LUISS

Department of Business and Management

Chair of Advanced Corporate Finance

Islamic Finance and Capital Asset Pricing Model.
An Alternative Approach

Supervisor

Prof. Pierluigi Murro

Candidate

Davide Fiocchi

Co-supervisor

Prof. Federico Merola

Academic Year 2019/2020

Table of Contents

INTRODUCTION

The ultimate purpose of this thesis is to analyse the relationship between Islamic finance and the Capital Asset Pricing Model (CAPM). On the one hand, today the *Shari'a* compliant financial systems still represent a rather unknown topic for many people in Western society. However, they could represent a great opportunity for many financial intermediaries. On the other hand, the CAPM is probably one of the most used and discussed model to price securities. It is very interesting to examine whether and how it can be applied to Islamic equities. Essentially, this is the research question of this work: to examine the application of CAPM in this specific field, discussing possible drawbacks and improvements of this model.

In the first chapter a comprehensive overview of Islamic finance in its main characteristics and specifications will be provided. In order to fully understand the roots of this phenomenon, its main features and core principles will be outlined. In particular, after a brief overview of the history of Islam, foundations and sources of Islamic law will be described. After this stage, the focus will be shifted on the historical development of Islamic finance: the roots of this peculiar financial system will be tracked down from the very beginning until today. Then, the current global status of this industry will be analysed with regard to the industry's three broad sectors that compose it. The last part of the chapter is aimed to provide an overview of all the Islamic financial services. They will be explained in their distinctive features, underlying differences with the conventional system.

After having outlined a comprehensive picture of Islamic finance, the Capital Asset Pricing Model will be the main topic of the second chapter. First, a brief explanation of this model will be provided. Starting from the Markowitz portfolio theory and building on some additional assumptions, the equation to compute expected return of securities will be derived. Then, the second part of the chapter provides a literature review of those academic papers that have linked CAPM with the Islamic financial system. Not only the application of this model to *Shari'a* compliant stocks will be discussed, but also possible adjustments in order to make it fully *Shari'a* compliant will be examined.

The third and final chapter consists of an empirical approach to this issue. The conventional CAPM and one of the proposed *Shari'a* Compliant Asset Pricing Models will be tested on a sample of Islamic equities. Firstly, both the asset pricing models will be individually examined in order to capture their specific characteristics and their explanatory power in this field. Secondly, a comparison will be made so to understand if the alternative approach can have same or even better effectiveness than the traditional one. Research method, empirical findings and discussion of the results are explained so that a comprehensive overview of process and deductions will be clear.

CHAPTER I

Introduction to Islamic finance

The aim of this chapter is to provide a comprehensive overview of Islamic finance in its main characteristics and specifications. Such a topic is a very extensive and it may be rather unknown to those who are not experts in the industry, however, it represents an interesting alternative and complement to the conventional financial systems.

In order to fully understand the roots of this phenomenon, its main features and core principles will be outlined in the paragraph 1.1. After a brief overview of the history of Islam, foundations and sources of Islamic law will be described. Then, a detailed explanation of the main directives which govern Islamic economics and finance will be provided. The paragraph ends with a mention of a very interesting paper about the positive effects of the described characteristics in mitigating the shock of global financial crisis.

Since it is possible to really evaluate a phenomenon only with a basic knowledge of the events that have contributed to shape it, an overview of the historical development of Islamic finance will be delineated in the paragraph 1.2. The roots of this peculiar financial system will be tracked down from the very beginning until today. With the purpose of offering an insight of the today's global status, the industry's three broad sectors will be analysed on the basis of the annual report that traces developments and trends of Islamic finance.

Finally, in the paragraph 1.3, Islamic financial services will be explained in their distinctive features, underlying the differences with the conventional system. First, the financial intermediation practiced by Islamic banks will be described, focusing on the services offered to their depositors. Then, particular attention will be given to the asset side of their balance sheet, analysing the types of contract implemented in financing operations. Also, the Islamic capital market will be discussed defining its main segments: the Islamic fixed-income instruments or *sukuk* market and the Islamic equity markets, especially for what concerns Islamic funds. The paragraph ends with a brief explanation of Islamic insurance.

1.1 Main characteristics and core principles

Among the monotheistic religions, Islam has some peculiar features which create a powerful and close relationship between religious beliefs and socio-economic behaviours. Teachings and practices of Islamic law are not bound to the relationship between God and Muslims, but they represent a code of behaviour which is valid in every aspect of common and individual life. As a

consequence, the analysis of Islamic finance has to start from a definition of the topic and from a basic knowledge of the Islam's main features.

Financial services have always played a fundamental role in the economy of every society. Within the framework of the existing financial system and capital markets, intermediaries and financial institutions are the main players in the transfer of funds between economic surplus units and economic deficit units (by means of the so called "financial intermediation"). Islamic finance's approach has exactly the same objective, but the important distinction is that it aims to achieve it abiding by Islamic law, which is called *Shari'a* (literally "way" or "path"). In a nutshell, "Islamic financial services pledge to conduct financial intermediation in accord with a code of behaviour based on Islamic values. The code's principles are enshrined in the contracts and product offerings".[1] Spontaneously, we may wonder: "How can a system or organization pertaining to financial industry be Islamic? One way to analyse this question is to think about "Islamic" finance as simply "Islamic law-compliant" finance – a system which tries to embody the economic and social teachings of Islam".[2]

Such attempt of combining two apparently opposite concepts (economy and religion) may sound rather strange to the non-Muslim population. In Western societies, law and faith have always been unrelated; on the opposite, Islamic law as well as Islamic finance directly stem from Islamic religion. This deep and tight link has historically been present since the emergence of Islam in the middle of the 7th century AD. Hence, it is therefore necessary to understand history, sources and core principles of this religion in order to fully comprehend its economic and financial system.

In 610 AD the Islamic Prophet Muhammad, previously a prominent merchant of that time, started to receive and spread the word of Allah (literally "God"). In 622 AD he moved from Mecca to Medina and, since then, this year has represented the beginning of calendar for Muslims. The Quran (which literally means "the recitation") continued to be revealed to Muhammad until his death in 632 AD. It was first memorized by the Prophet and his companions, but it was then recorded on pieces of wood, leather, stones and bones. Later on, during the Caliphate of Uthman ibn Affan, the Quran was definitely bound in a single volume.

An important characteristic of Islam's first period has to be underlined: the Islamic community who had moved to Medina with Muhammad formed the basis of the first Islamic state, which is a form of society completely based on Islamic law. Muhammad proved to be an important prophet as well as a valuable general: in 630 AD the Muslims who had moved to Medina took back Mecca and they slowly started to expand their power in the Arabic peninsula both from a political and a

---

[1] A.M. EL TIBY and W. GRAIS, *Islamic Finance and Economic Development: Risk Management, Regulation, and Corporate Governance* (Hoboken, New Jersey: John Wiley & Sons, 2015), 3.
[2] S.A.R. RIZVI and I. SABA, *Developments in Islamic Finance: Challenges and Initiatives* (London: Palgrave Macmillan, 2017), 2.

spiritual point of view. Therefore, the political sphere as well as the religious one coexisted from the very beginning, making of Islam a unicum in the world of monotheistic religions. This close relationship is reasonable thinking about Islam as a "system of religious beliefs and an all-encompassing way of life".[3] It is in fact "a religion of laws – it is a legal code, not a theology, which establishes the criteria for right and wrong, proper and improper behaviour. Muslims believe that Allah the Almighty revealed to Prophet Muhammad, the rules governing society and the proper conduct of the society's members. It is incumbent on the individual, therefore, to live in a manner prescribed by the revealed law, and on the community to build the perfect human society on Earth according to holy injunctions. Islam is a complete religion, embracing all the facets of activities in this world and hereafter. In essence, it is a command of Allah the Almighty encompassing all aspects of human life including the essence of economic well-being and development of Muslims at the individual, family, community, society, and state levels".[4]

Hence, *Shari'a* aims to be a complete code of life covering all behavioural, spiritual, mental and physical aspects for those Muslims who lived in the past, for those who live now and for those who will live in the future: it is a valid system for all societies of all times. Consequently, Islamic law prescribes behaviours in every aspect of life, including economics and finance as well, and it is divided into two main parts: *Ibadat*, which are laws about devotional matters, and *Muamalat*, which are laws related to human activities within the political, social and economic spheres. On the one hand, the latter includes rules about contracts, sales, *halal* (acceptable) and *haram* (unacceptable) activities and sources of income as well as rules about inheritance, marriage and divorce. On the other hand, *Ibadat* is exclusively linked to the relationship of every Muslim with Allah, including rules about fasting, pilgrimage, prayers and invocations. Moreover, it encompasses the famous five acts of worship (also known as "pillars") that all Muslims have to fulfil. They are:

1. *Shahada*: it the testimony of faith pronounced to state full faith in Allah;
2. *Salat*: it corresponds to the mandatory prayers said by Muslims five times a day;
3. *Zakat*: it is a financial obligation every Muslim has to fulfil towards needy people;
4. *Sawm*: it is the fasting required to all Muslims during the holy month of Ramadan;
5. *Hajj*: it is the annual pilgrimage to Mecca every Muslim has to do at least once in a lifetime.

---

[3] N. ALAM, L. GUPTA and B. SHANMUGAM, *Islamic Finance: A Practical Perspective* (London: Palgrave Macmillan, 2017), 17.
[4] Ibid.

The mentioned practices and beliefs form the foundations of Islamic faith, which directly stems from the *Shari'a*'s teachings. Interestingly, some important elements can be found both in worship issues and in economic rules, like *zakat* for example, which is one the five pillars, but it represents an important teaching within the economic and financial systems as well. Since Islamic finance is regulated by the same law which governs Islamic faith, here are the sources of this regulation.

- Quran: it is the central religious text for Muslims, and it includes the word of Allah that was directly received by Muhammad. Quran is mainly a book of moral and theological principles, but it also encompasses teachings and directives which are essential to define the Islamic community from a political, social and economic point of view.
- *Sunna*: it consists of the sayings, behaviours and tacit approvals done and approved by the Prophet Muhammad during all his life. Generic teachings of the Quran are explained and implemented in the Sunna: the former is practiced and enacted by the latter.
- *Ijma*: it is the agreement of Islamic scholars and jurists with regard to a particular legal matter. Hence, it is the general consensus of qualified experts in understanding, interpreting and applying the teachings of the Quran and the *Sunna*.
- *Qiyas*: it literally means "analogy" and it is the derivation of law through analogical deduction on the basis of a similar situation regulated by the Quran, the *Sunna* or the *Ijma*.

After having provided an overview of the foundations of Islam and of its sources of law, it is now necessary to underline the main principles that govern Islamic economics and finance. However, while holy rituals have to be accomplished tightly according to the *Shari'a* directives, the matters "that pertain to socio-economic rights and obligations are governed by the rule of "General Permissibility" […], which means that all acts and things which have not been expressly prohibited by the original sources of *Shari'a* are permissible".[5] Besides this general directive, here is a brief explanation of the basic principles which govern Islamic economics and finance.

- *Riba*

One of the fundamental principles of Islamic finance is the absolute prohibition of *riba*, which literally means "excess", "increase". Within the *Shari'a* law, it is meant as the additional amount that the borrower must pay to the lender together with the principal amount as a condition of the loan or in order to get an extension of its maturity. Today it is commonly defined as "interest".

---

[5] M. AYUB, *Understanding Islamic Finance* (Chichester, West Sussex: John Wiley & Sons, 2007), 22.

In order to provide a general notion of *riba*, it may be defined as: "any increase over and above the principal amount payable in a contract obligation, not covered by a corresponding increase in labour, commodity, risk or expertise".[6] This kind of gain is strictly prohibited by Islamic law because it is considered as an unjustified and effortless income, which is earned as usury or interest at the expenses of the borrower. There is no controversy among all Muslims in considering any transactions based on *riba* as a severe sin and in judging all parties involved in the contract (both the lender and the borrower) as grave sinners, easing these kinds of business.

This sort of prohibition is present in Islam as well as in the other revealed religions. The reason of this ban has its roots in the believing that it creates inequalities within human society, concentrating wealth in few people's hands. However, some exceptions in the interpretation of this directive have emerged. In fact, the prohibition of interest can be found in the *Torah*, but with regard to the "brother" only, meant as "any other fellow Jew". Hence, Jews are not allowed to lend at interest to all the other Jews, but they can feel free to do so to all non-Jew people. On the other hand, Old and New Testaments prohibit it for Christians, but with the emergence of early forms of capitalism in the 13th century AD, Christian values started to diverge. Thus, the general interpretation shifted towards a distinction between an excessive interest (which is usury) and an acceptable and legitimate interest. Then, in the 16th century, the development of trade and commerce, an increasing demand for capital along with the theories of Calvin and Molinaeus, induced economists and experts to justify interest, which is moderate and acceptable, and to condemn usury, which is excessive and unreasonable. Although the concept of interest has evolved in other monotheistic religions, leading to a permissive interpretation of it, Islamic law still considers *riba* as a guilt and it encompasses two different kinds of this sin.

- *Riba* in loans or debt

In both loans and debts, the creditor has the right to receive only the principal amount at maturity, "in the former case, exactly the amount given as the loan and in the latter case, the liability or the amount of debt generated from the credit transaction. Any amount, big or small, over and above the principal of loan or debt would be *riba*".[7]

Riba in loans or debts can be further classified in *riba qardh* and *riba jahiliyyah*. The first case of *riba* is included in the contract between lender and borrower and it is proportionate to the time taken by borrower to repay the loan. On the other hand, the second case of *riba* is not included at the beginning of the contract, but it then arises when the creditor asks the debtor a premium over and above the original amount in exchange for a delayed payment of the matured debt.

---

[6] Ibid., 53.
[7] Ibid., 47.

7

- *Riba* in sale transactions

It occurs in trading transactions "in which a commodity is exchanged for the same commodity but unequal in amount and the delivery of at least one commodity is postponed"[8]. This case happens especially when objects of the exchange are two ribawi materials (i.e. items such as gold, silver, wheat and dates, but not only) and the relative rules of trade are not observed.

Riba in sale transactions can be further classified in *riba fadhl* and *riba nasiah*. The first case arises when ribawi materials are exchanged at the same time, but they are different in weight, measurement or number. In the second case, ribawi materials are equal in weight, measurement and number but payment and delivery of the materials are performed in two different moments.

As it can be understood from the scenario depicted so far, the interest applied by conventional banks today clearly falls in the definition of *riba* as forbidden by the *Shari'a*. Hence most of traditional banks offer interest-based deposits, accounts and loans which are totally precluded to Muslims. Their financing needs must be met by an interest-free banking.

Even though *riba* is severely prohibited and considered a serious sin by Islam, it is totally different from profit from sales, which is instead welcomed. Many are the reasons for which *riba* is banned from the Islam community, here just a brief list of the most relevant ones is presented.

First and foremost, from a religious point of view, time is considered to belong to God, hence interest represents an unjustified income not related to human work: no man can increase his wealth just because of the passage of time (but augment of capital by means of trade is encouraged). Furthermore, the provision of an interest represents the expropriation of one's property without giving anything in exchange, and property is considered sacred according to Islamic law. Then, *riba* tends to make people lazy because they do not need to work to earn extra money, but they just can gain it by means of interest. In addition, *riba* prevents people from doing good to one another: its prohibition would allow the creation of a society where people lend each other expecting back only the amount lent, enhancing the feeling of goodwill and friendliness between borrower and lender. Besides, the presence of interest in a society leads banks to direct money only towards those businesses that can guarantee the return of the principal lent and the interest agreed, also thanks to the securities they can pledge. As a consequence, small businesses do not receive financial funding, increasing the concentration of wealth in few hands. Ultimately, big and rich firms can invest in research and development due to the funds received, whereas small companies cannot afford it, creating barriers to economic growth and, again, inequalities.

---

[8] ALAM, GUPTA and SHANMUGAM, *Islamic Finance: A Practical Perspective*, 40.

In conclusion, *Shari'a* firmly and absolutely prohibits *riba* but it encourages businessmen to invest through a business model based on profit and risk sharing, instead of becoming reciprocally creditors and debtors. Interest, in fact, leads to distorted relationships, deprives another person's property, prevents people from actively working for the well-being of all and shifts richness and wealth in few people's hands.

- *Gharar*

Gharar literally means "uncertainty", "hazard", "chance" or "risk" and it represents the second important prohibition required by Islamic law. It entails that any transaction or business contract which is inherently based on a lack of clarity with regard to the object or the compensation agreed is illegal. In fact, the risk related to incomplete information in the contract makes unknown the outcome of it, leading to speculation, dishonest activities, quarrels and injustice in trade. An exchange involving *gharar* may ultimately lead to loss of property to one or both the parties of a contract, which is unacceptable according to *Shari'a*; on the contrary, both parties should have perfect knowledge about the basic elements of agreement. The uncertain and inequal element of risk that may harm one or both contracting parties is not allowed, whereas all the specifics of a fair and transparent trade are described by Islamic law. Some examples of transactions which imply *gharar* are the following:

- Selling goods that the seller is unable to deliver;
- Selling known or unknown goods at an unknown price, such as selling the contents of a sealed box;
- Selling goods without description, such as a shop owner selling clothes with unspecified sizes;
- Selling goods without specifying the price, such as selling at the 'market price';
- Making a contract conditional on an unknown event that happens at an unspecified time;
- Selling goods on the basis of false description;
- Selling goods without allowing the buyer to properly examine the goods.[9]

Although the description provided so far mainly relates to the exchange of commodities, the application of *gharar* can be extended to all contracts, those which regulate financial investments as well. As a consequence, it is opinion of all scholars that this component of risk and uncertainty is present also in most of derivative products, such as options, futures and forward sales, making

---

[9] Ibid., 50.

investments in these products forbidden to Muslims. Clearly this consideration causes several effects in the world of Islamic banking and finance.

Even though the prohibition of *gharar* is rather extensive, it does not represent an absolute directive such as in the case of *riba*. Indeed, uncertainty in business can never be totally avoided: entrepreneurs and businessmen have to deal with the unknown every day. For example, production of goods is made for future sales and future is naturally unknown. On account of this, scholars tend to tolerate a certain degree of *gharar* in transactions, considering unacceptable only those exchanges which imply an excessive uncertainty with regard to the object and the price granted. On the other hand, even the minimum presence of *riba* may cause a transaction to be non-*Shari'a* compliant. To determine to what extent *gharar* is acceptable, it is classified in two different types.

- *Gharar Fahish*

It represents a major *gharar* which is considered as an excessive uncertainty for Islam. The presence of this kind of element is unacceptable to *Shari'a*, hence contracts with this characteristic are not valid. Excessive *gharar* may "originate in ignorance and lack of information over the nature and attributes of an object, a doubt over its availability and existence, doubt over quantity, exact information concerning the price, and the unit of currency in which price is to be paid or the terms of payment. These are strictly forbidden because of the ignorance of the parties over the existence or the attributes, or both".[10]

- *Gharar Yasir*

It indicates a minor *gharar*, which is tolerated by Islam. The rationale is that if an uncertainty with regard to one aspect of an exchange is not likely to interfere with its realization and delivery, the main aim of the contract is achieved, hence it is legal. Therefore, the prohibition of *gharar* does not represent a strict limit such as in the case of *riba*, but it may restrict the scope of Islamic banking and finance. For what concerns transactions, in order to avoid *gharar*, one contract should be free from excessive uncertainty with respect to the following features about the subject matter and its counter value in exchange: existence of them; availability, quality and quantity involved; timing of completion and delivery.

- *Maysir*

Islamic law strictly forbids *maysir* and *qimar*, which are the words used to refer to the prohibition of gambling and wagering. However, it is necessary to make a distinction between

---

[10] Ibid., 52.

them: they are both related to the same mentioned topic, but the former term is used in the Quran whereas the latter one is mainly quoted by the *Hadith* (i.e. collections of acts, sayings and approvals of Muhammad which form a great part of *Sunna*).

On the one hand, *maysir* "means wishing something valuable with ease and without paying an equivalent compensation for it or without working for it, or without undertaking any liability against it, by way of a game of chance".[11] On the other hand, *qimar* represents a subset of *maysir* for jurists and scholars and it "means receipt of money, benefit or usufruct at the cost of others, having entitlement to that money or benefit by resorting to chance".[12]

Gambling is a game of chance by which a person risks an amount of money in order to gain a higher sum, but the same amount could be lost or damaged as well. Incomes earned through this process are strictly forbidden by Islam because, such as in the case of *riba*, they are made with ease and the reason of earnings does not lie in any kind of human work or liability. Moreover, it could even represent a benefit that is gained at the expenses of other people's rights.

The prohibition of *maysir* has many consequences on the development of products and instruments of Islamic capital markets, banking and finance. Indeed, this element of speculation is present in a wide number of conventional financial transactions, entailing that the latter are unavailable to the community of Muslims. The traditional scheme of insurance, for example, is precluded because of the involvement of *riba* and *maysir*; conversely, these kinds of product have to comply with the scheme provided by *takaful*, the *Shari'a* compliant insurance. Furthermore, speculation in the stock market, meant as trading of securities in order to gain a profit thanks to uncertainty, is strictly impermissible according to *Shari'a*. Finally, prize bonds that are sometimes issued by governments and banks are included in this brief list of conventional financial instruments which do not abide by Islamic law, due to the presence of both *riba* and *maysir*. The typical feature of these issues is that regular drawing lots select a small random number of bonds which are redeemed at a higher amount than their face value.

- *Haram* and *Halal*

As mentioned above, Islamic economics is governed by a rule of "general permissibility", which means that *Shari'a* aims to list all the possible commercial activities that cannot be undertaken by Muslims, while the remaining business is freely available to them. This directive is implemented through the distinction between *haram*, that is illegal and not allowed, and *halal*, that is legal and allowed. The former forms of business are harmful to human beings and they include

---

[11] Ayub, *Understanding Islamic Finance*, 62.
[12] Ibid.

activities such as production, sale and distribution of alcoholic beverages, pork, weapons and tobacco. Moreover gambling, casino, nightclubs and pornography are prohibited as well.

This teaching has a direct consequence for those firms which aim to export their products in the Islamic countries: not only the mentioned products are considered not permitted, but also small traces of them may make a product *haram*. Let us think to everyday products which may include lard or alcohol, for example. Another relevant consequence concerns those Muslims or Islamic banks that plan to invest in stocks: these investors must ensure the compliance of firms to the mentioned criteria in order not to finance firms with unacceptable lines of business. Investments in equity of companies which are involved in *haram* activities as their core business is unacceptable to *Shari'a* law. However, it is possible that one organization is not primarily engaged in such operations, but it may have secondary activities, a branch or an investment in a company which is related to non-compliant businesses. In such a case, the most traditional scholars tend not to allow any connection regardless of the extent of the involvement. On the other hand, others accept investments in firms that earn minor part of their profits from secondary unlawful activities.

- *Zakat*

This principle has already been cited among the five pillars of Islam, but it has also economic implications which have to be underlined. It literally means "purification" and it is essential within the Islamic community because it purifies wealth from the unethical shift of it in few people's hands. *Zakat* is basically a tax (usually equal to 2.5%) on the properties held by Muslims during a lunar year. The prerequisites of this taxation are:

- To be a Muslim adult resident in an Islamic country;
- To have a wealth over and above an exemption limit called *nisab*;
- To have had this wealth for one lunar year at least.

The main recipients of *zakat* are the poor and the needy, hence the main purposes of this tax are to redistribute richness within society, to narrow the gap between the wealthiest and the poorest, reducing inequalities, and to compensate the limited or inexistent local welfare systems.

On the basis of the mentioned principles, it is now possible to have a better view of the Islamic finance's foundations and functions. Because of the deep relationship between religious teachings and economics standards, this phenomenon represents a unicum in the scenario of the world financial systems. In fact, the mandatory prohibition of interest, excessive uncertainty and speculation, together with the distinction between allowed and not allowed business activities, they tend to create a system in which asset-backed financial instruments and risk-sharing contracts represent the application of *Shari'a* tenets in a practical way. As a consequence, money has to be

related to real assets, and profits and losses have to be equally shared between investor and entrepreneur: in this scenario, financial world and real economy are strictly tied to one another, on the contrary of what often happens in the conventional systems.

A great number of academic researchers have tried to analyse the positive effects of the mentioned characteristics in mitigating the shock of the 2008 global financial crisis in the industry. Many of their findings agreed with this assumption, fuelling also among economists, bankers and policy makers the thought that the asset-backed and risk-sharing nature of Islamic finance may provide a better stability to the financial markets.

As an example, an IMF's working paper[13] compares the performance of Islamic and conventional banks during that period, by looking at the effects of the crisis on bank profitability, credit, and asset growth. The authors have examined about 120 Islamic and conventional banks in eight different countries (Bahrain,

Chart 1. Source: IMF staff estimates and calculations.

Jordan, Kuwait, Malaysia, Qatar, Saudi Arabia, Turkey, and the UAE) where they all have significant market shares. The sample covers more than 80% of the industry, excluding Iran.

As can be seen from Chart 1, looking at the average return on average assets and the average return on average equity, Islamic banks were more profitable than their conventional peers in the
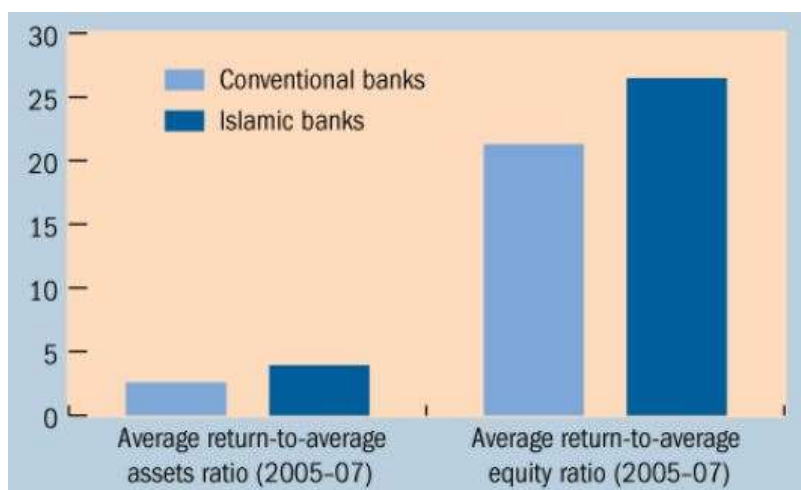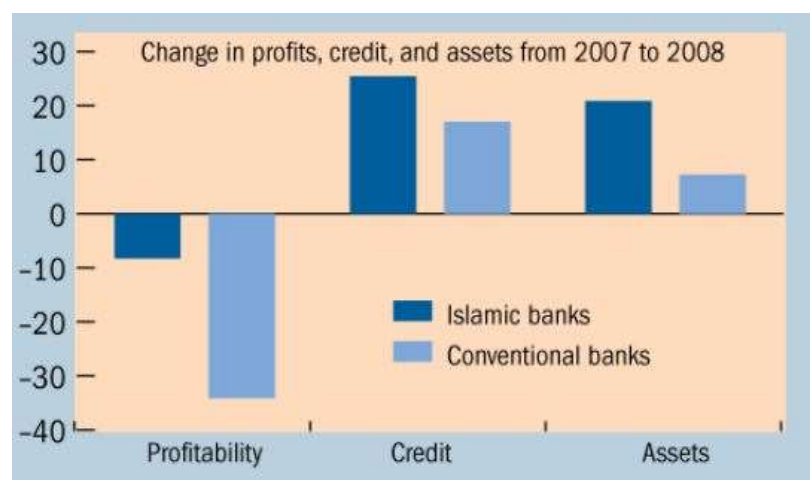

Chart 2. Source: IMF staff estimates and calculations.

years from 2005 to 2007. Likewise, on average, a stronger resilience during the global financial crisis was shown by the Islamic banking sector (see Chart 2): a minor impact on profits and a strong growth of credit and assets suggest that the principles underpinning Islamic finance hedged the industry from

---

[13] M. HASAN and J. DRIDI, *The Effects of the Global Crisis on Islamic and Conventional Banks: A Comparative Study*, IMF Working Paper WP/10/201 (Washington D.C.: International Monetary Fund, 2010).

the negative impact that, on the other hand, affected conventional banks in 2008. Smaller investment portfolios, lower leverage, and compliance to the *Sharia'a* directives (which preclude investing in and be financed by those speculative and excessively risky instruments that eroded the conventional banks' profitability) are the key factors of this hedge.

Despite this relatively better performance, Islamic banks suffered bigger losses in the following year, when the crisis hit the real economy. According to the authors, weaknesses in risk management of some of these banks caused a larger decline in profitability in 2009, if compared with the performance
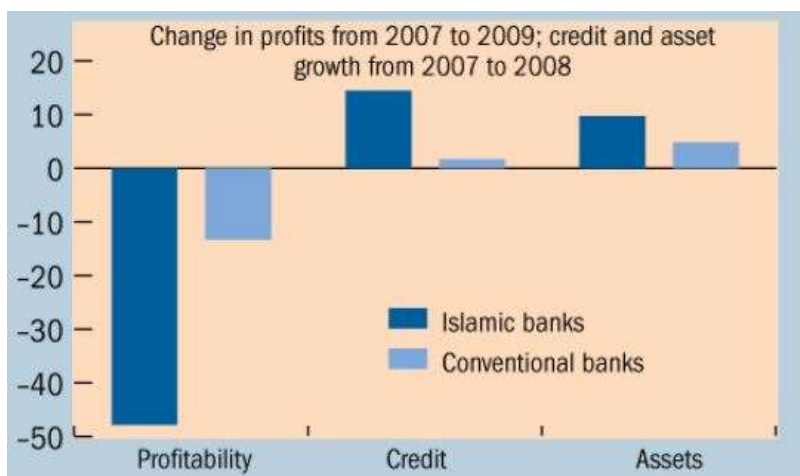

Chart 3. Source: IMF staff estimates and calculations.

of conventional banks (see Chart 3). In some countries, the reason of this poor result had its roots in sectoral and name concentration, which was even worsened by exemptions from concentration limits (applied by some UAE[14] Islamic banks).

According to the authors' thought, a higher profitability during the period before the global crisis (from 2005 to 2007) would have corresponded to a lager decline during the crisis period (from 2008 to 2009), if this higher profitability had been due to higher risk-taking. On the contrary, Islamic banks average profitability during the crisis period (from 2008 to 2009) was, on average, similar to that of conventional banks, suggesting, on average, a better result over the whole period (from 2005 to 2009) and implying that the higher pre-crisis profitability was not a result of a greater risk-taking strategy.

One last element to note is the strong credit and assets growth performed by Islamic banks in comparison with conventional banks (as can be seen from Chart 3): making more credit available, these banks contributed to a superior macroeconomic and financial stability. A higher solvency and a higher percentage of credit directed to the consumer sector (less affected by the crisis than other sectors of the countries examined) are the causes of this growth indicated by the authors of the working paper.

---

[14] UAE, United Arab Emirates.

1.2 Historical development and global status

After having provided a general definition of Islamic finance and an overview of the main principles which govern Islam and its economy, it is now necessary to outline the most important event which have led to the development and recognition of this phenomenon at a global level. Furthermore, an insight about the international worth of this industry will be indicated on the basis of the Stability Report issued by the Islamic Financial Services Board (IFSB) in the year 2019.

The history of Islamic finance covers a relative recent period: before the 1960s indeed there is no evidence of Islamic banks or financial institutions which strictly complied with the principles stated by *Shari'a*. However, during Medieval times, merchants of the Middle East were involved in financial transactions based on Islamic law's directives such as fairness and absence of usury, also applied by their European counterparts. They created a system based on prohibition of *riba* and sharing of profits and losses, which successfully worked during the great expansion of the Islamic empire from the 8th to the 13th century. Nevertheless, European countries slowly started to become key players in the World economy, leading to an increased presence of conventional financial institutions. Middle Eastern and Asian countries continued to be their commercial partners, but they saw the establishment of European banks' branches in their regions, operating with non-*Shari'a* compliant principles.

Only during the first half of the 20th century, a wide number of Islamic scholars, jurists and politicians started a debate about the need to restore a cultural and religious Muslim identity, contemporarily with some Islamic countries obtaining independence from European powers. During that period, a strong criticism towards the Western financial systems was moved and a research of ethic and *Shari'a* compliant economic models began. Since then, the development of Islamic financial systems followed a different path according to the different history, regulation and economic environment typical of each country. However, the following five stages may provide a useful insight of the most relevant events that have caused the shaping of Islamic finance as we know it today.

- The 1960s

This decade marked the beginning of Islamic finance: few years earlier, many scholars had published theories in order to develop an alternative system to the European economic and financial models. The establishment of a theoretical background laid down the foundations of the first Islamic financial institution during this period: the Mit Ghamr local savings bank in Egypt in 1963. It provided basic banking services to the local community it served, such as small loans for productive purposes, and it attracted funds invested on a profit and loss sharing basis. During the

same year, the Lembaga Urusan Tabung Haji (LUTH) was established in Malaysia in order to offer saving plans aimed to the pilgrims going to Mecca. The first *Shari'a* compliant financial services proved that Islamic finance was a viable option to communities of Muslims looking for alternatives to the traditional finance.

- The 1970s

The 1970s saw the emergence of modern Islamic banking. First and foremost, in 1975 the Islamic Development Bank was founded in Jeddah by the countries of the Organization of Islamic Conference (OIC). Main purpose of this agency was to promote Islamic banking worldwide and to enhance the economic development of Islamic communities.

Furthermore, thanks to the increase in oil prices and the consequent growth of financial resources available in the Middle East and Malaysia, a great number of Islamic banks started to operate during this period. Just to provide a brief list of them, the following banks were founded: Dubai Islamic Bank (1975), Kuwait Finance House (1977), Faisal Islamic Bank of Sudan (1977), Faisal Islamic Bank of Egypt (1979), Bahrain Islamic Bank (1979).

Even though Egypt was the first country to host an Islamic financial institution, it later had a disorderly development of investment companies governed by a weak regulation. Many of them then failed, El Rayan Company being the most famous case: claiming to be *Shari'a* compliant, it was actually a Ponzi scheme that collapsed in the late 1980s. On account of that, Egyptian authorities remained sceptical about the Islamic finance opportunity for a long time, authorizing the foundation of the first Islamic bank in 1979, but always with a certain bias towards the topic.

In addition, during this decade a new form of *Shari'a* compliant contract was thought: the *mudaraba*. This type of transaction is still practiced today, and its functioning will be precisely discussed later in this work.

- The 1980s

These years witnessed an even greater increase in the development of the industry: new financial institutions were founded, such as the Al Baraka Banking Group (1982) and the Qatar Islamic Bank (1982), while the number of products and services offered grew exponentially. Islamic banks were not any more a small local phenomenon offering basic banking services.

Moreover, a new support to the enhancement of this market came from governments of many different countries: they promoted the foundation of new banks, and some countries such as Iran, Sudan and Pakistan tried to align their economic and financial systems to Islamic tenets. Authorities in Malaysia, such as the country's central bank, implemented active policies as well:

they promoted the foundation of Bank Islam Malaysia Berhad (BIMB) in 1983 and encouraged a regulation which could enable a further development of the industry.

Then, during this period, the phenomenon attracted the attention of large conventional banks which saw a business opportunity in it: they slowly opened new channels called "Islamic windows" by means of which they offered Islamic products and services. Even academic research about this subject increased, both from higher education institutions and international organizations such as the International Monetary Fund (IMF).

- The 1990s

Since the 1990s, several Islamic economic institutions for the regulation and standardization of this industry have been founded: over the years, they have tried to set standards and common rules to all Islamic financial institutions. In 1990, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) was established in Bahrain in order to provide common accounting and auditing standards. The International Islamic Financial Market (IIFM) was founded in 2002 and it aims to provide regulation of the *Sharia'a* compliant financial instruments. Then, the Islamic Financial Services Board (IFSB) started to operate in 2003 in Kuala Lumpur: it is a supervisory and regulatory agency which aims to promote the stability and resilience of the Islamic financial services by means of new international standards and guidance.

Furthermore, in 1999 the Dow Jones Islamic Market Index was launched in order to provide information for those who seek investments in equities that are compliant with Islamic law.

- From 2000 until today

During these years, the development of Islamic financial systems has been completed: Islamic banks have kept on growing at a 10-15% rate, increasing their presence across almost 70 countries[15]. These institutions have been involved in many M&A operations between them, while revising their organizations according to the new issues of risk management and corporate governance. The total size of this industry is estimated today in trillions of dollars and it is expected to grow over the next few years.

Even though periods of financial crisis (such as the 2008 international crisis) and distress of Islamic banks have partially slowed down the industry's expansion, Islamic finance has been recognised as a real opportunity by regulators and governments all over the world. One of the most recent events with regard to this phenomenon is indeed the application of *Shari'a* compliant financial models in non-Islamic countries with a strong presence of Muslim communities, such as

---

[15] S. MOHAMED, A. GONI and S. HASAN, *Islamic Finance Development Report 2018: Building Momentum* (Toronto, Canada: Thomson Reuters, 2018).

USA, Canada, China, South Africa, United Kingdom, Germany, France, Luxembourg and the Netherlands. This process has had different approach, development, and speed in the different countries. However, the main consequence has been the definitive spread of Islamic windows among prominent conventional banks, offering more and more *Shari'a* compliant financial products and services to their customers. It is the case of banks such as HSBC, Société Générale, Deutsche Bank and Citibank.

Among European countries, the federal state of Sachsen-Anhalt (Germany) was the first one to issue a *sukuk* (a sort of "Islamic bond" that will be precisely explained later in this work) in 2004. However, already at the beginning of the 2000s the United Kingdom had declared its intention to make of London an international hub for Islamic finance, providing legal and tax systems required to support the creation and trade of Islamic products. Other countries such as France and Japan are going in the same direction.

Actually, for what concerns the United Kingdom, we may say that its goal of being a leader of the industry in Europe is not so far from being reached. The Islamic finance experience in the country dates to the 1980s, having been fuelled by the long-term links with the Middle East. Over the years, the strong support provided by government and authorities has increasingly widened the range of services provided and the number of financial institutions established in the City of London. Indeed, "since 2004, the Financial Service Authority (FSA) has authorised five stand-alone Islamic banks (retail banks, i.e., the Islamic Bank of Britain, and wholesale banks […]) as well as over 20 further banks that have opened Islamic windows, as well as an Islamic hedge fund manager and the issuance of *sukuk* listed on the London Stock Exchange".[16]

A very interesting phenomenon which is occurring in the last decades in the United Kingdom, and in other Western countries as well, is the increasing appeal of Islamic financial instruments and products within an audience of non-Muslim people. Over a third of the Al Rayan Bank's customers (which was known as Islamic Bank of Britain until 2014) is believed to be non-Muslim and, for certain categories of products, this proportion is even higher: in fact, over 80% of all fixed term deposit customers are not of Muslim faith.[17]

As can be deduced from the core principles described in the previous paragraph, Islamic economics and finance emphasize the establishment of an ethic and fair socio-economic system based on equitable distribution, reasonable spending and well-being of all the community. Consequently, the social and ethical goal makes of Islamic financial services an alternative appealing to everyone, not just to Muslims. Even though this phenomenon was born mainly to

---

[16] M. HAJJAR, *Islamic Finance in Europe: A Cross Analysis of 10 European Countries* (London: Palgrave Macmillan, 2019), 13.
[17] A. FIRDAUS, "The UK can be a world leader in Islamic finance", *The Telegraph*, May 10, 2019, https://www.telegraph.co.uk/business/business-reporter/uk-islamic-finance/.

meet the economic needs of Muslim clients, it does not represent anymore an exclusive for this population. Indeed, an always increasing number of non-Muslim customers considers turning to Islamic banks to engage in the virtuous and responsible option offered: they see in it a form of moral investing and banking as well as a more stable way of financing.

Despite being a rather recent event, Islamic finance has experienced a remarkable growth at a global level in the last three decades. Just to mention some representative numbers, in 2017, 505 Islamic banks (including Islamic windows) were estimated to operate in about 70 countries, while 45 jurisdictions had an official Islamic regulation and a total of 1389 Islamic financial institutions were involved worldwide.[18] A deeper insight of these numbers is necessary in order to analyse the global status of this industry today and the Stability Report (issued every year by the IFSB) is a very useful guidance in this process.

According to the IFSB Stability Report 2019, which covers the activities of the year 2018, in a scenario of international steady growth though with some uncertainties and geopolitical tensions, the global Islamic financial services industry (IFSI) had a positive growth. Even though it recorded a constant development for the third straight year in terms of its total worth, the growth rate of 6.9% for 2018 represents a smaller data than the 8.5% growth recorded between 2016 and 2017.

As can been seen from Chart 4, the combined total worth of the IFSI's three broad sectors (banking, capital markets and *takaful*) was estimated at USD 1.89 trillion in 2016, surpassing for the first time USD 2 trillion the following year (USD 2.05 trillion, to be exact) and then reaching USD 2.19 trillion in 2018. The decline in growth is attributed by the report to, among other geopolitical and economic factors, the long-standing depreciation of local currencies in USD terms in some countries with a strong presence of Islamic finance.
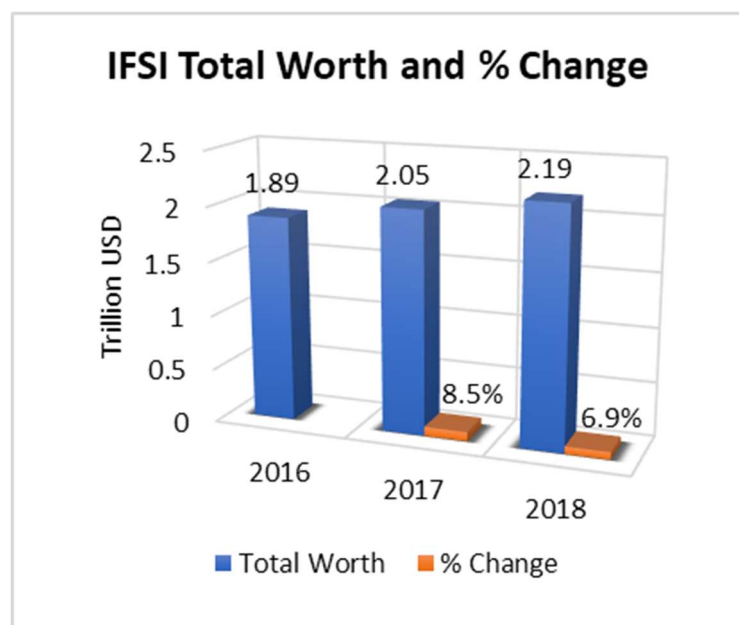

Chart 4. Source: personal work.

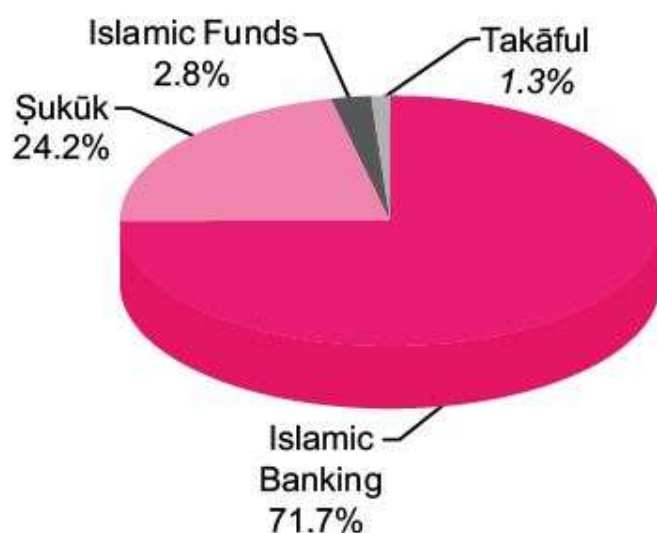[18] MOHAMED, GONI and HASAN, *Islamic Finance Development Report 2018*.

Chart 5. Sectoral composition of the global IFSI (2018). Source: IFSB Stability Report 2019.

The Stability Report claims that the industry's main sectors have been affected by different trends, leading to a different contribution to the IFSI total asset worth. The Islamic banking industry experienced only a 0.9% growth in assets (compared with a 4.3% growth in 2017) which led to a total value of approximately USD 1.57 trillion. As a consequence, the sector's share in the overall IFSI assets slightly contracted to 71.7% in 2018, whereas it was equal to 76% the previous year.

The weak yearly growth has been attributed to the depreciation of local currencies in USD terms, especially in emerging economies with a strong presence of Islamic banking such as Iran and Sudan.

Even though the industry's growth has been contributed by all the three main sectors, the key performance was the one fulfilled by the Islamic capital markets. This sector recorded further developments in 2018, accounting for 27% of the global IFSI assets with a worth of about USD 591.9 billion. The size of outstanding global *sukuk*, which dominates the Islamic capital markets sector, continued its positive trend by 22%, closing at USD 530.4 billion as at the end of 2018. Innovations in this sector have been represented by the Indonesia's first green sovereign *sukuk* to finance eco-friendly environment projects and the sovereign issue by Morocco. On the other hand, in line with the weak performance of equity markets in both advanced and emerging equity indices in 2018, Islamic funds' assets declined by 8.5% being estimated at USD 61.5 billion as at the end of the year. The reasons of this decline are due to, among others, slower economic growth, geopolitical challenges and tightening international liquidity conditions. Notwithstanding this

Region	Banking Assets	Ṣukūk Outstanding	Islamic Funds Assets	Takāful Contributions	Total
Asia	266.1	323.2	24.2	4.1	617.6
GCC	704.8	187.9	22.7	11.7	927.1
MENA (ex-GCC)	540.2	0.3	0.1	10.3	550.9
Africa (ex-North)	13.2	2.5	1.5	0.01	17.2
Others	47.1	16.5	13.1	--	76.7
Total	1,571.3	530.4	61.5	27.7	2,190

Table 1. Breakdown of the global IFSI by Sector and Region (billion, 2018). Source: IFSB Stability Report 2019.

slow down, the Islamic capital markets sector (made up of *sukuk* outstanding and Islamic funds) accounts for a higher share (27%) of the industry.

Finally, for what concerns the *takaful* industry, this sector experienced a 6.1% increase reaching a total worth of USD 27.7 billion as at the end of 2017. Despite this positive growth, the percentage in the total IFSI assets has been unchanged at 1.3%. The sectoral composition of the global IFSI is provided by Chart 5, whereas in Table 1[19] it is possible to have an overview of the IFSI total assets' breakdown by sector and region.

Looking in detail at the domestic market share of Islamic banking recorded between 2Q17[20] and 2Q18 in different countries, the Stability Report mentions many interesting data. In fact, despite a slower global asset growth, the domestic market share for Islamic banking relative to the total banking sector has kept on increasing in many countries, though at a slower speed. Considering 36 countries with the most relevant presence of an Islamic banking architecture (see Chart 6), this sector has seen a growth in domestic market share in 19 countries, six others remaining constant (including Iran and Sudan
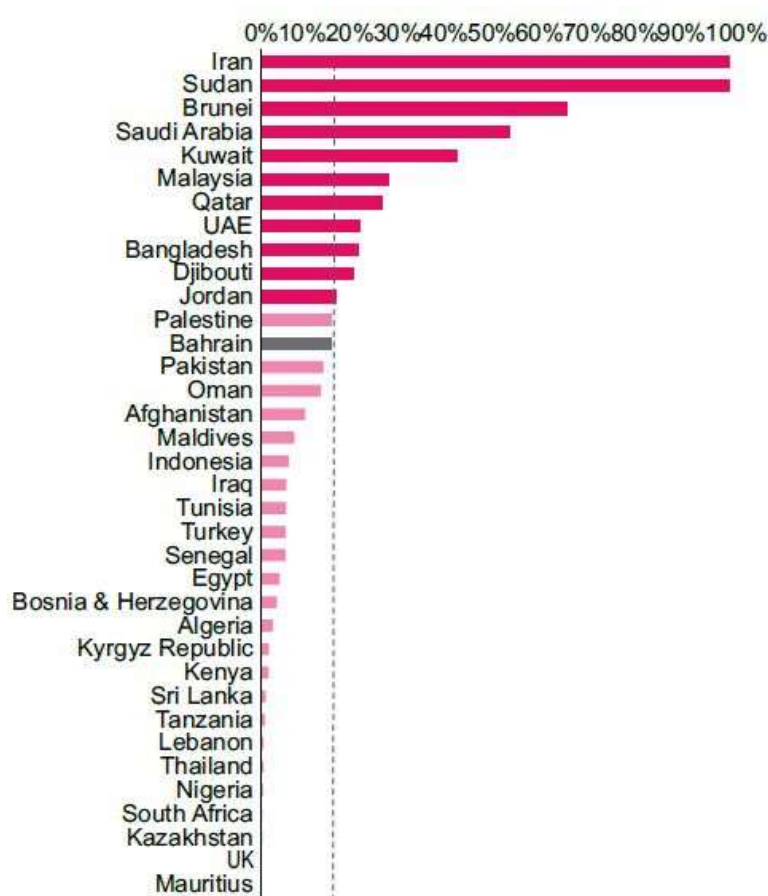
Chart 6. Islamic Banking Share in Total Banking Assets by Country (2Q18). Source: IFSB Stability Report 2019.

that operate with a fully *Sharia* compliant banking system). On the contrary, 11 countries have experienced a decline in market share, among which are three key Islamic banking markets such as Qatar, Turkey and Egypt. The most relevant market shares after Iran and Sudan are recorded in Brunei (63.6%) and Saudi Arabia (51.5%), where market penetration has further increased in 2018.

The list of jurisdictions where Islamic finance holds a domestic systemic importance is 12, a number consistent with the one of 2017. The Islamic financial sector is considered as systemically

---

[19] GCC, Gulf Cooperation Council; MENA (ex-GCC), Middle East and North Africa excluding GCC; Africa (ex-North), Africa excluding North Africa.
[20] 2Q17, Quarter 2 of the year 2017.

important when the total Islamic banking assets in a country represent more than 15% of its total domestic banking sector assets (these jurisdictions are depicted with a dark red bar in the chart). The Islamic banking sector is used by the report as a criterion for this definition because more than 70% of Islamic financial assets are held within the banking segment. Systemic importance is also recognised in Bahrain (depicted with a grey bar in the chart) because it is within one percentage point of the 15% benchmark and it has active involvement in the other two sectors (capital markets and *takaful*) of the IFSI. The 12 systemically important Islamic finance countries collectively contribute to 91% of the global Islamic banking assets and 80% of the global *sukuk* outstanding, showing a slight decrease in relation to 2017's data (92% and 80%, respectively).

According to the Stability Report, the geographical breakdown recorded in 2Q18 sees the GCC as the most relevant area for the global Islamic finance assets, showing a positive growth relative to the previous year (from 42% to 44.9%). The share of MENA excluding

Chart 7. Breakdown of IFSI by Region (2Q18). Source: IFSB Stability Report 2019.

GCC has increased as well, shifting from 29.1% to 34.4%. On the other hand, Asia has experienced a decline in market share of the total IFSI: 16.9% recorded in 2018 relative to 24.4% of 2017. The Chart 7 briefly reports these data.
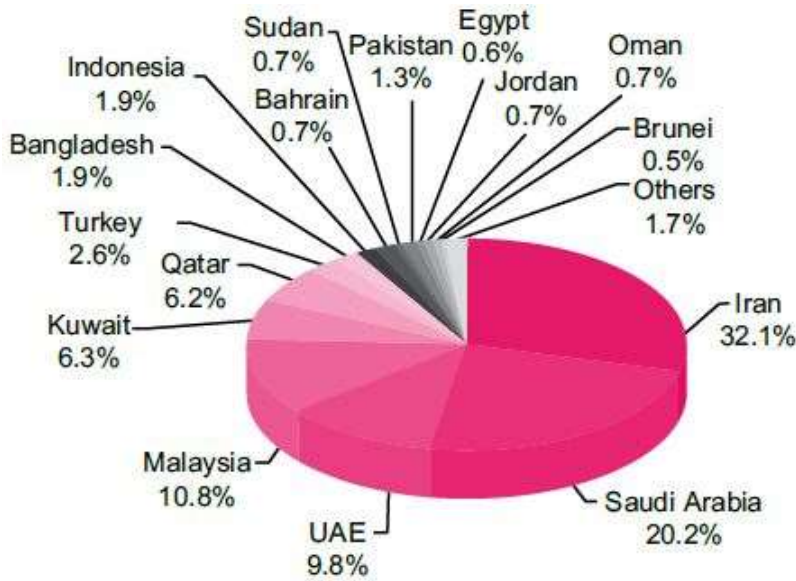
Chart 8. Share of Global Islamic Banking Assets (2Q18). Source: IFSB Stability Report 2019.

The IFSB Report further analyses the contribution of every country in terms of Islamic banking assets as at 2Q18. From this point of view, Iran represents the largest market accounting for 32.1% of the global Islamic banking Industry (see Chart 8). It is then followed by Saudi Arabia (20.2%), Malaysia (10.8%), UAE (9.8%) and Kuwait (6.3%) that complete the five most

important markets. The other jurisdictions that follow in this list are, in order of size, Qatar, Turkey, Bangladesh, Indonesia and Bahrain, completing the top 10 Islamic banking jurisdictions.

An interesting insight of the banking sector profitability is provided by the report, which analyses average return on assets (ROA) and return on equity (ROE). In 2017, the performance of these two indicators for stand-alone Islamic banks (meant as fully-fledged Islamic banks and Islamic subsidiaries of conventional banks,

Chart 9. Global Islamic Banking Weighted Average ROA and ROE (4Q13–2Q18). Source: IFSB Stability Report 2019.

excluding Islamic windows of conventional banks) was equal to 1.8% and 16.3%, respectively. Both ROA and ROE followed these trends in 2Q18 (see Chart 9) which represent higher levels than their respective moving averages for the past five years, equal to 1.6% and 13.6%, respectively. Furthermore, the return on equity for the global Islamic banking sector is greater than the returns performed by conventional banks over the same period in both the US and in the EU, equal to 11.9% and 7.2%, respectively. The Stability Report attributes this higher resilience of the Islamic banking sector mainly to a rebound in oil prices and enhanced asset quality due to credit growth.

For what concerns the net profit margin and income to expense ratios of Islamic banks, they have remained rather steady and around their global historical averages as a result of different performances across jurisdictions.
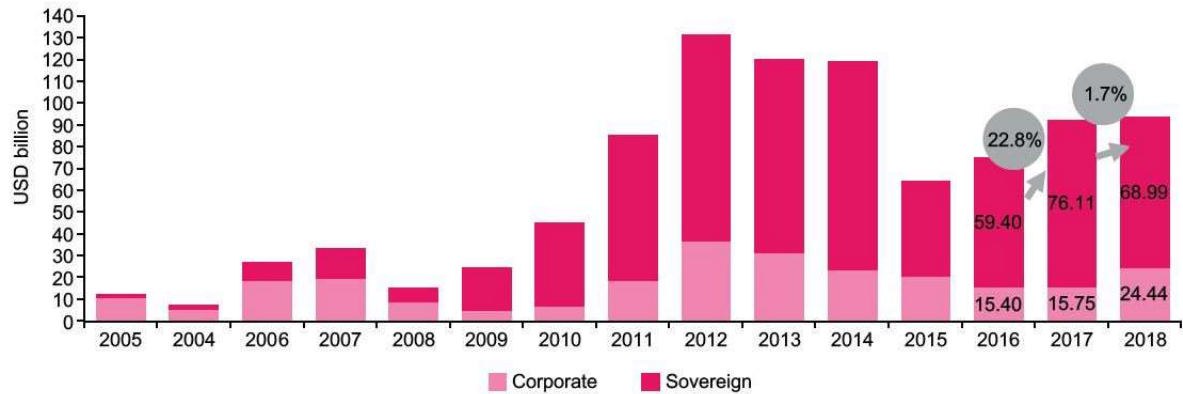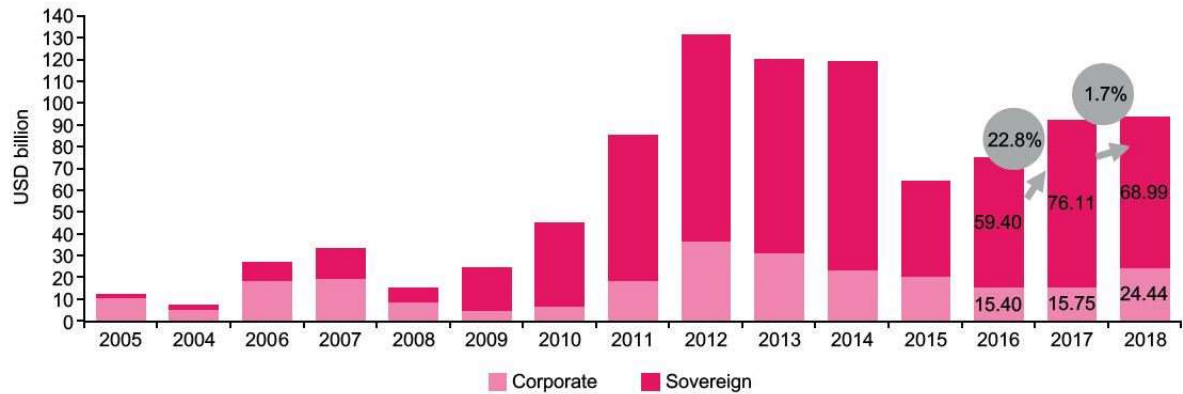

Chart 10. Sukuk Issuance Trend (2005–2018). Source: IFSB Stability Report 2019.

Focusing on the Islamic capital markets, the IFSB Stability Report provides useful data with regard to the issuances of *sukuk* and the countries where this financial instrument is more common. The new *sukuk* issuances in 2018 reached USD 93 billion, experiencing a growth of 1.7% from the previous year. It is possible to see this trend from the Chart 10: although the positive growth has been weaker if compared to the increase observed in 2017 (22.8%), which had been mainly caused by large GCC sovereign issuances, a promising growth (55%) in corporate issuances occurred in 2018. The moderation in sovereign issuances, especially from the GCC, is attributed by the report to a positive rebound in oil prices during the first months of 2018, which reduced the borrowing needs from some sovereigns.

In terms of issuances by jurisdictions (see Chart 11), considering both the sovereign and corporate *sukuk* markets, issuances took place in 16 countries in 2018. Malaysia holds the first position as the overall largest issuer in terms of volume, but its proportionate share of issuances is decreasing as other jurisdictions are increasing *sukuk* issues. Saudi Arabia is the second overall issuer, experiencing a drop due to its lower volume of sovereign issuances in 2018. While UAE became the third largest issuer because of its increase in corporate issues, Indonesia moved from third to fourth position. Finally, Turkey moved up to the fifth place because of the enhanced activities in 2018, despite the economic challenges faced throughout the year.
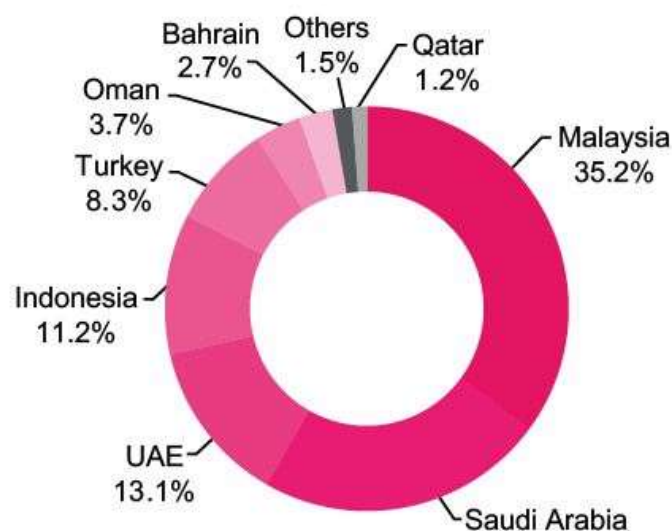
Chart 11. Overall Sukuk Issuances by Jurisdictions (2018). Source: IFSB Stability Report 2019.

In general, according to the IFSB Stability Report 2019, the global industry is estimated to maintain a positive growth trend in the next years, experiencing asset increase in all of its three broad sectors. Despite the prolonged depreciation of local currencies in several emerging markets that has led to a slower growth of the Islamic banking asset values, the global IFSI has kept on enhancing its international status also in 2018.

1.3 Islamic Financial Services

After having outlined the most relevant trends that have affected the Islamic finance industry in 2018, a deeper analysis of the IFSI's three broad sectors will be conducted in the following pages. First, in the subparagraph 1.3.1, a comprehensive insight of the Islamic banking sector will be provided, underlying the greatest differences with the conventional system. The mechanisms

of profit-making, the instruments to pool depositors' funds and the contents of a theoretical balance sheet will be discussed. Then, the most common types of transaction practiced by Islamic banks in financing their clients will be examined. Secondly, in the subparagraph 1.3.2, the main features of the Islamic capital markets will be considered, focusing first on the *sukuk* market and then on Islamic funds. In fact, these represent the two main segments of this sector. Finally, in the subparagraph 1.3.3, the Islamic insurance industry will be briefly presented in its main characteristics in order to complete the framework of the Islamic financial services.

1.3.1   Banking

As stated in the previous paragraph, the Islamic banking sector represents the most relevant segment of the global Islamic finance assets. As their conventional peers, Islamic banks are financial institutions that play a key role in the development of economic systems: they are fundamental intermediaries between economic surplus units and economic deficit units. On the one hand, families and individuals singularly have small savings whereas, on the other hand, companies and governments have huge needs of funds. By means of financial institutions, such as banks, deficit units' needs are satisfied receiving surplus units' funds in an indirect way: the former get necessary cash for their operations, while the latter can gain a fair return on their investment. Islamic banks act as intermediaries in the same manner, transferring excess funds from one party to another; however, their operations are based on the observance of *Shari'a* principles described in the first paragraph. As a consequence, the mentioned limits, such as avoidance of *riba*, investments in *halal* activities and creation of a just and ethical economic system, define their distinctive features.

The main characteristics that distinguish these financial institutions from their conventional counterparts are the absolute prohibition of charging any kind of interest (as intended by the definition provided by Islamic law) and the implementation of a risk sharing business model. These elements have relevant consequences on the Islamic banks' modus operandi and balance sheet. Indeed, the main source of income for a conventional bank comes from the spread between interest incomes and interest expenses as well as service charges: lack of the former component entails that other form of instruments have to replace the proceeds provided by interests.

Islamic banks collect funds by offering a wide number of financial products that can meet the needs of their customers who are in excess of funds, the economic surplus units. Depositors may have different preferences according to many variables; however, a Muslim saver is additionally concerned of the *Shari'a* compliance of products and services offered. Choosing among different types of deposit, a Muslim saver has essentially three options: he may either open a current account

or a savings account or an investment account. Savings accounts "however, […] usually fall in either the category of term investments or that of current accounts. We therefore distinguish only between investment deposits and current account deposits".[21]

Usually, current accounts are based on *wadiah* or *qard* contracts, they are drawable at demand without any conditions and restrictions, they do not provide any return and the bank acts only as custodian of funds at no extra charge. Hence, current account holders do not participate to risk and return of the bank's activities, and these deposits essentially represent an interest-free loan given to the bank: the latter has to guarantee the deposits' face value without any increase or decrease of it. On the contrary, investment accounts are profitable deposits and they are managed on the basis of a profit and loss sharing (PLS) model. In such a case, these funds are mobilized according to a *mudaraba* or a *wakala* (i.e. agency) contract and two different kinds of deposits are possible: unrestricted (or general) investment account and restricted (or special) investment account. In the former case, "the investment account holder authorizes the Islamic bank to invest the account holder's funds in a manner which the Islamic bank deems appropriate without laying down any restrictions as to where, how, and for what purpose the funds should be invested. Under this arrangement, the Islamic bank can commingle the investment account holder's fund with its own funds or with other funds the Islamic bank has the right to use".[22] On the contrary, in the case of restricted investment accounts, "the investment account holder imposes certain restrictions as to where, how, and for what purpose his funds are to be invested. Further, the Islamic bank may be restricted from commingling its own funds with the restricted investment account funds for purposes of investment. In addition, there might be other restrictions which investment account holders may want to impose".[23]

Thus, in the deposit side of their balance sheet, Islamic banks do not apply any fixed pricing mechanism, replacing this kind of reward with a PLS system. Investment account holders do not earn any profit on the basis of a fixed rate, instead they share in the bank's business risk, hence being entitled to a share of profits or losses. If the bank makes a profit, investment account depositors earn a part of it according to the PLS ratio agreed; if the bank incurs losses, these depositors have to bear them. Actual rates of return can be determined only on the basis of earnings occurred from real-sector activities and they are not assured by the bank. Indeed, it does not guarantee either the return or the face value of investment account depositors' funds, that could decrease if investments are unsuccessful. Hence, from the point of view of investment account holders, the bank acts like a mutual fund with a variable net asset value.

---

[21] EL TIBY and GRAIS, *Islamic Finance and Economic Development*, 125.
[22] ALAM, GUPTA and SHANMUGAM, *Islamic Finance: A Practical Perspective*, 102.
[23] Ibid., 109.

After having pooled depositors' funds, Islamic banks then sell them by means of a variety of financing products. Since they will be explained in the next subparagraphs, at this stage it is just necessary to underline the main distinction between them: they may either be equity-based products (i.e. PLS, hence risk is shared between bank and customer) or debt-based products (i.e. non-PLS, hence risk is transferred to the customer). Within the first category, the usual forms of financing entail a *mudaraba* or a *musharaka* contract that "can be used for short-, medium- and long-term project financing, import financing, preshipment export financing, working capital financing and financing all single transactions".[24] Another possible contract is the diminishing *musharaka* which is usually used for the purchase of fixed assets such as houses and machinery. On the contrary, the second category includes forms of contract such as the *murabaha*, based on a mark-up sale between bank and customer, the *ijarah*, which is essentially a leasing contract, the *salam* and the *istisna*, which represent two exceptions to the prohibition of forward and future sales. In addition, hybrid instruments may be composed mixing different forms of contract in order to meet customers' requests and needs.

In summary, Islamic banks make profits thanks to the difference between purchase and sale of funds: deposits are originated from current, savings and investment accounts that are channelled into trade financing, treasury products and services. However, no fixed or variable interest is charged, hence returns only proceed from the success of the projects in which liquidity is invested: Islamic banks participate in the profits of their borrowers and then split their share of profit with investment account holders. Then, banks' earnings are deducted of operating expenses, *zakat* and taxation before being potentially distributed to shareholders as dividends. Since rates of return for investors only depend on the performance of

Theoretical Balance Sheet of an Islamic Bank	
Assets	Liabilities
Short-term trade finance Cash, *Murabaha* , *Salam*	Demand deposits *Amana*
Medium-term investments *Ijara* , *Istisna*	General investment accounts *Mudaraba*
Long-term partnerships *Musharaka*	Special investment accounts *Mudaraba* , *Musharaka*
Fee-based services	Reserves
Non-banking assets (property)	Equity

Table 2. Source: H. VAN GREUNING and Z. IQBAL, Risk Analysis for Islamic Banks (Washington D.C.: World Bank, 2007).

[24] AYUB, *Understanding Islamic Finance*, 191.

investments, financial institutions do not have to face a fixed cost of fund. Thus, the usual amount of debt borne by conventional banks is not so heavy for Islamic banks.

Furthermore, the consequence of the mentioned factors is a balance sheet structure such as the one provided in Table 2[25]. Theoretically, this model has an inner hedge able to mitigate the impact of potentially negative external shocks: in fact, any shock experienced in the asset side would have an equal compensation in the liability side, hence

Characteristics of Islamic and Conventional Banking		
Characteristic	Islamic Banking	Conventional Banking
Nominal value guarantee of:		
Demand deposits	Yes	Yes
Investment deposits	No	Yes
Equity-based system where capital is at risk	Yes	No
Rate of return on deposits	Uncertain, not guaranteed	Certain and guaranteed
Mechanism to regulate final returns on deposits	Depending on banks' preformance/profits from investment	Irrespective of banks' performance/profits from investment
PLS principle is applied	Yes	No
Use of Islamic modes of financing: PLS and non-PLS modes	Yes	No
Use of discretion by banks with regard to collateral	Possible for reducing moral hazard in PLS modes Yes in non-PLS modes	Yes always
Banks' pooling of depositors' funds to provide depositors with professional investment management	Yes	No

Table 3 Source: L. ERRICO and M. FARAHBAKSH, Islamic Banking: Issues in Prudential Regulation and Supervision, IMF Working Paper WP/98/30 (Washington, DC: International Monetary Fund, 1998).

the real value of both financings and deposits would be equal at any time. A list of characteristics that distinguish Islamic banks from their conventional counterparts is provided in Table 3.

One last relevant feature of the Islamic banking framework needs to be considered and it relates to the issue of corporate governance. Every company, including Islamic financial institutions, needs a structured corporate governance system to be implemented in order to ensure all the different stakeholders with regard to the transparency and accountability of its processes. However, in comparison with conventional banking, this requirement is even more relevant for Islamic banks due to the additional compliance with the ethical, moral, and religious principles of *Shari'a* law. Compliance with the mentioned directives has to be consistently conveyed both to market and stakeholders.

---

[25] Assets and liabilities are listed according to their maturity, indicating the type of contract applied in each situation.

Since this topic may require a deep explanation and it is not focus of this work, it is sufficient to outline the main differences in comparison with the conventional model. The dominant approach applied by Islamic banks entails the presence of internal independent bodies aimed to the certification of *Shari'a* compliance. The most important among them is the *Shari'a* supervisory board, which is present in all Islamic financial institutions. This board plays a key role in the corporate governance systems "certifying permissible financial instruments through *fatwas*[26] (*ex-ante Shari'a* audit), verifying that transactions comply with issued *fatwas* (*ex-post Shari'a* audit), calculating and paying *zakat*, disposing of non-*Shari'a* compliant earnings, and advising on the distribution of income or expenses among shareholders and investment account holders".[27] Number and variety of tasks may change according to internal corporate provisions, national regulations and international standard setters' guidelines. In any case, the board issues every year a report (which is often part of the Islamic bank's annual report) that certifies the compliance of all financial transactions to the mentioned principles. It is usually appointed by the board of directors (to which it directly reports) and its members are selected among well-respected Islamic scholars and experts, in order to provide the highest independence of judgement and competence. The qualifications required to them are similar to those required to the members of an internal Board committee: independence, accountability, reliability, honesty and integrity.

After having introduced how Islamic banks work, operate, and make profit, it is now necessary to provide a deeper insight of the different types of transaction they implement. As mentioned above, two broad categories of transactions are available: PLS forms of contract and non-PLS forms of contract. The former schemes entail a sharing of risk and return by both the parties involved, making them closer to the Islamic economic principles, while the latter are characterised by a more predictable and stable return, making them easier to apply because of a lower control required to the bank. First, *mudaraba, musharaka* and diminishing *musharaka* (falling within the first structure) will be explained, then *murabaha*, *ijara*, *salam* and *istisna* (falling within the second category) will be detailed.

1.3.1.1 PLS forms of contract

- *Mudaraba*

Mudaraba is a PLS form of contract that has long existed: it was very common during the early days of Islam and it was practiced and encouraged even by the same Prophet Muhammad. It

---

[26] A *fatwa* is an opinion issued by Muslim scholars and experts with regard to an Islamic law's matter.
[27] EL TIBY and GRAIS, *Islamic Finance and Economic Development*, 147.

essentially represents a partnership transaction in which two main parties are involved: a capital provider (called *rab al mal*), who contributes funds necessary for the project, and an entrepreneur (called *mudarib*), who contributes efforts, skills and expertise. The funds' owner, that is often a bank, cannot interfere with the business operations, although some mutually agreed restrictions to the business scope may be imposed by this party. Hence, how to use funds and how to manage the business are decisions that are only up to the entrepreneur, whose capacity and honesty become key factors in such a contract. Finally, profits are shared between financier and *mudarib* according to a sharing ratio included in the contract, while losses are borne only by the former. Here are the usual stages that form a *mudaraba*:

- The investor (*rab al mal*) provides entire capital to the project or business;
- The entrepreneur (*mudarib*) contributes his efforts, skills and expertise to the partnership;
- Profits are shared between *rab al mal* and *mudarib* according to the contractual ratio;
- If losses occur, they are initially offset by business activity's profits;
- If losses are higher than profits, they are borne entirely by the *rab al mal,* while the entrepreneur suffers a loss in terms of time and efforts employed;
- Only in the event of his own misconduct, negligence or breach of terms the *mudarib* is liable for the total loss incurred.

In a partnership transaction of this kind, the financer is liable only for the capital he has provided, hence "an entrepreneur should not incur liabilities greater than the capital except with the explicit permission of capital provider to do so".[28] Moreover, neither the capital invested should consist of a commodity or a good, because of variability in their prices, nor it should be a debt. Possibly, it should be in a liquid form or cash. For what concerns the number of people involved in the partnership, one investor can decide to appoint more than one entrepreneur that is authorized to employ the capital provided, whereas, on the other hand, a single business manager may be appointed by many financers.

Mudaraba represents the perfect form of contract when a person is endowed with skills and expertise necessary to carry on a business, but he lacks funds. On the contrary, one person owns capital to invest in a project, but he lacks either competences or time necessary: by means of *mudaraba* they are both better off. Such a contract may be of two different types: restricted *mudaraba* and unrestricted *mudaraba*. In the former scheme, the financer is able to impose

---

[28] M. ALI and N. ZADA, *The Islamic Finance Trading Framework: Legitimizing Profit Making* (London: Palgrave Macmillan, 2019), 48.

limitations and constraints to the business manager with regard to the management and use of funds. Conversely, in the latter case, no restrictions are applied, and the entrepreneur is free to decide how, where and for what purpose the capital provided should be invested. As explained above, unrestricted *mudaraba* is applied for general investment accounts, whereas restricted *mudaraba* is applied in the case of special investment accounts.

When *mudaraba* is implemented in the liability side of Islamic banks' balance sheet, the latter institutions act as entrepreneurs investing funds in other *mudaraba* or *Shari'a* compliant instruments. Neither the face value nor the return of the deposit is guaranteed, but clearly providing a profit is in the bank's interest. If it occurs, it is shared according to the agreed ratio, while losses are borne only by depositors. Today, Islamic banks extensively implement *mudaraba* contracts in such a case, acting as managers while depositors are capital providers. On the other hand, they do not commonly use this scheme as a financing tool because of legitimate risk management reasons. Mitigation of the inherent risk requires evolved legal and conflict resolution systems that are often weak in many countries.

- *Musharaka*

A *musharaka* contract typically represents a partnership transaction in which two or more parties (called *musharik*) provide capital as well as skills and expertise. The simplest form of this scheme implies two main players: a bank and an entrepreneur. They combine financial resources and competences in order to undertake a business venture, whose profits are split according to an agreed profit-sharing ratio. For what concerns profits, although they "can be distributed in any proportion by mutual consent, it is not permissible to fix a lump-sum profit for any single partner".[29] On the other hand, losses are borne by both the parties on the basis of the percentage of capital contribution.

With regard to the business management, bank and customer are free to arrange a different degree of involvement, but the general form of this contract would entail an active participation of both the parties in terms of skills and expertise (meant as work, management, and the like). However, the financial institution may prefer to be exempted from daily operations, becoming a "sleeping partner". In such a case, only capital is provided to the business venture, though a right on control and follow-up is retained. For what concerns the capital injected in the business venture, it should be in form of cash, but also tangible assets may be committed, provided that their

---

[29] N. SCHOON, *Modern Islamic Banking: Products and Processes in Practice* (Chichester, West Sussex: John Wiley & Sons Ltd., 2016), 54.

monetary value is determined. In any case, partners may have an unequal share of the business. The following are the usual stages that form a *musharaka*:

- The client presents a business plan to the bank in order to receive funds necessary to undertake a business venture;
- The bank performs a due diligence on the basis of the information and documents provided;
- If the valuation comes to a positive conclusion, a *musharaka* contract is signed by the parties and the business venture is set up;
- Both bank and customer provide the necessary capital according to the percentage agreed;
- Profits are shared between the parties according to the contractual profit-sharing ratio;
- If losses occur, they are borne by both the bank and by the client on the basis of the percentage of capital contribution.

As *mudaraba*, *musharaka* contract dates back to the early times of Islam and it was practiced by the Prophet Muhammad as well. Today, Islamic banks apply *musharaka* contracts in order to get involved in the equity of new or established companies, such as in the case of venture capital financing, joint ventures and specific business projects.

Even though *musharaka* may represent a valid alternative to *mudaraba* for those Islamic financial institutions that aim to play an active role as shareholders and managers of a company, such a financing tool is not so common. In fact, Islamic banks tend not to practice it because of its longer maturity as well as weak regulatory systems that are present in many jurisdictions. *Musharaka* is indeed a form of financing that implies investing in long-term projects that thus present a higher risk: such a scheme requires very high skilled professionals and consultants that can undertake these operations. Moreover, this form of contract is perceived as a very old model that cannot keep up with the modern speed of transactions. However, this thought is mainly due to a lack of knowledge of this tool: only some broad principles have been set and new specific procedures may be implemented. Traditional form of *musharaka* can be developed by means of new practices, even though they were not applied in the past, provided that they do not violate any of the *Shari'a* directives.

- Diminishing *musharaka*

This kind of contract represents a special a form of the traditional *musharaka* partnership. Under this scheme, a bank is involved in the transaction as a financier of a specific project or a business venture. However, not only a profit-sharing ratio is defined in the contract but also the price that is paid by the partner to the bank in order to progressively acquire a greater share in the

business. Hence, on the one hand, the financial institution's share of equity gradually decreases, whereas, on the other hand, the client gradually increases his share until he eventually becomes the only business owner. In such a deal, the bank does not aim to be involved in the partnership indefinitely: the financer agrees to gradually sell his partnership interest, receiving payments that are higher than his share in partnership profits. At the same time, the client increases his share in the business equity as well as his liability for any loss.

Islamic banks tend to practice this model for house financing, but also for the financing of industrial establishments and properties. In the first case, the following steps take place:

- The client approaches the bank providing information relative to the house he aims to buy;
- After the bank has performed a due diligence, a diminished *musharaka* contract is signed with the client, arranging all terms;
- The bank and the client provide the capital to own the house but in different proportion;
- The bank leases its share in the house to the client receiving a monthly rental;
- The client pays the monthly rental plus a portion of the bank's share in the house;
- The client's share increases until the house is fully owned by him at the end of the contract.

At the end of this brief overview of the PLS types of transaction, it is clear that these structures are more in line with the principles of risk-sharing inherent in Islamic finance: equity and justice are indeed ensured among all parties, realising the higher mission of *Shari'a*. For this reason, they are favoured by Islamic scholars if compared with non-PLS instruments. However, as already mentioned, both *mudaraba* and *musharaka* are not extensively implemented by Islamic banks. Even though industry players try to encourage their use, they remain poorly attractive to Islamic financial institutions. Besides the specific pitfalls, a common hindrance lies in the high risk of moral hazard that these schemes involve: due to asymmetric information, financial institutions may invest in weak and fraudulent companies and entrepreneurs. The latter figures could lack the necessary skills and expertise or, even worse, be tempted not to declare their profits. In order to avoid these drawbacks, an Islamic bank needs to perform a detailed valuation and to implement a strict supervision, actively engaging in board meetings. As a consequence, strong and effective processes of project evaluation as well as operational and management skills are essential in order to protect the bank's interest. However, such characteristics require time to be established and, along with a lack of efficient regulatory systems in many countries, they prevent Islamic banks from financing clients on the basis of PLS techniques. Hence, they rely much more on the following mark-up-based financing modes, which do not require a strict supervision in order to obtain the agreed profit share.

1.3.1.2   Non-PLS forms of contract

- *Murabaha*

This Islamic financial transaction is often referred to as "mark-up financing" and it essentially consists in a sale contract between a purchaser, that is usually a bank's client, and a seller, that is usually a bank. The latter purchases a certain asset or commodity and sells it to the former adding a profit (which could be in a lump sum or based on a percentage) to the initial cost. The sale of the item takes place immediately, while payment is made on a pre-agreed date. However, the bank must communicate actual cost and profit charged to the client so that he is aware of the additional amount paid over the price.

    The profit margin earned by the bank cannot represent a reward for the use of its money because, in such a case, it would be classified as *riba*. On the contrary, in *murabaha* contracts, the sum paid over and above the cost price is considered as a reward for the risk assumed by the bank when first buying the commodity: buying and then selling at a mark-up implies a risk which is offset by the same mark-up. This interpretation makes perfectly *halal* this transaction, whose payment may be either on spot or on a deferred basis.

Some elements are essential in order to make valid such a contract. First, the exact cost price of the goods as well as the profit margin must be known by the purchaser. Then, expenses that are directly linked to the acquisition of the asset have to be included in the cost price and the mark-up is computed on the aggregate cost. Finally, *murabaha* can be applied only if the exact cost of a commodity is determined, otherwise another Islamic financial scheme has to be applied. Here are the usual stages that form a *murabaha*:

- The client identifies the asset he aims to buy, and he requests further details to the bank;
- Once received all the information, the client engages in a *murabaha* contract with the bank;
- The bank purchases (either on cash or on a deferred basis) the asset from the supplier;
- The ownership of the asset is transferred to the bank, while the physical asset is delivered to the client submitting a proof of delivery to the bank;
- The client purchases the asset from the bank according to the agreed selling price, made up of cost price and profit margin;
- The client pays the selling price to the bank on the agreed date either in a lump sum or by means of instalment payments.

Islamic banks commonly use *murabaha* for working capital financing and trade finance products as well as short-term consumer financing. For many reasons it represents one of the most

extensively used financing tools, if not the most favourite by financial institutions. They prefer to implement *murabaha* because of its lower risk, the absence of moral hazard issues and the inherent drawbacks of equity-based products. In fact, *murabaha* involves the sale of an asset whose ownership remains to the bank that can retain it as a pledge until the debt is completely paid off by the client. Alternatively, the latter usually has to provide a security (in the form of a guarantee, mortgage or hypothecation, for example) for the mitigation of risk. Clearly, Islamic banks prefer this scenario, if compared to the agency problems implied in *mudaraba* and *musharaka*.

- *Ijara*

Ijara represents the Islamic counterpart of conventional leasing. Essentially, it is a leasing contract in which one party (lessor) that owns an asset agrees to transfer its use to another party (lessee) for an agreed period of time. The latter, normally a bank's client, has to pay to the former, normally the bank, a periodic rental fee for the usufruct: the total amount paid is made up of the original cost plus the bank's profit margin.

Usually, the bank purchases an asset that is then leased to the client in exchange of payments that are not related to interest (otherwise it would fall within *riba*). The ownership of the asset remains to the lessor whereas the lessee has the right to enjoy its benefits, but he cannot sell it. The *ijara* contract lasts always for a definite period of time that is contractually agreed: at the end of it, the asset may or may not be reverted to the bank according to the different type of contract. In fact, in Islamic finance two different kinds of leasing transactions exist: operating lease and finance lease. On the one hand, in the operating lease, at the end of the contract the property is returned to the bank. On the other hand, in the finance lease, lessor and lessee agree upon the price at which the latter will purchase the asset at the end of the leasing period. Such option is agreed at the beginning of the contract and it cannot represent a mandatory condition of the agreement. An *ijara* generally follow these stages:

- The client identifies the asset he aims to buy, and he requests further details to the bank;
- Once he has received all the necessary information, the client and the bank engage in a *ijara* contract arranging time period and rental;
- The bank purchases the asset from the supplier;
- The ownership of the asset is transferred to the bank, while the actual asset is delivered to the client submitting a proof of delivery to the bank;
- The bank leases the asset to the client, transferring possession and right of use;
- The client pays the agreed periodic rentals according to the contractual terms;

- Expired the *ijara* period, the asset is returned or not to the bank according to the different kind of lease agreed (operating or finance lease).

Just a few elements of the *ijara* contract still needs to be underlined. First, not all assets may be included in such a scheme: they need "to be tangible, non-perishable, valuable, identifiable and quantifiable".[30] Furthermore, rental payments may be either fixed or floating, regardless of the type of lease. With regard to the liability of the leased asset, the lessor is responsible for the obligations linked to the ownership, such as extraordinary maintenance and insurance, while the lessee has to bear daily maintenance and usury. However, he is not responsible for damages to the asset, provided that they are not caused by his negligence, misconduct or breach of terms. As in the conventional lease, Islamic banks normally practice *ijara* for financing the use of fixed assets, machinery and equipment.

- *Salam*

In order to provide a first definition of *salam*, it may be described as "a deferred delivery contract, whereby the seller undertakes to supply some specific goods to the buyer at a future date in exchange for an advanced price fully paid on the spot".[31] Islamic banks usually apply such a transaction scheme for agriculture financing, so that small farmers can have the necessary funds for their working capital requirement and for their families, waiting for the harvest. In such a case, the farmer commits to deliver a specified quantity and quality of harvest to the bank at a future date in return for immediate payment. Then, the bank will sell the harvest in the market, earning a profit equal to the difference between purchase price and sale price. Hence both parties are better off: the farmer can fulfil his personal and financial needs, while the bank receives a commodity to fulfil other future obligations paying a lower price (indeed *salam* is generally cheaper than a cash sale) and without bearing storage costs.

Since this form of contract is exempted from two basic rules of *Shari'a* (because an asset is sold before it exists and the seller does not have its ownership yet) all the necessary elements need to be clearly specified in order to avoid *gharar*. Even though it represents an exception to the prohibition of forward sales, *salam* is a completely legitimate contract, provided that some strict rules relative to price and asset are observed. Especially for what concerns the commodity exchanged, it should not exist when the deal is made and all its specifics must be known by both parties, excluding any ambiguity. In addition, items that cannot be determined in quantity and quality (such as precious stones) cannot be object of a *salam*. Here is the usual process followed:

---

[30] SCHOON, *Modern Islamic Banking*, 57.
[31] ALAM, GUPTA and SHANMUGAM, *Islamic Finance: A Practical Perspective*, 206.

- The farmer approaches a bank in order to engage in a *salam* contract, being then subject to an assessment of his property and credit worthiness;
- The bank offers a purchase price to the client on the basis of its due diligence;
- Bank and farmer engage in a *salam* contract arranging all the necessary terms: quality and quantity of the harvest as well as delivery date;
- The agreed price is paid by the bank on the spot;
- The farmer provides the harvest to the bank according to contractual specifications and agreed delivery date;
- The bank sells the harvest in the market at a sale price that is higher than the purchase price, making a profit;

When Islamic banks apply *salam* in the agricultural industry, they often engage in a parallel *salam* contract relative to the same harvest, in order to mitigate their risk. In this way, after having purchased a commodity by means of *salam*, they can sell it by means of another *salam* with same date of delivery. Given that the parallel *salam* covers a shorter time period, the price should be higher than the first transaction, entailing a profit for the bank. A shorter period means a higher sale price hence a higher profit: short-term financing portfolios of Islamic financial institutions may be managed in this way. Notwithstanding the mentioned application, Islamic banks also practice *salam* in order to finance commercial and industrial activities as well as craftsmen and small producers.

- *Istisna*

Istisna, like *salam,* represents an exception to the *Shari'a* principles because, in this case as well, both the existence and the ownership of the asset are not materialised when concluding the contract. Nevertheless, this scheme is considered an Islamic law compliant mode of financing. After the deal is made, the manufacturer commits himself to manufacture the agreed commodity, whose specifications and price are included in the contract. However, contrary to *salam* characteristics, the payment to the manufacturer is not made in advance: it may be either in a lump sum at the end of the period or in periodic instalments during the development of the asset. An *istisna* contract may be revoked in any time by one of the parties before manufacturing starts. However, after the manufacturer has started his work, none of the parties can cancel the contract unless the commodity's specifications do not abide by the agreement. The manufacturer may hire someone else to perform the entire or a part of the work under his responsibility.

Normally, the exchanged commodity is of significant size and requests high capital expenditures that the buyer may not be able to face. If a financier is involved, a specific asset is

commissioned to the bank that, in turn, commissions the same asset to a manufacturer. Here are the usual steps:

- The client identifies the asset he aims to buy, and he requests further details to the manufacturer, especially the price quotation;
- The client provides all the necessary documents to the bank, including price, asset specifications and delivery date;
- The bank and the customer engage in an *istisna* contract, arranging all terms;
- The bank engages in a parallel *istisna* with the manufacturer including price, specifications and delivery date based on the first *istisna*;
- The manufacturer performs his task, receiving periodical payments from the bank;
- The manufacturer delivers the commodity directly to the customer, who, in turn, pays periodical instalments (made up of cost of the asset and bank's profit) to the bank.

Mainly because of its periodical instalments linked to the development of the commodity "this contract is especially suitable for the making of buildings and other projects such as bridges, highways, ships, and the like. In fact, this contract suits the purpose of infrastructure and project financing".[32] Hence, such a tool may be implemented for many financing purposes such as public interest projects as well as in construction and high-technology industries (aviation, shipbuilding and the like). GCC's Islamic banks largely use it for home financing and buildings construction.

At the end of this overview of the main contracts practiced by Islamic banks, it is clear that many alternatives are offered to economic deficit units and economic surplus units in order to meet their respective needs. However, the list provided does not conclude the topic because other *Shari'a* compliant forms of financing exist: they have not been described here for the sake of brevity. In any case, the most relevant and common types of transaction have been explained so far and they can help in understanding how Islamic finance aims to fulfil the same objectives of conventional finance, but in an ethical and Islamic law-abiding manner.

Furthermore, due to the speed and complexity of the modern financial landscape, the classic Islamic contracts have been shaped in innovative ways in order to meet the different requests and needs of today's investors and companies. As a consequence, these schemes have been practiced either in a new way or in mixed forms of them, able to fit the new necessities of an increasingly fast and complex world.

---

[32] ALI and ZADA, *The Islamic Finance Trading Framework*, 35.

1.3.2 Capital markets

At the end of the Islamic banking analysis, it is now necessary to outline the main features of the Islamic capital markets sector. Even though it does not represent the majority of the global IFSI assets, it is a relevant source of funds for capital seekers as well as an investment opportunity for capital providers. Islamic capital markets are indeed an appropriate alternative for those needs that are not met by Islamic banking. The main two segments that will be analysed are the *sukuk* market, underlying structure and differences in comparison with conventional bonds, and the Islamic funds industry, referring also to the construction of Islamic stock indexes.

1.3.2.1 *Sukuk* market

The *sukuk* market represents the most important segment of Islamic capital markets. Even though they are often defined as the Islamic counterpart of conventional bonds, *sukuk* actually show some peculiar features that will be outlined in the following pages. Also, a general structure of *sukuk* will be discussed.

According to the definition provided by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), *sukuk* are "certificates of equal value representing undivided shares in ownership of tangible assets, usufruct and services or in the ownership of the assets of particular projects or special investment activity, however, this is true after receipt of the value of the *sukuk*, the closing of subscription and the employment of funds received for the purpose for which the *sukuk* were issued".[33] Hence, *sukuk* are transferable certificates which represent a share in the ownership of a tangible asset or business venture, giving entitlement to the investors to receive periodical payments and face value at maturity. These certificates are always linked to the conclusion of either a PLS contract, such as *mudaraba* and *musharaka*, or a non-PLS contract, such as *murabaha*, *ijara*, *salam* and *istisna*.

Conventional bonds present two great drawbacks that make them unacceptable to Islamic finance: firstly, they pay interests and, secondly, they are often not linked to an underlying asset. As conventional bonds, the purpose of *sukuk* is to fulfil the same need of financing but doing so in a *Shari'a* compliant manner. In order to achieve this objective, *sukuk* have some features both of equity and of debt. On the one hand, in fact, they give entitlement to periodical payments and full redemption at maturity just as conventional bonds. In addition, they may be listed on regulated markets: they may be either bought from the issuer or in the secondary market, that actually is not

---

[33] AAOIFI Standard 17

very liquid. On the other hand, contrary to conventional bonds, by means of them a share in the ownership of an underlying (tangible or intangible) asset is transferred to the *sukuk* holder, along with the linked benefits and risks. Hence, he is entitled to receive a share of profit generated from the underlying asset or business venture but, in the same way, he is subject to any related risk and losses. Conversely, conventional bonds are a financial liability for the issuer until maturity. In order to have a clear understanding of all the differences that distinguish *sukuk* from bonds, they have been summarized in Table 4.

Differences between bonds and *sukuk*		
Characteristic	Bonds	*Sukuk*
Application	Issued with the aim to fulfil need of funds but without knowing their specific purpose and investment	Issued with the aim to invest funds in specific and determined assets linked to real economy activities
Rights of holders	Financial right to receive periodical (fixed or variable) coupons and face value at maturity	Ownership of a share of the underlying asset/business venture and its linked returns
Periodical payments and face value	Guaranteed	Subject to the performance of the underlying asset/business venture
Price formation	Market variables such as interest rates, coupon rate, risk	Expected return of the underlying asset/business venture
Restrictions	No constraints are imposed to the issuer, who can invest funds in any way: their use is unknown to bondholders	Funds collected from the issuance are invested in a specific and determined asset/business venture that *sukuk* holders know before the subscritpion
Secondary market	Well-developed, making the investment more liquid	Not well-developed, *sukuk* holders tend to wait until maturity making this investemnt less liquid

Table 4. Source: personal work.

Actually, to some extent, *sukuk* are also very similar to a securitization process because "securitization is 'a process of pooling/repackaging the nonmarketable and illiquid assets into tradable certificates of investment'. […] *Sukuk* could be understood in a same line of general securitization, as it makes underlying assets tradable by giving undivided ownership to many *sukuk* holders".[34] In any case, keeping it simple, *sukuk* represent very important financing structures that have played a key role in the development of Islamic capital markets. They represent, in fact, a valid alternative to the classical products offered by financial institutions that can facilitate "the funding of large projects, which would be beyond the capability of either an individual or a small group of investors".[35] Such a relevance within the global IFSI has already been underlined in the paragraph 1.2. We just remind that, on the basis of the last IFSB Stability Report, *sukuk* account for 24.2% of the global IFSI,

---

[34] ALAM, GUPTA and SHANMUGAM, *Islamic Finance: A Practical Perspective*, 416.
[35] SCHOON, *Modern Islamic Banking*, 64.

global *sukuk* outstanding have reached USD 530.4 billion in 2018 (+22% in comparison with 2017) with new issuances for USD 93 billion (+1.7% in comparison with 2017). As at the end of 2018, the compound annual growth rate of the *sukuk* market over the last 15 years was 30.6%. The largest issuer jurisdictions in 2018 were
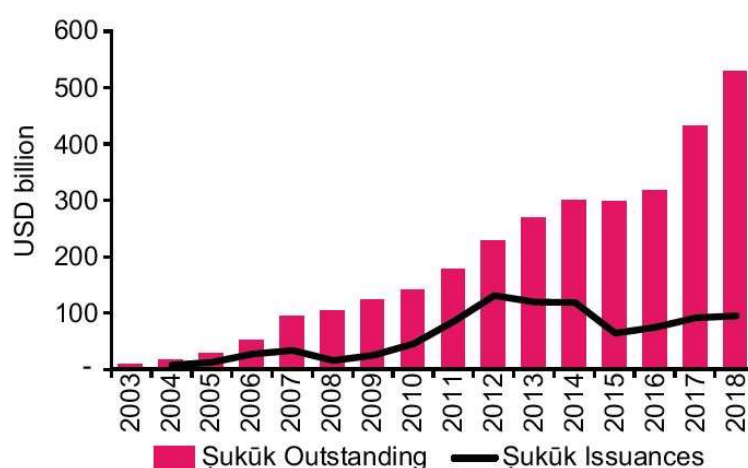

Chart 12. Trend in global sukuk outstanding and overall sukuk issuances (2003-18). Source: IFSB Stability Report 2019.

Malaysia, Saudi Arabia, UAE, Indonesia and Turkey, that accounted for 91% of total *sukuk* outstanding. From Chart 12, it is possible to understand the trend in global *sukuk* outstanding and overall *sukuk* issuances from 2003.

In the light of all the mentioned data, it is clear how the *sukuk* market represents today a relevant source of funds for many companies and jurisdictions. *Sukuk* issuances may have different structure according to the different type of transaction that is linked to them. Any of the explained contracts, both partnership transactions and schemes with a predictable return, may be the underlying model of *sukuk*. Notwithstanding some differences, a general scheme of such a form of financing can be outlined. Generally, although not mandatorily, a special purpose vehicle (SPV) is set up by the entity that aims to raise funds. Then an asset is transferred to the SPV, that consequently issues *sukuk* certificates. By means of the funds raised, the asset is paid to the entity so that it can invest these financial resources in the agreed type of transaction. Thus, profit and losses of the transaction are shared among investors through the SPV. At the end of the contract, the asset is sold again to the original entity and principal amount of the investment flows to the *sukuk* holders. A generic structure of *sukuk* is shown in Figure 1, notwithstanding that different steps may occur depending on the different underlying transaction. The word "corporation" in the figure can be replaced according to the different entity (government or other sovereign entity) which aims to raise funds. In any case, the basic form of *sukuk* entails the following stages.

1. The corporation sells an asset to the SPV, which the SPV divides up in equal units of usually $1,000 or £1,000 and transfers on to the *sukuk* holders. In the event that the underlying transaction is a *musharaka* or *mudaraba* the underlying asset can be represented by a share in the corporation or partnership.

2. The *sukuk* holders transfer the funds representing the number of certificates they bought to the SPV, which transfers the total proceeds minus any costs to the corporation.

3. The corporation invests the funds in the *Sharia'a* compliant investment stipulated in the contract.

4. The *Sharia'a* compliant investment either generates profits and losses (for partnership type contracts) or pays a return (for predictable return type instruments).

5. The SPV collects profits and losses or returns and pays (typically quarterly) coupons to the *sukuk* holder.

6. At maturity, the *sukuk* holder sells the asset to the SPV, which in turn sells it back to the corporation.

7. Money flows from the corporation to the *sukuk* holders through the SPV.[36]
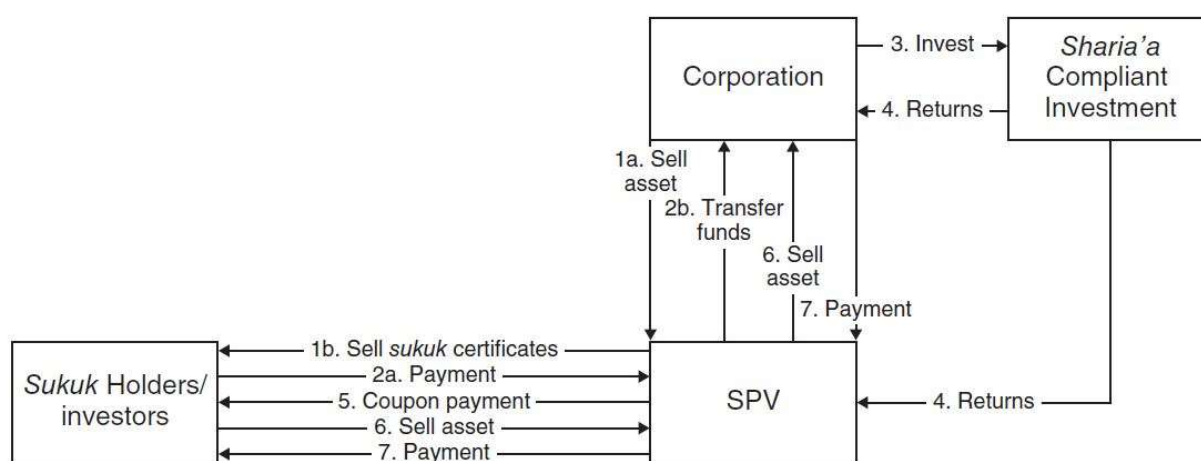
Figure 1. Generic sukuk structure. Source: SCHOON, Modern Islamic Banking.

As mentioned above, a variety of *sukuk* structures may be created according to the different underlying *Shari'a* transaction. Among all the various alternatives, it is possible to develop *sukuk al-mudaraba*, *sukuk al-musharaka, sukuk al-murabaha, sukuk al-ijara, sukuk al-salam, sukuk al-istisna* as well as hybrid and convertible *sukuk*. According to the IFSB Stability Report 2019, the highest volume of *sukuk* issuances in 2018 concerned *murabaha* contracts (accounting for almost 28% of issuances), followed by *sukuk* contracts based on *ijara* (25.4%), hybrid *sukuk* (equal to 21.4% of issuances) and then *sukuk wakala* (20.7%). The *sukuk* market mirrors the Islamic banking sector: *sukuk al-mudaraba* and *sukuk al-musharaka* are in fact not so common, representing 2.5% and 2.1% of global new issuances. Since all the relevant contracts have already been discussed in detail, just a brief description of the two most common *sukuk* will be provided.

In a *sukuk al-murabaha*, the *sukuk* holders purchase an asset by means of the SPV in order to provide it to an entity that cannot buy it on its own. Hence, the asset is transferred to the entity that

---

[36] Ibid., 65.

pays periodical instalments equal to the previously agreed cost price plus a mark-up. *Sukuk* holders receive these periodical payments comprehensive of their profit.

In a *sukuk al-ijara*, an SPV is again set up by the entity that needs to raise funds. After having issued certificates, the financial resources are used to purchase an asset from a supplier and then to lease it to the entity. The latter makes rental payments that are periodically distributed among *sukuk* holders. At the end of the period, the SPV sells the asset to the entity and thus investors are reimbursed their initial investment.

1.3.2.2 Islamic funds and indexes

Even though the greatest part of Islamic capital markets consists of the *sukuk* segment, Islamic equities and funds represent a relevant issue for those investors that aim to participate in the share capital of listed *Shari'a* compliant firms.

From an Islamic law perspective, investing in companies is an important mean of channelling financial resources into the economy and it does not represent a *haram* activity as long as *Shari'a* principles are observed. As a consequence, conventional and Islamic investors share common goals such as increase of capital and appropriate risk-taking, but the latter investors have one additional concern, that is the *Shari'a* compliance of their investments. Hence, if they do not want to violate the Islamic law directives with their share purchases, they should not support firms that engage in *haram* activities. Since a separate stock exchange for compliant equities does not exist, Islamic investors have to rely on screenings offered by professional providers.

As in the conventional markets, not all investors have sufficient time and competences in order to effectively manage their investment. Consequently, also a part of Islamic investors prefers to allocate financial resources in mutual funds managed by Islamic investment managers. The last IFSB Stability Report claims that the number of Islamic funds has reached 1292, holding about USD 67.4 billion of assets under management in 2018. Five countries account for about 85% of the total Islamic funds' assets, while the total number of jurisdictions where Islamic funds are domiciled is 34. The two key domiciles are Malaysia and Saudi Arabia that account for 34% and 32% of total assets under management, respectively.

Essentially, Islamic funds do not differ from conventional funds. In fact, "like conventional investment managers, Islamic investment managers can invest in a wide range of Islamic and conventional products and asset classes, including shares and other securities".[37] However, Islamic investment managers are forced to ensure their individual investments and their funds are

---

[37] Ibid., 121.

consistently *Shari'a* compliant. Thus, Islamic funds' structure is usually similar to conventional structures: a fund manager raises funds from a group of investors with similar objectives and risk aversion in order to invest them in an asset portfolio. According to the fund's investment objectives, financial resources are invested in a variety of asset class and the unit price of the fund is represented by its net asset value (NAV). This is computed as the total market value of the assets divided by the number of units issued to investors. The portfolio is managed by a professional fund manager, providing expertise and diversification that may not be possible for an individual investor.

From an Islamic law point of view, there are no big issues with regard to the structure of funds because investors' involvement is considered as a *mudaraba/musharaka* partnership. What is of most concern is the allocation of financial resources among different assets that may be not compliant to *Shari'a* principles. Hence, a *Shari'a* supervisory board is involved from the very beginning in order to advise the fund manager with regard to the assets' compliance. "This is a factor that distinguishes Islamic funds from conventional unit trusts/mutual funds. All investment assets must receive *Shari'a* approval from the *Shari'a* advisory board of the fund management company".[38] The screening process entails the following two main stages.

- Qualitative screening

The main issue here is to determine if a company is involved, and to what extent, in *haram* activities. Even though it would be preferable to invest only in fully *Shari'a* compliant stocks, the increasing globalisation and interrelation of markets do not always allow it. Hence, some companies may be considered compliant although a small share of its turnover originates from unlawful activities. Islamic scholars generally accept a 5% maximum threshold of total turnover. Conventional banking and insurance, alcohol, pork-related products, gambling, tobacco, pornography and weapons are some examples of *haram* business activities that are not allowed.

- Quantitative screening

Besides the industry screen, some financial ratios are considered in order to define which stocks represent a *Shari'a* compliant investment opportunity. Since thresholds may vary according to different financial institutions and *Shari'a* advisory boards, a useful benchmark is represented by the following criteria applied for the Dow Jones Islamic Market World Index:

---

[38] ALAM, GUPTA and SHANMUGAM, *Islamic Finance: A Practical Perspective*, 408.

- Total debt / trailing 24-month market capitalization < 33%;
- (Cash + interest-bearing securities) / trailing 24-month market capitalization < 33%;
- Accounts receivables / trailing 24-month market capitalization < 33%.

Furthermore, any income generated from *haram* activities should be purified by means of charity. Although Islamic scholars have different thoughts with regard to dividend purification, the common approach implies that "Islamic asset management companies have to purify their income by deducting from the returns on the investments the earnings emanating from any unacceptable source from the *Shari'a* point of view".[39]

In the event that a fund's share becomes momentarily non-compliant, the fund manager has to report it to the *Shari'a* advisory board in order to address the situation: the stock concerned may either remain in the investment (and, as long as non-compliance is present, all profits generated have to be purified) or it could be quickly sold (but it may be added again when it returns to compliance). In case of definitive and permanent non-compliance, divestment is always required.

One last element to analyse is represented by Islamic stock indexes. In order to provide a benchmark to Islamic investors, a wide number of indexes has been created over the years. The most relevant ones today are the Dow Jones Islamic Market Indexes, the FTSE *Shari'a* Global Equity Index Series, the MSCI Islamic Index Series and the S&P *Shari'a* Indexes. As in the case of Islamic funds, these benchmarks are set up and periodically revised according to the opinion of a *Sahri'a* supervisory board. The screening process may entail more flexible or more strict criteria than the ones provided above: it strongly depends on the Islamic scholars' opinion. In any case, the screening is then applied to a great number of stocks and dividend purification may be implemented.

1.3.3   *Takaful*

The last sector that has to be analysed is the Islamic insurance, which is often referred to as the *takaful* industry. Such an industry is rather recent, and it does not represent the majority of the global IFSI assets (just 1.3%), but it is necessary to underline its relevant features in order to provide a comprehensive overview of Islamic finance.

The first Islamic insurance company was set up in 1979, while six years later the Islamic Fiqh Academy declared that conventional insurance is forbidden because considered *haram*. Since then, the *takaful* industry has constantly growth until today: according to the IFSB Stability Report 2019,

---

[39] Ayub, *Understanding Islamic Finance*, 202.

306 *takaful* institutions operate in 45 countries globally, especially in the GCC, MENA and South-East Asia. From 2012 to 2017, the industry's gross contributions have increased at a compound average growth rate of 6.9%.

The main reason of this remarkable growth is due to the elements of *riba*, *maysir* and *gharar* contained in conventional insurance, which make it unacceptable from an Islamic law perspective. Instead, the *takaful* scheme implies that a number of partners agree to contribute donations in a fund in order to provide assistance in case of a defined loss or damage that may suddenly harm any of them. Resources of every participant of the fund support the needy members when it is necessary. This system is essentially based on the concepts of mutual assistance and donation: each member is, at the same time, the insurer and the insured. In fact, risk is voluntarily shared among the group and mutual assistance in case of loss is constantly guaranteed, making of equity, solidarity and cooperation the key elements of this mechanism.

On the contrary of conventional insurance, in a *takaful* scheme the risk is not transferred to the insurance company and it remains to the fund's participants: they carry the risk while the *takaful* operator is custodian of the funds. However, the latter can generally manage the funds undertaking investments, but only in *Shari'a* compliant instruments: in this way, the component of *riba* typical of conventional insurance is excluded. Then, profits and losses are shared between participants and *takaful* operator according to a pre-agreed ratio, leaving no room for uncertainty: *gharar* is removed as well. Finally, in conventional insurance *maysir* is present because policyholders may either lose all the premiums paid (if the risk does not occur) or get much more than them (if the risk occurs). Conversely, in a *takaful* scheme participants are entitled either to get back the contributions paid (if the risk does not occur) or to receive the premium paid together with the donations made by the other participants (if the risk occurs). Thus, also *maysir* is excluded.

Two main types of *takaful* exist: general *takaful* and family *takaful*. The former is normally linked to non-life insurance and damages to material goods whereas the latter mainly concerns life-insurance and personal injuries. In both cases, different types of contract may be implemented in order to govern the relationship between participants and *takaful* operator. Generally, *mudaraba* and *wakala* are the most common models, however, many *takaful* operators also apply some hybrid forms combining different schemes.

<center>**CHAPTER II**</center>
<center>**Islamic finance and Capital Asset Pricing Model**</center>

The ultimate purpose of this chapter is to provide an explanation of the Capital Asset Pricing Model (CAPM) and of its application to Islamic finance. As can be inferred from the previous pages, many issues and topics are linked to the Islamic capital markets. However, the focus of this second part has been shifted only to one of them so to cover it exhaustively: the implementation of one of the most applied asset pricing models within the boundaries of *Shari'a* framework.

Therefore, the paragraph 2.1 provides an analysis and discussion of the CAPM. Starting from the Markowitz portfolio theory, the optimization process needed to identify the efficient frontier will be explained. Then, building on some additional assumptions, the CAPM equation for the expected return will be derived. The paragraph ends with an explanation of the regression model based on the described asset pricing theory.

Afterwards, the paragraph 2.2 provides a literature review of the academic research which has linked the CAPM with the Islamic financial system. Firstly, an interesting paper regarding issues about Islamic equity investments will be analysed. Secondly, a collection of the studies that have applied CAPM to Islamic stocks will be presented. Then, the focus will be shifted on those research papers that have applied CAPM with the aim to analyse the relative performance of Islamic securities against their conventional counterparts. Finally, possible adjustments to this asset pricing model in order to make it fully *Shari'a* compliant will be examined.

2.1 Introduction to Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) represents one of the most common and relevant models able to explain the relationship between risk and return. It was first developed by William Sharpe in a 1964 paper[40] and, though not perfect, "it is widely regarded as a very useful approximation and is used by firms and practitioners as a practical means to estimate a security's expected return and an investment's cost of capital".[41] A brief explanation of this model will be provided in this paragraph, but, since its roots lie in the Harry Markowitz portfolio theory, it is first necessary to mention this thesis.

The model derived by Markowitz was first theorised in a 1952 paper[42] and then in successive studies of the same author. Essentially, he developed a model aimed to estimate the expected risk

---

[40] W.F. SHARPE, "Capital asset prices: A theory of market equilibrium under conditions of risk", *The Journal of Finance* 19, n. 3 (1964): 425–442.
[41] J.B. BERK and P.M. DeMARZO, *Corporate finance* (Boston, MA: Prentice Hall, 2011), 424.
[42] H. MARKOWITZ, "Portfolio selection", *The Journal of Finance* 7, n. 1 (1952): 77–91.

and return of a portfolio of assets. Furthermore, underlying the benefits of diversification in order to reduce the volatility of a portfolio, he demonstrated how an investor can build an optimal portfolio according to the level of volatility he is willing to accept.

The Markowitz portfolio theory assumes that investors are risk averse, hence given the level of expected return investors prefer lower risk. They are willing to bear higher risk only if compensated with higher expected return, and likewise investors who want a higher expected return must bear more risk. This trade-off is different for every investor, according to his risk aversion characteristics. The ultimate purpose of this model is to construct an efficient portfolio of assets, i.e. a portfolio whose volatility is minimized for any given level of return an investor is willing to earn or, in other words, whose expected return is maximized for any given level of volatility an investor is willing to accept.

Assuming that short sales are allowed and considering a portfolio P of N risky-assets, the weight (w_i) of each asset, the vector with unitary elements, the vector of the expected returns (r) and the variance-covariance matrix are expressed as follows:

$$w = \begin{pmatrix} w_1 \\ \vdots \\ w_N \end{pmatrix} \qquad 1 = \begin{pmatrix} 1 \\ \vdots \\ 1 \end{pmatrix} \qquad r = \begin{pmatrix} r_1 \\ \vdots \\ r_N \end{pmatrix} \qquad \Sigma = \begin{pmatrix} \sigma_{11} & \cdots & \sigma_{1N} \\ \vdots & \ddots & \vdots \\ \sigma_{N1} & \cdots & \sigma_{NN} \end{pmatrix}$$

Since the sum of the weights must be equal to one, hence:

$$\sum_i w_i = 1 \qquad \text{and in matrix form} \qquad 1'w = 1$$

In such a case, the expected return of the portfolio is equal to:

$$r(w) = E[R(w)] = \sum_{i=1}^{N} w_i r_i \qquad \text{and in matrix form} \qquad r(w) = r'w$$

while the variance of the portfolio (which measures the variability of the realized rate of returns around their mean) is measured by the following equation:

$$\sigma^2(w) = \sum_i \sum_j w_i w_j \, \sigma_{ij} \qquad \text{and in matrix form} \qquad \sigma^2(w) = w'\Sigma w$$

The term σ_{ij} indicates the correlation between stocks i and j: it ranges from -1 to +1 and it provides the degree to which returns tend move in relation to each other. On the other hand, the volatility (or standard deviation) of a portfolio of assets is equal to the square root of its variance. It is indicated with σ and it provides an estimate of the uncertainty linked to future returns or, in other words, a measure of the total risk of a portfolio (both systematic and firm specific risk). On the basis of these equations, we can compute the minimum variance portfolio, that is the efficient portfolio with the minimum variance. It can be determined resolving the following system:

$$\left[\begin{array}{l} \min \dfrac{1}{2} w'\Sigma w \\[2mm] 1'w = 1 \end{array} \right.$$

By means of a Langrage multiplier, this system is easily solved thus obtaining practical formulas to compute expected return, variance and standard deviation of the minimum variance portfolio.

Some interesting conclusions can be drawn in the case of an equally-weighted portfolio P made up of N risky securities. In such a case, the variance of the portfolio is equal to:

$$\sigma^2_{\text{ewp}} = \frac{\overline{\sigma^2}}{N} + \left(1 - \frac{1}{N}\right)\overline{\text{cov}}$$

where $\overline{\sigma^2}$ is the average variance of the individual stocks, while $\overline{\text{cov}}$ indicates the average covariance between stocks. This latter measure provides an estimate of the reciprocal variability of two stocks: if they move together it is positive, whereas if they move in opposite directions it is negative. The first component of the last equation is directly linked to the firm-specific risk of the portfolio: if N increases, the whole fraction decreases. This kind of risk affects only a specific asset and it is diversifiable. On the other hand, the second component of the equation represents the systematic risk of the portfolio: if N increases, it remains unchanged. This kind of risk affects all the stocks simultaneously and it cannot be diversified. Such a relevant result holds also in the case of a portfolio with arbitrary weights, whose variance is expressed by the formula mentioned above. Combining stocks into a portfolio, its variance (and its volatility as well) decreases unless stocks have a perfect correlation of +1 with one another. Consequently, the firm-specific risk of a portfolio of assets can be diversified away by adding non perfectly positively correlated stocks, lowering the total risk. However, it cannot be completely reduced because the systematic risk that affects all stocks still remains.

Even though the minimum variance portfolio is a remarkable result, the optimization process can be furtherly implemented to identify other efficient portfolios that minimize the variance for any given level of expected return. It is sufficient to add a constraint in the mentioned system of equations, which is transformed in the following one:

$$\left[\begin{array}{l} \min \dfrac{1}{2} w'\Sigma w \\[2mm] r'w = \mu \\[2mm] 1'w = 1 \end{array} \right.$$

where μ represents the target level of expected return. Thus, solving the system above, the portfolio weights computed minimize the variance for any given level of expected return.

These findings can be graphically represented plotting all the possible combinations of risky assets on the basis of their expected return (y-axis) and volatility (x-axis). Consequently, a region of space is defined by this collection of portfolios, whose extreme boundary is a branch of hyperbola. The lower part of the hyperbola is not efficient, whereas the upper boundary is called the "efficient frontier". Indeed, starting from the minimum variance portfolio (which is the efficient portfolio with the lowest volatility) and moving along the boundary, any portfolio lying on the frontier represents the alternative with the lowest risk for a given level of expected return.

According to the two fund theorem, any portfolio on the efficient frontier can be derived as a combination of two efficient funds or portfolios, hence an investor needs to invest only in a combination of these two funds. As a consequence, considering only a risk-free asset (which pays a risk-free rate of return r_o) and a risky asset T (which pays a risky rate of return r_T), the expected return and variance of a portfolio made up of these two stocks are:

$$r(w) = wr_T + (1 - w)r_0 \qquad \sigma^2(w) = w^2\sigma_T^2$$

In fact, the variance of the risk-free asset is equal to zero, thus the variance (and volatility) of the portfolio only depends on the variance of the risky asset T. Combining the formulas above, and with some mathematical steps, we derive that the possible combinations of the risk-free asset and T are defined by the following two half-lines:

$$r = \pm \frac{r_T - r_0}{\sigma_T} + r_0$$

In such a case, all the efficient portfolios lie on the upward sloping half-line that is called the Capital Market Line (CML). Its vertical intercept corresponds to the risk-free rate of return and it has the following slope, also known as the Sharpe Ratio:

$$SR_T = \frac{r_T - r_0}{\sigma_T}$$

Consequently, every efficient portfolio has the same Sharpe Ratio that is equal to the slope of the new efficient frontier. This ratio provides relevant information with regard to the risk-adjusted performance of a stock or a portfolio. Indeed, it is a measure of the excess return earned per unit of increase in risk.

The last step in this process is to consider a risk-free investment along with a number N of risky assets. In such case, the CML corresponds again to the efficient frontier and it is tangent to the upper boundary of the hyperbola that represents all the possible combinations of risky portfolios. Every portfolio on the CML has the highest Sharpe Ratio and the tangent point between CML and hyperbola represents the only purely risky efficient portfolio T. As a consequence, by

the one fund theorem, all the other efficient portfolios are derived as a combination of the risk-free asset and the risky portfolio *T*. Moving along the CML, different percentages of *T* and of the risk-free asset are held by an investor.

Starting from this framework and on the basis of some additional assumptions, the Capital Asset Pricing Model is able to provide a general equilibrium model for the capital markets. Moreover, the risk-return relationships are extended to all the assets, both efficient and non-efficient ones. The main hypotheses underpinning this model are the following:

- All investors have the same one period time horizon, e.g. one month or one year;
- There are no transaction costs and taxes, when buying and selling assets;
- Investors can borrow and lend any amount of money at the same risk-free rate of return;
- Investors hold only efficient portfolios that lie on the efficient frontier, i.e. portfolios with the highest expected return for a given level of volatility;
- Securities are infinitely divisible and marketable, hence they can be bought, sold and held in arbitrarily big and small quantities;
- Investors have homogeneous expectations with regard to expected returns, volatilities and correlations of traded securities;
- Investors are price-takers, hence they cannot affect the price of a stock by means of their buying and selling actions;
- Securities prices are formed as a result of the equilibrium between demand and supply;
- Short sales are allowed.

Under these assumptions, all the investors identify the same CML and the same purely risky efficient portfolio. Therefore, all the investors will demand this same portfolio, that is the tangent portfolio *T*. Given the fact that each investor must build up a portfolio composed of the risky securities in same proportions (that are provided by the tangent portfolio), the price of some risky securities tends to increase while the price of some others tends to decrease. While the aggregate demand is represented (in percentage terms) by the tangent portfolio, the aggregate supply is represented (in percentage terms) by the market portfolio. The latter "is a portfolio of all stocks and securities traded in the capital markets".[43] In market equilibrium, demand and supply of every security are equal, hence the tangent portfolio of risky securities equals the market portfolio.

From the equation of the covariance between a generic portfolio *P* and the tangent portfolio *T*, it is possible to express the excess expected return of *P* with this formula:

---

[43] Ibid, 375.

$$r - r_0 = \frac{\text{cov}(R, R_T)}{\sigma_T^2}(r_T - r_0)$$

but since the tangent portfolio T equals the market portfolio, we derive that:

$$r - r_0 = \frac{\text{cov}(R, R_M)}{\sigma_M^2}(r_M - r_0)$$

where:

$$\beta = \frac{\text{cov}(R, R_M)}{\sigma_M^2}$$

The beta of a portfolio (or stock) is essentially a measure of systematic risk and it indicates the sensitivity of a portfolio (or stock) to the changes in return of the market portfolio. Hence, "for a stock, this value is related to how sensitive its underlying revenues and cash flows are to general economic conditions".[44] If beta is positive, the stock i tends to move in the same direction of the market, while the opposite happens if beta is negative. In the case of beta equal to 1, the stock i perfectly reproduces the movement of the market. If it is equal to 0, there is no correlation.

The equation that expresses the excess expected return of a portfolio is valid both for efficient and non-efficient portfolios, and for individual stocks as well. In the latter case, the expected return of a stock i is given by the following formula, called the "CAPM equation for the expected return":

$$r_i = \beta_i(r_M - r_0) + r_0$$

This linear relationship between expected return and systematic risk of a stock can be plotted in a graph and it is called Security Market Line. It represents the line on which all securities lie when plotted on the basis of their beta and expected return. Its vertical intercept corresponds to the risk-free rate of return, whose beta is equal to 0. The difference between CML and SML is remarkable because the former measures the risk of a portfolio according to its volatility (which represents its total risk) and it is valid only for efficient portfolios. On the other hand, the SML considers only the systematic risk of a security and it can be applied both to individual stocks and portfolios. In this latter case, the beta is equal to the weighted average beta of all the assets in the portfolio.

Finally, it is interesting to analyse the CAPM equation in the form of the following regression model, expressing the excess return on a security as a function of the excess return on the market:

$$R - r_0 = \alpha + \beta(R_M - r_0) + \varepsilon$$

---

[44] Ibid, 376.

where α indicates the excess return above the estimation provided by CAPM while ε represents the error term in the regression equation. Alpha may be either positive or negative: in the former case the stock plots above the SML and it is undervalued, whereas in the latter case the stock plots below the SML and it overvalued. If alpha is equal to 0, the stock lies on the SML. Therefore, under CAPM assumptions:

$$\alpha = 0 \qquad \text{and} \qquad E[\varepsilon] = 0$$

In conclusion, the CAPM represents a very useful tool for firms and investors in order to estimate the expected return of a security. However, some of its underpinning assumptions are very strong and they do not accurately describe the investors' behaviour. Furthermore, many tests have questioned its effectiveness throughout the years. Nevertheless, it still represents one of the most important and widely used asset pricing models able to explain the risk and return relationship of securities.

2.2 Application of CAPM to Islamic Finance

After the explanation and discussion of the Capital Asset Pricing Model, it is now interesting to analyse its application to Islamic finance. Therefore, an overview of the main issues about Islamic equities will be discussed along with a literature review about the relationship between CAPM and *Shari'a* compliant stocks.

A wide number of studies and empirical research have been developed in the last years, covering a variety of different matters related to the world of Islamic capital markets. Especially Islamic equity investments have represented a very discussed topic. In this regard, Masih, Kamil and Bacha[45] have tried to provide a comprehensive overview of all the most relevant surveys about Islamic equities. The comparative performance between Islamic and conventional stocks along with the comparative performance between Islamic portfolios and socially responsible investment (SRI) funds are the first topics addressed by the authors. After this stage, they analyse empirical works about additional diversification benefits provided by *Shari'a* compliant equities. Then, peculiarities of this kind of investment, such as volatility, risk factors and performance attributes are discussed. Finally, research papers about efficiency perspectives, calendar anomalies, and issues in screening criteria are examined.

According to the authors, there is no definitive conclusion with regard to the comparison of performance between Islamic equities and their conventional counterparts. Evidence of

---

[45] M. MASIH, N. K. M. KAMIL and O. I. BACHA, "Issues in Islamic Equities: A Literature Survey", *Emerging Markets Finance and Trade* 54, n. 1 (2018): 1-26.

disagreement among empirical research is found both for the overall and for the relative performance in bullish and bearish markets. Three different conclusions are supported by different studies: *Shari'a* compliant stocks may outperform conventional equities, but the latter could also outdo the former and there might be insignificant differences in performance as well. All these theories have been proved by means of different methodologies and models employed: this is a possible reason that could explain lack of consensus in empirical works. A different investment category may dominate under certain circumstances, while the opposite may happen in other cases. Likewise, no significant difference may occur. The authors suggest that specific causes producing outperformance should be further examined.

The same conclusion can be applied to the comparative performance between Islamic stocks and SRI funds as well as to the additional diversification benefits provided by *Shari'a* compliant equities: divergence among academics does not provide a unanimous judgement. Also with regard to the risk profile of Islamic equities, conflicting results do not allow to state which investment category may be the least risky. Furthermore, even though efficiency of Islamic markets has been tested without definitive conclusions, some specific calendar anomalies have been reported: the month of Ramadan and the period of pilgrimage to Mecca stand out in this list. Finally, for what concerns the screening criteria, a standardization from this point of view has been requested by many scholars along with an improvement of these methods.

Even though the literature review provided by the authors yields contrasting results for the most part, they conclude that the returns of Islamic equities are as significant as those of conventional equity investments. In fact, according to a number of papers cited by them, Islamic equities outperform their conventional counterparts implying that screening criteria do not necessarily impact their relative risk-adjusted performance.

Since empirical methodologies and models implemented may vary from one research to another, it is interesting to specifically focus on those studies in which CAPM has been applied to Islamic equity investments. The main issue in such a case is to verify if the model developed by Sharpe is able to explain the risk-return relationship of *Shari'a* compliant stocks.

Following this approach, Selim[46] has reached significant results. Applying CAPM only to *musharaka* contracts, the author demonstrates that a zero risk-free rate of return leads to the optimal risk-return relationship for this type of investment. However, he is not the only one who has followed this path: Lean and Parsva[47] have tried to extend the same methodology to the Islamic indices in the Malaysia FTSE Market. The authors' purpose is to investigate the relationship

---

[46] T.H. SELIM, "An Islamic capital asset pricing model", *Humanomics* 24, n. 2 (2008): 122-129.
[47] H.H. LEAN and P. PARSVA, "Performance of Islamic Indices in Malaysia FTSE Market: Empirical Evidence from CAPM", *Journal of Applied Science* 12, n. 12 (2012): 1274-1281.

between risk and return of Islamic stocks in that specific market by means of some indices, used as benchmarks. FTSE Bursa Malaysia KLCI Index, FTSE Bursa Malaysia 100 Index and FTSE Bursa Malaysia EMAS Index are employed to form the market portfolio, whereas FTSE Bursa Malaysia Hijrah *Shari'a* Index and FTSE Bursa Malaysia EMAS *Shari'a* Index represent the Islamic portfolio. The sample period is from March 2007 to February 2011, including a sub-period from March 2008 to March 2009 in order to determine the impact of the 2008 global financial crisis. According to the authors' findings, CAPM is an appropriate model in examining the risk-return relationship of Islamic stocks in the Malaysian market.

Another empirical research of this kind it the one of Tariq[48], who actually focuses his attention on the Bahrain Stock Exchange. Here, the sample period is a little longer: five years are considered, from 2003 to 2007. Following a three-stage procedure, CAPM is applied to the security prices of 12 companies, that are then reduced to the number of nine because three of them show a low R^2 value (a coefficient that will be later explained in this work). Then, they are grouped into four portfolios according to their betas, and their returns are compared with the market excess returns. Ultimately, the portfolios' risk and return characteristics satisfy the CAPM theory, hence the authors come to the conclusion that "on an average there is positive trade-off between risk […] and return in the Bahrain capital market i.e. on average there is positive pattern of movement between portfolio return lines [and] market excess return lines".[49] Furthermore, "on an average there is linear relationship between risk […] and return i.e. on average there is same passion of movement between portfolio return lines and market excess returns line along the curve".[50]

Given the fact that these empirical works have proven the capability of CAPM to be an effective model in explaining the characteristics of Islamic equities, it is interesting to examine if CAPM may provide other benefits. Particularly, a wide number of researchers have tried to apply this model with the aim to analyse the comparative performances between Islamic stocks and their conventional counterparts. Even though the literature survey of Masih, Kamil and Bacha clearly demonstrates that it is not possible to deliver a universal conclusion with regard to this issue, it is important for the purposes of our research to investigate if CAPM may provide further insight.

The first research analysed is the one of Hussein[51]. The author investigates if the excess returns of the FTSE Global Islamic Index significantly outperform the FTSE All-World Index, both in the short-term and in the long-term. By means of this approach, he aims to understand if ethical

---

[48] S. TARIQ, "Capital Asset Pricing Model in the Gulf Capital Market; An Empirical study of Bahrain Stock Exchange", *Advances in Management* 6, n.9 (2013): 41-54.
[49] Ibid, 52.
[50] Ibid.
[51] K.A. HUSSEIN, "Ethical Investment: Empirical Evidence from FTSE Islamic Index", *Islamic Economic Studies* 12, n. 1 (2004): 21-40.

screening criteria may impact Islamic stocks' performance in comparison with conventional equity investments. Moreover, the performance of the FTSE4Good Index (a socially responsible index) is examined in comparison with the other two indices. The sample period is from July 1996 to August 2003, but it is divided into two sub-periods (from July 1996 to March 2000 and from April 2000 to August 2003) in order to further analyse the changes in performance under bullish and bearish market conditions. CAPM is implemented with the purpose to compute risk-adjusted returns, beta, and alpha of the three indices.

The author's findings indicate that the Islamic finance screening does not adversely impact the performance of the FTSE Global Islamic Index. In fact, both raw and risk-adjusted returns of this index are similar to those of the FTSE All-World Index. However, in the bull market period the Islamic index provides a significant superior performance, whereas it underperforms the conventional index in the bear market period. On the other hand, the FTSE4Good Index shows a higher return in comparison with the FTSE All-World Index in the entire and bull market periods. Hence, the author rejects the hypothesis that ethical investments provide inferior performances if compared with unscreened portfolios.

Another interesting empirical work is the one of Abbes[52]. The purpose of his research paper does not differ so much from the Hussein's work, but it stands out for the higher number of data employed. In fact, the author examines the risk and return characteristics of Islamic indices in comparison with their conventional counterpart indices in a wide number of jurisdictions. The scope is much broader because he investigates a group of 35 indices relative to developed, emerging, Arab and GCC countries. Specifically, 19 countries are classified as developed markets, while 16 countries are considered emerging markets. The sample period goes from June 2002 to April 2012, but also the impact of the 2008 global financial crisis is examined with regard to the systematic risk of Islamic indices. In order to test the risk-adjusted performance of the indexes, both the CAPM and a differences-in-Sharpe ratio test are employed in the empirical research.

According to the author's findings, the return path followed both by the Islamic indices and by the conventional ones is rather similar in most of the markets during the whole period. A large decrease affected both the categories during the global financial crisis period. The differences-in-Sharpe ratio test and the CAPM confirm that Islamic indices do not provide a significant superior performance if compared with conventional indices. The beta of Islamic indexes tends to be less than one for most of the markets, showing a lower systematic risk thus a lower sensitivity to the market movements. Instead, for what concerns the CAPM alphas, they are not significant for the Islamic sample. Hence, the risk-adjusted return of *Shari'a* compliant indices does not differ from

---

[52] M.B. ABBES, "Risk and Return of Islamic and Conventional Indices", *International Journal of Euro-Mediterranean Studies* 5, n. 1 (2012): 1-23.

the one of conventional indices. These conclusions are not challenged in the crisis period either, thus the author suggests that Islamic equities are a viable option for those investors who aim to pursue an investment in compliance with *Shari'a* law, but without sacrificing financial performance or incurring extra risk.

The third research paper analysed is the one of Listyaningsih and Krishnamurti[53], who focus their attention on the Indonesia Stock Exchange, specifically the Jakarta Islamic Index (JII, an index composed of 30 Indonesian *Shari'a* compliant stocks). The main purposes of their work are to investigate the performance of JII stocks and to evaluate a possible "ethical effect" comparing the returns of JII with non-JII stocks and *Sharia'a* compliant stocks with non-*Sharia'a* compliant stocks. Hence, two sample periods and different groups of stocks are examined: from 2005 to 2007 JII equities are compared with non-JII equities, whereas from 2008 to 2012 JII equities, non JII-*Shari'a* compliant equities and non JII-non *Shari'a* compliant equities are compared each other. The difference between JII equities and non JII-*Shari'a* compliant equities is that only the 30 most liquid Islamic stocks with high capitalization are included in the JII. The primary model applied by the authors is the CAPM single model extended to the Fama-French three-factor model, augmented with a liquidity factor.

The results of regression indicate that in the period from 2005 to 2007 there is no evidence of significant superior performance between JII stocks and non-JII stocks. Furthermore, also the period from 2008 to 2012 does not show a significant difference in the excess returns of JII, *Shari'a* compliant and non-*Shari'a* compliant stocks. The authors conclude that these findings are consistent with other studies in which there is no abnormal difference between *Shari'a* compliant equity investments and conventional ones.

Also the empirical research of Zhang et al.[54] is useful to analyse. In this study, the aim of the authors is to investigate the relative performance of *Shari'a* compliant portfolios in comparison with a US Equity Real Estate Investment Trust (REIT) portfolio. Such a specific scope is chosen because REITs are highly compatible with Islamic stocks: property investments are far from the concept of *riba* and an increasing number of REITs has been used as a vehicle for Islamic investments in the last years. Theoretically, the best comparison would be between *Shari'a* certified REITs and non-*Shari'a* REITs, but due to the limited number of certified Islamic REITs worldwide, the authors have constructed a variety of "synthetic" *Shari'a* compliant portfolios. They are based on different screening criteria applied to the 175 US Equity REITs. Sectorial and financial screens are implemented at various degree forming three different interpretations of

---

[53] E. LISTYANINGSIH and C. KRISHNAMURTI, "How performance of Jakarta Islamic Index (JII) stocks relative to other stocks?", *Jurnal Dinamika Manajemen* 6, n. 2 (2015): 145-164.
[54] W. ZHANG et al., "Does faith have impact on investment return: evidence from REITs", *International Journal of Strategic Property Management* 23, n. 6 (2019): 378-389.

compliance (strict, regular, and light), hence creating three portfolios. Then, a portfolio made up of all the 175 US Equity REITs is constructed to represent the market. However, all the portfolios are constructed both on an equally weighted basis and on a value weighted basis, for a total of eight funds. The sample period goes from 1993 to 2017, but also a sub-period analysis is performed for the crisis periods from 2000 to 2003 (dot-com bubble crash) and from 2007 to 2009 (global financial crisis). The authors employ CAPM and Carhart four-factor model in order to compute abnormal return performance.

The results of regression indicate that both with the single factor CAPM and with the Carhart four-factor model alphas are statistically insignificant. Hence, there is no evidence of superior or inferior performance of *Shari'a* compliant portfolios, if compared with the US Equity REITs portfolios. This finding is confirmed also by the analysis conducted during crisis periods. Therefore, *Shari'a* compliant REITs investors can pursue such an investment without incurring in extra costs or gains because of their faith.

At the end of this brief literature review, it is possible to draw some conclusions. First and foremost, Islamic equities represent a very broad issue that can be approached from many points of view. A considerable number of empirical and theoretical studies has been developed in the last years, but many issues are far from being solved. With regard to the application of CAPM to Islamic equity investments, there is rather broad consensus that this model is able to explain the risk-return relationship of these stocks. Furthermore, it has been widely implemented with the aim to measure possible abnormal returns provided by *Shari'a* compliant equities. In this context, CAPM has often been extended to other multi-factor models so that findings could be more accurate. Indeed, in this model only one risk factor (i.e. the market risk) explains the risk-return relationship, while other theories consider additional risk factors. The main focus of all the mentioned works is to investigate the impact of faith on investment performance, including also possible differences between bullish and bearish market periods. For this purpose, the classic methodology consists in comparing Islamic indices or portfolios of stocks with their conventional counterparts. Overall, mixed results have been delivered supporting different possible conclusions: superior, inferior and similar returns between samples have all been proved. However, within the CAPM framework, academics tend to conclude that there is no evidence of Islamic equities yielding statistically significant differences in returns if compared with conventional stocks. This finding is robust both overall and during periods of economic distress. Hence, investors can engage in this kind of investment without sacrificing return or facing higher costs.

Even though CAPM has been widely implemented to compare relative risk-adjusted returns of Islamic stocks with non-*Shari'a* compliant equities, other research has shifted the focus to the possible drawbacks of this model when applied to the Islamic finance framework. Hence, many

academics have analysed this issue providing alternative models able to combine the value of CAPM with a *Shari'a* compliant perspective.

The first research paper to analyse in this regard is the one of Hanif[55].The main purpose of the author is to investigate possible mismatches between asset pricing models and the Islamic finance framework, suggesting slight modifications of CAPM and multi-factor models. The central matter of CAPM is the fact that it is essentially based on an interest relationship which is not allowed by Islamic finance. Under the latter framework, risk-return relationship should be different and no risk-free investment opportunities should exist. Hence, the classical CAPM is not applicable. In order to develop a different model, the author examines the previous attempts made in this same direction. Since a risk-free rate is not legitimate under *Shari'a* law, Tomkins and Karim[56] modifies the original equation excluding this component. Hence, they propose the following relationship:

$$R_i = \beta_i(R_m)$$

Consequently, the expected return of one security only depends on its beta and on the expected return of the market, without any compensation for a risk-free investment.

Another possibility is the model of Shaik[57], who has proposed the nominal gross domestic product growth rate as a substitute of the risk-free rate. The classical equation is then transformed in the following one:

$$R_i = NGDP + \beta_i(R_m - NGDP)$$

Here, the required rate of return of an investor depends on the nominal gross domestic product growth rate and the market risk premium over this rate (multiplied for the security's beta).

On the contrary, for El-Ashker[58] the risk-free rate should be replaced by another ratio equal to the *zakat* rate (Z) that is the minimum an investor needs to earn, otherwise he would prefer spending. It is equal to 2.5% and consequently the CAPM equation becomes as follows:

$$R_i = Z + \beta_i(R_m - Z)$$

Thus, the expected return of a security is based on the return to cover *zakat* and the market risk premium over *zakat* (multiplied for the security's beta).

After this overview (that is useful also for the purpose of our research), Hanif further investigates the drawbacks of CAPM when applied to Islamic equities. Since a risk-free rate is

---

[55] M. HANIF, "Risk and Return Under Sharia Framework: An Attempt to Develop Sharia Compliant Asset Pricing Model-SCAPM", *Pakistan Journal Commercial Social Science* 5, n. 2 (2011): 283-292.

[56] C. TOMKINS and R.A.A. KARIM, "The Shari'ah and its Implications for Islamic Financial Analysis: An Opportunity to Study Interactions among Society, Organizations and Accounting", *The American Journal of Islamic Social Sciences* 4, n. 1 (1987): 101-115.

[57] S.A. SHAIKH, "Corporate Finance in an Interest Free Economy: An Alternate Approach to Practiced Islamic Corporate Finance", *Journal of Islamic Banking & Finance, International Association of Islamic Banks* (2009).

[58] A.A.F. EL-ASHKER, *The Islamic Business Enterprise* (London: Croom Helm, 1987).

illegitimate under the *Shari'a* framework, the main question to answer is if there should be a minimum compensation for an investor who engages in Islamic equities. Therefore, the author examines the composition of the nominal risk-free rate, which is made up of real risk-free rate plus inflation charge. However, the former component represents time value of money, that is a lease to use money. This element falls in the definition of *riba*, thus it clearly has to be excluded from the model. On the contrary, inflation charge is an issue for all investors also under Islamic law because it reduces their wealth and purchasing power. The main priority of any individual who aims to invest in business is the capital preservation, and then profit. Moreover, the impact of inflation hits all the investments regardless of the riskiness of a security. As a consequence, a CAPM modification is required and the author indicates a new *Shari'a* Compliant Asset Pricing Model (SCAPM) based on the following equation:

$$R_i = N + \beta_i(R_m - N)$$

where N is the inflation charge. As inflation proxies of Consumer Price Index (CPI), the author suggests Wholesale Price Index (WPI), but also baskets of selected commodities or currency. Furthermore, he extends his analysis also to the Arbitrage Pricing Theory (APT), that is a theory based on more than one factor as a measure of risk, instead of only one as in the case of CAPM. In APT as well the risk-free rate is replaced with the inflation charge.

In conclusion, the author claims that slight modifications of CAPM are needed to make it really applicable within the *Shari'a* framework, due the fact that risk-free return does not exist in the Islamic financial system. Consequently, conventional CAPM is converted in SCAPM by replacing this forbidden element with inflation rate.

Even though the work of Hanif is an interesting evolution of CAPM, there is no empirical application of such a model in his study. However, this attempt has been made by the same author in collaboration with Iqbal and Shah[59] few years later. The aim of their work is to investigate the valuation process of a sample of *Shari'a* compliant securities listed on the Karachi Stock Exchange, i.e. the Pakistan capital market. Both the CAPM and the SCAPM developed by Hanif are applied in this research with the aim to capture the impact of the market index on Islamic stocks' returns. However, differences in performance are also analysed on the basis of market capitalization, book to market ratio (B/M), price-earnings ratio (PER) and cash-flow yield (CFY) of the various stocks. In this regard, the sample of 97 stocks is divided in big companies and small companies, high B/M and low B/M companies, high CFY and low CFY companies, high PER and low PER companies. They are examined during the period from 2001 to 2010, testing both CAPM

---

[59] M. HANIF, A. IQBAL and Z. SHAH, "Risk and Returns of Shariah Compliant Stocks on the Karachi Stock Exchange – A CAPM and SCAPM Approach", *JKAU: Islamic Economics* 29, n. 2 (2016): 37-54.

and SCAPM. The former model is implemented replacing risk-free rate with change in inflation, measured by changes in CPI.

For what concerns the comparison between effectiveness of CAPM and SCAPM, the authors' findings lead to the conclusion that SCAPM provides slightly better results in comparison with CAPM. Inflation rate has a similar impact to the risk-free rate, hence SCAPM is a viable option in order to study stock return behaviour. Even though it does not provide abnormal benefits from a quantitative perspective, the authors recommend applying SCAPM for valuation in the Islamic financial system. Moreover, examining monthly price observations, the authors empirically find that from 60% to 70% of variance in returns is explained by changes in the market index. Hence, the explanatory power of both the models is rather high, having a primary role in explaining performance in the Pakistan Stock Exchange. However, other risk factors have to be identified.

Although the two research papers of Hanif represent a first viable alternative to the traditional CAPM, also other authors have tried to develop asset pricing models able to overcome CAPM's drawbacks. As mentioned above, the main issue when filtering this tool through the Islamic framework is the risk-free rate. Both the study of Hasanah and Maspupah[60] and the empirical research of Husein and Hasanah[61] aim to find another viable *Shari'a* Compliant Asset Pricing Model. The former work only provides a theoretical framework, so we will start from its analysis.

As many of the already cited authors, Hasanah and Maspupah emphasise the need of guidance for Islamic financial institutions and investors on the issue of risk-return relationship under *Shari'a* framework. However, incompatibility of CAPM with Islamic law is a matter of fact: the interest-based environment on which it is developed makes it inconsistent with Islamic finance. Consequently, a new model needs to be developed. In this regard, the authors cite the mentioned work of Hanif, but they do not include inflation rate in their theory. On the contrary, they replace the risk-free rate of return with the rate of return on Bank Indonesia *Shari'a* Certificates (SBIS). Consequently, the new SCAPM developed by the authors is based on the following formula:

$$R_i = R_{SBIS} + \beta_i(R_m - R_{SBIS})$$

where R_{SBIS} is equal to the rate of return on SBIS. The latter are short-term securities based on the *Shari'a* principles. They are issued by Bank Indonesia, which is the Indonesian central bank, and they are denominated in the rupiah. On the one hand, SBIS represent an instrument of fund management for Islamic banks, especially with regard to their short-term liquidity. On the other

---

[60] S.M. HASANAH and I. MASPUPAH, "Shariah Compliant Asset Pricing Model (SCAPM) The Formula of Risk and Return Modification in Islamic Finance", *Al-Tijary: Jurnal Ekonomi dan Bisnis Islam* 2, n. 2 (2017): 177-187.

[61] M.F. HUSEIN and S.M. HASANAH, "Determining the optimum portfolio of shariah stocks using an approach of Shariah Compliant Asset Pricing Model (SCAPM)", *Journal of Economics, Business, and Accountancy Ventura* 19, n. 3 (2016): 349-362.

hand, they are a means to improve the effectiveness of the Indonesian central bank's monetary policy through *Shari'a* compliant open market operations.

As mentioned above, the research paper of Hasanah and Maspupah does not provide an empirical test of such a model of SCAPM. However, this attempt has been made by Husein and Hasanah, who have developed a quantitative descriptive study of this slightly modified form of CAPM. In particular, their work aims to investigate the formation process of the optimal portfolio applying the aforementioned *Shari'a* Compliant Asset Pricing Model. Expected return and risk of the optimal portfolio are analysed as well.

The idea that CAPM is incompatible with the Islamic finance framework is present also in the research paper of Husein and Hasanah. The reason of this mismatch lies again in the risk-free rate of return, which is not allowed by Islam and that makes inapplicable the CAPM equation. The authors cite the model of Hanif, but they empirically test the SCAPM formula including the rate of return on SBIS instead of the inflation rate. The population consists of 26 stocks listed on the Jakarta Islamic Index at the Indonesian Stock Exchange, whereas the examined period goes from June 2013 to May 2015. The sample of equities is divided in three portfolios on the basis of the stock's risk-return characteristics: specifically, high risk and high return stocks, low risk and high return stocks and low risk and low return stocks. According to the betas and expected returns computed with the SCAPM formula, each equity is included in the portfolio in a different proportion. Finally, the optimal portfolio is identified as the one with low risk and high return, computing its expected risk and return. Such a process indicates that SCAPM may be a viable option for Islamic investors, but the authors have not included a comparison with CAPM that could have proved which model may be the most effective.

An alternative SCAPM that should be mentioned is the one developed by Hakim, Hamid and Meera[62]. Actually, they propose two versions of *Shari'a* compliant CAPM and they test them making a comparison with the traditional CAPM. As other mentioned academics, they start their work from the mismatches between CAPM and the Islamic finance principles. However, they claim that not only the risk-free rate is illegitimate from an Islamic law point of view, but also the market portfolio represents an issue because it may be composed of *haram* companies. Hence, conventional CAPM as it is does not allow to properly describe the risk-return relationship of stocks. Even though, they acknowledge the attempts made by other academics in order to make it compliant with the *Shari'a* law, they do not agree with the adjustments made. Indeed, variables introduced in place of the risk-free rate are not appropriate and the conventional market portfolio needs to be restructured as well. Previous academics have not modified it, considering the Islamic

---

[62] S.A. HAKIM, Z. HAMID and A.K.M. MEERA, "Capital Asset Pricing Model and Pricing of Islamic Financial Instruments", *JKAU: Islamic Economics* 29, n. 1 (2016): 21-39.

financial market as a component of the whole capital market. On the other hand, Hakim, Hamid and Meera treat it as a separate entity that is independent from the conventional market.

Starting from the specificity of the Islamic financial instruments, the authors propose two versions of *Shari'a* compliant CAPM that overcome the limits of other works, though maintaining the fundamental values of this model. On the basis of a Fischer Black's theory, they relax the assumptions of lending and borrowing at the risk-free rate and they propose to use a *Shari'a* compliant zero-beta portfolio in place of the risk-free asset. Hence, the CAPM equation is transformed as follows:

$$E(r_i) = E(r_z) + \beta_i[E(r_m) - E(r_z)]$$

where $E(r_z)$ is the expected return of the zero-beta portfolio. Thus, this represents the first form of SCAPM developed by the authors. Secondly, they assume absence of a zero-beta portfolio and suggest that the risk-free rate of return should be substituted with cash holding. Consequently, the CAPM equation is transformed in the following one:

$$E(r_i) = \beta_i[E(r_m)]$$

In this way, the prohibition of *riba* is overcome by the mentioned formulas. For what concerns the interdiction of engaging in non-*halal* activities, the market portfolio needs to be adjusted. Hence, recognizing the Islamic financial market as an independent entity, where only Islamic equities are traded, the authors build a market portfolio made up of *Shari'a* compliant stocks only. Finally, the effectiveness of these two versions of SCAPM is examined along with the conventional CAPM.

The models proposed are tested in the Bursa Malaysia (i.e. the Malaysian stock exchange), running regressions during different periods because of limited data available. For SCAPM, the FTSE Bursa Malaysia EMAS *Shari'a* Index is used as a proxy for the market portfolio, whereas one-year yield on AAA-*ṣukūk* is used to compute the return on the zero-beta portfolio. On the other hand, the conventional CAPM is tested with returns on the FTSE Bursa Malaysia EMAS Index, in excess of return on a 3-month Malaysian Treasury Bill.

Since the earliest available data for the AAA-*ṣukūk* is November 2011, the SCAPM based on the zero-beta portfolio is tested over a three-year period from January 2012 to December 2014. Over the same period, also SCAPM with cash and conventional CAPM are tested in order to assess the comparative performance of SCAPM based on the zero-beta portfolio. In addition, SCAPM with cash and conventional CAPM are tested over a ten-year period from January 2004 to December 2013 because all input data are available.

The authors' findings with regard to the test over a three-year horizon indicate that SCAPMs show a notable similarity in betas and explanatory power. Thus, they may be used interchangeably. Instead, for what concerns the tests over a ten-year horizon, findings show that distinctions

between SCAPM and CAPM tend to disappear in the long-run. Indeed, they are rather similar in explaining returns. As a consequence, the authors draw two important conclusions. First, the two models of SCAPM yield similar results over the three-year horizon, hence they could be safely used interchangeably. However, data should be carefully handled because similarity of the models need to be tested over a longer period, making inferences reliable. Secondly, SCAPM with cash and CAPM show similar behaviour in explaining returns over a longer horizon. Hence, the authors infer that this *Shari'a* compliant CAPM is as adequate in explaining the risk-return relationship of Islamic stocks as conventional CAPM is with stocks in general. Nevertheless, the models need to be tested also in other markets to prove their validity.

The last empirical research analysed here is the one of Derbali, El Khaldi and Jouini[63]. Even though the purpose of their research is not different from the papers examined before, the approach is slightly broader. In fact, the traditional Capital Asset Pricing Model is not modified only with regard to the risk-free asset, but also integrating it with other variables in line with the *Shari'a* framework. Then the model is tested on a sample of ten Islamic equities listed on Bursa Malaysia. A comparison with conventional CAPM is made with the aim to assess the relative performance of the model in explaining stocks' risk-return relationship.

With the purpose to analyse if the application of CAPM under Islamic framework represents a legitimate practice, the authors examine all the assumptions underpinning this model and the Markowitz portfolio theory. For each hypothesis, they investigate if it may conflict or not with the Islamic law directives. It is interesting for the purpose of our research to report this analysis.

- No transaction cost

This assumption is included in the conventional model to reduce its complexity. It does not conflict with the Islamic finance principles, and its exclusion may cause problems when many transactions are performed. Thus, the authors follow the CAPM hypothesis of no transaction cost.

- Absence of personal income tax

This element is not in contradiction with any principles of *Shari'a*. However, Islamic finance is also based on the concept of *zakat*, which is charged in excess wealth. Hence, the authors suggest that this latter component has to be included in the model proposed.

- Divisibility and marketability of asset

CAPM assumes that assets are infinitely divisible and marketable. Even though this situation is not always verified in practice, it is meant to simplify the model. Since it is compatible with Islamic finance principles, the authors follow this assumption.

---

[63] A. DERBALI, A. EL KHALDI and F. JOUINI, "Shariah-compliant Capital Asset Pricing Model: new mathematical modelling", *Journal of Asset Management* 18, n. 7 (2017): 527-537.

- Investors' decisions are solely in terms of expected return and variance

This assumption is perfectly in line with the principles of Islamic finance. Consequently, the authors keep it in their mathematical modelling.

- Short sales are allowed

Short sales entail that assets can be held in a discretional amount (positive and negative) and they make CAPM simplified in its mathematical derivation. Due to the possible elements of *riba* and *maysir*, that are illegitimate from an Islamic finance perspective, the authors exclude them.

- Unlimited lending and borrowing at a risk-free rate

From an Islamic finance perspective, risk-free assets are not legitimate because of the inherent component of *riba*. However, this element could be made *Shari'a* compliant if Islamic financial assets like *sukuk* are used as a proxy for the risk-free rate. This is the path followed by the authors.

- Homogeneity of expectation

Because of homogeneous expectations, all the investors hold the same optimal portfolio in the CAPM model. According to the authors, this assumption is reasonably applicable to Islamic investors as well.

- An investor cannot affect the price of a stock by his buying and selling actions

Homogeneity of expectation entails that investors are price takers; thus, no individual investor can modify a stock price by means of his transactions. This assumption is preserved also in the *Shari'a* compliant CAPM developed in the research paper.

Hence, Derbali, El Khaldi and Jouini conclude that most of the assumptions that underlie the Markowitz portfolio theory and CAPM are not in contrast with Islamic finance. The model they propose is essentially built on the conventional CAPM, though with some modifications applied in order to include *zakat* and purification of return but excluding short sales. *Zakat* and purification of return are two different concepts: the former represents a religious tax that is charged on the excessive wealth held by an individual for one year, whereas the latter is meant as the act of deducing the income linked to non-*halal* activities from the return on investment. Hence, due to the complexity and non-Islamic essence of existing capital markets, this proportion of return of portfolios and individual assets has to be identified and donated. Theoretically, *zakat* would be a subset of purification, but the authors treat them as two independent variables.

Combining all the CAPM assumptions modified as described above and including *zakat* and purification of return, the authors derive a *Shari'a* compliant version of CAPM whose regression form is given by the following equation:

$$R_{it} - R_{st} = \alpha_i + \beta_{iM}\left(R_{Mt} - \frac{R_{st}}{1 - \partial_{Mt}}\right) + \varepsilon_{it}$$

where R_{it} is the rate of return of the asset i at time t, R_{st} is the *sukuk* profit rate, R_{Mt} indicates the market rate of return, β_{iM} is the beta of the asset i and ε_{it} represents the random disturbance term in the regression equation at time t. One variable is left to analyse, and it is ∂_{Mt} that is called "market purification rate" by the authors. It is obtained by the following equation:

$$\partial_M = 1 - \frac{\theta' \sigma_M + (1-z)R_s}{(1-z)R_M}$$

where σ_M is the standard deviation of the market, z indicates the *zakat* rate while θ' represents the observed market price of risk on the capital market line.

After having developed their own model, the authors test it comparing this form of SCAPM with conventional CAPM. This process is conducted on a sample of ten *Shari'a* compliant stocks listed o

n Bursa Malaysia. The sample period goes from January 2003 to December 2015. The monthly returns of the Kuala Lumpur Composite Index (KLCI) are used as a proxy of the market portfolio, while a 3-month Malaysian Treasury Bills is employed as the risk-free investment for the traditional CAPM. On the other hand, the returns of a 3-month Malaysian Islamic Treasury Bill are used as a proxy for the *sukuk* profit rate in the proposed SCAPM.

Firstly, the monthly returns of each stock are regressed on the monthly surplus market returns and, on the basis of the betas computed, the expected rate of return of each asset is estimated. The coefficient of determination (denoted with "R^2") indicates the percentage of movements of a variable Y (here, the monthly returns of each stock) that can be explained by the movements of a variable X (here, the KLCI used as a benchmark of the market). It ranges from 0 to 1: the closer it is to 1, the more changes in the index can explain changes in the stock price. Consequently, a low R^2 indicates that a small part of the stock price's movements can be explained by the changes in index. The reasoning can be applied both to an individual asset and to a portfolio of stocks. In this research, the authors' empirical results indicate that R^2 coefficients are all greater than 80% hence a great part of changes in the Islamic stock prices is explained by those of the index, applying conventional CAPM.

Secondly, the analysis is continued implementing the mentioned form of SCAPM. The *zakat* rate is set equal to 2.5%, while a purification rate is computed for each stock dividing non allowed income by total earnings of each company. The R^2 coefficients applying the *Shari'a* compliant CAPM are all greater than 90%, thus even a greater part of changes in the Islamic stock prices is explained by those of the index.

Furthermore, the authors draw the different efficient frontier for the 10 assets by using both CAPM and SCAPM. Efficient frontiers and minimum variance portfolios are slightly different.

Indeed, the minimum variance portfolio computed with SCAPM shows smaller expected return and standard deviation (13.44% and 7.69%) in comparison with the results of the traditional counterpart (14.04% and 7.96%). Moreover, for lower levels of risk the efficient frontier of the *Shari'a* compliant CAPM outperforms the conventional CAPM's efficient frontier, while the contrary happens for higher levels of risk. Due to the exclusion of short sales, the efficient frontiers have limited upper and lower boundaries.

At the end of this literature review, some conclusions need to be drawn. First and foremost, the remarkable growth of the Islamic financial system over the last decades has increased the need of a model able to adequately explain the risk-return relationship of Islamic securities. As mentioned above, some empirical studies have proved that the conventional CAPM can be implemented to estimate the expected return of an Islamic index or stock. However, other scholars have noted that some inherent drawbacks of this model make it not applicable to Islamic finance. In particular, they have emphasised the illegitimacy of a risk-free asset within the *Shari'a* framework, that strictly prohibits *riba*. As a consequence, a wide number of academics have developed new asset pricing models adjusting the conventional CAPM with slight modifications. Therefore, many versions of *Shari'a* Compliant Asset Pricing Models have been theorised with the aim to truly capture the distinctive nature of risk and return dynamics of Islamic equities. Some of them have only been theoretically thought, whereas some of the others have also been empirically tested. Often, they have been tested in comparison with the traditional CAPM in order to evaluate if these new models may provide a superior effectiveness. In general, empirical tests have proved that some forms of SCAPM tend to adequately explain the risk-return relationship of Islamic stocks, in some cases even better than CAPM. Empirical tests should be furtherly performed in different markets and during different sample periods, but, in any case, investors can rely on an increasingly robust academic research in support of a *Shari'a* compliant approach to the conventional CAPM.

CHAPTER III
Applying a *Shari'a* Compliant Asset Pricing Model

The previous chapter has been focused on the analysis of the relationship between Islamic finance and traditional CAPM. However, in the last pages possible *Shari'a* Compliant Asset Pricing Models have been examined. This issue has been approached both from a theoretical and a practical point of view from many academic researchers. In this chapter, the conventional CAPM and one of the proposed Islamic CAPMs will be empirically tested. Firstly, both the asset pricing models will be individually examined in order to capture their specific characteristics and their explanatory power in this field. Secondly, a comparison will be made so to understand if the alternative approach can have same or even better effectiveness than the traditional one.

In paragraph 3.1 the research method will be precisely explained in all its parts. Then, in paragraph 3.2 the empirical findings of the analysis will be presented. Finally, in paragraph 3.3 results and evidence will be discussed. Hence, some final conclusions about the research questions will be drawn.

3.1 Research method

As mentioned above, the aim of this chapter is to test the Capital Asset Pricing Model and one of the *Shari'a* Compliant Asset Pricing Models, applying them to Islamic equities. Comparing the results of both the models, our final purpose is to understand whether and how they can explain the risk-return relationship of *Shari'a* compliant securities. However, the research will be performed on individual stocks, and then on different sectors of a capital market. This approach is slightly different from the previously examined papers, in which CAPM is tested on portfolios and indices. Even though some studies have stated the applicability of CAPM to Islamic stocks, it is interesting to evaluate if it still represents an appropriate model when tested on individual securities rather than portfolios and indices. Furthermore, the chosen SCAPM will be implemented with the aim to evaluate possible improvements especially with regard to its explanatory power. In fact, although many alternatives to CAPM have been proposed, not all of them have been empirically tested. Hence, despite representing Islamic law compliant versions of CAPM, they may not have the same effectiveness when computing the expected return of a security.

The capital market examined in this work is Bursa Malaysia, i.e. the Malaysian stock exchange. The choice has fallen to this market because of the strong presence of Islamic finance in the country. Looking at the charts of the IFSB Stability Report 2019, many indicators express the tight

link between this jurisdiction and Islamic financial services. Indeed, Malaysia is one of the jurisdictions where Islamic finance is systemically important, and it is the fourth country for share of Islamic banking assets. Also, the country holds the first position as the overall largest *sukuk* issuer in terms of volume.

Bursa Malaysia offers a wide number of Islamic equities. The securities screening methodology applied by the *Shari'a* Advisory Council (SAC) of the Securities Commission Malaysia (SC) establishes the Islamic compliance of stocks listed and traded in the market. Every company is reviewed on the basis of the latest annual reports. The SC issues an updated list of the *Shari'a* compliant stocks twice a year, on May and November. The latest list available is the one issued on 29th November 2019; hence data have been retrieved from it.

The monthly rates of return of 378 Islamic public-listed companies of Bursa Malaysia have been investigated. The return of each security *i* at time *t* has been computed according to the following formula:

$$R_{i,t} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

where P_t indicates the closing price at time t and P_{t-1} indicates the closing price at time t-1.

The sample period examined in this work goes from 30th March 2009 to 30th March 2020, thus 11 years. The CAPM and SCAPM have been applied to the sample of stocks in the following way. With regard to the traditional Capital Asset Pricing Model, the CAPM equation has been implemented in the form of the regression model explained in the previous chapter. Hence, the excess return on a security has been expressed as a function of the excess return on the market:

$$r_i - r_0 = \alpha_i + \beta_i(r_m - r_0) + \varepsilon_i$$

where r_i indicates the rate return on the security *i*, r_0 is the rate of return on the risk-free asset, r_m is the rate of return on the market portfolio, β_i represents the systematic risk of the asset *i*, α indicates the excess return above the estimation provided by CAPM while ε represents the error term in the regression equation. CAPM assumptions imply that alpha is equal to zero.

In this case, the monthly rates of return on the FTSE Bursa Malaysia KLCI have been employed as a proxy for the rates of return on the market portfolio. The KLCI is a capitalisation-weighted index composed of the 30 largest companies by market capitalisation listed on Bursa Malaysia. On the other hand, the average monthly rate of return on a 3-month Malaysian Treasury Bill has been used as a proxy for the risk-free rate of return.

For what concerns the *Shari'a* Compliant Asset Pricing Model, one of the alternatives proposed by Hakim, Hamid and Meera[64] has been considered. Although the authors have developed two different models, only the one built on a paper of Fischer Black[65] has been examined. In particular, the authors have appealed to the Black's version of CAPM, which relaxes the assumption of lending and borrowing at a risk-free rate. Hence, a new model based on a zero-beta portfolio is constructed according to the following equation:

$$E(r_i) = E(r_z) + \beta_i[E(r_m) - E(r_z)]$$

where $E(r_z)$ is the expected return of the zero-beta portfolio, $E(r_m)$ is the expected return of the market, $E(r_i)$ is the expected return of the asset *i* and β_i indicates its systematic risk. Taking off expectations and considering the previous equation as a regression model, we obtain:

$$r_i - r_z = \alpha_i + \beta_i[r_m - r_z] + \varepsilon_i$$

where α_i is the excess return and ε is the error term in the regression equation.

In this case, the FTSE Bursa Malaysia Hijrah Shariah Index has been used as a proxy for the market portfolio. This index is composed of the 30 largest companies by market capitalization of the FTSE Bursa Malaysia EMAS Index (a broader index of Bursa Malaysia). Securities are screened by the SAC and by the *Shari'a* consultancy firm Yasaar Ltd against a set of guiding principles. On the other hand, the yield to maturity of a 12-year AAA-*sukuk* has been employed as a proxy for the rate of return of the zero-beta portfolio.

After having determined the basic elements of CAPM and SCAPM, monthly excess returns of each asset have been regressed on the monthly market excess returns. In this way, alphas, betas and expected returns have been computed for each asset and for the stock market indexes. Furthermore, the coefficients of determination (also called "R^2") have been estimated for the same securities. Recalling what has been said in the previous chapter, the beta of a security indicates its sensitivity to changes in return of the market portfolio, while alpha is equal to the excess return over and above the estimation provided by CAPM. Instead, the coefficient of determination represents the proportion of movements for a dependent variable that can be explained by movements of an independent variable. Since it ranges from 0 to 1, the closer it is to 1 the higher the model's explanatory power is.

With the aim to make a comparison among different sectors of the market, all the estimations made for each stock have been grouped according to the sectorial classification of the SAC. In

---

[64] HAKIM, HAMID and MEERA, "CAPM and Pricing of Islamic Financial Instruments".
[65] F. BLACK, "Capital market equilibrium with restricted borrowing", *Journal of Business* 45, n.3 (1972): 444-455.

Table 5 the different sectors of Bursa Malaysia are listed, comparing the number of *Shari'a* compliant assets with the total number of securities.

Main Market and ACE Market	Number of Shari'a compliant securities	%	Total number of securities	%
Construction	49	91%	54	100%
Consumer Products & Services	139	72%	194	100%
Energy	27	84%	32	100%
Healthcare	16	94%	17	100%
Industrial Products & Services	215	84%	255	100%
Plantation	34	77%	44	100%
Property	78	80%	97	100%
Transportation & Logistics	29	83%	35	100%
Technology	76	84%	91	100%
Telecommunications & Media	20	63%	32	100%
Utilities	10	77%	13	100%
Financial Services	3	9%	34	100%
Other securities	0	0%	2	100%
Total	696	77%	900	100%

Table 5. Number of securities of Bursa Malaysia. Source: List of Shariah-Compliant Securities by the Shariah Advisory Council of the Securities Commission Malaysia.

"Main Market" and "ACE Market" represent the two fundamental segments of Bursa Malaysia. As the latter market is mainly aimed to start-up and new companies with growth prospects, the research has been performed on the Main Market only. Furthermore, some sectors have been excluded because of the low number of listed *Shari'a* compliant stocks. The utilities and financial services sectors have been removed because of their low absolute number, while the technology and telecommunications & media sectors hold a low percentage of Islamic equities against the total number of sectorial securities. The effective number of stocks and sectors that have been tested is thus presented in Table 6.

Main Market	Securities tested	%	Number of Shari'a compliant securities	%	Total number of securities	%
Construction	31	57%	49	91%	54	100%
Consumer Products & Services	91	47%	139	72%	194	100%
Energy	15	47%	27	84%	32	100%
Healthcare	10	59%	16	94%	17	100%
Industrial Products & Services	132	52%	215	84%	255	100%
Plantation	28	64%	34	77%	44	100%
Property	52	54%	78	80%	97	100%
Transportation & Logistics	19	54%	29	83%	35	100%
Total	378	52%	587	81%	728	100%

Table 6. Number of securities tested. Source: personal work on the basis of the SAC's list.

Therefore, some securities have been removed from the sample because of their lower significance with regard to the sectorial analysis. Overall, excluding those securities for which data were not available and those that are part of the removed sectors, 42% of the total market has been tested. All the stocks' closing prices have been retrieved from the Thomson Reuters Eikon database. However, data about the AAA-*sukuk* have been found on the Malaysia's bond and *sukuk* information platform (bixmalaysia.com).

After having estimated expected returns and betas for each security, the Security Market Line has been plotted comparing the different results provided by CAPM and SCAPM. However, the SML has been plotted for each specific sector as well, so that different outcomes yielded by the two models could be understood.

In order to have a deeper insight of the difference between the explanatory power of CAPM and SCAPM, a two-sample t-test has been run to test if the differences in means of R^2 are significantly different. Such a test has been performed on each sector comparing the two R^2 means obtained with the two models, respectively.

Finally, an analysis of Islamic equities' betas has been performed. The distribution of betas has been examined both for CAPM and SCAPM so to find possible differences in frequency for the two models. Lastly, the sectorial betas have been compared to a standard classification so that possible deviations from the norm could be captured.

3.2 Empirical findings

Since the research method has been exhaustively explained in the previous paragraph, this part of the work is aimed to display the empirical findings of the research process. All the tables and

charts that are shown in the next section are results of personal work, hence source will not be cited because it does not differ from one case to another.

Our research has started from a brief analysis of the two indices employed as a benchmark for the market portfolio: the FTSE Bursa Malaysia KLCI and the FTSE Bursa Malaysia Hijrah Shariah Index. The first index has been used in the traditional CAPM, whereas its Islamic counterpart has been applied in the SCAPM. In Chart 13 it is possible to see the historical trend of both the indices during the sample period. The blue line indicates the KLCI's trend from March 2009 to March 2020, while the orange line represents the Hijrah Shariah Index's trend during the same period.
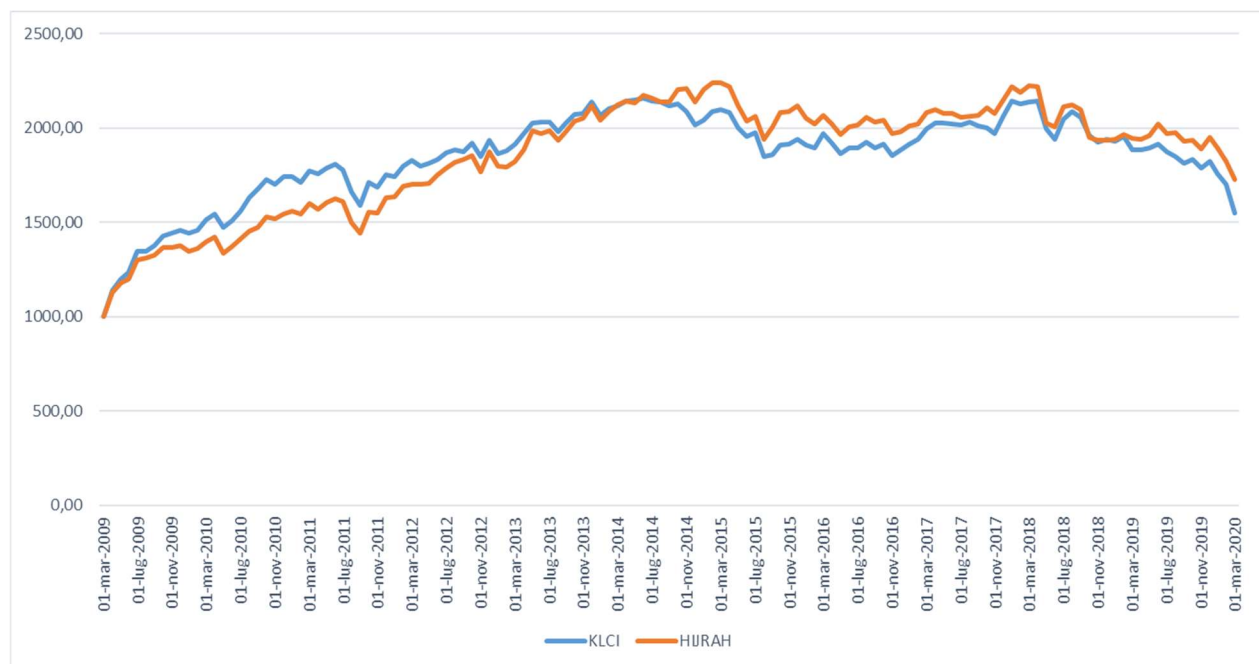

Chart 13. Historical trends of the FTSE Bursa Malaysia KLCI and the FTSE Bursa Malaysia Hijrah Shariah Index.

Looking at the chart we deduct that the two indices have followed the same trend during most of the period. However, from 2009 to half of 2014 the KLCI has outperformed its Islamic counterpart. On the other hand, from half of 2014 until the end of the sample period the Hijrah Sharia Index has performed better than the conventional proxy for the market portfolio. Examining the indices' descriptive statistics, there is no great difference between their measures of risk. However, their annual mean returns slightly diverge: the *Shari'a* compliant index yielded a 1% higher return during the period. In Table 7 mean return, variance, and standard deviation are presented for both the indices.

Index	Mean Return	Variance	SD
FTSE Bursa Malaysia KLCI	4,51%	0,00089863	2,9977%
FTSE Bursa Malaysia Hijrah Shariah	5,50%	0,00090269	3,0045%

Table 7. Descriptive statistics of the FTSE Bursa Malaysia KLCI and the FTSE Bursa Malaysia Hijrah Shariah Index.

The difference in return between the two indices has produced different estimations when the asset pricing models have been implemented. In this respect, the Security Market Lines can help to have a deeper insight of the results generated by the two models. In Chart 14, the Security Market Lines (SML) estimated both with CAPM and with SCAPM have been plotted. Recalling what has been said in the previous chapter, the SML represents the linear relationship between expected return and systematic risk of a security. It is the line on which all assets lie when represented on the basis of these two variables. Its vertical intercept is equal to the risk-free rate of return, while its slope is equal to the market risk premium (i.e. the difference between the expected return on a market portfolio and the risk-free rate of return). The systematic risk for the market portfolio is equal to 1, whereas the beta of the risk-free asset is equal to 0.
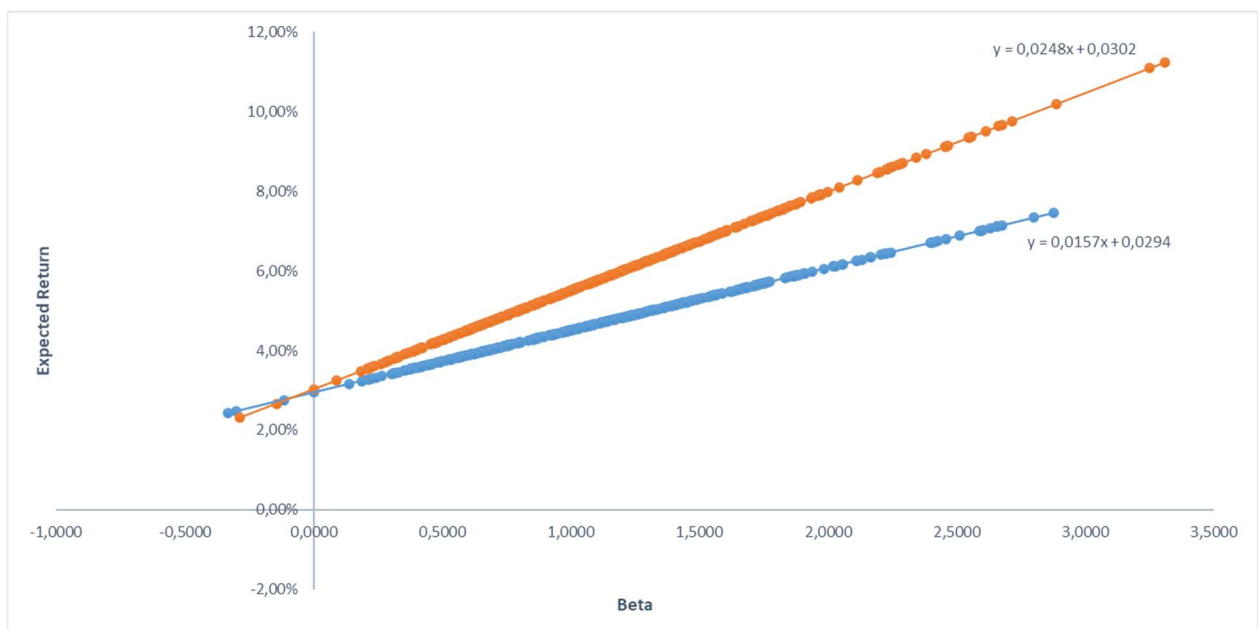

Chart 14. Security Market Lines estimated with CAPM and SCAPM.

The blue line in the chart indicates the SML obtained applying CAPM to *Shari'a* compliant securities, while the orange one represents the SML obtained applying SCAPM to the same sample. Since the rate of return on the 3-month Malaysian Treasury Bill and the yield to maturity of the AAA-*sukuk* do not differ so much, the two lines have essentially the same intercept on the vertical axis. However, the different market risk premia estimated with the two models lead to a remarkable difference of slope for the two SMLs. As a consequence, securities with a positive beta tend to have a higher expected return with SCAPM in comparison with the expected return computed with CAPM. On the other hand, securities with a negative beta tend to have a lower expected return comparing results obtained with SCAPM to the estimations provided by CAPM.

With the aim to have a deeper insight of the different findings yielded by the two asset pricing models, the actual returns of each security along with the SML have been plotted grouping each

sector of Bursa Malaysia. In fact, regressing the monthly excess returns of each security on the monthly market excess returns has led to the estimation of beta, expected return and alpha as well. Hence, each sector has been examined in order to understand the effects of the two models on the estimation of alphas. The next group of charts display the SMLs plotted applying CAPM and SCAPM as well as the expected return of each stock augmented of its alpha.

Chart 15. Comparison of SML and actual returns estimated with CAPM and SCAPM (construction sector).

Chart 16. Comparison of SML and actual returns estimated with CAPM and SCAPM (consumer products & services sector).

Chart 17. Comparison of SML and actual returns estimated with CAPM and SCAPM (energy sector).

Chart 18. Comparison of SML and actual returns estimated with CAPM and SCAPM (healthcare sector).

Chart 19. Comparison of SML and actual returns estimated with CAPM and SCAPM (industrial products & services sector).
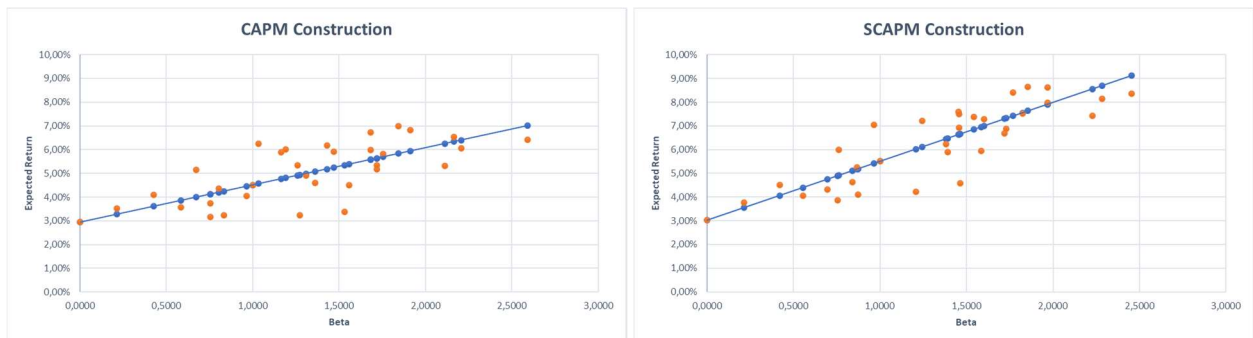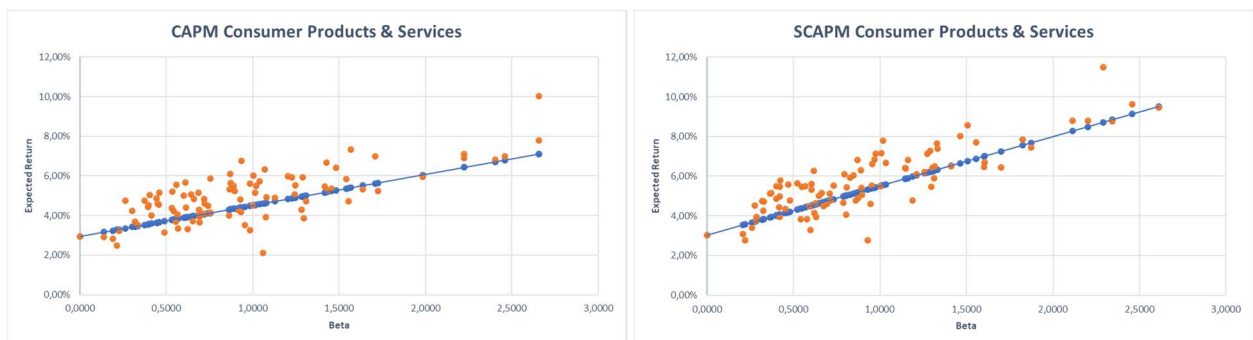

Chart 20. Comparison of SML and actual returns estimated with CAPM and SCAPM (plantation sector).
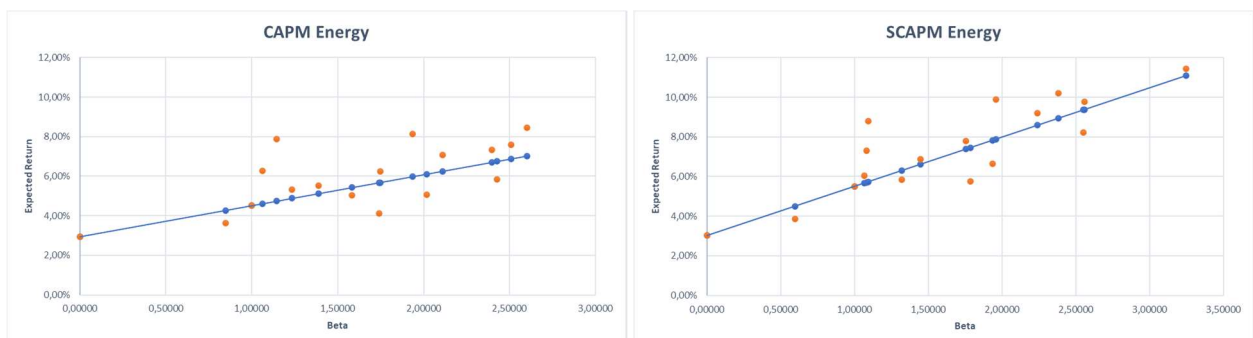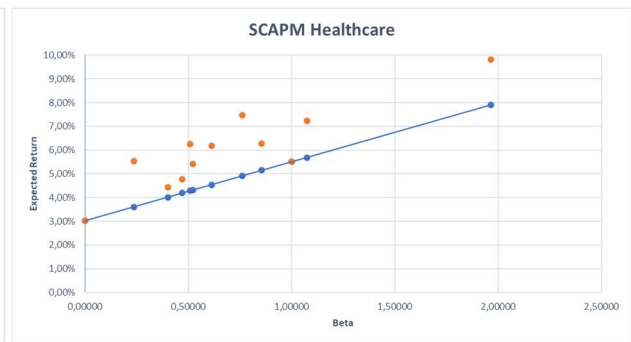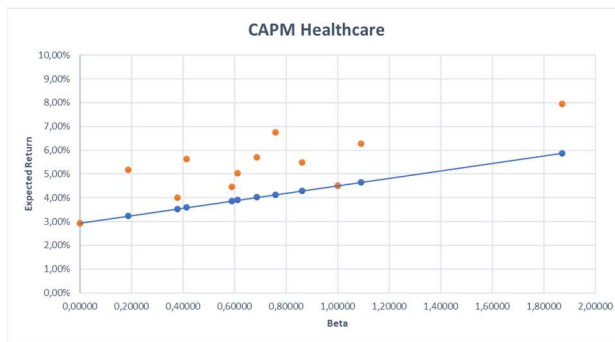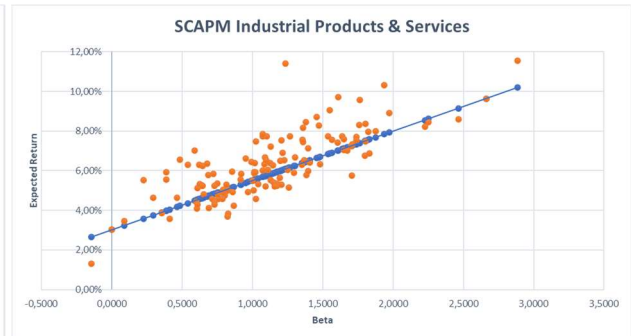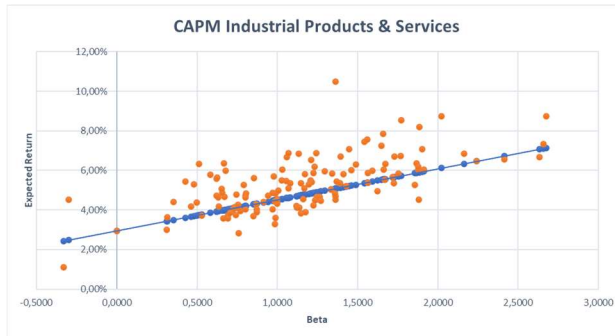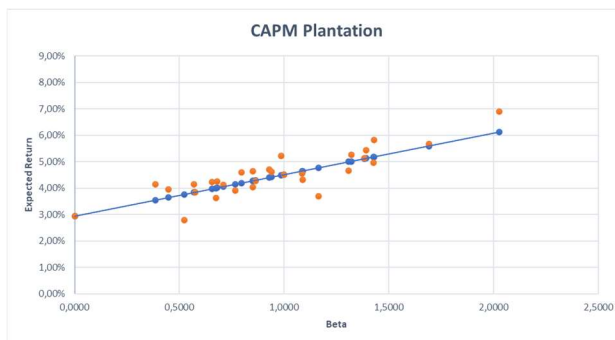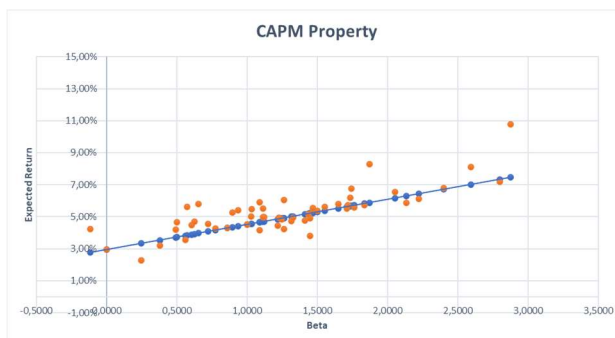

Chart 21. Comparison of SML and actual returns estimated with CAPM and SCAPM (property sector).
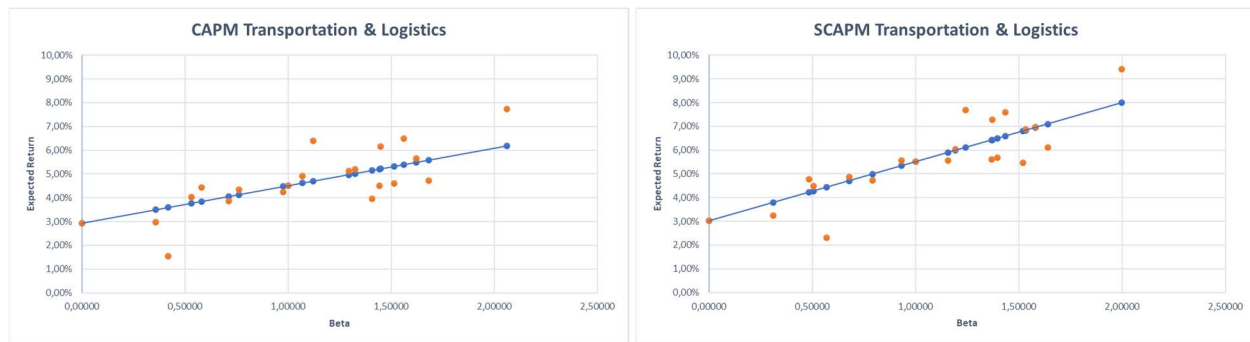
Chart 22. Comparison of SML and actual returns estimated with CAPM and SCAPM (transportation & logistics sector).

Comparing each sector individually, there are no great differences between the application of one model or another with respect to the alphas' estimation. However, one trend has to be underlined. For what concerns those securities with a positive alpha estimated by CAPM, this measure of excess return tends to decrease applying SCAPM. Hence, on average those stocks that are considered undervalued with the traditional Capital Asset Pricing Model tend to plot closer to the SML with the implementation of the Islamic CAPM. On the other hand, securities that plot under the SML according to the first asset pricing model tend to plot even further from the same line according to SCAPM. In fact, those securities with a negative alpha (thus, overvalued) for the conventional model present an even lower alpha applying the *Shari'a* compliant CAPM. As a consequence, all the securities appear to be slightly shifted down in respect with the SML, when plotting their actual returns.

After having provided the different charts yielded by the application of the two models, a quantitative definition of this approach will be given in the following table. Each sector has been examined comparing CAPM and SCAPM. In particular, the average betas, alphas and expected returns expressed on an annual basis have been estimated so that a full picture of every group of securities is provided. Furthermore, also the average R^2 as well as the maximum and minimum R^2 values are displayed for each sector.

	Construction			Consumer Products & Services		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	15,70%	15,93%	0,24%	8,47%	7,88%	-0,59%
max. R^2	47,81%	50,28%	2,48%	40,01%	40,39%	0,38%
min. R^2	1,65%	1,67%	0,02%	0,17%	0,48%	0,31%
Alpha	0,00038	-0,00075	-0,00114	0,00504	0,00429	-0,00075
Beta	1,35	1,37	0,02	0,96	0,94	-0,03
Expected Return	5,07%	6,43%	1,36%	4,45%	5,34%	0,90%

	Energy			Healthcare		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	12,74%	12,82%	0,08%	7,42%	7,05%	-0,37%
max. R^2	23,68%	24,63%	0,95%	16,39%	18,17%	1,79%
min. R^2	4,17%	2,08%	-2,08%	0,37%	0,60%	0,23%
Alpha	0,00493	0,00347	-0,00146	0,01537	0,01474	-0,00063
Beta	1,78	1,80	0,02	0,75	0,74	0,00
Expected Return	5,74%	7,50%	1,76%	4,11%	4,86%	0,75%

	Industrial Products & Services			Plantation		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	10,79%	10,02%	-0,77%	15,97%	15,54%	-0,43%
max. R^2	32,01%	31,10%	-0,91%	37,51%	38,69%	1,19%
min. R^2	0,13%	0,05%	-0,08%	2,63%	2,50%	-0,13%
Alpha	0,00544	0,00455	-0,00089	0,00069	-0,00012	-0,00081
Beta	1,16	1,13	-0,03	0,98	0,98	0,00
Expected Return	4,76%	5,83%	1,07%	4,48%	5,46%	0,98%

	Property			Transportation & Logistics		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	13,37%	13,23%	-0,14%	12,19%	11,39%	-0,80%
max. R^2	40,97%	37,55%	-3,42%	27,80%	23,81%	-3,99%
min. R^2	0,05%	0,33%	0,27%	0,50%	0,93%	0,43%
Alpha	0,00358	0,00251	-0,00108	0,00035	-0,00058	-0,00093
Beta	1,31	1,31	0,01	1,15	1,14	-0,01
Expected Return	4,99%	6,28%	1,29%	4,75%	5,86%	1,11%

Table 8. Comparison of CAPM and SCAPM estimating averages for R^2, alpha, beta, expected return as well as maximum and minimum R^2 for each sector of Bursa Malaysia.

Looking at Table 8 above, some important deductions can be inferred. First and foremost, with regard to the traditional Capital Asset Pricing Model, the R^2 values do not appear so high on average: just from 7.42% for the healthcare sector to 15.97% for the plantation sector. Even though these numbers are not so remarkable, it is necessary to think that they are referred to single stocks. For sure applying this approach to groups of securities and portfolios could improve this measure. Furthermore, the indices that have been employed as proxies for the market portfolios are both composed of only 30 securities. If other broader indices such as the FTSE Bursa Malaysia EMAS Index (as a proxy for the conventional market portfolio) and the FTSE Bursa Malaysia EMAS Shariah Index (as a proxy for the screened Islamic market portfolio) had been applied, higher R^2 values would have been yielded. Nevertheless, such low coefficients lead us to think that CAPM represents an effective model in explaining the risk-return relationship of Bursa Malaysia's Islamic equities only with regard to one factor, i.e. the market risk. In fact, even though maximum coefficients of determination reach up to 47.81% for the construction sector and 40.97% for the

property sector, on average they tend to show a weak explanatory power of the model. As a consequence, there must be other factors that have not been included in the model, affecting the expected return of the sample. Other multifactor asset pricing models, such as the Arbitrage pricing theory, the Fama-French three-factor model and the Carhart four-factor model may represent an appropriate alternative in this sense. Hence, the traditional Capital Asset Pricing Model should be extended to other factors in order to have a fully effective approach.

The same conclusions drawn for CAPM can be applied to SCAPM. Also in the latter case the coefficients of determination tend to be very low on average, ranging from 7.05% for the healthcare sector to 15.93% for the construction sector. The highest peaks for this measure are shown by the construction sector and the consumer products & services sector, with 50.28% and 40.39% respectively. Consequently, also the *Shari'a* compliant CAPM represents a good starting point in explaining the risk-return relationship of Islamic securities but it needs to be extended to other factors. In general, those sectors whose risk-return relationship seems to be more effectively explained by CAPM and SCAPM are construction, plantation, and property sector.

With regard to the differences in R^2 between the two asset pricing models, the coefficients tend to be rather steady. On the one hand, the explanatory power slightly increases from CAPM to SCAPM for the construction and energy sector. On the other hand, it moderately decreases for all the other sectors. A t-test has been performed on the difference in mean for each group of securities, and it will be explained in detail in the next pages.

Concluding this brief overview of the most relevant measures yielded by the tests, some observations need to be done for alphas, betas and expected returns of the regressions. For what concerns the excess returns, on average they all appear quite low: except for the healthcare sector, they are all lower than 1% yearly. In Table 8, it is possible to see how alphas decrease on average applying the two different asset pricing models. Notwithstanding these slight differences, one interesting fact is common to both the asset pricing models that have been tested. Indeed, in order to verify the significance of the estimated alphas, both the t-stat and the p-value for the alphas of each security have been examined. These two measures are expression of the significance of one variable. The t-stat is equal to the estimated value divided by its standard deviation, while the p-value is equal to the probability of achieving results as accurate as the ones obtained with the regressions. Both these measures are employed to test the null hypothesis, that in this case means to state that alpha is equal to 0. In order to reject the null hypothesis at a 5% percent level of significance, the following two conditions must hold:

$$|t - stat| > 1.96 \quad \text{and} \quad p - value < 0.05$$

In our analysis of the conventional CAPM, the t-stat ranges from -1.96 to 1.96 and the p-value is higher than 0.05 for 351 out of 378 securities. Hence, we failed to reject the null hypothesis for a great part of the sample (92.86%, to be precise). In a similar way with the *Shari'a* compliant CAPM, the t-stat ranges from -1.96 to 1.96 and the p-value is higher than 0.05 for 353 out of 378 securities. Therefore, we failed to reject the null hypothesis for even a greater part of the sample (93.39%, precisely). This finding is very interesting because it tells us that for most of securities (92.86% of the sample with CAPM and 93.39% of the sample with SCAPM) alphas are statistically insignificant with a probability of 95%. Consequently, from this point of view both the asset pricing models appear to be effective in predicting the expected return of Islamic equities.

Moving on to the analysis of the betas of Islamic stocks, they are not so much different comparing CAPM and SCAPM. Construction, energy, industrial products & services, property, and transportation & logistics show a higher than 1 beta. Conversely, plantation and consumer products & services have a very close to 1 beta. Lastly, healthcare is the only sector analysed with a beta between 0 and 1. A deeper analysis of the frequency of betas will be later considered in this work. Lastly, with regard to the average expected returns they all tend to be slightly higher with the *Shari'a* compliant CAPM, in comparison with the traditional asset pricing model. Indeed, the higher market risk premium linked to the Islamic model leads to higher expected returns for securities with a positive beta, which are the greatest part.

Trying to furtherly examine the differences in means of the R^2 values, a two-sample t-test has been performed on each of the R^2 means. The ultimate purpose of such a test is to determine if the difference between two means is significant or if it has happened by chance. In this case, our purpose is to understand for each sector if the mean coefficient of determination yielded by SCAPM is significantly different from the one obtained with CAPM. Table 9 shows the summary of the t-tests performed at a 95% level of confidence. The most relevant coefficients are again the t-stat and the p-value. In fact, as mentioned above, if the former exceeds the ± t-critical value, thus we can reject the null hypothesis. The same conclusion can be drawn if the p-values are lower than the level of significance, i.e. 0.05 here.

Construction	R^2 CAPM	R^2 SCAPM	Consumer Products & Services	R^2 CAPM	R^2 SCAPM
Mean	0,15697	0,15934	Mean	0,08467	0,07879
Variance	0,01708	0,01659	Variance	0,00547	0,00482
Hypothesized Mean Difference	0		Hypothesized Mean Difference	0	
df	60		df	179	
t Stat	-0,07190		t Stat	0,55332	
P(T<=t) two-tail	0,94292		P(T<=t) two-tail	0,58074	
t Critical two-tail	2,00030		t Critical two-tail	1,97331	

Energy		
	R^2 CAPM	R^2 SCAPM
Mean	0,12739	0,12823
Variance	0,00308	0,00367
Hypothesized Mean Difference	0	
df	28	
t Stat	-0,03943	
P(T<=t) two-tail	0,96882	
t Critical two-tail	2,04841	

Healthcare		
	R^2 CAPM	R^2 SCAPM
Mean	0,07418	0,07046
Variance	0,00232	0,00234
Hypothesized Mean Difference	0	
df	18	
t Stat	0,17213	
P(T<=t) two-tail	0,86525	
t Critical two-tail	2,10092	

Industrial Products & Services		
	R^2 CAPM	R^2 SCAPM
Mean	0,10792	0,10020
Variance	0,00586	0,00473
Hypothesized Mean Difference	0	
df	259	
t Stat	0,86213	
P(T<=t) two-tail	0,38941	
t Critical two-tail	1,96917	

Plantation		
	R^2 CAPM	R^2 SCAPM
Mean	0,15973	0,15540
Variance	0,00995	0,00891
Hypothesized Mean Difference	0	
df	54	
t Stat	0,16674	
P(T<=t) two-tail	0,86820	
t Critical two-tail	2,00488	

Property		
	R^2 CAPM	R^2 SCAPM
Mean	0,13369	0,13228
Variance	0,00877	0,00824
Hypothesized Mean Difference	0	
df	102	
t Stat	0,07762	
P(T<=t) two-tail	0,93828	
t Critical two-tail	1,98350	

Transportation & Logistics		
	R^2 CAPM	R^2 SCAPM
Mean	0,12186	0,11390
Variance	0,00643	0,00465
Hypothesized Mean Difference	0	
df	35	
t Stat	0,32949	
P(T<=t) two-tail	0,74375	
t Critical two-tail	2,03011	

Table 9. Summary of statistics for the t-tests performed on mean R^2 values.

Looking at t-stats and p-values of the t-tests, the former measure is between ± the t-critical values for every sector while the latter coefficient is always lower than the level of significance. As a consequence, we infer that we fail to reject the null hypothesis in all of the cases above. Therefore, there is no significant difference between the average coefficients of determination computed with CAPM and the ones estimated with SCAPM. We can conclude that the *Shari'a* Compliant Asset Pricing Model has the same explanatory power of the traditional Capital Asset Pricing Model in estimating the expected return of Bursa Malaysia's Islamic equities.

Apparently, the average betas estimated for each sector of the capital market do not differ so much applying one asset pricing model or another. However, a deeper analysis of this measure of risk has been performed in order to catch possible differences between the two approaches. First, means and medians of the whole betas' populations have been computed: they are shown in Table 10. Then, the frequency distribution of betas has been estimated both for the results yielded by traditional CAPM and for the estimations provided by Islamic

	CAPM	SCAPM	change
Mean	1,15	1,13	-0,01
Median	1,08	1,08	0,00

Table 70. Mean and median of the betas' populations.

CAPM. In Table 11, the frequency distribution and the cumulative frequency are presented on the basis of betas estimated with CAPM. Chart 23 represents the histogram of the relative distribution. The bin width has been computed using the Scott's normal reference rule, assuming normally distributed data. In the same way, frequency distribution and cumulative frequency have been estimated for the betas computed with SCAPM. They are presented in Table 12, while in Chart 24 the histogram of the distribution has been represented.

The mean betas of all the Islamic equities applying CAPM and SCAPM do not vary greatly: they are 1.15

Bin	Frequency	Cumulative
-0,33|-0,05	3	1%
-0,05|0,23	6	2%
0,23|0,51	32	11%
0,51|0,79	78	31%
0,79|1,07	63	48%
1,07|1,35	69	66%
1,35|1,63	51	80%
1,63|1,91	40	90%
1,91|2,19	14	94%
2,19|2,47	11	97%
2,47|2,75	9	99%
2,75|3,03	2	100%

Table 81. CAPM Betas' frequency distribution and cumulative frequency.
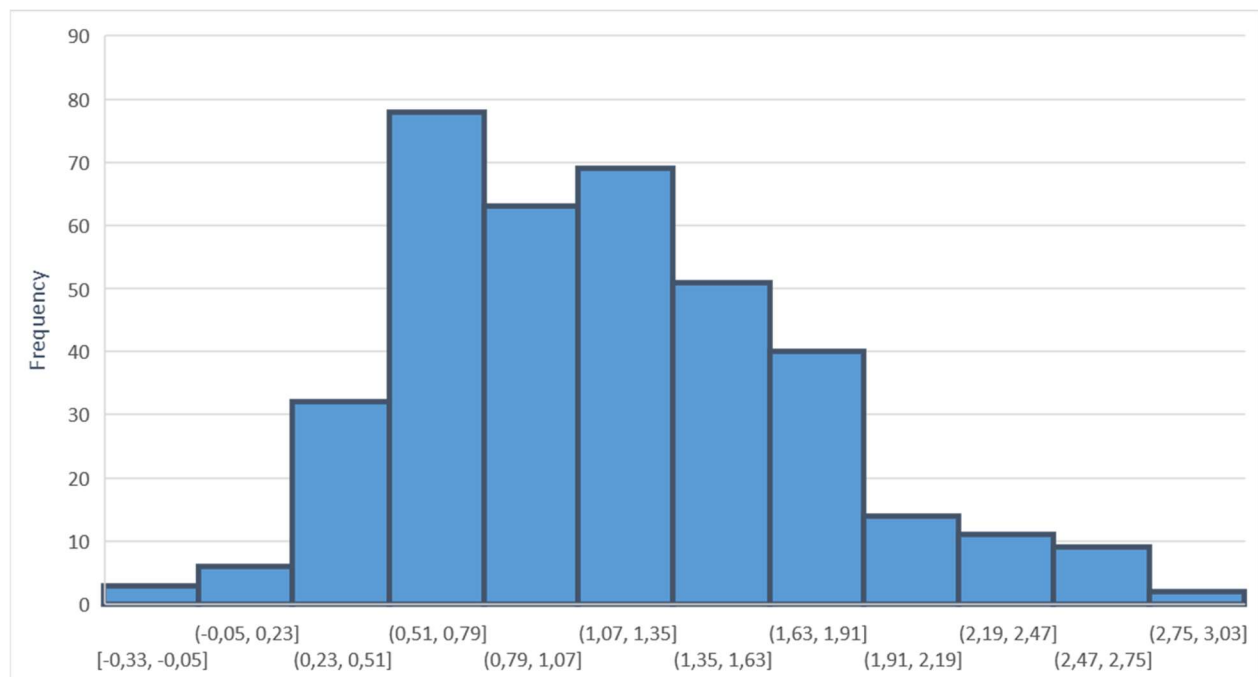

Chart 23. Histogram of the CAPM betas' distribution of frequency.

and 1.13, respectively. This fact confirms the results yielded by the sectorial analysis. Likewise, the medians of the distributions are equal: 1.08 for both the models.

Looking at the width of the frequency distributions, betas computed with CAPM have a smaller extent, ranging from -0.33 to 3.03. On the other hand, betas yielded by the Islamic CAPM estimation range from -0.29 to 3.35 and their distribution of frequency has an additional bin. Despite this slight difference in the extension of the distributions, the two models are not so different with regard to the cumulative distributions: about 80% of betas are in the first seven bins, for both the populations.

Examining the frequency distributions and histograms, we infer that betas do not distribute normally. Indeed, the histograms are both skewed to the right. Data tend to concentrate on the left side of the histograms, but few larger coefficients are on the right side. Consequently, the mean is a bit higher than the median.

Given the fact that some sectors have been removed from the analysis because of their lower number of Islamic equities, this examination of the betas may be limited. Hence, an extensive analysis of all the Islamic securities listed and traded on Bursa Malaysia may lead

Bin	Frequency	Cumulative
-0,29|-0,01	2	1%
-0,01|0,27	8	3%
0,27|0,55	45	15%
0,55|0,83	81	36%
0,83|1,11	66	53%
1,11|1,39	65	71%
1,39|1,67	47	83%
1,67|1,95	31	91%
1,95|2,23	13	95%
2,23|2,51	10	97%
2,51|2,79	7	99%
2,79|3,07	1	99%
3,07|3,35	2	100%

Table 92. SCAPM Betas' frequency distribution and cumulative frequency.
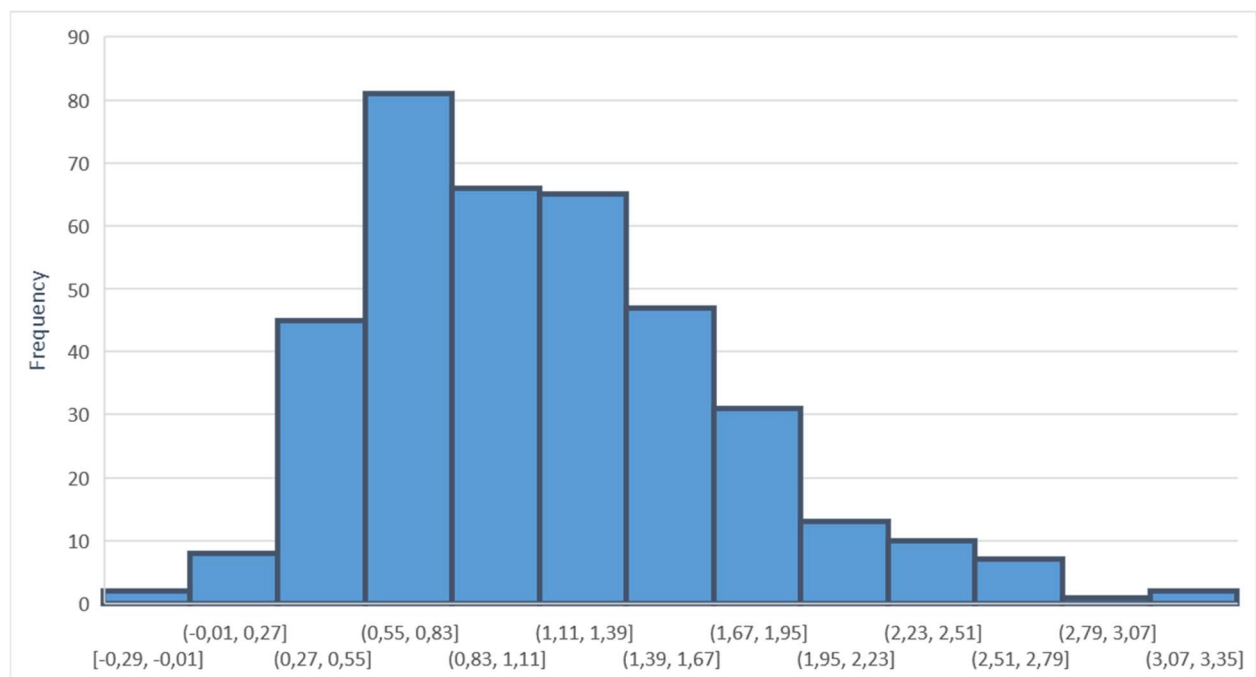

Chart 24. Histogram of the SCAPM betas' distribution of frequency.

to a normal distribution of betas. In any case, in our tests the two asset pricing models do not vary significantly in the estimation of this measure.

In Chart 25, the SMLs have been represented plotting all the sectors that have been tested in this work. On the one hand, expected returns tend to vary from one model to another, and the higher is the beta the greater is the difference in expected return. On the other hand, betas are rather steady for all the sectors.
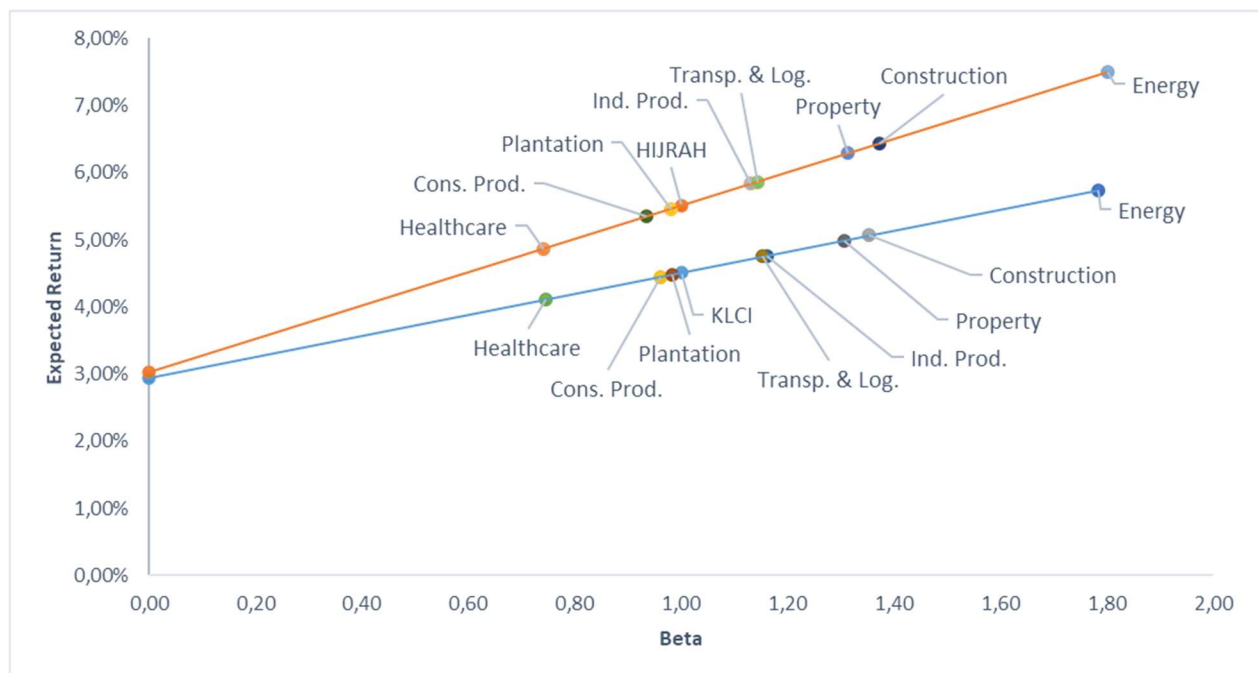

Chart 25. Security Market Lines (orange for CAPM, blue for SCAPM) and sectors of the sample tested.

Since the two asset pricing models seem to lead to the same valuation of the stocks' systematic risk, we have examined if Islamic equities have a different behaviour from this perspective, in comparison with their conventional counterparts. In particular, the beta of each sector has been compared to the measure of systematic risk that is usually estimated by analysts and academics. As a benchmark for the industry classification, the Morningstar Global Equity Classification Structure has been employed. This system maps every stock into one of 145 industries that reflect the company's underlying business. Then, industries are mapped into 55 industry groups on the basis of their common operational characteristics. Consequently, they are grouped in 11 sectors that are finally divided into three major economic spheres: cyclical, defensive, and sensitive. The cyclical sector is composed of industries that are greatly affected by economic shifts: their betas are generally higher than 1. The defensive sector includes industries that are unaffected by economic cycles, hence their betas are less than 1. Lastly, the sensitive sector is made up of industries that tend to follow the overall economy, and thus their betas are very close to 1.

In Table 13 sectors of Bursa Malaysia that have been tested in this research are shown. For each one of them, average betas estimated with CAPM and SCAPM are presented. Then, they have been classified according to the Morningstar Global Equity Classification Structure. In the last column, it is possible to see the classification that would have been assigned by the same system if sectors had been made up of conventional securities only.

Sector	Beta CAPM	Beta SCAPM	Classification	Morningstar
Construction	1,35	1,37	Cyclical	Cyclical
Consumer Products & Services	0,96	0,94	Defensive	Defensive
Energy	1,78	1,80	Cyclical	Sensitive
Healthcare	0,75	0,74	Defensive	Defensive
Industrial Products & Services	1,16	1,13	Cyclical	Sensitive
Plantation	0,98	0,98	Defensive	Defensive
Property	1,31	1,31	Cyclical	Cyclical
Transportation & Logistics	1,15	1,14	Cyclical	Sensitive

Table 10. Comparison of the industry classification on the basis of the findings of this work and the Morningstar Global Equity Classification Structure.

Looking at Table 13, five out of eight industries do not have a different systematic risk in comparison with the classification that is assigned to conventional sectors by the Morningstar system. Indeed, the "Islamic version" of the construction, consumer products & services, healthcare, plantation and property sectors have the same systematic risk that is estimated by analysts for their conventional counterparts. However, two sectors need to be furtherly explained. Firstly, the consumer products industry shows a rather close to 1 beta (despite being negative), so it would be reasonable to classify it as a sensitive sector. Conversely, the Morningstar report makes a distinction between "Consumer Cyclical" and "Consumer Defensive". Both with CAPM and SCAPM, about 60% of Islamic securities in our test have a lower than 1 beta. Hence, it has been classified as a defensive sector. Nevertheless, the dual nature of this industry needs to be kept in mind, and it probably represents the reason of a such close to 1 beta. Secondly, also the plantation sector has an average beta that is not so far from 1, that should lead to estimate it as a sensitive industry. However, the medians of the betas' populations tend to be lower than their averages both with the CAPM and SCAPM approach (0.90 and 0.92, respectively). Thus, plantation has been considered as a defensive sector as it is in the Morningstar system.

Three Islamic industries display a different classification if compared to the one that is assigned by the standard system. The findings of this work indicate that the energy, industrial products & services and transportation & logistics sectors composed of *Shari'a* compliant securities are cyclical industries with a higher than 1 beta. Conversely, their conventional counterparts are classified as sensitive sectors by the Morningstar system, thus with a very close to 1 beta. Even

though betas for the last two sectors are not so higher than the market beta (on average about 15% more than 1), the difference for the energy sector is remarkable (78% and 80% higher than 1 with the CAPM and SCAPM approach, respectively). Such a gap may be explained by the fact that Malaysia represents a very active emerging market, with a vibrant oil and gas industry. Since energy stocks of emerging markets tend to be more volatile and sensitive to market changes[66], such a high beta is probably a reflection of this tendency.

3.3 Discussion

At the end of this chapter, it is necessary to provide a brief summary of all the conclusions that have been drawn on the basis of the research findings. The ultimate purposes of our tests were: to understand whether and how the traditional CAPM can explain the risk-return relationship of *Shari'a* compliant securities; to understand whether and how the chosen *Shari'a* compliant CAPM can achieve the same goal; to understand if the second asset pricing model can represent a more effective alternative to the conventional method.

The approach of our research has been focused on the Malaysian stock exchange, choosing a sample of 378 Islamic securities grouped in eight different sectors. Only the Main Market of Bursa Malaysia has been tested during a period of 11 years. On the one hand, the conventional CAPM has been implemented as explained in the second chapter. On the other hand, one of the *Shari'a* Compliant Asset Pricing Models examined in the previous pages has been empirically tested. For the first model, the FTSE Bursa Malaysia KLCI and a 3-month Malaysian Treasury Bill have been respectively employed as a proxy for the market portfolio and for the risk-free asset. Conversely, for the Islamic version of CAPM, the FTSE Bursa Malaysia Hijrah Shariah Index and the yield to maturity of an AAA-*sukuk* have been used as a proxy for the market portfolio and for the zero-beta portfolio. Essentially, the monthly excess returns of each asset have been regressed on the monthly market excess returns for CAPM and SCAPM. Subsequently, alpha, beta and expected return of every asset and of the stock market indices have been estimated according to both the models. The coefficients of determination have been computed as well. All these measures are able to provide useful indications for our research questions.

With regard to the two SMLs estimated with the two asset pricing models, they present essentially the same vertical intercept. However, the higher market risk premium estimated with SCAPM leads to a higher slope of the SML. Consequently, with this approach, stocks with a

---

[66] D. FONDA, "9 'Risky' Energy Stocks for an Oil Rally", *Barron's*, April 12, 2018, https://www.barrons.com/articles/9-energy-stocks-that-will-ride-the-uptrend-1523534401.

positive beta have a higher expected return than the one estimated with CAPM. Conversely, stocks with a negative beta have a lower expected return than the one determined with CAPM.

With regard to the alphas of the regressions, they are all lower than 1% yearly both with CAPM and with SCAPM. The healthcare sector represents the only exception with a slightly higher excess return. Comparing the two asset pricing models, alphas tend to decrease with the Islamic CAPM. Indeed, securities with a positive alpha plot closer to the SML while securities with a negative alpha plot further from the SML. Despite this trend, excess returns are statistically insignificant for most of the equities. In fact, we failed to reject the null hypothesis at a 5% level of significance for 351 out of 378 securities with CAPM and for 353 out of 378 securities with SCAPM. Hence, 92.86% of the sample with the first model and 93.39% of the sample with the second model have statistically insignificant alphas with a probability of 95%. Consequently, from this point of view both the asset pricing models appear to be effective in predicting the expected return of Bursa Malaysia's Islamic equities.

For what concerns the betas of the regressions, the average systematic risk estimated for each sector does not differ so much applying one asset pricing model or another. Construction, energy, industrial products & services, property, and transportation & logistics show a higher than 1 beta. Conversely, plantation and consumer products & services have a very close to 1 beta. Lastly, healthcare is the only sector analysed with a beta between 0 and 1. Looking at the frequency distribution of betas, the Islamic CAPM approach shows a slightly broader extension, but cumulative distributions are rather similar. Indeed, about 80% of betas are in the first seven bins for both the populations and both the histograms are not normally distributed: they are skewed to the right with a higher concentration on the left side and few larger coefficients on the right side.

Since the two asset pricing models lead to the same estimation of the beta for each sector, this measure has been compared to the systematic risk that is usually assessed by analysts. In this respect, the energy, industrial products & services and transportation & logistics sectors have been classified as cyclical instead of sensitive industries. Thus, the underlying Islamic securities are supposed to be more volatile in comparison with their conventional counterparts. The greatest difference is shown by the energy industry, but this may be due to the fact that oil and gas stocks show higher betas in emerging markets. Securities of these three sectors should be furtherly tested in other capital markets in order to understand if these differences are due to inner characteristics of *Shari'a* compliant equities.

Finally, the most relevant findings are the ones concerning the R^2 values of the regressions. Both for the conventional CAPM and for the Islamic CAPM, the coefficients of determination are not very high. Applying the first asset pricing model, the average R^2 values range from 7.42% for the healthcare sector to 15.97% for the plantation sector. On the other hand, the *Shari'a* compliant

CAPM shows coefficients of determination ranging from 7.05% for the healthcare sector to 15.93% for the construction sector. However, some securities can provide higher coefficients: in these cases the maximum R^2 values reach up to 47.81% with CAPM and 50.28% with SCAPM. Nevertheless, they are isolated cases that are not statistically reliable. Consequently, there must be other factors that have not been included in the model, affecting the expected returns of the tested securities. Other multifactor asset pricing models, such as the Arbitrage pricing theory, the Fama-French three-factor model and the Carhart four-factor model may represent an appropriate alternative in this sense. Since coefficients do not vary greatly from on model to another, this reasoning is applicable both to CAPM and SCAPM.

With regard to the differences in R^2 means between the two asset pricing models, the coefficients tend to be rather steady within each sector. However, to examine if these differences are statistically significant, a two-sample t-test has been performed on the R^2 means for every industry. Looking at t-stats and p-values of the t-tests, we failed to reject the null hypothesis in all the cases. Hence, there is no significant difference between the average coefficients of determination computed with CAPM and the ones estimated with SCAPM. We can conclude that the *Shari'a* Compliant Asset Pricing Model has the same explanatory power of the traditional CAPM in estimating the expected return of Bursa Malaysia's Islamic equities.

In conclusion, the tested *Shari'a* Compliant Asset Pricing Model represents an Islamic law compliant version of CAPM that can have a similar effectiveness in explaining the risk-return relationship of Islamic equities. However, as mentioned above, other factors need to be included in the research so to provide a fully effective asset pricing model. If so, more than one portfolio would be used to capture different components of the systematic risk. In the Arbitrage pricing theory, for example, the expected return of a security is linearly related to a number of macroeconomic variables that capture systematic risk. Some examples of these latter variables are fluctuations of interest rates, inflation, GDP, exchange rates and oil prices as well. On the other hand, the Fama-French three-factor model uses firm characteristics that empirically seem to proxy for exposure to systematic risk. In such a case, the variables chosen to capture risk are firm size, book-to-market ratio, price-earnings ratio and so on. The latter represents the dominant approach to specify factors as candidates for sources of systematic risk, hence the method implemented in this research could be refined following this process.

CONCLUSIONS

At the end of this thesis, we can draw some relevant conclusions. First and foremost, Islamic finance represents a very wide subject that is linked to a variety of different issues. The aim of this thesis has been the one to explore the world of Islamic capital markets, especially with regard to the relationship between *Shari'a* compliant securities and Capital Asset Pricing Model. After having provided an overall picture of Islamic finance in its main characteristics and specifications, the focus has been shifted on those academic papers that have further analysed the application of CAPM to this peculiar world. It is very interesting to notice that the attempts in this direction have been many and different. On the one hand, many research works have examined if this asset pricing model can adequately explain the risk-return relationship of Islamic equities. On the other hand, some others have tried to apply it specifically with the aim to analyse the relative performance of Islamic securities against their conventional counterparts. Finally, some academic papers have been aimed to examine possible adjustments to this asset pricing model in order to make it fully *Shari'a* compliant. Indeed, the main issue of CAPM is the fact that it is essentially based on an interest relationship which is not allowed by Islamic finance. Furthermore, some authors have also questioned the construction of a market portfolio: it should not be composed of *haram* companies and thus it needs to be restructured as well. Hence, the classical CAPM needs to be modified and converted into a *Shari'a* Compliant Asset Pricing Model. Many alternatives have been proposed in this respect, but not all of them have been empirically tested. Nevertheless, empirical tests have proved that certain forms of SCAPM tend to adequately explain the risk-return relationship of Islamic stocks, in some cases even better than CAPM. This thesis has tried to further implement these tests, applying one form of SCAPM to different sectors of the Malaysian stock market. From the findings of our research, betas and alphas of the regressions are not very different from one model to another. Coefficients of determination are generally rather low on average reaching up to 15.97% with CAPM and 15.93% with SCAPM. Consequently, there must be other factors that affect the expected returns of the tested securities. However, performing a two-sample t-test on the R^2 means for every sector analysed, we failed to reject the null hypothesis in all of the cases. Hence, there is no significant difference between the average coefficients of determination estimated with one model and another. Therefore, we can conclude that the tested SCAPM represents an Islamic law compliant version of CAPM that can have a similar effectiveness in explaining the risk-return relationship of Islamic equities. However, other factors need to be included in the research so to provide a fully effective asset pricing model. Indeed, the market portfolio cannot capture all the systematic risk, while more than one portfolio could be an improvement in this sense. Thus, the method implemented could be refined following this process.

Bibliography

ABBES, M.B. "Risk and Return of Islamic and Conventional Indices". *International Journal of Euro-Mediterranean Studies* 5, n. 1 (2012): 1-23.

ALAM, N., GUPTA, L. and SHANMUGAM, B. *Islamic Finance: A Practical Perspective.* London: Palgrave Macmillan, 2017.

ALI, M. and ZADA, N. *The Islamic Finance Trading Framework: Legitimizing Profit Making.* London: Palgrave Macmillan, 2019.

AYUB, M. *Understanding Islamic Finance.* Chichester, West Sussex: John Wiley & Sons Ltd., 2007.

BERK, J.B. and DEMARZO, P.M. *Corporate finance.* Boston, MA: Prentice Hall, 2011.

BILLAH, M.M. *Islamic Financial Products: Principles, Instruments and Structures.* London: Palgrave Macmillan, 2019.

BLACK, F. "Capital market equilibrium with restricted borrowing". *Journal of Business* 45, n.3 (1972): 444-455.

DERBALI, A., EL KHALDI, A. and JOUINI, F. "Shariah-compliant Capital Asset Pricing Model: new mathematical modelling". *Journal of Asset Management* 18, n. 7 (2017): 527-537.

EL-ASHKER, A.A.F. *The Islamic Business Enterprise.* London: Croom Helm, 1987.

EL TIBY, A.M. and GRAIS, W. *Islamic Finance and Economic Development: Risk Management, Regulation, and Corporate Governance.* Hoboken, New Jersey: John Wiley & Sons Inc., 2015.

ERRICO, L. and FARAHBAKSH, M. *Islamic Banking: Issues in Prudential Regulation and Supervision.* IMF Working Paper WP/98/30. Washington, DC: International Monetary Fund, 1998.

FIRDAUS, A. "The UK can be a world leader in Islamic finance". *The Telegraph*, May 10, 2019, https://www.telegraph.co.uk/business/business-reporter/uk-islamic-finance/.

FONDA, D. "9 'Risky' Energy Stocks for an Oil Rally". *Barron's*, April 12, 2018, https://www.barrons.com/articles/9-energy-stocks-that-will-ride-the-uptrend-1523534401.

HAJJAR, M. *Islamic Finance in Europe: A Cross Analysis of 10 European Countries.* London: Palgrave Macmillan, 2019.

HAKIM, S.A., HAMID, Z. and MEERA, A.K.M. "Capital Asset Pricing Model and Pricing of Islamic Financial Instruments". *JKAU: Islamic Economics* 29, n. 1 (2016): 21-39.

HANIF, M. "Risk and Return Under Sharia Framework: An Attempt to Develop Sharia Compliant Asset Pricing Model-SCAPM", *Pakistan Journal Commercial Social Science* 5, n. 2 (2011): 283-292.

HANIF, M., IQBAL, A. and SHAH, Z. "Risk and Returns of Shariah Compliant Stocks on the Karachi Stock Exchange – A CAPM and SCAPM Approach". *JKAU: Islamic Economics* 29, n. 2 (2016): 37-54.

HASAN, M. and DRIDI, J. *The Effects of the Global Crisis on Islamic and Conventional Banks: A Comparative Study*. IMF Working Paper WP/10/201.Washington D.C.: International Monetary Fund, 2010.

HASANAH, S.M. and MASPUPAH, I. "Shariah Compliant Asset Pricing Model (SCAPM) The Formula of Risk and Return Modification in Islamic Finance". *Al-Tijary: Jurnal Ekonomi dan Bisnis Islam* 2, n. 2 (2017): 177-187.

HASSAN, A. and MOLLAH, S. *Islamic Finance: Ethical Underpinnings, Products, and Institutions.* London: Palgrave Macmillan, 2018.

HUSEIN, M.F. and HASANAH, S.M. "Determining the optimum portfolio of shariah stocks using an approach of Shariah Compliant Asset Pricing Model (SCAPM)". *Journal of Economics, Business, and Accountancy Ventura* 19, n. 3 (2016): 349-362.

HUSSEIN, K.A. "Ethical Investment: Empirical Evidence from FTSE Islamic Index". *Islamic Economic Studies* 12, n. 1 (2004): 21-40.

ISLAMIC FINANCIAL SERVICES BOARD. *Islamic Financial Services Industry Stability Report*. Kuala Lumpur, Malaysia: Islamic Financial Services Board, 2019.

LEAN, H.H. and PARSVA, P. "Performance of Islamic Indices in Malaysia FTSE Market: Empirical Evidence from CAPM". *Journal of Applied Science* 12, n. 12 (2012): 1274-1281.

LISTYANINGSIH, E. and KRISHNAMURTI, C. "How performance of Jakarta Islamic Index (JII) stocks relative to other stocks?". *Jurnal Dinamika Manajemen* 6, n. 2 (2015): 145-164.

MARKOWITZ, H. "Portfolio selection". *The Journal of Finance* 7, n. 1 (1952): 77–91.

MASIH, M., KAMIL, N. K. M. and BACHA, O. I. "Issues in Islamic Equities: A Literature Survey". *Emerging Markets Finance and Trade* 54, n.1 (2018): 1-26.

MOHAMED, S., GONI, A. and HASAN, S. *Islamic Finance Development Report 2018: Building Momentum*. Toronto, Canada: Thomson Reuters, 2018.

RIZVI, S.A.R. and SABA, I. *Developments in Islamic Finance: Challenges and Initiatives*. London: Palgrave Macmillan, 2017.

SCANDOLO, G. *Matematica finanziaria.* Italy: Amon, 2013.

SCHOON, N. *Modern Islamic Banking: Products and Processes in Practice*. Chichester, West Sussex: John Wiley & Sons Ltd., 2016.

SELIM, T.H. "An Islamic capital asset pricing model". *Humanomics* 24, n. 2 (2008): 122-129.

SHAIKH, S.A. "Corporate Finance in an Interest Free Economy: An Alternate Approach to Practiced Islamic Corporate Finance". *Journal of Islamic Banking & Finance, International Association of Islamic Banks* (2009).

SHARPE, W.F. "Capital asset prices: A theory of market equilibrium under conditions of risk". *The Journal of Finance* 19, n. 3 (1964): 425–442.

TARIQ, S. "Capital Asset Pricing Model in the Gulf Capital Market; An Empirical study of Bahrain Stock Exchange". *Advances in Management* 6, n.9 (2013): 41-54.

TOMKINS, C. and KARIM, R.A.A. "The Shari'ah and its Implications for Islamic Financial Analysis: An Opportunity to Study Interactions among Society, Organizations and Accounting". *The American Journal of Islamic Social Sciences* 4, n. 1 (1987): 101-115.

VAN GREUNING, H. and IQBAL, Z. *Risk Analysis for Islamic Banks.* Washington D.C.: World Bank, 2007.

ZHANG, W., SUN, T., WANG, Z., KUMAR, V.R. and MA, Y. "Does faith have impact on investment return: evidence from REITs". *International Journal of Strategic Property Management* 23, n. 6 (2019): 378-389.

SUMMARY

The ultimate purpose of this thesis is to analyse the relationship between Islamic finance and the Capital Asset Pricing Model (CAPM). On the one hand, today the *Shari'a* compliant financial systems still represent a rather unknown topic for many people in Western society. However, they could represent a great opportunity for many financial intermediaries. On the other hand, the CAPM is probably one of the most used and discussed model to price securities. It is very interesting to examine whether and how it can be applied to Islamic equities. Essentially, this is the research question of this work: to examine the application of CAPM in this specific field, discussing possible drawbacks and improvements of this model.

In the first chapter a comprehensive overview of Islamic finance in its main characteristics and specifications has been provided. Among the monotheistic religions, Islam has some peculiar features which create a powerful and close relationship between religious beliefs and socio-economic behaviours. Teachings and practices of Islamic law are not bound to the relationship between God and Muslims, but they represent a code of behaviour which is valid in every aspect of common and individual life. As a consequence, the ultimate goal of Islamic finance is not different from the one of conventional financial systems and capital markets, however, it aims to achieve it abiding by Islamic law, which is called *Shari'a*. Essentially, Islamic financial services perform financial intermediation according to a code of behaviour based on Islamic principles.

The tight link between law and faith has historically been present since the emergence of Islam, making of Islam a unicum in the world of monotheistic religions. *Shari'a* prescribes behaviours in every aspect of life, including economics and finance as well. The main principles that govern these spheres are:

- *Riba*: it represents the prohibition of charging any interest;
- *Gharar*: it entails that any transaction based on a lack of clarity is illegal;
- *Maysir*: it represents the interdiction of gambling;
- *Haram* and *halal*: the former are illegal business activities, while the latter are legal;
- *Zakat*: it is basically a tax on the properties held by Muslims during a year.

The mentioned directives tend to create a system in which asset-backed financial instruments and risk-sharing contracts represent the application of *Shari'a* tenets in a practical way. A great number of academic researchers have tried to analyse the positive effects of these characteristics in mitigating the shock of the 2008 global financial crisis in the industry. On average, a stronger resilience during the global financial crisis was shown by the Islamic banking sector. However,

despite this relatively better performance, Islamic banks suffered bigger losses in the following year, when the crisis hit the real economy.

The history of Islamic finance covers a relative recent period: before the 1960s indeed there is no evidence of Islamic banks or financial institutions. Only during the first half of the 20th century, a wide number of Islamic scholars, jurists and politicians started a debate about the need to restore a cultural and religious Muslim identity. Thus, the 1960s marked the beginning of Islamic finance. Since then, a constant growth of this industry has attracted the attention of large conventional banks, regulators and governments, being recognised as a real opportunity. The total size of this industry is estimated today in trillions of dollars and it is expected to grow over the next few years. Moreover, the inherent ethical goal makes of Islamic financial services an alternative appealing to everyone, not just to Muslims. Indeed, an always increasing number of non-Muslim customers considers turning to Islamic banks to engage in the virtuous and responsible option offered.

According to the IFSB Stability Report 2019, the global Islamic financial services industry (IFSI) recorded a constant development for the third straight year in terms of its total worth. However, the growth rate of 6.9% for 2018 represents a smaller data than the 8.5% growth recorded between 2016 and 2017. The combined total worth of the IFSI's three broad sectors (banking, capital markets and *takaful*) was estimated at USD 1.89 trillion in 2016, surpassing for the first time USD 2 trillion the following year and then reaching USD 2.19 trillion in 2018. The decline in growth is attributed by the report to, among other geopolitical and economic factors, the long-standing depreciation of local currencies in USD terms in some countries with a strong presence of Islamic finance.

The banking sector represents the most relevant one of the Islamic financial services industry. Islamic banks act as intermediaries as conventional banks, transferring excess funds from economic surplus units to economic deficit units. However, their operations are based on the observance of *Shari'a* principles. In the deposit side of their balance sheet, they essentially offer two options: current accounts and investment accounts. The former deposits do not provide any return and the bank acts only as custodian of funds at no extra charge. Conversely, the latter are profitable deposits and they are managed on the basis of a profit and loss sharing (PLS) model. Thus, in the deposit side of their balance sheet, Islamic banks do not apply any fixed pricing mechanism, replacing this kind of reward with a PLS system. After having pooled depositors' funds, Islamic banks then sell them by means of a variety of financing products. Two broad categories of transactions are available: PLS forms of contract and non-PLS forms of contract. The former schemes entail a sharing of risk and return by both the parties involved, making them closer to the Islamic economic principles, while the latter are characterised by a more predictable and stable return, making them easier to apply because of a lower control required to the bank.

Therefore, PLS types of transaction are more in line with the principle of risk-sharing and they are favoured by Islamic scholars. However, they are not extensively implemented by Islamic banks. They rely much more on mark-up-based financing modes, which do not require a strict supervision in order to obtain the agreed profit share.

- PLS forms of contract
    - *Mudaraba* essentially represents a partnership transaction in which two main parties are involved: a capital provider (*rab al mal*) and an entrepreneur (*mudarib*).
    - *Musharaka* contract typically represents a partnership transaction in which two or more parties (*musharik*) provide capital as well as skills and expertise.
    - Diminishing *musharaka* represents a special a form of *musharaka* whereby the client gradually increases his share until he eventually becomes the only business owner.

- Non-PLS forms of contract
    - *Murabaha* is often referred to as "mark-up financing" and it essentially consists of a sale contract between a purchaser and a bank.
    - *Ijara* represents the Islamic counterpart of conventional leasing. It is a leasing contract in which one party agrees to transfer the use of an asset to another party.
    - *Salam* is a deferred delivery contract usually applied for agriculture financing.
    - *Istisna* is an exchange contract in which a party commits to manufacture a good or an asset at a predetermined future time and at an agreed price.

In summary, Islamic banks make profits thanks to the difference between purchase and sale of funds: deposits are originated from current and investment accounts that are channelled into trade financing, treasury products and services. However, no fixed or variable interest is charged, hence returns only proceed from the success of the projects in which liquidity is invested: Islamic banks participate in the profits of their borrowers and then split their share of profit with investment account holders.

With regard to the Islamic capital markets sector, we can say that it does not represent the majority of the global IFSI assets. Nevertheless, it is a relevant source of funds for capital seekers as well as an investment opportunity for capital providers. The *sukuk* market represents the most important segment of Islamic capital markets. *Sukuk* are transferable certificates which represent a share in the ownership of a tangible asset or business venture, giving entitlement to the investors to receive periodical payments and face value at maturity. These certificates are always linked to

the conclusion of either a PLS contract or a non-PLS contract, and they have different structure according to the different type of transaction that is linked to them.

Conventional bonds present two great drawbacks that make them unacceptable to Islamic finance: firstly, they pay interests, and secondly, they are often not linked to an underlying asset. As conventional bonds, the purpose of *sukuk* is to fulfil the same need of financing but doing so in a *Shari'a* compliant manner. In order to achieve this objective, *sukuk* have some features both of equity and of debt. On the one hand, they give entitlement to periodical payments and full redemption at maturity just as conventional bonds. In addition, they may be listed on regulated markets, but the secondary market is actually not very liquid. On the other hand, contrary to conventional bonds, by means of them a share in the ownership of an underlying (tangible or intangible) asset is transferred to the *sukuk* holder, along with the linked benefits and risks. Hence, he is entitled to receive a share of profit generated from the underlying asset or business venture but, in the same way, he is subject to any related risk and losses. Conversely, conventional bonds are a financial liability for the issuer until maturity.

Even though the greatest part of Islamic capital markets consists of the *sukuk* segment, also Islamic equities and funds represent a relevant issue. From an Islamic law perspective, investing in companies is an important mean of channelling financial resources into the economy and it does not represent a *haram* activity as long as *Shari'a* principles are observed. However, since a separate stock exchange for compliant equities does not exist, Islamic investors have to rely on screenings offered by professional providers. Likewise, professional Islamic investment managers are forced to ensure their individual investments and their funds are consistently *Shari'a* compliant. Thus, the structure of Islamic funds involves a *Shari'a* supervisory board in order to advise the fund manager with regard to the assets' compliance. The linked screening process entails both a qualitative screening (in order to determine if a company is involved, and to what extent, in *haram* activities) and a quantitative screening (performed on the basis of some financial ratios). The latter process may vary according to different financial institutions and *Shari'a* advisory boards.

Furthermore, many Islamic stock indexes have been created over the years in order to provide a benchmark for Islamic investors. Financial services companies such as Dow Jones, FTSE, MSCI and S&P have all launched their own indices. These benchmarks are set up and periodically revised according to the opinion of a *Sahri'a* supervisory board. The screening process may entail more flexible or more strict criteria.

Lastly, the Islamic insurance (*takaful*) completes the Islamic financial services' overview. The elements of *riba*, *maysir* and *gharar* contained in conventional insurance make it unacceptable from an Islamic law perspective. On the other hand, in a *takaful* scheme risk is voluntarily shared

among a group and mutual assistance in case of loss is constantly guaranteed, making of equity, solidarity and cooperation key elements of this system.

The ultimate purpose of the second chapter is to provide an explanation of the Capital Asset Pricing Model and of its application to Islamic finance. CAPM was first developed by William Sharpe in a 1964 paper[67] and, though not perfect, it is a very useful means in assessing a security's expected return and an investment's cost of capital. Starting from the Markowitz portfolio theory and on the basis of some additional assumptions, the Capital Asset Pricing Model is able to provide a general equilibrium model for the capital markets. Under its assumptions, the expected return of a stock (or portfolio) i is given by the following formula:

$$r_i = \beta_i(r_M - r_0) + r_0$$

where r_M is equal to the expected return on the market portfolio and r_0 indicates the rate of return on a risk-free asset. The beta of a stock (or portfolio) is essentially a measure of systematic risk and it indicates the sensitivity of a stock (or portfolio) to the changes in return of the market portfolio. If beta is positive, the stock i tends to move in the same direction of the market, while the opposite happens if beta is negative. In the case of beta equal to 1, the stock i perfectly reproduces the movement of the market. If it is equal to 0, there is no correlation. In any case, it is given by the following formula:

$$\beta = \frac{\text{cov}(R, R_M)}{\sigma_M^2}$$

Therefore, the CAPM equation provides a linear relationship between expected return and systematic risk of a stock. This relationship can be plotted in a graph and it is called Security Market Line (SML). It represents the line on which all securities lie when plotted on the basis of their beta and expected return. Its vertical intercept corresponds to the risk-free rate of return, whose beta is equal to 0. Furthermore, the CAPM equation can be examined in the form of the following regression model, expressing the excess return on a security as a function of the excess return on the market:

$$R - r_0 = \alpha + \beta(R_M - r_0) + \varepsilon$$

where α indicates the excess return above the estimation provided by CAPM while ε represents the error term in the regression equation. Alpha may be either positive or negative: in the former case the stock plots above the SML and it is undervalued, whereas in the latter case the stock plots below the SML and it is overvalued. Under CAPM assumptions, α and ε are equal to zero.

---

[67] W.F. SHARPE, "Capital asset prices: A theory of market equilibrium under conditions of risk", *The Journal of Finance* 19, n. 3 (1964): 425–442.

After the explanation and discussion of the Capital Asset Pricing Model, it is interesting to analyse its application to Islamic finance. The main issue in such a case is to verify if the model developed by Sharpe is able to explain the risk-return relationship of *Shari'a* compliant stocks. Lean and Parsva[68] have tried to apply this approach to Islamic indices of the Malaysia FTSE Market, coming to the conclusion that CAPM is an appropriate model in examining the risk-return relationship of Islamic stocks. On the other hand, Tariq[69] focuses his attention on the Bahrain Stock Exchange and, ultimately, the portfolios' risk and return characteristics satisfy the CAPM theory.

A wide number of researchers have applied this model with the aim to analyse the comparative performances between Islamic stocks and their conventional counterparts. Hussein[70] investigates if the excess returns of the FTSE Global Islamic Index significantly outperform the FTSE All-World Index, concluding that the Islamic finance screening does not adversely impact the performance of the FTSE Global Islamic Index. Likewise, Abbes[71] examines the risk and return characteristics of Islamic indices in comparison with their conventional counterpart indices, suggesting that Islamic indices do not provide a significant superior performance if compared with conventional indices. Then, Listyaningsih and Krishnamurti[72] have focused their attention on the Indonesia Stock Exchange: in this case as well, there is no abnormal difference between *Shari'a* compliant equity investments and conventional ones. Finally, Zhang et al.[73] investigate the relative performance of *Shari'a* compliant portfolios in comparison with a US Equity Real Estate Investment Trust (REIT) portfolio. Again, Islamic investors can pursue such an investment without incurring in extra costs or gains because of their faith.

Even though CAPM has been widely implemented to compare relative risk-adjusted returns of Islamic stocks with non-*Shari'a* compliant equities, other research has shifted the focus to the possible drawbacks of this model when applied to the Islamic finance framework. Therefore, many academics have analysed this issue providing alternative models (*Shari'a* Compliant Asset Pricing Models, SCAPM) able to combine the value of CAPM with a *Shari'a* compliant perspective. The central matter of CAPM is the fact that it is essentially based on an interest relationship which is not allowed by Islamic finance. Under the latter framework, no risk-free investment opportunities

---

[68] H.H. LEAN and P. PARSVA, "Performance of Islamic Indices in Malaysia FTSE Market: Empirical Evidence from CAPM", *Journal of Applied Science* 12, n. 12 (2012): 1274-1281.

[69] S. TARIQ, "Capital Asset Pricing Model in the Gulf Capital Market; An Empirical study of Bahrain Stock Exchange", *Advances in Management* 6, n.9 (2013): 41-54.

[70] K.A. HUSSEIN, "Ethical Investment: Empirical Evidence from FTSE Islamic Index", *Islamic Economic Studies* 12, n. 1 (2004): 21-40.

[71] M.B. ABBES, "Risk and Return of Islamic and Conventional Indices", *International Journal of Euro-Mediterranean Studies* 5, n. 1 (2012): 1-23.

[72] E. LISTYANINGSIH and C. KRISHNAMURTI, "How performance of Jakarta Islamic Index (JII) stocks relative to other stocks?", *Jurnal Dinamika Manajemen* 6, n. 2 (2015): 145-164.

[73] W. ZHANG et al., "Does faith have impact on investment return: evidence from REITs", *International Journal of Strategic Property Management* 23, n. 6 (2019): 378-389.

should exist. Hence, many authors have modified the original CAPM equation excluding this component. Some of them have proposed not to include any compensation for a risk-free investment, thus the expected return of one security only depends on its beta and on the excess expected return of the market. On the other hand, some others have proposed possible alternatives to the risk-free rate of return such as the nominal gross domestic product growth rate and the *zakat* rate. Starting from the examination of the nominal risk-free rate, Hanif[74] claims that it should be instead substituted with inflation charge. However, there is no empirical application of such a model in his study. Nevertheless, this attempt has been made by the same author in collaboration with Iqbal and Shah[75] few years later. The aim of their work is to apply both the CAPM and the mentioned SCAPM to a sample of *Shari'a* compliant securities listed on the Karachi Stock Exchange, i.e. the Pakistan capital market. The authors' findings lead to the conclusion that SCAPM provides slightly better results in comparison with CAPM, though not giving abnormal benefits. Also Hasanah and Maspupah[76] have developed their version of SCAPM, replacing the risk-free rate of return with the rate of return on Bank Indonesia *Shari'a* Certificates (short-term securities based on the *Shari'a* principles). This alternative SCAPM has been tested by Husein and Hasanah[77], who examine 26 stocks listed on the Indonesian Stock Exchange. Their research indicates that SCAPM may be a viable option for Islamic investors, but the authors have not included a comparison with CAPM that could have proved which model may be the most effective. Conversely, Hakim, Hamid and Meera[78] propose two versions of *Shari'a* compliant CAPM, claiming that that not only the risk-free rate is illegitimate from an Islamic law point of view, but also the market portfolio represents an issue because it may be composed of *haram* companies. Hence, recognizing the Islamic financial market as an independent entity, where only Islamic equities are traded, the authors build a market portfolio made up of *Shari'a* compliant stocks only. For one SCAPM, they suggest using a *Shari'a* compliant zero-beta portfolio in place of the risk-free asset, whereas for the other one, they propose that the risk-free rate of return should be substituted with cash holding. In the short term, SCAPMs show a notable similarity in betas and explanatory power, while in the long run distinctions between SCAPM and CAPM tend to disappear, being rather similar in explaining returns. Therefore, this *Shari'a* compliant CAPM is

---

[74] M. HANIF, "Risk and Return Under Sharia Framework: An Attempt to Develop Sharia Compliant Asset Pricing Model-SCAPM", *Pakistan Journal Commercial Social Science* 5, n. 2 (2011): 283-292.

[75] M. HANIF, A. IQBAL and Z. SHAH, "Risk and Returns of Shariah Compliant Stocks on the Karachi Stock Exchange – A CAPM and SCAPM Approach", *JKAU: Islamic Economics* 29, n. 2 (2016): 37-54.

[76] S.M. HASANAH and I. MASPUPAH, "Shariah Compliant Asset Pricing Model (SCAPM) The Formula of Risk and Return Modification in Islamic Finance", *Al-Tijary: Jurnal Ekonomi dan Bisnis Islam* 2, n. 2 (2017): 177-187.

[77] M.F. HUSEIN and S.M. HASANAH, "Determining the optimum portfolio of shariah stocks using an approach of Shariah Compliant Asset Pricing Model (SCAPM)", *Journal of Economics, Business, and Accountancy Ventura* 19, n. 3 (2016): 349-362.

[78] S.A. HAKIM, Z. HAMID and A.K.M. MEERA, "Capital Asset Pricing Model and Pricing of Islamic Financial Instruments", *JKAU: Islamic Economics* 29, n. 1 (2016): 21-39.

as adequate in explaining the risk-return relationship of Islamic stocks as conventional CAPM is with stocks in general. Finally, Derbali, El Khaldi and Jouini[79] have a slightly broader approach: conventional CAPM is not adjusted only with regard to the risk-free asset, but also modifying some of its assumptions and including *zakat* and purification of return. Then this form of SCAPM is tested on a sample of ten Islamic equities listed on Bursa Malaysia, comparing results with traditional CAPM. The authors' empirical findings indicate that, applying conventional CAPM, R^2 coefficients are all greater than 80% hence a great part of changes in the Islamic stock prices is explained by those of the index. On the other hand, R^2 coefficients applying SCAPM are all greater than 90%, thus even a greater part of changes in the Islamic stock prices is explained by those of the index.

Given the fact that empirical tests on alternative SCAPMs should be furtherly performed in different markets and during different sample periods, in the third and final chapter the conventional CAPM and one of the proposed Islamic CAPMs have been empirically tested. Comparing the results of both the models, our final purpose is to understand whether and how they can explain the risk-return relationship of *Shari'a* compliant securities. However, the research has been performed on individual stocks, and then on different sectors of a capital market. This approach is slightly different from those ones of the previous papers, in which CAPM is tested on portfolios and indices. Furthermore, the chosen SCAPM has been implemented with the aim to evaluate its explanatory power in comparison with the conventional model. In fact, despite representing an Islamic law compliant version of CAPM, it may or may not have the same effectiveness when computing the expected return of a security. In summary, the ultimate purposes of our tests have been the following ones: to understand whether and how the traditional CAPM can explain the risk-return relationship of *Shari'a* compliant securities; to understand whether and how the chosen *Shari'a* compliant CAPM can achieve the same goal; to understand if the second asset pricing model can represent a more effective alternative to the conventional method.

The capital market examined in this work is Bursa Malaysia, i.e. the Malaysian stock exchange. The *Shari'a* Advisory Council (SAC) of the Securities Commission Malaysia (SC) establishes the Islamic compliance of stocks listed and traded in the market. Data about *Shari'a* compliant securities have been retrieved from the latest list issued by the SAC on 29th November 2019.The monthly rates of return of 378 Islamic public-listed companies of Bursa Malaysia have been investigated. The return of each security *i* at time *t* has been computed according to the following formula:

---

[79] A. DERBALI, A. EL KHALDI and F. JOUINI, "Shariah-compliant Capital Asset Pricing Model: new mathematical modelling", *Journal of Asset Management* 18, n. 7 (2017): 527-537.

$$R_{i,t} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

where P_t indicates the closing price at time t and P_{t-1} indicates the closing price at time t-1. The sample period examined in this work goes from 30th March 2009 to 30th March 2020, thus 11 years. With regard to the conventional CAPM, it has been tested in its usual regression form:

$$r_i - r_0 = \alpha_i + \beta_i(r_m - r_0) + \varepsilon_i$$

where r_i indicates the rate return on the security i, r_0 is the rate of return on the risk-free asset, r_m is the rate of return on the market portfolio, β_i represents the systematic risk of the asset i, α indicates the excess return above the estimation provided by CAPM while ε represents the error term in the regression equation. Monthly rates of return on the FTSE Bursa Malaysia KLCI have been employed as a proxy for the rates of return on the market portfolio, while the average monthly rate of return on a 3-month Malaysian Treasury Bill has been used as a proxy for the risk-free rate. On the other hand, following the approach of Hakim, Hamid and Meera, a *Shari'a* compliant zero-beta portfolio has been used in place of the risk-free asset. Hence, the following regression model portfolio has been implemented:

$$r_i - r_z = \alpha_i + \beta_i(r_m - r_z) + \varepsilon_i$$

where r_z indicates the rate of return on the zero-beta portfolio. In this case, the FTSE Bursa Malaysia Hijrah Shariah Index has been used as a proxy for the market portfolio, whereas the yield to maturity of a 12-year AAA-*sukuk* has been employed as a proxy for the rate of return on the zero-beta portfolio. After having determined the basic elements of CAPM and SCAPM, monthly excess returns of each asset have been regressed on the monthly market excess returns. In this way, alphas, betas and expected returns have been computed for each asset and for the stock market indexes. Furthermore, the coefficients of determination (R^2) have been estimated for the same securities. The latter coefficient represents the proportion of movements for a dependent variable that can be explained by movements of an independent variable. Since it ranges from 0 to 1, the closer it is to 1 the higher the model's explanatory power is. With the aim to make a comparison among different sectors of the market, all the estimations made for each stock have been grouped according to the sectorial classification of the SAC. However, only the Main Market of Bursa Malaysia has been considered and some sectors have been excluded because of the low number of listed *Shari'a* compliant stocks. Overall, excluding those securities for which data were not available and those that are part of the removed sectors, 42% of the total market has been tested. All the stocks' closing prices have been retrieved from the Thomson Reuters Eikon database. However, data about the AAA-*sukuk* have been found on the Malaysia's bond and *sukuk*

information platform (bixmalaysia.com). The SML has been plotted comparing the different results provided by CAPM and SCAPM. However, the SML has been plotted for each specific sector as well, so that different outcomes yielded by the two models could be understood. In order to have a deeper insight of the difference between the explanatory power of CAPM and SCAPM, a two-sample t-test has been run to test if the differences in means of R^2 are significantly different. Such a test has been performed on each sector comparing the two R^2 means obtained with the two models, respectively. Finally, an analysis of Islamic equities' betas has been performed. The distribution of betas has been examined both for CAPM and SCAPM so to find possible differences in frequency for the two models. Lastly, the sectorial betas have been compared to a standard classification so that possible deviations from the norm could be captured.

The two SMLs estimated with the two asset pricing models are plotted in Chart 1 (blue line for the SML estimated with CAPM and orange line for the SML obtained with SCAPM). Since the average rate of return on the 3-month Malaysian Treasury Bill and the yield to maturity of the AAA-*sukuk* do not differ so much, the two lines have essentially the same intercept on the vertical axis. However, the different market risk premia estimated with the two models lead to a remarkable difference of slope for the two SMLs. As a consequence, securities with a positive beta tend to have a higher expected return with SCAPM in comparison with the expected return computed with CAPM. On the other hand, securities with a negative beta tend to have a lower expected return comparing results obtained with SCAPM to the estimations provided by CAPM.
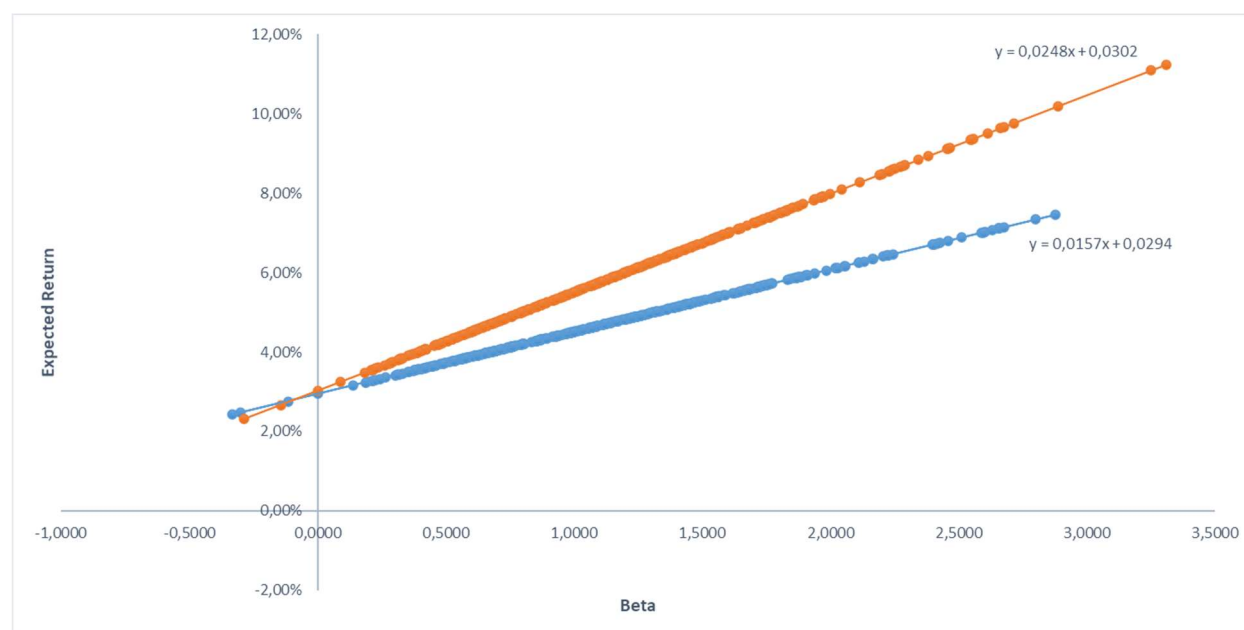

Chart 1. Security Market Lines estimated with CAPM and SCAPM. Source: personal work.

Main findings of the research are provided in the following tables. Each sector has been examined comparing CAPM and SCAPM. In particular, the average betas, alphas and expected

102

returns expressed on an annual basis have been estimated so that a full picture of every group of securities is provided. Furthermore, also the average R^2 as well as the maximum and minimum R^2 values are displayed for each sector.

	Construction			Consumer Products & Services		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	15,70%	15,93%	0,24%	8,47%	7,88%	-0,59%
max. R^2	47,81%	50,28%	2,48%	40,01%	40,39%	0,38%
min. R^2	1,65%	1,67%	0,02%	0,17%	0,48%	0,31%
Alpha	0,00038	-0,00075	-0,00114	0,00504	0,00429	-0,00075
Beta	1,35	1,37	0,02	0,96	0,94	-0,03
Expected Return	5,07%	6,43%	1,36%	4,45%	5,34%	0,90%

	Energy			Healthcare		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	12,74%	12,82%	0,08%	7,42%	7,05%	-0,37%
max. R^2	23,68%	24,63%	0,95%	16,39%	18,17%	1,79%
min. R^2	4,17%	2,08%	-2,08%	0,37%	0,60%	0,23%
Alpha	0,00493	0,00347	-0,00146	0,01537	0,01474	-0,00063
Beta	1,78	1,80	0,02	0,75	0,74	0,00
Expected Return	5,74%	7,50%	1,76%	4,11%	4,86%	0,75%

	Industrial Products & Services			Plantation		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	10,79%	10,02%	-0,77%	15,97%	15,54%	-0,43%
max. R^2	32,01%	31,10%	-0,91%	37,51%	38,69%	1,19%
min. R^2	0,13%	0,05%	-0,08%	2,63%	2,50%	-0,13%
Alpha	0,00544	0,00455	-0,00089	0,00069	-0,00012	-0,00081
Beta	1,16	1,13	-0,03	0,98	0,98	0,00
Expected Return	4,76%	5,83%	1,07%	4,48%	5,46%	0,98%

	Property			Transportation & Logistics		
	CAPM	*SCAPM*	*change*	*CAPM*	*SCAPM*	*change*
R^2	13,37%	13,23%	-0,14%	12,19%	11,39%	-0,80%
max. R^2	40,97%	37,55%	-3,42%	27,80%	23,81%	-3,99%
min. R^2	0,05%	0,33%	0,27%	0,50%	0,93%	0,43%
Alpha	0,00358	0,00251	-0,00108	0,00035	-0,00058	-0,00093
Beta	1,31	1,31	0,01	1,15	1,14	-0,01
Expected Return	4,99%	6,28%	1,29%	4,75%	5,86%	1,11%

Table 1. Comparison of CAPM and SCAPM estimating averages for R^2, alpha, beta, expected return as well as maximum and minimum R^2 for each sector of Bursa Malaysia.

With regard to the alphas of the regressions, they are all lower than 1% yearly both with CAPM and with SCAPM. The healthcare sector represents the only exception with a slightly higher excess return. Comparing the two asset pricing models, alphas tend to decrease with the Islamic CAPM.

Indeed, securities with a positive alpha plot closer to the SML while securities with a negative alpha plot further from the SML. As a consequence, all the securities appear to be slightly shifted down in respect with the SML, when plotting their actual returns. Despite this trend, excess returns are statistically insignificant for most of the equities. In fact, we failed to reject the null hypothesis at a 5% level of significance for 351 out of 378 securities with CAPM and for 353 out of 378 securities with SCAPM. Hence, 92.86% of the sample with the first model and 93.39% of the sample with the second model have statistically insignificant alphas with a probability of 95%. Consequently, from this point of view both the asset pricing models appear to be effective in predicting the expected return of Bursa Malaysia's Islamic equities.

For what concerns the betas of the regressions, the average systematic risk estimated for each sector does not differ so much applying one asset pricing model or another. Construction, energy, industrial products & services, property, and transportation & logistics show a higher than 1 beta. Conversely, plantation and consumer products & services have a very close to 1 beta. Lastly, healthcare is the only sector analysed with a beta between 0 and 1. Examining the frequency distribution of betas, the Islamic CAPM approach shows a slightly broader extension, but cumulative distributions are rather similar. Indeed, about 80% of betas are in the first seven bins for both the populations and both the histograms are not normally distributed: they are skewed to the right with a higher concentration on the left side and few larger coefficients on the right side. Given the fact that some sectors have been removed from the analysis because of their lower number of Islamic equities, this examination of the betas may be limited. Hence, an extensive analysis of all the Islamic securities listed and traded on Bursa Malaysia may lead to a normal distribution of betas. In any case, in our tests the two asset pricing models do not vary significantly in the estimation of this measure.

Since the two asset pricing models lead to the same estimation of the beta for each sector, this measure has been compared to the systematic risk that is usually assessed by analysts. As a benchmark for the industry classification, the Morningstar Global Equity Classification Structure has been employed. Securities are divided into three major economic spheres: cyclical (with higher than 1 betas), defensive (with less than 1 betas), and sensitive (with very close to 1 betas). In Table 2, sectors of Bursa Malaysia that have been tested in this research are shown. For each one of them, average betas estimated with CAPM and SCAPM are presented. Then, they have been classified according to the Morningstar Global Equity Classification Structure. In the last column, it is possible to see the classification that would have been assigned by the same system if sectors had been made up of conventional securities only.

Sector	Beta CAPM	Beta SCAPM	Classification	Morningstar
Construction	1,35	1,37	Cyclical	Cyclical
Consumer Products & Services	0,96	0,94	Defensive	Defensive
Energy	1,78	1,80	Cyclical	Sensitive
Healthcare	0,75	0,74	Defensive	Defensive
Industrial Products & Services	1,16	1,13	Cyclical	Sensitive
Plantation	0,98	0,98	Defensive	Defensive
Property	1,31	1,31	Cyclical	Cyclical
Transportation & Logistics	1,15	1,14	Cyclical	Sensitive

Table 2. Comparison of the industry classification on the basis of the findings of this work and the Morningstar Global Equity Classification Structure.11

Looking at Table 2, five out of eight industries do not have a different systematic risk in comparison with the classification that is assigned to conventional sectors by the Morningstar system. Indeed, the "Islamic version" of the construction, consumer products & services, healthcare, plantation and property sectors have the same systematic risk that is estimated by analysts for their conventional counterparts. However, since their average beta is very close to 1, the consumer products and the plantation sectors should be considered as sensitive industries. Nevertheless, their frequency distributions lead to evaluate them as defensive sectors. Three Islamic industries display a different classification if compared to the one that is assigned by the standard system. The findings of this work indicate that the energy, industrial products & services and transportation & logistics sectors composed of *Shari'a* compliant securities are cyclical industries with a higher than 1 beta. Conversely, their conventional counterparts are classified as sensitive sectors by the Morningstar system, thus with a very close to 1 beta. The greatest difference is shown by the energy industry, but this may be due to the fact that oil and gas stocks show higher betas in emerging markets. Securities of these three sectors should be furtherly tested in other capital markets in order to understand if these differences are due to inner characteristics of *Shari'a* compliant equities.

Finally, the most relevant findings are the ones concerning the R^2 values of the regressions. With regard to the conventional CAPM, the R^2 coefficients do not appear so high on average: just from 7.42% for the healthcare sector to 15.97% for the plantation sector. Such low values lead us to think that CAPM represents an effective model in explaining the risk-return relationship of Bursa Malaysia's Islamic equities only with regard to one factor, i.e. the market risk. In fact, even though maximum coefficients of determination reach up to 47.81% for the construction sector and 40.97% for the property sector, on average they tend to show a weak explanatory power of the model. As a consequence, there must be other factors that have not been included in the model, affecting the expected return of the sample. Hence, the traditional Capital Asset Pricing Model should be extended to other factors in order to have a fully effective approach.

The same conclusions drawn for CAPM can be applied to SCAPM. Also in the latter case the coefficients of determination tend to be rather low on average, ranging from 7.05% for the healthcare sector to 15.93% for the construction sector. The highest peaks for this measure are shown by the construction sector and the consumer products & services sector, with 50.28% and 40.39% respectively. Consequently, also the *Shari'a* compliant CAPM represents a good starting point in explaining the risk-return relationship of Islamic securities but it needs to be extended to other factors. In general, those sectors whose risk-return relationship seems to be more effectively explained by CAPM and SCAPM are construction, plantation, and property sectors.

With regard to the differences in R^2 between the two asset pricing models, the coefficients tend to be rather steady. On the one hand, the explanatory power slightly increases from CAPM to SCAPM for the construction and energy sector. On the other hand, it moderately decreases for all the other sectors. Trying to furtherly examine the differences in means of the R^2 values, a two-sample t-test has been performed on each of the R^2 means. The ultimate purpose of such a test is to determine if the difference between two means is significant or if it has happened by chance. In this case, our aim is to understand for each sector if the mean coefficient of determination yielded by SCAPM is significantly different from the one obtained with CAPM. Since we have failed to reject the null hypothesis in all of the cases, we infer that there is no significant difference between the average coefficients of determination computed with CAPM and the ones estimated with SCAPM. We can conclude that the *Shari'a* Compliant Asset Pricing Model has the same explanatory power of the conventional Capital Asset Pricing Model in estimating the expected return of Bursa Malaysia's Islamic equities.

In conclusion, the tested SCAPM represents an Islamic law compliant version of CAPM that can have a similar effectiveness in explaining the risk-return relationship of Islamic securities. However, as mentioned above, other factors need to be included in the research so to provide a fully effective asset pricing model. In this way, more than one portfolio would be used to capture different components of the systematic risk. Other multifactor asset pricing models, such as the Arbitrage pricing theory and the Fama-French three-factor model may represent an appropriate alternative in this sense. In the Arbitrage pricing theory, the expected return of a security is linearly related to a number of macroeconomic variables that capture systematic risk. Some examples of these latter variables are fluctuations of interest rates, inflation, GDP, exchange rates and oil prices as well. On the other hand, the Fama-French three-factor model uses firm characteristics that empirically seem to proxy for exposure to systematic risk. In such a case, the variables chosen to capture risk are firm size, book-to-market ratio, price-earnings ratio and the like. The latter represents the dominant approach to specify factors as candidates for sources of systematic risk, hence the method implemented in this research could be refined following this process.