spain, NASDAQ, NYSE, Oslo, OTC, CBOE, TSXV, Berlin, Dusseldorf, Frankfurt, Hamburg, Munich, Stuttgart, Trade-Gate, Xetra, Amsterdam, Argentina, BMandF, Botswana, BSE, Copenhagen, Doha, Hong Kong, Ireland, Johannesburg, Kuala Lumpur, Madrid, Mexico, Milan, Namibia, NEO, NSE, Singapore, Stockholm, Switzerland, Sydney, Toronto.

1.5 Organisation of the thesis

Chapter two of the thesis sheds light of depositary receipts and their relevant concepts. This chapter also presents the theories related to our thesis scope; Modern Portfolio Theory (MPT), Liquidly Preference Theory, Arbitrage and Law of One Price (LOP) and Efficient Market Hypothesis (EMH). Finally, this chapter ends with the concepts of the thesis variables as follows; stock market return and volatility, stock market liquidity, country-wide factors (inflation rate, interest rate, GDP, exchange rate and country corruption).

Chapter three entitled "Literature review" is an extensive research of various research papers using electronic databases to critically review the relevant literature with regard to depositary receipts as an international diversification investment's mechanism. The chapter includes the following issues;

- Depositary receipts and their arbitrage opportunities in inefficient markets
- Depositary receipts as a speculative motive in light of liquidity preference theory
- Depositary receipts and their corresponding underlying stocks return and volatility
- Liquidity effect on depositary receipts and underlying stocks return and volatility
- The effect of domestic country-wide factors on depositary receipts and their underlying stocks return and volatility. These factors are as follows;
    - Inflation effect on depositary receipts and underlying stocks return and volatility.
    - Interest rate effect on depositary receipts and underlying stocks return and volatility.
    - Exchange rate effect on depositary receipts and underlying stocks return and volatility.
    - GDP effect on depositary receipts and underlying stocks return and volatility.
    - Corruption effect on depositary receipts and underlying stocks return and volatility.

Chapter four includes an overview of the methodology adopted in this thesis, starting with the research philosophy then the research approach. Also, the thesis variables are identified and the measures that applied for each one of them are clarified. Also this chapter provides how the thesis hypotheses are developed, followed by the conceptual framework of the thesis which represents the relationships between the study's variables. Then the thesis models are presented and then diagnosed according to OLS assumptions. Finally the statistical methods that applied to test the models are discussed.

Chapter five entitled ''Empirical findings on stock market return'' includes the main empirical findings of the data concerning the impact of liquidity and country-wide factors on the return of the underlying stocks and their respective DRs that are traded in different foreign markets across different countries according to three groups: Group (1): domestic and foreign countries, Group (2): European and non-European countries and Group (3): developed and developing countries. Then it presents the thesis findings concerning return models and compares them to those in the literature to determine whether to accept or reject the thesis hypotheses.

Chapter six entitled ''Empirical findings on stock market volatility'' includes the main empirical findings of the data concerning the impact of liquidity and country-wide factors on the return of the underlying stocks and their respective DRs that are traded in different foreign markets across different countries according to three groups: Group (1): domestic and foreign countries, Group (2): European and non-European countries and Group (3): developed and developing countries. Then it presents the thesis findings of volatility models and compares them to those in the literature to determine whether to accept or reject the thesis hypotheses.

Chapter seven includes robustness check techniques applied to determine whether the main findings of data analysis are significantly changed or not when different statistical methods are used. Consequently, the results of the study's models will be more reliable after checking them by applying different robustness check techniques.

Chapter eight finalises the thesis through providing the major findings of it, followed by the main contributions to theory, practice and methodology. Also, this chapter includes thesis limitations and suggestions for future studies and ends up with the conclusion.

Chapter Two

Depositary Receipts and Their Relevant Concepts

Chapter 2

Depositary receipts and their relevant concepts

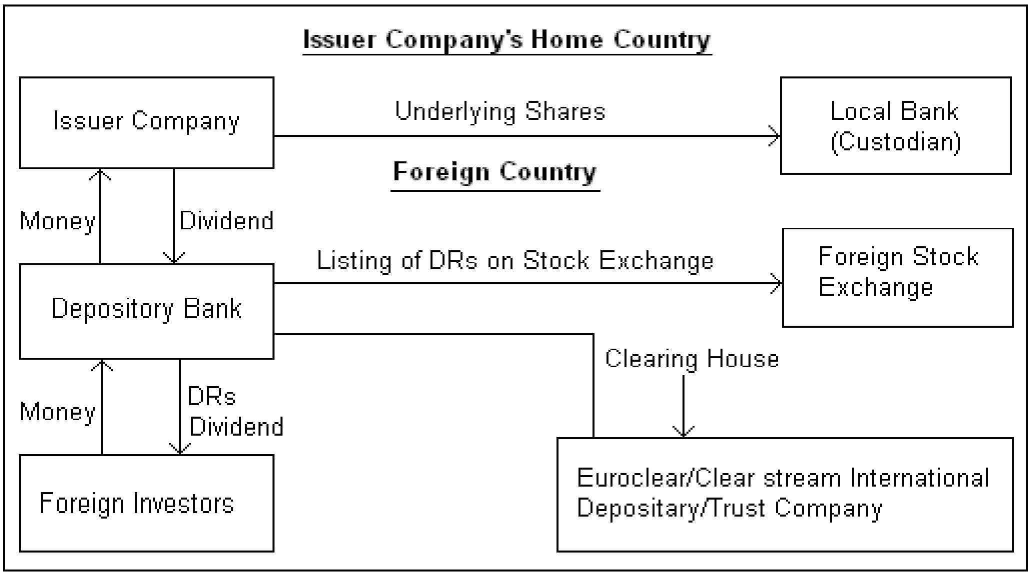
Depositary receipts are "negotiable financial instruments issued by a bank to represent a foreign company's publicly-traded securities". Essentially, depositary receipts are traded in the local market, but the custodian bank in the foreign country holds the actual stock as a DR can be considered as a "tracking stock" on a foreign market. There are two security instruments: ADRs and GDRs; they are named according to the home country of the issuing company. What makes them unusual is that they can be changed back to the original stock which essentially has the same value (Depositary receipts handbook, 2003). Actually, there are different theories that can be utilised in explaining the depositary receipts mechanism such as; modern portfolio theory, liquidity preference theory, arbitrage theory and law of one price as well as the efficient market hypothesis. To get the benefits of understanding DRs mechanism, these theories are explained in this chapter. Also, as DRs are considered one of the popular international investment tools, they may affected heavily by different country-wide factors such as inflation rate, interest rate, exchange rate, and the level of country corruption which are discussed in this chapter.

2.1 An overview of depositary receipts

2.1.1 Depositary receipt mechanisms

As shown in figure 2.1, DRs mechanism starts with buying an underlying stock from the home market of the issuer and then, depositing it there with the custodian bank. Then, the depositary bank issues the depositary receipts certificates, which represent the corresponding underlying stocks, for the investors or their brokers.

Figure 2.1: The typical structure of DR programs



Source: Kumar, M., 2006. *Depositary Receipts: Concept, Evolution and Recent Trends, Evolution and Recent Trends.*

To establish depositary receipts, the issuer should first determine the "depositary receipts ratio" which refers to the number of underlying stocks represented by one depositary receipt. It helps in determining whether the price of the depositary receipt is located within the average price range in one market, as it is associated directly to the usual prices of the issuer's industry and consequently the investors perceive them as well-priced depositary receipts. Actually, the broker doesn't need to create a new depositary receipt as he/she can buy and/or sell it at any market where depositary receipts are freely traded (Troyanska, 2004).

Cancellation mechanism of the depositary receipts is the contrary of the issuance process. For example, when investors, or their brokers, decide to sell their depositary receipts or transferring them to other investors, they can sell them back into the home market. Therefore, they will be delivered to the depositary bank, which, in turn, cancels these depositary receipts and gives instructions to the custodian to release the underlying stocks to a new buyer in home market (Troyanska, 2004).

Actually, the two most common types of depositary receipts are unsponsored depositary receipts or sponsored depositary receipts. Unsponsored depositary receipts are issued without a formal agreement with the company by one or more depositaries in response to market demand. Lack of formal agreement also means lack of control over the transactions and conceivable hidden costs. Unsponsored depositary receipts are considered outmoded and practically speaking almost never used today (Troyanska, 2004).

Sponsored depositary receipts may be issued at different levels available in various markets and are issued by one depositary appointed by any company under a deposit agreement or service contract. Also, sponsored depositary receipts provide more flexibility to list on the US or European market and raise the capital needed. Companies are able to easily access the US and non-US capital markets using a sponsored level I depositary receipt program. Prices of level I depositary receipts are published in the pink sheets, allowing them to be traded on both the US over-the- counter (OTC) market and on some exchanges outside the US. Since the creation of a Level I program does not need the full SEC registration as well the firm does not have to report its accounts under American Generally Accepted Accounting Principles (GAAP) or even to provide full Securities and Exchange Commission (SEC) disclosure, it can be used as a way to enter the US capital market without performing any changes in the company reporting or registration. Using a Sponsored Level I depositary receipt program companies reap the rewards of a publicly-traded security without restructuring to meet SEC requirements (Troyanska, 2004).

Because of their simplicity and because it is easy to upgrade from a sponsored level I depositary receipt to a level 2 (listing) or level 3 (offering) program, numerous well-known multinational companies have taken advantage of this, making Sponsored Level I depositary receipts the fastest-growing segment of the depositary receipt business (Troyanska, 2004). Companies with a Level I program often obtain 5 percent to 15 percent of its shareholder base in depositary receipt form to enjoy the benefits of depositary receipts (Troyanska, 2004).

In order to list depositary receipts on the US stock exchange, large investment companies in NASDAQ or NYSE raise capital or make an acquisition, making securities companies use sponsored level 2 or sponsored level 3 depositary receipts. Despite level 2 and level 3 depositary receipt programs require SEC registration and adherence to applicable requirements for the US GAAP, companies choose them to attract a significant number of the US investors (Troyanska, 2004). Features of these types of depositary receipts include the ability to be listed on some exchanges outside the US. Capital which is being raised with level 3 programs can generate the most US investors interest, as opposed to level 2 depositary receipts, which are exchange-listed securities but without raising new capital (Troyanska, 2004).

To access the US and other capital markets without SEC registration, companies can either use three levels of sponsored depositary receipt programs that trade publicly in the US, or enter through SEC rule 144A and/or SEC regulation S depositary receipts facilities. Rule 144A program allows capital to be increased by using depositary receipts with qualified investors (qualified investor buyers [QIBs]) in the US domestic market. Increasing capital can be achieved with regulation S programs by placing DRs offshore to non-US investors utilising regulation S. A level I program can be created in tandem with a rule 144A program and a regulation S program may be joined into a level I program after time limitations have expired (Troyanska, 2004).

2.1.2 Global depositary receipts

In 1990s, because of the increased flow of capital through DR programs, issuers in emerging markets are motivated to generate different DR programs. This leads to developing GDR programs and their numerous alternatives, permitting the issuer to increase capital at the same time in different exchanges through the global offering. In light of GDR offering, issuers can access different markets rather than the home market which gives them an opportunity to expand their investors' base. GDRs are listed in different exchanges such as London stock exchange (LSE) and also traded over-the-counter (Kumar, 2006).

Like ADRs, GDRs give the investors a valuable opportunity to invest their money in foreign countries without any serious concern about differences in laws, foreign trading practices, accounting principles applied, or even the cross-border transactions, in addition to offering almost the same corporate rights to the GDRs holders that the underlying stockholders enjoy (e.g. voting rights and receiving dividends). Also, one of the main benefits of GDRs is the availability of buying and investing in them through the institutional investors even when they may be restricted by law enforcement from buying stocks of foreign companies. In other words, GDRs can overcome restrictions imposed by the country of corporate issuer on the foreign ownership or any capital movement which eliminate any risky settlement procedures, any foreign custody fees or imposing any additional taxes that may be due when the company's stocks are bought or sold directly. GDRs can be considered one of the most liquidated investments tools as their demand and supply can be regulated by creating or cancelling them. However, they are subject to foreign exchange risk in case of trading them in different currencies. Consequently, because of their flexible structure, GDRs became one of the most popular and quickly growing capital-raising instruments (Spaulding, 2020).

Generally, DR program can be tailored to specific region or certain home country of issuing company without offering stocks in the US, such as European DR (EDR), or Singapore DR (SDR) as they enable the issuing company to select the investor base they need to access in order to enhance their presence in certain market (Kumar, 2006). According to efficient market hypothesis (EMH), two assets with same features are sold for the same price. Hence, for different depositary receipts which are traded in different markets but derived from the same underlying stock, they should be traded also at the same price. However, if any changes in the prices across different markets take place, this means that a valuable arbitrage opportunity arises in this market to sell the asset where it is overpriced and buy it back in other market where it is under-priced. Moreover, the unrestricted flow of DRs between different markets extends to include the home market in which their corresponding underlying stocks are traded. This means that investors of DRs can easily transform them into underlying stocks at home market as well they can reconvert them into DRs again.

In fact, two mutual ways of trading DRs and their underlying stocks (i.e. two-way fungibility) provide investors with the possibility of DRs re-issuance or cancellation. Fungibility of DRs has many benefits; it can increase the trading volumes of DRs, increase the liquidity of international DRs investments due to the increased opportunities to sell (i.e. liquidate) DRs in more than one market across different countries, which may ultimately, increase the DRs return (i.e. prices) due to the increase in demand. This means that the two-way fungibility of DRs provides the investors with the opportunity to buy and sell them rapidly and freely because of the deviations in the prices of the same DR and its reference stock in different markets. Therefore, the two-way fungibility increases the trading volume of transactions, and in turn, the liquidity of these transactions provides better price of DRs and their respective underlying stocks. On the other hand, arbitrageurs can exploit the discrepancies in prices to achieve profits till reaching the point of stock-DR parity at which no more available profit opportunities can take place. DRs issuing companies around the world are increasingly exploiting the internationalisation of the DRs trading mechanism in order to access the international stock markets to trade their depositary receipts widely but conveniently within the relevant host markets across different countries (Kumar, 2006).

2.1.3 Benefits of depositary receipts

In many emerging markets, companies are often faced with seemingly-endless hurdles to foreign investments. However, trading in DRs solves this problem by functioning as an instrument to increase global trade. At the same time DRs can help increasing not only the businesses in local and foreign markets, but can also ease the exchange of information, technology, regulatory procedures and promote market transparency. Thus, the DR investor and company can both get benefits from investing abroad.

In order to gain the benefits of diversification, DRs immediately turn the portfolio of a given investor into a global one while trading in his/her own market under familiar settlement and clearance conditions, or more critically, to capture the benefits of these higher-risk and higher-return equities, investors just purchase a DR (Troyanska, 2004). Purchasing a DR also avoids the added risks of going directly into foreign markets in which investors may face the dangers of lacking transparency or instability resulting from changing regulatory procedures (Troyanska, 2004). Even though many risks are neutralised, it is important to stress the point that an investor will still bear some foreign-exchange risk as there will always be a degree of instability in emerging economies and societies. Furthermore, companies issue DRs have additional benefit of increasing the stock’s simplicity of conversion into cash in addition to improving the company's image in its local market.

Depositary receipts fortify a global stockholder base, and provide people who live abroad with a more convenient opportunity to invest in their home countries. In many countries, especially those with emerging markets, hindrances often block foreign investors from accessing the local market. By issuing a DR, a company can invest internationally and overcomes many barriers that a foreign investor might otherwise face since DRs can be traded free just like any other security, either on an exchange or in the over-the-counter market. The establishment of a depositary receipt program extends multiple advantages to non-US companies. The major reasons to establish a depositary receipt program can be divided into two widespread categories: capital and commercial. Advantages of this program may include;

- Increasing market share via widespread investor exposure, possibly increasing or stabilising the stock price, with potentially more liquidity.
- More integrated profile for the company's products, services and financial instruments in foreign marketplaces.
- More flexible mechanism for increasing companies' capitals.
- Efficient reduction of administration costs to save individual investors' money.

When individuals want to invest outside the local market, a DR is an excellent way to make an investment in a foreign country. With that said, trading in foreign markets is not just about return on investment. It also contains potential risks, such as political risk (country corruption), exchange rate risk and inflationary risk as the latter is very injurious to businesses, causing the value of the currency of a country with high inflation to go down daily (Strong, 2009).

2.2 Modern portfolio theory (MPT)

Diversification can be considered as one of the most important factors that affect the investment decision-making process in light of the expected "yield" or "return" and "risk" measured by the variance in return. It includes wealth allocation through assets' variety. This variety in portfolio can reduce the probability of achieving losses. In other words, to measure the investments in portfolios, the overall portfolio's risk and return should be taken into consideration simultaneously and not be viewed individually for each asset in the portfolio (Koumou and Dionne, 2019). Therefore, according to the diversification concept, Modern Portfolio Theory (MPT) was initially introduced by Harry Markowitz in his paper "Portfolio Selection," which published in 1952 and it was one the main reason behind receiving a Nobel Prize for his revolutionary academic and practical contributions to finance field. He established the foundations of modern portfolio theory which approved that the construction and the selection of portfolio depends mainly on maximising the possible expected portfolio returns along with minimising its risk of investment (Mangram, 2013).

Markowitz (1952) illustrated that the process of selecting a portfolio begins with accumulating experiences, knowledge and observations in order to conclude relevant beliefs about the potential performance of the available assets and ends with taking a decision concerning portfolio selection which depends mainly on the "expected returns-variance of returns" rule. This rule focuses on the assumption that investor always searches for maximising the future returns value which, in fact, includes a risk allowance.

Modern portfolio theory (MPT) showed that diversification can decrease the risk of portfolios by not holding the highly correlated assets together. Therefore, it can be expected that international assets may provide investors with better outcomes of diversification as their prices are generally less correlated which can be identified by various essential economic variables.

To illustrate the privileges of the international portfolios diversification, Solnik (1973) examines stock returns of eight different markets in different countries; Belgium, France, Germany, Italy, Netherlands, Switzerland, the United Kingdom, and the United States of America on a weekly data basis for about six years. He supposed that investors have no skills to select the stocks in their portfolios. As well he applied many strategies of diversification; across countries, as well across industries and countries with an assumption of currency hedging in order to minimise the risk of foreign exchange rate.

He concluded, finally, that selecting stocks across countries was better than selecting them domestically as the investors will get more benefits in terms of increasing the expected return and decreasing the volatility of this return through minimising the correlations between the diversified securities (Mansourfar et al., 2010 and Solnik, 1973). Also, Bartram and Dufey

(2001) approved that international investments have more attractive opportunities for the foreign investors rather than the domestic ones because of what is called “the attractions of diversification effects” which contribute in the foreign markets growth and the abnormal returns achieved due to market segmentation. The idea behind that is simply the fact that the gains achieved across countries are not moving all the times in the same manner which is the main reason behind achieving “diversification returns”. Evidence supports the idea stated by Baele et al. (2007) who proved that in the US and the European countries the equity domestic investments have significantly reduced over the past two decades vs. the international ones.
Solnik and McLeavey (2003) argued that international investments whether in developing or developed countries contribute in the "diversification returns" as investments in developing countries can be considered a golden opportunity to utilise from the fast developing economies of their emerging markets and accordingly achieving significant returns in a few years. On the other hand, developed countries which are characterised by more stable and strong economies with less political risks can also contribute in achieving more returns because of the international diversification.

However, there are many obstacles of international portfolio investments such as the probability of the existence of positive correlation coefficients of market returns within similar markets nature, i.e. between developed stock markets or between mature emerging markets which tend to increase gradually over time or because of the occurrence of any exceptional international crisis (Solnik, 1995). Moreover, there are many problems that the investors may face especially in the emerging markets in respect to the international portfolio diversification such as; country risk, unfamiliarity with foreign markets nature, market inefficiency, bureaucracy, rules and regulations, taxes and currency risk (Solnik and McLeavey, 2003).

Although many studies, e.g. Égert and Kocenda (2007), Kearney and Poti (2006) and Gerke et al. (2005) focused on the international diversification issues from the viewpoint of investors in different developed countries. However, still the main focus on the mechanism of cross-country diversification has been specified in large body of studies for the US investors perspective and the benefits that they can get through the international diversification of their investments.

For example, Grubel (1968) and followed by Solnik (1973) applied Modern Portfolio Theory (MPT) on the US investors in order to determine the prospective gains of holding international assets through directing partially the capitals of investors towards the foreign stock markets. They concluded that investors can achieve notable gains and reduce the international portfolios risks through well-diversified international portfolios. Consequently, the gains from International Portfolio Diversification (IPD) are harvested, from the US investors' perspective, in the last few decades as the degree of integration among their country and its foreign markets through diversifying the investors international portfolios have radically increased overtime. Moreover, there is evidence indicates that the US investors can benefit from diversifying their portfolios in international markets to get the privileges of the international portfolio diversification (Rezayat and Yavas, 2006).

Another group of studies focuses on the advantages of portfolio diversification among developing countries (i.e. emerging markets) which reflect a superior opportunity to be included in the international diversification investments as it can achieve significant potential returns in the international investments (Middleton et al., 2008). Whereas, Mensah and Alagidede (2017), Kapingura and Makhetha-Kosi (2014), Agyei-Ampomah (2011) and Alagidede et al. (2011) proved that investments in emerging or developing stock markets (e.g. African markets) are weakly correlated with the developed stock markets. Consequently, a portfolio which includes securities from emerging and developed stocks markets is one example of a well-diversified international portfolio, considering the level of corruption in these countries as it significantly affects the relevant investments decisions.

Brandao-Marques et al. (2013) argued that a country's greater "opacity" towards the investors, especially the aspects of financial and accounting disclosure, makes the country subject to any changes in global market conditions, which affects foreign portfolio investment heavily. Also, Stenzel and Wagner (2018) proved that opacity because of country corruption may impose substantial selection costs on investors which finally leads to higher overall trading costs and reduce the portfolio investment return domestically and internationally. In fact, the domestic or foreign corruption's nonlinear trade-off and its impact on the institutional investors has not been explored before. Furthermore, corruption also has a significant impact on investments because of the asymmetric information between foreign and domestic investors that, in turn, affect portfolio investment decisions. For example, foreign investment in DRs is expected to increase when country corruption in which DRs are traded is very low. Therefore, transparent environment with less corruption in certain countries may encourage investors to invest their money in these countries.

2.2.1 Measures of portfolio diversification

According to Koumou (2018) and Koumou and Dionne (2019) there are four measures of portfolio's diversification: the law of large numbers diversification measures, the correlation diversification measures, the market portfolio diversification measures and the risk contribution diversification measures.

- Law of large numbers diversification measures (or equal weight portfolio) include a small investment portion of wealth in each of a large number of assets (e.g. naïve diversification) in which the same fraction of wealth is invested in each available asset.
- Correlation diversification measures depend mainly on the interdependence between the returns of different assets which can ultimately minimise the overall portfolio risk. These measures are considered the rational diversification option which are more suitable for risk averse investors.

- Market portfolio diversification measures focus on holding a market portfolio in order to reduce the idiosyncratic risk of the portfolio, therefore, they don't work during systematic crises (e.g. 2007-2009 financial crisis).

- Risk contribution diversification measures capture the influence of risk contribution diversification via allocating the portfolio risk equally among its individual components. These measures became more popular after 2007-2009 financial crisis (Qian, 2013).

2.2.2 International diversification

In 1968, Evans and Archer published one of the most important cited papers in finance economics and corporate finance textbooks which was a logical continuation of the Capital Asset Pricing Model (CAPM). They assessed how large a portfolio should be to minimise its risk. They concluded that diversification could be achieved through a few number of stocks that are required to minimise the overall portfolio risk. Accordingly, Solnik (1973) applied the Evans and Archer's approach to study the international portfolio diversification effect on its return and risk and he found that because of the correlation structure and the large size of the US market, investors are provided with better opportunities for diversification than most of the European markets. Most importantly, he concluded that when the US and European markets are combined, the overall portfolio risk will be reduced dramatically.

The key incentive behind holding an international diversified portfolio of stocks is to reduce its overall risk which will be less than the risk of its individual stocks. Therefore, the portfolio's overall risk depends, not only on the number of stocks of the portfolio, but also on the riskiness of each component and the degree that each individual risk is independent of each other (Solnik, 1995).

As well, he approved that a well-diversified international portfolio is one-tenth as risky as an individual component of the portfolio and half as risky as a well-diversified portfolio which includes a number of domestic stocks in terms of variability of stocks returns, assuming the same number of holdings in each case. Therefore, the benefits of international diversification would be greater than investing in highly diversified domestic portfolio in terms of risk and return.

For example, increasing the number of stocks in a domestic portfolio may achieve a slight reduction in risk compared to the one which can be achieved through the same size of an internationally well-diversified portfolio (Solnik, 1995).

In practice, there are many selection criteria which have to be taken into consideration when constructing a well-diversified international portfolio such as selecting stocks across countries in order to assure that a good geographical diversification is actually achieved. Moreover, the stocks can be selected across industries from different countries which increase the diversification and in turn minimise the risk and maximise the possible expected returns. Actually, investors in foreign securities have to protect themselves against any fluctuations in exchange rate. Otherwise, they can speculate on currencies in order to minimise the effect of exchange risk.

This may occur by buying forward exchange contracts which may be relatively gainful. However, more reduction of risk can be achieved through diversifying an international portfolio. The idea behind that is shown by many authors over the last decades (Lu and Vivian, 2020, Solnik and Freitas, 1988, Solnik, 1973 and Grubel, 1968).

They showed that the movements of the stock prices across countries are often different as the stock in one country is subject to many variables (e.g. macroeconomic variables) which almost different from the other countries. So, when stocks of one country are doing better than expected, another market is expected to be doing worse, which in turn, offsetting any losses that may occur. In an international portfolio, there is a high possibility that returns of different securities are not correlated as diversification increases and the portfolio risk decreases but not in a consistent manner (Lassance and Vrins, 2019 and Solnik, 1995). Traditionally, investors have associated risk concept with volatility and considered it an unavoidable type of risk which affects radically how returns are accumulated over time. This concept is beneficial not only for managing risk, but also improves returns overtime (Bouchey et al., 2012). In conclusion, the overall portfolio risk is radically minimised by investing in different stocks across different countries, which in turn affects positively on its overall expected return.

2.3 The concept of liquidity and liquidity preference theory

Liquidity of stocks indicates to how quick a given amount of stocks can be changed over into money without affording a lot of transaction costs or causing any negative impact on stocks value. Actually, demanding money has two aspects; the first is associated with people income or the wealth as increase of income will lead to increase in money holdings for transactions purposes. The other aspect is associated with the possibility of getting other assets that can be converted into money quickly (i.e. to be liquidated in short time). This aspect becomes more attractive as keeping these assets will result in demanding more money quickly. When the two aspects are combined, they can express the nature of ‘‘Liquidity Preference Theory’’.

Liquidity preference theory was developed by Keynes (1936) in his book; The General Theory of Employment, Interest and Money who considered liquidity preference as a demand for money through determining the best combination between money holdings and the prospective risks, taking into consideration that the more rapidly an asset is converted into cash, the more liquid it is (Finkler et al., 2018). As well, the theory indicates that people are different in the amount of cash holdings they are willing to keep. Therefore, sufficient quantity of money needed to be held may differ from one to another according to the income level.

Also, liquidity preference theory stated that the central bank sets the rate of interest in order to control the financial assets prices through the demand for money. This means that the higher the rate of interest, the lower the price of assets and consequently, the higher the demand for money. Hence, liquidity preference is at the core of the relationship between asset markets and money markets (Mierzejewski, 2009). Actually, Keynes (1936) suggested three motives that lead to the demand for money: (1) the transactions motive, (2) the precautionary motive, and (3) the speculative motive.

The transactions motive: it comes from the need of cash for the regular or day to day transactions of personal and business activities in order to fill the gap between the available income and expenditures. Practically, it is positively associated with the level of income. In other words, transaction motive for holding money is an increasing function of money income. This means that people with high income may hold more cash to meet their needs, i.e., the higher the level of income, the higher the transactions motive (Sanyal, 2019).

The precautionary motive: it means the desire of people to demand money as a reserve for any unanticipated expenditures. It is directly associated with their income level, like in transactions motive, as people with high income can keep more money to meet their emergencies needs. This means that precautionary motive for demanding money is an increasing function of money income, i.e. the higher the level of income, the higher the precautionary motive (Sanyal, 2019).

The speculative motive: it shows that demand for money is for obtaining return from less risky investments after keeping enough money for transactions and precautionary motives, e.g. to make a speculative gain by investing in interest-bearing securities. In other words, the demand for money here is for the purpose of investments that can be converted into cash rapidly

(Lekachman, 1964). According to Andabai (2010) the expectations about changes in prices of bonds or securities in the current market identify the speculative demand for money. According to Keynes, expectations might affect the transactions motive if people expected an extensive change in their levels of activity of business, however, the changes in expectations have the principal effect on speculative motives for demanding money. For example, expectations of higher interest rate (e.g. fixed interest government securities) will lead to reduction in holding money and expecting fall in interest rate will motivate people to store their wealth under the speculative motive (Upadhyay, 2016 and Lekachman, 1964). So, it is notable that the main contribution of liquidity preference theory was extensively detected in the speculative motive for the demand for money (Keynes, 1936) as it refers to the desire to hold the assets in most liquidated form in order to take advantages of any market movements, given any expectations of the future uncertainty. Hence, money held under this motive is utilised in making speculative gains by investing in bonds or any other securities whose prices and rate of interest change inversely. In other words, the speculative motive for demanding money fluctuates inversely with the rate of interest (Sanyal, 2019).

Essentially, Keynes highlighted that the interest rate brings together the readiness to save and the demand for investment into equilibrium with each other. Here, saving is considered the supply side and investment is the demand for investible resources, whereas the interest rate is the ‘price’ of investible resources at which the two sides are balanced (Keynes, 1936). Also, he remarked that after deciding how much to save, people have to select in which form they will hold the command over upcoming consumption from which they reserve currently or from previous savings (Keynes, 1936). Actually, interest rate does not rely on saving decisions but on the liquidity preference as the interest rate is not the ‘price’ which brings the demand for the investible resources with the willingness to abstain from current consumption into equilibrium. Interest rate is the price that equilibrates the need for holding money with the available quantity of it (Bertocco and Kalajzic, 2014 and Keynes, 1936).

However, Friedman (1968) criticised the liquidity preference theory as it has a little practical concern especially with a steady money stock growth. The money demand would be adequately stable to keep self-modifying market forces to take place. Friedman, (1968) stressed that the central banks should not interfere in the process of identifying interest rates as markets just balanced by steady base growth without any interest rate relevant policies.

It is essential to say that Keynes emphasised that decisions whether to spend or not should not be conflicted with decisions concerning either hold wealth in terms of money or any other asset, not neglecting that the rate of interest affects significantly the investment decisions. However, it is improper to allocate the rate of interest at the level of spending/saving decisions, it has to be allocated at portfolio decisions level (Friedman, 1968).

2.4 Arbitrage and the law of one price (LOP)

2.4.1 Arbitrage

Arbitrage, sometimes called “playing the margin”, is defined as a simultaneous buying and selling in two different markets in order to gain from the difference in prices between them. This definition accurately describes what is known as a “classic” arbitrage through which the investor can buy and sell the same stock in different markets (Moore, 2018).

Arbitrage is the practice of using price differentials between two or more markets to make a profit. A mixture of corresponding deals is created to exploit the imbalance between the market prices. Academics consider arbitrage a risk-free profit as it includes only a positive cash flow without any negative cash flow or any additional risk at any probabilistic state. If the price of the market doesn’t support an arbitrage opportunity, this price may create an arbitrage equilibrium which is considered as a requirement for a general economic equilibrium. Profit is made on the range between both; the real and perceived values.

Concerning DRs, arbitrage can take place when their prices are below their real values, so investors can buy them with the expectation of making profits derived from the differences in prices. However, the original stock may also fall in value too (Billingsley, 2005).

2.4.2 Types of arbitrage

Merger arbitrage and depositary receipts arbitrage are two of multiple types of arbitrage. Merger arbitrage is accomplished in two stages; the first stage is purchasing the company's stocks which engaged in mergers and takeovers, while the second stage is shorting the stock of the acquiring company. Depositary receipts arbitrage is related to "tracking stock" on a foreign market to achieve profits from price discrepancy (Billingsley, 2005).

There are two security instruments; ADRs or GDRs, so named relying on the location of the home country of the issuing company. Nevertheless, what makes them unusual is the possibility of "fungibility" which means that they can be changed back to the underlying stocks at the same value. Profit is the difference between the expected value and actual value. Therefore, ADRs could be traded below value, so investors purchase the ADR with the expectation of making profits derived from the difference from the original price. The primary phenomenon of arbitrage is its ability of making parity in prices in different markets. Moreover, arbitrage influences the exchange rates as well the price of securities in different markets, moving towards reaching the same prices in all markets. The market efficiency can be gauged by the speed at which prices converge (Billingsley, 2005). In fact, arbitrage works on closing the gap in prices by purchasing the stock when price falls and reselling it again when the price rises. This is a valid technique when buyers are able to resell stocks freely, without high fees for buying, holding and reselling compared to the relative difference in prices in the different markets. Arbitrage opportunities are present when one of two conditions exists; First, when the same stock does not trade at the same price on all markets. Second, two stocks with the same cash flows are not traded at the same price (Billingsley, 2005).

2.4.3 Risks of arbitrage

Since it is almost impossible to close more than one transaction simultaneously, the risk has to present when a part of the deal is closed and a rapid move in prices makes it impossible to close the other at a profitable price. Another type of risk is that the other buyer or seller does not keep up his part of the bargain. This risk may significantly increase as money borrowed goes down in value.

While a classical arbitrage transaction is quick and has a low risk, present day operations can produce enormous losses. A hedge is used to apply an arbitrage strategy as it is carried out to gain more protection against any possible negative result (Moore, 2018).

All in all, a hedge makes the arbitrage strategy risk-free, allowing an investor to participate in arbitrage that profitably exploits mispriced investments without additional risk. In other words, hedging is the tool that allows arbitrage to fix asset values (Billingsley, 2005).

2.4.4 Arbitrage opportunities in trading depositary receipts

Practically, when arbitrage opportunities are discovered, they do not last long. So, the question is why is it essential to explore and analyse arbitrage opportunities? Does it carry significant benefits which justify heavily its analysis cost? Actually, there are many reasons for delving deeply into arbitrage.

Investors are concerned with whether a financial asset's price is correct or "fair." They search for favourable conditions or characteristics in an asset associated price disparities. Some low price/earnings (P/E) stocks are always outstanding values, so investors may pay attention to these factors along with other indications of value. While the presence of an arbitrage opportunity suggests that a riskless strategy can be outlined to produce a return greater than the risk-free rate, its absence indicates that an asset's price has stabilised. Surely, just because "an asset's price is not fluctuating doesn't guarantee its price is correct" (Moore, 2018).

Essentially, transactions cost is one of the causes behind the differences in prices. Moreover, many market participants believe that prices are wrong, influencing them to trade and thus affecting stock prices. Since there is an initial required investment, it may not be an arbitrage opportunity in the genuine sense of profit without risk. Thus, it is necessary to carefully compare price differences to the concept of arbitrage because it does not work in all cases (Billingsley, 2005). Arbitrage-free prices create standards for asset prices and give practical insights. First, the no-arbitrage principle helps set prices for new financial products when no market prices yet exist. Second, when price estimates are needed for a static portfolio with no recent trades, arbitrage can be used. Finally, no-arbitrage prices can be used as benchmark prices against which market prices can be compared to help in locating and leveraging assets without clear values.

Practically, there is no market is totally efficient as it is actually subject to one or more kind of imperfection which may differ considerably in amount and degree from one market to another. According to Cohen and Winn (2007) there are four various sources of market imperfections (i.e. inefficiencies): imperfect informational flow, inefficient businesses, defective pricing mechanisms (i.e. mispricing) and the existence of any other external factors.

Arbitrage is a process of buying and selling the same asset in different markets for the purpose of gaining profits which derived from differences in prices (Shapiro, 2018). Consequently, arbitrage is a very dynamic concept in the field of international investment as the latter is affected significantly by several interactions of variables between the local and international markets in different countries. These variables are mainly the country-wide factors such as inflation rate, interest rate, exchange rate and country corruption level. Therefore, Shapiro (2018) argued that arbitrage connects markets together as it is considered one of the main motives behind the globalisation of markets.

As well, international investment originates from arbitrage or the law of one price (LOP) when arbitrageurs follow profit-guaranteeing statement, i.e. buy low and sell high (Shapiro, 2018).

Law of one price deals with stock prices in different countries, taking the exchange rate into consideration. It is based on different assumptions; for example, in case of investing in DRs, there is no additional costs as there are no physical obstacles to trade internationally. It assumes that underlying stocks in home country are sold at the same price of their respective DRs which are traded in different countries worldwide expressed in the same currency. This means that according to the law of one price, prices of stocks are expected to be the same in different markets across different locations which in turn reflects significantly on the volatility as it is expected to be also the same.

2.5 Efficient market hypothesis (EMH)

As argued by Ross (1987), it is assumed that market is efficient in light of the existence of certain set of information which leads to unavailability of achieving profits as there are no available arbitrage opportunities since all information effect has been reflected on prices. Samuelson (1965) and Fama (1970) stressed on the importance of the availability of all relevant information to be reflected totally in the stock prices which follow a random walk process within the context of efficient market hypothesis. Consequently, any changes in stock prices (i.e. returns) are distributed identically. EMH can be divided into three levels, the weak form, the semi strong form and the strong form, depending on the degree of information reflected in stock prices in each level (Fama 1970, Brealey et al., 2006 and Bodie et al., 2008).

- **Weak form**: it means that stocks prices reflect only all their past relevant information whether public or private. This set of information can be extracted from market trading data which includes history of past prices and trading volumes. In other words, past stock data have to be publicly available without any additional costs in order to be utilised as an efficient tool of prediction for all investors at the same time (Bodie et al. 2008, Brealey et al., 2006 and Fama, 1970).

- **Semi-strong Form:** in this form of efficient market all publicly available information which can be obtained from various resources, such as the financial news or any relevant forecasts of a company, have to be reflected on the stock prices. So, according to this form, information which include all relevant market trading data along with the important news concerning the company (e.g. new production lines, forecasts of its profits or losses and its management and accounting practices) should be available for all of the investors at the same time (Fama 1970, Bodie et al. 2008 and Brealey et al. 2006).

- **Strong Form:** it is the most extreme version of the EMH. This form refers to the availability of all information relevant to the firm, not only the publicly available information (Fama, 1970). In this form, insider trading is not possible since even information available only to company insiders is reflected in the stock price (Bodie et al., 2008). All investors can be targeted in this form as there is no superior investment manager who can consistently beat the market (Brealey et al. 2006).

Generally, Buckley (2004) defines an efficient market as “A market in which there is a sufficiently large number of buyers and sellers to eliminate an incentive for arbitrage transactions, and in which the trade-off between return and risk is fully reflected in prices”.

Like other great ideas, the concept of efficient capital markets emerged from a chance discovery (Brealey et al. 2006). Kendall (1953, as cited in Brealey et al. 2006) studied the behaviour of stock and commodity prices expecting to find a regular pattern of price over a period of time but that did not seem to exist. Each series turned out to be a “wandering one”, and added it to the current price to determine the next week’s price”. Stock and commodity prices appeared to be following a random walk (Brealey et al. 2006). By random walk, Kendall (1953) implied that prices changes were independent of one another. Fama (1965) found evidence supporting random walk theory saying that analysts/chartists cannot predict future prices based on historical prices unless they can consistently prove that their predictions are right. If random walk was not the case and it could see that there was actually a tendency of a stock to rise based on the rising trend over one week, investors would rush to buy the stocks, inflating its price further until the stocks offer a “normal rate of return’’ (Brealey et al. 2006). The point is that the investors eliminate any profit opportunities and drive prices back to fair value (Brealey et al., 2006).

In competitive markets, today’s price of stock must already reflect the information in past prices. However, if markets are competitive, the prices should reflect all the information available to the investors. In that case, stocks could be fairly priced and returns would be unpredictable (Brealey et al., 2006).

Brealey et al. (2006) stated that “investors do not buy a stock for its unique quality but they buy it to earn a fair rate of return”. It doesn’t matter which company it is but if the prospective return is low, no one will buy it.

Brown (2011) concluded that economists in general and financial economists were “blinded by an irrational faith in a discredited EMH and failed to see the bubble in asset prices and to give due warning of its collapse.” In theory the strong implication of EMH is that no practitioner, no academic and no regulator had the ability to foresee the credit-crunch/global recession of 2008. Brown (2011) went on to say that an unrealistic competitive equilibrium implies the EMH but actually, the EMH by itself does not imply anything about competitive equilibrium in the capital markets. The issue is not focusing on whether the hypothesis is true or false, but the issue is to determine whether it is adequately true to work as a useful standard for investment decisions. That is, depending on the degree of efficiency to what extent can investors trust or get signal from particular kinds of announcements to estimate the measures of equity risks. Practically, investors can gain money by utilising any small opportunities in which the markets diverge from the EMH, however, others may assume that EMH is factually correct. In this thesis it is planned to find out any possibility for opportunities to earn returns based on investing in underlying stocks and their corresponding DRs that are traded in different locations worldwide.

2.5.1 Market imperfection

Market imperfection is the opposite of market efficiency. Actually the reason behind the inception of multinational corporations (MNCs) is simply to exploit the market imperfections around the globe and reap the absolute benefits of diversification (Agmon and Lessard, 1977). That way, just buying the stock of a given MNC is considered as a diversified portfolio to the investor. Why would the investors need to think about investing in the capital markets of different countries then? The MNC on the shareholders' behalf had already spread the risk by operating in different markets. Nevertheless, the prices of the same class of a stock for certain company are not the same on a given date. They may be quite close but not exactly the same. Therefore, arbitrage can work on removing any market imperfections and restore efficiency.

2.6 Stock market return

The stock market price is the price at which both the buyer and seller accept to trade in a given stock market under conditions that guarantee to a considerable extent a fair deal as each of the buyer and the seller acts proficiently, supposing that the price is not influenced by any other unnecessary reasons. Consequently, investors can gain what is called "stock market return" which has two forms; profit achieved through trading in secondary market or dividends granted by the firm to its stockholders. Hence, stock market return is not stable as it is subject permanently to different types of market risks, in contrast to the fixed return generated by the bonds, as it differs from one investor to another according to his/her acceptable margin of risk. The notion behind stock return is how to purchase the stock with the minimum price and sell it with the maximum price (Choudhry, 2003). In order to do so, it is essential to speculate on the base of two types of analyses; fundamental and technical analyses. Fundamental analysis includes any analysis of a company's relevant data such as the profit trend for the last five years or certain ratios such as return on assets, which actually have an influence on the stock's value. Fundamental analysis aids in forecasting the changes in stock. Also, technical analysis attempts to assess the upcoming movement of the stock prices by using different statistical tools, charts, diagrams, etc. Technical analysis focuses on the stock price fluctuation in order to forecast consequently as these fluctuations are most probably repetitive in nature and follow a frequent pattern. Stock market returns are always susceptible to risk but currently there are many derivative tools such as futures and options for hedging the relevant risks of certain investments. These tools can be exploited for speculative purposes through price discrepancies between different markets. Actually, Arbitrage doesn't provide the investors with so high return but it helps essentially in minimising losses as well as in protecting the capital (Graham, 1996).

2.7 Stock market volatility

Stock market volatility refers to the discrepancies in stock prices within certain period of time. Actually, to a certain extent, market volatility cannot be avoided, as variations in stock prices refer to changes in values across different economic conditions. However, extensive and frequent discrepancies in stock prices increase the uncertainty which impact considerably on the stock price instability. Accordingly, the confidence of the investor is affected negatively, especially the risk averse and the risk neutral investors, towards investing in this stock as they may withdraw from the market due to the sharp price fluctuations. Therefore, the extreme movements in prices interrupt completely the smooth working conditions of the stock exchange and that is why volatility is perceived by investors as a risk measure (Brooks, 2008). Specifically, policymakers and rational investors use market volatility as a tool to measure the vulnerability of the market. Practically, high levels of volatility mean high levels of uncertainty which harm the effective performance of the stock markets and, in turn, the entire economy. In other words, extreme volatility in stock market weakens the ability of stock prices to be used as a useful indicator about the inherent value of the issuing company (Karolyi, 2001). According to Pindyck (1984) when volatility increases unexpectedly, it may result in rising the review of expected volatility in the future along with its relevant risk premium which in turn leads to discounting the expected cash flows in future and decreasing today's stock prices and returns. According to Karolyi (2001), stock price volatility is higher when stock price decreases than when price increases. At any stock market, stock prices rise high and fall down and these ups and downs identify the return as well as the volatility of the stock market. Volatility can be considered as an indicator of a highly liquid stock market as pricing of each stock relies principally on its volatility. Therefore, an increase in volatility carries a large change in the stock price. From the investor's perspective, an increase in volatility means an increase in the risk of investing in the relevant security and accordingly he/she may direct investments towards another security with less risk (i.e. volatility). Therefore, stock market volatility has a significant influence on business investment environment and consequently, the economic growth. Mutually, any changes in economic and political conditions affect dramatically the stock price fluctuations and present the current status of stock market to public (Brooks, 2008).

Stock prices volatility was the field of interest in different studies. For instance Mamtha and Srinivasan (2016), Bhowmik (2013), Wang and Huang (2012), Sakthivel et al (2012), Karanasos and Kyrtsou (2011), Saryal (2007), Beltratti and Morana (2006) and Engle (2001) have discussed different aspects of volatility's facts as an amount of risk or uncertainty and how it influences securities' values and consequently investments returns. This means that volatility significantly affects the stock prices behaviour which in turn, reflects the integration with the overall conditions of economy. Fama (1981) illustrated that the stock prices are the reflection of different country-wide factors such as interest rate, inflation rate, exchange rate and GDP. This means that the higher the changes in the fundamental country-wide factors in a given country, the higher the volatility of stock prices in relevant stock markets. Similarly, Engle and Rangel (2005) concluded an indication about the impact of the overall economic conditions on the stock market volatility. They determined that countries with higher inflation rates were more vulnerable to stock prices volatilities than the countries with more stable stock prices. Also, in his comparative study between Turkey and Canada which investigated the influence of inflation on stock market volatility, Saryal (2007) indicated that in both stock markets there is a strong time varying volatility. Moreover, he concluded that inflation rate is one of the most critical determinants of the volatility in Turkey which has higher inflation rate than Canada.

2.8 Inflation rate

Inflation rate is considered as one of the most important country-wide factors that draws all attentions of the counrtries as it has multi-dimensional effects on their economies in several positive and negative ways. Inflation is an increase in the average price level of goods and services over some period of time which involves a reduction in purchasing power and increasing in cost of living. So, the influence of inflation is reflected directly on both; the stability of any country's economy from one side and the government's ability to control its economy through its fiscal, monetary as well as its trade policies from the other side. Therefore, it is essential to determine the impact of inflation rate on stock market in terms of the stocks return and volatility as it erodes the purchasing power of the consumers. In addition, it disturbs the expectations of the investors which leads to significant fluctuations in the return of the stock market. However, a debatable question is always raised concerning the nature of the relationship between the inflation rate and stock market return and volatility which, till now, have many contradictory views and interpretations (Izedonmi and Abdullahi, 2011).

For example, Fisher (1930) argued that the nominal interest rate should equal to the real interest rate and the anticipated inflation rate. Hence, if Fisher effect holds, this means that there is no change in nominal stock return as the latter is allowed to hedge for the inflation. Nevertheless, according to Fama's proxy hypothesis, there is a negative relationship between inflation rate and stock market return. In other words, the stock market should do well in case of low inflation rate which could be interpreted into a strong economic growth. Fama (1981) assumed that rising in inflation pushes interest rate upwards which may stimulate investors to benefit from the higher return derived from higher interest rate by moving their investments from equities markets to bond market. Also, Fama (1981) argued that falling in stock prices due to inflation can be identified by two different relationships: the first is a negative relationship between inflation and predictable level of economic activities (i.e. higher inflation may reduce the economic activities) and the second is a positive relationship between predictable economic activities and stock prices (i.e. higher level of economic activities involve higher stock prices). Hence, combining these two relationships together implies that the higher the inflation, the lower the stock prices as the inflation rate is the proxy of the economic activities and that is why it is called "Fama's proxy hypothesis" (Fama, 1981).

Another point of view concerning the impact of inflation rate on the volatility and return is argued by Schwert (1990) who studied the relationship between the volatility of stock market and volatility of real and nominal macroeconomic variables. He asserted that fluctuations in inflation have weak predictive power on the stock market return and volatility. In contrast to Yaya and Shittu (2010) who stated that the inflation rate has a substantial impact on the stock market volatility.

2.9 Exchange rate

Exchange rate can be defined as the foreign currency per unit of the domestic currency or the domestic currency per unit of the foreign currency.

Also, it is defined as the price of the domestic currency which is identified in terms of another currency. Therefore, in calculating an exchange rate, comparison between two different currencies takes place in order to determine their relative values in terms of one currency. So, the values of currencies change against each other over time because of many reasons such as its demand, supply and the consumer confidence (Obstfeld and Krugman, 2003).

Nowadays most of companies are working on attracting more international investments beyond their home country's borders, however changes in exchange rate influence various markets investment power as investors always need to know how their investments will be influenced by the changes of the exchange rate (Karolyi, 2001). For example Foreign Direct Investment (FDI) is significantly affected by the changes in exchange rate across different countries as any decline in exchange rate results in more foreign direct investment because of the reduction of international investment cost which in turn, increases the relevant return of foreign investments. Actually, there are many studies that supported this view, Froot and Stein (1991) showed that the US achieved large foreign direct investments due to the weak dollar over the period of 1970s and 1980s. Their study illustrated that because of the weak domestic currency, foreign direct investment had increased dramatically within this duration and several multinational companies moved towards the US for investment purposes. Blonigen (1997) also found that reduction in home currency increases FDI in relevant country which aids in supporting the home currency through supporting its exports. Therefore, international investment can benefit the home country to get more recognition in the world market which impact consequently on its currency power. Investing in depositary receipts is similar to FDI as both of them imply a foreign investments in another country rather than the host one. However, investing in FDI may expose these investors to the prevailing risks associated with foreign markets such as instability of political conditions, differences in tax regimes, various regulatory structures and the vulnerability to expropriation. Whereas investing in depositary receipts may significantly affected by the changes in exchange rate however they have lower associated risks compared to FDI as investors can buy them in their home country avoiding any risks that they may face in the foreign country (Dan-Habu, 2018).

2.10 Growth domestic product (GDP)

Growth domestic product refers to the market value of all goods and services made within a given country for a certain period of time. GDP can be considered the most popular indicator of the country's growth and standard of living as it becomes one of the key measures of the size of the country's economy and growth rate. However, calculating GDP is a complicated process when a country produces fewer goods and introduces more services which makes it hard to track and value. Along with the challenge of calculating it, GDP has another challenge in terms of how to use it, that is why it is one of the main concerns for many economists and politicians to use it as a useful comparison tool across different countries' economies as well as an effective measure of stock market performance for investors (Engle and Rangel, 2005).

Actually, higher GDP in a given country means faster economic growth which reflects positively on company's sales growth and consequently on the stock market performance. Nevertheless there is always a debatable issue concerning to what extent stocks can track GDP in a given country where they are originated. Obviously, a substantial change in GDP influences the stock market significantly as a strong economy means higher earnings of companies which is reflected positively on the relevant stock prices (Engle and Rangel, 2005). Nevertheless, many authors didn’t recommend to rely heavily on GDP in predicting an investment opportunity or in planning for an investment strategy (Binswanger, 2004). In fact, no one can deny that GDP is a reflector of the actual performance of certain economy for previous periods of time and that is the reason for its significant role it plays in affecting stock markets and their relevant investments. From this point, one can say that GDP is considered one of the factors that can affect the stock liquidity, returns (Florackis et al., 2014) and volatility (Engle and Rangel, 2005).

2.11 Interest rate

Interest rate is reflected directly on the country's economic growth as one of the most important country-wide factors. The borrower views the interest rate as a cost of borrowing money whereas the lender considers it as a gain obtained from lending money. Interest rates changes may have significant impact on the stock markets in a way that makes the central bank frequently changes its required interest rate as a response of the country's economic activity. It raises interest rate when the economy is almost strong, while it reduces interest rate when it needs to make borrowing more affordable in order to stimulate the country's stagnant or slow economy by encouraging more spending on investments. Therefore, changing in interest rate upwards and downwards opens the door for different investment opportunities according to the expected return from the investor's point of view which is associated with the dominant interest rate (Aljarayesh, et al., 2018). For example, when interest rates have increased, businesses may reduce their expenditures which will cause their earnings to drop and consequently their stock prices will correspondingly drop. In contrast, when interest rates have reduced significantly, businesses may increase their expenditures, reflecting positively on their stock prices. Also, there is a negative relationship between interest rate and bond prices as the interest rate increases, the bond price decreases and vice versa. This inverse relationship is derived from the government desire to raise money. When interest rate falls, it is easier to borrow money and consequently businesses tend to issue new bonds to finance their expansions which will increase the demand for high-yield bonds. On the other hand when interest rate increases, it becomes less affordable to borrow money, therefore, the demand for low yield bonds will fall, forcing their prices to fall (Amarasinghe, 2015).

2.12 Country corruption

Corruption is defined as the misuse of the public power for obtaining private gain (Jain et al., 2017). Initially, corruption harms the public wealth due to exploiting the scarce public resources for achieving personal gains instead of benefiting the relevant community. Corruption also impedes any developments of fair markets and harms competition, which in turn discourages any potential investment. This critical phenomenon is tracked in different types of countries; small or big, poor or rich, however, developing countries with high poverty levels are suffering more from the consequences of corruption as its influence is the most damaging and destructive rather than any other countries. Corruption in developing countries heavily harms the poor by eroding their limited funds specified for the infrastructure development and constrains the government’s ability to deliver basic services, discouraging any foreign aid as well as any investments in their financial markets (UN, 2004). Therefore, many public and private entities were established in order to fight corruption as they considered it as a serious barrier to the rule of law and sustainable development as well as weakening the public confidence and transparency. Therefore, since 1995, Transparency International is publishing annually what is called "The Corruption Perceptions Index" (CPI) as an index includes ranking of different countries worldwide according to the level of corruption in their public sectors which based mainly on many experts' evaluations and surveys. Finland and Denmark are considered the least perceived corrupt countries, whereas most corrupt countries recorded are Somalia and South Sudan. Although its apparent negative consequences in different aspects of life, but surprisingly, the theoretical relationship between corruption and stock market is still a debatable issue, therefore, it is a field of interest for different researchers and academics as the impact of corruption on stock market still contradictory and unclear (Aljazaerli et al., 2016). Some authors stated that it has a positive impact as a means to overcome the inefficiencies and red tape in the economic system (e.g. Chêne, 2014 and Lau et al., 2013), whereas, many studies support its harmful consequences on the country's economy (e.g. Mashal, 2011 and Cuervo-Cazurra, 2008).

2.13 Conclusion

This chapter illustrates the most important theories that explain the main relationships of the current thesis variables. It focuses on many theories, e.g. the modern portfolio theory, liquidity preference theory, arbitrage theory and law of one price as well as the efficient market hypothesis. This chapter also introduces the main relevant concepts that are used throughout the thesis which are; liquidity, country-wide factors (inflation rate, interest rate, exchange rate, GDP and country corruption) in addition to the concepts of stock market return and volatility. In next chapter, the theories mentioned above will be illustrated in light of depositary receipts context as well as the relationships between the thesis variables will be presented depending on an extensive research papers and using electronic databases to critically review the relevant literature.

Chapter Three

Literature Review

Chapter 3

Literature review

To accomplish the theoretical background of the current thesis, this chapter illustrates the explanation of DRs as an investment instrument in light of four theories; international portfolio diversification, arbitrage and the law of one price, efficient market hypothesis, and liquidity preference theory. Also, it includes many studies that discussed the return and volatility of underlying stocks and their corresponding DRs. Moreover, it includes the previous studies that focused on the impact of liquidity and different country-wide factors (i.e. inflation rate, interest rate, exchange rate, GDP, and the level of country corruption) on the return and volatility of the underlying stocks and their corresponding DRs.

3.1 Depositary receipts as an international diversification investment's mechanism

As concluded by Officer and Hoffmeister (1987), Choi and Kim (2000), Alaganar and Bhar (2001) and Arnold et al. (2004), DRs can be considered a popular mechanism of the international diversified investments. Consequently, investors prefer to invest in DRs in order to diversify their portfolios which affect positively their returns and reduce their relevant volatility (Nandy et al., 2020, Arnold et al., 2004, Kim et al., 2000 and Alaganar and Bhar, 2001). For example, Arnold et al. (2004) analysed ADRs which are traded through 1990s and found that these securities are considered a very beneficial tool for improving portfolio performance through maximising its overall return.

Actually many studies have widely pointed out the advantages of foreign listings and concluded that cross-listing in the US market and trading in ADRs strongly support the investors. Therefore, cross-listing contributes to reducing the cost of capital, improving the liquidity position and enhancing the investor recognition (Kim and Pinnuck, 2014 and Hail and Leuz, 2009). Initially, GDRs were issued by London Stock Exchange (LSE) in 1990s and recently

GDRs trading has become one of the most popular cross-listing mechanisms across stock markets worldwide. Although both of GDRs and ADRs have a similar structure, however, GDRs are more affordable than ADRs as the former have less strict reporting requirements (Kim, 2016).

Officer and Hoffmeister (1987), for example, examined the investment characteristics of ADRs as an alternative to direct investment in foreign equities. Specifically, they examined whether any additional advantages may arise when including ADRs in a portfolio of US securities. The sample of ADRs that used for this study consisted of 20 securities selected from the NYSE and ASE and 25 securities from the OTC market. The period of study was from 1973 to 1983 and floating exchange rates were in place. The study revealed that the betas of the ADR portfolio are very low compared to the domestic stocks. Therefore, a significant reduction in standard deviation would be achieved if ADRs and domestic stocks are combined in one portfolio. In the same vein, Officer and Hoffmeister (1987) and Johnson and Walther (2011) reached the same result concerning the factor of liquidity. Both studies asserted that if ADRs are used as an alternative to direct investment in foreign equities, liquidity risks can be reduced. Likewise, Schaub (2019) mentioned that the main purpose behind DRs investments is to get the benefits of the international diversification through investing in different markets and countries in such a way as to offset losses as investments in DRs can be considered as one of the most popular way to own foreign investments. Whereas other studies showed that investment in ADRs gives the US investors the opportunity to obtain the diversification benefits through investing in the most popular global firms on their domestic market without a need to trade in their foreign markets (Officer and Hoffmeister, 1988). However, other studies like Christoffersen et al. (2012) found that the benefits of the international diversification have reduced overtime especially in the developed markets, nevertheless, emerging markets still provide investors with better international diversification benefits.

Actually, the significance of the international portfolio diversification was presented by many authors such as Grubel (1968), Solnik (1995) and Gilmore et al. (2005). Abid et al. (2019) examined both the international diversification versus domestic diversification. They formed a domestic diversified portfolio which consists of 30 highest capitalisation US stocks by using their closing prices. For international diversified portfolios they used stock market indices from G6 countries. They found clearly that the international diversified portfolio outperformed significantly the domestic diversified portfolio. On the other hand, the study of Schaub (2014) illustrated that diversifying a portfolio internationally with European ADRs aided in avoiding the losses that could occur in the time of extreme market volatility.

In conclusion, investing in DRs, which are traded in foreign markets, can be considered as one of the most popular mechanisms used to obtain the benefits of the international diversified investments. Through DRs investments, an investor can form a well-diversified international portfolio which maximises its returns and minimises its overall risk by investing in more than one market across different countries which may outperform a domestic-only portfolio significantly.

3.2 Depositary receipts and their arbitrage opportunities at inefficient markets

Generally, efficient market hypothesis (EMH) reflects two key claims; first, the price changes are following the random walk across different financial markets. Second, the assets prices reflect the economic fundamentals. However, the relationship between these two claims remains arguable in many studies and researches (Delcey, 2009). The efficient market hypothesis (EMH) plays an important role in correcting the prices of the same assets which are traded in different markets due to the notion of the efficiency across different financial markets. A consequence of EMH is the law of one price which emphasises the significance of the hypothesis in perfectly integrated markets, as cross-traded assets should trade for the same price in different markets. Practically, due to the existence of arbitrageurs whose continued interests are directed towards the financial markets, mispricing is adjusted by purchasing the cheaper asset and selling it with higher price in order to produce a profit from the price differences (Olkkonen, 2009). In the light of such concepts, many DRs studies deal with the relationship between domestic and foreign markets returns and their volatility from one side and the arbitrage opportunities from the other side. The common economic concept behind these studies is the law of one price (LOP), which argues that trading an asset at two different markets in different locations should take place at the same price. However, any differences between prices in these markets will open the door for arbitrage opportunities which can be exploited by arbitrageurs to gain profits.

Several studies were conducted to show the effectiveness of arbitrage in depositary receipts market from the volatility point of view such as Ackert and Tian (2000), Rajan et al., (2003), Suarez (2005) and Brockman and Hao (2011). The conclusions of these studies are quite opposing. For example, Ackert and Tian (2000) and Suarez (2005) provided opposing opinions regarding the relationship between the prices of the DRs and the prices of the underlying stocks in the local market for extended periods due to the effects of the rule of arbitrage. On one hand, Ackert and Tian (2000) found that the prices of DRs are not much different from those of the underlying stocks in the domestic market as the arbitrage eliminates the effect of the noise traders of DRs. On the other hand, Brockman and Hao (2011) argued the same notion that the increase in the number of new market stocks listed both locally and internationally leads to highlighting the role of the overseas markets in the price discovery process. Rajan et al. (2003) tackled this point by studying the role of global depositary receipts (GDR) market for Indian stocks. They found that London and Mumbai prices were co-integrated despite arbitrage restrictions imposed by Indian government.

Alsayed and McGroarty (2012) highlighted the importance of the arbitrage as an effective price-correcting mechanism for maintaining the stock-DR parity through examining a sample of 25 UK stock–ADR pairs. They found that the arbitrage started with attaining small per-trade returns which increase gradually till achieving significant cumulative returns. They detected high tendency of disequilibria in pricing (i.e. mispricing) to be highly mean-reverting as the two-way convertibility between stocks and ADRs takes place. This means that the arbitrageurs face minimal risks toward price difference. Therefore, they provided a strong evidence against the automatic efficient prices, and reinforced the idea that the mispricing encourages traders to achieve market efficiency.

Previous studies have examined the profits that may derive from trading DRs in different countries. Some studies are based on the assumption of market efficiency, i.e. prices of DRs and underlying stocks are the same at all times, as expected by the law of one price. Accordingly, any changes occur in the underlying stocks prices are reflected rapidly and completely in DR prices. For example, Jithendranathan (2006) found that in dealing with Russian cross-listed stocks, there were no arbitrage opportunities due to the existence of the informational efficiency. Miller and Morey (1996) used data of one cross-listed British security in the US for two months, and they found that the deviations between prices in the two markets are insignificant which supported that there is no available arbitrage opportunities for traders. Similarly, Park and Tavakkol (1994) did not find any arbitrage opportunities between the ADRs and their underlying stocks in different developed markets. Abrosimova et al. (2002) documented that the Russian stock market can be categorised as a weak-form of market efficiency for the period from 1995 till 2001. Same conclusion for Russian market was reached by Chong et al. (2010), for the period from 1995 to 2008 and added that it was the least efficient among the four BRIC countries.

Moreover, Gagnon and Karolyi (2010) supported the same previous results as they conducted their study on a sample of 506 US cross-listed stocks from 35 different countries. They showed that any differences between the prices of underlying stocks and their respective DRs were economically insignificant which impeded any serious arbitrage opportunities even after controlling any transactions costs and foreign investment constraints. On the contrary, many studies argued that domestic and foreign markets are not integrated and consequently they are inefficient. Suarez (2005) analysed the price discrepancy between the underlying stocks and their corresponding ADRs by using a high frequency data set of French and American stocks. It showed that large deviations in prices took place and an arbitrage trading rule revealed that profits could have been made on these large disequilibria. Thus this study classified these markets as disintegrated and not fully efficient markets. MacKenzie (2003) described the arbitrage as an element that removes any price divergences between different markets for the same asset.

On the other hand, Suh (2003) examined DRs that are traded in emerging markets which impose many restrictions on the foreign ownership and other capital barriers. He concluded that changes in DRs returns are associated significantly with the foreign market returns. Hence, a well-diversified portfolio which includes underlying stocks and their respective DRs along with taking into consideration the differences in risks may enhance the arbitrage opportunities for arbitrageurs. Also, Kaul and Mehrotra (2000) examined cross-listed Canadian stocks that are traded in the US markets and concluded that there are arbitrage opportunities that can be utilised, especially for the stock pairs with quite low spreads and low trading volumes. Similarly, Karolyi and Stulz (1996) argued that the cross-listed stocks in different markets and in different countries contribute in paving the way for the arbitrage opportunities because of the differences in the trading hours among them.

In other words, the closing price of the underlying stock and the closing price of their corresponding depositary receipts almost are not identical, and therefore a price deviation may take place and in turn arbitrage opportunities exist till reaching the market equilibrium as the law of one price stated. Kim (2016) found that the Russian stock market is not completely efficient in light of its underlying stocks and their respective GDRs cross-listed on London stock exchange. Consequently, they found a profitable arbitrage opportunity based on daily prices of the Russian leading firms. On the other hand, Kim et al. (2000) reached mixed findings concerning the market efficiency hypothesis as they found that relative small arbitrage opportunities may exist between the underlying stocks and their corresponding ADRs in the short term period. They concluded in their study, which was conducted in five countries: Japan, the UK, Sweden, Netherlands, and Australia, that despite the significant and different influences of the underlying stocks prices along with the exchange rate against the US dollar and the US market index on the ADRs prices, the adjustments of the latter are not completed at once within the same calendar day. They are fully adjusted in the following working day which makes the arbitrage opportunities available within a very short-term period as well with relatively small value due to the existence of the transactions costs. However, Samuelson (1965) settled this matter by identifying the relationship between arbitrage opportunities and market efficiency. He stated that in the presence of the differences in prices across different stock markets, the latter adjust their prices rapidly due to the arbitrage opportunities, turning them back to the normal range without any additional costs. Consequently, these markets are considered efficient markets. Nevertheless if price differences persist for a long period of time, the relevant markets cannot be considered efficient markets. Hence, both arbitrage opportunities and market efficiency can exist together. The idea behind distinguishing the efficient from the inefficient markets is how rapidly market responds to the arbitrage opportunities.

In conclusion, many studies have different views towards the existence of arbitrage opportunities and consequently the validity of law of one price. Many of them tend to believe that different markets are always integrated and in turn the prices of the assets have to be the same due to the information efficiency. Others view the arbitrage as a main price correcting mechanism in order to maintain stock–ADR parity, i.e. it erodes the price discrepancy between underlying stocks returns and their corresponding DRs. Hence, profits could have been made on these imbalances and consequently these markets are characterised as not fully efficient markets according to the efficient market hypothesis.

3.3 Depositary receipts as a speculative motive of liquidity preference theory

The current thesis is distinguished from the previous literature from different aspects; one of these aspects is that it explains DRs trading mechanism in light of the liquidity preference theory as all previous literature neglected this important issue. It contributes to clarifying how liquidity can affect the investors' decisions concerning their investments in the underlying stocks and their corresponding DRs. As discussed in chapter two, there are three motives of the liquidity preference theory (i.e. motives of demanding the most liquid assets) which were created by Keynes; transactional, precautionary and speculative motives. Our concern here is the third motive; the speculative demand for money as it includes securing profits from getting knowledge about what the future will bring forth after keeping enough liquidity for the purposes of both the transactions and precautionary purposes, (i.e. achieving a speculative profit by investing in most liquid assets. Funds held for speculative purposes can be utilised in securities investments whenever the opportunity arises. Accordingly, it is supposed that people can keep their wealth in form of most liquid assets which rely mainly upon the predictions of their financial yields in the future. Also, it depends principally on the interest rate as the latter varies inversely with the market value of these securities. In other words, the interest rate has a significant negative relationship with the underlying stock market return and direct relationship with its associated volatility (Alam and Salah-Uddin, 2009).

Actually, from the investors' perspective, they prefer investments in less risky assets, however, there is no investment with 100% risk-free, and that is why investor should evaluate their acceptable margin of risk (Hopkins, 2019). By definition, DRs liquidity reflects how quick it is to transform DRs investment into cash.

Although DRs liquidity depends mainly on where and how much they are traded, as well their volatility level, however they can be considered as one of less risky investments, especially for investors who prefer to invest their money in foreign markets. Hence, in order to minimise the risk of DRs, investors have to select them carefully, with high trading volumes and low volatility (Hopkins, 2019).

According to DRs mechanism, investors have many alternatives to gain profits; they may convert their DRs into their original underlying stocks or to sell them in another foreign country which may produce more profits. Moreover, if the relevant DRs are traded in more than one foreign market in different countries, investors have more opportunities to gain more profits as these countries are surrounded by different circumstances (e.g. macroeconomic variables and political conditions) which impact upon the DRs prices in these countries. For example the companies covered by the thesis issue their DRs in different markets; ranging from 1 to 19 markets. These diversified locations increase the investors' opportunities to liquidate their DRs quickly. Accordingly, investing in DRs through forming well-diversified portfolio of DRs from different markets turns an investor's portfolio into a global one.

Hence, it makes these investments less risky and contributes to higher return as they can trade them in their own market, without bearing any additional risks associated with different foreign markets regulatory procedures (Hopkins, 2019).

In conclusion, liquidity preference theory focuses mainly upon different motives for demanding money. One of them is the speculative motive, which reflects the desire to hold cash waiting for more attractive investment opportunities that may arise. However, this theory focuses also on the interest rate as a reason behind parting the cash (i.e. interest rate represents the price for money). Additionally, interest-rate has an important role in identifying the returns of DRs as they are issued by foreign companies whose sources of funds are affected by their domestic as well as their relevant foreign markets. Consequently, interest rates may affect the company's cost of capital, profitability and operations.

In conclusion, investors can decrease the risk of their investments in DRs when investing in more than one foreign market which reflects positively on the expected opportunities to convert DRs into cash quickly.

Moreover, to lessen the risk of their investments, investors can form well-diversified portfolios of DRs that are traded in different markets across different countries in order to enhance the opportunity to liquidate them quickly. Furthermore, to emphasise on accelerating the process of converting DRs into cash quickly, investors have to take into consideration that the higher the trading volumes of DRs, the less the risk they are subject to.

3.4 The return and volatility of underlying stocks and their corresponding DRs

Recently, many studies presented different contributions from different aspects such as the informational flow between the underlying stocks and their respective DRs in foreign markets (Poshakwale and Aquino, 2008), the rapidity of DRs prices adjustments as a response to certain factors affecting the underlying stocks (Kim et al., 2000) and consequently the sensitivity of DRs returns and their volatility to the different foreign countries where DRs are traded (Vo and Bui, 2016 and Jaiswal-Dale and Jithendranathan, 2009).

Johnson and Walther (2011) examined different types of foreign equities; ADRs, Direct Foreign Shares (DFS), and International Mutual Funds as different mechanisms for the international investment diversification. This study which was conducted for a period of three years starting from 1983 to 1986 suggested that ADRs contributed significantly in improving the investments return along with reducing the potential risk when compared to domestic diversification of their respective underlying stocks. This means that a remarkable improvement in return can be attained if DRs are used across industries, markets and countries. Ely and Salehizadeh (2001) concluded that the US equity markets impact significantly on the returns of the underlying stocks and their corresponding DRs. In other words, daily returns of ADRs are more affected by the conditions of the US equity markets, relative to their underlying stocks. Moreover, many studies offered strong evidence that investing in ADRs can provide significant long-term diversification benefit to the US investors. Schaub (2016) has concluded that ADRs listed on US stock markets significantly outperformed the US benchmarks (i.e. U.S. indices such as SandP 500 and NASDAQ) suggesting that ADRs can provide US investors with more benefits through considerable diversified portfolios especially during the volatile times.

Also, many studies showed that the political news may affect the return of the underlying stocks in one country and also, it may affect the corresponding DRs returns in the foreign markets. For example, Nandy and Sussan (2020) reported that Russian ADRs listed in the US market are affected negatively during the US Presidential election in 2016. Nandy et al. (2020) concluded that in India, returns of Indian ADRs that are traded in the US stock exchange were correlated with the returns of their corresponding underlying stocks that are traded in the national stock exchange of India. They found that the news of the parliamentary elections in 2014 affect the returns of the underlying stocks in India and consequently affect the returns of Indian ADRs. Schaub (2017) argued that British ADRs lost about 10% of their return because of the Brexit referendum event, whereas Nandy and Sussan (2020) concluded similar view but in terms of the impact of the Brexit referendum on the return of a portfolio consists of ten British ADRs. Their results showed that returns of the portfolio are affected significantly and negatively by this event. Choi and Kim (2000) examined numerous determinants of ADRs and their underlying stock returns for the period from 1990 till 1996. They concluded that the returns of underlying stocks and their corresponding ADRs across different countries are affected significantly by the local market factors more than the foreign market factors within the same sample period. This conclusion was more applicable in developing markets compared to the developed markets. Chen et al., (2002) analysed whether the stock trends have causal relationships between the underlying stocks and their corresponding DRs. They found that DRs daily return was significantly affected by underlying stocks return, however the daily underlying stocks return was not affected significantly by the DRs daily return.

Also, many authors focused on investment in ADRs as a beneficial alternative for achieving more returns. Schaub (2012) and Elliott and Schaub (2009) showed a strong evidence for the investors' preferences towards DRs investments as they are considered one of the significant long-term investments through which the diversification benefits can be gained especially when DRs are traded in different markets across different countries. As well, Singh and Chakraborty (2017) examined the differences in the efficiencies in financial returns of Indian ADRs and their underlying stocks by using Hurst coefficient as a measure of the differences of return values of equities. They found that it is better to trade the Indian ADRs in the US stock market as it is considered the most efficient market in trading Indian ADRs. Also, many authors discussed the price volatility of the underlying stocks and their corresponding DRs, e.g. Chen et al. (2002), Chung et al. (2005) and Ely and Salehizadeh (2001). Although they used different research methods, they apparently reached similar conclusion regarding the volatility. The relationship between the underlying stocks and their corresponding DRs exists only as a one-way (i.e. unidirectional) relationship; from the domestic market to the foreign markets. Therefore, the main idea behind these studies is that the underlying stocks in domestic markets play a dominant role in the price volatility of the DRs that are traded in foreign markets. Madhavan and Ray (2019) tested the price and the volatility relation between Indian GDRs which are traded in Luxembourg and London and their underlying stocks which are traded in India by using the vector auto-regression (VAR) and dynamic conditional correlation (DCC-GARCH) models. They found a similarity between the two prices of Indian GDRs that are traded in London and Luxemburg from one side and the underlying stocks that are traded in Mumbai from the other side. In other words, there is a significant relationship between Indian GDRs that are traded in both markets; London and Luxembourg and their underlying stocks in Mumbai. Consequently, the price and volatility in the Indian stock exchange and its counterpart in London and Luxembourg are similar. The similarity may be due to the invariant nature of law of one price between different stock exchanges. On the other hand, Sharma (2017) examined the impact of oil price volatility on twelve countries ADRs returns using monthly data from 1999 to 2014. The results show that oil price volatility has a significant negative impact on ADR return in all of the countries under study. Therefore, the study concluded that to minimise the volatility of prices, it is recommended to form well-diversified portfolios across different markets worldwide.

In conclusion, the previous studies showed that the domestic factors which may affect the returns of the underlying stocks may be also considered one of the key determinants of the return of DRs which are traded in foreign markets. Also, they focused on the importance of ADRs investments across different countries as they can be considered an effective mechanism of well-diversified investments in order to minimise their overall volatility.

3.5 The effect of liquidity on return and volatility of underlying stocks and their corresponding DRs

Liquidity in the stock market refers to the degree of which a security can be rapidly sold or bought in a particular market, without affecting the price of this security. By definition, liquidity is consequently closely related to cash, as cash is the quickest asset which can be converted into any other asset. It can be measured by the total trading volume which has a significant influence on stock liquidity.

Most of the studies have been done through defining liquidity as the change in trading volume such as Domowitz et al. (1998) and Bayar and Önder (2005). Many researches discussed the impact of cross-listing on the changes in liquidity. Berkman and Nguyen (2010) showed that before and after cross-listing there is a similar effect on liquidity. In other words, there is an insignificant impact on liquidity in both cross-listed and domestic listed firms. However, Avdic and Resulovic (2006) and Domowitz et al. (1998) proved that cross-listing has a positive impact on the domestic liquidity provided that the information of intermarket price is available at all times. Svensson and Heikenstrom (2016) examined the impact of cross-listing in the US and the UK markets on liquidity of 19 Swedish companies from 1989 to 2004, measuring liquidity as the change in trading volume. They concluded that there are no longer significant gains to receive when cross-listing in either the US market or London market takes place.

Kalu and Chinwe (2014) examined the relationship between the volatility of the stock returns and trading volume in Nigeria for the period from 2000 to 2011. They showed that there is a significant positive relationship between trading volume as a measure of liquidity and volatility of the stock returns.

Antoniewicz (1993) found that stocks returns on high trading volume days are more sustainable than returns on low volume days. Similarly, Stickel and Verrecchia (1994) concluded that returns that associated with high volumes are more sustainable provided that they must be accompanied by earnings announcements. Whereas Chordia and Swaminathan (2000) showed that the stock returns with high trading volumes lead those with small ones. However, Rodríguez (2016) found that after grouping ADRs geographically, it is concluded that there is no significant difference between cross-listed and single-listed ADRs liquidity on a daily basis. Chan et al. (2008) investigated the liquidity-premium relationship of the underlying stocks and their corresponding DRs through using both infrequency of trading and turnover ratio as proxies for liquidity. They concluded that the ADR premium has a direct relationship with DRs liquidity and an inverse relationship with the underlying stocks liquidity. Also, they showed that foreign markets in which DRs are traded can be considered as the best choice for examining the influence of liquidity for two reasons; first, they include the same cash flow rights of their corresponding underlying stocks in the home market. Second, the increased importance of trading DRs in different international equity markets as a less risky tool available for the investors who prefer to invest their money in foreign markets, e.g. over the last two decades, the US investors holdings of foreign equities have been increased radically (Hales, 2015). On the other side, the importance of liquidity appears clearly in determining the DRs prices. Hales (2015) examined the determinants of ADRs prices in Latin America by using different 87 ADRs .The results indicate that liquidity is crucial element for determining DRs prices.

Therefore investors have a good opportunity to diversify their DRs portfolio internationally in order to get the benefit of the differences in DRs prices across different foreign markets in which ADRs are traded. Therefore these differences affect significantly the ADRs return and its volatility. However, as Latin America countries are considered as underdeveloped countries, their stock markets are characterised by high levels of illiquidity.

In conclusion, the speed of liquidating the asset is considered one of the most important aspects that the investor is interested in. This aspect is supported by the liquidity preference theory, which states that the investors prefer primarily to keep adequate cash and other highly liquid assets. However, they may demand more premiums on any other securities which carry greater risk. Therefore, DRs liquidity (i.e. their trading volume) refers to how long and at what cost it takes to convert DRs into cash. Hence, the high level of liquidity (i.e. high DRs trading volume) influences significantly the DRs and their corresponding underlying stocks prices. It is considered as a good opportunity for the investors to utilise from the different status of liquidity in different foreign market worldwide. Therefore forming diversified portfolios which includes different DRs from different markets can affect significantly the DRs return and its associated volatility.

3.6 The effect of domestic country-wide factors on return and volatility of underlying stocks and their corresponding DRs

As the financial markets are mainly affected by the surrounding economy, recently, many academics, researchers and investors are interested in determining to what extent the country-wide factors, mainly the macroeconomic variables, have an impact on the stock market return and volatility in order to predict the future economic conditions (Ahad et al., 2018, Gupta et al., 2016, Bali et al., 2014 and Akbar et al., 2012). Corradi et al. (2013) found that macroeconomic variables contribute to 75 percent of the changes in stock market volatility.

Accordingly, there are many studies report different results and findings concerning the relationship between the macroeconomic variables and the stock markets return and the volatility. Many authors suggested that the macroeconomic variables affect significantly the stock market growth (Bali et al., 2014, Allen et al., 2012, Bloom, 2009 and Bloom et al., 2007). On the contrary, other authors found insignificant relationship between stock market returns and macroeconomic variables owed to foreign portfolio investments and speculative bubbles (Narayan and Narayan 2012, Hosseini et al., 2011 and Binswanger, 2004).

Olweny and Omondi (2011) conducted their study to investigate the effect of macroeconomic variables on the stock return volatility in Nairobi stock market. The study focused on the effect of foreign exchange rate, interest rate and inflation rate fluctuation on stock return volatility. Data collected are based on monthly time series which covered a period from 2001 to 2010. They found that the foreign exchange rate, interest rate and inflation rate are affecting stock return volatility significantly.

The study of Jasra et al. (2012) aims to determine the relationship between the following macroeconomic variables (interest rate, inflation rate, and exchange rate) and the stock market returns in Pakistan context from 1973 to 2004 for four industries; oil and gas, chemical, cement industry and insurance industry. The study examined the causal relationship between macroeconomic variables and stock index in Pakistan. It is found that there is an insignificant impact of interest rate on the stock return of oil and gas, chemical and cement sectors, while it has a significant negative impact on returns of insurance companies, which means that the increase in interest rate decreases the stock price. Whereas inflation rate, in terms of CPI, has a significant direct impact on the stock returns in the four sectors. Lastly, this study concluded that exchange rate has a significant negative impact on the return of all mentioned sectors.

Practically, the stock market and the overall economy are significantly correlated. Variations in macroeconomic variables affect dramatically businesses performance and the trade movements. Hence, predicting the potential future trends of macroeconomic variables can be utilised in order to determine the leading direction of stock returns and their volatility. Consequently, there are many efforts performed in order to determine the link between macroeconomic variables and stock market return and volatility (Özlen and Ergun, 2012). Gupta et al. (2016) concluded that ADR investors are confident about the upcoming financial position of the underlying stocks and accordingly prepared their ADRs portfolios according to economic progress of home countries. They tried to determine whether ADRs prices are affected by the economic conditions of the countries in which the issuing companies operate. Essentially, ADRs stem their value from the performance of their counterpart of underlying stocks in the domestic countries. Afterwards, according to market efficiency theory, it is supposed to trade both; the underlying stock and their respective ADRs at same price (Gupta et al., 2016). Nevertheless DRs are affected differently by the home country-wide factors of the underlying stocks, its regulatory system, the investors risk perceptions and the degree of connection between the domestic and foreign markets (Gupta, et al., 2016).

Another study conducted in Sri Lanka by Nijam et al. (2015) which examined the relationship between the macro economic variables, i.e. GDP, Inflation rate, interest rate, balance of payment, and exchange rate and the stock market performance in terms of price index, which covers the period from 1980 to 2012. The study revealed that there are significant relationships between macroeconomic variables and the stock market in Sri Lanka. Particularly, GDP, interest rate, and exchange rate are positively related to stock market index whereas there is a negative relationship with inflation rate. However, the balance of payment has insignificant relationship with the stock market performance in Sri Lanka.

Also, Ahad et al. (2018) investigated the relationship between macroeconomic variables (Inflation, economic growth and money supply) and ADR prices for the period from 2000 to 2016 in some countries of European Union. They concluded that inflation has a significant negative relationship with ADR prices in case of France and Italy, while in case of Germany, Greece and Spain, its influence is a significant and positive one. Likewise, there is a significant positive impact of economic growth on ADR prices in France, Greece and Spain, however in Germany and Italy, economic growth has an insignificant relationship with ADR prices. Lastly, money supply has a significant positive impact on ADR prices in all countries under study.

Gupta et al. (2016) investigated the long-run and short-run impact of domestic macroeconomic fundamentals on ADRs prices in the context of BRICs (Brazil, Russia, India and China) from 2000 to 2013. The investigation is conducted to determine the impact of the macroeconomic variables which are; economic growth, inflation, money supply and oil prices on the underlying stocks in order to determine the integration between the ADR market and its underlying stock market. The study concluded that the integration between the ADR market and its respective underlying stock market took place only in the long run whereas the correspondence between home country's macroeconomic variables and ADRs is unclear and has inconsistent directions.

As mentioned above, the impact of domestic macroeconomic variables on the stock market return and volatility has attracted many scholars and researchers. Practically, most of them revealed a significant effect of different macroeconomic variables from different perspectives on the stock market return and volatility. However, most of them didn’t focus explicitly on the impact of domestic macroeconomic variables on DRs that are traded in more than one foreign market for the same underlying stock which surrounded by certain domestic country-wide factors. Hence, this thesis is a complement to the existing literature which conducts the investigation of the impact of domestic country-wide factors on the return and volatility of underlying stocks and their respective UK DRs. The country-wide factors that are examined in this thesis are; inflation rate, interest rate, exchange rate and GDP in addition to the level of country corruption.

3.6.1. The effect of inflation rate on return and volatility of underlying stocks and their corresponding DRs

Fama and Schwert (1977), Jaffe and Mandelker (1976) and Lintner (1975) discussed the relationship between expected returns and expected inflation. In contrast to Fisher hypothesis, most of these studies approved a negative relationship between stock return and inflation, whereas other studies are consistent with Fisher hypothesis. For example, Firth (1978) argued that in the UK, there is a positive relationship between stock return and inflation. Fama (1981) concluded that there is a negative relationship between stock return and inflation mediated by real economic activity. As inflation decreases, the real economic activity increases, and then the stock return increases. That is why there is a negative relationship between inflation rate and stock return. Schotman and Schweitzer (2000) considered deceasing in inflation is one of the main investors' concerns because it increases the real return on their investments. This negative impact of inflation on return is called "proxy effect" which is developed by Fama (1981) who assumed that this negative effect exists as long as the real economic activity is affected by inflation. However, once real economic activity is no longer affected by inflation, "proxy effect" disappears (Garbade and Wachtel, 1978).

Nevertheless, Adrangi et al. (2002) rejected this conditional mediating role of real economic activity. They collected data from Brazilian markets and emphasised on the negative relationship between stock return and inflation regardless of the effect of real economic activity. Moreover, they argued that an increase in inflation can decrease the present value of future profit which finally reduces stock return. Similarly, Apergis and Eleftheriou (2002) conducted their study in Greece as they illustrated that reduction in inflation can contribute to an increase in the stock price.

Nishat and Shaheen (2004) reported the same conclusion about the negative relationship between inflation rate and return in their study which was applied in Pakistan. However, different point of view is illustrated by Ugur and Ramazan (2005) in their study which proved that there is no correlation between inflation and real return on stocks. Whereas Yeh and Chi (2009) conducted their study on 12 OECD countries which showed that these countries have a significant negative co-movement between inflation and stock returns. This conclusion is also reached by Modigliani and Cohn (1979) and Feldstein (2009) who proposed that a decrease in inflation increases the real returns on stock. As well, Rapach (2001) concluded the same finding as there is a negative significant impact of inflation on stock returns after controlling output shock. Kenourgios et al. (2005) who conducted their empirical study in Greece proved that there is an insignificant negative relationship between inflation and stock returns. Whereas, Floros (2004) concluded that the two variables; stock return and inflation should be handled independently because the study results showed that there is no significant relationship between them in Greece. As well, Crosby (2001) concluded that there is a short-term negative relationship between inflation and stock return. In contrast, Lee et al. (2000) concluded a significant positive relationship between realised and expected inflation and stock returns in Germany. Choudhry (2001) who conducted his study in some Latin American countries concluded that the lag values of inflation affect significantly the stock return which means that the stocks play an important role in hedging against inflation. Patra and poshakwale (2006) conducted their study in Greece and the results showed that the inflation, alongside other significant macroeconomic variables like money supply and volume of trade, has short and long run relationships with the stock price.

Ugur and Ramazan (2005) implemented their study in Turkey and proved that there is a negative relationship between inflation rate and stock return which is in the same vein with the proxy hypothesis. These results are similar with many studies such as Khil and Lee (2000) who applied their study on ten pacific countries and the US. They argued that all of these countries except Malaysia have a negative relationship between inflation and stock returns.

Based on the efficient market hypothesis and rational expectation theory, Ahmed and Mustafa (2012) investigated the impact of inflation on stock returns. They concluded that there is a significant negative relationship between real stock returns and unexpected inflation, however controlling real output growth makes the negative relationship between these two variables to be vanished over time. Engle and Rangel (2005) concluded that countries that recorded high rates of inflation almost experienced larger expected level of volatilities than those with less inflation rates.

Saryal (2007) conducted a comparative study between Turkey and Canada in order to examine the impact of inflation on conditional stock market volatility. He found that the rate of inflation is one of the most important determinants of conditional market volatility in Turkey, which has a higher inflation rate than Canada. Actually, empirical studies in this area focused on the inflation as a weak predictive power on stock market volatility and returns, e.g. Rizwan and Khan (2007), Engle (2004) and Davis and Kutan (2003). Whereas Murungi (2012), Engle and Rangel (2005) and Hamilton and Lin (1996) focused on the inflation as a strong predictive power on stock market volatility and returns.

In conclusion, many researchers and authors have discussed the effect of inflation on the stock market in terms of return and volatility over the past few decades. Most of them concluded that inflation rate has a critical impact on the stock return and volatility in many directions as every country and stock market has unique determinants. Accordingly, this thesis examines the effect of the UK inflation on stock market return and volatility for the underlying stocks that are traded in the UK, in addition to the foreign markets where DRs are traded.

3.6.2 The effect of interest rate on return and volatility of underlying stocks and their corresponding DRs

Several studies examined the impact of interest rate movements on stock market performance, specifically on DR prices (Aljarayesh, et al., 2018, Amarasinghe, 2015, Chen et al., 1986 and Bin et al., 2003). Karolyi (2001) argued that interest rate has a significant impact on the stock market return volatility, which in turn motivates investors to invest more in less risky investments such as bonds. Bonomo et al. (1993) investigated the effect of the US interest rate changes on ADRs and they found that ADRs do not respond to the fluctuations in interest rates although their importance in affecting the cash flow position of any firm as they influence the cost of capital. Also, changes in the US interest rates lead to changes in short-term interest rates in foreign countries (Bin et al., 2003). In other words, any change occurs in the US interest rates, is followed by changes in the foreign countries interest rates, which consequently influence the profitability of the ADR originating foreign firms. This effect is conveyed to the value of the underlying stock and finally to the ADRs.

Patelis (1997) approved that there is a long term relationship between interest rates and stock prices from one side and the movement of stock prices from the other side which can be identified by observing the interest rate's fluctuations for a certain period of time. However, Fair (2000) concluded different view through approving that prices are not affected by the fluctuations in interest rate. Similarly, Akbar and Kundi (2009) had the same view in their study which showed that stock prices are not influenced by the monetary policy in terms of the level of interest rate. Whereas, Hashemzadeh and Taylor (1988) found that interest rate has a negative relationship with stock return. They concluded that an increase in interest rate can decrease the present value of future cash flow that the investors expect to get in terms of capital gains and dividends. Hence, an increase in interest rate means a decrease in bond prices, which ultimately leads to more bonds demands and less stock investments. The same results have been reached by Alam and Salah-Uddin (2009) who investigated the relationship between stock price and interest rate for fifteen developed and developing countries. They concluded that the interest rate has a significant negative relationship with stock price. In contrast, Barsky (1989) argued that there is a positive relationship between stock return and interest rate, stating that the decrease in the interest rate may not encourage the investors to trade in the stocks because of the high level of risk associated with their trade.

Fenton and Paquet (1998) suggested that ADRs, which are supported by foreign securities, can be affected by the fluctuations in interest rates in domestic and foreign countries where ADRs are traded. However, Bonomo et al. (1993) examined the impact of the US interest rate movements on ADRs and concluded that they don't respond significantly to the changes occur in the US interest rates. Another view of Bin et al. (2003) who analysed ADRs trading movement in many countries, and found that interest rates have a significant influence on ADR returns. Wang (2010) analysed the relationships between underlying stock, depositary receipt, stock index, interest rate and currency rate. He concluded that the fluctuation of interest rate affected GDR price less. Also, he concluded that the price of underlying stocks can influence GDR price however, the latter is not affecting the underlying stocks price (i.e. one way effect). Verma and Jackson (2012) examined the effect of interest rate and its associated volatility on ADRs prices. They concluded that in most of the markets under study, interest rates spill over to ADRs in price and volatility. Okechukwu et al. (2019) and Aljarayesh et al. (2018) indicated that interest rate has a negative relationship with the stock market returns, whereas interest rate has a significant effect on the stock market volatility.

In conclusion, the previous literature clarified, in most of it, the forceful effects of changes in interest rates on the stock market return and volatility as it is considered one of the substantial determinants of the stock and DR prices. That is why most of the researchers focused in their studies on the sensitivity of stock prices to the interest rate theoretically and empirically.

Therefore, in the current thesis, prevailing interest rate in the UK is applied as one of the most significant country-wide factors in order to determine whether it has a significant impact on return and volatility of stock market domestically, in the UK, in which underlying stocks are traded and internationally in which DRs are traded in various foreign markets across different countries which can support the investors in their investment's decisions.

3.6.3 The effect of exchange rate on return and volatility of underlying stocks and their corresponding DRs

Aquino and Poshakwale (2006) approved that the main factors that affect ADRs prices are their underlying stocks prices in their domestic markets and the changes occurred in the exchange rates of currencies between the countries where the underlying stocks are domestically traded and the foreign country where the ADRs are traded, which in turn, affect the ADRs return and its volatility. As well, Karolyi (2001) illustrated that variations in exchange rates can increase the stock market return volatility which motivates investors to direct their investments towards less risky investments such as bonds. Huang and Stoll (2001) investigated to what extent exchange rate has an impact on the ADRs price and accordingly its returns through examining their trading costs in the US. Microstructure characteristics of the UK and Mexican ADRs are applied around two main exchange rate crises; which are the sterling withdrawal from the European exchange rate mechanism in 1992 and the Mexican devaluation in 1994. They concluded that the changes in exchange rate had no effect on the ADRs prices. Kim et al. (2000) stated that ADR price is influenced by the underlying stock price, the currency exchange rate and the domestic market index. Therefore, their study examined the relative significance of these factors towards the ADRs prices along with the speed of the ADRs prices adjustment in light of these factors. The results showed that the price of the underlying stock is the most important factor affecting ADR price followed by the exchange rate then finally, the US market index. Furthermore, the ADRs overreact primarily to the US market index but underreact to the changes in underlying stocks prices and exchange rates.

Kim et al. (2000) concluded that although ADRs which are traded in dollars do not bear explicit exchange-rate risk, however there is an implicit risk in their prices because of the convertibility between ADRs and their underlying stocks. Hence, they approved that exchange rate can affect ADR prices through influencing the firm's operating performance and converting their values in dollar terms which in turn affect ADRs volatility. Also, they concluded that even if the underlying stock price remains constant for a certain period of time, changes in the exchange rate can change the price of ADRs in order to avoid any arbitrage profits. He and Ng (1998) found that most of foreign multinational firms are subject insignificantly to any currency risk as these firms have their own resources for financial and operational hedging transactions. However, unpredicted variation in the exchange rates may influence their operating performance. Also, they concluded that, based on wider sample portfolios, the currency exposure could still play a substantial role in affecting foreign stock returns. As well, Bodart and Reding (2001) argued that exchange rate changes play a significant role in the conditional distribution, volatility and cross-country correlation, of the stock returns in different industries and countries.

Focusing on the ADR market, Liang and Mougoue (1996) found that returns of ADRs affected significantly by the exchange rate changes in different countries. Bae et al. (2020) studied the impact of the exchange rate changes on the stock returns and how translation and economic exposure aspect of exchange rate risk can be priced across different countries. They concluded that exchange rate changes have a negative impact on underlying stock returns, but they have positive impact on ADR returns in the US markets.

Also, ADR returns are more related to the domestic market returns than the US market returns, indicating that the domestic market conditions play an important role in identifying ADR returns. Madhavan and Ray (2019) examined the linkage between the price and volatility of Indian GDRs traded in Luxembourg/London and their counterparts stocks traded in Mumbai. The study indicated that both the price and volatility of the underlying stocks and their respective GDRs are similar, taking into consideration the selection of the pertinent exchange rate. It means that there is no significant difference in volatility between domestic and foreign countries where the GDRs are traded. Although the critical differences between the selected stock exchanges in terms of listing requirements and the level of information disclosure, the similarity in findings may be due to the nature of law of one price through which the arbitrage played an important role in making prices parity.

Previous literature illustrated that the exchange rate effect on the stock markets return and volatility is variant according to the context and the timeframe of each study. In this thesis, Pound Sterling is exchanged for different foreign currencies according to the country where the DRs are traded. Sterling is considered the most important indicators of the UK economic health conditions as it is one of the most commonly converted currencies in the world.

3.6.4 The effect of GDP on return and volatility of underlying stocks and their corresponding DRs

Many economists such as Lucas (1988) supposed that there is no significant relationship between the economic growth and the financial system, however, economists such as Demirgüç-Kunt and Maksimovic (1998) emphasised on the significance of this relationship between them. Similarly, many authors discussed their different views about this relationship from different perspectives. A side of them discussed the relationship between the economic growth measured by Gross Domestic Product (GDP) and stock market return and its risk. For example, Ritter (2005) and Dimson et al. (2002) have studied whether countries with higher real GDP growth had higher real stock market return at the same time. Surprisingly, there is a negative relationship between real GDP across countries and stock market returns.

Joseph and Rostand (2017) discussed in their study the influence of stock market development on the economic growth in some African countries. They concluded that there is no causal relationship between stock market development and GDP. However, they illustrated that the main country-wide factors affecting, or affected by, stock markets are only inflation and money supply. Whereas Engle and Rangel (2005) found that GDP has a significant and positive impact on the stock market volatility. Ahmed and Samad (2008) revealed that stock market volatility has a significant and positive relationship with the economic growth. Specifically, Campbell et al. (2001) found that stock market volatility has a significant power for real GDP assessment. In contrast, Adjasi and Biekpe (2006) claimed that stock market volatility has a negative impact on the economy growth.

Guo (2003) found that stock market volatility has a significant and negative effect on GDP growth. However, he concluded that stock market returns drive out stock market volatility in predicting output. This means that beyond stock market returns, the stock market volatility doesn't provide any extra evidence or information regarding future output. According to Babatunde (2013) stock market plays an important role in improving GDP through raising the stock prices which may increase the domestic demand and accelerate the increase in real GDP growth. Therefore stock prices should be used as main indicators of future economic activity. From another perspective, since the value of equity at the aggregate level relies heavily on the economy state, uncertainty about future economic growth may cause a change in the stock market. Therefore, Babatunde (2013) concluded that there is a bi-causal relationship between volatility of the stock market and the country's real GDP. However, Wang (2010) investigated the relationship between stock market volatility and economic growth in terms of inflation rate and real GDP. He found that there is a mutual relationship between stock prices and inflation, however, there was no significant relationship between stock prices and real GDP.

Augustine and Pius (2010) studied the effect of stock market development as an independent variable and which measured by total market capitalisation, total value of shares traded, and turnover ratio, while GDP per capita growth was adopted as a dependent variable. They found that stock market size and turnover ratios have a positive impact on GDP. Another study stated that some emerging countries have experienced remarkable economic growth, and investors always ask whether they can direct a higher portion of their investments to these countries according to their GDP rather than market capitalisation. Those investors need to believe that directing more investments towards these countries should accompanied by an expectation about higher return. Hence, "supply-side" models have been developed in order to clarify and predict stock market returns based on macroeconomic variables. These models supposed that GDP can affect the shareholders investments through three stages; first stage, high GDP growth leads to the aggregate earnings growth; second stage, the aggregate earnings growth can converted into earnings per share (EPS) growth, and finally the EPS growth can be transformed into stock price which may reflect positively on the expected stocks returns and the investments in the stock markets. Actually, this idea is successfully applied by focusing on global equity returns as represented by a combination of different world indices, and then, comparing them to each country GDP growth that included in the same indices (MSCI, 2010).

From the previous literature it can be concluded that examining the impact of the economic growth on stock markets is considered as a significant but still debatable issue. Hence, as the UK remains a strong economic power with great influence around the world, the current thesis investigates whether the UK GDP has a positive or negative impact not only on the return and volatility of the domestic stock market but also on the foreign markets in which corresponding DRs are traded.

3.6.5 The effect of country corruption on return and volatility of underlying stocks and their corresponding DRs

Blackburn and Powell, (2011) defined corruption as the misappropriation of the public resources which has a negative impact on the availability of the resources used by the government in financing its expenditures. Consequently, the government may search for other sources of funds such as imposing additional taxes on the consumers as well as the investors which has a negative impact on the stock exchanges performance and consequently, their returns. This view is consistent with Méon and Sekkat (2005) who conducted their study in the period from 1970 to 1998. They found a negative impact of corruption on investment, assuming that the corruption depends essentially on the government effectiveness. In other words, if the government is less effective, this means that there is a high level of corruption.

Méon and Weill (2010) also analysed the linkage between corruption and governing entities in different developed and developing countries. They argued that corruption in developing countries, which almost have more ineffective governmental entities, has less negative consequences rather than the developed countries which are characterised by more effective governmental entities. In other words, corruption may have a direct relationship with efficiency in countries with highly ineffective governing entities. Similarly, Peng and Luo (2000) discussed the effect of corruption, in terms of managerial ties with the officials in different governmental institutions, on transition economy. They found that corruption can decrease the drawbacks of the businesses uncertainty which impact positively on their performance.

Also, Mo (2001) concluded a significant negative relationship between corruption and investments. Accordingly, many popular international entities such as IMF, the World Bank and OECD considered fighting corruption one of their key priorities especially in the developing countries which suffer a lot from corruption consequences that negatively affect their economies and in turn harm their investments, particularly the foreign investments (Méon and Sekkat, 2005). Also, Jain et al. (2017) argued that corruption has a negative impact on the foreign portfolio investments. This impact occurs as a result of the mediating effect of both the asymmetric information and investor uncertainty which lead to more adverse selection costs that in turn affect negatively the foreign investments and their trading volumes. Therefore, corruption is considered one of the critical barriers to the foreign investments as they are subject to high level of volatility. On the other hand, Heckelman and Powell (2010) showed that corruption has a positive impact on the investments in countries that surrounded by limited economic freedom conditions as it can help the investors in avoiding any useless bureaucratic regulations in the governmental institutions. The positive impact of corruption may be minimised in countries with more economic freedom conditions.

In contrast, Swaleheen and Stansel (2007) argued that corruption has a negative impact on economic growth in countries with limited economic freedom conditions. However, if different choices are available for the investors in countries with more economic freedom conditions, corruption may support them by providing a means around the government controls.

Furthermore, many studies focused on the relationship between corruption and governance. Hooper et al. (2009) focused on the quality of governance which measured by political stability and how the governance is positively related to the international stock returns. Though, Low and Ang (2013) showed that countries with more integrated governance framework are characterised by more effective government and strong control mechanisms to control corruption. These countries show lower equity returns than countries with weak governance mechanisms. In addition, numerous studies have examined the impact of corruption on financial markets, and they concluded that corruption is detrimental for financial markets. Ciocchini et al. (2003) showed that corruption increases the financial burden of the government in terms of borrowing costs in emerging markets. As well, Lee and Ng (2009) illustrated that the corruption can contribute in decreasing the equity values with controlling some firm and country levels variables. Moreover, Gelos and Wei (2002) found that low level of transparency in one country may discourage investors from investing their money in this country. This is one of the main reasons behind that the highly corrupted countries receive less investment from foreign investors. In stock exchanges context, investors, especially the risk averse investors, prefer to avoid investing in the stock exchanges with high probability of volatility which negatively affects their investments.

Actually, many studies revolve around the impact of different variables (e.g. various political uncertainty aspects) on stock markets volatility (e.g. Chau et al., 2014, Goodell and Vahamaa, 2013 and Önder and Şimga-Mugan, 2006). One of these critical aspects is the corruption which studied also by many authors (e.g. Spyromitros, 2020 and Zhang, 2012) who concluded that there is a significant negative relationship between corruption and stock market volatility with controlling number of macroeconomic variables.

However, corruption may play a different role than what is expected as it contributes in achieving more financial stability in stock markets. Pastor and Veronesi (2012) discussed one aspect of corruption which is bribery and they concluded that it may lower the stock market volatility especially in emerging markets. Whereas Zhang (2012) used the Corruption Perception Index (CPI) as a proxy of the corruption in order to evaluate the impact of corruption on stock market volatility and concluded that there is evidence of correlations of corruption with financial market stability. In contrast, Aljazarel (2016) investigated the effect of corruption on stock market in Gulf Cooperation Council countries (GCC) by using Corruption Perception Index (CPI) as a measure of corruption. The study showed that in GCC countries, corruption is positively related to their financial developments which are consistent with many studies findings (e.g. Aidt, 2009, Cuervo-Cazurra 2008 and Egger and Winner 2005). Also, Novotná et al. (2016) focused on the quality of governance which is assessed from different aspects; government effectiveness, control of corruption and rule of law in different African countries individually. The findings of this study showed considerable differences among the different African countries, as some of these countries reach the worst findings, with significantly high levels of corruption.

In conclusion, many studies have examined the relationship between corruption and financial markets. It seems that this relationship does not essentially take the same direction across different contexts, i.e. it differs from one country to another according to different financial and economic variables. Therefore, the current thesis extends previous literature in determining the impact of corruption on financial markets return and volatility but from a different perspective. Corruption impact on return and volatility is applied here from two aspects; the domestic corruption in the UK in which the underlying stocks are traded and the foreign corruption (i.e. corruption in 25 countries) in which the corresponding depositary receipts are traded which sets this thesis apart from the previous literature.

3.7 Conclusion

As stated in the first chapter, the thesis is intended to bridge the gap resulting from the inadequate comprehensive studies about the factors affecting the return and volatility of the underlying stocks that are traded in the UK and their corresponding DRs that are traded in different countries. As shown above, several studies have been conducted in order to examine different aspects of the depositary receipts issue as an alternative to the direct investments in foreign markets. However, the current thesis is distinguished from the previous studies by focusing on the impact of the underlying stocks and their corresponding DRs liquidity on their return and volatility, especially when DRs are traded in more than one foreign market for the same respective underlying stocks.

As well, the thesis encompasses the most important domestic country-wide factors that affect the return and volatility of underlying stocks and DRs (i.e. inflation rate, interest rate, exchange rate, GDP). Along with these variables, country corruption is also examined which sets this thesis apart from the previous literature as it examines the corruption from different facets; the domestic corruption in the UK and its impact on the underlying stocks in the UK and the foreign corruption in which the respective depositary receipts are traded.

Collectively, these factors are of great interest to the investors and arbitrageurs as they can predict the effectiveness of their investments decisions. Correspondingly, this thesis shades the light on DRs investements as a valuable opportunity towards forming well-diversified international portfolios which maximise their returns and minimise their volatility by enabling the investors to invest in more than one foreign market across different countries. Consequently, it opens the door for possible arbitrage opportunities as a main price correcting mechanism in order to maintain stock–DR parity according to the law of one price and the efficient market hypothesis. In conclusion, this thesis represents an integrated framework of many important factors that may affect the return and volatility of the UK underlying stocks and their corresponding DRs and in turn affect the investors' relevant investement decisions.

Chapter Four

Research Methodology

Chapter 4
Research Methodology

The aim of this chapter is to present how the thesis will be carried out. It provides an overview of the methodology adopted in this thesis. It starts with the research philosophy and approach, then identifying the main variables of the thesis models and their applicable measures. Also this chapter provides how the thesis hypotheses are developed, followed by the conceptual framework which clarifies the relationships between different variables. Then the thesis models are illustrated and finally, the applied statistical diagnostics and methods to examine these models are explained.

4.1 Research philosophy

Understanding the distinct research philosophies is so crucial because the relevant thoughts involved in them will aid in selecting which research plans and methods will be used. Paradigm, as a term, can be traced back to the Greek word 'paradeigma' meaning pattern. It came to life at the hands of Kuhn (1970) who defined it as "integrated sequence of constant concepts, variables and problems linked to related approaches and tools". Therefore, "paradigm" denotes a research method with a set of values, beliefs, and propositions that a set of scholars share regarding the nature and conduct of research (Kuhn, 1977). In addition, a paradigm also means a set of academic and scientific notions, assumptions and values (Olsen, 2019).

Two focal philosophical branches to researchers in the field of human behaviour are ontology and Epistemology (Saunders et al., 2009 and Gill and Johnson, 2010). Ontology and epistemology aspects concern a person's worldview. It has due impact on the changing importance of the aspects of reality perceived.

- **Ontology**

The ontology is how things really are and how things really work (Denzin and Lincoln, 1998). The variety of phenomena is an issue of importance for ontology as a philosophy. In simpler terms, ontology concerns what exists, what it looks like, what parts make it up and how the parts interact with each other.

- **Epistemology**

The Greek word (episteme), which means knowledge, is the origin of the term "epistemology"(Trochim, 2000). Epistemology is the philosophy of knowledge. What differentiates methodology from epistemology is that the former is much more practical in nature than the latter. Epistemology includes the processes of gathering knowledge and developing new models or theories. Knowledge is dynamic and never static as it is always subject to change. Actually, there are two contrasting epistemological perspectives: "Interpretivism" and "positivism" (Grix, 2002).

On one hand, interpretivism is defined as "an epistemological position that is based upon the belief that a strategy is needed with respect to the variances between objects and people of the natural science (Grix, 2002). On the other hand, positivism is defined as "an epistemological position that supports the application of the natural science methods to the social reality studies and beyond" (Grix, 2002). As a result, the social scientist has to fully get the subjective meaning of social action (Grix, 2002). One can conclude that depending on the choice of one of these epistemological positions, a different methodology will be applied. Thus, different views of the same social phenomena are the consequence of researcher's ontological and epistemological positions. Positivism is a research paradigm related to scientific theories. As a tool of comprehending and investigating social and psychological phenomena, advocates of positivism apply scientific methodology. For O'Toole and Beckett (2010), positivism is defined as "human understanding of behaviours that should be positive, tangible and demonstrable". Jones (2007) asserted that in a positivistic point of view "reality is universal, objective, and quantifiable". This offers a view of reality as stable and measurable irrespective of the person who experiences it. A constructionist paradigm revolves around the idea that humans create their own realities, scaffolding their learning in the process (O'Toole and Beckett, 2010).

Furthermore, Jones (2007) believed that "reality is shaped by the cultural, historical, political, and social norms", that being the build-up of experiences and their analysis into a world view which O'Toole and Beckett (2010) regard as a philosophical paradigm.

Interpretivism integrates human interest into a study as it necessitates researchers to interpret elements of the study. Accordingly, interpretive researchers suggest that access to reality is only realised through "social constructions such as language, consciousness, shared meanings, and instruments" (Myers, 2013). Developing interpretivist philosophy hence depends upon the critique of positivism in the field of social science. Interpretivism and idealism are two faces to the same coin and are used to set together many approaches which deny the objectivist view that exists within the world independently of consciousness" (Collins, 2018). Because studies of interpretivism typically emphasise on meaning, it can apply numerous approaches to show the several issue's facets.

- **Methodology**

Methodology refers to the specific ways that can be used to better understand our world. There is a close relationship between Epistemology and methodology. While the former involves the philosophy of how to get to know the world ", the latter presents the practice (Trochim, 2000).

4.2 Research design

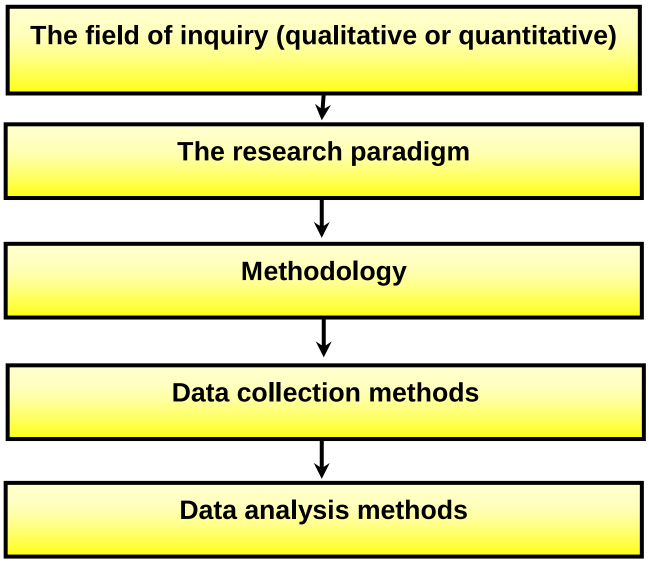
The research design refers to the thorough strategy which others have called it strategy of inquiry (Denzin and Lincoln, 2011). Actually, Sarantakos (1998), Tashakkori and Taddlie (2008), Crotty (1998), Denzin and Lincoln (2005), Bryman and Bell (2015), Saunders et al.

(2009) and Cooper and Schindler (2008) argued that there is no single way to categorise social research into phases. In fact, the topic of research is controversial and received due opposition considering the terminology used for research design and the order of research stages which ultimately leads to confusion. Sarantakos (1998) suggested that the paradigm includes "the researcher's epistemology and theoretical perspective". As a result, they form functional duet and, in turn, guide researchers' selected research methodologies (designs/action plans).

Also, Sarantakos (1998) separated epistemology and theoretical perspectives and names four sequential stages that follow each other in social research design in a sequential order. These stages are: epistemology, theoretical perspective, methodology and methods.

However, Denzin and Lincoln (2005), as illustrated below in figure 4.1, outlined that the choice of a research design rests upon five successive steps. In first place comes assigning the field of inquiry (either qualitative or quantitative). The second step involves selecting the theoretical research paradigm. The third step is related to the choice of the fitting methodology whereas the final two stages involve the process of selecting the appropriate methods of data collection and data analysis.

Figure 4.1: Denzin and Lincoln's social research design



Adapted from: Denzin, N., and Lincoln, Y., 2005. *Introduction: The discipline and practice of qualitative research*

Following the Denzin and Lincoln (2005), the researcher believes that the selection of a research design begins by designating the field of inquiry qualitative, quantitative and mixed methods research.

- **Qualitative research** is an exploratory research that aims at obtaining a full grasp of reasons, opinions, and motivations. It also provides solutions for problems and develops different views or hypotheses for quantitative research. Trends in thoughts and opinions are uncovered by qualitative research. Qualitative data collection methods are not stable as it uses semi-structured or unstructured techniques. There are many applicable methods such as group discussions, individual interviews, and participation/observations (Creswell, 2014).
- **Quantitative research** depends on using mathematical methods to analyse the collected statistical data. Quantitative research is about "hypothesis testing, and theory testing". In other words, the predictions are listed explicitly, and then compared with data (Wellington and Szczerbiński, 2007). It depends on examining the relationship among variables as a tool for testing objective theories. These variables can be measured by certain instruments through which data can be analysed and explained by using different statistical tools. This needs to clarify different critical points into a well-structured report includes; an introduction, theories applied and the relevant literature review, research methods, results, findings and final discussion" (Creswell, 2014). Actually, those who use this form of inquiry have presuppositions about testing the applied theories in a deductive manner, avoiding bias, planning for alternative explanations, and generalising and the outcomes (Creswell, 2014).

- **Mixed methods research** is a research method which mixes the qualitative and quantitative methods in one study. Therefore, it is not just collecting and analysing both types of data; the benefits of a research are greater than either qualitative or quantitative research. Mixed method enhances the analysis enrichment and strengthens the findings of any evaluation (Creswell and Clark, 2017).

4.2.1 Research theoretical approach

In current thesis, the first step is to select the appropriate research design. Therefore, to achieve the thesis purpose, the researcher adopts the quantitative research which seeks to explain the impact of liquidity, country-wide factors on underlying stocks and their corresponding depositary receipts return and volatility in the UK context. Therefore, numerical data are gathered about daily prices of its underlying stocks and respective depositary receipts, and then analysed by using mathematically based methods in particular statistics. Actually, there are different research methods; deductive, inductive, or a mix of them. First, deductive approach includes determining the relevant theories and concepts from literature which can be tested through applying the most appropriate methods and techniques. Deductive approach seeks to find the relationships between variables including the causation. The current thesis follows the deductive approach in support of certain theories in order to deduce certain hypotheses to be tested, collecting data and drawing conclusions (Saunders et al., 2009).

The second step of this thesis is to select positivism as it firstly involves selecting the theoretical research paradigm. As well, it seeks to develop hypotheses relying on the following theories which compose the theoretical background of it; liquidity preference theory, modern portfolio theory and arbitrage and law of one price in light of an efficient market hypothesis (EMH). Next, these hypotheses are tested and giving explanations which can be measured.

The third step is related to choosing the suitable methodology. Quantitative researches are either descriptive, cannot make predictions, or explanatory, focusing on reviewing a certain situation to explain the relationships between research variables (Saunders et al., 2009).

Descriptive research focuses on detailed profiles of people, situations, and events (Robson, 2002). Descriptive research is a precursor to a part of exploratory research or an explanatory research. Prior to the collection of the data, it is necessary to have a profound profile of the relevant phenomena that you need to collect data and draw conclusions (Saunders et al., 2009).

Saunders et al., (2009) argued that these are higher-order skills than those of accurate description. Hence, they stated that description in management and business research should be thought of as a means to an end rather than an end in itself so it has a very clear place. As a consequence, if the research project needs use of description, it is likely to be an indicator of explanation. These studies are called Descripto-explanatory studies. Descripto-explanatory study has two aspects; descriptive and explanatory. Hence, to achieve the current thesis purposes, it adapts Descripto-explanatory research (Saunders et al., 2009).

The final two stages which involve the process of selecting appropriate methods of data collection and data analysis will be illustrated in the following sections.

4.3 Data collection

Collecting data means starting to operate the information gathering tool especially when it is decided how to get information. Heaton, (1998) sees that the starting point is the definition of secondary data: "existing data, gathered for the goals of a previous study, in order to continue a research interest which is different from that of the original work". There are four possible sources of secondary data. The first source is individual empirical studies which are discerned in the research process. This task became much easier than it was due to the development of online databases and technological tools. Academics, consultants, public sector institutions and private researchers produce such studies, and the study authors can be contacted for access to the data upon which the studies were based on (Argyrous, 2009).

A second source of secondary data comes from the administrative records which are usually collected by societal organisations, government and business as a task of their procedures, but which may be of interest to other researchers. Argyrous (2009) considers this source as an approach that may provide data and information one did not realise their existence before.

Public archives present the third source. A stable system is used by public archives for providing the data and their associated information, such as the original inquiry tool and codebooks used for introducing the data electronically. Public archives also provide a search tool to rapidly find data relevant to answer all relative questions (Argyrous, 2009).

Collecting information on a wide range of topics and issues is the main task of official agencies for statistics which form the fourth source, e.g., the Australian Bureau of Statistics (ABS) in Australia. These agencies enjoy a long history of work, and so can result in comprehensive chronological data on many topics. Moreover, these agencies apply international criteria of data collection, which give them the opportunity to conduct comparative analysis across countries. International data collection agencies can bring together relevant national data from the official agencies to facilitate cross-country comparisons. For example, the World Bank provides a comprehensive data across countries. Another advantage is that it also originates a type of data that is not available at the level of the individual country (Argyrous, 2009).

This thesis is based mainly on secondary data**.** The dataset covers a period from January 2004 to December 2019 which based on the observations of daily prices for the underlying stocks traded in the UK, as well, their corresponding depositary receipts which are traded in stock exchanges outside the UK.

The process of analysing data is based on applying panel data of 254 companies which represent all companies that operate in UK and issue the underlying stocks and their corresponding depositary receipts in different industries and trade them internationally at all relevant stock exchanges in 25 countries; Argentina, Australia, Austria, Brazil, Botswana, Canada, Denmark, France, Germany, Hong Kong, India, Ireland, Italy, Malaysia, Mexico, Namibia, Netherlands, Norway, Qatar, Singapore, South Africa, Spain, Sweden, Switzerland, and USA. Moreover, the thesis includes all of the depositary receipts markets that are traded in the following 49 stock exchanges: BATS UK, BATS France, BATS Italy, BATS Spain, BATS Sweden, Derived UK, Derived Australia, Derived Hong Kong , Derived Italy, Derived Norway, Derived South Africa, Derived Spain, London, NASDAQ, NYSE, Oslo, OTC, CBOE, TSXV, Berlin, Dusseldorf, Frankfurt, Hamburg, Munich, Stuttgart, Trade-Gate, Xetra, Amsterdam, Argentina, BMandF, Botswana, BSE, Copenhagen, Doha, Hong Kong, Ireland, Johannesburg, Kuala Lumpur, Madrid, Mexico, Milan, Namibia, NEO, NSE, Singapore, Stockholm, Switzerland, Sydney, Toronto.

Essentially, during data collection phase, the researcher faces a challenge concerning the voluminous of data as the thesis aims to cover relevant data of the underlying stocks that are traded in the UK's stock markets, as well their respective depositary receipts which are traded in different foreign markets across many countries on a daily basis. Precisely, the daily prices data - in terms of open price and close price- as well, the daily trading volumes for all underlying stocks and their respective DRs of 256 companies that are traded in 49 stock markets across 26 countries are collected for a long period of time. Then, data are converted from daily to annual basis to be consistent with the time frame of country wide-factors' data (i.e. inflation rate, interest rate, GDP, exchange rate and country corruption) which are reported annually in their relevant sources. Specifically, data related to liquidity, return and volatility are drawn from investing.com[1]. For GDP[2] , inflation rate (CPI)[3], and interest rate[4], data are collected from the OECD database. Moreover, data of annual exchange rate are drawn from Bank of England Database[5], whereas, country corruption indices data are collected from Transparency International[6]. Finally, volatility is measured by the Excel SKEW function[7] which computes the skewness of a set of values distribution with a minimum; three numeric values that constitute the data set.

[1] For more details see https://www.investing.com/
[2] https://data.oecd.org/gdp/gross-domestic-product-gdp.htm
[3] https://data.oecd.org/price/inflation-cpi.htm
[4] https://stats.oecd.org/index.aspx?queryid=86
[5] https://www.bankofengland.co.uk/statistics/exchange-rates
[6] https://www.transparency.org/
[7] For more details see https://www.excelfunctions.net/excel-skew-function.html

In order to calculate the liquidity, return and volatility of the underlying stocks and their respective DRs, **74,602** daily observations are collected which include 74,602 open and close prices as well, 74,602 observations of the trading volumes for each relevant underlying stock and corresponding DR from January 2004 to December 2019.

Table 4.1: Measures of liquidity, return and volatility

This table represents the measures of liquidity, return and volatility which are calculated on a daily basis within the study period from January 2004 till December 2019. To calculate the daily change of the first working day of January, 2004, data of the last working day in 2003 are used.			
Variable	**Symbol**	**Type**	**Measure**
Liquidity	LIQ	Independent	LN (Trading Volume)
Return	RET	Dependent	Daily Price Change $\frac{\text{Daily opening price} - \text{Daily closing price}}{\text{Daily closing price}}$
Volatility	VOL	Dependent	Skewness of Daily Price Change SKEW(number1, [number2], [number3])

These data are collected on a daily basis, however, data of the domestic country-wide factors (**UK macro-economic factors and country corruption index)** are available annually according to the following measures as shown in tables 4.2 and 4.3;

Table 4.2: Measures of the UK macro-economic factors

This table represents the measures of the UK macro-economic factors (i.e. inflation rate, interest rate, exchange rate and GDP) which are calculated annually within the study period from January 2004 till December 2019. To calculate the annual change of each variable in 2004, ‘‘prior year’’ value of 2003 is used.			
Country-wide factors	**Symbol**	**Type**	**Measure**
The UK Inflation	CPI	Independent	Annual Change in CPI $\frac{\text{Current year CPI- Prior year CPI}}{\text{Prior year CPI}}$
The UK Interest Rate	IR	Independent	Annual Change in IR $\frac{\text{Current year IR- Prior year IR}}{\text{Prior year IR}}$
The UK Exchange Rate	ER	Independent	Annual Change in ER $\frac{\text{Current year ER- Prior year ER}}{\text{Prior year ER}}$
The UK Gross Domestic Product	GDP	Independent	Annual Change in GDP $\frac{\text{Current year GDP- Prior year GDP}}{\text{Prior year GDP}}$

Table 4.3: Measures of country corruption

This table represents the measures of the country corruption which are collected on an annual basis within the study period from January 2004 till December 2019 by using the annual corruption perceptions index (CPI).			
Country-wide factors	**Symbol**	**Type**	**Measure**
Country Corruption:		Independent	**Corruption Perceptions Index**
Domestic Country Corruption	UKCI	Independent	The UK Corruption Perceptions Index
Foreign Country Corruption	FCCI	Independent	Foreign Country Corruption Perceptions Index for each country in which DRs are traded.

As mentioned before, to standardise the time frame of all relevant data, daily data of liquidity, return and volatility have to be converted into annual data. Therefore, the following steps, on EXCEL, are applied;

1- To convert data from given numbers to be named as ‘‘days’’, the function =Text(selected cell,0,dddd) is applied

2- The required days are counted by using the following function =Day(Texted)

3- To ensure the accuracy of counted days used, the following function is applied; =Days360(Day).

4- To convert data from daily to monthly basis, the following function is used; =Month(Content)

5- Then, using year function =Year(Month) to convert monthly data to annual data.

6- Lastly, the pivot table is used to assemble all relevant data for the same year and finally, the annual observations are amounted to **7680**.

4.3.1 Data sorting

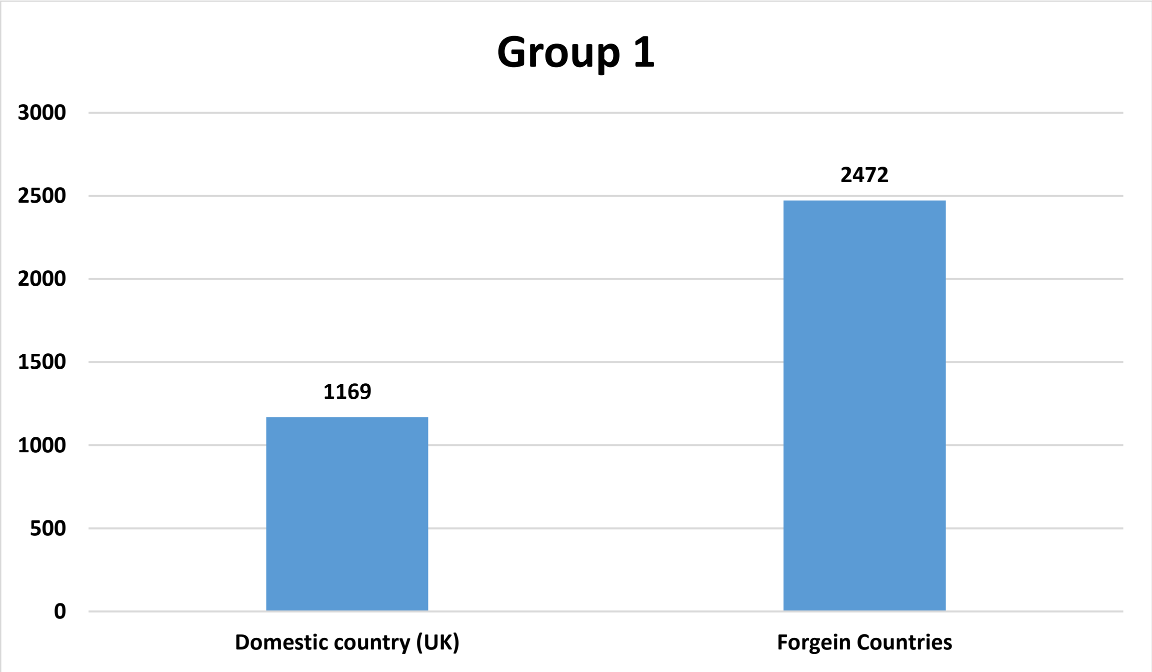
Concerning volatility measure of the underlying stocks and their corresponding DRs, the out of risk area, which includes 4039 positive or zero skewness, is eliminated. Hence, **3641** annual observations represent the negative skewed data, i.e., the actual volatile (i.e. risky) observations are used to conduct data analysis for the relevant study's variables. Table 4.4 summarises the data collection and sorting stages and how data are converted from daily to annual basis.

Table 4.4: Summary of data collection and sorting stages

<table>
<tr><td colspan="4">This table summarises the stages of converting daily data to annual data within the study period from January 2004 to December 2019. Then SKEW analysis has been carried out in order to focus only on the negative skewed observations as the positive and zero skewed data are considered 'out of risk area' and, accordingly, they are excluded from the final number of observations of the prices and trading volumes of the underlying stocks which are traded in the UK and their corresponding DRs that are traded in different countries.</td></tr>
<tr><th colspan="2">Data</th><th colspan="2">No. of observations</th></tr>
<tr><td colspan="2">Initial data (daily)</td><td colspan="2">74602</td></tr>
<tr><td colspan="2">First conversion (monthly)</td><td colspan="2">18584</td></tr>
<tr><td colspan="2">Second conversion (annually)</td><td colspan="2">7680</td></tr>
<tr><td colspan="2" rowspan="4">SKEW analysis</td><td colspan="2">Out of risk area (excluded)</td></tr>
<tr><td>Positive skewed</td><td>2462</td></tr>
<tr><td>Zero skewed</td><td>1577</td></tr>
<tr><td colspan="2">Negative skewed (targeted) <u>3641</u></td></tr>
<tr><td colspan="4">Hence, the final annual observations that are used in this study are 3641; these observations are analysed according to the following mentioned groups as follows:</td></tr>
<tr><th colspan="4">Group (1)</th></tr>
<tr><td colspan="2">Domestic country (the UK)
1169</td><td colspan="2">Foreign countries
2472</td></tr>
<tr><td colspan="4">The observations of DRs which are traded in the foreign countries (2472) are classified into the following groups;</td></tr>
<tr><th colspan="2">Group (2)</th><th colspan="2">Group (3)</th></tr>
<tr><td>European countries
1683</td><td>Non-European countries
789</td><td>Developed countries
2425</td><td>Developing countries
47</td></tr>
</table>

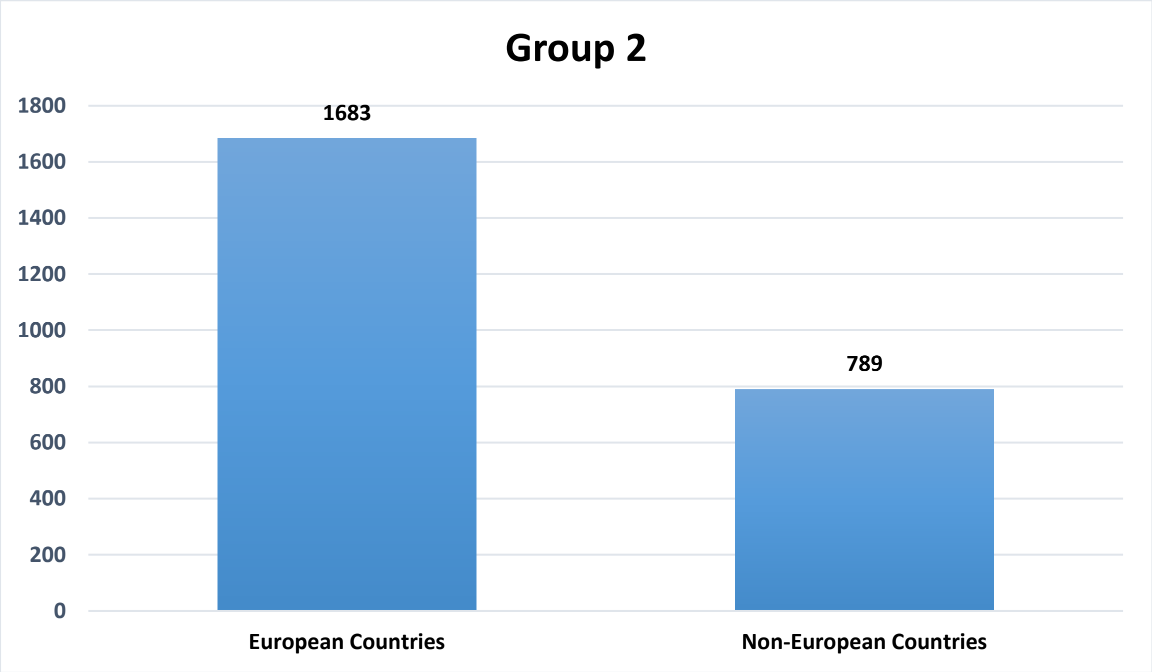
The classifications of the observations of the underlying stocks that are traded in the UK and their corresponding DRs that are traded in different countries according to the mentioned groups are illustrated in figures 4.2, 4.3 and 4.4.

Figure 4.2: Observations of domestic and foreign countries



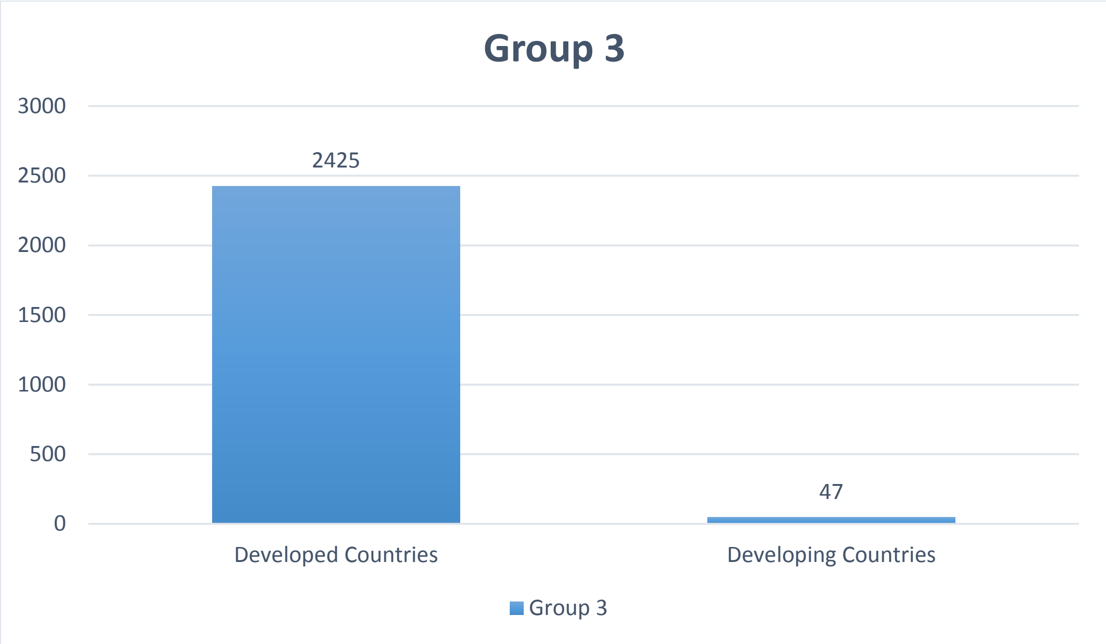
As shown in section 4.3.1, after converting daily data to annual data, the total number of observations is amounted to 3641. These observations consist of the prices and the trading volumes of the underlying stocks that are traded in the UK along with their respective DRs that are traded in different foreign countries. From figure 4.2, it's clearly shown that the percentage of underlying stocks that are traded domestically in the UK is amounted to 1169 observations (32.11%), which is approximately the half of DRs that are traded in foreign countries and amounted to 2472 observations (67.89%). This proportion reflects the fact that each underlying stock in the UK may have more than one DR in more than one foreign country. In current thesis, there are 3 domestic stock markets in home country (the UK) that issue the underlying stocks which are covered by DRs that are traded in 35 foreign markets and located in 18 foreign countries.

Figure 4.3: Observations of European and non- European countries



As illustrated in figure 4.2, there are 2472 observations. These annual observations consist of the prices and the trading volumes of the DRs that are traded in foreign countries. To get more in-depth information about the nature of DRs mechanism in foreign countries, they are divided into European and non-European countries. As mentioned in figure 4.3, 2472 observations are divided into 1683 observations in European countries with a percentage of 68% whereas, 789 observations exist in non-European countries with the percentage of 32%, given that the UK is the most important European country in the region that attracts most of the investors. Hence, in figure 4.3, all relevant data of all cross-listed companies in multiple foreign markets are collected where their stocks are covered by DRs that are traded in 17 European markets in 6 European countries along with 18 non-European markets located in 12 non-European countries.

Figure 4.4: Observations of developed and developing countries



As shown in figure 4.4, 2742 annual observations of DRs that are traded in foreign countries are classified into developed and developing countries. The developed countries represent almost all of the observations with a percentage of 98%, whereas the remaining 2% exists in developing countries with 47 observations only.

This proportion indicates to a huge difference in observations of DRs which are traded in developed countries compared to the developing countries. Actually, current thesis includes 27 developed stock markets located in 11 developed countries and 8 emerging stock markets located in 7 developing countries. This may be due to the fact that the world's largest economies which are grouped in the developed countries may change the direction of money flows that adversely affecting emerging markets in developing countries (Özen and Tetik, 2019).

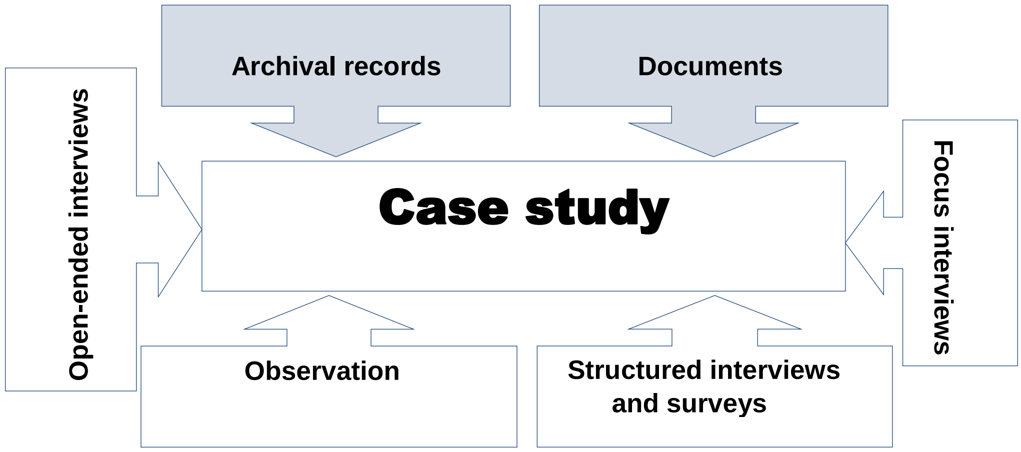
4.4 Case study of the UK

Case study research method has considered, in many scientific disciplines, as a valuable means to examine particular situations and trends within certain conditions. Also, it is very useful in testing scientific theories and models thoroughly by applying them in real world situations. As well, it can provide researchers with more realistic responses than a purely statistical survey in terms of many indications, detailed explanations and creating hypotheses for different disciplines. However, it is preferable to be supported by statistical tools. Case study research is more applicable when the research revolves around one of contemporary phenomena, that researchers have no control over; the research type is typically exploratory; or answer the "why" and "how" questions (Kumar, 2019 and Yin, 2017). In addition, case study method is characterised by its flexibility as it may give more unexpected results during its course which consequently provides the thesis with new directions and guidelines. The primary basis of case study is the thesis subject under study and its relevance as it focuses on a particular case of a small study group, or even a specific population. Therefore, it is essential to plan and design how to address the thesis subject as well the relevance of data collected in order to have more focused and precise results and conclusions.

The main reason for choosing a case study strategy is due to its distinctive advantages over other research strategies to generate answers to the research questions: “how”, “why” and “what” (Saunders et al., 2009 and Yin, 2017).

Here, the UK is the case study applied to investigate the impact of country-wide factors and liquidity on the return and volatility of underlying stocks which are traded domestically and their corresponding depositary receipts that are traded in multiple foreign markets for the same stocks, taking into consideration the effect of corruption domestically and internationally. Yin (2017) suggested the six types of data collection methods that can be used in case study (Figure 4.5).

Figure 4.5: Sources of evidence for case study research



(Shaded boxes indicate the methods used)

Source: Yin, R.K., 2017. *Case study research and applications: Design and methods*. Sage publications.

Multiple sources of data collections are used in this thesis, including, archival records and document analysis for the data needed which cover 15 years (2004-2019) for the underlying stocks that are traded in the UK and their corresponding depositary receipts which are traded in different foreign countries.

4.4.1 The UK as an investment context

Investors should pay due consideration before choosing in which country they will invest and the UK is one of these reliable choices. It can be considered the leader of foreign investments in Europe which makes the World Bank ranks it among the best countries in operating businesses as it takes only 5 days to establish a business (WB, 2019). The most important reason behind considering the UK as one of the most attractive investment opportunities is its sound country-wide factors effects. Although the economic consequences of its planned exit from the European Union (Brexit) impacts negatively on its growth in the first half of 2017 (OECD, 2019), the UK is still the world's fifth-largest national economy (IMF, 2019).

As well, the UK contributes to the wealth of investment opportunities within the world class market infrastructure via strong communication network as it has extensive broadband markets and also it is one of the strongest ICT infrastructure and technological readiness in the world. World Economic Forum ranks the UK among the top 10 in their Networked Readiness Index (Baller et al., 2016 and DIT, 2019).

Moreover, the UK is considered one of the key financial centres worldwide (The second country next to the US) which is reflected positively on its stock markets stability and liquidity that investors looking for (Reid, 2019). Whereas London is in the second rank next to New York in overall assessment as a financial centre and the first in one of the most important competitiveness areas; business environment which focuses mainly on three pillars; The regulatory environment, the levels of corruption and the rule of law enforcement (GFCI-25, 2019). As well, it is one of the most globalised economies with many large companies operating within its economy (Gygli et al., 2019) (e.g. of the world's 500 major businesses, 21 are headquartered in the UK) (Fortune, 2018), which makes it an attractive investment destination for investors who can invest in it through different ways such as easy-to-use exchange-traded funds (ETFs), depositary receipts and other instruments of foreign direct investments (Kuepper, 2019). Hence, the UK offers vast business opportunities for investors within its stable regulatory structure as it follows a consultative system for formulating its rules and regulation which impacts positively on its business environment (Griffiths and Wall, 2012). Consequently, the UK's approach to FDI is very clear as stated by Europe Attractiveness Survey as number one destination for FDI in Europe (EAS, 2019). Also, a population exceeds 66 million people makes it a major market and an attractive investment destination in Europe of an approximate population of 500 million (ONS, 2019). Moreover, OECD has identified the UK as a high labour market flexibility and large labour supply which pushed the unemployment rate down to below 4.5% (OECD, 2019). From taxes side, the UK is focused on developing the optimum environment for business to thrive and at the heart of this is low tax, fair but competitive tax rules. Therefore, it has a competitive tax environment in terms of offering tax reliefs such as the enterprise investment scheme, seed enterprise investment scheme and venture capital trust which help to stimulate over £2.5 billion a year of investment in the UK SMEs (HMRC, 2018).

4.4.2 Depositary receipts in the UK

The UK is one of the most popular countries where DRs are issued by its depositary banks which represent ownership of shares that listed and traded independently from the underlying stocks. In 90s, the LSE issued the GDR as a competitive instrument of ADR, which becomes a very popular cross-listing instrument in developing countries within their emerging markets. Recently, it is observable that there are some changes in DRs markets as companies from developing markets preferred GDRs rather than ADRs, and choosing LSE for their cross-listing purposes (Kim, 2016). ADRs and GDRs have similar structure, but GDRs have less strict requirements of reporting and consequently, they are more affordable than ADRs. In particular, within the past five years, and although there is a high level of uncertainty, GDRs programs have outperformed ADRs and have achieved a steady progress (i.e. about 29% of total increase in listings, providing higher return on investment (ROI) to stockholders (Kim, 2016). It refers to the growing desire of businesses and investors to invest more in GDRs than in ADRs. Generally, depositary receipts become one of the most popular tools that investors and businesses utilise in order to access the foreign markets without being subject to many barriers to access foreign investments in their countries. In LSE, cross-listed companies are using DRs extensively to contact one of the largest capital pools in the world and to strengthen their profiles, in terms of company name and business nature to access the International Order Book (IOB). IOB is the global trading platform of DRs as it enables investors to have an easy and efficient access to DRs across different countries worldwide via single and central electronic book (LSE, 2020).

4.5 Identification of thesis variables

As the current thesis examines the impact of liquidity and country-wide factors on return and volatility of underlying stocks and their corresponding depositary receipts, it is focused mainly on two types of variables: independent variables (liquidity and the UK country-wide factors; (the UK Inflation rate, the UK Interest rate, the UK Exchange rate, the UK Gross Domestic Product (GDP) alongside, the country corruption; domestically in the UK, where underlying stocks are traded and internationally in 25 foreign countries, where their corresponding depositary receipts are traded. Also, two dependent variables are included; the return and the volatility of underlying stocks and their respective depositary receipts.

- **Independent variables**
- **Liquidity**

Liquidity means the speed of converting a certain amount of stocks into cash without affording any additional transaction costs or causing any negative effect on their value. So, the less the time it takes to convert given amount of stocks into cash, the higher the liquidity of those stocks. In contrast, illiquidity means that the stocks cannot be easily converted into cash without incurring a considerable loss in their prices as the market may lack the adequate buyers and sellers. Amihud and Mendelson (1986) argued that the investors often ask for obtaining a premium for less liquid stocks, therefore, the less the liquidity of a given amount of stocks, the higher the average returns they have. Practically, they found that illiquidity shock of the underlying stocks returns tend to be one of the critical variable affecting the return and the volatility of their corresponding DRs. In the current thesis, liquidity (LIQ), as an independent variable, is measured by annual observations of trading volumes for each cross-listed company in home country (the UK) (Moyo et al. 2018). Whereas Harris (1986) found evidence to highlight the significant and positive relationship between the changes in stock prices and their trading volumes. Also, Karpoff (1987) found that upward or downward changes in the stock prices are associated fundamentally with the need of having high trading volume of a given amount of stocks. Also, Chordia and Swaminathan (2000) examined the impact of trading volume of the stocks on forecasting the short term stock returns. They found that the daily return of high trading volume of stocks was the main drive of the daily return of low trading volume of stocks. On the same way, Chen et al. (2001) found that the trading volume information can be considered as a beneficial predictor of stocks return as it can explain the upward or downward movements of the stock prices.

- **Domestic country-wide factors**

Several country-wide factors can clearly affect the status of the stock market, measured by stock return and risk. According to Corradi, et al. (2013) macroeconomic variables contribute to 75 percent of changes in stock market volatility. As mentioned before, DRs markets are supposed to be an extension of the underlying stock market. Accordingly, this thesis investigates the impact of the domestic country-wide factors on the underlying stocks and their respective DRs that are traded in multiple foreign markets. Actually, London Stock Exchange (LSE) as a well-developed stock market is affected significantly by the sound country-wide factors of the UK, which may affect the DRs return and volatility in different countries. Therefore, the domestic country-wide factors of this thesis include the following: the UK Inflation (CPI), the UK Interest Rate (IR), the UK Exchange Rate (ER), and the UK Gross Domestic Product (GDP), as well as the UK corruption index (UKCI) in addition to each foreign country corruption index (FCCI) where DRs are traded. These variables are illustrated in the following section respectively.

- **The UK inflation rate (CPI)**

Stock market participants rely on many elements to predict the stock return. One of the key elements is the inflation rate. The theory of interest by Fisher (1930) suggested that any asset's return involves both; the real interest rate and the inflation rate, whereas the extended Fisher hypothesis (1934) stated that the actual nominal return is a function of expected and unexpected nominal returns in addition to both expected and unexpected inflation rate (Fisher, 1934).

Lintner (1975), Jaffe and Mandelker (1976) and Fama and Schwert (1977) discussed the relation between inflation and stock prices. The purpose of these studies is to investigate the kind of relationship between expected nominal returns and expected inflation. Most of these studies reported a negative linkage between stock returns and inflation, in contrast to the results of Fisher hypothesis which stated a positive relationship between expected nominal returns and expected inflation. Also, Firth (1978) claimed a direct and significant relationship, in the UK, between figurative inflation rate and stock market return. As well, Ibrahim and Agbaje (2013) argued that inflation has a significant positive impact on the stock return. This means that inflation rate is one of the significant macroeconomic variables that affects the investment movements and consequently, the stock returns. However, Ugur and Ramazan (2005) proved that there is no relationship between inflation and stock returns. Other studies suggested that there is a negative relationship between inflation and stock returns which resulted from the negative influence of unexpected inflation on stock returns (Hussain and Khan, 2011). Engle and Rangel (2005) stated that there is an impact of inflation as one of the main economic conditions on the market volatility. Also, they argued that high inflation rate leads to high volatility than those with less fluctuated values. However, Murungi (2012) stated that till now the impact of inflation rate on the return and volatility of stock market is an arguable issue. However, to determine whether the impact of inflation rate is significant or not, it relies heavily on many factors such as the country’s relevant markets, the country's monetary policy, the methodology applied and the period covered by the study. Consumer Price Index (CPI) is applied in this thesis as a measure of inflation rate. CPI is the weighted price index which measures the change in the monthly prices of goods and services (Jepkemei, 2017) which is used as a proxy of inflation rate in the overall domestic economy (Graham, 1996). Actually, the direction of the relationship between inflation rate and stock return relies seriously on whether the economy faces expected or unexpected inflation. Expected inflation takes place when demand exceeds supply, which increases the prices and consequently, it leads to an increase in supply. As it is expected, the inflation will force businesses to increase stock prices and in turn they will produce more profits. Consequently, more profits encourage these businesses to pay more dividends and in turn, their stocks prices will increase. While in case of unexpected inflation, stock prices will increase which leads to an increase in cost of living and this subsequently will increase consumption rather than investments. Actually, as the inflation increases, the nominal interest rates increase as the discount rate used to identify stocks prices which will reduce the present value of net income causing reduction in stock prices. Furthermore, if the stock price elasticity of demand of the company´s finished goods is high, an increase in inflation leads to a decrease in the sales of the company and its net profit, and consequently, its stock price decreases. This negative correlation between the unexpected inflation and the price of the stock is mentioned by Fama (1981) as a function of the relationship between real activity in the economy and the unexpected inflation rate (Talla, 2013).

- **Interest rate (IR)**

When interest rate increases, stock prices decrease as investors tend to hold their money in interest-bearing securities (i.e. bonds) rather than investing in stocks. Essentially, interest rate is one of the significant macroeconomic conditions which is directly associated with economic growth. Usually, there is a negative relationship between the interest rate and the stock return (Talla, 2013). Grossman and Shiller (1981) showed that stock price changes can be determined by real interest rate change. Salah-Uddin and Alam (2007) found that interest rate has a significant negative relationship with the stock value, as well change in interest rate has a significant negative relationship with the changes in stock prices.

- **Exchange rate (ER)**

Exchange rate has a significant impact on foreign investments as its fluctuations may affect significantly the assets prices in the domestic and foreign markets. In general, increase in home currency may lead to an inverse influence on future cash flows, as falling in exchange rate means additional costs burden on the foreign investors to buy assets locally, even if the asset price remains constant and, consequently, profits may decrease. Therefore, the increase in stock return is directly related to the currency depreciation (Chao et al., 2011). This evidence is mostly based on a long-term view of the influence of the value's change of a currency on the sale of goods and consequently on the relevant stock values (Chiang and Jiang, 1995). Nevertheless, in short-term view, an increase in the home currency value can be explained as an improvement in the home economy, which will give the investors better impression concerning the investment conditions and accordingly, it attracts more investments and increases stock prices. From the foreign investor's side, expectations of higher currency value in a given country in which he/she invests, will give another chance to gain from their investments by purchasing foreign stocks, as the overall return of foreign investments are extracted from the price appreciation in the currency market and stock market (Chiang, 1991).

From this view, an increase in stock return is directly related to the currency appreciation. Nevertheless, an increase in exchange rate will lead to a drop in stock prices due to the inflation expectations, i.e. the stock market reacts inversely to currency depreciation. Doong et al. (2005) examined the relationship between stocks and exchange rates. They concluded that there is a significant negative relationship between stock return and the exchange rate changes in most of countries under study, which means that the currency depreciation may reduce the stock price.

- **Gross domestic product (GDP)**

GDP is one of the most important indicators of the financial markets performance and, generally, the overall economy's performance. Tiwari et al. (2015) asserted that there is a significant correlation between country's GDP and the stock prices, whereas Florackis et al. (2014) stated that there is a significant positive relationship between GDP and the liquidity of the stocks at a given stock market.

On the other side, Engle and Rangel (2005) illustrated that GDP has a significant positive impact on the volatility of the stock market. Tsouma (2009) referred to the significant relationship between economic growth and stock market return across many developed and developing countries. Nevertheless, Binswanger (2004) asserted that GDP did not interpret the changes of the stock return in the 1980’s, as the financial markets in certain countries (e.g. the US, the UK and Canada) in this duration was affected by the market bubbles.

- **Country Corruption**

Many researchers have examined the impact of corruption on financial markets which mostly concluded that corruption has an inverse influence on the financial markets. Precisely, Ciocchini et al. (2003) showed that corruption increases borrowing costs for businesses as well as governments especially in emerging markets in developing countries. Lee and Ng (2009) showed that the existence of corruption in a given country reduces stock prices. Gelos and Wei (2002) found that the highly corrupted countries are mostly expected to receive fewer investments from foreign investors as the low level of transparency discourages any investor to invest his/her money in any international funds in this country. Moreover, Zhang (2012) applies one of the most popular international indices to measure the corruption which is known as "the Corruption Perceptions Index" (CPI)[1] to measure the influence of corruption on different stock markets. By applying CPI, he found that there is an inverse relationship between corruption and stock market return. The CPI is defined as an indicator that categorises different countries according to the corruption level of their public sectors (Aljazaerli et al., 2016). Since 2019, CPI, as a proxy of corruption, is scaled from 0 to 100 where 0 means that a country is perceived as highly corrupt and 100 means it is perceived as the least corrupt (TI, 2019).

Also, Bolgorian (2011) stressed on the significant relationship between the stock market and the corruption by analysing a data set of stock market development measures and corruption represented by CPI. She concluded that there is power-law dependence between corruption and stock market development in terms of a negative relation between level of corruption and financial system improvement.

[1] For more details, see https://www.transparency.org/

Dependent variables

- **Stock Market Return**

To monitor the stock return, one needs to investigate the stock's adjusted closing price. However, to enumerate returns, one can use unadjusted stock's closing prices. There is evidence that a daily return for an individual stock proves more credibility by showing substantial deviations from normality that are not spotted with monthly data (Fama, 1976). A strong positive current relation between firm stock returns and volatility was pointed out by Duffee (1995). It is proved to be positive at the daily report and otherwise negative at the monthly report. The benefit of these relations is that they widely explain the findings of Cheung and Ng (1992) that there is a negative correlation between firm stock returns and changes in volatility. There are many economic factors that affect the stock returns such as (1) unexpected changes in risk premium; (2) expected level of industrial production; (3) unexpected level of inflation and (4) unexpected shifts in interest rate (Ross, 1976). According to Chen et al. (1986) stock return relies on expected and unexpected economic factors. Also, portfolio returns are principally affected by systematic risk as the risk associated with an individual asset can be avoided through well-diversified portfolios.

- **Stock Market Volatility**

Volatility, which is one of the most important concepts in the field of finance, is widely used as a risk indicator. Brooks (2009) defined volatility as "a crude measure of the total risk of financial assets". As well, Emenogu et al. (2020) defined volatility as a measure of the stock's return dispersion. Standard deviation or variance between returns of the same stock can be considered as the most popular measure of volatility. Obviously, higher level of volatility means higher level of risk for a given stock. Skewness can be used as a measure of volatility, e.g. Theodossiou and Savva (2016) investigated the impact of volatility on the risk–return relationship by using skewness as an analytical framework based on the popular skewed generalised t (SGT) distribution. Additionally, investors who require a higher return expectation and wish to recompense for higher risk-taking have to consider volatility as a fundamental variable. To assume a positive relation between expected stock returns and risk, Merton (1980) developed a provisional CAPM (ICAPM) model. Bali and Peng (2006) and Bali and Cakici (2010) found evidence of a positive statistical relation while testing the null hypothesis by comparing the conditional stock returns to the conditional discrepancy.

Although most researchers carried out their studies using a form of GARCH-in-mean models, Granger and Sin (2000) reported that ultimate stock returns and return squares are more manageable through using the ARCH-like model of return disparity.

Statistically, skewness is based on measuring the distribution asymmetry of the mean. In other words, zero skew refers to a perfect symmetry whereas a positive skew refers to more values lie below the mean, as well the distribution has a tail which extends towards higher values.

In contrast, a negative skew refers to more values lie above the mean and the distribution has a tail which extends towards lower values.

In conclusion, the variables used in the regressions are: independent variables; liquidity (LIQ), and domestic country-wide factors: gross domestic product (GDP), inflation (CPI), interest rate (IR), exchange rate (ER) as well as country corruption whether the UK corruption index (UKCI) or foreign country corruption index (FCCI). Also, dependent variables in this thesis are return (RET) and volatility (VOL).

4.6 Identification of thesis models

This thesis includes four models; Model (1) and (2) examine the extent to which underlying stocks and their respective DRs returns are significantly affected by liquidity and the UK country-wide factors. Actually, the difference between Model (1) and (2) is that in model (1) the UK corruption index is used whereas the foreign country corruption index for each relevant foreign country is used in model (2). Also, model (3) and (4) are used to determine to what extent the volatility of underlying stocks and their corresponding DRs are significantly affected by liquidity and the UK country-wide factors. In model (3) the influence of the UK corruption index is examined whereas foreign corruption indices are used in model (4). Accordingly, each model's variables are discussed in table (4.5).

Table 4.5: Summary of the thesis models' variables

This table shows the independent variables applied for each model (UK inflation rate, UK interest rate, UK exchange rate, UK GDP and country corruption index). Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).				
	Model 1	**Model 2**	**Model 3**	**Model 4**
Independent variables	**Liquidity (LIQ)**	**Liquidity (LIQ)**	**Liquidity (LIQ)**	**Liquidity (LIQ)**
	The UK country-wide factors - The UK Inflation (CPI) -The UK Interest Rate (IR) -The UK Exchange Rate (ER) -The UK GDP.	**The UK country-wide factors** -The UK Inflation (CPI) - The UK Interest Rate (IR) - The UK Exchange Rate (ER) - The UK GDP	**The UK country-wide factors** -The UK Inflation (CPI) - The UK Interest Rate (IR) - The UK Exchange Rate (ER) - The UK GDP	**The UK country-wide factors** -The UK Inflation (CPI) - The UK Interest Rate (IR) - The UK Exchange Rate (ER) - The UK GDP
Independent Variable	**The UK corruption Index** (UKCI)	**Foreign Country Corruption Index** (FCCI)	**The UK Corruption Index** (UKCI)	**Foreign Country Corruption Index** (FCCI)
Dependent variable	**Return (RET)**	**Return (RET)**	**Volatility (VOL)**	**Volatility (VOL)**
	The results of each model will be analysed according to three groups; domestic and foreign countries, European and non-European countries, and developed and developing countries.			

4.6.1 Classifications of models' results

As mentioned before, the current thesis revolves around examining the impact of liquidity and the UK country-wide factors on return and volatility of the underlying stocks that are traded in the UK and their DRs which are traded in different countries. Hence, the results of return and volatility models are illustrated in light of the following classification of countries; group (1) domestic and foreign countries. Whereas foreign countries in which DRs are traded are classified into; group (2) European and non-European countries and group (3) developed and developing countries.

- **Group (1): Domestic and foreign countries**

This group is specified for classifying data into two categories; the domestic category is represented by the UK where the underlying stocks are traded while the foreign category is represented by 35 foreign markets across 18 foreign countries in which DRs are traded.

The main aim here is to differentiate the impact of liquidity and the UK country-wide factors on underlying stocks and DRs return and volatility in light of the UK and foreign corruption indices applied respectively in both categories of this group. This topic is very dynamic as it deals with a number of factors that may significantly affect the investors' decisions concerning their investments domestically and internationally.

When these factors are addressed through previous literature review, their findings and results varied and contradicted. One of the most prominent reasons behind this contradiction is the location in which the relevant study was conducted. For example, for the same period of time, one study results that conducted in the US market may differ completely from the results of another study that was conducted in one of the European countries' market. Similarly, the results of a study in one of the developing countries may contradict with the results of another study that conducted in one of the developed countries and so on.

Thus, the current thesis is concerned with the knowledge gap that needs to be examined in relation to the effect of the same country-wide factors on different stock markets. Therefore, this thesis intends to fulfil this gap of knowledge through more in-depth classifications of the results as DRs are traded in various foreign countries with different economic and political conditions. Therefore, DRs data analysis are classified into the following two groups;

- **Group (2): European and non -European countries**

In this group, the data are classified into two categories; European and non-European countries in order to show the impact of liquidity and the UK country-wide factors on DRs return and volatility in light of the UK and foreign corruption indices applied respectively on the two categories of this group. This thesis covers all of the 17 European markets in which DRs are traded across 6 European countries. As well, it includes 18 non-European markets in 12 non-European countries.

- **Group (3): Developed and developing countries**

In this group there are 27 developed markets in 11 developed countries where DRs are traded as well, 8 emerging markets in 7 developing countries where DRs are traded in light of using the UK corruption index and foreign corruption indices.

This classifications may provide the investors with a beneficial opportunity to choose from those markets what suit them to invest or may help them in making decisions regarding forming well-diversified international portfolios that may include a number of DRs from different foreign markets along with their respective underlying stocks in home country (the UK).

4.7 Developing thesis hypotheses

This thesis investigates the impact of liquidity and country-wide factors on return and volatility of the underlying stocks that are traded in the UK and their respective DRs that are traded in different foreign countries. The main idea is that the stocks of companies which operate in the UK are affected principally by its economic conditions (e.g. currency exchange rate, inflation rate, interest rate,…) and consequently these conditions may affect the return and volatility of underlying stocks and their counterpart of DRs in the countries that they are traded. Therefore this thesis provides investors with more integrated overview concerning the factors affecting their investments in the underlying stocks and their corresponding DRs.

Concerning **liquidity**, according to the liquidity preference theory, investors prefer holding investments that can be liquidated quickly according to their speculative motive which may affect positively the returns of their investments. Furthermore, according to the theory of international portfolio diversification, investing in DRs maximises investors' returns and minimises their associated volatility as they can sell their underlying stocks or their respective DRs in different countries where they are over-priced and buy them back where they are under-priced without any additional transaction costs. This mechanism provides the investors with valuable opportunities to liquidate their investments quickly as supported by the liquidity preference theory.

On the other hand, this study embraces different critical country-wide factors and one of them is **the inflation rate**. Most of scholars concluded that inflation rate has a critical impact on the stock return and volatility in many directions as each country has its unique economic determinants and consequently, there are different responses for different countries. Practically, there are limited studies that discussed the impact of inflation rate on DRs return and volatility. However, these studies covered limited number of countries upon which results cannot be generalised on the stock markets in the same region. Therefore, this thesis is more comprehensive than the previous literature in examining the effect of the UK inflation rate on return and volatility of underlying stocks that are traded in the UK and their corresponding DRs that are traded in foreign countries, which categorised into European and non-European along with developed and developing countries. According to the Fisher hypothesis (1930), and consistent with Firth (1978), this thesis assumes that there is a positive impact of the UK inflation rate on underlying stocks and DRs return. On the other hand, the increase in inflation rate leads to an increase in DRs volatility as it is considered a strong predictive power on stock market volatility.

Concerning **interest rate,** as illustrated in chapter three, the previous studies didn't agree upon the role of interest rate in affecting the return and volatility of the underlying stocks and their DRs. However, the researcher considers interest rate as one of the substantial determinants of the stocks and DRs return and volatility. Therefore, prevailing interest rate in the UK is applied here as one of the most significant country-wide factors which has a negative impact on the return and positive impact on volatility of the underlying stocks and their respective DRs domestically (in the UK) and their DRs which are traded in foreign countries.

As well, there are contradicted views between the results of the previous studies as illustrated in chapter three about the effect of the **exchange rate** on the underlying stocks and their relevant DRs return and volatility. However, because of the nature of DRs mechanism as they are traded outside the home country, investors who hold them as foreign equities are obviously subject to exchange rate fluctuations. Therefore, this thesis expects that there is a significant negative impact of the exchange rate on DRs return that are traded in foreign countries as the increase in exchange rate means additional costs' burden on the foreign investors which consequently decrease their return. Also, the researcher expects to find a positive impact of exchange rate on the DRs volatility as it may generate significant swings in the investors' international investments.

Concerning **GDP**, it can be concluded that examining the impact of the economic growth (GDP) on stock markets return and volatility is considered one of the significant issues that associated directly with the stock markets development.

Therefore, in this thesis, it is expected that there is a positive impact of GDP on the return of underlying stocks and their corresponding DRs as the UK remains a strong economic power with great influence around the world. The positive impact is due to the investors' desire to direct a higher portion of their investments towards stable countries with high economic growth accompanied by predicting higher return and consequently, lower volatility.

Finally, this thesis is first in examining the effect of **country corruption** on return and volatility from two different aspects; the UK corruption; home country corruption of underlying stocks (UKCI) and foreign country corruption (FCCI) for each country where their respective DRs are traded. Concerning UKCI, because of the power of the UK as one of the most important developed countries worldwide, its country-wide factors, including its corruption, may extend beyond its borders.

Consequently, DRs investments in foreign countries may be subject to high level of volatility because of the corruption's influence which is considered one of the critical barriers to the foreign investments. Its impact varies from one country to another in which DRs are traded according to the government effectiveness. Therefore, it is expected that corruption in countries that characterised by highly effective governments, can decrease the return and consequently, increase the volatility of the underlying stocks and their respective DRs. On the other hand, the corruption in countries with more ineffective governments tend to have a positive impact on return and a negative impact on volatility as it can decrease the drawbacks of the businesses uncertainty which impact positively on DRs investments. Accordingly, the following hypotheses are developed as follows;

First: Return Model

H1: There are significant impacts of liquidity and country-wide factors on the return of underlying stocks and their corresponding depositary receipts. H1.1 There are positive impacts of liquidity, the UK inflation rate, the UK GDP on the return of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately. H1.2 There are negative impacts of the UK interest rate, the UK corruption and the UK exchange rate on the return of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively, and in European, non-European, developed and developing countries separately. H1.3 There are positive impacts of foreign country corruption on the return of depositary receipts that are traded in foreign countries collectively, and in non- European and developing countries separately whereas it has negative impacts on the return of depositary receipts that are traded in European and developed countries separately.

<u>Second: Volatility Model</u>

H2: There are significant impacts of liquidity and country-wide factors on the volatility of underlying stocks and their corresponding depositary receipts.

H2.1 There are positive impacts of the UK corruption, the UK inflation rate, the UK interest rate and the UK exchange rate on the volatility of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately.

H2.2 There are negative impacts of liquidity and the UK GDP on the volatility of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately.

H2.3 There are positive impacts of foreign country corruption on the volatility of depositary receipts that are traded in foreign countries collectively, and in European and developed countries separately whereas it has negative impacts on volatility of depositary receipts that are traded in non-European and developing countries separately.

4.7.1 Summary of thesis hypotheses

Tables 4.6, 4.7 and 4.8 summarise the expectations of hypotheses developed in this thesis. They are classified respectively according to the following groups; group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. They show the expected signs (i.e. significant positive or negative impact) of different variables (liquidity, the UK inflation rate, the UK GDP, the UK interest rate and the UK exchange rate in addition to the two aspects of country corruption (the UK corruption and foreign country corruption) on return and volatility of the underlying stocks and their respective DRs.

Table 4.6: The excepted direction of relationships between variables in group (1) domestic and foreign countries

This table shows the expected impact (i.e. positive or negative) of liquidity, inflation, interest rate, GDP, exchange rate, and country corruption (UKCI and FCCI) on return and volatility models of underlying stocks and their corresponding DRs in light of group (1) domestic and foreign countries.					
Group (1)	Independent Variable	Expected Signs			
		Return Model		Volatility Model	
		UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	-	-	+	+
	UKCI	+		-	
	FCCI		+		-
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate				
	Independent Variable	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	-	-	+	+
	UKCI	+		-	
	FCCI		+		+
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate	+	+	-	-

Table 4.7: The excepted direction of relationships between variables in group (2) European and non-European countries

This table shows the expected impact (i.e. positive or negative) of liquidity, inflation, interest rate, GDP, exchange rate, and country corruption (UKCI and FCCI) on return and volatility models of DRs that are traded across the countries of group (2) European and non-European countries.					
Group (2)	Independent Variable	Expected Signs			
		Return Model		Volatility Model	
		UKCI	FCCI	UKCI	FCCI
European	Liquidity	-	-	+	+
	UKCI	+		-	
	FCCI		+		-
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate	+	+	-	-
	Independent Variable	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	-	-	+	+
	UKCI	+		-	
	FCCI		-		+
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate	+	+	-	-

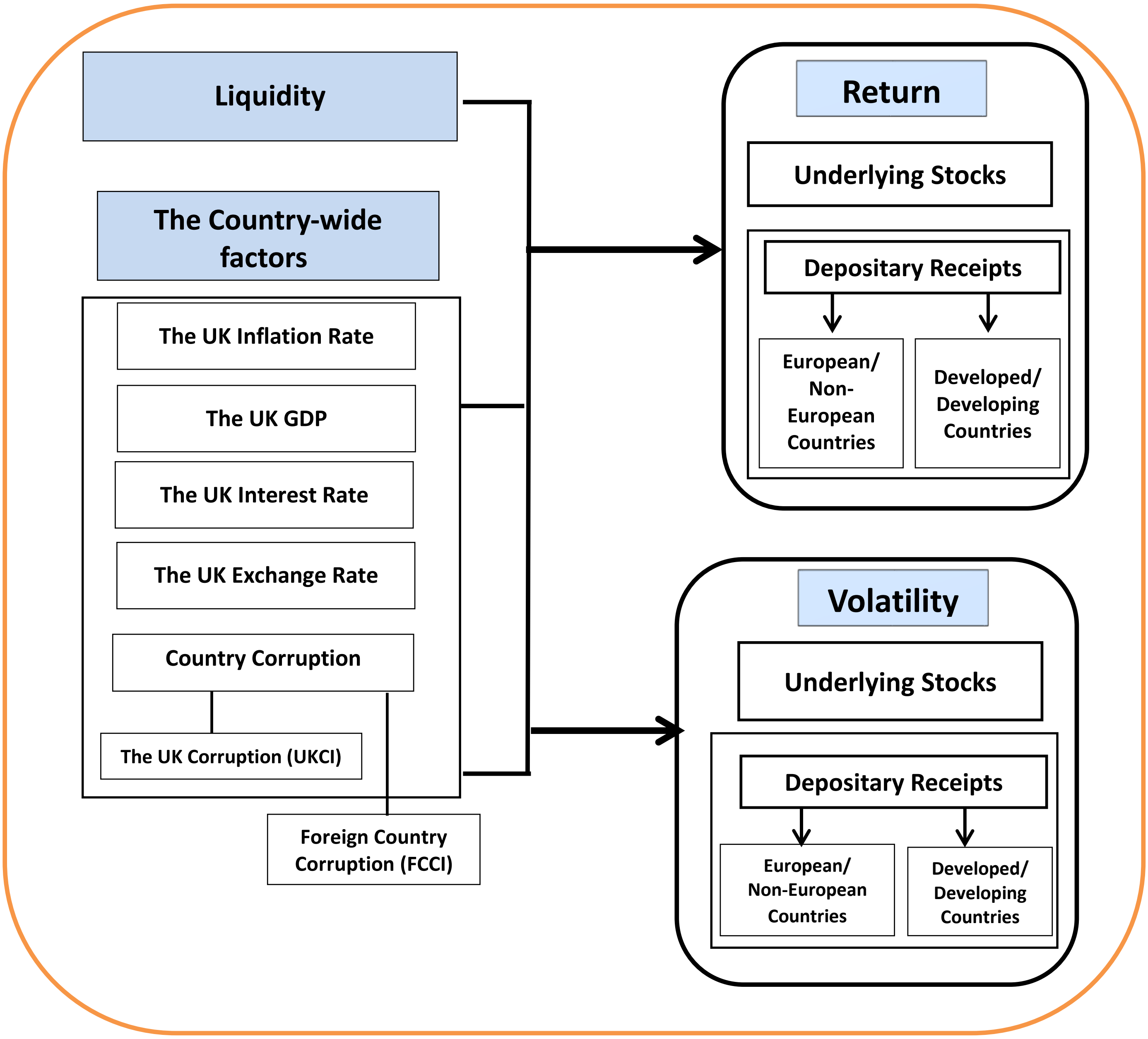
Table 4.8: The excepted direction of relationships between variables in group (3) developed and developing countries

This table shows the expected impact (i.e. positive or negative) of liquidity, inflation, interest rate, GDP, exchange rate, and country corruption (UKCI and FCCI) on return and volatility models of DRs that are traded across the countries of group (3) developed and developing countries.					
Group (3)	**Independent variable**	**Expected signs**			
		Return Model		**Volatility Model**	
		UKCI	**FCCI**	**UKCI**	**FCCI**
Developed	**Liquidity**	-	-	+	+
	UKCI	+		-	
	FCCI		+		-
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate	+	+	-	-
	Independent variable	**UKCI**	**FCCI**	**UKCI**	**FCCI**
Developing	**Liquidity**	-	-	+	+
	UKCI	+		-	
	FCCI		-		+
	The UK Inflation	+	+	+	+
	The UK GDP	-	-	+	+
	The UK Interest Rate	+	+	-	-
	The UK Exchange Rate	+	+	-	-

4.8 The conceptual framework of the thesis

In accordance with the literature review and the hypotheses developed in this study, the proposed conceptual framework is illustrated in figure 4.6:

Figure 4.6: The conceptual framework of the thesis



As shown in figure 4.6, the conceptual framework with its main constructs demonstrate the impact of liquidity and the country-wide factors which include: the UK inflation rate, the UK GDP, the UK interest rate, the UK exchange rate as well as the country corruption on the return and volatility of underlying stocks that are traded in the UK (i.e. home country) and their DRs that are traded in foreign countries. These foreign countries in which DRs are traded are divided into sub-groups; European and non-European as well as developed and developing countries.

Actually, country corruption in the conceptual framework is represented by two facets; the UK corruption index (UKCI) and foreign country corruption index (FCCI) as it was concluded from previous literature that country corruption has a significant impact upon the return and volatility of investments and this is the reason behind including it in the study as one of the most critical variables that may affect significantly the investors' decisions concerning DRs investments.

Concerning UKCI, although the UK is not suffering from endemic corruption, ''Transparency International'' stated in its annual reports that corruption still exists in the UK. The UK position in the worldwide ranking of corruption is fluctuated upward and downward along the duration covered by this study, e.g. during the last three years, ''Transparency International'' shows that, the UK placed in 8th, 11th then 12th position in the corruption perceptions index in 2017, 2018 and 2019 respectively. This means that the level of corruption in the UK is increasing along the last three years as its ranking is deteriorated according to the corruption perceptions index[1]. In 2019, the UK was less corrupted than USA and France (23rd), and Japan (20th) however, more corrupted than Denmark (1st) and Germany (9th) which means that it is a fact that corruption exists in the UK and practices that have been taken for granted for many years are still awaiting more improvements to achieve a top ranking worldwide. (TI, 2019).

[1] - https://www.transparency.org/en/cpi/2017/index/nzl
https://www.transparency.org/en/cpi/2018/index/dnk
https://www.transparency.org/en/cpi/2019/index/nzl

Concerning FCCI, as the thesis seeks to provide DRs investors with more comprehensive overview to help them in their relevant investment's decision, corruption index is not included only as one of the domestic country factors that affect return and volatility of stocks and their respective DRs (i.e. UKCI), but also it includes the corruption index for each country in which DRs are traded to determine its impact on DRs investments in these countries (i.e. FCCI).

Generally, based on previous literature which provides an overview of many studies that critically assess different views of what have already been published on this topic, this conceptual framework implies different relationships between variables with respect to return and volatility models;

- The return models

In these models, the impact of liquidity and country-wide factors on the return of underlying stocks and their respective depositary receipts is examined as follows;

- **Liquidity**

As shown in literature review, many studies (e.g. Stickel and Verrecchia 1994 and Antoniewicz, 1993) supported that liquidity has a significant impact on return of underlying stocks and their corresponding DRs. They showed that high trading volumes of stocks (as a proxy of liquidity) are associated directly with high and more sustainable returns. On the other hand, this thesis is considered the first study that relies on liquidity preference theory to explain the impact of liquidity on DRs return. This theory focuses mainly on the investors' preference to liquidate their assets quickly according to their speculative motive which may influence positively the return of underlying stocks and their respective DRs. Specifically, this thesis embraces all underlying stocks that are traded in the UK and their respective DRs that are traded in different markets (ranging from one to nineteen markets) across different foreign countries (ranging from one to eight countries). These different locations may help in liquidating their underlying stocks or their corresponding DRs quickly as supported by the liquidity preference theory. Also, as mentioned above, the diversity in trading locations of DRs is supported by the international portfolio diversification theory which seeks to maximise the stock return as investors can sell their underlying stocks and their respective DRs where they are overpriced and buy them back in other market – and may be in a different country –where they are under-priced without any additional transaction costs which means that investors can liquidate their assets quickly. Therefore, this thesis contributes to getting the benefits of the two theories (i.e. liquidity preference theory and international portfolio diversification) as it suggests that they are interrelated together in explaining the significant positive impact of liquidity on return.

- **Country-wide factors**

Generally, most of the studies that investigate the impact of different country-wide factors on the stock markets' return emphasised their significant impact (Ahad et al. 2018, Nijam et al. 2015, Bali et al. 2014, Akbar et al. 2012 and Jasra et al. 2012). However, some of studies have no strong evidence about the significant effect of most of the macroeconomic variables on the stock market return (e.g. Narayan and Narayan 2012 and Hosseini et al. 2011). The country-wide factors in this thesis implies four domestic macro-economic variables (i.e. inflation rate, interest rate, GDP, and exchange rate) along with the country corruption.

- **Inflation rate**

Inflation rate is considered one of the vital macro-economic variables that can affect significantly the return of the stocks and their corresponding DRs. In consistent with Fisher (1934) and Firth (1978), this thesis expects that inflation rate may have a significant and positive effect on the return of stocks and their respective DRs as stocks can be used as a hedge against inflation (Ely and Robinson, 1997, Lee et al., 2000 and Choudhry, 2001).

- **Interest rate**

The conceptual framework suggests that interest rate is one of the country-wide factors that affects significantly and inversely the return of stocks and their corresponding DRs. Actually, Keynes's liquidity preference theory explains how interest rate can affect significantly the stocks' returns (Keynes, 1936). This theory clarifies that when interest rates increase, the speculative demand of investors for money decreases and subsequently the returns of underlying stocks and their DRs decrease (Sanyal, 2019, Upadhyay, 2016 and Lekachman, 1964).

- **GDP**

As GDP is a most popular indicator of the country's growth and standard of living and a main reflector of the actual performance of a given economy, it is included as one of the country-wide factors that affect significantly the return of the stocks and their corresponding DRs (Ahad et al., 2018). It is suggested that GDP has a significant positive impact on stocks' return as higher GDP in one country means higher economic growth which reflects positively on companies' performance and consequently the stock market return (Florackis et al., 2014).

- **Exchange rate**

Madhavan and Ray (2019), Jasra et al. (2012), Baea et al. (2007), Aquino and Poshakwale (2006) and Kim et al. (2000) emphasised the significant negative impact of exchange rate on stocks' returns as it can be considered as additional costs' burden on the investors to buy DRs which are traded in different foreign countries with different currencies. In contrast, the increase in stock return is directly related to the currency depreciation (Chao et al., 2011).

- **Country corruption**

A-The UK corruption (UKCI)

As concluded from literature that corruption has a significant impact on the stock market performance, it is suggested that there is a negative impact of the UK corruption on return of underlying stocks and their corresponding depositary receipts that are traded in foreign countries. The reason behind that is may be due to the dominant role that the UK is playing in the global economy, accordingly, the impact of its corruption's perception may extend beyond its borders especially for the foreign investors who prefer to invest in UK DRs from different countries (TI-UK, 2011). Therefore, the return of DRs may be affected negatively by any perception of any corruption that may exist in the UK. This view is consistent with Jain et al. (2017), Swaleheen and Stansel (2007), Méon and Sekkat (2005) and Pellagrini and Gerlach (2004) who demonstrated that corruption impedes investments and consequently the economic growth in the relevant countries.

B- Foreign country corruption (FCCI)

The conceptual framework suggests that foreign country corruption has two facets of impact on the stock return; positive and negative which is consistent with Méon and Weill (2010) who concluded a positive impact of corruption on some countries covered by the study and a negative impact on other countries under the same study. Therefore, it is suggested that there is a significant positive impact of FCCI on the return of depositary receipts that are traded in foreign countries collectively, and in non- European and developing countries individually. This view is consistent with Chêne (2014) and Lau et al. (2013) who argued that corrupt government officials may use back doors in governmental entities to accelerate and facilitate the complicated administrative procedures, as well to overcome any inefficiencies and red tape in their economic systems.

Also, it is suggested that foreign corruption has a negative impact on the return of DRs that are traded in European and developed countries. This view which is supported by many authors, e.g. Jain et al. (2017), Swaleheen and Stansel (2007), Méon and Sekkat (2005), Mo (2001), Brunetti and Weder (1998) and Mauro (1995) who argued that high corrupt countries discourage the investors to invest money in their related markets in order to avoid any significant losses that may take place.

- The volatility models

In these models, the effect of liquidity and wide-country factors on the volatility of underlying stocks and their corresponding depositary receipts is examined as follows;

- **Liquidity**

The integration of both theories (i.e. liquidity preference theory and international portfolio diversification) is applicable here, to explain the impact of liquidity on the volatility of underlying stocks and their respective DRs. This means that an increase in liquidity, i.e. an increase in trading volume which is the proxy of liquidity, along with the diversity of markets and countries in which underlying stocks and DRs are traded may lead to a decrease in their volatility. In other words, the liquidity of underlying stocks and their DRs depends on how much it's traded and where it's traded which may influence significantly their level of volatility.

- **Country-wide factors**

Many studies emphasised the importance of different country-wide factors on the volatility of the underlying stocks and respective DRs. (Ahad et al. 2018, Gupta et al. 2016, Nijam et al. 2015, Bali et al. 2014, Corradi, et al. 2013, Onakoya 2013, Akbar et al. 2012 and Olweny and Omondi 2011). The suggested conceptual framework includes the following factors.

- **Inflation rate**

Murungi (2012), Olweny and Omondi (2011), Saryal (2007), Rizwan and Khan (2007), Engle and Rangel (2005), Engle (2004), Davis and Kutan (2003) and Hamilton and Lin (1996) investigated the significant impact of inflation rate on the volatility of the underlying stocks and their corresponding DRs. The conceptual framework suggests that any increase in inflation rate is considered as a strong predictive power for high stock market volatility.

- **Interest rate**

According to liquidity preference theory, expectations of higher interest rate will affect the speculative motive for holding money negatively and in turn the volatility of the underlying stocks and their corresponding DRs increases. This view is supported by many authors who concluded a significant positive impact of interest rate on volatility of underlying stocks and their respective DRs. (Okechukwu et al. 2019, Aljarayesh et al. 2018, Upadhyay, 2015 and Olweny and Omondi, 2011).

- **GDP**

From previous literature, it can be concluded that GDP can affect the returns and their relevant volatility of the shareholders investments, as the growth of GDP leads to an increase in aggregate earnings that are reflected into earnings per share growth, which transformed into stock price. This mechanism impacts positively on the expected stocks returns and negatively on their volatility. This view is on the same way of Adjasi and Biekpe (2006) and Campbell et al. (2001), however, this view is inconsistent with Wang (2010), Ahmed and Samad (2008) and Engle and Rangel (2005).

- **Exchange rate**

This study expects to find a positive impact of the exchange rate on the DRs volatility as it may generate significant swings in the investors' international investments because of adding extra costs upon the investors derived from the changes in exchange rate. This expectation underlines the prevailing assumption which states that the uncertainty of the exchange rate harms the performance of the stock markets. In other words, changes in exchange rate increase the volatility of the stocks. This view is supported by Madhavan and Ray (2019), Olweny and Omondi (2011), Baea et al. (2007), Adjasi and Biekpe, (2006), Aquino and Poshakwale (2006), Engle and Rangel (2005), Guo (2003) and Kim et al. (2000). However, it is in contrast with many other studies (e.g. Ahmad and Samad 2008 and Levine and Zervos, 1998).

- **Country corruption**

A-The UK corruption (UKCI)

As demonstrated from literature, the corruption has a significant impact on the stability of stock market performance, accordingly, it is suggested that there is a positive impact of the UK corruption on volatility of underlying stocks and their corresponding depositary receipts that are traded in foreign countries. In other words, as the perception of corruption in the UK increases especially from the foreign investors' side, the volatility of their DRs investments increases. This view is consistent with many researchers who argued that the perception of corruption increases the volatility of stock market's investments in different sectors such as investments in healthcare, education, and infrastructure because it raises operational cost and creates uncertainty and thus deters investments (Campo et al., 1999, Tanzi and Davoodi, 1997 and Wei, 1997). Consequently, investors refrain from holding DRs investments that may associated with any probability of corruption risk in home country (Jain et al., 2017 and Aljazarel, 2016).

B- Foreign country corruption (FCCI)

It is suggested that foreign country corruption may have a significant effect on the volatility of DRs which are traded in different countries, however, its influence may differ from one group under study to another. It is expected that FCCI has a significant positive effect on the volatility of DRs that are traded in foreign countries collectively, and in European and developed countries specifically. This view is supported by many authors (e.g. Jain et al. 2017, Aljazarel, 2016 and Swaleheen and Stansel, 2007) as the corruption, which is considered an extra cost for operations, affects negatively the investors' perception towards the country's stability and investments' safety and in turn increases the stock market volatility.

On the other hand, it is expected that FCCI has a negative impact on volatility of DRs that are traded in non-European and developing countries. This view is consistent with Spyromitros (2020), Heckelman and Powell (2010) and Zhang (2012) who argued that corruption may have a positive effect on investments in these mentioned groups by reducing their volatility, as it may aid investors in avoiding useless bureaucratic regulations and simplifying the complicated administrative procedures in the relevant governmental entities.

4.9 Data diagnostics' analysis

The thesis models have to be diagnosed according to the OLS assumptions. If all assumptions are met, the results of the pooled OLS will be sufficient. If there are extreme deviations from any of the proposed assumptions, the GLS model will be considered instead.

More precisely, it is essential to go through these assumptions before fitting a linear regression model to a given set of data. These assumptions are considered as an official check to confirm that the model provides the best possible results for a given data set.

Therefore, before making the analysis step, a number of assumptions have to be checked first (Hilmer and Hilmer, 2014 and Gujarati and Porter, 2009). These assumptions are detecting outliers, linearity, normality, homoscedasticity, autocorrelation in the residual and multicollinearity. Also, an additional test for endogeneity is run to determine which model has to be chosen (e.g. GMM). For instance, Roodman (2009) mentioned that if there is an endogeneity problem, the GMM model is recommended. Also, Hilmer and Hilmer (2014), Wooldridge (2016) and Gujarati and Porter (2009) considered that the following are the most serious assumptions that must be met before applying OLS.

- There is no autocorrelation in the error term and if exists, the best estimator to apply is the GLS (Gujarati and Porter, 2009). In other words, GLS is an OLS estimator of GLM.
- There is no multicollinearity among independent variables and if exists, one of these variables has to be dropped (Gujarati and Porter, 2009 a McClave et al., 2014).
- There is no heteroscedasticity in data, however if exists, it may need to transform the variables or applying GLS regression (Gujarati and Porter, 2009).
- **Linearity**

Linearity assumption indicates that the dependent variable is directly related to the independent variables and error term (Hilmer and Hilmer, 2014). Since there is a set of independent variables, It has to be linear in parameters. However, variables may not be in a linear relationship with the dependent variables (Gujarati and Porter, 2009).

To check this linearity assumption, Regression Equation Specification Error Test (RESET) (Ramsey, 1969) can be applied in order to check null hypothesis H_0 Vs. the alternative hypothesis H_1 as follows:

H_0: $\hat{\gamma}^2, \hat{\gamma}^3 = 0$ (Linear)

H_1: $\hat{\gamma}^2, \hat{\gamma}^3 \neq 0$ (Non-Linear)

For testing these hypotheses, the following steps are followed:

-Estimating a (restricted) form which assumes linearity. This form includes all the independent variables (Liquidity (LIQ), and domestic country-wide factors: Gross Domestic Product

(GDP), Inflation (CPI), Interest rate (IR), and Exchange rate (ER). Also, by using the independent variables, the value of SSE_R can be derived from ANOVA.

-Estimating the (unrestricted) form which assumes non-linearity. This form includes all of the independent variables in addition to $\hat{y}^2$ and $\hat{y}^3$. Therefore, the predicted values of y ($\hat{y}$), as well $\hat{y}^2$ and $\hat{y}^3$ are calculated. After applying the regression by using these variables, the value of SSEU can be obtained from ANOVA.

Then, the value of F-statistics will be compared to the critical value, and accordingly a decision of whether to reject or not reject H_0 can be taken. Table 4.9 reports summary of the F-statistic and critical value obtained after running RESET test.

Table 4.9: F-statistic and critical value of RESET test

This table shows the RESET test for the four study's models. Testing linearity needs to estimate the (restricted) form which assumes linearity along with the (unrestricted) form which assumes non-linearity and that is applied on each model's variables to take the appropriate decision of whether to reject or not reject the null hypothesis. If F-statistic is greater than the critical value, or p-value is less than 0.05, H_0 will be rejected and the relationship will be non-linear. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).

	Model 1	**Model 2**	**Model 3**	**Model 4**
F-statistic	2.3165	1.3187	2.2735	1.180
Critical Value	2.9982	2.9982	2.9982	2.9982
SSE-restricted	1590.712	1590.736	839.189	839.426
SSE-Unrestricted	1588.71	1589.582	838.14	838.881
No. of variables	8	8	8	8
P-value	0.09876	0.2676	0.10310	0.30736
Decision	**As F-statistic is less than the critical value and the p-value is greater than 0.05, the decision is not to reject H_0 and the relationships are linear for all of the study's models.**			

- **Outliers**

An outlier is defined as a data observation that deviates significantly from the other observations. It may be due to variability in the measurement or it may indicate experimental error, the latter is sometimes excluded from the data set. An outlier can cause serious problems in statistical analyses. Therefore, it's important to detect the outlier in the data (Hawkins et al., 2002) as its distribution can be significantly impacted by outliers (Ben-Gal, 2005).

To test this assumption, two stages have to be applied; first, detecting whether there are outliers in data by using Casewise diagnostics. Second, if the outliers problem exists, ‘‘winsorization’’ technique will be applied. Winsorization is the transformation of data by constraining the extreme values in the statistical data to decrease the negative impact of possibly existing outliers. More precisely, winsorization is a method of handling the problem of outliers in the data distribution to be more acceptable statistically (Hawkins et al., 2002). Values fall outside of standard deviations (3) are considered outliers which can be detected by Casewise diagnostics. After running the diagnostic on SPSS, outliers are detected in model (1) and winsorization technique is applied on 3641 observations included in the study in order to minimise the influence of the detected outliers (Garson, 2012 and Ben-Gal, 2005). The rationale behind that is to preserve the number of observations as far as each observation reflects and closely related to the objectives of the thesis. From the results of Casewise diagnostics, it is decided to select cut-off point for winsorization at 5% of data. In other words, 5% of data will be Winsorized (modified) at 2.5% of each tail area (i.e. 2.5% and 97.5% percentile). This means that 182 out of 3641 observations are Winsorized, 91 observations from each tail area (Wilcox, 2017).

- **Normality**

As actual probabilities are calculated, statistical tests for normality are more accurate (Wooldridge, 2016). So, this assumption can be checked by Kolmogorov-Smirnov test or

Shapiro-Wilk test. For dataset less than 2000 observations, the Shapiro-Wilk test is used, otherwise, the Kolmogorov-Smirnov test is used. Kolmogorov-Smirnov test and Shapiro-Wilk test are a non-parametric tests. As there are 3641 observations should be examined, Kolmogorov-Smirnov test is used. This test calculates the probability that the sample was drawn from a normal population. Accordingly, the relevant hypotheses are illustrated as follows:

H_0: The sample data are not significantly different than a normal population.

H1: The sample data are significantly different than a normal population.

So, if p-value > 0.05, it means that data are normal, whereas p-value < 0.05 means that data are not normal (Wesolowski and Musselwhite, 2018).

Table 4.10 provides a summary of the p-values of Kolmogorov-Smirnov Test.

Table 4.10: P-values of Kolmogorov-Smirnov Test

This table shows the p-value of Kolmogorov-Smirnov test to determine whether each study's model is normal or not. If p-value is less than 0.05, this means that the relevant data are not normal. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).

Model	P-value	Decision
Model 1	0.000	Not normal
Model 2	0.000	Not normal
Model 3	0.000	Not normal
Model 4	0.000	Not normal

The results reported in table 4.10 show that the data in the four models don't follow a normal distribution. However, after applying two different techniques to transform data from non-normal to normal distribution, i.e. natural logarithm (McClave et al., 2014), then the Van Der Waerden test (Conover, 1999), normality problem still exists.

- **Homoscedasticity**

Homoscedasticity refers to the relationship under investigation is the same for the entire range of the dependent variables. Any lack of homoscedasticity can be shown by higher errors (i.e. residuals) for some parts of the range compared to others. This means that there is a heteroscedasticity in data (Garson, 2012) in which the error terms are not constant (Hilmer and Hilmer, 2014). Many approaches applied in the heteroscedasticity detection involve the examination of the OLS residuals (Gujarati and Porter, 2009). One of these approaches involves examining the plotting of standardised residuals against predicted values as stated in linearity assumption. When no systematic pattern is detected by the plotted points, it indicates that data has no heteroscedasticity and accordingly it is consistent with the assumption of homoscedasticity (Gujarati and Porter, 2009).

It is very important to mention that heteroscedasticity does not lead to any consistency and biasness of OLS estimators; it makes them no longer minimum variance (Gujarati and Porter, 2009). Therefore, if homoscedasticity is violated, GLS will be used.

One of the most popular ways to detect whether there is heteroscedasticity or not is to use Breusch–Pagan test which was developed in 1979 by Trevor Breusch and Adrian Pagan (Breusch and Pagan, 1979).The Breusch–Pagan test is a test for heteroscedasticity of errors in regression. Hence, the hypotheses for running this test are illustrated as follows;

H_0: Constant variance (homoscedasticity)

H1: heteroscedasticity

If the test statistic has a small p-value (i.e. $p < 0.05$) then the null hypothesis of homoscedasticity is rejected and heteroscedasticity is assumed through testing the following null hypothesis H_0 Vs. the alternative hypothesis H1. Table 4.11 reports summary of the p-values obtained after running Breusch-Pagan Test. P-values are used either to reject or not reject H_0.

Table 4.11: P-values of Breusch-Pagan Test

This table shows the p-values of Breusch-Pagan test for the 4 models of the study in order to determine whether each one of them is homoscedastic or heteroscedastic. If p-value is less than 0.05, it is assumed that the model is heteroscedastic. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).		
Model	**P-value**	**Decision**
Model 1	0.1079	Homoscedastic
Model 2	0.0936	Homoscedastic
Model 3	0.0003	Heteroscedastic
Model 4	0.0004	Heteroscedastic

The results reported in table 4.11 show that the p-value for model (1) and (2) are greater than 5%, therefore, null hypothesis is not rejected (Homoscedastic). The p-value for models (3) and (4) are less than 5%, therefore null hypothesis is rejected (Heteroscedastic). The standard transformation of heteroscedasticity of model (3) and (4) is used through dividing the variables by the estimated error term (Hill et al., 2011). According to Brooks (2015) in the presence of heteroscedasticity, the generalised least squares (GLS) can be used as an alternative regression method of OLS. Therefore, to solve the heteroscedasticity problem in model (3) and (4), in GLS, robust error will be used instead of standard error.

- **Autocorrelation**

This assumption states that the dependent variables' observations are sequentially correlated. Also, it illustrated that error terms are independently distributed so that their covariance is zero (Gujarati and Porter, 2009). Autocorrelation can be detected in different ways; one of the most popular ways is using Durbin-Watson d statistic (Durbin and Watson, 1951 and Gujarati and Porter, 2009). To determine that there is no autocorrelation assumption, the Durbin-Watson d statistic value should be 2 or around 2 (Gujarati and Porter, 2009). Furthermore, our values will be compared to their counterpart values of dL and dU tabulated in (Durbin-Watson table; from

Savin and White, 1977). Consequently, to detect whether there is an autocorrelation in thesis models, the results will follow these hypotheses;

If d < dL reject Ho: $\rho = 0$

If d > dU do not reject Ho: $\rho = 0$

If dL < d < dU test is inconclusive.

Autocorrelation happens when the residual errors are dependent on each other (or correlated). The presence of correlation in error terms radically decreases the accuracy of the model. The Durbin-Watson values range from 0 to 4 (Gujarati and Porter, 2009). Accordingly, table 4.12 reports a summary of Durbin-Watson Test.

Table 4.12: Values of Durbin-Watson Test

This table shows the values of Durbin-Watson test to be applied on the 4 models individually. If Durbin-Watson d statistic value is 2 or around 2, it is assumed that there is no autocorrelation. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).

Model	Durbin-Watson	Decision
Model 1	0.443	autocorrelation
Model 2	1.097	autocorrelation
Model 3	1.982	no autocorrelation
Model 4	1.967	no autocorrelation

Table 4.12 shows that values of Durbin-Watson statistic in model (1) and (2) are 0.443 and 1.097 respectively. However, the value of Durbin-Watson statistic of models (3) and (4) are 1.982 and 1.967 respectively. After comparing these values to dL and dU in Durbin-Watson table (from Savin and White, 1977). Ho is rejected in models (1) and (2), whereas Ho is not rejected for models (3) and (4). In other words, there is an autocorrelation in models (1) and (2), however, there is no autocorrelations in models (3) and (4). Therefore, to overcome the autocorrelation problem, the generalised least squares (GLS) will be applied as an alternative regression of OLS. In addition, the robust error will be used instead of the standard error.

- **Multicollinearity**

Gujarati and Porter (2009), Wooldridge (2016) and Hilmer and Hilmer (2014) argued that multicollinearity assumption implies the presence of a linear relationship between some or all independent variables of the regression model. This means that for OLS to be an unbiased estimator for the multiple regression models, none of the independent variables are linear grouping of each other (Hilmer and Hilmer, 2014). Multicollinearity occurs when there are high correlations between two or more variables.

This creates redundant information, skewing the results in a regression model. Also, this is called multicollinearity independent variables.

As shown in table 4.13, there are many ways to detect multicollinearity such as Variance Inflation Factor (VIF). The larger the value of variance inflation factor, the more the collinear the variable. More precisely, if the variance inflation factor of a variable is more than 10, this means that this variable will be highly collinear (Gujarati and Porter, 2009). Also, this assumption can be checked by tolerance. The less the value of tolerance indicates to more collinearity of the variable. In other words, if the tolerance of a variable is less than 0.1, such variable is considered highly collinear (Gujarati and Porter, 2009). Multicollinearity happens when there are high correlations between two or more independent variables.

This means that, one predictor variable can be applied to predict the other which creates redundant information, skewing the results in a regression model. Also, this is called multicollinear independent variables which can be tested by using Variance Inflation factor (VIF) and Tolerance (Wooldridge, 2016).

Table 4.13: VIF and Tolerance values

Table 4.13 shows a summary of the Variance Inflation Factor (VIF). When VIF is more than 10, this means that the variable is highly collinear. Also, tolerance values are used to determine whether there is a multicollinearity or not. If the tolerance of a given variable is less than 0.1, the variable is considered highly collinear. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).

	Model 1		Model 2		Model 3		Model 4	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
Liquidity	.786	1.272	.770	1.299	.786	1.272	.770	1.299
Inflation rate	.879	1.138	.968	1.033	.879	1.138	.968	1.033
Interest rate	.810	1.234	.953	1.050	.810	1.234	.953	1.050
Exchange rate	.869	1.151	.768	1.301	.869	1.151	.768	1.301
GDP	.949	1.053	.995	1.005	.949	1.053	.995	1.005
UK corruption UKCI	.963	1.038			.963	1.038		
Foreign country corruption FCCI			.936	1.068			.936	1.068

From table 4.13, it can be concluded that there is no multicollinearity of all independent variables in four models as they have VIF values less than 10 and Tolerance greater than 0.1.

Endogeneity

Endogeneity indicates to the situations in which an independent variable is correlated with the error term. If the independent variable is correlated with the error term in a regression model, therefore, the estimate of the regression coefficient in OLS regression is biased. Endogeneity is tested by Durbin Wu-Hausman test for each independent variable (Hausman, 1978). Durbin Wu-Hausman test which is abbreviated by DWH is used to check the endogeneity of each variable by comparing instrumental variable (IV) estimates.

Then the Wu–Hausman statistic is calculated as follows;

H= $(\mathrm{b1}-\mathrm{b0})'(\mathrm{Var}(\mathrm{b}_0)\mathrm{Var}(\mathrm{b1}))^{-1}(\mathrm{b1}-\mathrm{b0})$

If this test statistic has a small p-value (e.g. $p < 0.05$) then the null hypothesis of exogenous is rejected and endogeneity exists of the variable that tested. Endogeneity test is done by using Durbin Wu-Hausman Test which is applied for each independent variable (Hausman, 1978), taking into consideration the following hypotheses;

H_0: the variable is exogenous

H_1: the variable is endogenous

Table 4.14 illustrates the p-values of Durbin Wu-Hausman Test for the thesis models in order to identify whether to reject or not reject H_0.

Table 4.14: P-value of Durbin Wu-Hausman Test

This table shows the p-values of each study's variable in the 4 models. If p-value < 0.05, this means that there is an endogeneity in the related variable. Return models are (1) and (2), whereas models (3) and (4) are specified for volatility. As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4).

	Model 1 P-value	Model 2 P-value	Model 3 P-value	Model 4 P-value
Liquidity	0.3785	0.3416	0.4776	0.6781
Inflation rate	0.4875	0.6107	0.6760	0.3830
Interest rate	0.5475	0.4319	0.5586	0.3785
Exchange rate	0.4607	0.5891	0.0733	0.0899
GDP	0.3616	0.4416	0.5318	0.5105
UK corruption UKCI	0.3675		0.8874	
Foreign country corruption FCCI		0.6897		0.4318

From table 4.14, it can be concluded that p-values for all the independent variables are greater than 0.05. So, H_0 isn't rejected at confidence level 95%. Accordingly, there is no endogeneity problem for all of the independent variables; Liquidity, inflation rate, interest rate, exchange rate and GDP as well as UKCI and FCCI, in all of the thesis models.

From the results of previous assumptions, it is concluded that OLS method is not applicable to the thesis panel data, as its conditions are violated due to the following problems; non-normality which exists in all study's models as well, the problem of heteroscedasticity that exists in models (3) and (4), and finally autocorrelation problem exists in model (1) and (2). For that reason, GLS can be used in order to overcome these problems.

4.10 Regression methods

As discussed in section 4.9, some of Ordinary Least Squares (OLS) assumptions are violated, therefore, Generalised Least Squares (GLS) will be applied (Alma, 2011).

- **Regression analysis**

Regression analysis is considered one of the most popular statistical methods in the multivariate analysis. The main aim of the regression analysis is to measure the independent variables which have a significant impact on the dependent variable by involving them in a regression model (Gujarati and Porter, 2009). When there are one dependent variable and two or more independent variables, the regression model is known as multiple regression (Bryman and Bell, 2015). The mathematical representation of the model, which is used to illustrate the relationship between the independent variables and the dependent variable, depends heavily on the nature of the dependent variable. The typical choice of the relationship between independent and dependent variables is the linear relationship, making the model to be mentioned as 'multiple linear regression model' (Gujarati and Porter, 2009). The multiple linear regression models are applied when the dependent variable is continuous. They are applied to examine the effect of each of the independent variables on the dependent variable. The estimated model provides the direct effect of each independent variable on the dependent variable. The multiple linear regression models seek to minimise the vertical distance between the fitted line and the observed value of the dependent variable (McClave et al., 2014).

Generally, statistical tests for multiple regression models are classified into two aspects: parametric and non-parametric. In order to use parametric techniques, some assumptions need to be satisfied (Gujarati and Porter, 2009 and Hilmer and Hilmer, 2014). On the other hand, non-parametric tests make no assumptions regarding the distribution from which the observations are drawn (Gujarati and Porter, 2009). So, the data can identify which kind of methods can be used in the study. Consequently, in current thesis, non-parametric tests are applied as an alternative method to parametric tests due to the nature of data which are not normally distributed. Also, Hausman test can be used to choose between fixed and random effects as its basic purpose is to test whether the unique errors are connected with the regressors (Hausman, 1978). However, because of heteroscedasticity problem in current thesis, Hausman test is redundant as an error of "non-positive definite" arises when it runs. Hence, it is decided to use Mundlak approach instead of Hausman test (Wooldridge, 2016).

- **Mundlak Approach**

Mundlak (1978) argued that the addition of time averages to the usual panel equation to eliminate the fixed effects bias. Mundlak equation relies essentially on substituting the time-varying explanatory variables with the corresponding deviations from the averages over time, while keeping the time averages in the equation. More precisely, Mundlak (1978) stated that one of the ways to reconcile fixed effect and random effect methods is to estimate the individual effect as a function of the individual means of time-varying characteristics:

$$u_i = \bar{x}_i \gamma + \tau_i$$

Substituting into the main model:

$$y_{it} = \alpha_0 + z_i \alpha + x_{it} \beta + \bar{x}_i \gamma + \tau_i + \varepsilon_{it}$$

Estimating by GLS yields because the (linear) dependence of u_i on x_{it} is fully captured by the Mundlak formulation

A test of cov (u_i ,x_{it}) = 0 is a test of H_0: $\gamma = \mathbf{0}$.

If the test rejects H_0, the FE model should be used and if the test doesn't reject H_0, the RE model should be used.

- **Panel data**

Panel data is a dataset in which the behaviour of entities (states, companies, individuals, countries, etc.) is observed in relation to time. Panel data makes controlling on variables that cannot be observed or measured, and that can change over time but not across entities (Brooks, 2015).

According to Baltagi (2009), the major merits of using panel data are:

1) Controlling individual's variation
2) More flexibility and less risk of linear link between variables because of the voluminous information.
3) Simpler to study "dynamics of adjustment".
4) Easier to test or create more advanced models.

There are two forms of panel data observed: balanced and unbalanced. To distinguish between the balanced and unbalanced data, observations need to be applicable in both cross sectional and time series. If the number of observations in the time series is the same for each cross sectional unit, it is considered to be a balanced panel data. If not, it is unbalanced. The data, both cross sectional and time series observations, should be placed into a single column and handled in regression. Once done, it is easier to apply the GLS method to test the data.

Due to the nature of the current topic, there are different markets across different countries with different issuing dates of DRs. Accordingly, this thesis is analysing data set of different markets using the panel model of unbalanced data in particular.

- **Fixed-Effects Regression Model**

Fixed-effects can be used to analyse the influence of variables that change across time. The relationship between predictor and outcome variables within an entity (country, person, company, etc.) is predicted by fixed-effects regression model. Characteristics of each entity are unique and may influence the predictor variables. An assumption behind applying fixed-effects is that something within the individual variable may affect the predictor variables and which is needed to be controlled. This is the reason behind the assumption of the linkage between entity's error term and predictor variables. The net effect of precursors on the outcome variable can be evaluated because fixed effect removes the effect of those time-constant characteristics (Hausman, 1978).

- **Random-effects GLS Regression Model**

Unlike the fixed effects model, the rationale behind random effects model is that the variation across entities is assumed to be random and has no fixed relationship with the predictor or independent variables included in the model. In this respect, Greene (2008) contends that the essential difference between fixed and random effects is whether the undetected individual effect signifies elements that are linked to the regressors in the model. One utility of random effects is that time invariant variables can be included.

- **Robustness Check**

A common practice in empirical studies is conducting "robustness check", where the researcher investigates about how certain "core" regression coefficient estimates behave when the regression specification is amended by running other models. If coefficients are robust and plausible, this is commonly interpreted as evidence of structural validity. In this study, as some of OLS assumptions are violated, Weighted Least Square (WLS) and Robust regression are used as a robustness check.

- **Weighted Least Square (WLS)**

Weighted least squares (WLS), also known as weighted linear regression, is a generalisation of ordinary least squares and linear regression. It is used when data violates the assumption of homoscedasticity. WLS encompassed various structures of weighting observations in order to decrease the effects of heteroscedasticity. WLS has many advantages over other methods, including; it's appropriateness to extract maximum information from small data sets. Also, it is the only method that can be used for data points of varying quality.

In WLS the goal is to minimise to following sum of squares:

$$\sum_{i=1}^{n} w_i (Y_i - a - bx_i)^2$$

Here, the idea behind WLS estimate is to determine the values for w_i (Garson, 2012).

- **Robust regression**

Robust regression pursues the relationship between one or more independent variables and a dependent variable. Robust regression methods are designed not to be excessively affected by violations of assumptions by the underlying data-generating process (Anderson, 2008).

4.11 Empirical thesis models

As mentioned before, the thesis includes four models; return models are (1) and (2), whereas volatility models are (3) and (4). As one of the country-wide factors, UK corruption index is applied in model (1) and (3), whereas foreign country corruption index is applied in model (2) and (4). These models can be illustrated in the following formulas;

Model 1

$$\text{Return} = \beta_0 + \beta_1 \text{liquidity} + \beta_2 \text{inflation} + \beta_3 \text{Interest Rate} + \beta_4 \text{Exchange rate} + \beta_5 \text{GDP} + \beta_6 \text{UKCI} + \varepsilon$$

Model 2

$$\text{Return} = \beta_0 + \beta_1 \text{liquidity} + \beta_2 \text{inflation} + \beta_3 \text{Interest Rate} + \beta_4 \text{Exchange rate} + \beta_5 \text{GDP} + \beta_6 \text{FCCI} + \varepsilon$$

Model 3

$$\text{Volatility} = \beta_0 + \beta_1 \text{liquidity} + \beta_2 \text{inflation} + \beta_3 \text{Interest Rate} + \beta_4 \text{Exchange rate} + \beta_5 \text{GDP} + \beta_6 \text{UKCI} + \varepsilon$$

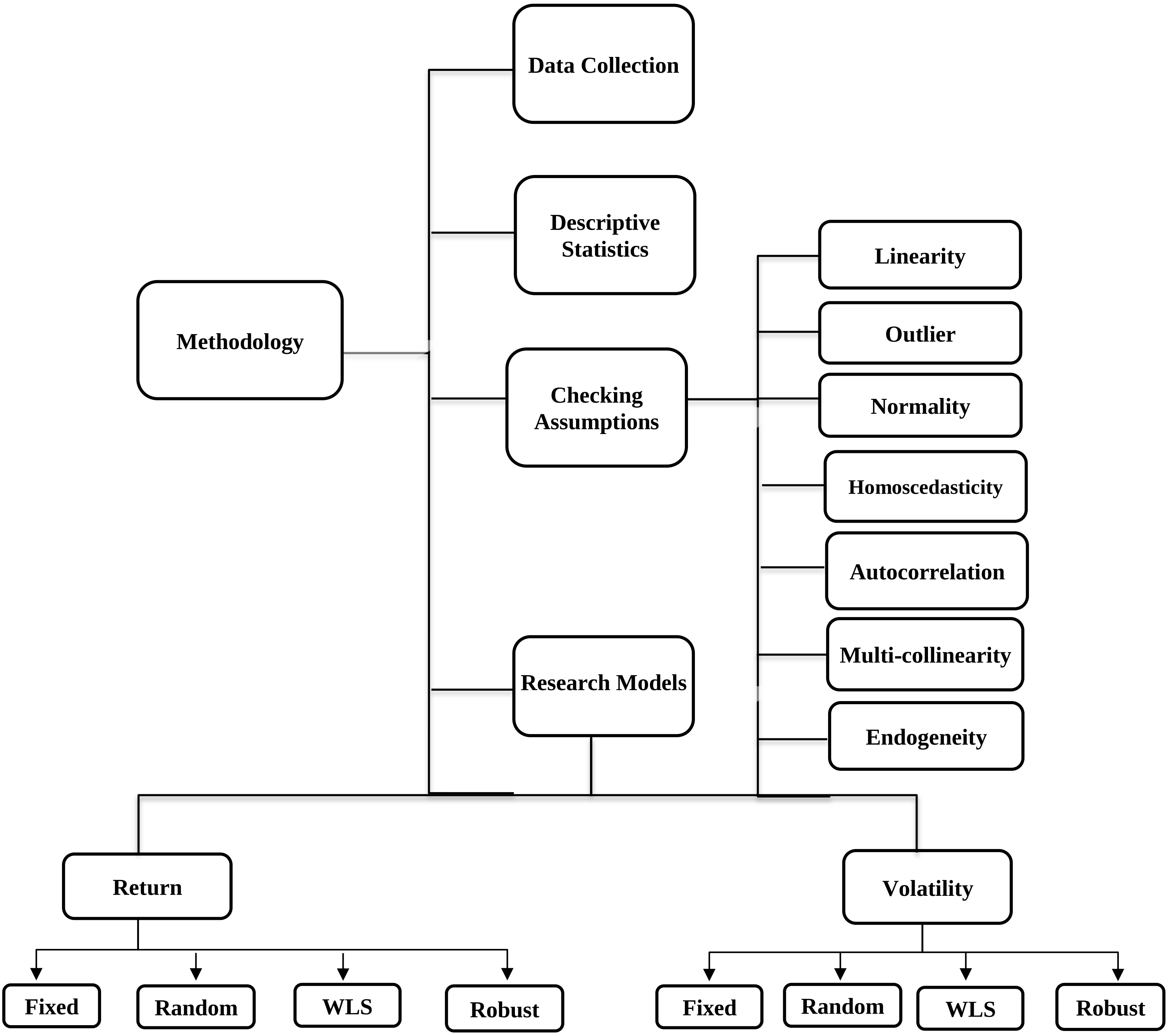
Model 4

$$\text{Volatility} = \beta_0 + \beta_1 \text{liquidity} + \beta_2 \text{inflation} + \beta_3 \text{Interest Rate} + \beta_4 \text{Exchange rate} + \beta_5 \text{GDP} + \beta_6 \text{FCCI} + \varepsilon$$

4.12 Conclusion

This chapter justified the thesis's methods along with identifying the main variables and their measures. Also this chapter showed how the hypotheses are developed and consequently the conceptual framework was demonstrated. Therefore, this chapter provided the foundation for the following chapter which will explain the statistical analysis used in the thesis as it will be the basis for assessing the influence of the liquidity as well the domestic country-wide factors on the return and volatility of underlying stocks and their corresponding DRs through examining the following points as shown in figure 4.7.

Figure 4.7: Summary of the thesis methodology



Chapter Five

Empirical Findings on Stock Market Return

Chapter 5

Empirical findings on stock market return

This chapter includes data analysis and consequently, the main empirical findings of the data concerning the impact of liquidity and country-wide factors on the return of the underlying stocks and their respective DRs that are traded in different foreign markets across different countries. Also, in this chapter, data are analysed according to three groups: Group (1): domestic and foreign countries; domestic country (the UK) in which the underlying stocks are traded, whereas these stocks are covered by DRs that are traded in 35 stock markets in 18 foreign countries. Group (2): European and non-European countries: in this group, data are classified on the basis of the country in which DRs are traded, whether in a European or non-European country. Group (3): developed and developing countries: here, data are sorted according to the strength of each country's economy in which DRs are traded. The main aim of these classifications is to have more in-depth view about the effect of liquidity and the UK country-wide factors on the return of underlying stocks and their corresponding DRs. Moreover, the thesis examines the impact of corruption on return from different aspects. It examines the impact of the UK corruption on return of underlying stocks in the UK and their corresponding DRs that are traded in foreign countries. As well, it examines the impact of corruption of each foreign country on DRs return. Generally, country corruption is represented by the corruption perceptions index (CPI) in order to identify which aspect of them; the UK corruption or the foreign country corruption, has more significant impact on the return of underlying stocks and their corresponding DRs.

5.1 Group (1) Domestic and foreign countries

This section includes all relevant findings of the impact of liquidity and country-wide factors on the return of the underlying stocks that are traded in the UK along with their respective DRs that are traded in different foreign countries.

5.1.1 Results of GLS regression of return models

Tables 5.1 and 5.2 illustrate the regression results of the impact of liquidity and the UK country-wide factors in domestic and foreign countries on the return of the stocks that are traded in the UK and their corresponding DRs which are traded in foreign countries.

Table 5.1: Regression results of the impact of liquidity and the UK country-wide factors on the return of underlying stocks and DRs (Effect of the UK corruption: UKCI) (Group1: Domestic and Foreign countries)

This table shows the effect of liquidity and the UK country-wide factors on stocks and DRs return. It includes the impact of the UK corruption (UKCI) for group (1): domestic and foreign countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**								
Return: Group (1): Domestic and Foreign countries								
<u>First: UKCI</u>								
Dependent variable/ Return	**Domestic country (the UK)**				**Foreign countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	1.22749	1.3911	35.3649	1.1895	0.7878	0.7888	-0.62324	0.62116
Liquidity P-value	0.01343 ***	0.002911 ***	0.525 ***	0.01423 ***	0.00725 ***	0.00735 ***	0.4259 ***	0.00823 ***
UKCI P-value	-0.68	-0.75935	-16.861	-0.5968	-0.4556	-0.4557	-0.31143	-0.34097
The UK Inflation P-value	0.0053 ***	0.00571 ***	0.0048 ***	0.004999 ***	0.00382 ***	0.0038 ***	0.00147 (0.068)	0.0045 ***
The UK GDP P-value	-0.0047 ***	-0.0048 ***	-0.0031 ***	-0.0040 ***	-0.0021 **	-0.0021 **	-0.0025 *	-0.0026 **
The UK Interest Rate P-value	-0.1861 ***	-0.18006 ***	-0.4577 ***	-0.2573 ***	-0.18771 ***	-0.1875 ***	-0.35499 ***	-0.2461 ***
The UK Exchange Rate P-value	Omitted	Omitted	Omitted	Omitted	-2.216 ***	-2.2362 ***	-2.696744 ***	-2.74046 ***
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop >F ***
Mundlak Approach	Prop > chi2 0.6832				Prop > chi2 0.2886			

Table 5.2: Regression results of the impact of liquidity and the UK country-wide factors on underlying stocks and DRs return (Effect of foreign country corruption: FCCI) (Group 1: Domestic and Foreign countries)

This table shows the effect of liquidity and the UK country-wide factors on stocks and DRs return. It includes the impact of the foreign country corruption (FCCI) for group (1): domestic and foreign countries. It displays the results of all thesis models for four regression analyses; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and * = P ≤ 0.10 (10%).**

Return: Group (1): Domestic and Foreign Countries

Second: FCCI

Dependent variable/ Return	**Domestic country (the UK)**				**Foreign countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	1.22749	1.3911	35.3649	1.1895	-0.41614 *	-0.3885 *	-5.15309 ***	-0.3054
Liquidity P-value	0.01343 ***	0.013316 ***	0.04621 ***	0.01423 ***	0.00756 ***	0.00765 ***	0.03131 ***	0.00854 ***
FCCI P-value	-0.68	-0.75935	-16.861	-0.5968	0.1294	0.118678	2.5011	0.1076
The UK Inflation P-value	0.0053 ***	0.00571 ***	0.0048 ***	0.004999 ***	0.00383 ***	0.0038 ***	0.00039 ***	0.0045 ***
The UK GDP P-value	-0.0047 ***	-0.0048 ***	-0.0031 ***	-0.0040 ***	-0.0024 ***	-0.0025 ***	-0.0029 ***	-0.0016 *
The UK Interest Rate P-value	-0.18615 ***	-0.18006 ***	-0.4577 ***	-0.2573 ***	-0.18824 ***	-0.18811 ***	-0.2695277 ***	-0.2451 ***
The UK Exchange Rate P-value	Omitted	Omitted	Omitted	Omitted	-2.2367 ***	-2.2362 ***	-2.688619 ***	-2.7346 ***
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.0005				Prop > chi2 0.0000			

Table 5.1 illustrates the regression analysis results concerning first group; (domestic and foreign countries) applying the UK Corruption Index (UKCI). Domestic aspect here is represented by the UK markets where the underlying stocks are traded and covered by their corresponding DRs which are traded in 35 foreign markets across 18 foreign countries. From table 5.1, Mundlak approach provides evidence in favour of the random model for **both domestic and foreign categories** of this group as chi2 values are equal to 0.6832 and 0.2886 respectively. Thus, random effect models have been selected as chi2 values are greater than 0.05.

For random effect method of **domestic category** where underlying stocks are traded in the UK, the table 5.1 shows that the variables that have significant influence on underlying stocks return are; liquidity, the UK inflation rate, the UK GDP and the UK interest rate. Likewise, these variables are considered the most significant factors that influence DRs return of the **foreign category** in this group in addition to the exchange rate. However, the latter is omitted in the domestic category's results as the underlying stocks are traded in its domestic currency (GBP) in the UK. Moreover, liquidity and the UK inflation rate have a positive impact on the return of underlying stocks in the UK and their corresponding DRs that are traded in different foreign countries. Whereas, the UK GDP and the UK interest rate have negative impact on the return of underlying stocks in the UK and their corresponding DRs that are traded in foreign countries. Finally, exchange rate has a negative impact on DRs return. Surprisingly, although the UK Corruption Index (UKCI) has a negative impact on the return of the underlying stocks and their counterpart of DRs, this impact is statistically insignificant.

From table 5.1, it is illustrated that any increase in trading volume (as a proxy of liquidity) by one stock leads to an increase in underlying stocks return by 0.29% , while an increase by one DR leads to an increase in DRs return by 0.74% . In addition, any increase by 1% in the UK inflation rate leads to an increase in the return of underlying stocks and DRs by 0.57% and

0.38% respectively. Also, any increase in the UK GDP by 1% leads to a decrease in the return of underlying stocks and DRs by 0.48% and 0.21% respectively whereas any increase in the UK interest rate by 1% results in a decrease in the return of underlying stocks and DRs by 18% and 18.7% respectively, whereas an increase in exchange rate by one GBP leads to a decrease in DRs return by 223.6%.

Table 5.2 illustrates the regression analysis results concerning first group; (domestic and foreign countries) where the underlying stocks and DRs are traded in light of applying Foreign Country Corruption Index (FCCI). The domestic category is represented by the UK markets where the underlying stocks are traded whereas the foreign countries category includes 35 foreign markets across 18 foreign countries where DRs are traded. From table 5.2, Mundlak approach provides evidence in favour of the fixed method for **both domestic and foreign categories** as chi2 values are equal to 0.0005 and 0.0000 respectively. Thus, fixed effect methods have been selected as chi2 values are less than 0.05. For fixed effect method of **domestic category** (the UK) where underlying stocks are traded, the table 5.2 shows that the variables that have a significant influence on the return of underlying stocks are; liquidity, the UK inflation rate, the UK GDP and the UK interest rate. Also, these variables are considered the most significant factors influence DRs return of the **foreign category** in this group in addition to the UK exchange rate. However, the latter is omitted in the domestic category's results as the underlying stocks are traded in its domestic currency (GBP). Moreover, liquidity and the UK inflation rate have a positive impact on the return of underlying stocks in the UK and their corresponding DRs that are traded in different foreign countries. Whereas, the UK GDP and the UK interest rate have negative impact on the return of underlying stocks and their corresponding DRs that are traded in foreign countries. Finally, the UK exchange rate has a negative impact on DRs return. However, Foreign Country Corruption Index (FCCI) has an insignificant impact on the return of the underlying stocks and their corresponding DRs.

From table 5.2, it is illustrated that any increase in liquidity by one stock leads to an increase in underlying stocks return by 1.34%, while an increase by one DR leads to an increase in DRs return by 0.76%. In addition, any increase by 1% in the UK inflation rate leads to an increase in the return of underlying stocks and DRs by 0.53% and 0.38% respectively. Also, any increase in the UK GDP by 1% leads to a decrease in the return of underlying stocks and DRs by 0.47% and 0.24% respectively whereas any increase in the UK interest rate by 1% results in a decrease in the return of underlying stocks and DRs by 18.6% and 18.8% respectively. Finally, an increase in the UK exchange rate by one GBP leads to a decrease in DRs return by 223.6%.

5.1.2 Discussion of hypotheses' results

According to the previous results, the impacts of liquidity and country-wide factors on the return of underlying stocks and DRs are discussed in light of the two categories of group (1); domestic and foreign countries.

5.1.2.1 The impact of liquidity on the return of underlying stocks and their DRs

This section represents the impact of the liquidity of underlying stocks and their corresponding depositary receipts on their return when applying corruption indices (UKCI) and (FCCI).

Table 5.3: The impact of liquidity on the return of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of liquidity on the return of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;* = P ≤ 0.01 (1%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
Liquidity	Domestic country	+***	+***	Accept	Accept
	Foreign countries	+***	+***	Accept	Accept

As shown in table 5.3, liquidity has a positive and significant influence on the return of underlying stocks that are traded in the UK when applying UKCI and FCCI respectively. Also, liquidity has a positive and significant impact on returns of DRs which are traded in 35 markets across 18 countries. This means that an increase in trading volume, as a proxy of liquidity, of the UK underlying stocks and their corresponding DRs in all countries leads to an increase in their returns. In the current thesis, it is noted that in more than one cross-listed company, underlying stocks and their corresponding DRs are traded in more than one market. This means that extending the trading markets where the stocks and their DRs are traded affects significantly their liquidity. For example, AstraZeneca Co. has 19 markets in the UK and five foreign countries; Germany, Mexico, Sweden, Switzerland and the US where DRs are traded. These findings are consistent with Domowitz et al. (1998), Bayar and Önder (2005) and Smith and Sofianos (1997) as they argued that liquidity is considered as an indicator of how fast the investors can convert their investments into cash.

5.1.2.2 The impact of the UK inflation rate on the return of underlying stocks and their DRs

This section represents the impact of the UK inflation rate on the return of the underlying stocks and their corresponding DRs when applying corruption indices (UKCI) and (FCCI).

Table 5.4: The impact of the UK inflation rate on the return of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the return of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;* = P ≤ 0.01 (1%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Inflation Rate (CPI)	Domestic country	+***	+***	Accept	Accept
	Foreign countries	+***	+***	Accept	Accept

As shown in table 5.4, the UK inflation has a significant positive influence on the return of underlying stocks that are traded in the UK and DRs that are traded in foreign countries when applying UKCI and FCCI respectively. These results are consistent with the Fisher hypothesis (1930), on which Firth (1978) relied on and found that there is a positive relationship between the inflation rate and stock return in the UK. According to Fisher (1930), it is suggested that stocks should be used as a hedge against inflation. This view is supported by Ely and Robinson (1997) who concluded that if investors invest in equity, they can get soared with the inflation. However, Fisher (1911) argued that stocks can be considered as a beneficial opportunity for hedging in the long run only and considered a poor opportunity for hedging in the short run as people spend more money on their basic necessities not on investments in stocks, however, after a period of time, this opportunity reaches the equilibrium point.

5.1.2.3 The impact of the UK GDP on the return of underlying stocks and their DRs

This section discusses the impact of the UK GDP on the return of underlying stocks and their corresponding depositary receipts when applying (UKCI) and (FCCI).

Table 5.5: The impact of the UK GDP on the return of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK GDP on the return of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK GDP	Domestic country	-***	-***	Reject	Reject
	Foreign countries	-**	-***	Reject	Reject

As shown in table 5.5, there is a significant and negative impact of the UK GDP on the returns of underlying stocks that are traded in the UK along with the respective DRs that are traded in foreign markets when applying UKCI and FCCI respectively. These results are consistent with Ritter (2005) who confirmed on the significant negative impact of the UK GDP on the stocks return as the economic growth is actually reflected in the prices and consequently reduces the realised returns. These results are inconsistent with the mechanics of Supply-Side Models which assume that GDP growth influences positively the stock return according to the following mechanism; an increase in economic growth means an increase in the corporate earnings growth and in turn an increase in earnings per share growth, which is reflected positively on the stocks return (MSCI, 2010).

5.1.2.4 The impact of the UK interest rate on the return of underlying stocks and their DRs

This section illustrates the impact of the UK interest rate on the return of underlying stocks and their corresponding DRs when applying corruption indices (UKCI) and (FCCI).

Table 5.6: The impact of the UK interest rate on the return of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK interest rate on the return of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;* = P ≤ 0.01 (1%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Interest Rate (IR)	Domestic country	-***	-***	Accept	Accept
	Foreign countries	-***	-***	Accept	Accept

As shown in table 5.6, the UK interest rate (IR) has a negative and significant influence on the return of underlying stocks that are traded in the UK when applying UKCI and FCCI respectively. This result is consistent with Okechukwu et al. (2019), Olweny and Omondi (2011) and Hashemzadeh and Taylor (1988) who concluded that interest rate has a negative impact on stock returns. Also, these results are consistent with Aljarayesh et al. (2018) who mentioned that the declining in interest rate reduces the investment in fixed income securities, and consequently, investors move their money towards the stock market which increases the stock return.

5.1.2.5 The impact of the UK exchange rate on the return of DRs

This section includes the impact of the UK exchange rate on depositary receipts return when applying corruption indices (UKCI) and (FCCI).

Table 5.7: The impact of the UK exchange rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK exchange rate on the return of the DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Exchange Rate (ER)	Domestic country				
	Foreign countries	-***	-***	Accept	Accept

As shown in table 5.7, it is observed that there is a negative and significant impact of the exchange rate on the DRs return in foreign countries when applying UKCI and FCCI respectively. This result is consistent with Subair and Salihu (2013), Adjasi et al. (2008) and Doong et al. (2005) who concluded that there is a negative effect of exchange rate on stock returns. Similarly, Adjasi and Biekpe (2005) showed that in some of the study's countries in the long-run, exchange rate depreciations led to increases in stock market return.

5.1.2.6 The impact of country corruption on the return of underlying stocks and their DRs

A- The UK Corruption (UKCI)

Table 5.8: The impact of UKCI on the return of underlying stocks and their DRs

This table shows the impact of the UK corruption (UKCI) on the return of underlying stocks that are traded in the UK and DRs that are traded in foreign countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.			
Variable	Group	GLS regression Model	Accept/Reject the hypothesis
UKCI	Domestic country	-	Reject
	Foreign countries	-	Reject

B- Foreign Country Corruption (FCCI)

Table 5.9: The impact of FCCI on the return of underlying stocks and their DRs

This table shows the impact of the foreign country corruption (FCCI) on the return of underlying stocks that are traded in the UK and DRs that are traded in foreign countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.

Variable	Group	GLS regression Model	Accept/Reject the hypothesis
FCCI	Domestic country	-	Reject
	Foreign countries	+	Reject

Tables 5.8 and 5.9 show the results of the influence of corruption factor on the underlying stocks and their DRs return. This thesis investigates whether DRs are affected by the home country corruption or the foreign country corruption or both of them where DRs are traded. It is observed that the corruption of the home country (UKCI) has an insignificant impact on the return of the underlying stocks that are traded in UK. It may be due to the fact that the UK placed among the least corrupt countries worldwide (TI, 2019). Also, FCCI has an insignificant impact on DRs that are traded in foreign countries, taken as a whole. This result is contrasted with many empirical studies which proved that the corruption has a negative and significant effect on the return across international financial markets as it is accompanied with high borrowing cost and low stock valuation (Bolgorian, 2011, Ng, 2006 and Ciocchini et al., 2003).

5.2 Group (2) European and non-European countries

This section includes all relevant data analysis and consequently the relevant findings of the impact of liquidity and country-wide factors on the return of the DRs that are traded in different European and non-European countries.

5.2.1 Results of GLS regression of return models

Tables 5.10 and 5.11 illustrate the regression results of the impact of liquidity and the UK country-wide factors on the return of DRs which are traded in European and non-European countries in light of applying UKCI and FCCI respectively.

Table 5.10: Regression results of the impact of liquidity and the UK country-wide factors on the return of DRs (Effect of the UK corruption: UKCI) (Group 2: European and non-European countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs return. It includes the impact of the UK corruption (UKCI) for group (2): European and non-European countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Return: Group (2): European and non-European countries

First: UKCI

Dependent variable/ Return	European countries				Non-European countries			
	Method 1 Fixed	Method 2 Random	Method 3 WLS	Method 4 Robust	Method 1 Fixed	Method 2 Random	Method 3 WLS	Method 4 Robust
Constant P-value	1.793 ***	1.7959	0.38367	1.9746 ***	-0.2366	-0.24388	-0.122196	-0.53655
Liquidity P-value	0.013 ***	0.01328 ***	0.0152 **	0.01451 ***	0.0087 **	0.009072 **	0.074 **	0.01174 ***
UKCI P-value	-0.974 ***	-0.97524 ***	-0.2423 *	-0.95799 ***	-0.00712	-0.0046431	-0.0528	0.15657
The UK Inflation P-value	0.00437 ***	0.00444 ***	0.00073 ***	0.00397 ***	0.004836 ***	0.004795 ***	0.001 ***	0.00584 ***
The UK GDP P-value	-0.00257 ***	-0.00357 ***	-0.0015 ***	-0.00334 ***	-0.5458 ***	-0.5904 ***	-0.2957 ***	-0.1347 ***
The UK Interest Rate P-value	-0.157 ***	-0.15685 ***	-0.1619 ***	-0.26333 ***	-0.300397 ***	-0.2988 ***	-0.32015 **	-0.361307 ***
The UK Exchange Rate P-value	-0.007	-0.00747	-0.2234	-0.06476	-2.22789 ***	-2.225 ***	-2.7543 ***	-2.62144 ***
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop> F ***
Mundlak Approach	Prop > chi2 0.333				Prop > chi2 0.3938			

Table 5.11: Regression results of the impact of liquidity and the UK country-wide factors on the return of DRs (Effect of foreign country corruption: FCCI) (Group 2: European and non-European countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs return. It includes the impact of the foreign country corruption (FCCI) for group (2): European and non-European countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Return: Group (2): European and Non-European countries

<u>Second: FCCI</u>

Dependent variable/ Return	**European countries**				**Non-European countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	0.57887	0.56548	-3.3193	0.36696	-0.4	-0.36484	-0.122196	-0.3697
Liquidity P-value	0.122571 ***	0.012419 *	0.01444 *	0.013868 ***	0.0085 **	0.00906 **	0.0721 ***	0.01174 ***
FCCI P-value	-0.37959 ***	-0.37164 ***	-0.55 ***	-0.1838 ***	0.0773	0.05998	0.627	0.0786
The UK Inflation P-value	0.00418 ***	0.00425 ***	0.00076 ***	0.0039 ***	0.0049 ***	0.004856 ***	0.001 ***	0.00593 ***
The UK GDP P-value	-0.0032 ***	-0.0032 ***	-0.0010 ***	-0.0039 ***	-0.5871	-0.3695	-0.2616	-0.1208
The UK Interest Rate P-value	-0.16315 ***	-0.16295 ***	-0.1539 ***	-0.26032 ***	-0.30084 ***	-0.2985 ***	-0.32015 **	-0.36029 ***
The UK Exchange Rate P-value	0.00070	0.000017	0.2487	0.05297	-2.2486	-2.2391 ***	-2.2487 ***	-2.6367 ***
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop >F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.1578				Prop > chi2 0.1418			

Table 5.10 illustrates the regression analysis results concerning first group; (European and non-European countries) when applying the UK Corruption Index (UKCI). European countries category here includes 17 European markets across 6 European countries, while non-European countries category includes 18 non-European markets in 12 non-European countries.

From table 5.10, Mundlak approach shows that random model will be applied for both European and non-European categories of this group as their chi2 are equal to 0.333 and 0.3938 respectively.

As shown in table 5.10, liquidity has a significant positive impact on DRs return in both categories of this group; European and non-European countries. Therefore, any increase in trading volume by one DR leads to an increase in its return by 1.33% and 0.91% respectively. Similarly, the UK inflation rate has a positive impact on DRs return in both categories. So, an increase by 1% in the UK inflation rate leads to an increase in DRs return in European and non-European countries by 0.44% and 0.48% respectively. On the other hand, there is a significant negative impact of the UK interest rate on DRs return in both categories (i.e. an increase in the UK interest rate by 1% leads to a decrease in the return of DRs in European and non-European countries by 15.68% and 29.88% respectively). Also, the UK GDP has a significant negative influence on DRs return in European countries. In other words an increase in the UK GDP by 1% leads to a decrease in DRs return in European countries by 0.35%. However it has insignificant effect on DRs return in non-European countries. Additionally, the UK exchange rate has a negative and significant influence on DRs return in non-European countries.

This means that an increase by one GBP leads to a decrease in DRs return in non-European countries by 225%. However it has an insignificant effect on DRs return in European countries. Lastly, UKCI has a negative and significant influence on DRs return in European countries. Therefore, an increase in UKCI by 1% leads to a decrease in DRs return in European countries by 97.5%, however it has an insignificant impact on the DRs return in non-European countries.

Table 5.11 shows the regression analysis results concerning second group; (European and non-European countries) with applying Foreign Country Corruption Index (FCCI). In table 5.11 Mundlak approach shows that random model will be applied for both European and non-European categories of this group as chi2 values are equal to 0.1578 and 0.1418 respectively. Also, as shown in table 5.11, liquidity has a significant positive impact on DRs return in both categories of this group; European and non-European countries. Therefore, any increase in trading volume by one DR leads to an increase in its return by 1.24% and 0.90% respectively. In the same way, the UK inflation rate has a positive impact on DRs return in both categories. So, an increase by 1% in the UK inflation rate leads to an increase in DRs return in European and non-European countries by 0.43% and 0.48% respectively. On the other hand, there is a significant negative influence of the UK interest rate on DRs return in both categories, (i.e. an increase in the UK interest rate by 1% leads to a decrease in the return of DRs in European and non-European countries by 16.29% and 29.85% respectively). Also, the UK GDP has a negative and significant influence on DRs return in European countries, i.e. an increase in the UK GDP by 1% leads to a decrease in DRs return in European countries by 0.32%. However it has an insignificant effect on DRs return in non-European countries. On the other hand, the UK exchange rate has a negative and significant influence on DRs return in non-European countries. This means that an increase by one GBP leads to a decrease in DRs return in non-European countries by 223.9%. However it has an insignificant effect on DRs return in European countries. Finally, FCCI has a significant negative impact on DRs return in European countries. So, an increase in FCCI by 1% leads to a decrease in DRs return in European countries by 37.16%, however it has an insignificant impact on the DRs return of non-European countries.

5.2.2 Discussion of hypotheses' results

In this section the impact of liquidity and domestic country-wide factors on the return of DRs is discussed in light of two categories of group (2); European and non-European countries.

5.2.2.1 The impact of liquidity on the return of DRs

This section represents the impact of the liquidity of DRs on their return when applying corruption indices (UKCI) and (FCCI).

Table 5.12: The impact of liquidity on the return of DRs

This table shows the GLS regression's results for the impact of liquidity on the return of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
Liquidity	European countries	+***	+*	Accept	Accept
	Non-European countries	+**	+**	Accept	Accept

As shown in table 5.12, liquidity has a positive and significant impact on their DRs returns when applying UKCI or FCCI. As illustrated in table 5.12, this positive and significant effect of DRs liquidity on their returns is consistent with the results of Kalu and Chinwe (2014), Avdic and Resulovic (2006) and Domowitz et al. (1998) who illustrated that there is a significant positive relationship between trading volume as a measure of liquidity and the stock returns.

5.2.2.2 The impact of the UK inflation rate on the return of DRs

This section represents the impact of the UK inflation rate on DRs return when applying corruption indices (UKCI) and (FCCI).

Table 5.13: The impact of the UK inflation rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the return of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Inflation Rate (CPI)	**European countries**	+***	+***	**Accept**	**Accept**
	Non-European countries	+***	+***	**Accept**	**Accept**

As illustrated in table 5.13, the UK inflation rate has a positive and significant influence on the return of DRs that are traded in European and non-European countries. These results are consistent with many studies, e.g. Fama (1981), Lintner (1975) and Jaffe and Mandelker (1976). These previous results and their interpretations concerning the impact of the UK inflation rate on the return of the underlying stocks and their corresponding DRs have been obtained in light of applying the two corruption indices (i.e. UKCI and FCCI).

5.2.2.3 The impact of the UK GDP on the return of DRs

This section discusses the impact of GDP on DRs return in light of applying (UKCI) and (FCCI).

Table 5.14: The impact of the UK GDP on the return of DRs

This table shows the GLS regression's results for the impact of UK GDP on the return of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK GDP	**European countries**	**-*** **	**-*** **	**Reject**	**Reject**
	Non-European countries	**-**	**-**	**Reject**	**Reject**

As illustrated in table 5.14, when applying the two sources of corruption; UKCI and FCCI, it is found that there is a significant and negative impact of the UK GDP on DRs return in the European countries. This result is consistent with Dimson et al. (2002) who concluded that higher level of GDP reflects lower real stock market return. However, it has an insignificant impact on the return of DRs that are traded in non-European countries which is consistent with Joseph and Rostand (2017) who concluded that there is no causal relationship between stock market development and GDP.

5.2.2.4 The impact of the UK interest rate on the return of DRs

This section illustrates the impact of the UK interest rate on DRs return when applying corruption indices (UKCI) and (FCCI).

Table 5.15: The impact of the UK interest rate on the return of DRs

<table>
<tr><td colspan="6">This table shows the GLS regression’s results for the impact of the UK interest rate on the return of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).</td></tr>
<tr><th rowspan="2">Variable</th><th rowspan="2">Group</th><th colspan="2">GLS regression Model</th><th colspan="2">Accept/Reject the hypothesis</th></tr>
<tr><th>The UK corruption UKCI</th><th>Foreign country corruption FCCI</th><th>The UK corruption UKCI</th><th>Foreign country corruption FCCI</th></tr>
<tr><td rowspan="2">The UK Interest Rate (IR)</td><td>European countries</td><td>-***</td><td>-***</td><td>Accept</td><td>Accept</td></tr>
<tr><td>Non-European countries</td><td>-***</td><td>-***</td><td>Accept</td><td>Accept</td></tr>
</table>

As shown in table 5.15, the UK interest rate has a negative and significant impact on the return of DRs that are traded in European and non-European countries alike when applying UKCI and FCCI. These results are consistent with the current thesis’s expectations as well as Wang (2010) and Alam and Salah-Uddin, (2009) who argued that the fluctuation of interest rate affects DR return negatively.

5.2.2.5 The impact of the UK exchange rate on the return of DRs

The following section includes the impact of the UK exchange rate on the return of DRs when applying corruption indices (UKCI) and (FCCI).

Table 5.16: The impact of the UK exchange rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK exchange rate on the return of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Exchange Rate (ER)	**European countries**	**-**	**+**	**Reject**	**Reject**
	Non-European countries	**-*****	**-*****	**Accept**	**Accept**

As shown in table 5.16, in light of applying UKCI and FCCI, it is observed that there is an insignificant effect of exchange rate on the return of DRs that are traded in European countries. This result is matched with the study of Mlambo et al. (2013) which showed that exchange rate has a very weak impact on the stock markets. On the other hand, there is a negative and significant impact of the exchange rate on the DRs return that are traded in non-European countries. This result is consistent with Adjasi and Biekpe (2005) who showed that in the long-run, exchange rate depreciations led to an increase in the stock market return in some of their study's countries.

5.2.2.6 The impact of country corruption on the return of DRs

A- The UK Corruption (UKCI)

Table 5.17: The impact of UKCI on the return of DRs

This table shows the impact of the UK corruption (UKCI) on the return of DRs that are traded in European and non-European countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; *** = P ≤ 0.01 (1%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
UKCI	**European countries**	**-*****	**Accept**
	Non-European countries	**-**	**Reject**

B- Foreign Country Corruption (FCCI)

Table 5.18: The impact of FCCI on the return of DRs

This table shows the impact of the foreign country corruption (FCCI) on the return of DRs that are traded in European and non-European countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; *** = P ≤ 0.01 (1%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
FCCI	**European countries**	**-*** **	**Accept**
	Non-European countries	**+**	**Reject**

Tables 5.17 and 5.18 show the results of the impact of corruption (i.e. UKCI and FCCI) on the return of DRs that are traded in European and non-European countries. It is observed that the UKCI and FCCI have a negative and significant impact on the return of DRs that are traded in European and non-European countries. Actually, these results are normally expected in many studies due to harmful effect of the corruption on any investments. Therefore, these results are consistent with Blackburn and Powell (2011) and Mauro (1995) who reported the same result concerning the effect of corruption factor and concluded a significant negative impact of it on investment return as the investors may refrain from investing in countries that are characterised by high levels of corruption in order to avoid any losses that may occur.

5.3 Group (3) Developed and developing countries

This section includes all relevant data analysis' results of the impact of liquidity and country-wide factors on the return of the DRs that are traded in different developed and developing countries.

5.3.1 Results of GLS regression of return models

Tables 5.19 and 5.20 illustrate the regression results of the impact of liquidity and the UK country-wide factors on the return of DRs which are traded in developed and developing countries in light of applying UKCI and FCCI respectively.

Table 5.19: Regression results of the impact of liquidity and the UK country-wide factors on the return of DRs (Effect of the UK corruption: UKCI) (Group 3: Developed and developing countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs return. It includes the impact of the UK corruption (UKCI) for group (3): developed and developing countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Return: Group (3): Developed and developing countries

<u>First: UKCI</u>

Dependent variable/ Return	**Developed countries**				**Developing countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	1.4902 **	1.47918 **	0.0408 *	1.731 ***	4.451	3.84404	-1.4847 ***	-0.5583
Liquidity P-value	0.01128 ***	0.01136 ***	0.0248 ***	0.0135 ***	0.0733 ***	0.05783 ***	0.112845 ***	0.0582 **
UKCI P-value	-0.836 ***	-0.8372 ***	-0.0455 ***	-0.8665 ***	-2.727	-2.3328	-0.0455	-0.1797
The UK Inflation P-value	0.00434 ***	0.00432 ***	0.0003 ***	0.00426 ***	0.0045 ***	0.0033 ***	0.00462 ***	0.00004 ***
The UK GDP P-value	-0.0024 ***	-0.0023 ***	-0.0014 ***	-0.0034 ***	0.0012 **	0.0011 **	0.0098 ***	0.0087 ***
The UK Interest Rate P-value	-0.1648 ***	-0.1647 ***	-0.2709 ***	-0.2695 ***	0.0924	0.075798	0.2709	0.16489
The UK Exchange Rate P-value	0.027	0.02763	0.1369	0.02224	-1.136	-1.48117	-0.1369	-1.5829
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.5094				Prop > chi2 0.0233			

Table 5.20: Regression results of the impact of liquidity and the UK country-wide factors on the return of DRs (Effect of foreign country corruption: FCCI) (Group 3: Developed and developing countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs return. It includes the impact of the foreign country corruption (FCCI) for group (3): developed and developing countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Return: Group (3): Developed and developing countries

Second: FCCI

Dependent variable/ Return	**Developed countries**				**Developing countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	-0.3637 ***	0.01132 ***	-5.8487 ***	-0.2505 ***	-0.9115	-0.7227	-1.1118	-0.77186 *
Liquidity P-value	0.01123 ***	0.0768 ***	0.01449 ***	0.01325 ***	0.0695 **	0.063319 **	0.1669 **	0.06235 **
FCCI P-value	0.06562	0.00417	2.7704	0.08747	-0.1255	-0.217236	-0.9696	-0.15617
The UK Inflation P-value	0.00419 ***	0.00418 ***	0.00077 ***	0.00418 ***	0.0056 ***	0.00457 ***	0.0044 ***	0.00058 ***
The UK GDP P-value	-0.0031 ***	-0.0168 ***	-0.0021 ***	-0.0016 ***	0.0010 *	0.0009 *	0.0096 **	0.0088 **
The UK Interest Rate P-value	-0.1684 ***	-0.0248 ***	-0.1979 ***	-0.2616 ***	0.055	0.04352	0.169	-0.12333
The UK Exchange Rate P-value	0.02477	-0.39868	0.24233	0.0169	-1.2333	-1.374196	-1.9257	-1.421416
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop >F ***
Mundlak Approach	Prop > chi2 0.0132				Prop > chi2 0.162			

Table 5.19 demonstrates the regression analysis results concerning third group (developed and developing countries) in light of applying the UK Corruption Index (UKCI). Developed countries category includes 27 developed markets across 11 developed countries where DRs are traded, while the category of developing countries, includes 8 emerging markets in 7 developing countries. From table 5.19, Mundlak approach provides evidence in favour of the random model for developed countries category as chi2 value is equal to 0.5094, while fixed effect method is selected for developing countries category as chi2 value is equal to 0.0233.

Also, as shown in table 5.19, liquidity has a significant positive impact on DRs return in both categories of this group; developed and developing countries. Therefore, any increase in liquidity by one unit leads to an increase in DRs return by 1.14% and 7.33% respectively. Furthermore, the UK inflation rate has a positive impact on DRs return in both categories. So, an increase by 1% in the UK inflation rate leads to an increase in DRs return in developed and developing countries by 0.43% and 0.45% respectively. On the other hand, there is a significant negative impact of the UK interest rate on DRs return in developed countries only, (i.e. an increase in the UK interest rate by 1% leads to a decrease in the return of DRs in developed countries by 16.47% however interest rate has an insignificant effect on DRs return in developing countries. Moreover, the UK GDP has a significant negative influence on DRs return in developed countries, i.e. an increase in the UK GDP by 1% leads to a decrease in DRs return in developed countries by 0.23%. However it has a positive and significant effect on DRs return in developing countries. This means that an increase in the UK GDP by 1% leads to an increase in DRs return in developing countries by 0.12%. Also, UKCI has a significant negative impact on DRs return which are traded in developed countries. So, an increase in UKCI by 1% leads to a decrease in DRs return in developed countries by 83.72%, however it has an insignificant effect on DRs return in developing countries. Lastly, the UK exchange rate has an insignificant influence on DRs return in developed and developing countries.

Table 5.20 shows the regression models results concerning third group (developed and developing countries) with applying Foreign Country Corruption Index (FCCI) on DRs return. It illustrates that Mundlak approach provides evidence in favour of the fixed model for developed countries category as chi2 value is equal to 0.0132, while random effect method is selected for the developing countries category as chi2 value is equal to 0.162.

From table 5.20, it can be concluded that liquidity has a significant positive impact on DRs return in the two categories of the group; developed and developing countries. So, any increase in liquidity by one unit leads to an increase in DRs return by 1.13% and 6.33% respectively. Similarly, the UK inflation rate has a positive impact on DRs return in both categories. So, an increase by 1% in the UK inflation rate leads to an increase in DRs return in developed and developing countries by 0.42% and 0.46% respectively. On the other hand, there is a significant negative impact of the UK interest rate on DRs return in developed countries only which means that an increase in the UK interest rate by 1% leads to a decrease in the return of DRs in developed countries by 16.84%, however the UK interest rate has an insignificant effect on DRs return in developing countries. Moreover, the UK GDP has a negative and significant effect on DRs return in developed countries. This means that an increase in the UK GDP by 1% leads to a decrease in DRs return in developed countries by 0.31%. However it has a positive and significant influence on DRs return in developing countries, i.e. an increase in the UK GDP by 1% leads to an increase in DRs return in developing countries by 0.10%. Lastly, both variables; the exchange rate and foreign country corruption (FCCI) have an insignificant influence on DRs return in developed and developing countries.

5.3.2 Discussion of hypotheses' results

In light of the relevant hypotheses' results, the effect of liquidity and the country-wide factors on the return of DRs will be discussed in terms of the two categories of group (3); developed and developing countries.

5.3.2.1 The impact of liquidity on the return of DRs

This section represents the impact of the liquidity of DRs on their return when applying corruption indices (UKCI) and (FCCI).

Table 5.21: The impact of liquidity on the return of DRs

This table shows the GLS regression's results for the impact of liquidity on the return of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;*** = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
Liquidity	**Developed countries**	+***	+***	**Accept**	**Accept**
	Developing countries	+***	+**	**Accept**	**Accept**

As the foreign countries are classified into 11 developed countries and 7 developing countries, table 5.21 illustrates that liquidity has a positive and significant influence on DRs returns in these two categories whether applying UKCI or FCCI. This positive and significant impact of DRs liquidity on their returns is consistent with the results of Amihud (2002) who argued that illiquidity of stocks has a negative correlation with their returns. However, these results are in contrast to Svensson and Heikenstrom (2016) and Berkman and Nguyen (2010) who showed that before and after cross-listing, there is a similar effect of liquidity.

5.3.2.2 The impact of the UK inflation rate on the return of DRs

This section represents the impact of the UK inflation rate of DRs on their return when applying corruption indices (UKCI) and (FCCI).

Table 5.22: The impact of the UK inflation rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the return of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Inflation Rate (CPI)	**Developed countries**	+***	+***	**Accept**	**Accept**
	Developing countries	+***	+***	**Accept**	**Accept**

According to the results illustrated in table 5.22, the UK inflation rate has a positive and significant influence on the return of DRs that are traded in developed and developing countries whether when applying UKCI or FCCI as it is considered one of the most important determinants of the stock return. Essentially, many studies documented the same evidence such as Choudhry (2001) and Feldstein (2009) who found a positive and significant impact of inflation on stock return.

5.3.2.3 The impact of the UK GDP on the return of DRs

This section discusses the impact of the UK GDP on the return of DRs when applying (UKCI) and (FCCI).

Table 5.23: The impact of the UK GDP on the return of DRs

This table shows the GLS regression's results for the impact of the UK GDP on the return of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK GDP	Developed countries	-***	-***	Reject	Reject
	Developing countries	+**	+*	Accept	Accept

As illustrated in table 5.23 when applying UKCI and FCCI, there is a negative and significant impact of UK GDP on DRs that are traded in developed countries. However, it has a positive and significant impact on DRs that are traded in developing countries. This view is consistent with the thesis expectations according to the mechanics of Supply-Side Models (MSCI, 2010).

5.3.2.4 The impact of the UK interest rate on the return of DRs

This section illustrates the impact of the UK interest rate on DRs return when applying corruption indices (UKCI) and (FCCI).

Table 5.24: The impact of the UK interest rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK interest rate on the return of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Interest Rate (IR)	**Developed countries**	-***	-***	**Accept**	**Accept**
	Developing countries	+	+	**Reject**	**Reject**

As illustrated in table 5.24, there is a negative and significant influence of the UK interest rate on the return of DRs that are traded in developed countries, however the impact on developing countries was insignificant. The last result is supported by Kurihara and Nezu (2006) and Bonomo et al. (1993) who found that DRs return doesn't respond significantly to the fluctuations in interest rates and consequently, there is no significant impact of the interest rate on the stock return.

5.3.2.5 The impact of the UK exchange rate on the return of DRs

This section illustrates the effect of the UK exchange rate on DRs return when applying corruption indices (UKCI) and (FCCI).

Table 5.25: The impact of the UK exchange rate on the return of DRs

This table shows the GLS regression's results for the impact of the UK GDP on the return of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Exchange Rate (ER)	**Developed countries**	+	+	**Reject**	**Reject**
	Developing countries	-	-	**Reject**	**Reject**

As shown in table 5.25, there is an insignificant impact of the exchange rate on the return of DRs that are traded in developed and developing countries in case of applying the two corruption indices; UKCI and FCCI. These results are matched with Mlambo et al. (2013) who showed that exchange rate has no significant impact on the stock market's performance. Practically, this view is not supporting the prevailing assumption which states that the uncertainty of the exchange rate harms the performance of the stock markets.

5.3.2.6 The impact of country corruption on the return of DRs

A- The UK Corruption (UKCI)

Table 5.26: The impact of UKCI on the return of DRs

This table shows the impact of the UK corruption (UKCI) on the return of DRs that are traded in developed and developing countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; *** = P ≤ 0.01 (1%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
UKCI	**Developed countries**	**-*** **	**Accept**
	Developing countries	**-**	**Reject**

B- Foreign Country Corruption (FCCI)

Table 5.27: The impact of FCCI on the return of DRs

This table shows the impact of the foreign country corruption (FCCI) on the return of DRs that are traded in developed and developing countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
FCCI	**Developed countries**	**+**	**Reject**
	Developing countries	**_**	**Reject**

Table 5.26 shows that UKCI has a significant and negative effect on the return of DRs that are traded in developed countries. Mo (2001), Brunetti and Weder, (1998) and Mauro (1995) reported the same significant and negative effect of corruption on the stock market return as corruption can be considered as a real challenge that may impede economic performance which discourages investments and consequently constricts returns of stock markets. However, UKCI has an insignificant effect on the return of DRs that are traded in developing countries. Same results are concluded from table 5.27 as FCCI has insignificant effects on the returns of DRs which are traded in developed and developing countries.

5.4 Summary of hypotheses' results

According to the previous findings of the impact of liquidity and country-wide factors on the return of the underlying stocks and their respective DRs and in light of the three mentioned groups, the following hypothesis is accepted partially as some of these country-wide factors have no significant impact on return.

H1: There are significant impacts of liquidity and country-wide factors on the return of underlying stocks and their corresponding depositary receipts.

The previous hypothesis is accepted partially as data analysis clarified that the UK GDP has no significant impact on the DRs return which are traded in non-European countries. Also, the UK exchange rate has no significant impact on DRs return which are traded in European, developed and developing countries, as well the UK interest rate has no significant impact on DRs return which are traded in developing countries. In addition, the UK corruption has no significant impact on underlying stocks return that are traded in the UK, whereas foreign country corruption has no significant impact on DRs return that are traded in developed countries. Lastly, neither the UK corruption nor foreign country corruption has a significant impact on depositary receipts return that are traded in foreign countries, specifically in non-European and developing countries.

Similarly, the following hypothesis is accepted partially as there is a negative impact of the UK GDP on underlying stocks and their corresponding DRs return that are traded in foreign countries specifically in European and developed countries.

H1.1 There are positive impacts of liquidity, the UK inflation rate, the UK GDP on the return of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately.

On the other hand the following hypothesis is accepted partially as the UK interest rate has no significant impact on depositary receipts return that are traded in developing countries.;

H1.2 There are negative impacts of the UK interest rate , the UK corruption and the UK exchange rate on the return of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively, and in European, non-European, developed and developing countries separately.

Additionally, the following hypothesis is accepted partially as the data analysis illustrated that foreign country corruption has an insignificant impact on return of depositary receipts except its significant and negative impact on depositary receipts that are traded in European countries.

H1.3 There are positive impacts of foreign country corruption on the return of depositary receipts that are traded in foreign countries collectively, and in non- European and developing countries separately whereas it has negative impacts on the return of depositary receipts that are traded in European and developed countries separately.

5.5 Conclusion

This chapter covers the data analysis and the relevant empirical findings of the return models. Hence, table 5.28 summarises GLS results for all of the thesis variables in terms of the three groups; domestic and foreign, European and non-European and developed and developing countries. Also, it illustrates whether the relevant hypotheses are accepted or rejected in order to determine obviously the impact of liquidity and country-wide factors on the return of underlying stocks and their corresponding DRs.

Table 5.28: Summary of the return models' results

This table shows the expected signs of the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the return of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. Also it displays a summary of GLS regression's results and the decision of whether to accept or reject the relevant hypotheses in light of the UK corruption (UKCI) and the foreign country corruption (FCCI) respectively. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

GROUPS	Independent Variable	Expected sign		GLS regression Model		Accept/ Reject Hypothesis	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	+	+	+***	+***	Accept	Accept
	UKCI	-		-		Reject	
	FCCI		-		-		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	GDP	+	+	-***	-***	Reject	Reject
	The UK interest Rate	-	-	-***	-***	Accept	Accept
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	+	+	+***	+***	Accept	Accept
	UKCI	-		-		Reject	
	FCCI		+		+		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	+	+	-**	-***	Reject	Reject
	The UK interest Rate	-	-	-***	-***	Accept	Accept
	The UK exchange Rate	-	-	-***	-***	Accept	Accept
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	+	+	+***	+*	Accept	Accept
	UKCI	-		-***		Accept	
	FCCI		-		-***		Accept
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	+	+	-***	-***	Reject	Reject
	The UK interest Rate	-	-	-***	-***	Accept	Accept
	The UK exchange Rate	-	-	-	+	Reject	Reject

GROUPS	Independent Variable	Expected sign		GLS regression Model		Accept/ Reject Hypothesis	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	+	+	+**	+**	Accept	Accept
	UKCI	-		-		Reject	
	FCCI		+		+		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	+	+	-	-	Reject	Reject
	The UK interest Rate	-	-	-***	-***	Accept	Accept
	The UK exchange Rate	-	-	-***	-***	Accept	Accept
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	+	+	+***	+***	Accept	Accept
	UKCI	-		-***		Accept	
	FCCI		-		+		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	+	+	-***	-***	Reject	Reject
	The UK interest Rate	-	-	-***	-***	Accept	Accept
	The UK exchange Rate	-	-	+	+	Reject	Reject
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	+	+	+***	+**	Accept	Accept
	UKCI	-		-		Reject	
	FCCI		+		-		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	+	+	+**	+*	Accept	Accept
	The UK interest Rate	-	-	+	+	Reject	Reject
	The UK exchange Rate	-	-	-	-	Reject	Reject

Chapter Six

Empirical Findings on Stock Market Volatility

Chapter 6

Empirical findings on stock market volatility

This chapter deals with the analysis of data to address the thesis questions which revolve around determining the factors affecting the volatility of the underlying stocks and their corresponding DRs. These factors are liquidity, the UK macroeconomic variables (inflation rate, GDP, interest rate, exchange rate) along with the country corruption indices. In this chapter, data are analysed in terms of three groups: Group (1): domestic and foreign countries, Group (2): European and non-European countries and Group (3): developed and developing countries. The main aim of these classifications is to get more comprehensive and in-depth picture about the impact of liquidity and the UK country-wide factors on the volatility of underlying stocks and their respective DRs.

6.1 Group (1) Domestic and foreign countries

This section includes all relevant data analysis and the relevant findings of the impact of liquidity and country-wide factors on the volatility of the underlying stocks that are traded in the UK along with their respective DRs that are traded in different foreign countries.

6.1.1 Results of GLS regression of volatility models

Tables 6.1 and 6.2 illustrate the regression results of the impact of liquidity and the UK country-wide factors in domestic and foreign countries on the volatility of the stocks that are traded in the UK and their corresponding DRs which are traded in foreign countries in light of applying UKCI and FCCI respectively.

Table 6.1: Regression results of the impact of liquidity and the UK country-wide factors on the volatility of underlying stocks and their DRs (Effect of the UK corruption: UKCI) (Group 1: Domestic and Foreign countries)

This table shows the effect of liquidity and the UK country-wide factors on stocks and DRs volatility. It includes the impact of the UK corruption (UKCI) for group (1): domestic and foreign countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Volatility: Group (1): Domestic and Foreign countries

First: UKCI

Dependent variable/ Volatility	Domestic country (the UK)				Foreign countries			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	0.39157 ***	0.38046 ***	-1.7227 ***	-1.10578 ***	-3.332 ***	-3.2979 ***	-2.3844 ***	-1.83061 ***
Liquidity P-value	-0.0127 ***	-0.01224 ***	-0.001 ***	-0.00319 ***	0.0008089 *	0.00114 ***	0.0004832 ***	0.0003047 **
UKCI P-value	-0.75327 **	-0.7541 **	-0.0071 *	-0.24268 **	0.93487 ***	0.9288 ***	0.3487 ***	0.07765 ***
The UK Inflation P-value	0.002249 ***	0.00225 ***	0.00008 ***	0.00048 ***	0.0011297 **	0.00119 ***	0.0004547 ***	0.00038 ***
The UK GDP P-value	-122.169	-121.61	-8.619	-16.077	-49.3749	-54.089	-304.1325	14.209
The UK Interest Rate P-value	0.04918 *	0.05075 *	0.00483 ***	0.0155 **	0.032523 **	0.03411 **	0.0032746 ***	0.0296 ***
The UK Exchange Rate P-value	omitted	Omitted	omitted	omitted	-0.1746188 **	-0.17489 **	-0.1966396 ***	-0.01618 ***
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.0000				Prop > chi2 0.3531			

Table 6.2: Regression results of the impact of liquidity and the UK country-wide factors on the volatility of underlying stocks and their DRs (Effect of foreign country corruption: FCCI) (Group 1: Domestic and Foreign countries)

This table shows the effect of liquidity and the UK country-wide factors on stocks and DRs volatility. It includes the impact of the foreign country corruption (FCCI) for group (1): domestic and foreign countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Volatility: Group (1): Domestic and Foreign countries

Second: FCCI

Dependent variable/ Volatility	**Domestic country (the UK)**				**Foreign countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	0.39157	0.38046 ***	-1.7227 ***	-1.10578 ***	-1.49616 ***	-1.4323 ***	-1.745542 ***	-1.724 ***
Liquidity P-value	-0.0127 ***	-0.0123 ***	-0.0010 ***	-0.003 ***	0.0011564 **	0.0015 **	0.0008485 **	0.0003 **
FCCI P-value	-0.75327 *	-0.7541 *	-0.0071 *	-0.243 **	0.035699	0.0179	0.0189514	0.0245
The UK Inflation P-value	0.00225 ***	0.00225 ***	0.00008 ***	0.00048 ***	0.001336 ***	0.00139 ***	0.0002658 ***	0.0004 ***
The UK GDP P-value	-122.168	-121.61	-8.6193	-16.077	28.82	22.33995	-130.1983	16.917
The UK Interest Rate P-value	0.04918 *	0.05075 *	0.00484 ***	0.0155 **	0.03768 **	0.0393912 **	0.0003389 **	0.0293 ***
The UK Exchange Rate P-value	Omitted	Omitted	Omitted	Omitted	-0.15388	-0.1529	-0.068911	-0.0152
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F **	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.0033				Prop > chi2 0.1849			

Table 6.1 illustrates the regression analysis results concerning first group (domestic and foreign countries). In this group there are three domestic markets in the UK where the underlying stocks are traded and covered by DRs which are traded in 35 markets across 18 foreign countries in light of using the UK corruption index. Mundlak approach provides evidence in favour of the fixed model for the UK markets. Table 6.1 shows that chi2 value is equal to 0.0000. For foreign markets category where DRs are traded, Mundlak approach supports the random effect method as chi2 value is equal to 0.3531.

Table 6.1 shows that the variables that have significant effects on underlying stocks volatility are; liquidity, the UK inflation rate and UKCI and the UK interest rate. However, the UK GDP has an insignificant effect on the underlying stocks volatility. The effect of exchange rate is omitted in the domestic category as the underlying stocks are traded in its domestic currency (GBP). Moreover, liquidity and the UK corruption index have a negative impact on underlying stocks volatility, whereas, inflation and interest rate have a positive impact on underlying stocks volatility.

For random effect method of the foreign countries category, table 6.1 shows that the variables that have a positive significant effect on the DRs volatility are liquidity, the UK inflation, the UK interest rate and the UK corruption index, while there is a significant negative influence of the UK exchange rate on the DRs volatility. However, GDP has an insignificant effect on DRs volatility.

Also, from table 6.1, it is illustrated that in the domestic country category, any increase in trading volume (as a proxy of liquidity) by one stock leads to a decrease in underlying stocks volatility by 1.27%. In addition, any increase by 1% in the UK corruption index leads to a decrease in underlying stocks volatility by 75.3%. Also, any increase in the UK inflation rate by 1% leads to an increase of underlying stocks volatility by 0.22%, whereas any increase in the UK interest rate by 1% results in an increase of underlying stocks volatility by 4.9%.

For the foreign countries category, table 6.1 shows that any increase in trading volume (as a proxy of liquidity) by one DR leads to an increase in DRs volatility by 0.11% while any increase in the UK exchange rate by one GBP leads to a decrease in DRs volatility by 17.49%. On the other hand, any increase in the UK inflation rate by 1% leads to an increase in DRs volatility by 0.12% whereas, an increase in the UK interest rate by 1% leads to an increase in DRs volatility by 3.4%. In addition, any increase in the UK corruption index by 1% leads to increase in DRs volatility by 92.88%.

Table 6.2 illustrates the results of group (1); domestic and foreign countries in light of Foreign country corruption index to be applied on each corresponding foreign country in order to determine the effect of FCCI on underlying stocks and DRs volatility. Actually, the results of the domestic country category which are shown in table 6.1 are exactly similar as in table 6.2 since the same corruption index is applied twice on the UK; (UKCI) and (FCCI). As shown in table 6.2, Mundlak approach provides evidence in favour of the random effect for the foreign markets of DRs. It shows that chi2 is equal to 0.1849.

For the random effect method of foreign countries category, the table 6.2 shows that the variables that have significant effect on DRs volatility are; liquidity, the UK inflation rate and the UK interest rate. However, the UK GDP, the UK exchange rate and FCCI have insignificant effects on DRs volatility in foreign countries category. Moreover, liquidity, the UK inflation rate and the UK interest rate have a positive impact on DRs volatility in foreign countries where DRs are traded. From table 6.2, it is shown that any increase in trading volume by one DR leads to an increase in DRs volatility by 0.15%. In addition, any increase by 1% in the UK inflation rate leads to an increase in DRs volatility by 0.14%. Also, any increase in the UK interest rate by 1% leads to an increase of volatility by 3.94% in foreign countries.

6.1.2 Discussion of hypotheses' results

According to the previous results, the impact of liquidity and domestic country-wide factors on the volatility of the underlying stocks and DRs is discussed in this section in light of the two categories of group (1); domestic and foreign countries.

6.1.2.1 The impact of liquidity on the volatility of underlying stocks and their DRs

This section represents the impact of the liquidity of underlying stocks and their corresponding depositary receipts on their volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.3: The impact of liquidity on the volatility of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of liquidity on the volatility of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
Liquidity	Domestic country	-***	-***	Accept	Accept
	Foreign countries	+**	+**	Reject	Reject

As shown in table 6.3, liquidity has a negative and significant influence on the underlying stocks volatility that are traded in the UK. Practically, stocks covered by DRs have less intensity of fluctuation in their prices than the stocks that uncovered by DRs. The reason behind that is due to the availability of trading the stocks and their corresponding DRs in different markets. Stocks that covered by DRs provide the investors with more than one opportunity to liquidate these stocks by selling them at home country or converting them into DRs which also can be sold at any foreign market in which DRs are traded. This conclusion is consistent with Chang et al. (2017) who highlighted that stock price fluctuations can significantly harm investors' confidence and welfare and consequently it increases the exit risk of unsatisfied investors. However, it is observed that liquidity has a positive and significant effect on the volatility of DRs that are traded in foreign countries. In other words, the higher the liquidity of

DRs in foreign markets, the higher the volatility of the DRs that are traded in these markets. It may be due to the fact that high liquidity means high return which almost accompanied by high risk as investors have to be rewarded for this risk, however, there is no guarantee that they will actually get a higher return by accepting more risk (Hasan et al., 2012).

6.1.2.2 The impact of the UK inflation rate on the volatility of underlying stocks and their DRs

This section represents the impact of the UK inflation rate of underlying stocks and their corresponding depositary receipts on their volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.4: The impact of the UK inflation rate on the volatility of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the volatility of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Inflation Rate (CPI)	Domestic country	+***	+***	Accept	Accept
	Foreign countries	+***	+***	Accept	Accept

As illustrated in table 6.4, it is notable that the UK inflation rate has a significant and positive influence on the volatility of the underlying stocks which are traded in the UK. Also, there is a positive and significant influence of the UK inflation rate on the volatility of DRs traded in different foreign countries. These results matched with Engle and Rangel (2005) who concluded that countries with high inflation rate experience large stock volatilities.

6.1.2.3 The impact of UK GDP on the volatility of underlying stocks and their DRs

This section discusses the impact of the UK GDP on underlying stocks and their corresponding depositary receipts volatility when applying (UKCI) and (FCCI).

Table 6.5: The impact of the UK GDP on the volatility of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK GDP on the volatility of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK GDP	**Domestic country**	-	-	**Reject**	**Reject**
	Foreign countries	-	+	**Reject**	**Reject**

As shown in table 6.5 there is an insignificant impact of the UK GDP on the volatility of underlying stocks that are traded in the UK along with the corresponding DRs which are traded in foreign markets when both of corruption indices (UKCI and FCCI) are applied respectively. These results are consistent with Morelli (2002) who examined the impact of GDP on the stocks volatility but the results show that GDP cannot explain, by any means, the stock market volatility.

6.1.2.4 The impact of the UK interest rate on the volatility of underlying stocks and their DRs

This section illustrates the impact of the UK interest rate on underlying stocks and their corresponding DRs volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.6: The impact of the UK interest rate on the volatility of underlying stocks and their DRs

This table shows the GLS regression's results for the impact of the UK interest rate on the volatility of underlying stocks that are traded in the UK and their respective DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows; ** = P ≤ 0.05 (5%) and * = P ≤ 0.10 (10%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Interest Rate (IR)	**Domestic country**	+*	+*	**Accept**	**Accept**
	Foreign countries	+**	+**	**Accept**	**Accept**

As shown in table 6.6 there is a positive significant impact of the UK interest rate on the volatility of underlying stocks traded in the UK along with the corresponding DRs which are traded in foreign markets. These results are consistent with (Karolyi, 2001) who stated that interest rate has a significant and positive impact on the stock market volatility. He argued that any increase in interest rate may discourage the investors to trade in stocks due to the high level of risk associated with stock trade especially when applied on the investors' portfolios, which make the volatility of the stocks more sensitive to any changes in interest rate.

6.1.2.5 The impact of the UK exchange rate on the volatility of DRs

The following section includes the impact of the UK exchange rate on depositary receipts volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.7: The impact of the UK exchange rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK exchange rate on the volatility of the DRs that are traded in foreign countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; * = P ≤ 0.10 (10%).

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Exchange Rate (ER)	Domestic country				
	Foreign countries	-*	-	Reject	Reject

Table 6.7 represents the impact of the UK exchange rate on depositary receipts volatility when applying corruption indices (UKCI) and (FCCI). It shows that there is a significant negative impact of the exchange rate on the DRs volatility which are traded in foreign countries when applying UKCI only. This means that any increase in exchange rate may reduce the volatility of the DRs markets. This is may be due to the different country-wide factors and political conditions of the foreign countries, which collectively may result in misleading findings.

Hence, the current thesis classifies the foreign countries results into; European, non-European, developed and developing countries as each group may carry similar conditions and characteristics, to a certain extent, and consequently, results may be more accurate than the general results that extracted from the foreign countries data.

However, in light of FCCI, the UK exchange rate has an insignificant impact on the DRs volatility that are traded in these countries. This result is stated in accordance with Suriani et al. (2015) who proposed that there is a very weak association between the exchange rate and stock market volatility. The reason is that stock markets are significantly affected by other macroeconomic factors such as inflation rate and interest rate.

6.1.2.6 The impact of country corruption on the volatility of underlying stocks and their DRs

A- The UK Corruption Index (UKCI)

Table 6.8: The impact of UKCI on the volatility of underlying stocks and their DRs

This table shows the impact of the UK corruption (UKCI) on the volatility of underlying stocks that are traded in the UK and DRs that are traded in foreign countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows; *** = P ≤ 0.01 (1%) and * = P ≤ 0.10 (10%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
UKCI	**Domestic country**	**-***	**Reject**
	Foreign countries	**+*****	**Accept**

B- Foreign Country Corruption Index (FCCI)

Table 6.9: The impact of FCCI on the volatility of underlying stocks and their DRs

This table shows the impact of the foreign country corruption (FCCI) on the volatility of underlying stocks that are traded in the UK and DRs that are traded in foreign countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; * = P ≤ 0.10 (10%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
FCCI	**Domestic country**	**-***	**Reject**
	Foreign countries	**+**	**Reject**

This thesis seeks to investigate whether the volatility of the underlying stocks and their corresponding DRs is affected by the home country corruption or the foreign country corruption or both of them.

Therefore, tables 6.8 and 6.9 show the results of the influence of corruption factors (UKCI and FCCI) on the volatility of the underlying stocks that are traded in the UK and their corresponding DRs that are traded in different foreign countries.

As illustrated in table 6.8 and 6.9, UK corruption has a significant and negative effect on the volatility of underlying stocks that are traded in the UK. Concerning the impact of UKCI on DRs volatility, table 6.8 illustrates that there is a significant and positive impact of UKCI on the DRs volatility of the foreign countries taken as a whole, as the increased level of corruption of the UK leads to an increase in the risk of investments in these foreign countries. This relation derived from the fact that the UK, especially London, is considered as one of the largest financial centres worldwide, therefore, it has a sound influence which may extend beyond its borders even if it is not actually among the corrupt countries (TI-UK, 2011). However FCCI has an insignificant effect on the volatility of DRs that are traded in foreign countries taken as a whole.

6.2 Group (2) European and non-European countries

This section includes all relevant data analysis and the relevant findings of the impact of liquidity and country-wide factors on the volatility of the DRs that are traded in different European and non-European countries.

6.2.1 Results of GLS regression of volatility models

Tables 6.10 and 6.11 illustrate the regression results of the impact of liquidity and the UK country-wide factors on the volatility of DRs which are traded in European and non-European countries in light of applying UKCI and FCCI respectively.

Table 6.10: Regression results of impact of liquidity and the UK country-wide factors on the volatility of DRs (Effect of the UK corruption: UKCI) (Group 2: European and non-European countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs volatility. It includes the impact of the UK corruption (UKCI) for group (2): European and non-European countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Volatility: Group (2): European and Non-European countries

First: UKCI

Dependent variable/ Volatility	European countries				Non -European countries			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	-1.9214 ***	-1.92329 ***	-1.6186 ***	-1.5343 ***	-2.3277 **	-2.23896 **	-1.90105 ***	-1.750633 ***
Liquidity P-value	-0.0047 ***	-0.0038 **	-0.0012 ***	-0.00085 **	0.0076182 ***	0.0075 ***	0.0152915 ***	0.000422 ***
UKCI P-value	0.2912	0.288	-0.0482	-0.04915	0.36388	0.3308	0. 638	0.0201882
The UK Inflation P-value	0.00171 ***	0.00185 ***	0.00016 ***	0.000535 ***	0.00228 ***	0.0019 ***	0.0106246 *	0.0001837 **
The UK GDP P-value	-52.0935	-50.046	-9.98	-22.8309	-87.764	-192.4036	-7.51	-43.70973
The UK Interest Rate P-value	0.04408 ***	0.044422 ***	0.0018 *	0.0306 ***	0.0743 ***	0.0857 ***	0.0982362 ***	0.0242193 ***
The UK Exchange Rate P-value	0.007697	-0.00423	0.01385	-0.00608	0.01437	0.03989	-3.7796	0.0243499
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.3794				Prop > chi2 0.033			

Table 6.11: Regression results of impact of liquidity and the UK country-wide factors on the volatility of DRs (Effect of foreign country corruption: FCCI) (Group 2: European and non-European countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs volatility. It includes the impact of the foreign country corruption (FCCI) for group (2): European and non-European countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).**

Volatility: Group (2): European and Non-European countries

<u>Second: FCCI</u>

Dependent variable/ Volatility	**European countries**				**Non -European countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant	-1.0092	-1.0779	-1.6370	-1.5046	-0.8757	-0.99676	-0.562647	-1.693
P-value	***	***	***	***	***	***	***	***
Liquidity	-0.0049	-0.004	-0.0018	-0.00096	0.00844	0.007732	0.0152915	0.000425
P-value	***	**	***	***	***	***	***	***
FCCI	-0.15103	-0.1217	-0.0375	-0.06263	-0.3662	-0.2896	-1.15397	-0.008627
P-value					***	***	***	***
The UK Inflation	0.00177	0.0019	0.00012	0.0005	0.00198	0.00166	0.0038102	0.0001733
P-value	***	***	***	***	***	**	***	**
The UK GDP	-23.4114	-22.827	-11.408	21.17233	-37.848	-145.438	-9.408	-40.414
P-value								
The UK Interest Rate	0.04508	0.04542	0.00463	0.03015	0.0787	0.0893	0.1558232	0.023595
P-value	***	***	***	***	***	***	***	***
The UK Exchange Rate	0.00998	-0.00197	0.02322	-0.00497	0.12279	0.13182	0.7319	0.0263524
P-value								
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop > F ***
Mundlak Approach	Prop > chi2 0.1538				Prop > chi2 0.0023			

This group includes 17 European markets in 6 European countries, in addition to the non-European group which includes 18 markets where DRs are traded in 12 non-European countries. According to Mundlak approach, table 6.10 shows that chi2 value is equal to 0.379. Thus random effect method has been selected for the European countries aspect of this group, while it supports the fixed effect method for non-European countries as chi2 value is equal to 0.033. For the random effect method of the European countries, table 6.10 shows that both the UK inflation rate and the UK interest rate have a positive and significant relationship on DRs volatility, however, liquidity has a negative influence on DRs volatility. On the other side, the UK GDP, the UK exchange rate and UKCI have insignificant effects on DRs volatility in European countries. Also, table 6.10 shows that the variables that have a positive significant effect on the DRs volatility in non-European countries are liquidity, the UK inflation and the UK interest rate. Though, the UK GDP, the UK exchange rate and UKCI have insignificant effects on DRs volatility in non-European countries. Hence, table 6.10 shows that for the European countries, any increase in trading volume by one unit leads to a decrease in DRs volatility by 0.38%. In addition, any increase by 1% in the UK inflation rate leads to an increase in DRs volatility by 0.19%. Moreover, any increase in the UK interest rate by 1% leads to an increase of DRs volatility by 4.44%.

For the non-European countries any increase in trading volume by one DR leads to an increase in DRs volatility by 0.76% while any increase in the UK inflation rate by 1% leads to an increase in DRs volatility by 0.23%. As well, any increase in the UK interest rate by 1% leads to an increase in DRs volatility by 8.57%.

As illustrated in table 6.11, Foreign Country Corruption Index (FCCI) is applied for each corresponding country where DRs are traded. Specifically, 6 corruption indices are applied on their respective European countries and 12 indices for the non-European indices. For European countries category, Mundlak approach illustrates in table 6.11 that the value of chi2 is equal to

0.1538, consequently, random effect method has been selected. Also, it supports the fixed effect method for non-European countries category, as the value of chi2 is equal to 0.0023.

For the random effect method of the European countries, table 6.11 shows that the UK inflation rate and the UK interest rate have a positive and significant effect on DRs volatility, nevertheless, liquidity has a negative significant influence on DRs' volatility. However, the UK GDP, FCCI, and the UK exchange rate have insignificant effects on DRs volatility which are traded in European countries. For non-European countries category, table 6.11 illustrates that variables which have a significant positive impact on the DRs volatility are liquidity, the UK inflation and the UK interest rate, though, FCCI has a negative effect on the DRs volatility. Also, the UK GDP and exchange rate have insignificant effects on DRs volatility in non-European countries category.

For European countries category, table 6.11 shows that any increase in trading volume (as a proxy of liquidity) by one unit leads to a decrease in DRs volatility by 0.40%. In addition, any increase by 1% in the UK inflation rate leads to an increase in DRs volatility by 0.19%. Also, any increase in the UK interest rate by 1% leads to an increase of DRs volatility by 4.54%. For non-European countries category, increase in trading volume (as a proxy of liquidity) by one DR leads to an increase in DRs volatility by 0.84% while any increase in the UK inflation rate by 1% leads to an increase in DRs volatility by 0.20%. Furthermore, any increase in the UK interest rate by 1% leads to an increase in DRs volatility by 7.87%. However, any increase in FCCI by 1% leads to a decrease in DRs volatility by 36.62%.

6.2.2 Discussion of hypotheses' results

In this section the impact of the liquidity and country-wide factors on the volatility of DRs is discussed in light of the two categories of group (2); European and non-European countries.

6.2.2.1 The impact of liquidity on the volatility of DRs

This section represents the impact of the liquidity of DRs on their volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.12: The impact of liquidity on the volatility of DRs

This table shows the GLS regression's results for the impact of liquidity on the volatility of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;*** = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
Liquidity	**European countries**	**-****	**-****	**Accept**	**Accept**
	Non-European countries	**+*****	**+*****	**Reject**	**Reject**

As showed in table 6.12, liquidity has a negative and significant influence on the DRs volatility that are traded in the European countries. This result is supported by Holden et al. (2014) who highlighted the importance of stock liquidity in terms of trading a significant quantity of the stocks at a low cost and in short period of time in order to minimise their volatility. It is shown that investing in DRs, which are traded in European countries can be considered as one of the mechanisms to obtain the benefits of the international diversified investments. Also, through DRs investments, investors can form a well-diversified international portfolio which maximises its returns and minimises its volatility by investing in more than one market across different European countries. Furthermore, to emphasise the acceleration of the process of converting DRs into cash quickly, investors have to take into consideration that the more the trading volume of DRs, the less the risk that they will face. In contrast to this result, high liquidity has a significant and positive impact on the volatility of DRs that are traded in non-European countries. This may be due to the fact that more liquidity means high return which is almost associated with high risk (Hasan et al., 2012). Therefore, because of DRs internationalisation nature and the validity of trading them in different markets across different countries, it is preferable to select the countries with less risky investments' markets (i.e. European markets) and avoid DRs investments in more risky markets (non-European markets), taken into consideration that liquidity has the same impact on volatility in light of applying UKCI or FCCI.

6.2.2.2 The impact of the UK inflation rate on the volatility of DRs

This section represents the impact of the UK inflation rate on DRs volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.13: The impact of the UK inflation rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the volatility of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;* = P ≤ 0.01 (1%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Inflation Rate (CPI)	European countries	+***	+***	Accept	Accept
	Non-European countries	+***	+***	Accept	Accept

As shown in table 6.13, when foreign countries are classified into European and non-European in light of applying UKCI and FCCI respectively, it is observed that the UK inflation rate has a significant and positive impact on the volatility of DRs that are traded in these countries. These results are supported by Bekaert and Engstrom (2010) who argued that high inflation rate is consistent with periods of uncertainty which reasonably increases returns and their associated volatility. Also, this result is consistent with Najand and Rahman (1992) who found that there is a positive relationship between inflation volatility and stock return volatility.

6.2.2.3 The impact of the UK GDP on the volatility of DRs

This section discusses the impact of the UK GDP on DRs volatility in light of applying (UKCI) and (FCCI).

Table 6.14: The impact of the UK GDP on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK GDP on the volatility of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK GDP	**European countries**	-	-	**Reject**	**Reject**
	Non-European countries	-	-	**Reject**	**Reject**

As shown in table 6.14, in light of applying both types of corruption; UKCI and FCCI, there is an insignificant impact of the UK GDP on the volatility of DRs which are traded in European and non-European markets. These results are consistent with Zakaria and Shamsuddin (2012) who didn't find any relationship between the changes of the annual GDP and the stock market volatility.

6.2.2.4 The impact of the UK interest rate on the volatility of DRs

This section illustrates the impact of the UK interest rate on DRs volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.15: The impact of the UK interest rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK interest rate on the volatility of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Interest Rate (IR)	**European countries**	+***	+***	**Accept**	**Accept**
	Non-European countries	+***	+***	**Accept**	**Accept**

As illustrated in table 6.15, when applying UKCI and FCCI respectively, there is a significant positive impact of the UK interest rate on the volatility of DRs which are traded in European and non-European countries. These findings are matched with Barsky (1989) and Kasman et al. (2011) who argued that there is a positive impact of interest rate on stock volatility. Also, these results are matched with Kumari and Mahakud (2015) who found that the stock market volatility is very sensitive to the fluctuations in interest rate.

6.2.2.5 The impact of the UK exchange rate on the volatility of DRs

The following section includes the impact of the UK exchange rate on the volatility of DRs when applying corruption indices (UKCI) and (FCCI).

Table 6.16: The impact of the UK exchange rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK exchange rate on the volatility of DRs that are traded in European and non-European countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Exchange Rate (ER)	**European countries**	**-**	**-**	**Reject**	**Reject**
	Non-European countries	**+**	**+**	**Reject**	**Reject**

As illustrated in table 6.16 which represents the impact of the UK exchange rate on DRs volatility that are traded in European and non-European countries when applying UKCI and FCCI, there is an insignificant impact of the exchange rate on the DRs volatility.

This result is consistent with Bhattacharya (2012) who argued that there is no significant interaction between changes of exchange rate and the stock market volatility. Actually, this view contradicts with the prevailing financial theory which states that the upward and downward exchange rate movements contribute significantly in the changes of stocks volatility.

6.2.2.6 The impact of country corruption on the volatility of DRs

A- The UK Corruption (UKCI)

Table 6.17: The impact of UKCI on the volatility of DRs

This table shows the impact of the UK corruption (UKCI) on the volatility of DRs that are traded in European and non-European countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
UKCI	**European countries**	+	**Reject**
	Non-European countries	+	**Reject**

B- Foreign Country Corruption Index (FCCI)

Table 6.18: The impact of FCCI on the volatility of DRs

This table shows the impact of the foreign country corruption (FCCI) on the volatility of DRs that are traded in European and non-European countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; *** = P ≤ 0.01 (1%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
FCCI	**European countries**	**-**	**Reject**
	Non-European countries	**-*** **	**Accept**

Tables 6.17 and 6.18 show the results of the impact of corruption index (UKCI and FCCI) on the volatility of DRs that are traded in European and non-European countries. It is observed that UKCI has an insignificant impact on the volatility of the DRs traded in European and non-European countries whereas FCCI has an insignificant influence on DRs volatility that are traded in European countries only. However, FCCI has a significant and negative impact on the volatility of DRs that are traded in non-European countries. This result is consistent with Spyromitros (2020), Zhang (2012) and Peng and Luo (2000) who found that corruption may decrease the drawbacks of businesses uncertainty in non-European countries which may reduce the investments volatility in the stock markets across these countries.

6.3 Group (3) Developed and developing countries

This section includes all relevant data analysis and findings of the impact of liquidity and country-wide factors on the volatility of the DRs that are traded in different developed and developing countries.

6.3.1 Results of GLS regression of volatility models

Tables 6.19 and 6.20 illustrate the regression results of the impact of liquidity and the UK country-wide factors on the volatility of DRs which are traded in developed and developing countries in light of applying UKCI and FCCI respectively.

Table 6.19: Regression results of impact of liquidity and the UK country-wide factors on the volatility of DRs (Effect of the UK corruption: UKCI) (Group 3: Developed and developing countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs volatility. It includes the impact of the UK corruption (UKCI) for group (3): developed and developing countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Volatility: Group (3): developed and developing countries

<u>First: UKCI</u>

Dependent variable/ Volatility	**Developed countries**				**Developing countries**			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	-1.985 ***	-2.0018 ***	-1.7772 ***	-1.5475 ***	-0.48389	-6.6039	-1.1956	-6.175075
Liquidity P-value	-0.0037 ***	-0.0029 **	-0.0003 ***	-0.00091 **	0.01094 **	0.0161 *	0.01038 **	0.017235 *
UKCI P-value	0.30346	0.3108	0.02209	0.05699	-1.2639 *	-2.451 *	-2.02209 **	-2.230019 *
The UK Inflation P-value	0.00157 ***	0.00156 ***	0.00004 ***	0.000403 ***	-0.0055	0.000216	0.001236	0.0000371
The UK GDP P-value	-81.60	-89.578	-22.384	-16.396	749.498	605.9575	38.644	756.7607
The UK Interest Rate P-value	0.04524 ***	0.04777 ***	0.0019 **	0.02399 ***	-0.0539	-0.1224	-0.146	-0.121698
The UK Exchange Rate P-value	0.03712 *	0.02106	0.0049	0.00259	2.3495 ***	1.6105 *	2.842 **	1.564 **
Model significance	Prop >F ***	Prop > chi2 ***	Prop> chi2 ***	Prop >F ***	Prop >F ***	Prop > chi2 ***	Prop> chi2 ***	Prop >F ***
Mundlak Approach	Prop > chi2 0.1885				Prop > chi2 0.000			

Table 6.20: Regression results of impact of liquidity and the UK country-wide factors on the volatility of DRs (Effect of foreign country corruption: FCCI) (Group 3: Developed and developing countries)

This table shows the effect of liquidity and the UK country-wide factors on DRs volatility. It includes the impact of the foreign country corruption (FCCI) for group (3): developed and developing countries. It displays the results of all thesis models for four regression methods; Generalised Least Squares (GLS) Fixed Effect Estimator (FE), Generalised Least Squares (GLS) Random Effect Estimator (RE), Weighted Least Square (WLS) and Robust Regression. Firstly, fixed and random methods are run. Then, Mundlak approach is applied to select the most convenient one of them according to chi2 value. Fixed effect method is selected when chi2 value is less than 0.05 whereas random effect method is selected when chi2 value is greater than 0.05. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

Volatility: Group (3): developed and developing

Second: FCCI

Dependent variable/ Volatility	Developed countries				Developing countries			
	Method 1 Fixed	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**	**Method 1 Fixed**	**Method 2 Random**	**Method 3 WLS**	**Method 4 Robust**
Constant P-value	-1.7738 ***	-1.6447 ***	-1.7558 ***	-1.7534 ***	-0.48389	-1.2956 ***	-1.7058 ***	-1.322507 ***
Liquidity P-value	-0.00322 **	-0.00268 *	-0.0003 ***	-0.00062 *	0.0055 ***	0.3245 **	0.0302 *	0.03182 *
FCCI P-value	0.19974	0.13948	0.01421	0.04349	-0.4491 **	-0.34489 **	-0.993 *	-0.32577 *
The UK Inflation P-value	0.00168 ***	0.00164 ***	0.00006 ***	0.000412 ***	-0.0066	-0.000889	-0.00133	-0.0008
The UK GDP P-value	-62.0965	-67.43	-20.675	-3.3977	818.90	782.8821	361.675	756.7607
The UK Interest Rate P-value	0.04844 ***	0.0503 ***	0.00136 ***	0.02464 ***	-0.0548	-0.1205	-0.0136	-0.1177183
The UK Exchange Rate P-value	0.02884	0.0176	0.00362	0.000445	2.906 **	2.2216 *	1.00362 **	2.193812 *
Model significance	Prop > F ***	Prop > chi2 ***	Prop > chi2 ***	Prop >F ***	Prop >F ***	Prop > chi2 ***	Prop > chi2 ***	Prop >F ***
Mundlak Approach	Prop > chi2 0.0054				Prop > chi2 0.0007			

This group includes 27 developed markets in 11 developed countries in addition to 8 emerging markets across 7 developing countries. As shown in table 6.19, Mundlak approach suggests using random effect method for the developed countries category as chi2 is equal to 0.1885 which is greater than 0.05, while it suggests using fixed effect method for developing countries category with as chi2 value 0.000.

For the random effect method of the developed countries, table 6.19 shows that the UK inflation rate and the UK interest rate have a positive and significant effect on DRs volatility, however, liquidity has a significant negative influence on DRs volatility. Also, the UK GDP, UKCI, and the UK exchange rate have insignificant effects on DRs volatility which are traded in the relevant developed countries. For the fixed effect method of the developing countries, table 6.19 shows that liquidity and the UK exchange rate have a significant positive effect on DRs volatility, while, UKCI has a significant negative influence on DRs volatility. However, the UK inflation rate, the UK GDP, and the UK interest rate have insignificant effects on DRs volatility which are traded in the relevant developing countries.

Also, for the developed countries category, table 6.19 shows that any increase in trading volume by one unit leads to a decrease in DRs volatility by 0.30%. In addition, any increase by 1% in the UK inflation rate leads to an increase in DRs volatility by 0.16%. Also, any increase in the UK interest rate by 1% leads to an increase of DRs volatility by 4.78%.

For developing country category, table 6.19, illustrates that any increase in trading volume by one DR leads to an increase in DRs volatility by 1.10%. In addition, any increase by one GBP leads to an increase in DRs volatility by 234.95%. However, any increase in UKCI by 1% leads to a decrease in DRs volatility by 112.60%.

As shown in table 6.20, when FCCI is applied, Mundlak approach suggests using fixed effect method for both categories; the developed countries and developing countries as the values of chi2 are equal to 0.0054 and 0.000 respectively.

For the fixed effect method of the developed countries, table 6.20 shows that the UK inflation rate and the UK interest rate have a positive effect on DRs volatility, whereas, liquidity has a negative significant influence on DRs volatility. However, the UK GDP, exchange rate and FCCI have insignificant effects on DRs volatility which are traded in the relevant developed countries.

For the fixed effect method of the developing countries, table 6.20 illustrates that liquidity and exchange rate have a positive significant effect on DRs volatility, while, FCCI has a negative significant influence on DRs volatility. Though, the UK inflation rate, the UK interest rate and the UK GDP have insignificant effects on DRs volatility which are traded in the relevant developing countries.

For developed countries, table 6.20 exhibits that any increase in trading volume (as a proxy of liquidity) by one unit leads to a decrease in DRs volatility by 0.32%. In addition, any increase by 1% in the UK inflation rate leads to an increase in DRs volatility by 0.17%. Also, any increase in the UK interest rate by 1% leads to an increase of DRs volatility by 4.84%. On the other hand, table 6.20 shows that for the developing countries, any increase in trading volume (as a proxy of liquidity) by one DR leads to an increase in DRs volatility by 0.55%.

In addition, any increase by one GBP leads to an increase in DRs volatility by 290.60%. However, any increase in FCCI by 1% leads to a decrease in DRs volatility by 44.91%.

6.3.2 Discussion of hypotheses' results

In light of the relevant hypotheses' results, the effect of liquidity and the UK country-wide factors on the volatility of DRs is discussed in terms of the two categories of group (2) European and non-European countries.

6.3.2.1 The impact of liquidity on the volatility of DRs

This section represents the impact of the liquidity of DRs on their volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.21: The impact of liquidity on the volatility of DRs

This table shows the GLS regression's results for the impact of liquidity on the volatility of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
Liquidity	**Developed countries**	-**	-**	**Accept**	**Accept**
	Developing countries	+**	+***	**Reject**	**Reject**

As observed in table 6.21, whether applying UKCI or FCCI, liquidity has a negative and significant influence on the volatility of the DRs that are traded in the developed countries. This result is supported by Officer and Hoffmeister (1987) and Johnson and Walther (2011) who reached the same result as both studies asserted that if DRs are used as an alternative to direct investment in foreign equities, liquidity risks of DRs can be reduced. Whereas the current thesis supports Schaub (2019) who mentioned that the main purpose behind DRs investments is to get the benefits of the international diversification through investing in different markets and countries in such a way as to offset losses as investments in DRs can be considered as one of the most popular way to own foreign investments. Therefore, in order to reduce the risk of DRs investments, well-diversified portfolio can be formed from different markets to enhance the opportunity to liquidate them quickly. Consequently, according to our results, it is recommended to invest in less risky markets in developed countries to obtain the benefits of the international diversified investments rather than the developing countries in which the liquidity in their emerging markets has a significant and positive impact on DRs volatility.

6.3.2.2 The impact of the UK inflation rate on the volatility of DRs

This section represents the impact of the UK inflation rate of DRs on their volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.22: The impact of the UK inflation rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK inflation rate on the volatility of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Inflation Rate (CPI)	Developed countries	+***	+***	Accept	Accept
	Developing countries	-	-	Reject	Reject

As illustrated in table 6.22, in light of applying UKCI and FCCI, the UK inflation rate has a significant positive impact on the volatility of DRs that are traded in developed countries. However, it has an insignificant effect on the volatility of DRs that are traded in developing countries. This result is consistent with Aliyu (2012) who emphasised on the insignificant effect of the inflation rate on stocks fluctuations. Also, it is on the same way of Hondroyiannis and Papapetrou (2006) who found that there is no relationship between changes that occur in the inflation rate and any changes in the performance of stocks that are traded in Athens stock exchange.

As well, the study of Limpanithiwat and Rungsombudpornkul (2010) concluded the same result for the stock exchange of Thailand as it was affected substantially by the political tension which may be the reason behind the insignificant role of inflation.

6.3.2.3 The impact of the UK GDP on the volatility of DRs

This section discusses the impact of the UK GDP on the volatility of DRs when applying (UKCI) and (FCCI).

Table 6.23: The impact of the UK GDP on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK GDP on the volatility of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected.					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK GDP	**Developed countries**	-	-	**Reject**	**Reject**
	Developing countries	+	+	**Reject**	**Reject**

As shown in table 6.23, there is an insignificant impact of the UK GDP on the volatility of DRs that are traded in developed and developing countries. These results are consistent with Wang (2010) who found that there is no relationship between GDP volatility and the stock market volatility which means that GDP does not significantly affect stock volatility. These results are concluded when applying UKCI and FCCI respectively.

6.3.2.4 The impact of the UK interest rate on the volatility of DRs

This section illustrates the impact of the UK interest rate on DRs volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.24: The impact of the UK interest rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK interest rate on the volatility of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows;*** = P ≤ 0.01 (1%).					
Variable	**Group**	**GLS regression Model**		**Accept/Reject the hypothesis**	
		The UK corruption UKCI	**Foreign country corruption FCCI**	**The UK corruption UKCI**	**Foreign country corruption FCCI**
The UK Interest Rate (IR)	**Developed countries**	+***	+***	**Accept**	**Accept**
	Developing countries	-	-	**Reject**	**Reject**

As shown in table 6.24, in light of applying UKCI and FCCI, there is a positive and significant effect of the UK interest rate on the volatility of DRs that are traded in developed countries. This result is consistent with López and Navarro (2013) and Engle and Rangel (2005) who argued that volatility in macroeconomic variables (e.g. interest rate) is a key explanatory factor that affects significantly the stocks volatility. However, the current thesis results show that the impact of interest rate on developing countries is insignificant which is supported by Léon (2008) who concluded that interest rate changes are not really accountable for stock market volatility as interest rate can be considered a weak predictive power for stock volatility.

6.3.2.5 The impact of the UK exchange rate on the volatility of DRs

This section illustrates the effect of the UK exchange rate on DRs volatility when applying corruption indices (UKCI) and (FCCI).

Table 6.25: The impact of the UK exchange rate on the volatility of DRs

This table shows the GLS regression's results for the impact of the UK exchange rate on the volatility of DRs that are traded in developed and developing countries in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%) and ** = P ≤ 0.05 (5%).**

Variable	Group	GLS regression Model		Accept/Reject the hypothesis	
		The UK corruption UKCI	Foreign country corruption FCCI	The UK corruption UKCI	Foreign country corruption FCCI
The UK Exchange Rate (ER)	Developed countries	+	+	Reject	Reject
	Developing countries	+***	+**	Accept	Accept

Table 6.25 represents the impact of the UK exchange rate on depositary receipts volatility when applying corruption indices (UKCI) and (FCCI). It shows that there is an insignificant impact of the exchange rate on the DRs volatility which are traded in developed countries. This result is matched with Ong and Izan (1999) who concluded that there is a very weak relationship between the stock market performance and changes in exchange rates. However, it has a significant positive impact on the volatility of DRs that are traded in developing countries. This result is consistent with Kumari and Mahakud, (2015) who stated that the volatility of the

exchange rate affects significantly the stock market volatility. Similarly, this result is supported by Mechri et al. (2018) who found that the volatility of the exchange rate has a positive and significant impact on the fluctuations (i.e. volatility) of the stock market.

6.3.2.6 The impact of country corruption on the volatility of DRs

A- The UK Corruption (UKCI)

Table 6.26: The impact of UKCI on the volatility of DRs

This table shows the impact of the UK corruption (UKCI) on the volatility of DRs that are traded in developed and developing countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows; * = P ≤ 0.10 (10%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
UKCI	**Developed countries**	**+**	**Reject**
	Developing countries	**-***	**Reject**

B- Foreign Country Corruption Index (FCCI)

Table 6.27: The impact of FCCI on the volatility of DRs

This table shows the impact of the foreign country corruption (FCCI) on the volatility of DRs that are traded in developed and developing countries. Accordingly, the table displays whether the relevant hypothesis is accepted or rejected. Statistical significance level is denoted as follows ** = P ≤ 0.05 (5%).			
Variable	**Group**	**GLS regression Model**	**Accept/Reject the hypothesis**
FCCI	**Developed countries**	**+**	**Reject**
	Developing countries	**-****	**Accept**

As illustrated in table 6.26 and 6.27, UKCI and FCCI have an insignificant effect on the volatility of DRs that are traded in developed countries. Nevertheless, they have a significant and negative impact on the volatility of DRs that are traded in developing countries.

These results are consistent with Chêne (2014) and Lau et al. (2013) who stated that corruption may reduce the volatility of the emerging markets as corruption is considered an efficient tool to overcome the inefficiencies in the administrative procedures and their associated red tape in the economic systems of the relevant developing countries.

6.4 Summary of hypotheses' results

According to the previous results and findings concerning the impact of liquidity and country-wide factors on the volatility of the underlying stocks and their respective DRs, the following hypothesis is accepted partially as some of these country-wide factors have no significant impact on volatility.

H2: There are significant impacts of liquidity and country-wide factors on the volatility of underlying stocks and their corresponding depositary receipts.

Moreover, the following hypothesis is accepted partially as the UK corruption has a negative impact on volatility of the underlying stocks and their corresponding depositary receipts that are traded in developing countries, whereas, the UK exchange rate has a negative impact on volatility of depositary receipts that are traded in foreign countries.

H2.1 There are positive impacts of the UK corruption, the UK inflation rate, the UK interest rate and the UK exchange rate on the volatility of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately.

Furthermore, the following hypothesis is accepted partially as liquidity has a positive impact on volatility of depositary receipts that are traded in foreign, non-European and developing countries, whereas the UK GDP has no significant impact on the volatility of underlying stocks and their corresponding depositary receipts.

H2.2 There are negative impacts of liquidity and the UK GDP on the volatility of underlying stocks and their corresponding depositary receipts that are traded in foreign countries collectively and in European, non-European, developed and developing countries separately.

Lastly, the following hypothesis is accepted partially as the data analysis showed that foreign country corruption has an insignificant impact on volatility of depositary receipts except its significant negative impact on depositary receipts volatility that are traded in non-European and developing countries.

H2.3 There are positive impacts of foreign country corruption on the volatility of depositary receipts that are traded in foreign countries collectively, and in European and developed countries separately whereas it has negative impacts on the volatility of depositary receipts that are traded in non-European and developing countries separately.

6.5 Conclusion

This chapter contains the data analysis and the empirical findings of the volatility model. Table 6.28 summarises GLS results for all of the thesis variables classified into the three groups; domestic and foreign, European and non-European and lastly developed and developing countries. Also, it illustrates whether each hypothesis associated with each variable is accepted or rejected in order to determine explicitly the impact of liquidity and country-wide factors on the volatility of underlying stocks and their corresponding DRs.

Table 6.28: Summary of the volatility models' results

This table shows a summary of the expected signs of the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the volatility of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. Also it displays the summary of GLS regression's results and the decision of whether to accept or reject the relevant hypotheses in light of the UK corruption (UKCI) and the foreign country corruption (FCCI). Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

GROUPS	Independent Variable	Expected sign		GLS regression Model		Accept/ Reject Hypothesis	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	-	-	-***	-***	Accept	Accept
	UKCI	+		-*		Reject	
	FCCI		+		-*		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	-	-	-	-	Reject	Reject
	The UK interest Rate	+	+	+*	+*	Accept	Accept
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	-	-	+**	+**	Reject	Reject
	UKCI	+		+***		Accept	
	FCCI		+		+		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	-	-	-	+	Reject	Reject
	The UK interest Rate	+	+	+**	+**	Accept	Accept
	The UK exchange Rate	+	+	-*	-	Reject	Reject

GROUPS	Independent Variable	Expected sign		GLS regression Model		Accept/ Reject Hypothesis	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	-	-	-**	-**	Accept	Accept
	UKCI	+		+		Reject	
	FCCI		+		-		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	-	-	-	-	Reject	Reject
	The UK interest Rate	+	+	+***	+***	Accept	Accept
	The UK exchange Rate	+	+	-	-	Reject	Reject
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	-	-	+***	+***	Reject	Reject
	UKCI	+		+		Reject	
	FCCI		-		-***		Accept
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	-	-	-	-	Reject	Reject
	The UK interest Rate	+	+	+***	+***	Accept	Accept
	The UK exchange Rate	+	+	+	+	Reject	Reject
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	-	-	-**	-**	Accept	Accept
	UKCI	+		+		Reject	
	FCCI		+		+		Reject
	The UK inflation rate	+	+	+***	+***	Accept	Accept
	The UK GDP	-	-	-	-	Reject	Reject
	The UK interest Rate	+	+	+***	+***	Accept	Accept
	The UK exchange Rate	+	+	+	+	Reject	Reject

GROUPS	Independent Variable	Expected sign		GLS regression Model		Accept/ Reject Hypothesis	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	-	-	+**	+***	Reject	Reject
	UKCI	+		-*		Reject	
	FCCI		-		-**		Accept
	The UK inflation rate	+	+	-	-	Reject	Reject
	The UK GDP	-	-	+	+	Reject	Reject
	The UK interest Rate	+	+	-	-	Reject	Reject
	The UK exchange Rate	+	+	+***	+**	Accept	Accept

Chapter Seven

Robustness Tests

Chapter 7

Robustness tests

Many widely applied regression techniques, such as OLS, have reliable results if their underlying assumptions are true, however it may give misleading results if these assumptions are not true. Robust regression is designed to be not overly impacted by violations of assumptions by the underlying data-generating process (Anderson, 2008). Robust regression results are shown in this chapters for the impact of liquidity and country-wide factors on both models; return and volatility respectively in terms of the three groups: Group (1) domestic and foreign countries as the latter is divided into the following groups, Group (2) European and non-European countries, and lastly, Group (3) developed and developing countries.

7.1 The importance of using robustness check

Robustness check is applied in order to determine whether the main findings of data analysis are not significantly changed when different statistical methods are used. It refers to the strength of the applied statistical models, tests, and procedures according to certain statistical analysis conditions that the thesis is relied on principally. Therefore, when these conditions are sufficiently met, the applied models can be verified to be more reliable through the use of the statistical confirmation. Hence, WLS and robust regression are applied as robustness check.

7.2 WLS regression method

Weighted least squares regression (WLS) encompasses various schemes for weighting observations in order to reduce the effects of heteroscedasticity. WLS regression has several advantages over other methods as it is well-suited to extract maximum information from small data sets. Also, it is the only method that can be used for data points of varying quality. WLS results are shown below in the following two tables 7.1 and 7.2 which illustrate WLS results for return and volatility models respectively. Also, these results are compared to GLS regression results in terms of three groups; domestic and foreign countries, European and non-European countries, and lastly, developed and developing countries when applying the country corruption indices; UKCI and FCCI.

7.2.1 WLS regression results' of return

Table 7.1: WLS regression results' of return

This table shows a comparison between the GLS and WLS regression's results concerning the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the return of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. As well, it displays the decision of whether to accept or reject the relevant hypothesis of each variable. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

GROUPS	Independent Variable	GLS Regression Method		Accept/ Reject Hypothesis		WLS Regression Method	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	+***		Accept	Accept	+***	+***
	UKCI	-		Reject		-	
	FCCI						
	The UK inflation rate	+***		Accept	Accept	+***	+***
	The UK GDP	-***		Reject	Reject	-***	-***
	The UK interest Rate	-***		Accept	Accept	-***	-***
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	+***	+***	Accept	Accept	+***	+***
	UKCI	-		Reject		-	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+**	+***
	The UK GDP	-**	-***	Reject	Reject	-*	-***
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	-***	-***	Accept	Accept	-***	-***
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	+***	+*	Accept	Accept	+***	+**
	UKCI	-***		Accept		-**	
	FCCI		-***		Accept		-***
	Inflation	+***	+***	Accept	Accept	+***	+***
	GDP	-***	-***	Reject	Reject	-***	-***
	Interest Rate	-***	-***	Accept	Accept	-***	-***
	Exchange Rate	-	+	Reject	Reject	-	+

GROUPS	Independent Variable	GLS Regression Method		Accept/ Reject Hypothesis		WLS Regression Method	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	+**	+**	Accept	Accept	+**	+***
	UKCI	-		Reject		-	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	-***	-***	Accept	Accept	-***	-***
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	+***	+***	Accept	Accept	+***	+***
	UKCI	-***		Accept		-***	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-***	-***	Reject	Reject	-***	-***
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	+	+	Reject	Reject	+	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	+***	+**	Accept	Accept	+***	+**
	UKCI	-		Reject		-	
	FCCI		-		Reject		-
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	+**	+*	Accept	Accept	+***	+**
	The UK interest Rate	+	+	Reject	Reject	+	+
	The UK exchange Rate	-	-	Reject	Reject	-	-

7.2.2 WLS regression results' of volatility

Table 7.2: WLS regression results' of volatility

This table shows a comparison between the GLS and WLS regression's results concerning the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the volatility of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. As well, it displays the decision of whether to accept or reject the relevant hypothesis of each variable. Statistical significance levels are denoted as follows; *** = $P \leq 0.01$ (1%), ** = $P \leq 0.05$ (5%), and * = $P \leq 0.10$ (10%).

GROUPS	Independent Variable	GLS Regression Method		Accept/ Reject Hypothesis		WLS Regression Method	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	-***		Accept	Accept	-***	-***
	UKCI	-*		Reject		-*	
	FCCI						
	The UK inflation rate	+***		Accept	Accept	+***	+***
	The UK GDP	-		Reject	Reject	-	-
	The UK interest Rate	+*		Accept	Accept	+***	+***
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	+**	+**	Reject	Reject	+**	+**
	UKCI	+***		Accept		+***	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	+	Reject	Reject	-	-
	The UK interest Rate	+**	+**	Accept	Accept	+***	+**
	The UK exchange Rate	-*	-	Reject	Reject	-***	-

GROUPS	Independent Variable	GLS Regression Method		Accept/ Reject Hypothesis		WLS Regression Method	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	-**	-**	Accept	Accept	-***	-***
	UKCI	+		Reject		-	
	FCCI		-		Reject		-
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	+***	+***	Accept	Accept	+*	+***
	The UK exchange Rate	-	-	Reject	Reject	+	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	+***	+***	Reject	Reject	+***	+***
	UKCI	+		Reject		+	
	FCCI		-***		Accept		-***
	The UK inflation rate	+***	+***	Accept	Accept	+**	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	+***	+***	Accept	Accept	+***	+***
	The UK exchange Rate	+	+	Reject	Reject	-	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	-**	-**	Accept	Accept	-***	-***
	UKCI	+		Reject		+	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	+***	+***	Accept	Accept	+***	+***
	The UK exchange Rate	+	+	Reject	Reject	+	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	+**	+***	Reject	Reject	+**	+*
	UKCI	-*		Reject		-**	
	FCCI		-**		Accept		-*
	The UK inflation rate	-	-	Reject	Reject	+	-
	The UK GDP	+	+	Reject	Reject	+	+
	The UK interest Rate	-	-	Reject	Reject	-	-
	The UK exchange Rate	+***	+**	Accept	Accept	+***	+***

7.3 Robust regression method

Robust regression investigates the relationship between independent variables (liquidity and domestic country-wide factors (i.e. inflation rate, interest rate, GDP, exchange rate and corruption) and the dependent variables (return and volatility). Considering it as a widely used method of regression, robust regression is an alternative to least squares regression when outliers are detected in data, and it can also be used for the purpose of detecting influential observations. Robust results are shown below in the following two tables 7.3 and 7.4 which illustrate robust regression results for return and volatility models respectively. These results are compared to GLS regression results with respect to three groups; domestic and foreign countries, European and non-European countries, and lastly, developed and developing countries when applying the country corruption indices; UKCI and FCCI.

7.3.1 Robust regression results' of return

Table 7.3: Robust regression results' of return

This table shows a comparison between the GLS and robust regression's results concerning the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the return of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. As well, it displays the decision of whether to accept or reject the relevant hypothesis of each variable. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

GROUPS	Independent Variable	GLS Regression Method		Accept/ Reject Hypothesis		Robust Regression Model	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	+***		Accept	Accept	+***	+***
	UKCI	-		Reject		-	
	FCCI						
	The UK inflation rate	+***		Accept	Accept	+***	+***
	The UK GDP	-***		Reject	Reject	-***	-***
	The UK interest Rate	-***		Accept	Accept	-***	-***
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	+***	+***	Accept	Accept	+***	+***
	UKCI	-		Reject		-	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-**	-***	Reject	Reject	-**	-*
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	-***	-***	Accept	Accept	-***	-***

GROUPS	Independent Variable	GLS regression Method		Accept/ Reject Hypothesis		Robust Regression Method	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	+***	+*	Accept	Accept	+***	+***
	UKCI	-***		Accept		-***	
	FCCI		-***		Accept		-***
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-***	-***	Reject	Reject	-***	-***
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	-	+	Reject	Reject	-	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	+**	+**	Accept	Accept	+***	+***
	UKCI	-		Reject		+	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	-***	-***	Accept	Accept	-***	-***
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	+***	+***	Accept	Accept	+***	+***
	UKCI	-***		Accept		-***	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-***	-***	Reject	Reject	-***	-***
	The UK interest Rate	-***	-***	Accept	Accept	-***	-***
	The UK exchange Rate	+	+	Reject	Reject	+	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	+***	+**	Accept	Accept	+***	+**
	UKCI	-		Reject		-	
	FCCI		-		Reject		-
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	+**	+*	Accept	Accept	+***	+**
	The UK interest Rate	+	+	Reject	Reject	+	-
	The UK exchange Rate	-	-	Reject	Reject	-	-

7.3.2 Robust regression results' of volatility

Table 7.4: Robust regression results' of volatility

This table shows a comparison between the GLS and robust regression's results concerning the impact of the following variables (liquidity, UK corruption (UKCI), foreign country corruption (FCCI), UK inflation rate, UK GDP, UK interest rate and UK exchange rate) on the volatility of underlying stocks and their respective DRs according to the three mentioned groups; Group (1) domestic and foreign countries, group (2) European and non-European countries and group (3) developed and developing countries. As well, it displays the decision of whether to accept or reject the relevant hypothesis of each variable. Statistical significance levels are denoted as follows;* = P ≤ 0.01 (1%), ** = P ≤ 0.05 (5%), and * = P ≤ 0.10 (10%).**

GROUPS	Independent Variable	GLS regression Model		Accept/ Reject Hypothesis		Robust regression Model	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Domestic	Liquidity	-***		Accept	Accept	-***	-***
	UKCI	-*		Reject		-**	
	FCCI						
	The UK inflation rate	+***		Accept	Accept	+***	+***
	The UK GDP	-		Reject	Reject	-	-
	The UK interest Rate	+*		Accept	Accept	+**	+**
	The UK exchange Rate						
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Foreign	Liquidity	+**	+**	Reject	Reject	+*	+**
	UKCI	+***		Accept		+***	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	+	Reject	Reject	+	+
	The UK interest Rate	+**	+**	Accept	Accept	+***	+***
	The UK exchange Rate	-*	-	Reject	Reject	-***	-
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
European	Liquidity	-**	-**	Accept	Accept	-**	-***
	UKCI	+		Reject		-	
	FCCI		-		Reject		-
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	+
	The UK interest Rate	+***	+***	Accept	Accept	+***	+***
	The UK exchange Rate	-	-	Reject	Reject	-	-
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Non-European	Liquidity	+***	+***	Reject	Reject	+***	+***
	UKCI	+		Reject		+	
	FCCI		-***		Accept		-***
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	+***	+***	Accept	Accept	+***	+***
	The UK exchange Rate	+	+	Reject	Reject	+	+

GROUPS	Independent Variable	GLS regression Model		Accept/ Reject Hypothesis		Robust regression Model	
		UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developed	Liquidity	-**	-**	Accept	Accept	-**	-*
	UKCI	+		Reject		+	
	FCCI		+		Reject		+
	The UK inflation rate	+***	+***	Accept	Accept	+***	+***
	The UK GDP	-	-	Reject	Reject	-	-
	The UK interest Rate	+***	+***	Accept	Accept	+***	+***
	The UK exchange Rate	+	+	Reject	Reject	+	+
	Independent Variable	UKCI	FCCI	UKCI	FCCI	UKCI	FCCI
Developing	Liquidity	+**	+***	Reject	Reject	+**	+**
	UKCI	-*		Reject		-*	
	FCCI		-**		Accept		-*
	The UK inflation rate	-	-	Reject	Reject	+	-
	The UK GDP	+	+	Reject	Reject	+	+
	The UK interest Rate	-	-	Reject	Reject	-	-
	The UK exchange Rate	+***	+**	Accept	Accept	+***	+*

As shown in tables from 7.1 to 7.4, the comparison between the results of the GLS regression with the robustness tests (i.e. WLS regression and robust regression) for return and volatility models showed that the findings of the study's models (i.e. return and volatility models) can be considered reliable as they are consistent with the results of robustness check whether with WLS regression or robust regression with respect to their influence and significance. However, significance levels of some variables may vary slightly, upwards or downwards, within the acceptable margin of significance levels (1% - 5% - 10%) which can be illustrated in the following section.

7.4 Robustness check discussion

7.4.1 WLS regression discussion

7.4.1.1 Return models

As illustrated in table 7.1, the significance of the UK inflation rate effect on DRs return that are traded in foreign countries in light of the UK corruption, changed from level 1% to 5%. Although the hypothesis of the impact of the UK GDP on DRs return that are traded in foreign countries when applying the UK corruption is rejected, however, its significance changed from 5% to 10%. Also, the significance of DRs liquidity effect on DRs return that are traded in European and non-European countries when applying foreign country corruption, changed from 10% to 5% and from 5% to 1% respectively whereas the significance of the UK corruption effect on DRs return in European countries, changed from 1% to 5%. Finally, the significance of the impact of the UK GDP on DRs return that are traded in developing countries when applying the UK corruption and foreign country corruption changed from 5% to 1% and from 10% to 5% respectively.

7.4.1.2 Volatility models

As illustrated in 7.2, the significance of the UK interest rate impact on underlying stocks volatility when applying the UK corruption and foreign country corruption changed from 10% to 1%. Also, the significance of the UK interest rate impact on DRs volatility that are traded in foreign and European countries when applying the UK corruption, changed from 5% to 1% and from 1% to 10% respectively. Although the hypothesis of the impact of exchange rate on DRs volatility that are traded in foreign countries when applying the UK corruption is rejected, its significance changed from 10% to 1%. However, the impact of exchange rate on DRs volatility that are traded in developing countries when applying foreign country corruption changed from 5% to 1%. Also, the significance of DRs liquidity impact on DRs volatility that are traded in European and developed countries when applying the UK corruption and foreign country corruption, changed from 5% to 1% whereas the UK inflation rate effect on DRs volatility in non-European countries, changed from 1% to 5% when applying the UK corruption. Also, the significance of the impact of DRs liquidity on DRs volatility that are traded in developing countries when applying foreign country corruption changed from 1% to 10%. Finally, while the hypothesis associated with the impact of the UK country corruption on DRs volatility that are traded in developing countries is rejected, its significance level changed from 10% to 5%.

7.4.2 Robust regression discussion

7.4.2.1 Return models

As illustrated in table 7.3, the significance of the impact of the UK GDP on DRs return that are traded in foreign markets changed from 1% to 10%, whereas the significance of the impact of DRs liquidity that are traded in European countries on DRs volatility changed from 10% to 1% when applying foreign country corruption. Also, the significance of the impact of DRs liquidity that are traded in non-European countries on DRs return changed from 5% to 1% when applying the UK corruption and foreign country corruption. Moreover, the significance of the UK GDP impact on DRs return that are traded in developing countries when applying the UK corruption, changed from 5% to 1% whereas its significance changed from 10% to 5% when applying foreign country corruption.

7.4.2.2 Volatility models

As illustrated in table 7.4, although its associated hypothesis is rejected in the current thesis, the significance of the impact of the UK corruption on the underlying stocks volatility changed from 10% to 5%. Moreover, the significance of the impact of the UK interest rate on the underlying stocks volatility changed from 10% to 5% when applying the UK corruption. Also, the significance of the impact of DRs liquidity which are traded in the foreign countries on the DRs volatility changed from 5% to 10% when applying the UK corruption. Furthermore, the significance of the UK interest rate impact on DRs volatility that are traded in foreign countries changed from 5% to 1% when applying both; the UK corruption and foreign country corruption. While its related hypothesis is rejected, the significance of the impact of the exchange rate on DRs volatility that are traded in foreign countries changed from 10% to 1% when applying the UK corruption. Additionally, the significance of DRs liquidity impact on DRs volatility that are traded in European, developed and developing countries changed from 5% to 1%, 5% to 10% and from 1% to 5% respectively while DRs volatility which are traded in the developing countries changed from 5% to 10% when foreign country corruption is applied**.**

7.5 Conclusion

Robustness check is applied in order to ensure that the results extracted from GLS regression analysis didn't change significantly when other regression methods are applied. Hence, in this study weighted least square (WLS) and robust regression are used as a robustness check to compare their results with the GLS regression. In conclusion, the results of the robustness check (i.e. WLS and robust regression) are consistent with the results relied on GLS model which are classified into domestic and foreign countries, European, non-European and developed and developing countries. Afterwards, the following chapter will discuss the main conclusion and recommendation of these results.

Chapter Eight

Conclusions and Suggestions for Future Studies

Chapter 8

Conclusions and suggestions for future studies

This chapter discusses the main findings and contributions of the thesis that scholars and practitioners could make use of. The major thesis findings are presented in section 8.1 whereas section 8.2 provides the contributions of the thesis. Thesis limitations and suggestions for future studies are discussed in section 8.3. Lastly, the general conclusion of the thesis is illustrated in section 8.4.

8.1 Major findings of the thesis

This section represents the major findings which revolve around the impact of liquidity and domestic country-wide factors on underlying stocks and their respective depositary receipts return and volatility, considering the country corruption index (CPI) in home country (the UK) and internationally where DRs are traded. Different regression methods were applied and demonstrated for return and volatility for each of the following groups; domestic and foreign countries, European and non-European countries, and finally developed and developing countries. Moreover, within each group, regression methods are run two times; first within applying the UK Corruption Index (UKCI) to examine its impact on the return and volatility of the UK underlying stocks and their corresponding DRs that are traded in other countries. Second, the Foreign Country Corruption Index (FCCI) was applied on each country in which DRs are traded. The relevant findings are illustrated as follows;

8.1.1 The impact of liquidity on return and volatility of underlying stocks and their corresponding DRs

Liquidity has a positive and significant influence on the **return** of underlying stocks that are traded in the UK. Also, DRs liquidity has a positive and significant impact on their returns which are traded in 35 markets across 18 foreign countries. Additionally, in the current thesis, these foreign countries are classified into 6 European countries and 12 non-European countries. As well, the foreign countries are classified into 11 developed countries and 7 developing countries. Actually, DRs liquidity has a positive and significant impact on their returns in all their relevant markets. This means that the increase in trading volume, as a proxy of liquidity, of both the UK underlying stocks and their corresponding DRs that are traded in foreign countries leads to an increase in their respective returns.

In the current thesis, it is noted that, the underlying stocks in the UK have more than one corresponding DR which are traded in more than one market in different countries. This means that extending the trading markets where the stocks and their DRs are traded affects significantly their liquidity.

Also liquidity has a negative and significant influence on the underlying stocks volatility that are traded in the UK and their DRs volatility that are traded in European countries and developed countries which have the same significant influence on reducing volatility.

Hence, the current thesis supports Schaub (2019) who mentioned that the main purpose behind DRs investments is to get the benefits of the international diversification through investing in different markets and countries in such a way as to offset losses as investments in DRs can be considered as one of the most popular way to own foreign investments.

As concluded from the thesis, investing in DRs, which are traded in European countries or developed countries, can be considered as one of the most important mechanisms to obtain the benefits of the international diversified investments. Also, through DRs Investments, investors can form well-diversified international portfolios which maximise their returns and minimise their volatility by investing in more than one market across different countries. Therefore, in order to reduce the risk of this type of investments, well-diversified portfolio of DRs which includes different DRs from different markets can be formed in order to enhance the opportunity to liquidate them quickly as the theory of liquidity preference recommends.

Furthermore, to accelerate the process of converting DRs into cash, investors have to take into consideration that the more the trading volume of DRs, the less the risk they may face.

Also, results showed that there is a significant positive influence of DRs liquidity which are traded in non-European and developing countries on their **volatility**. Nevertheless, investing in all foreign depositary receipts markets may not validate the mechanism of obtaining the benefits of the international diversification. In other words, the higher the liquidity of DRs in all foreign markets jointly, the higher the volatility of the DRs that are traded in these markets. However, as the current thesis classifies the foreign markets into 2 groups; European and non-European countries as well, developed and developing countries, the results changed considerably.

Also, the results illustrate that there is a negative impact of DRs liquidity on their volatility in both categories; the European and developed countries, in contrast to the results of non-European and developing countries. This means that in order to minimise the volatility of DRs, investors have to select their DRs or to form their well-diversified portfolios from the categories that record negative impact of DRs liquidity on volatility (i.e. European and developed countries). As well, they are recommended to avoid the markets in non-European and developing countries in their selection of DRs investment. Although, the higher the return of an investment, the higher the risk the investor may face as they have to be rewarded for this risk, there is no guarantee that they will actually get a higher return by accepting more risk. Essentially, because of DRs internationalisation nature and the validity of trading them in different markets across different countries, it is preferable to the investors to select the countries with less risky investments.

Concerning the country corruption; UKCI and FCCI have similar impact on the relationship between liquidity from one side and return and volatility from the other side. This means that, regardless of the source of corruption, whether derived from the issuing country of underlying stocks or the foreign country in which DRs are traded, it is an essential issue to be taken into consideration while making investment decisions seeking high probability of success.

8.1.2 The impact of the UK country-wide factors on return and volatility of underlying stocks and their corresponding DRs

This section illustrates the influence of the UK country-wide factors (i.e. inflation rate, GDP, interest rate, exchange rate and country corruption) on the return and volatility of the stocks that are traded in the UK and their corresponding DRs that are traded outside the UK. Here, the thesis aims to determine to what extent the issuing companies of underlying stocks in the UK have an influence not only on underlying stocks return and volatility that are traded in the UK but also on DRs that are traded in foreign countries which allow investors to hold shares in the equity of foreign countries in order to diversify their portfolios. As well, the impact of the UK country-wide factors on return and volatility of the underlying stocks and their corresponding DRs are affected differently by the country corruption variable (whether UKCI or FCCI) which varies from one country-wide factor to another as will be explained below.

8.1.2.1 The impact of the UK inflation rate on return and volatility of underlying stocks and their corresponding DRs

The UK inflation rate has a positive and significant influence on the **return** of underlying stocks which are traded in the UK. Also, there is a positive and significant influence of the UK inflation rate on the return of DRs that are traded in different foreign countries.

Additionally, the same results are obtained when the foreign countries are classified into European and non-European as well as the developed and developing countries, i.e., the UK inflation rate has a positive and significant influence on the return of DRs that are traded in European, non-European and the developed and developing countries.

Concerning the **volatility** it is notable that the UK inflation rate has a significant and positive influence on the volatility of the underlying stocks which are traded in the UK. Also, there is a positive and significant influence of the UK inflation rate on the volatility of DRs that are traded in different foreign countries.

Additionally, the same results are obtained when the foreign countries are classified into European and non-European as well as the developed countries as the high inflation rate is consistent with periods of uncertainty which reasonably increase returns. However, the UK inflation impact on DRs volatility that are traded in developing countries is insignificant. This may be due to that the most of investors in developing countries are not fully aware of developments in their stock markets or it may be due to poor brokerage procedures.

As for the country corruption aspects, UKCI and FCCI have the same impact on the relationship between the UK inflation rate from one side and return and volatility from the other side. Their effects are significant on this relationship except in case of the volatility of depositary receipts which are traded in developing countries, i.e., their effects were insignificant.

Generally, except the insignificant role of corruption on DRs volatility in developing countries, determining the level of corruption (whether UKCI or FCCI) may help the investor in taking the most appropriate investment decisions.

8.1.2.2 The impact of the UK GDP on return and volatility of underlying stocks and their corresponding DRs

There are significant and negative impacts of the UK GDP on the **returns** of underlying stocks that are traded in the UK along with the respective DRs which are traded in foreign markets. These results are inconsistent with our expectations about the effect of GDP as the higher level of GDP leads to higher real stock market return.

However, when the foreign countries are classified, the same significant and negative impact of the UK GDP on return is observed in the European and developed countries. Actually, results are unexpected as GDP growth in a given economy affects positively the stock return as the financial system becomes stronger.

This view is consistent with one of the current thesis results concerning the developing counties in which the UK GDP has a positive and significant impact on DRs return. Finally it is notable that the UK GDP has insignificant impact on the return of DRs traded in non-European countries. This insignificant influence is consistent with Joseph and Rostand (2017) who concluded that there is no causal relationship between Stock market development and GDP.

On the other hand, the UK GDP has no significant impact on the **volatility** of underlying stocks and their respective DRs that are traded in all foreign countries with all their relevant groups. In other words, changes in the UK GDP cannot explain any changes occur in volatility of underlying stocks and DRs traded outside the UK.

8.1.2.3 The impact of the UK interest rate on return and volatility of underlying stocks and their corresponding DRs

The UK interest rate has a negative and significant influence on the **return** of underlying stocks that are traded in the UK. Also there is a negative and significant influence of the UK interest rate on the return of DRs that are traded in different foreign countries. Additionally, the same results are obtained from European, non-European and developed countries, however the impact on developing countries was insignificant. Therefore, it is notable that any fluctuation in interest rate affects underlying stocks and DRs' return negatively because of the declining in interest rate may reduce any investments in fixed income securities, and consequently, investors transfer their money towards the equity market. Therefore, an increase in the interest rate causes the stock return to drop and vice versa.

Concerning **volatility**, there is a positive significant impact of the UK interest rate on the volatility of underlying stocks that are traded in the UK along with the corresponding DRs which are traded in foreign markets. Similarly, same results are obtained from the analysis of foreign countries into European, non-European and developed countries. Actually, this positive influence of the UK interest rate on stock volatility may restrict investors to invest their money in stocks due to the high level of risk related to stock trade even if when applied on the investors' portfolios, which make the volatility of the stocks more sensitive to any changes in interest rate.

This means that any increase in interest rate may guide the investor to acquire greater return that exceeds the increase occurs in interest rate (i.e. increase in required rate of return).

On the other side, the results show that there is an insignificant impact of interest rate on developing countries as it can be considered a weak predictive power for stock volatility. These results have been obtained in light of corruption indices (i.e. UKCI and FCCI) which clarified that both of them have the same significant effect on the relationship between the UK interest rate and the return and volatility of underlying stocks and DRs in all countries except their insignificant effect on return and volatility of DRs that are traded in developing countries.

8.1.2.4 The impact of the UK exchange rate on return and volatility of DRs

The UK exchange rate has a negative and significant impact on DRs return in foreign countries. However when foreign markets are classified into groups, the same results are found only in non-European countries whereas the UK exchange rate has a significant and positive impact on the volatility of DRs which are traded in developing countries.

Unexpectedly, most of the results show that exchange rate changes have insignificant impact on the stock return and volatility as these results are not matching with the dominant assumption which indicates that changes in exchange rate considerably harms the performance of the stock markets. These results are concluded when taking country corruption index into consideration; UKCI and FCCI. These two types of corruption have similar effect on the relationship between exchange rate and DRs return and volatility except in case of the volatility of DRs that are traded in foreign countries as UKCI has a significant negative effect on DRs volatility, however, FCCI has an insignificant effect on the same countries.

This indicates that the UK corruption is extended to affect the corresponding DRs volatility in foreign countries in which DRs are traded. In other words, the greater the corruption in the UK, the less the volatility in DRs that are traded outside the UK as it may be consistent with the "grease the wheels" hypothesis which indicates that corruption may be beneficial in some countries where some aspects of governance are ineffective.

8.1.2.5 The impact of country corruption on return and volatility of underlying stocks and their corresponding DRs

The UK corruption (UKCI) has a negative and significant influence on DRs **return** in European and developed countries, while the foreign country corruption (FCCI) has the same significant and negative impact on the DRs return which are traded in European countries. The investors may refrain from investing in countries that characterised by high levels of corruption in order to avoid any relevant losses that may take place.

One the other hand, the results emphasised on the importance of classifying the foreign countries into their sub-categories; European and non-European and developed and developing countries as the corruption of the home country (UKCI) or the foreign country corruption (FCCI) have insignificant impacts on the return of DRs that are traded in foreign countries, taken as a whole. However, results changed dramatically when corruption indices are applied on the mentioned groups in the current thesis as follows; there is a significant negative impact on DRs returns that are traded in both categories; European and developed countries, whereas the foreign country corruption (FCCI) has a negative and significant influence on the return of DRs that are traded in European countries only. Therefore, the current thesis focuses on determining which type of corruption (UKCI or FCCI) has a significant impact on different categories of countries where DRs are traded and here is the answer, the DRs return which are traded in European countries are affected by both types of corruption (i.e. UKCI and FCCI) while the return of DRs that are traded in developed countries are affected only by the UK corruption (UKCI).

Concerning the impact of the UK corruption index (UKCI) on DRs **volatility**, there is a significant positive impact of UKCI on the DRs volatility of the foreign countries taken as a whole, as the increased level of corruption of the UK leads to an increase in the risk of investments in these foreign countries. This relation derived from the fact that the UK, especially London, is considered as one of the largest financial centres worldwide, accordingly, its corruption may extend beyond its borders, as stated in ‘‘Corruption in the UK report’’ (TI-UK, 2011). Consequently, the UK relevant investments in these countries are almost subject to high level of volatility because of the UK corruption's influence. However, the results of developing countries in this thesis are inconsistent with this view as UKCI has a significant and negative impact on DRs volatility in developing countries.

Similarly, the results of current thesis shows that foreign country corruption (FCCI) where the DRs are traded has the same significant negative influence on the DRs’ volatility in developing countries as well as non-European countries. The same significant negative effect of the UK corruption on underlying stocks that are traded in the UK was also concluded, assuming that corruption may decrease the drawbacks of the businesses uncertainty in these countries which decrease the investments volatility in the stock markets across these countries.

8.2 Thesis contributions

The thesis's contributions are presented in the following sections as follows: contributions to theory (section 8.2.1), contributions to practice (section 8.2.2), and contribution to methodology (section 8.2.3).

8.2.1 Contributions to theory

The theoretical contribution of the current thesis revolves around three main contributions:

First: it is the first thesis that examines the applicability of liquidity preference theory in explaining the mechanism of underlying stocks and their DRs return and volatility.

Second: it is also the first thesis that highlights the applicability of modern portfolio theory in diversifying international portfolio that implies the underlying stocks which are traded in domestic country and have more than one depositary receipt that are traded in different foreign countries.

Third: the current thesis contributes to underlining the importance of combining two theories to be applicable together; liquidity preference theory and modern portfolio theory to explain the theoretical background of the impact of liquidity and country-wide factors on underlying stocks and their corresponding depositary receipts' return and volatility.

Actually, the current thesis investigates the applicability of liquidity preference theory on DRs return and volatility as the core of the theory sheds the light on the investors' speculative motive to invest their money in most liquidated assets which can be converted into cash quickly. Consequently, this theory highlights the importance of investing in the underlying stocks that have more than one depositary receipt in different markets across different countries which increase the probability of having more than one valuable opportunity to liquidate these investments quickly. Additionally, in order to maximise the benefits of the liquidity preference theory, the modern portfolio theory has to be applied as the latter emphasises the importance of diversifying investments across different markets in different countries. According to international portfolio diversification, investors can offset losses by investing in the underlying stocks and their respective DRs which can be considered as one of the most popular way to own foreign investments with similar rights of the domestic investor. Hence, international well-diversified portfolio which includes DRs investments is considered a good opportunity for the investors who have their own speculative motive to gain more money in short term. Collectively, this thesis made in favour of integrating the applicability of both theories together; liquidity preference theory and modern portfolio theory which encourage investors to hold well-diversified portfolios of underlying stocks and their corresponding depositary receipts across different countries through which liquidity preference theory interacts with the modern portfolio theory to explain the mechanism of DRs return and volatility.

8.2.2 Contributions to practice

First: the main contribution to practice focuses mainly on providing the investor and the arbitrageur with a comprehensive picture concerning investing in stocks that covered by more than one depositary receipt for the same underlying stock that are traded in more than one foreign countries.

Second: another contribution of the current thesis is to provide the investors with more in-depth practical analysis of DRs to have more clear view for their investments decisions in terms of classifying DRs that are traded in foreign countries into the following groups; European, non-European, developed and developing countries as the thesis revealed that trading DRs in developed countries may have different influence on their return and volatility from the DRs that are traded in developing countries. Also, DRs return and volatility that are traded in one of European countries differ from the return and volatility of DRs that are traded in one of non-European countries.

So, it is focused on the importance of categorising DRs in order to provide the investors with a comprehensive picture of the categories of countries in which DRs are traded.

Third: the current thesis focuses mainly on the underlying stock which has more than one depositary receipt (For example, the stock of one cross-listed company under study has DRs that are traded in 19 markets across different countries).

This can open the door for possible arbitrage opportunities as a main price correcting mechanism till reaching stock-DR parity as these markets are considered not fully efficient markets according to the efficient market hypothesis (EMH) till prices between the stocks and DRs are balanced according to the law of one price.

Fourth: the current thesis contributes to the practical knowledge as it is considered the first study that focuses on the impact of critical country-wide factors of the UK (i.e. inflation rate, interest rate, exchange rate, GDP and level of corruption) on the return and volatility of the underlying stocks and their depositary receipts that are traded outside the issuing country. This contribution adds to the practical knowledge a variety of evidence associated with the influence of country-wide factors on the return and volatility of underlying stocks that are traded domestically and their depositary receipts which are traded internationally.

Fifth: this is the first thesis examines the corruption as one of the barriers of foreign investments which are subject to high level of volatility. Practically, corruption has two main sources; the domestic corruption (corruption of issuing country). Another source of corruption is the foreign country corruption that is derived from the country in which DRs are traded. So, this thesis examines the impact of the two sources of corruption to determine which one of them has more significant impact on the return and volatility of underlying stocks and their corresponding DRs.

Actually, the current thesis added to the knowledge that these two sources of corruption have significant practical impact on different categories of countries where DRs are traded. For example, DRs return in European countries are affected significantly by both sources of corruption, while DRs return that are traded in the developed countries is affected only by the UK corruption.

Collectively, the previous factors which represent the comprehensive picture of the mechanism of the underlying stocks and their corresponding DRs are of great interest to the investors and arbitrageurs through which they can predict the effectiveness of their DRs' investments decisions.

In conclusion, it is suggested that investors should be aware of the following;

- The increase in trading volume, as a proxy of liquidity, of both the UK underlying stocks and their corresponding DRs in different countries leads to an increase in their respective returns and a decrease of their volatility. Moreover, the increase of trading volume of underlying stocks that have more than one depositary receipts provides them with more valuable opportunities to liquidate their investments into cash quickly, which in turn enhances their returns and reduces the relevant volatility.
- There is a strong effect of the UK inflation rate and the UK interest rate on the return and volatility of underlying stocks and their corresponding DRs whereas the UK GDP has a strong effect on return only. Also, compared to the other country-wide factors, the UK exchange rate had the least significant effect as it influences the return of DRs that are traded in non-European countries, and the volatility of DRs that are traded in developing countries. Also, country corruption has a significant impact, however, this impact differs according to the classification of countries in which DRs are traded. For example, it has a significant negative impact on DRs return in European and developed countries, whereas it has a negative impact on DRs volatility in non-European or developing countries.

8.2.2.1 Policy implications

Although depositary receipts function as an effective means to increase global trade, which in turn affect significantly the stock market performance, developing countries recorded the least number of corresponding depositary receipts that are traded in their relevant emerging markets. The reason behind that is the existence of many obstacles (e.g. high level of corruption) that often impede foreign investors from holding DRs investments in these emerging markets. Therefore, policy makers in these countries have to enhance DRs trade by creating a well-regulated marketplace in order to attract the growing number of investors who have the desire to invest internationally.

8.2.3 Contributions to methodology

First: The main contribution to methodology is in using a volatility estimation technique to capture volatility as accurately as possible. After comparing different measures, it is decided to use skewness as a suitable technique to estimate the volatility since it doesn’t imply any estimation biases as it avoids the existence of any error term.

Hence, skewness is used to measure the volatility of underlying stocks and their corresponding DRs in order to avoid the drawbacks of other measures such as the standard deviation which is considered the most popular technique that used to measure the volatility. Standard deviation as a volatility measurement shows only how the annual returns of an investment are spread out and it doesn't necessarily mean that the outcomes will be consistent in the future.

Moreover, the investments may be influenced by other non-related factors such as inflation or interest rates changes. Standard deviation is not used as a final risk measurement tool, but it should be used besides the other risk measurements, as well, it assumes a normal distribution of data values, not skewed ones, and that is why skewness technique is used here in the current thesis for measuring the volatility. Actually, investors note skewness when judging a return distribution because it considers the extremes of the data set rather than focusing solely on the average.

Second: Another contribution to methodology is due to the nature of this thesis as it relies mainly on dataset derived from different markets across different countries with different issuing dates. Accordingly, this thesis analysed the dataset of these different markets by using panel model of unbalanced data in particular.

8.3 Thesis limitations and suggestions for future studies

8.3.1 Thesis limitations

There are many limitations that were faced while undertaking this thesis which might hinder its findings:

First: One of the limitations is the period covered by the thesis which was from January 2004 to December 2019. This means that the thesis considered the UK one of the members of the European Union as Brexit departure didn’t occur yet in this period.

Second: Referring to the real data of the UK, there was limited number of companies that trade their DRs in developing countries compared to the developed countries which may affect the accuracy of results and findings of developing countries.

8.3.2 Suggestions for future studies

First: There are numerous opportunities for future research, such as examining the impact of Brexit on the relationships between the thesis variables as it may lead to dramatic changes in the results especially in light of the future UK-EU relationships.

Second: Also another possibility for future studies can revolve around focusing on the emerging markets in developing countries through examining DRs return and volatility that are traded only in developing countries as it is concluded from the thesis that there are valuable investment opportunities in these markets where there are huge gains awaiting investors if they are provided with the required relevant data.

Third: Furthermore, in the current thesis DRs return and volatility that are traded in foreign countries were categorised into (European, non-European, developed and developing countries), whereas future research may categorise them differently by regions (i.e. Middle East, Africa, Asia, etc.…).

Fourth: Also, one of the crucial areas for future studies is related to COVID-19 and its impact on the securities markets worldwide. It is notable that there is a sharp drop in the global stock markets within the COVID-19 pandemic and consequently stocks activities are affected dramatically which paves the way for further studies to examine the impact of COVID-19 on the volatility of the stocks that are covered by DRs compared to the stocks that are uncovered by DRs in different markets worldwide.

8.4 Conclusion

Depositary receipt is a type of financial security that offers the same investment opportunity as direct investment in foreign stocks. It allows the investors to invest in shares of foreign companies in their local market. It is also easy to purchase, hold or sell on the local stock market and gives the opportunity to get benefit from economic growth in other countries. In other words, trading in DRs enables investors to have access to the capital markets of the foreign companies in different markets across different countries easily.

Therefore, the main purpose behind investments in DRs is to get the benefits of the international diversification in such a way as to offset losses. Also this thesis emphasises on the importance of classifying the results of foreign countries into; European, non-European, developed and developing countries to get more in-depth information for each group. Also, the current thesis concluded that, according to our classifications of countries, both types of corruption indices (i.e. UKCI and FCCI) have significant impact on the return and volatility of the underlying stocks and their corresponding DRs, however, such impact differs from one country to another.

Also, this thesis remarks that investment in underlying stocks that have more than one depositary receipts considered as a valuable opportunity for the investors to liquidate their investments into cash quickly. This view is supported by liquidity preference theory as it focuses mainly upon the investor's preference to get most liquid assets with a quick cash conversion expectation. Hence, investors who have the speculative motive to invest in the underlying stocks or their corresponding DRs which are traded in different countries may have a valuable opportunity to achieve more gains and to liquidate their DRs quickly. Also, the thesis concludes that when underlying stock is covered by more than one depositary receipt in different foreign countries, it can open the door for more arbitrage opportunities to gain from the differences between the returns until the markets become efficient and the law of one price takes place.

Lastly, this thesis provides the investors with a comprehensive overview of the impact of liquidity and domestic country-wide factors on both the return and the volatility of the underlying stocks and their corresponding DRs, considering the effect of country corruption-domestically and internationally.

References

Abid, I., Guesmi, K., Saadi, S., and Ftiti, Z., 2019. Portfolio diversification with virtual currency: Evidence from bitcoin. *International Review of Financial Analysis*, 63, pp.431-437.

Abrosimova, N., Dissanaike, G. and Linowski, D., 2002, February. Testing weak-form efficiency of the Russian stock market. In *EFA 2002 Berlin meetings presented paper*.

Ackert, L.F. and Tian, Y.S., 2000. Arbitrage and Valuation in the Market for Standard and Poor's Depositary Receipts. *Financial Management*, 29(3), pp.71-87.

Adjasi, C. K., and Biekpe, B. N. 2005. Stock Market Returns and Exchange Rate Dynamics in Selected African Countries: A Bivariate Analysis. *The African Finance Journal*, 2(6), pp. 17-28.

Adjasi, C. K., Harvey, S.K. and Agyapong, D.A., 2008. Effect of exchange rate volatility on the Ghana stock exchange. *African Journal of Accounting, Economics, Finance and Banking Research*, 3(3), pp. 28-48.

Adrangi, B., Chatrath, A. and Sanvicente, A.Z., 2002. Inflation, output, and stock prices: Evidence from Brazil. *Journal of Applied Business Research (JABR)*, 18(1).

Agmon, T. and Lessard, D.R., 1977. Investor recognition of corporate international diversification. *The Journal of Finance*, 32(4), pp.1049-1055.

Agyei-Ampomah, S., 2011. Stock market integration in Africa. *Managerial Finance*, 37(3), pp.242-256.

Ahad, M., Qureshi, F., Hanif, W. and Anwer, Z., 2018. Modelling Asymmetric Impact of Home Country Macroeconomic Variables on American Depositary Receipts: Evidence from Eurozone. *Annals of Economics and Finance*, 19(2), pp. 703-727.

Ahmed, H.U. and Samad, Q.A., 2008. Performance level of Dhaka stock market: a quantitative analysis.

Ahmed, R. and Mustafa, K., 2012. Real stock returns and inflation in Pakistan. *Research Journal of finance and Accounting*, *3*(6), pp.97-102.

Aidt, T.S., 2009. Corruption, institutions, and economic development. *Oxford review of economic policy*, 25(2), pp.271-291.

Akbar, M. and Kundi, U., 2009. Monetary Policy Variables and Stock Prices in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 1, pp. 84-102.

Akbar, M., Khan, S.A. and Khan, F., 2012. The relationship of stock prices and macroeconomic variables revisited: Evidence from Karachi stock exchange. *African Journal of Business Management*, *6*(4), pp.1315-1322.

Alaganar, V. T. and Bhar, R., 2001. Diversification gains from American depositary receipts and foreign equities: evidence from Australian stocks, *Journal of International Financial Markets*, Institutions and Money, Elsevier, 11(1), pp. 97-113.

Alagidede, P., Panagiotidis, T. and Zhang, X., 2011. Why a diversified portfolio should include African assets. *Applied Economics Letters*, 18(14), pp.1333-1340.

Alam, M.D. and Salah-Uddin, G., 2009. Relationship between interest rate and stock price: empirical evidence from developed and developing countries. *International Journal of Business and Management*, 4(3), pp.43-51.

Aliyu, S.U.R., 2012. Does inflation have an impact on stock returns and volatility? Evidence from Nigeria and Ghana. *Applied financial economics*, 22(6), pp.427-435.

Aljarayesh, N.I.A., Asfour, L.K. and Al-Abdallah, S.Y., 2018. Interest rates volatility and its consequences on stock returns: The case study from Amman Stock Exchange, Jordan. *Journal of Economics Library*, 5(2), pp.149-160.

Aljazaerli, M. A., Sirop, R. and Mouselli, S. 2016. Corruption and Stock Market Development: New Evidence from GCC Countries, *Business: Theory and Practice*, 17(2), pp.117–127.

Allen, L., Bali, T.G. and Tang, Y., 2012. Does systemic risk in the financial sector predict future economic downturns?. *The Review of Financial Studies*, *25*(10), pp.3000-3036.

Alma, Ö. G., 2011. Comparison of robust regression methods in linear regression. *Int. J. Contemp. Math. Sciences,* 6(9), pp. 409-421.

Alsayed, H. and McGroarty, F., 2012. Arbitrage and the Law of One Price in the market for American Depositary receipts, *Journal of International Financial Markets, Institutions and Money*, Elsevier, 22(5), pp. 1258-1276.

Amarasinghe, A., 2015. Dynamic Relationship between Interest Rate and Stock Price: Empirical Evidence from Colombo Stock Exchange, *International Journal of Business and Social Science*, 6(4), pp. 92-97.

Amihud, Y. and Mendelson, H. 1986. Asset pricing and the bid–ask spread. *Journal of Financial Economics*, 17, pp. 223–249.

Amihud, Y., 2002. Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, 5, pp. 31–56.

Anderson, R., 2008. *Modern Methods for Robust Regression*. (No.152), Sage University Paper Serieson Quantitative Applications in the Social Sciences.

Antoniewicz, R. L., 1993. *Relative volume and subsequent stock price movements*. Board of Governors, Federal Reserve System, Washington, DC.

Apergis, N. and Eleftheriou, S., 2002. Interest rates, inflation, and stock prices: the case of the Athens Stock Exchange. *Journal of policy Modeling*, 24(3), pp.231-23.

Aquino, K.P. and Poshakwale, S., 2006. Price determinants of American Depositary Receipts (ADR): a cross-sectional analysis of panel data. *Applied Financial Economics, 16*(16), pp.1225-1237.

Andabai, P.W., 2010. Dynamics of interest rate management and its impact on money supply in Africa: A theoretical approach. *The University Advanced Research Journal*, (3), pp.1-7.

Argyrous, G., 2009. *Evidence for policy and decision-making*. Sydney: University of New South Wales Press.

Arnold, T., Nail, L. and Nixon, T.D., 2004. Do ADRs enhance portfolio performance for a domestic portfolio? Evidence from the 1990s. *Research in International Business and Finance*, *18*(3), pp.341-359.

Augustine, U and Pius, S.O., 2010. Stock market development and economic growth: Evidence from Nigeria, *European Journal of Economics, Finance and Administrative Sciences*, 25, pp. 46-53.

Avdic, L., and Resulovic, E., 2006. *Cross-listing of Swedish stocks in London and New York*, School of Economics and Management, Lund University.

Babatunde, O.A., 2013. Stock market volatility and economic growth in Nigeria (1980-2010). *International review of management and business research*, *2*(1), pp.201-209.

Bae, S.C., Kim, H.S. and Kwon, T.H., 2020. Foreign currency borrowing surrounding the global financial crisis: Evidence from Korea. *Journal of Business Finance & Accounting*, *47*(5-6), pp.786-817.

Baele, L., De Jonghe, O. and Vander Vennet, R., 2007. Does the stock market value bank diversification?. Journal of Banking & Finance, 31(7), pp.1999-2023.

Bali, T. and Cakici, N., 2010. World market risk, country-specific risk and expected returns in international stock markets. *Journal of Banking and Finance*, 34(6), pp.1152-1165.

Bali, T. and Peng, L., 2006. Is there a risk–return trade-off? Evidence from high- frequency data. *Journal of Applied Econometrics*, 21(8), pp.1169-1198.

Bali, T., Brown, S.J. and Caglayan, M.O., 2014. Macroeconomic risk and hedge fund returns. *Journal of Financial Economics*, *114*(1), pp.1-19.

Baller, S., Battista, A. D., Dutta, S., Lanvin, B. 2016, World Economic Forum, *The Global Information Technology Report, The Networked Readiness Index 2016,* Geneva Ouranos.

Baltagi, B., 2009. *Econometric analysis of panel data*. New York: John Wiley and Sons.

Barsky, R., 1989. Why do not the prices of stock and bonds move together? *American Economic Review*, 79, pp. 1132-1145.

Bartram, S.M. and Dufey, G., 2001. International portfolio investment: theory, evidence, and institutional framework. Financial Markets, Institutions & Instruments, 10(3), pp.85-155.

Bayar, A., and Önder, Z., 2005. Liquidity and price volatility of cross-listed French stocks. *Applied Financial Economics*, 15(15), pp. 1079-1094.

Bekaert, G. and Engstrom, E., 2010. Inflation and the stock market: Understanding the "Fed Model". *Journal of Monetary Economics*, 57(3), pp.278-294.

Beltratti, A. and Morana, C., 2006. Breaks and persistency: macroeconomic causes of stock market volatility. *Journal of econometrics*, *131*(1-2), pp.151-177.

Ben-Gal, I., 2005. *Outlier Detection*. In: Maimon O., Rokach L. (eds) Data Mining and Knowledge Discovery Handbook. Springer, Boston, MA.

Berkman, H. and Nguyen, N.H., 2010. Domestic liquidity and cross-listing in the United States. *Journal of Banking & Finance*, *34*(6), pp.1139-1151.

Bertocco, G. and Kalajzic, A., 2014. *The liquidity preference theory: a critical analysis* (No. qf1402). Department of Economics, University of Insubria.

Bhattacharya, B., 2012. Causal relationship between stock market and exchange rate, foreign exchange reserves and value of trade balance in India: An empirical analysis.

Bhowmik, D., 2013. Stock market volatility: An evaluation. *International Journal of Scientific and Research Publications*, *3*(10), pp.1-17.

Billingsley, R., 2005. *Understanding arbitrage: An Intuitive Approach to Financial Analysis*. Harlow: Financial Times Prentice Hall.

Bin, F.S., Morris, G.B. and Chen, D.H., 2003. Effects of exchange-rate and interest-rate risk on ADR pricing behaviour. *The North American Journal of Economics and Finance, 14*(2), pp.241-262.

Binswanger, M., 2004. Stock returns and real activity in the G-7 countries: did the relationship change during the 1980s? *The quarterly review of economics and finance*, 44(2), pp. 237-252.

Blonigen, B.A., 1997. Firm-specific assets and the link between exchange rates and foreign direct investment. *The American Economic Review*, pp.447-465.

Bloom, N., 2009. The impact of uncertainty shocks. *Econometrica*, *77*(3), pp.623-685.

Bloom, N., Bond, S. and Van Reenen, J., 2007. Uncertainty and investment dynamics. *The review of economic studies*, *74*(2), pp.391-415.

Bodart, V. and Reding, P., 2001. Do Foreign Exchange Markets Matter for Industry Stock Returns? An empirical investigation (No. 2001016). *Université catholique de Louvain, Institut de Recherches Economiques et Sociales (IRES).*

Bodie, Z. Kane, A. Marcus, A. I. 2008. *Investments*, 7th ed. Boston, McGraw Hill/Irwin Inc.

Bolgorian, M., 2011. Corruption and stock market development: A quantitative approach, *Physica A: Statistical Mechanics and its Applications*, 390(23–24), pp. 4514-452.

Bonomo, V., Ferris, S.P. and Noronha, G., 1993. The international impact of Federal Reserve Bank discount rate changes: Evidence from American Depositary receipts. *Economics Letters*, 43(2), pp.211-218.

Bouchey, P., Nemtchinov, V., Paulsen, A. and Stein, D.M., 2012. Volatility harvesting: Why does diversifying and rebalancing create portfolio growth?. *The Journal of Wealth Management*, *15*(2), pp.26-35.

Brandao-Marques, M.L., Correa, M.R. and Sapriza, M.H., 2013. *International evidence on government support and risk taking in the banking sector* (No. 13-94). International Monetary Fund.

Brealey, R.A., Myers, S.C. and Allen, F., 2006. *Corporate Finance: International Edition*. McGraw-Hill/Irwin.

Breusch, T. S., and Pagan, A. R., 1979. The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, 47(1), pp. 239-253.

Brockman, P. and Hao, G., 2011. Short selling and price discovery: evidence from American Depositary Receipts. *Journal of financial research*, 34(4), pp.569-588.

Brooks, C., 2009. RATS handbook to accompany. *Introductory econometrics for finance*. New York: Cambridge University Press.

Brooks, C., 2015. *Introductory econometrics for finance*. New York: Cambridge: Cambridge University Press.

Brooks, M., 2008. Behavioral finance: Theories and evidence. *The Research Foundation of CFA Institute. University of Edinburgh*.

Brown, S.J., 2011. The efficient markets hypothesis: The demise of the demon of chance? *Accounting & Finance*, *51*(1), pp.79-95.

Brunetti, A. and Weder, B., 1998. Investment and institutional uncertainty: a comparative study of different uncertainty measures. *Weltwirtschaftliches Archiv*, *134*(3), pp.513-533.

Bryman, A. and Bell, E., 2015. *Business research methods*. 4th ed. Oxford: Oxford Univ. Press.

Buckley, A., 2004. *Multinational finance*. Pearson Education.

Campbell, J.Y., Lettau, M., Malkiel, B.G. and Xu, Y., 2001. Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk. *The journal of finance*, *56*(1), pp.1-43.

Campo, J. E., Lien, D., and Pradhan, S. 1999. The Impact of Corruption on Investment: Predictability Matters. *World Development*, 27 (6), 1059-1067.

Chan, J. S. P., Hong, D., Subrahmanyam, M. G., 2008. A Tale of Two Prices: Liquidity and Asset Prices in Multiple Markets, *Journal of Banking and Finance,* 32, pp. 947-960.

Chao, C. C., Hu, S. W., Tai, M. Y., and Wang, V., 2011. Monetary policy announcements and stock price dynamics in a small open economy. *International Review of Economics and Finance*, 20, pp. 520-531.

Chau, F., Deesomsak, R., and Wang, J., 2014. Political uncertainty and stock market volatility in the Middle East and North African (MENA) countries. *Journal of International Financial Markets, Institutions and Money,* 28, 1-19.

Chen, G. M., Firth, M., and Rui, O. M., 2001. The dynamic relation between stock returns, trading volume, and volatility. *Financial Review*, 38, 153–174.

Chen, N. F., Richard R., Stephen A., 1986. Economic Forces and the Stock Market, *Journal of Business*, 59, pp. 383-403.

Chen, S.Y., Chou, L.C. and Yang, C.C., 2002. Price transmission effect between GDRs and their underlying stocks—evidence from Taiwan. *Review of Quantitative Finance and Accounting*, 19(2), pp.181-213.

Chêne, M., 2014. The impact of corruption on growth and inequality. *Transparency International.*

Cheung, Y. and Ng, L., 1992. Stock Price Dynamics and Firm Size: An Empirical investigation. *The Journal of Finance*, 47(5), pp.1985-1997.

Chiang, T. C., 1991. International asset pricing and equity market risk. *Journal of International Money and Finance*, 10, pp. 349-364.

Chiang, T. C., and Jiang, C., 1995. Foreign exchange returns over short and long horizons. *International Review of Economics and Finance*, 4, pp. 267-282.

Choi, Y.K. and 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), pp.351-368.

Chong, T.T.L., Cheng, S.H.S. and Wong, E.N.Y., 2010. A comparison of stock market efficiency of the BRIC countries. *Technology and Investment*, *1*(4), p.235.

Chordia, T. and Swaminathan, B., 2000. Trading volume and cross-autocorrelations in stock returns. *Journal of Finance*, 55, pp. 913-935.

Choudhry, T., 2001. Inflation and rates of return on stocks: evidence from high inflation countries. *Journal of International Financial Markets, Institutions and Money*, *11*(1), pp.75-96.

Choudhry, T., 2003. Short-run deviations and optimal hedge ratio: evidence from stock futures. *Journal of Multinational Financial Management*, *13*(2), pp.171-192.

Christoffersen, P., Errunza, V., Jacobs, K. and Langlois, H., 2012. Is the potential for international diversification disappearing? A dynamic copula approach. *The Review of Financial Studies*, 25(12), pp. 3711-3751.

Chung, H., Ho, T. and Wei, L., 2005. The dynamic relationship between the prices of ADRs and their underlying stocks: Evidence from the threshold vector error correction model. *Applied Economics*, 37(20), pp. 2387-2394.

Ciocchini, F., Durbin, E., and Ng, D.T.C., 2003. Does corruption increase emerging market bond spreads? *Journal of Economics and Business*, 55, pp. 503-528.

Cohen, B. and Winn, M.I., 2007. Market imperfections, opportunity and sustainable entrepreneurship. *Journal of business venturing*, *22*(1), pp.29-49.

Collins, H., 2018. *Creative research: the theory and practice of research for the creative industries.* Bloomsbury Publishing.

Conover, W.J., 1999. Practical nonparametric statistics. John Wiley & Sons.

Cooper, D. and Schindler, P., 2008. *Business research methods*. Boston: McGraw-Hill/Irwin.

Corradi, V., Distaso, W. and Mele, A., 2013. Macroeconomic determinants of stock volatility and volatility premiums. *Journal of Monetary Economics*, 60(2), pp.203-220.

Creswell, J.W. and Clark, V.L.P., 2017. *Designing and conducting mixed methods research*. Sage publications.

Creswell, J.W., 2014. *Educational research*. Harlow, Essex: Pearson.

Crosby, M., 2001. Stock returns and inflation. *Australian Economic Papers,* 40(2), pp.156-165.

Crotty, M., 1998. *The foundations of social research*. Londres (Inglaterra) Thousand Oaks (California, Estados Unidos): SAGE Publications.

Cuervo-Cazurra, A., 2008. Better the devil you don’t know: type of corruption and FDI in transition economies. *Journal of International Management*, 14(1), pp. 12–27.

Dang, T.L., Moshirian, F., Wee, C.K.G. and Zhang, B., 2015. Cross-listings and liquidity commonality around the world. *Journal of Financial Markets*, *22*, pp.1-26.

Dan-Habu, H., 2018, *Depositary Receipts: A Tool for Investment in sub-Saharan Africa*, Aelex. Retrieved from: https://www.aelex.com/wp-content/uploads/2018/12/DEPOSITARY-RECEIPTS-A-TOOL-FOR-INVESTMENT-IN-SUB-SAHARAN-AFRICA.pdf

Davis, N. and Kutan, A.M., 2003. Inflation and output as predictors of stock returns and volatility: international evidence. *Applied Financial Economics*, 13(9), pp.693-700.

Delcey, T., 2009. Samuelson vs Fama on the Efficient Market Hypothesis: The Point of View of Expertise. *Economia*, Varia, 9 (1), pp.37-58.

Demirgüç-Kunt, A. and Maksimovic, V., 1998. Law, finance, and firm growth. *The journal of finance*, *53*(6), pp. 2107-2137.

Denzin, N. and Lincoln, Y., 1998. *The landscape of qualitative research*. (3rd Ed.). Thousand Oaks, CA: Sage.

Denzin, N. and Lincoln, Y., 2011. *The SAGE handbook of qualitative research* (4th Ed.). Thousand Oaks, CA: Sage.

Denzin, N., and Lincoln, Y., 2005. *Introduction: The discipline and practice of qualitative research.* In N. Denzin and Y. Lincoln (Eds.), The Sage handbook of qualitative research (3rd Ed.) (pp. 1-32). Thousand Oaks, CA: Sage.

Depositary receipts handbook. (2003). New York, NY: Deutsche Bank.

Dimson, E., Marsh, P., Staunton, M., 2002, *Triumph of the Optimists: 101 Years of Global Investment Returns,* Princeton University Press and Princeton.

DIT, 2019. *The UK's Department for International Trade*, Available at: https://www.great.gov.uk/international/content/about-uk/why-choose-uk/uk-infrastructure/.

Domowitz, I., Glen, J., and Madhavan, A., 1998. International cross-listing and order flow migration: Evidence from an emerging market. *The Journal of Finance*, 53(6), pp. 2001-2027.

Doong, S. Ch., Yang, Sh. Y., Wang, A., 2005. The dynamic relationship and pricing of stocks and exchange rates: Empirical evidence from Asian emerging markets, *Journal of American Academy of Business*, 7, (1), pp.118-23.

Duffee, G., 1995. Stock returns and volatility a firm-level analysis. *Journal of Financial Economics*, 37(3), pp.399-420.

Durbin, J. and Watson, G.S. 1951. Testing for serial correlation in least squares regression II. *Biometrika*, 38(1/2) p. 159-177.

EAS, 2019. *Europe Attractiveness Survey*. Available at: https://www.ey.com/en_gl/attractiveness/19/how-can-europe-raise-its-game-ey-european-attractiveness-survey-2019.

Égert, B. and Kocenda, E., 2007. Interdependence between Eastern and Western European stock markets: Evidence from intraday data. Econ. Syst. 31(2), pp.184-203.

Egger, P. and Winner, H., 2005. Evidence on corruption as an incentive for foreign direct investment, *European Journal of Political Economy*, 21, pp. 932-952.

Elliott, R.S. and Schaub, M., 2009. A Reassessment of the Performance of American Depositary Receipts: The Brazilian Experience. *The Journal of Wealth Management*, *12*(3), pp.125-131.

Ely, D. and Salehizadeh, M., 2001. American depositary receipts. *International Review of Financial Analysis*, 10(4), pp.343-363.

Emenogu N. G., Adenomon, M. O., Nweze, N. O., 2020. On the volatility of daily stock returns of Total Nigeria Plc: evidence from GARCH models, value-at-risk and backtesting, *Financial Innovation*, 6(18), pp. 1-25.

Engle, R. F. and Rangel, J. G., 2005. *The Spline GARCH model for unconditional volatility and its global macroeconomic causes,* presented at the World Congress of the Econometric Society, London.

Engle, R., 2001. GARCH 101: The use of ARCH/GARCH models in applied econometrics. *Journal of economic perspectives*, *15*(4), pp.157-168.

Engle, R., 2004. Risk and volatility: Econometric models and financial practice. *American economic review*, *94*(3), pp.405-420.

Evans, J.L. and Archer, S.H., 1968. Diversification and the reduction of dispersion: An empirical analysis. *The Journal of Finance*, *23*(5), pp.761-767.

Fair, R.C., 2000. Estimated, calibrated, and optimal interest rate rules.

Fama, E. and Schwert, G., 1977. Asset returns and inflation. *Journal of Financial Economics*, 5(2), pp.115-146.

Fama, E. 1965. The behavior of stock market prices. *Journal of Business* 38(1), pp.34-105.

Fama, E., 1970. Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, *25*(2), pp.383-417.

Fama, E., 1976. *Foundations of finance: portfolio decisions and securities prices*. Basic Books (AZ), Oxford: Blackwell.

Fama, E., 1981. Stock returns, real activity, inflation, and money. *American Economic Review,* 71, pp. 545-565.

Feldstein, M., 2009. *Inflation, tax rules, and capital formation*. University of Chicago Press.

Fenton, P. and Paquet, A., 1998. *International interest rate differentials: The interaction with fiscal and monetary variables and the business cycle*. Centre de recherche sur l'emploi et les fluctuations économiques, Université du Québec à Montréal (CREFÉ), Center for Research on Economic Fluctuations and Employment (CREFE).

Finkler, S.A., Smith, D.L. and Calabrese, T.D., 2018. *Financial management for public, health, and not-for-profit organizations*. CQ Press.

Firth, M., 1978. The relationship between stock market returns and rates of inflation. *The Journal of Finance*, 34(3), pp. 743-749.

Fisher, I., 1911. *The Purchasing Power of Money*, New York: MacMillan.

Fisher, I., 1930. *The Theory of Interest*. New York: MacMillan.

Fisher, I., 1934. *The theory of interest as determined by impatience to spend income and opportunity to invest it*. New York: Kelley and Millman.

Florackis, C., Giorgioni, G., Kostakis, A., and Milas, C., 2014. On stock market illiquidity and real-time GDP growth. *Journal of International Money and Finance*, 44, pp. 210-229.

Floros, C., 2004. Stock returns and inflation in Greece. *Applied Econometrics and International Development*, 4(2).

Fortune, 2018. Available at: https://fortune.com/global500/2018/search/?hqcountry=Britain

Friedman, M., 1968. The role of monetary policy, *The American Economic Review*, 58(1), pp. 1-17.

Froot, K.A. and Stein, J.C., 1991. Exchange rates and foreign direct investment: an imperfect capital markets approach. *The quarterly journal of economics*, *106*(4), pp.1191-1217.

Gagnon, L. and Karolyi, G.A., 2010. Multi-market trading and arbitrage. *Journal of Financial Economics*, 97(1), pp.53-80.

Garbade, K. and Wachtel, P., 1978. Time Variation in the Relationship between Inflation and Interest Rates, *Monetary Econ*., 4(7), pp. 55 – 65.

Garson, G.D., 2012. *Testing statistical assumptions*. Asheboro, NC: Statistical Associates Publishing.

Gelos, R. G., and Wei, S. J., 2002. *Transparency and international investor behaviour*. National Bureau of Economic Research, No. w9260.

Gerke, W., Mager, F. and Röhrs, A., 2005. Twenty years of international diversification from a German perspective. *Schmalenbach Business Review*, *57*(2), pp.86-101.

GFCI-25, 2019. *The Global Financial Centres Index 25*. Available at: https://www.longfinance.net/media/documents/GFCI_25_Report.pdf.

Gill, J. and Johnson, P., 2010. *Research Methods for Managers*. London: Sage Publications.

Gilmore, C.G., McManus, G.M. and Tezel, A., 2005. Portfolio allocations and the emerging equity markets of Central Europe. *Journal of Multinational Financial Management*, 15(3), pp.287-300.

Goodell, J.W., and Vahamaa, S., 2013. US presidential elections and implied volatility: the role of political uncertainty. *Journal of Banking and Finance,* 37, pp. 1108-1117.

Graham, F. C., 1996. Inflation, real stock returns and monetary policy. *Applied Financial Economies*, 6, pp. 29-35.

Granger, C., and Sin, C., 2000. Modelling the absolute returns of different stock market indices: Exploring the forecastability of an alternative measure of risk. *Journal of Forecasting*, 19, pp. 277-298.

Greene, W., 2008. *Econometric analysis*. 6th ed. Upper Saddle River, NJ, Prentice Hall.

Griffiths, A. and Wall, S., 2012, *Applied economics,* 12th ed., Prentice Hall .LSE, London Stock Exchange.

Grix, J., 2002. Introducing students to the generic terminology of social research. *Politics*, 22(3), pp.175-186.

Grossman, S.J and Shiller R.J., 1981. The Determinants of the Variability of Stock Market Prices, *the American Review*, 71(2), pp. 222-227.

Grubel, H.G., 1968. Internationally Diversified Portfolios: Welfare Gains and Capital Flows. *The American Economic Review*, 58, pp. 1299-1314.

Gujarati, D.N. and Porter, D., 2009. *Basic Econometrics*, Mc Graw-Hill International Ed.

Guo, H., 2003. *Stock market returns, volatility, and future output*. Inter-university Consortium for Political and Social Research.

Gupta, R., Yuan, T., Eduardo Roca, E., 2016. Linkages between the ADR market and home country macroeconomic fundamentals: Evidence in the context of the BRICs, *International Review of Financial Analysis* 45, pp. 230-239.

Gygli, S., Haelg, F., Potrafke, N. and Sturm, J.E., 2019. The KOF globalisation index–revisited. *The Review of International Organizations*, 14(3), pp.543-574.

Hail, L. and Leuz, C., 2009. Cost of capital effects and changes in growth expectations around US cross-listings. *Journal of financial economics*, 93(3), pp.428-454.

Hales, A. D., 2015, Liquidity and price discovery in Latin America: evidence from American depositary receipts, *Journal of Economics and Finance*, 39, pp. 661–678.

Hamilton, J.D. and Lin, G., 1996. Stock market volatility and the business cycle. *Journal of applied econometrics*, 11(5), pp.573-593.

Hondroyiannis, G. and Papapetrou, E., 2006. Stock returns and inflation in Greece: A Markov switching approach, *Review of Financial Economics*, 15, pp. 76-94.

Harris, L., 1986. Cross-security tests of the mixture of distributions hypothesis. *Journal of Financial and Quantitative Analysis*, 21, pp. 39-46.

Hashemzadeh, N. and Taylor, P., 1988. Stock prices, money supply, and interest rates: the question of causality. *Applied economics*, 20(12), pp.1603-1611.

Hausman, J., 1978. Specification tests in econometrics, *Econometrica*, 46(6), pp. 1251-1271.

Hawkins, S., He, H., Williams, G. and Baxter, R., 2002. Outlier detection using replicator neural networks. *In International Conference on Data Warehousing and Knowledge Discovery* (pp. 170-180). Springer, Berlin, Heidelberg.

He, J. and Ng, L.K., 1998. The foreign exchange exposure of Japanese multinational corporations. *The Journal of Finance*, 53(2), pp.733-753.

Heaton, J., 1998. Secondary analysis of qualitative data. *Social research update*, 22(4), pp.88-93.

Heckelman, J.C. and Powell, B., 2010. Corruption and the Institutional Environment for Growth. *Comparative Economic Studies*, 52(3), pp. 351-378.

Hill, R., Carter, G., William E. and Lim, G. C. 2011. *Principles of Econometrics.* 4th ed., Wiley.

Hilmer, C.E. and Hilmer, M.J., 2014. *Practical Econometrics: Data Collection, Analayis, and Application*.

HMRC, 2018. HM Revenue and Customs, National Statistics, *Venture Capital Trusts Statistics*. Available at: https://www.gov.uk/government/statistics/venture-capital-trusts-statistics-december-2018

Holden, C.W., Jacobsen, S., Subrahmanyam, A., 2014. The Empirical Analysis of Liquidity. *Foundations and Trends in Finance*, 8, pp. 263-365.

Hooper, V., Sim, A. B., and Uppal, A., 2009. Governance and stock market performance. Economic Systems, 33(2), pp. 93-116.

Hopkins, S., 2019. Beware These Risks When Investing in American Depositary Receipts, the Motley Fool Hong Kong Limited. Available at https://www.fool.hk/en/2019/03/08/beware-these-risks-when-investing-in-american-depositary-receipts/

Hosseini, S.M., Ahmad, Z. and Lai, Y.W., 2011. The role of macroeconomic variables on stock market index in China and India. *International Journal of Economics and finance, 3*(6), pp.233-243.

Huang R. D. and Stoll, H. R., 2001. Exchange rates and firms' liquidity: Evidence from ADRs. *Journal of International Money and Finance* 20(3), pp. 297-325.

Hussain, A., and Khan, M. J., 2011. Impact of Inflation and Interest Rate on Stock Return. *The Journal of Humanities and Social Sciences*, 19 (1-2), pp. 29-36.

Ibrahim, T. M. and Agbaje, O. M., 2013. The relationship Between Stock Return and Inflation in Nigeria. European. *Scientific Journal*, 9 (4), pp. 146-157.

IMF, 2019, World Economic and Financial Surveys, World Economic Outlook Database, Available at:

https://www.imf.org/external/pubs/ft/weo/2019/01/weodata/index.aspx.

Izedonmi, P.F. and Abdullahi, I.B., 2011. The effects of macroeconomic factors on the Nigerian stock returns: A sectoral approach. *Global Journal of Management and Business Research, 11*(7), pp.25-29.

Jaffe, J.F. and Mandelker, G., 1976. The" Fisher effect" for risky assets: An empirical investigation. *The Journal of finance*, 31(2), pp. 447-458.

Jain, P.K., Kuvvet, E. and Pagano, M.S., 2017. Corruption’s impact on foreign portfolio investment. *International Business Review*, 26(1), pp.23-35.

Jaiswal-Dale, A. and Jithendranathan, T., 2009. Transmission of shocks from cross-listed markets to the return and volatility of domestic stocks. *Journal of Multinational Financial Management*, 19(5), pp.395-408.

Jasra, J.M., Azam, R.I. and Muhammad, A.K., 2012. Impact of macroeconomic variables on stock prices: industry level analysis. *Actual problems of economics*, (134), pp.403-412.

Jepkemei, B., 2017, the impact of inflation on stock market liquidity a case of Nairobi securities exchange, Kenya, International *Journal of Economics, Commerce and Management*, 1, pp. 319-350.

Jithendranathan, T., 2006. An empirical study of pricing and trading volume of Russian depositary receipts. *Investment Management and Financial Innovations*, 3(3), pp. 60–78.

Johnson, L. and Walther, C., 2011. The Value Of International Equity Diversification: An Empirical Test. *Journal of Applied Business Research (JABR)*, 8(1), pp.38.

Jones, D., 2007. Making connections: The relationship between epistemology and research methods. *Australian Community Psychologist*, 19(1), pp. 19-27.

Joseph, N. T. and Rostand, D.T.D., 2017. Stock markets, volatility and economic growth: evidence from Cameroon. *Ivory Coast and Nigeria*, 12(24), pp. 145-175.

Kalu, E.O. and Chinwe, O.C., 2014. The relationship between stock returns volatility and trading volume in Nigeria. *Business Systems and Economics*, 4(2), pp.115-125.

Kapingura, F. and Makhetha-Kosi, P., 2014. The causal relationship between the bond market development and economic growth in Africa: Case study of South Africa. *Mediterranean Journal of Social Sciences*, 5(3), p.126.

Karanasos, M. and Kyrtsoub, C., 2011. Analyzing the link between stock volatility and volume by a Mackey&Glass GARCH&type model: the case of Korea.

Karolyi, G. A., 2001, Why Stock Return Volatility Really Matters, *Institutional Investor Journals Series*, pp. 1-16.

Karolyi, GA and Stulz, RM. 1996. Why do Markets Move Together? An Investigation of US-Japan Stock Return Comovements, *Journal of Finance*, 29, pp.95-124.

Karpoff, J. M., 1987. The relation between price changes and trading volume: A survey. *Journal of Financial and Quantitative Analysis*, 22, pp. 109–126.

Kasman, S., Vardar, G. and Tunc, G., 2011. The impact of interest rate and exchange rate volatility on banks' stock returns and volatility: Evidence from Turkey, *Economic Modelling*, 28 (3), pp. 1328-1334.

Kaul, A. and Mehrotra, V., 2000. In Search of International Integration: An Examination of Intraday North American Trading of Canadian Dually Listed Stocks.

Kearney, C. and Potì, V., 2006. Correlation dynamics in European equity markets. *Research in International Business and Finance*, *20*(3), pp.305-321.

Kendall, M. G., 1953. The Analysis of Economic Time Series, Part 1, Prices, *Journal of the Royal Statistical Society,* A, 116, 11-25.

Kenourgios, D., Samitas, A. and Papathanasiou, S., 2005. The day of the week effect patterns on stock market return and volatility: Evidence for the Athens Stock Exchange. In *Proceedings of the 2nd Applied Financial Economics (AFE) International Conference on "Financial Economics",* Samos island, Greece.

Keynes, J. M., 1936. The general theory of interest, employment and money.

Khil, J. and Lee, B.S., 2000. Are common stocks a good hedge against inflation? Evidence from the Pacific-rim countries. *Pacific-Basin Finance Journal*, *8*(3-4), pp.457-482.

Kim, M, Szakmary, A.C. and Mathur, I., 2000. Price Transmission Dynamics between ADRs and their Underlying Foreign Securities, *Journal of Banking andFinance*, 24, pp.1359-1382.

Kim, O. and Pinnuck, M., 2014. Competition among Exchanges through Simplified Disclosure Requirements: Evidence from the American and Global Depositary Receipts, *Accounting and Business Research*, 44 (1), pp. 1-63.

Kim, O., 2016. Market efficiency and arbitrage opportunities for Russian depositary receipts cross-listed on the London Stock Exchange. *Review of Pacific Basin Financial Markets and Policies*, 19(02), p.1650007.

Koumou, G. B., 2018. Diversification and portfolio theory: a review. *Revision Requested at Financial Markets and Portfolio Management.*

Koumou, G. B., and Dionne, G., 2019. *Coherent diversification measures in portfolio theory: An axiomatic foundation*. Working Papers 19-2, HEC Montreal, Canada Research Chair in Risk Management..

Kuepper, J., 2019. How to safely invest in the UK Economy, the balance. Available at: https://www.thebalance.com/how-to-invest-in-the-uk-1979050.

Kuhn, T., 1970. *The structure of scientific revolutions.* University of Chicago Press.

Kuhn, T., 1977. *Teaching Collection* (Archaeology / ARCLG 053).

Kumar, M., 2006. Depositary Receipts: Concept, Evolution and Recent Trends. *Evolution and Recent Trends*.

Kumar, R., 2019. *Research Methodology a Step-by-Step Guide for Beginners*, 5th ed., Sage publications.

Kumari, J. and Mahakud, J., 2015. Does investor sentiment predict the asset volatility? Evidence from emerging stock market India. *Journal of Behavioral and Experimental Finance*, 8, pp.25-39.

Kurihara, Y. and Nezu, E., 2006. Recent stock price relationships between Japanese and US stock markets. *Studies in Economics and Finance, 23*(3), p.211.

Lassance, N. and Vrins, F., 2019. Portfolio selection with higher-order moments: A target-distribution approach. Paris, France. *9th General AMaMeF Conference*.

Lau, C.K.M., Demir, E. and Bilgin, M.H., 2013. Experience-based corporate corruption and stock market volatility: Evidence from emerging markets. *Emerging Markets Review*, *17*, pp.1-13.

Lee, C. M., and Ng, D., 2009. Corruption and international valuation: does virtue pay? *The Journal of Investing*, 18(4), pp. 23-41.

Lee, S.R., Tang, D.P. and Wong, K.M., 2000. Stock returns during the German hyperinflation. *The Quarterly review of economics and finance*, 40(3), pp.375-386.

Lekachman, R., 1964. *Keynes and the Classics*. Heath.

Léon, N. K., 2008. The Effects of Interest Rates Volatility on Stock Returns and Volatility: Evidence from Korea. International Research *Journal of Finance and Economics*, 14, pp. 285-290.

Liang, Y., and Mougoue, M. 1996. The pricing of foreign exchange risk: Evidence from ADRs. *International Review of Economics Finance*, 5(1059-0560), 377-385.

Limpanithiwat, K. and Rungsombudpornkul, L., 2010. *Relationship between inflation and stock prices in Thailand*. Available at: https://www.diva-portal.org/smash/get/diva2%3A326653/FULLTEXT01.pdf

Lintner, J., 1975. Inflation and Security Returns. *The Journal of Finance,* 30(2), p.259.

López, R. and Navarro, E., 2013. Interest rate and stock return volatility indices for the Eurozone. Investors' gauges of fear during the recent financial crisis, *Applied Financial Economics*, 23(18), pp. 1419-1432.

Low, K.C.P. and Ang, S.L., 2013. Confucian ethics, governance and corporate social responsibility. *International journal of business and management*, *8*(4).

LSE, 2020. Available at: https://www.londonstockexchange.com/trade/equity-trading/international-order-book.

Lu, Q. and Vivian, A., 2020. Domestically formed international diversification, *Journal of International Money and Finance*, 103(C).

Lucas, Jr, R.E., 1988. On the mechanics of economic development. *Journal of monetary economics*, *22*(1), pp.3-42.

Mackenzie, D. M., 2003. Long-Term Capital Management and the Sociology of Arbitrage, *Economy and Society*, 32(3), pp. 349-380.

Madhavan, V., and Ray, P., 2019. Price and Volatility Linkages between Indian Stocks and Their European GDRs. *Journal of Emerging Market Finance*, 18(2), pp. S213-S237.

Mamtha, D. and Srinivasan, K.S., 2016. Stock market volatility–conceptual perspective through literature survey. *Mediterranean Journal of Social Sciences*, *7*(1), p.208.

Mangram, M.E., 2013. A simplified perspective of the Markowitz portfolio theory. Global journal of business research, 7(1), pp.59-70.

Mansourfar, G., Mohamad, S. and Hassan, T., 2010. A review on international portfolio diversification: The Middle East and North African region. African Journal of Business Management, 4(19), pp.4167-4173.

Markowitz, M. 1952. Portfolio Selection. The Journal of Finance, 7(1), p. 77 – 91.

Mashal, A. M., 2011. Corruption and resource allocation distortion for "ESCWA" countries, *International Journal of Economics and Management Sciences* 1(4), pp.71-83.

Mauro, P., 1995. Corruption and growth. *Quarterly Journal of Economics*, 110 (3), pp. 681-712.

McClave, J.T., Benson, P.G., Sincich, T. and Sincich, T., 2014. *Statistics for business and economics* (pp. 074-0188). Boston: Pearson.

Mechri, N., Ben Hamad, S., de Peretti, C. and Charfi, S., 2018. *The impact of the exchange rate Volatilities on stock markets dynamics: Evidence from Tunisia and Turkey.*

Mensah, J.O. and Alagidede, P., 2017. How are Africa's emerging stock markets related to advanced markets? Evidence from copulas. *Economic Modelling*, 60, pp.1-10.

Méon, P G., and Weill, L., 2010. Is Corruption an Efficient Grease? *World Development*, 38(3), pp. 244-259.

Méon, P. G., and Sekkat, K., 2005. Does corruption grease or sand the wheels of growth? *Public Choice*, 122 (1-2), pp. 69-97.

Merton, R. C., 1980. On estimating the expected return on the market: An exploratory investigation. *Journal of Financial Economics*, 8, pp. 323–336.

Middleton, C.A., Fifield, S.G.M. and Power, D.M., 2008. An investigation of the benefits of portfolio investment in Central and Eastern European stock markets. *Research in International Business and Finance*, 22(2), pp.162-174.

Mierzejewski, F., 2009. Towards a general theory of liquidity preference. *Journal of Applied Economic Sciences (JAES)*, 4(08), pp. 261-272.

Miller, D.P. and Morey, M.R., 1996. The intraday pricing behaviour of international dually listed securities. *Journal of International Financial Markets Institutions and Money*, 6, pp.79-90.

Mlambo C., Maredza A., and Sibanda K., 2013. Effects of Exchange Rate Volatility on the Stock Market: A Case Study of South Africa. Mediterranean *Journal of Social Sciences MCSER*, 4(4), pp. 561-570.

Mo, P.H., 2001. Corruption and economic growth. *Journal of comparative economics*, *29*(1), pp.66-79.

Modigliani, F. and Cohn, R. A., 1979. Inflation, rational valuation and the market. *Financial Analyst Journal*, 38, pp. 24-44.

Moore, K.M., 2018. *Risk arbitrage: an investor's guide*. John Wiley and Sons.

Morelli, D., 2002. The relationship between conditional stock market volatility and conditional macroeconomic volatility: Empirical evidence based on UK data. *International Review of Financial Analysis*, 11(1), pp.101-110.

Moyo, E., Waititu, A.G. and Ngunyi, A., 2018. Modelling the Effects of Trading Volume on Stock Return Volatility Using Conditional Heteroskedastic Models. *Journal of Finance and Economics*, *6*(5), pp.193-200.

MSCI, 2010. *Is There a Link Between GDP Growth and Equity Returns? MSCI Barra*, Retrieved from: https://www.msci.com/documents/10199/a134c5d5-dca0-420d-875d-06adb948f578.

Mundlak, Y., 1978. On the pooling of time series and cross section data. *Econometrica: journal of the Econometric Society*, pp. 69-85.

Murungi, C.M., 2012. *The impact of inflation on stock market returns and volatility: Evidence from Nairobi securities exchange,* the University of Nairobi.

Myers, M. 2013. Qualitative research in business and management. Los Angeles: SAGE.

Najand, M. and Rahman, H., 1992. Stock market volatility and macroeconomic variables: International evidence. *Journal of Multinational Finance Management*, *1*(3), pp.51-66.

Nandy, S. and Sussan, F., 2020. Did American Depositary Receipts from Britain Show Aggregate Abnormal Return Different from Zero on the Brexit Referendum Announcement Day and on the Actual Brexit Referendum Day?. *Review of Integrative Business and Economics Research,* 9(4), pp.114-122.

Nandy, S., Sussan, F. and Nakagawa, H., 2020. Parliamentary Elections and Stock Performance: A Comparison of American Depositary Receipts and their Underlying Equities in India. *Review of Integrative Business and Economics Research*, 9(1), pp.51-62.

Narayan, S., and Narayan, P. K., 2012. Do US macroeconomic conditions affect Asian stock markets?, *Journal of Asian Economics*, 23(6), pp. 669-679.

Ng, D., 2006. *The Impact of Corruption on Financial Markets*. Managerial Finance.

Nijam, H.M, Ismail, SMM, Musthafa, AMM. 2015. The Impact of Macro-Economic Variables on Stock Market Performance; Evidence From Sri Lanka AMM, *Journal of Emerging Trends in Economics and Management Sciences*, 6(2), pp. 151-157.

Nishat and Shaheen, 2004. Macro-economic factors and Pakistani Equity Market, *The Pakistan Development Review*, 43, pp. 619-637.

Novotná, Z., Šánová, P., and Laputková, A., 2016. Evaluation of the Quality of Governance in African Countries using Aggregate Indicators. *International Journal of Economics and Financial*, 6(2), pp. 682-687.

Obstfeld, M. and Krugman, P.R., 2003. *International Economics: Theory and Policy*. Pearson Education, Inc.

OECD, 2019. *Economic Survey of the United Kingdom*. Available at: http://www.oecd.org/economy/united-kingdom-economic-snapshot/.

Officer, D. and Hoffmeister, R., J., 1987. ADRs. *The Journal of Portfolio Management*, 13(2), pp. 61-65.

Officer, D., and Hoffmeister, R. 1988. “ADRs: A Substitute for the Real Thing?” *Journal of Portfolio Management*, 13 (2): 61–65.

Okechukwu Z. A., Mbadike, N. S.; Geoffrey, U., Ozurumba, B.A, 2019. Effects of Exchange Rate, Interest Rate, and Inflation on Stock Market Returns Volatility in Nigeria. *International Journal of Management Science and Business Administration*, 5(6), pp. 38-47.

Olkkonen, S., 2009. The Law of One Price Evidence from Three European Stock Exchanges, Master’s Thesis in Finance, *The International Business Program*, Linköping University, Sweden Department of Management and Engineering.

Olsen, M.E., 2019. Viewing the world ecologically. Routledge.

Olweny, T. and Omondi, K., 2011. The effect of macro-economic factors on stock return volatility in the Nairobi stock exchange, Kenya, *Economics* and *Finance Review*, 1(10), pp. 34-48.

Önder, Z., and Şimga-Mugan, C., 2006. How do political and economic news affect emerging markets? Evidence from Argentina and Turkey. *Emerging Markets Finance and Trade*, 42(4), pp. 50-77.

Ong, L.L. and Izan, H.Y., 1999. Stocks and currencies: Are they related? *Applied Financial Economics*, 9(5), pp. 523-532.

ONS, 2019. *Population estimates*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates

O'Toole, J. and Beckett, D., 2010. *Educational research: Creative thinking and doing*. Oxford University Press, USA.

Özen, E. and Tetik, M., 2019. Did Developed and Developing Stock Markets React Similarly to Dow Jones During 2008 Crisis? , *Frontiers in Applied Mathematics and Statistics*, 5(49), pp. 1-7.

Özlen, S. and Ergun, U., 2012. Macroeconomic Factors and Stock Returns, *International Journal of Academic Research in Business and Social Sciences*, 2(9), pp. 315-343.

Park, J. and Tavakkol, A., 1994. Are ADRs a dollar translation of their underlying securities? The case of Japanese ADRs. *Journal of International Financial Markets, Institutions and Money*, *4*(1-2), pp.77-87.

Pastor, L., and Veronesi, P., 2012. Uncertainty about government policy and stock prices. *The Journal of Finance*, 67(4), pp. 1219-1264.

Patelis, A.D., 1997. Stock return predictability and the role of monetary policy. *The Journal of Finance*, 52(5), pp.1951-1972.

Patra, T. and Poshakwale, S., 2006. Economic variables and stock market returns: evidence from the Athens stock exchange. *Applied financial economics*, *16*(13), pp.993-1005.

Peng, M.W. and Luo, Y., 2000. Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. *Academy of management journal*, *43*(3), pp.486-501.

Pindyck, R.S., 1984. Risk, Inflation, and the Stock Market. *The American Economic Review*, *74*(3), pp.335-351.

Poshakwale, S.S. and Aquino, K.P., 2008. The dynamics of volatility transmission and information flow between ADRs and their underlying stocks. *Global Finance Journal*, *19*(2), pp.187-201.

Qian, E., 2013. Are risk-parity managers at risk parity?. *The Journal of Portfolio Management*, *40*(1), pp.20-26.

Rajan, K, Lalatendu, M and Yiuman, T., 2003. International price discovery for emerging market stocks. *Review of Quantitative Finance and Accounting*, 2(1), pp. 179–199.

Ramsey, J.B., 1969. Tests for specification errors in classical linear least-squares regression analysis. *Journal of the Royal Statistical Society: Series B (Methodological)*, *31*(2), pp.350-371.

Rapach, D.E., 2001. Macro shocks and real stock prices. *Journal of Economics and Business*, 53(1), pp.5-26.

Reid, D., 2019. New York stretches lead over London as the world's top financial center, *Survey shows*. Available at: https://www.cnbc.com/2019/09/19/new-york-beats-london-again-as-the-worlds-top-financial-center.html.

Rezayat, F. and Yavas, B.F., 2006. International portfolio diversification: A study of linkages among the US, European and Japanese equity markets. *Journal of Multinational Financial Management*, 16(4), pp.440-458.

Ritter, J.R., 2005. Economic growth and equity returns. *Pacific-Basin Finance Journal*, *13*(5), pp.489-503.

Rizwan, M.F. and Khan, S.U., 2007. Stock return volatility in emerging equity market (KSE): the relative effects of country and global factors. *International Review of Business Research Papers*, *3*(2), pp.362-375.

Robson, C., 2002. *Real world research: A resource for social scientists and practitioner-researchers*, 2, Oxford: Blackwell.

Rodríguez, J., 2016. A Look at Liquidity of Single-versus Cross-Listed ADRs. *The Journal of Investing*, *25*(1), pp.59-63.

Roodman, D., 2009. A note on the theme of too many instruments. *Oxford Bulletin of Economics and statistics*, *71*(1), pp.135-158.

Ross, S. A., 1976. The arbitrage theory of capital asset pricing, Journal *of Economic Theory*, 13(3), pp. 341-360.

Ross, S.A., 1987. The interrelations of finance and economics: Theoretical perspectives. *The American Economic Review*, *77*(2), pp.29-34.

Sakthivel, P., Bodkhe, N. and Kamaiah, B., 2012. Correlation and volatility transmission across international stock markets: a bivariate GARCH analysis. *International Journal of Economics and Finance*, *4*(3), pp.253-264.

Salah-Uddin, M. G. and Alam, M. M., 2007. The Impacts of Interest Rate on Stock Market: Empirical Evidence from Dhaka Stock Exchange, *South Asian Journal of Management and Sciences*, 1(2), pp. 123-132.

Samuelson, P., 1965. Proof that properly anticipated prices fluctuate randomly, *Industrial Management Review*, 6:2 (1965: Spring) p.41-49.

Sanyal, R. (2019). *Liquidity Preference Theory of Interest (Rate Determination) of JM Keynes*. Available at: https://www.researchgate.net/profile/Rajibkumar_Sanyal/publication/335881211_Liquidity_Preference_Theory_of_Interest_Rate_Determination_of_JM_Keynes/links/5d81c424458515fca1712564/Liquidity-Preference-Theory-of-Interest-Rate-Determination-of-JM-Keynes.pdf?origin=publication_detail.

Sarantakos, S., 1998. Varieties of social research. In *Social Research*, pp. 31-71. Palgrave, London.

Saryal, F.S., 2007. Does inflation have an impact on conditional stock market volatility?: Evidence from Turkey and Canada. *International research journal of finance and economics*, *11*, pp.123-133.

Saunders, M., Lewis, P. and Thornhill, A., 2009. *Research methods for business students*. Pearson education.

Savin, N. E. and White, K. J. 1977. The Durbin-Watson test for serial correlation with extreme sample sizes or many regressors. *Econometrica*, 45(8), p. 1989-1996.

Schaub, M., 2012. International equities listed on the New York stock exchange: does type of issue or date of issue matter?. *Financial Markets and Portfolio Management*, *26*(4), pp.429-447.

Schaub, M., 2014. European ADRs: what a difference a decade makes. *Applied Economics Letters*, *21*(7), pp.470-476.

Schaub, M., 2016. Early wealth effects of Asia Pacific and European NASDAQ-listed ADRs: a comparison of 1990s and 2000s issues. *Applied Economics Letters*, *23*(5), pp.382-387.

Schaub, M., 2017. Initial wealth effects of the Brexit vote on UK ADRs, *Applied Economics Letters*, 24 (17), pp. 1232-1236.

Schaub, M., 2019. Holding period returns from NASDAQ traded ADRs. *Applied Economics Letters*, *26*(20), pp.1689-1693.

Schotman, P.C. and Schweitzer, M., 2000. Horizon sensitivity of the inflation hedge of stocks. *Journal of empirical Finance*, *7*(3-4), pp.301-315.

Schwert, G.W., 1990. Stock volatility and the crash of' 87. *The review of financial studies*, *3*(1), pp.77-102.

Shapiro, A., 2018. Between autonomy and control: Strategies of arbitrage in the "on-demand" economy. *New Media & Society*, *20*(8), pp.2954-2971.

Sharma, S., 2017. Oil price shocks and American depositary receipt stock returns. *Research in International Business and Finance*, *42*, pp.1040-1056.

Singh, A. and Chakraborty, M., 2017. Examining efficiencies of Indian ADRs and their underlying stocks. *Global Business Review*, *18*(1), pp.144-162.

Smith, K. and Sofianos, G., 1997. *The impact of an NYSE listing on the global trading of non-US stocks*. New York Stock Exchange.

Solnik, B. and McLeavey, D., 2003. Global Performance Evaluation. *International Investments*. 5th ed.Upper Saddle River, NJ: Pearson Addison-Wesley.

Solnik, B.H. and Freitas, A.D., 1988. International factors of stock price behaviour. In *Recent developments in international banking and finance*, 2, pp. 259-276. Edited by Khoury, S.J. and Ghosh, A., Lexington, Mass.: Lexington Books.

Solnik, B.H., 1973. Note on the validity of the random walk for European stock prices. *The journal of Finance*, *28*(5), pp.1151-1159.

Solnik, B.H., 1995. Why not diversify internationally rather than domestically? *Financial analysts journal*, *51*(1), pp.89-94.

Spaulding, W. 2020. Global depositary receipts. Thismatter. Available at: https://thismatter.com/money/stocks/global-depositary-receipts.htm

Spyromitros, E. 2020. The effect of corruption on stock market volatility, *Journal of Applied Finance and Banking*, 10(2), pp. 117-123.

Stenzel, A. and Wagner, W. 2018. *Opacity, Liquidity and Disclosure Policies*. University of Bonn and University of Mannheim, Germany.

Stickel, S. E., and Verrecchia, R. E., 1994. Evidence that trading volume sustains stock price changes. *Financial Analysts Journal*, 50(6), pp.57-67.

Strong, R., 2009. *Portfolio construction, management, and protection*. Nelson Education.

Suarez, E., 2005. Arbitrage opportunities in the depositary receipts market: Myth or reality? *Journal of International Financial Markets, Institutions and Money*, 15(5), pp.469-480.

Subair, K and Salihu, O. M., 2013. Exchange rate volatility and the stock market: The Nigerian experience, *Kwara State University*. Available at::https://pdfs.semanticscholar.org/3036/cd5db56fd11ce7173b7853259bf66237430e.pdf.

Suh, J., 2003. ADRs and US market sentiment. *The Journal of Investing*, *12*(4), pp.87-95.

Suriani, S., Kumar, M. D., Jamil, F. and Muneer, S., 2015. Impact of exchange rate on stock market, *International Journal of Economics and Financial Issues*, 5(1S), pp. 385-388.

Svensson, A. and Heikenström, A., 2016. The effects of delisting on liquidity and volatility: A case study on Nordic companies. *Jönköping International Business School.*

Swaleheen, M., and Stansel, D., 2007. Economic freedom, corruption, and growth. *Cato Journal*, 27(3), pp. 18-25.

Talla, J.T., 2013. Impact of macroeconomic variables on the stock market prices of the Stockholm stock exchange (OMXS30). *Jönköping International Business School.*

Tanzi, V., and Davoodi, H. 1997. Corruption, Public Investment and Growth. *IMF Working Paper 98/63*.

Tashakkori, A. and Teddlie, C., 2008. Quality of inferences in mixed methods research: Calling for an integrative framework. *Advances in mixed methods research*, pp.101-119.

Theodossiou, P. and Savva, C. S., 2016. Skewness and the Relation between Risk and Return. *Management Science*, 62(6), pp.1598-1609.

TI, 2019, *Corruption perceptions index*, available at: https://www.transparency.org/en/cpi/2019

TI-UK, 2011. *Corruption in the UK: overview and policy recommendations*.Available:at:https://www.transparency.org.uk/publications/corruption-in-the-uk-overview-policy-recommendations/.

Tiwari, A. K., Mutascu, M. I., Albulescu, C. T., and Kyophilavong, P., 2015. Frequency domain causality analysis of stock market and economic activity in India, *International Review of Economics and Finance*, 39, pp. 224-238.

Trochim, W. M. 2000. *The Research Methods Knowledge Base*, 2nd Ed. Atomic Publishing, Cincinnati, OH.

Troyanska, K., 2004. Derivatives as an instrument of financial management in international companies. *Diplomica Verlag GmbH*.

Tsouma, E., 2009. Stock returns and economic activity in mature and emerging markets. *The Quarterly Review of Economics and Finance*, 49(2), pp. 668-685.

Ugur, S., and Ramazan, S., 2005. Inflation, stock returns, and real activity in Turkey. *The Empirical Economics Letters*, 4 (3), pp. 181-192.

UN, 2004. The global programme against corruption. U.N. Anticorruption Toolkit (United Nations Office on Drugs and Crime, New York)

Upadhyay, A., 2016. Causality Relationship between Interest Rate and Stock Returns in India-An Analytical Study. *Journal of Management Sciences and Technology.* Research Scholar, Banaras Hindu University Varanasi. India.

Verma, P. and Jackson, D., 2012. The dynamic relationship between ADRs, interest rates, exchange rates and their spill over effects, *North American Journal of Finance and Banking Research*, 6(6), pp. 1-26.

Vo, X.V. and Bui, H.T., 2016. Liquidity, liquidity risk and stock returns: evidence from Vietnam. *International Journal of Monetary Economics and Finance*, *9*(1), pp.67-89.

Wang, T. and Huang, Z., 2012. The relationship between volatility and trading volume in the Chinese stock market: a volatility decomposition perspective. *Annals of economics and finance*, 13(1), pp.211-236.

Wang, X., 2010. The relationship between stock market volatility and macroeconomic volatility: Evidence from China. *International Research Journal of Finance and Economics*, 49, Euro Journals Publishing, Inc.

WB, 2019. Time required to start a business (days). Available at: https://data.worldbank.org/indicator/ic.reg.durs

Wei, S., 1997. Why is Corruption so much more Taxing than Tax? Arbitrariness Kills. *NBER Working Paper 6255*. Cambridge, MA.

Wellington, J. and Szczerbiński, M., 2007. *Research methods for the social sciences*. A and C Black.

Wesolowski, B. C. and Musselwhite, D. J., 2018. *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*, Normal Distribution, SAGE Publications, Inc. Thousand Oaks.

Wilcox, R. 2017. *Introduction to robust estimation and hypothesis testing: A volume in statistical modeling and decision science*, 4th ed. Academic press.

Wooldridge, J.M., 2016. *Introductory econometrics: A modern approach*. Nelson Education.

Yaya, O.S. and Shittu, O.I., 2010. On the Impact of Inflation and Exchange Rate on Conditional Stock Market Volatility: A Re-Assessment. *European Journal of Scientific Research and Industrial Research*, *2*(1), pp. 115-117.

Yeh, C.C. and Chi, C.F., 2009. The co-movement and long-run relationship between inflation and stock returns: Evidence from 12 OECD countries. *Journal of Economics and Management*, 5(2), pp.167-186.

Yin, R.K., 2017. *Case study research and applications: Design and methods*. Sage publications.

Zakaria, Z. and Shamsuddin, S., 2012. Empirical Evidence on the Relationship between Stock Market Volatility and Macroeconomics Volatility in Malaysia. *Journal of Business Studies Quarterly*, *4*(2), pp.61-71.

Zhang, A., 2012. An examination of the effects of corruption on financial market volatility. *Journal of Emerging Market Finance*, 11(3), pp. 301-322.