



Islamic Financial Engineering at the Crossroads: Between the Need for Hedging and the Compliance Requirements

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Abstract

Financial engineering is a vital need for the prosperity of Islamic finance. It offers solutions to create new opportunities, expand the existing market and create market niches for Islamic financial institutions. Despite its importance, the literature on Islamic financial engineering is scarce, and almost nothing exists from a practice perspective as this aspect is very secretive within Islamic financial institutions. The present paper is a theory-based-research attempting to gather, analyze in depth and present the thematic of Islamic financial engineering and related issues to its application, especially for market risk hedging. We first start with the theoretical background of Islamic financial engineering to identify its principles and understand the challenges it faces. As a case study, we delimit our research to Islamic explicit derivatives, which are designed instruments to hedge market risk. The analysis of those instruments shows that the current path of Islamic financial engineering is towards imitation and replication of conventional products rather than designing genuine conceptual alternatives. Finally, we argue that the imitation strategy is not inevitable; it is possible to do without within the mutuality framework.

Keywords: Islamic financial engineering, hedging, Islamic derivatives

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1. Introduction

Financial engineering (FE) has several connotations and might have different meanings in different contexts. According to Finnerty (1988), FE encompasses the design, development, implementation and formulation of creative solutions to problems in finance. It is the process of employing basic financial tools to build complex structures in order to provide a suitable design for a new financial innovation (Alamad, 2017). The FE involves the design and evaluation of financial products that offer better risk-return combination while improving the profitability of the issuing institution (Al-Suwailem and Hassan, 2011). The output of FE may be a new consumer-customized financial instrument, new security or new process that ultimately results in the lowering of funding costs, increasing return on investments or expanding opportunities for risk sharing (Iqbal and Mirakhor, 2011). In the financial world, FE relates mostly to mathematical modeling of financial products with a particular aim of pricing financial derivatives and other financial structures (Al-Suwailem and Hassan, 2011). From a *Shariah* point of view, several principles should be respected when it comes to FE. Thus, Al-Suwailem (2006) suggests that Islamic financial engineering (IFE) is best described as a set of principles and strategies to develop innovative financial solutions. Indeed, as the operations and financial products offered by Islamic Financial Institutions (IFIs) are different from those of conventional banking, it is also the same regarding financial innovation and engineering (Alamad, 2017).

The process of FE can be viewed as either building complex instruments using basic building blocks or unbundling and repackaging different components of existing financial instruments (Iqbal, 1999). According to Iqbal and Mirakhor (2011), the types of financial innovation activities that have the most significant impact on the markets are those that enhance liquidity, transfer and share price and credit risk and, finally, generate

revenues from credit and equity. The phrases FE, financial innovation and new product development process (PDP) are often used interchangeably; they form a family that leads to change and innovation. In practice, financial innovation is the generation of new ideas for a financial product to be built using FE within an overall process (i.e., set the steps) that is commonly known as PDP (Alamad, 2017).

Product development, within the Islamic finance (IF) framework, refers to the process of assets development through innovation and research, in the form of products and services, to satisfy consumer demand while respecting the precepts of *Shariah* or reengineering existing conventional products to make them *Shariah*-compliant (Ayub, 2007). Thus, two different approaches are to be considered as part of IFE; an innovative approach and a reverse engineering approach. The FE is of great importance for IF; its survival and development will depend on the degree of innovation and the originality of the offered products to investors willing to invest in compliance with *Shariah*. Besides, FE can create new opportunities, expand the existing market and create market niches for IFIs. Consequently, the IFIs will be able to offer more products to a broader range of customers and provide the market with an abundance of choices (Lahsasna and Hassan, 2011). The present paper firstly discusses the principles of IFE. These principles are necessary to set the basic requirements of IFE and measure the extent to which the current practices depart from these latter. Afterward, the challenges facing the IFE are presented and analyzed since they are crucial in understanding the current path of IFE. The third section of the paper gives examples of designed Islamic explicit derivatives (IEDs) to manage market risk. The choice of hedging as the primary concern of this paper can be justified on two grounds. First, many observers acknowledge that the IF industry will not sustainably be able to continue its growth, and may even regress, without a proper market risk management framework (Ayoub, 2013). On the other hand, risk management is the most significant activity within FE, to the point that this latter is sometimes made equivalent to financial risk management (Fabozzi and Drake, 2009). Al-Sabhany (2019) pointed out that hedging purposes overwhelmed the FE, and this latter is likely to become concerned solely by finding solutions to hedging problems. This is not surprising since FE is mainly in demand because the financial world has become riskier (Azmi *et al.*, 2015). In the last section, the IEDs compliance with the principles and objectives of IFE will be discussed.

2. Principle of Islamic Financial Engineering

Beekun and Badawi (2005) argued that Islam is a full way of life, not just a religion. Accordingly, when we address the subject of IFIs, we should bear in mind that the noun ‘finance’ suggests that these institutions deal with financial credit and risk allocation. Thus, IF must be, in essence, similar to other forms of finance. However, the adjective ‘Islamic’ suggests some fundamental differences between IF and its conventional counterpart (El-Gamal, 2006). That said, business ethics and the *Shariah* objectives cannot be ignored or separated in FE and product development (Alamad, 2017), which is also the case for any field within IF. Therefore, the IFE is governed by a set of principles¹ that distinguish it from its conventional counterpart.

2.1 Principle of balance

According to Al-Suwailem (2006), this principle stresses the balance between self-regarding and other-regarding interests, between for-profit and non-profit activities, between competitive and cooperative relations. Therefore, there should be a balance between personal interests and those of society and between for-profit activities and charitable ones. The balance principle puts the approach of IF halfway between capitalism and communism. Accordingly, social welfare, the greater good and benefit of individuals and society should be the motivation to any financial innovation (Alamad, 2017). As a corollary, instead of seeking profit maximization by any means, as an objective of FE, Islam encourages value maximization within the boundary of ethical principles (Alamad, 2017). According to Iqbal and Mirakhor (2011), by keeping the objectives of *Shariah* in sight, the FE will lead to an increase in overall social welfare.

The balance principle is generally backed by cooperation that should be promoted in parallel with competition to achieve higher goals. Indeed, objectives can be achieved more effectively through a cooperative approach instead of the recommended arrangements and contracts under conventional finance (Al-Suwailem, 2006). El-Gamal (2007) argued that mutual structures (i.e., based on cooperation), in financial intermediation

¹ We adopt the division made by Al-Suwailem (2006), Al-Suwailem and Hassan (2011) and Iqbal and Mirakhor (2011).

of credit and risk, are a solution that can help significantly in implementing the substance of *Shariah* as well as its forms. In practice, mutuality is essential for IFE since it has the power of deactivating *riba* (interest) and *gharar* (uncertainty), which do not apply to donations. The principle of balance will prevent developing zero-sum structures where the payoffs of one agent are the negative of the other.

2.2 Principle of acceptability and freedom of contract

This principle is a cornerstone of IFE. It stipulates that there is no limitation to innovation and creativity as long as it does not cause more harm than good. Accordingly, individuals have full freedom of contract, and the contracting parties are free to engage in any transactions not prohibited by *Shariah* (Iqbal and Mirakhor, 2011). In practice, it is necessary to ensure that a transaction or a contract is not vitiated by *haram* and does not contain elements of *gharar*, *riba* or injustice. When we face a discrepancy about the illegal aspect of a contract, the proof is borne by the party believing that it is *haram*. The freedom of contract implies that transactions are permitted unless a legal text stipulates the opposite. Nevertheless, one should distinguish a contract or a transaction considered as *halal* from the financial instrument used to facilitate its implementation, which could be *haram* (Mirakhor, 2010). For example, *murabahah* is accepted by scholars as it is described in fiqh books, while the use of the binding promise to structure the deal is highly controversial. The principle of acceptability has significant implications. It will provide IFE with the basic building blocks to be used to structure more complex financial instruments with specific characteristics regarding risk and return.

2.3 Principle of integration

One of the key differentiators between conventional and Islamic product development is that the latter is either asset-based or asset-backed (Alamad, 2017), which is a direct consequence of the principle of integration. This latter emphasizes that financial and economic activity should be tied together. The linkage between the two spheres will prevent the emergence of a dichotomy between the real and the financial sector. This dichotomy is problematic since Islam promotes the integration of the two sectors to achieve balance and sustained economic growth. Thus, the IFE should rely on asset-linked securities (Iqbal and Mirakhor, 2011) since money-for-money instruments are unacceptable if performed for profit (Al-Suwailem, 2006).

The argument of using conventional derivatives to manage risk may, therefore, be challenged because these instruments evolve independently of the real economy. Indeed, the notional value of outstanding derivatives worldwide reached US\$ 648 trillion in 2020 (SIFMA, 2021), which is greater than 7.5 times the global GDP during the same period². Al-Suwailem (2006) pointed out that conventional derivatives operate a risk commoditization by creating a market for it. Such a situation will, in the long run, result in risk proliferation rather than risk reduction.

The principle of integration has several implications for IFE. Indeed, the realm of Islamic contracts, which are usually used for trading, financing and investing, should be extended to serve other purposes (e.g., hedging).

2.4 Principle of consistency

Consistency is a fundamental principle of IFE. It stresses that the form and the substance of an Islamic product must be consistent with each other; the product's form is to serve its substance. In general, *Shariah* emphasizes that every contract must comply with its legal form, its essential requirements and its nature and implications (Hamour *et al.*, 2019). Therefore, any attempt to develop a product or a process that runs not adhering to the objectives of *Shariah* will not be accepted. If we consider the case of *murabahah*, which is deemed a *halal* financing transaction, one must pay attention to form's rules that can render it illicit (e.g., the sale of a commodity before its possession). In sum, both the form and the substance of a contract are binding. Nevertheless, many studies raised various criticisms on the application of certain techniques to validate the contracts as *Shariah*-compliant, while their economic substance is quite similar to their conventional counterparts (Hamour *et al.*, 2019). These form over substance techniques, which are paradoxically based on IFE, lead to a growing substance gap in the IF industry. It is worth noting that the debate on Islamic derivatives amounts mainly to a fundamental dispute over form versus substance in Islamic law (Uberoi and Khadem, 2011). The debate has given attention to the application of "form," hence circumventing the "economic substance" of Islamic financial transactions, which raises concerns regarding how authentic some Islamic

² According to the World Bank's website, the global GDP is valued at US\$ 84.86 trillion during 2020 (see, <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?end=2020&start=1960&view=chart>).

financial transactions are (Hamour *et al.*, 2019). The consistency principle calls for much diligence in the application of form or substance when developing *Shariah*-compliant products and services to ensure the compliance of the contracts in line with their objectives (Hamour *et al.*, 2019).

3. Challenges Facing Islamic Financial Engineering

The pace of IFE development has been very slow compared to the conventional one (Iqbal and Mirakhor, 2011). This delay is attributable partly to a set of challenges it faces. Besides the existing regulatory framework that does not accommodate the nature of Islamic financial products (Alamad, 2017), IFE is facing many other challenges.

3.1 A fragmented Shariah approach

Shariah governance plays a key part in deciding whether the financial innovation or product is acceptable to be developed and offered in the market by an IFI or not (Alamad, 2017). Indeed, introducing a new product requires considerable effort as it has to receive approval from *Shariah* scholars, not all of whom are necessarily well-versed in economics and quantitative finance (Iqbal and Mirakhor, 2011).

Differences of opinion and interpretation regarding the commandments about the economy and transactions can hinder the progress of the Islamic financial industry. This heterogeneity testifies to the difficulties of reconciling financial innovation with a principled interpretation of different sources of religious doctrine via analogous deduction (i.e., *qiyas*), independent analytical reasoning (i.e., *ijtihad*) and scholarly consensus (i.e., *ijma'*) (Rafay *et al.*, 2016; Jobst, 2013). However, if these differences are handled within the agreed-upon principles, it will provide a fertile environment for innovation and creativity. These differences will be considered as diversity in the application of *Shariah* instead of inconsistencies and contradictions (Al-Suwailem and Hassan, 2011). A study conducted by the International *Shariah* Research Academy for Islamic Finance (ISRA) on *fatwas* (Islamic rulings) reveals that there are more similarities than differences in *Shariah* resolutions between Asia and the Middle East, contrary to popular belief (Noripah and Tsu, 2013). This convergence is a good sign that the Islamic financial industry is going toward standardization and harmonization.

3.2 The product development process (PDP) in Islamic finance

The lack of a systematic and well-defined PDP within IFIs is one of the biggest challenges to innovating new products. In practice, the new Islamic products are introduced by imitation of other Islamic banks or, worse, the conventional ones. It is worth noting that conventional banks are leaders in developing Islamic products. Since the environment in these institutions is not Islamic, these products become a simple adaptation of conventional products instead of original value-added products (Al-Suwailem and Hassan, 2011). However, one should keep in mind that imitation is among product development strategies. It is by far the easiest strategy because the target of the development process is already known. Therefore, imitation can help, especially in the early stage of IF (Al-Suwailem, 2006). El-Gamal (2006) pointed out that Islamic banks are primarily mimicking the financial products offered by conventional banks rather than creating genuine Islamic financial products that serve the real economy. Effects of imitation can be harmful in the long term due to the emergence of path dependencies; if we maintain imitation, change is made increasingly difficult (Mirakhor, 2010). Hence the need to move from imitation to mutation and, finally, to a FE that is based on the customers' needs.

3.3 The specialized institutions and developed markets

The developed products will not work in a vacuum; they must be implemented by institutions whose structure is critical to define the appropriate products (e.g., equity investment is more suited to venture capital funds and investment banks than to commercial banks) (Al-Suwailem and Hassan, 2011). According to Belabes (2020), the path to follow by the products is decided by the current system of financial markets. Institutions and markets will play a key role in testing, approving and marketing the new products. In practice, specialized institutions can be assimilated to "labs" or "factories" without which a new product could not prove its practical scope and effectiveness. Besides, without suitable markets, designed financial solutions remain mere ideas or prototypes (Belabes, 2020).

It is worth noting that developed products within the IF framework lack a secondary market (Ibrahim, 2019; Ajmi *et al.*, 2014), which prevents IF from operating in large parts of the world. The small Islamic secondary markets currently lack depth and breadth (Noripah and Tsu, 2013). Regarding conventional markets, they are equipped with tested, liquid, well-established and standardized instruments. This situation will render the launch of new [Islamic] products, which are not approved by the major players in the field, difficult (Iqbal, 1999).

3.4 Gaps within the theoretical framework

The interest rate has always been an important variable in portfolio theory, general capital theory and to practitioners (Merton, 1973). Indeed, modern finance theory and subsequent financial innovations hinge on the concept of a predetermined interest rate, which has become an integral part of all major asset-pricing models (Iqbal, 1999). Even in lending, the risk of losing the principal as well as interest coexist, but a great deal of attention is paid to the risk element in fixing the rate of return (i.e., interest) (Knight, 1921). Therefore, any attempt of FE to create a new instrument without any reference to interest appears to be a challenging task (Iqbal, 1999).

The concept of time value of money forms the basis of major financial decisions. Cash flows occurring at different points in time are not comparable; they cannot be added or subtracted without computing their time-adjusted equivalent values (Obaidullah, 2007). For many researchers, discounting does not comply with *Shariah* since it encompasses *riba* (Akkizidis and Khandelwal, 2008). Others proposed using a *halal* rate of return³ (Gharbi, 2016; Askari *et al.*, 2010; Mirakhor, 2010; Obaidullah, 2007) and those Islamic banks and financial institutions should strive for developing their benchmark. Nevertheless, one should distinguish the interest rate functions' and its institution (Naqvi and Qadir, 1986). A fundamental point that is missed by most Islamic critics of discounted cash flow (DCF) model is that the discount rate is not an interest rate in the sense of being a fixed rate of interest with no risk of capital loss; it is the yield investors expect given the uncertainties they face (Tomkins and Abdul Karim, 1987). Additionally, it is necessary to distinguish between the use of the interest rate to determine a *halal* profit and the fact of collecting interest on a loan, which is the forbidden *riba*. Thus, in a contract, it is not the method of calculation that must be considered, but the event giving rise to the remuneration (Causse-Broquet, 2012). The interest rate in IF is comparable to an instrumental variable that has no ontological content while being very useful for the valuation of assets and other financial calculations.

Finally, it is worth noting that although academic research on Islamic economics and finance has made healthy progress, it has not developed fully to the point where it can tackle some critical issues such as asset pricing, risk premium, risk mitigation and hedging (Kafou, 2020; Kafou and Chakir, 2015; Iqbal and Mirakhor, 2011).

3.5 Lack of specialists in the field of IFE

It is worth noting that the lack of qualified human resources is a general problem of IF. Indeed, *Shariah* scholars are in great demand, and many of them sit on multiple boards across the world (Alsartawi, 2019; Oseni *et al.*, 2016; Malek, 2013). The multitude of mandates is explained by some authors, not by competence, but because there is a shortage of *Shariah* scholars who will give the judgments (i.e., fatwa) that the IFIs are looking for (Al-Masri, 2009; Power, 2009). When it comes to the IFE, the problem of qualified human resources is more complicated since this field requires multidisciplinary expertise.

According to Iqbal and Mirakhor (2011), no effort to introduce FE into the Islamic financial system can take place without a proper understanding of its basic building blocks and principles that can be used to build more sophisticated instruments. While practitioners in the conventional capital market are well trained and have technical skills and expertise in the understanding of the risk and return of basic financial instruments, Islamic financial markets are lagging behind in their professional and research resources (Iqbal, 1999). It is, therefore, essential that multidisciplinary expertise, covering topics ranging from theological interpretation to financial structuring, be developed through knowledge-sharing, cross-training and acquiring an understanding of the functioning of markets (Iqbal and Mirakhor, 2011).

³ For example, the interest rate can be replaced with the average rate of return to the real sector of the economy or the GDP growth.

4. Application of Islamic Financial Engineering for Market Risk Hedging

Al-Sabhany (2019) argued that the conventional financial system was built upon an invalid basis (i.e., *faṣīd*) regarding many aspects. The first is that it tries to dissociate return from the risk of an investment, and, secondly, this risk is permitted to be transferred to a third party through agreed-upon contracts. Hedging in IF may seem to oppose the legal maxim of *al-kharaj bi-ḍaman*, which stipulates that entitlement to profits is subject to the responsibility for attendant expenses and possible loss (Kafou and Chakir, 2015). Nevertheless, *ḍaman* must be understood as guaranteeing the object of the contract (i.e., damage), not the market conditions surrounding it (i.e., price variations) (Al-Qari, 2008). Strong suggestions from *Shariah* on managing risk as a way of wealth protection and its preservation from loss or damage, which is in line with *Shariah*'s objectives, has led many scholars of the past and present to support hedging (Dusuki and Mokhtar, 2010; Razif et al., 2012). Thus, as pointed out by Al-Suwailem (2006), hedging is not an issue within IF; the issue is how to reach this goal and what means should be used to meet this end.

Islamic banks face a mixture of risks they share with conventional ones and some specific risks. Islamic banks share the market risk, credit risk and liquidity risk with conventional banks. Besides, the IFIs bear their specific risks; these include the displaced commercial risk, *Shariah* compliance risk and associated risks with profit-and-loss (PLS) financing modes. The displaced commercial risk arises when an Islamic bank is under pressure to pay its investment depositors a rate of return higher than what should be payable under the actual terms of the investment contract. This situation may occur when the bank has underperformed during a period and was unable to generate adequate profits for distribution to the account holders (Iqbal and Mirakhour, 2011). The *Shariah* risk can be defined as the possibility of a transaction being refused based on its non-compliance with *Shariah*.

Derivatives are powerful instruments in managing market risks. Nevertheless, conventional derivatives are, for many considerations, not permitted within the IF framework. Consequently, *Shariah*-compliant alternatives were structured. Islamic derivatives can be classified as implicit, legacy and explicit derivatives (Idris and Muhammad, 2018; Jobst and Solé, 2012). This section will deal with IEDs that are intended to hedge market risks.

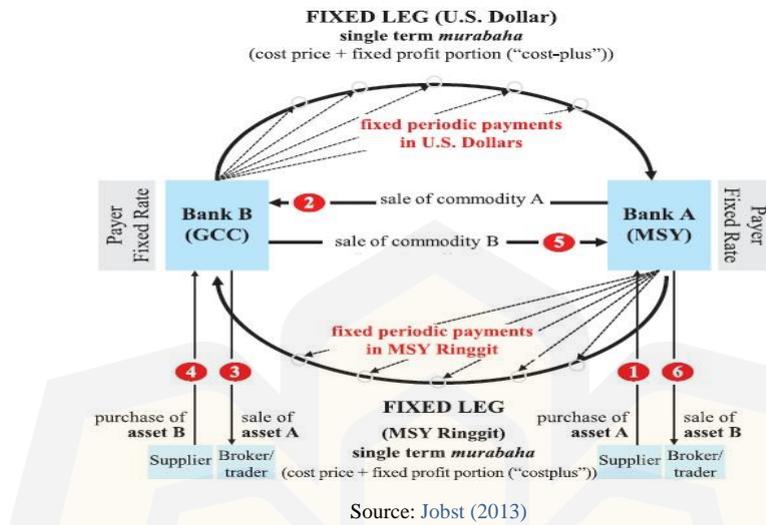
4.1 Currency risk hedging

Currency risk, also called exchange-rate risk, is the risk that the relative values of the domestic and foreign currencies will adversely change in the future (Fabozzi and Drake, 2009). This section deals with two instruments that can be used to hedge currency risk, namely *Murabahah*-Based Cross-Currency Swap (MB-CCS) and *Wa'd*-Based FX Option (WB-FXO).

4.1.1 *Murabahah*-based cross-currency swap

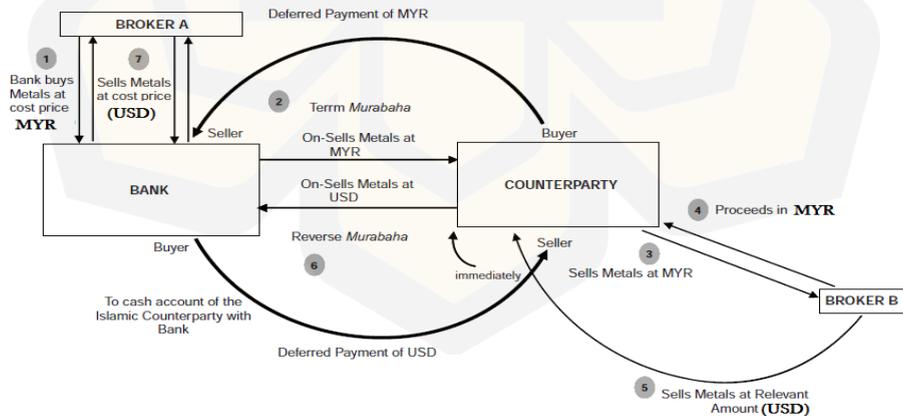
To understand the mechanism of MB-CCS, let us consider the example of an Islamic bank located in Malaysia, with incomes in Ringgit (MRY), facing USD payments over a fixed period. To cancel any currency mismatch, the CCS will substitute the bank's future cash outflows in USD for ones in MRY. To do so, the Malaysian bank can enter into an MB-CCS with a dollar-paying counterpart. The arrangement is structured as follows: The Malaysian bank buys a commodity "A" in local currency (step 1) and sells it to a foreign bank through a *murabahah* contract. Payments will be made in installments over an agreed-upon period (step 2). The foreign bank will sell a commodity "A" (step 3) and will buy a commodity "B" in USD (step 4) that it will resell to the Malaysian bank (step 5). The Malaysian bank will, in turn, resell the received commodity to one of its clients (step 6). The Malaysian bank will receive cash flows in MRY that will be assigned to the foreign bank while this latter will accept payments in USD that will be transferred to the Malaysian bank account. By combining the two *murabahah* contracts, each denominated in a different currency, both parties receive cash flows in the desired currency. Figure 1 shows the operation of the MB-CCS.

Figure 1: MB-CCS (USD/MYR)



The exchange rate used to calculate the amount of each installment is the prevailing rate at the moment of contracts' entry. Thus, the exchange rate is locked during the period of the MB-CCS. Note that when the CCS is used as described in Figure 1 (i.e., selling different commodities to different clients), nothing is objectionable about it as long as the commodities are not *haram* or require spot payment (e.g., gold). Nevertheless, this swap structuring will require having two parties with an identical profile (regarding the position in *murabahah*) but expressed in different currencies. Besides the low probability of such coincidence, hedging will be, in this case, driven by clients' demands, not the institutions' needs. Consequently, in real life, London Metal Exchange-traded metals, such as copper and aluminum, are often used as commodities. Moreover, clients and suppliers are replaced by brokers, and the same commodity is often traded between parties, as shown in Figure 2.

Figure 2: MB-CCS (MYR/USD)



These changes render the MB-CCS more realistic and adapted to the IFIs' needs. It is worth noting that, often, it is only one party that needs hedging. In this case, the agreed-upon mark-up in *murabahah* may include a risk premium whose direction and size will reflect the service rendered.

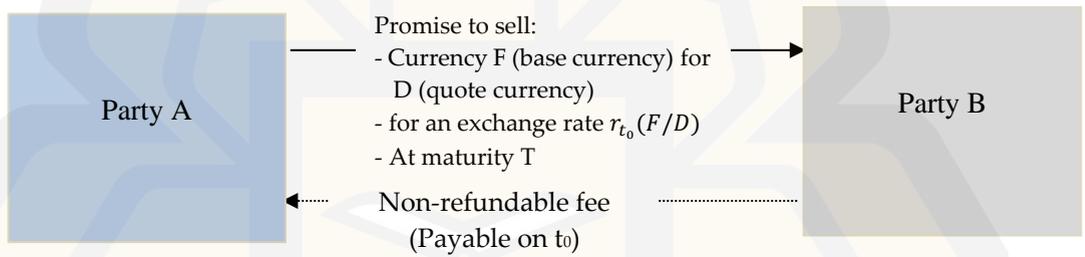
⁴ Here, some cash flows' currency was changed to reflect that the counterparty needs MYR for a specific period.

There were many applications of MB-CCS for currency risk hedging. In July 2006, Standard Chartered arranged the first such operation on behalf of Bank Muamalat Malaysia (Jobst, 2013). In October 2006, Citigroup designed a currency swap for the Dubai Investment Group (DIB) to hedge the currency risk on DIB's 828 million MYR (approximately £119 million) investment in Bank Islam Malaysia (Uberoi and Khadem, 2011). Standard Chartered Saadiq and DIB are marketing products based on *Shariah*-compliant CCS (ADIB, 2020; Standard Chartered, 2020).

4.1.2 *Wa'd*-based FX option

The *wa'd* (i.e., promise) is used to structure the WB-FXO. This product works as follows: One party "A" makes a promise to sell a particular amount of a currency "F" against another currency "D" at a predetermined date based on a predetermined rate $r_{t_0}(F/D)$ ⁵. The opposing party "B" acknowledges the issued promise without making any promise to "A." In return for the received promise, "B" will pay a non-refundable fee to "A" regardless of whether the promise will be enforced or not. Obviously, "B" will enforce the promise only if $r_{t_0}(F/D)$ is below the prevailing exchange rate at the maturity date. Figure 3 shows the mechanism of WB-FXO.

Figure 3: *Wa'd*-Based FX Option.



Source: by author

The WB-FXO bears a remarkable resemblance to the conventional FX options. Thus, the paid fee for the promise will not deviate from the conventional FX option's premium. In February 2009, the Gulf Finance House announced a partnership with Deutsche Bank in a foreign exchange hedging deal worth over 30 million Euros (39.4 million USD) using a WB-FXO (Uberoi and Khadem, 2011). RHB Islamic Bank Berhad also markets WB-FXO structures (RHB Bank, 2019).

4.2 Profit rate risk hedging

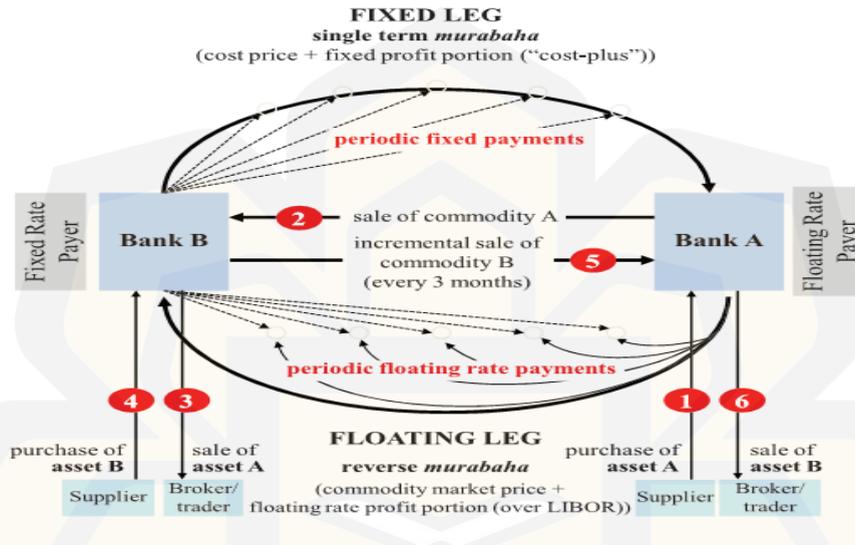
The profit rate risk may be viewed as an Islamic version of interest rate risk. This latter is the risk of interest rate change, resulting in a change of the value of a claim or investment. For a financial institution, the interest rate risk is the risk to earnings or capital arising from differential changes in the value of assets and liabilities as interest rates shift (Morrison and Pyle, 1978). Because of interest payment and receipt prohibition, it is usual to admit that the IFIs do not face interest rate risk. However, these latter are indirectly affected by this risk because of their profit rate offer. In practice, many IFIs use LIBOR as a benchmark in their profit rate calculation. Thus, if these benchmarks change, IFIs can face the interest rate risk in the sense of their paying more profit to future depositors as compared to receiving less income from the users of long-term funds (Al-Amine, 2008).

The IFIs can use the *Murabahah*-Based Profit Rate Swap (MB-PRS) to manage their exposure to fixed and floating rates of profit. Thus, a bank "A" wishing to convert a portion of its income from a floating to a fixed rate of profit may enter into MB-PRS with another bank "B" needing to carry out the opposite position. The deal is structured as follows: Bank "A" buys a commodity to bank "B" for a fixed rate of profit. The latter will

⁵ That is the number of units in currency "D" needed to buy one unit of currency "F."

buy another commodity and resell it to the bank “A” at its market price plus a floating rate of profit. In fixing this rate, banks use a benchmark (e.g., LIBOR), and the profit rate is often equal to LIBOR plus a fixed number of basis points. Bank “A” will pay a floating rate of profit and buys the commodity by periodic increments every three months⁶ as opposed to bank “B,” which buys the entire quantity at the MB-PRS’s inception. The MB-PRS implies the full and effective payment on each due date, and both parties sell their commodities to recoup their initial pay-out. Figure 3 shows the mechanism of MB-PRS.

Figure 3: Murabahah-Based Profit Rate Swap



Source: Jobst (2013)

As for MB-CCS, metals such as copper and aluminum are often used, the clients are replaced by brokers, and the same commodity is traded between the parties. Thus, the same adjustments of MB-CCS are to take into consideration⁷. Usmani (2012) argued that using interest rate as a benchmark does not render a transaction invalid, *haram* or prohibited, because the deal itself does not contain interest. The MB-PRS was introduced by the Commerce International Merchant Bank of Malaysia in 2005. In October 2006, Standard Chartered Saadiq entered into a 150 million USD three-year profit rate swap with Kuwait-based Aref Investment Group SAK (Uberoi and Khadem, 2011). Standard Chartered Saadiq is still offering *Shariah*-compliant PRS (Standard Chartered, 2020).

4.3 Hedging price risk using wa‘d based total return swap

The price risk is the risk of a price decline or a loss due to adverse price movement (Fabozzi and Drake, 2009). Managing such a risk is crucial for IFIs. In practice, the risk of equity portfolios and commodities, which are widely accepted as *Shariah*-compliant investments, is primarily a price risk. The wa‘d Based Total Return Swap (WB-TRS) was introduced to deal with such a risk.

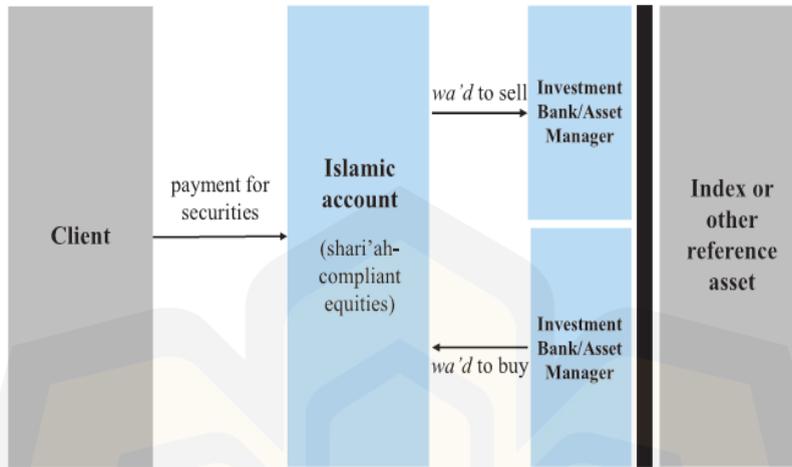
4.3.1 Modus operandi

The WB-TRS was launched in 2007 by Deutsche Bank. It was a controversial product because it allows Muslim investors to get the performance of non-*Shariah* compliant assets (Atallah and Ghoul, 2011). The WB-TRS is structured using a double binding promise. The first is a promise to sell a *Shariah*-compliant asset, and the second is a promise to buy this latter at a price that will be set according to an agreed-upon benchmark. The asset, the portfolio or the index serving as a benchmark may be Islamic or conventional. The mechanism of WB-TRS is described in Figure 4.

⁶ Three months can be replaced by any period depending on the benchmark’s change frequency.

⁷ Cf. Uberoi and Khadem (2011) for such a configuration of MB-PRS.

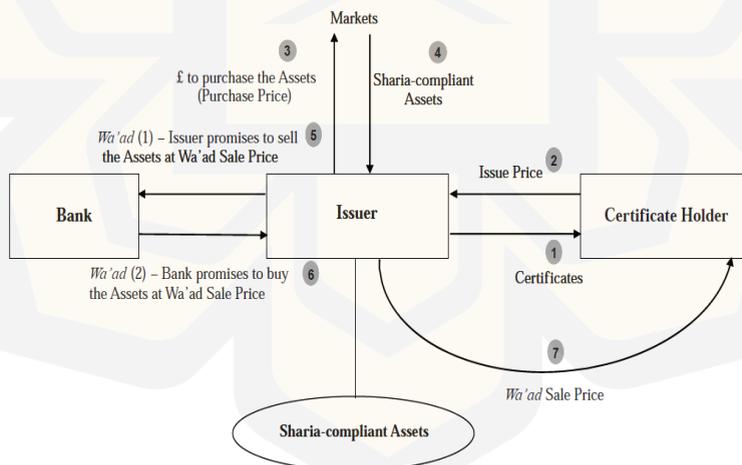
Figure 4: WB-Total Return Swap



Source: Jobst (2013)

The WB-TRS can also be structured using an SPV to issue trust certificates. The WB-TRS will, in this case, link the return of the certificates to the desired benchmark rather than the performance of the underlying assets. This way of structuring will help to issue *sukuk* that mirror perfectly the cash flows of conventional bonds. Figure 5 explains the mechanisms of WB-TRS with investment certificates issuance.

Figure 5: WB-Total Return Swap with investment certificates issuance.



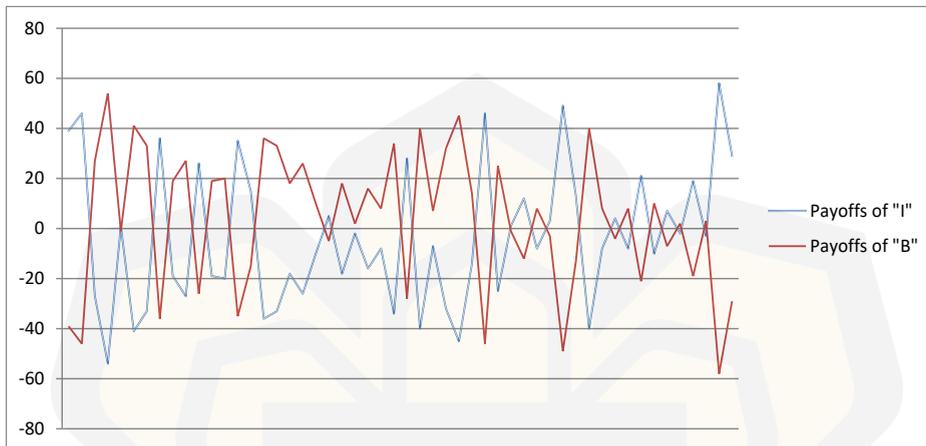
Source: Uberoi and Khadem (2011)

4.3.2 Profit and loss analysis

Consider an investor “I” with a *Shariah*-compliant asset “C” valued at 100 for which he wants to swap the profit by entering into a WB-TRS with another investor “B.” The chosen benchmark is a conventional mutual fund whose current value is 100. Thus, each party issues a binding promise to sell or buy “C.” At the maturity date, if the price of “C” is lower than the benchmark, the investor “I” will enforce the promise to buy. He will collect the benchmark’s price in the counterpart of his *Shariah*-compliant asset. As a result,

he will make a gross profit⁸ equal to the price difference between the benchmark and the asset “C.” In the opposite scenario (i.e., $C > \text{benchmark}$), investor “B” will require fulfilling the agreement to sell asset “C” against the payment of the benchmark’s price. The patterns of profits and losses for both parties are given in Figure 6.

Figure 6: P&L for a random simulation of price changes of asset “C” and the benchmark.



Source: by author.

Figure 6 shows that WB-TRS is a zero-sum game (ZSG). Indeed, losses of one party are gained by the other. The ZSG schemes are very far from the spirit of Islam and the principles of IFE, especially the principle of balance. Thus, the WB-TRS may seem *Shariah*-compliant, but its essence is not in line with *Shariah*'s objectives. Besides, the associated risk with the WB-TRS is important and can expose investors to toxic assets. Another issue with the WB-TRS is allowing access to the performance of non-*Shariah* compliant assets. Using a conventional benchmark in the WB-TRS is problematic and cannot be compared to the use of LIBOR for pricing. As explained by DeLorenzo (2007), while the LIBOR is used to indicate the return, the benchmark in the WB-TRS is used to deliver the return.

5. Discussion of IEDs' Issues

The prevailing opinion of the non-permissibility of conventional derivatives has left IF short of risk management tools (FitchRatings, 2020; Kafou and Chakir, 2015). In this context, a middle position emerged. This latter asserts that although conventional derivatives fail to comply with some of the formal and substantive requirements of Islamic law, these obstacles may, nevertheless, be overcome by drawing upon the rich internal resources of Islamic jurisprudence (Nafis, 2019; Kafou, 2017; Uberoi and Khadem, 2011). This position was the influential motivation behind IEDs that, to preserve *Shariah* compliance, should be used only for hedging purposes. Besides, the IEDs must meet the needs of the contracting parties without complexity in their implementation.

According to Al-Suwailem (2004), to go mainstream, Islamic products must satisfy two properties: *Shariah* compliance and economic efficiency. The first one is best achieved by avoiding the areas of *khilaf* (i.e., diverging opinions among scholars). For the second, the developed products within IFE must be, at least, as economically effective as conventional ones. After a brief description of the main IEDs in the previous section, it is clear that they fail to satisfy neither the first property nor the second. Even more, those products violate the core principles of IFE. For the MB-CCS⁹, it is easy to see that its *Shariah* compliance is debatable. Indeed, MB-CCS involves many of *bay' al-wafa'*¹⁰. The first is between the Bank and Broker “A,” the second is between counterparty and broker “B,” and the third is between the bank and counterparty (see, Figure 2). The arrangement may be worse if the used exchange rate is different from the spot one, leading to *bay' al-'inah*.

⁸ Both parties may incur several transaction costs, fees and taxes.

⁹ Note that the same criticism also applies to MB-PRS.

¹⁰ *Bay' al-wafa'* is a sale where the seller has the option to buy back a commodity.

The WB-FXO, in turn, embodies many violations of *Shariah*. On the one hand, the binding promise is highly controversial when used for commutative transactions. On the other hand, the WB-FXO allows paying for a contingent claim, independently from the sale contract, which is deemed illicit in IF (Al-Suwailem, 2006). The ZSG structure of payoffs is a common feature of WB-FXO and the WB-TRS. Besides, the WB-TRS is structured using a bilateral binding promise. The two promises to buy and sell the same asset sum up to a bilateral binding promise.

When analyzing the IEDs of the previous section, it appears that they are mainly structured using the imitation strategy. In practice, if one tries to figure out the difference between the WB-FXO and a conventional FX option, the answer would be “nothing,” especially when it comes to the conceptual side. Differences may only emerge from pricing, transferability or other technical details. Malek (2013) pointed out that the goal of IEDs is to replicate, as accurately as possible, conventional derivatives rather than being genuine conceptual alternatives. This replication is “blatant” in the case of the WB-FXO, while it is more “hidden” in the MB-CCS. Since imitation implies the same objective of conventional instruments, but with the additional constraints of *Shariah* rulings, it follows that Islamic products will always be inferior to conventional ones (Al-Suwailem, 2006).

According to Kamali (1999), the applied aspect of derivatives is mainly a question of designing suitable trading formulae and products that would appeal to the market participants and ensure the viability and survival of this line of trading on the market floor. Thus, the requirement is not only that Islamic derivatives can function as risk management tools; it is also crucial that their price be competitive. Nevertheless, as explained by Mohamed et al. (2013), the requirement to be *Shariah*-compliant, for some companies, may render pricing less of an issue. It is the case because these companies are choosing within the Islamic space, not from the entire universe comprising both conventional and Islamic products.

The first major problem of IEDs is the multitude of sales and purchases for the sake of form. In practice, the set-up of IEDs is quite complicated and involves many parties and transactions, which will undoubtedly increase their cost. For example, the intervention of brokers and the use of commodities are just a matter of form in the MB-CCS. With its complexity and additional costs, it is hard for the MB-CCS to compete with its conventional counterpart. In most cases, the IEDs are backed by stocks of non-precious metals (e.g., copper) (Uberoi and Khadem, 2011), which are often resold several times without leaving their warehouses (Awidah, 2010). This process will produce huge transaction costs for the only purpose of creating a form of integration that Al-Suwailem (2006) called “artificial integration.” Ayoub (2013) pointed out that such activity is likely to result in distortions in commodities’ pricing due to artificial elements of supply and demand, which, in turn, has negative implications to their users in the real sector who have no relation whatsoever to the swap contract. Al-Sabhany (2019) argued that giving complete freedom to financial markets and institutions may be detrimental to the real economy.

Introducing other parties (e.g., brokers) and trades (e.g., buying and selling) into a deal will result in the loss of the deal’s *Shariah* qualification. A mechanism that El-Gamal (n.d) called “degrees of separation.” According to El-Gamal (n.d.), the idea of making a transaction *halal* by using degrees of separation is not new; it underlies most schemes (i.e., *hiyal*) to circumvent *Shariah* restrictions. As a result, simplification rules are necessary for IFE to requalify a transaction. DeLorenzo (2007) argued that the objective of some structures’ mechanism (e.g., WB-TRS) is to use non-*Shariah* compliant assets and their performance to bring returns into a so-called *Shariah*-compliant investment or investment portfolio. He qualified this stratagem as “*Shariah* Conversion Technology.”

The binding promise is another major problem of IFE. According to Al-Masri (2002), the debate among the early scholars about the bending promise was moved from the category of the voluntary offer (i.e., *tabarru’āt*) to that of the commutative contracts (i.e., *mu’āwadāt*). It is worth noting that the Islamic Fiqh Academy (IFA) ruled that the unilateral promise is by religion binding except where otherwise justified and can also, sometimes, be judicially binding (IFA, 1988; Al-Masri, 2002). A relevant criticism of the unilateral binding promise is its use as an alternative to a proscribed contract, such as selling goods that are not in one’s possession (Al-Masri, 2002; Al-Sabhany, 2019). Using unilateral binding promise for hedging will result in arrangements where the objective is neither reducing nor sharing the risk; the concern becomes about who accepts to bear the risk when others decide to avoid it. In practice, the unilateral binding promise is a way to introduce ZSG schemes into the IF. It is worth noting that the bilateral binding promise (i.e., *muwa’ada mulzima*) is ruled out

even by the IFA. For Hamour *et al.* (2019), having a different substance from what it was initially intended for does not necessarily make the use of wa'd erroneous; it must be evaluated based on its new effect in society.

The use of controversial building blocks (e.g., binding promise and *tawarruq*) to structure IEDs may raise some divergence regarding compliance and, thus, a legal risk. Legal risk [for a derivative contract] is the risk that the legal system will fail to enforce a contract (Chance and Brooks, 2010). In the case of IEDs, this risk is compounded. Indeed, if the transaction is governed solely by *Shariah* law as a matter of form, the opinion of *Shariah* courts could override commercial legal concepts, which might requalify the legal nature of a transaction (Jobst and Solé, 2012). As a result, the outcome of the IEDs becomes unpredictable, which brings some additional uncertainty to the position to hedge. To get around different interpretations of *Shariah*, experts recommend developing products that are more broadly accepted by most jurisdictions (Ghoul, 2012). Therefore, it is essential to avoid areas of divergence because they render the process of seeking contractual enforcement lengthy, cumbersome and expensive (Jobst and Solé, 2012).

Finally, the IFIs that offer Islamic hedging instruments may need, themselves, to hedge their risk to bring in profit (FitchRatings, 2020; Mohamed *et al.*, 2013). This problem is more pronounced for purely Islamic structures than for Islamic windows. Actually, controlling the use of [conventional] derivatives for hedging the group level positions is beyond the reach of *Shariah* supervisors of an Islamic window in a conventional bank (Khan and Ahmed, 2001).

6. Summary and Conclusion

Innovation is believed to be one of the key ingredients for economic growth; it leads to national wealth creation and prosperity. Therefore, innovation is often perceived as the ultimate solution to existing economic issues in the society (Alamad, 2017). Within the financial activity, FE is the framework to materialize new ideas for financial products. The application of FE is the key to the rapid development of secondary markets and of liquidity-enhancing products, which will result in effective risk management (Iqbal and Mirakhor, 2011). The IFE is in its infancy, and the developed products within the IF are still lacking breadth and depth. In fact, the IF industry is dominated by short-term instruments such as *murabahah* and *ijarah* contracts while it [still] lacks liquidity and risk management instruments (Iqbal, 1999). Hence, the IFE is called to provide innovative and creative solutions that can compete with conventional ones.

The analysis of IEDs showed a gap between the theory of IFE and the current practice. Indeed, the IEDs are far from being fully *Shariah*-compliant; many violations of the contractual rules were reported while analyzing those products. At first glance, we can see that IEDs are mainly based on contracts' combination and conditioning and a multitude of sales for the sake of form. On the other hand, the binding promise plays a central role in structuring those products. The difference between conventional and IEDs becomes superficial when the binding promise is used to structure them. The binding promise leads to a ZSG with uncertain payoffs and could result in disputes and eating others' wealth, which are all characteristics of *gharar* transactions (Al-Suwailem, 2000).

Financial innovation and engineering can be viewed as a reaction to some restrictions to economic objectives such as profit, liquidity and risk reduction (Al-Suwailem, 2004). The central impulses to successful financial innovations have come from the desire to override regulations and taxes (Miller, 1986). For the IFE, a third motivation is to consider; circumventing the *Shariah* restrictions. According to Al-Sabhany (2019), the IFE was mainly motivated by the search of bypassing *Shariah* prohibitions on financial transactions, which explains its current "negative" path. Bypassing *Shariah* prohibitions becomes, because of the current path of the IF industry (i.e., short-termism and rent-seeking), undoubtedly a motivation of the IFE. In practice, with the dominance of imitation strategy, the conceptual side of IFE that is embodied in its principles is, to a large extent, neglected. Consequently, the failure of IEDs to be fully *Shariah*-compliant is not surprising.

It is essential to keep in mind that risk management is crucial for both the qualitative and quantitative development of the IF industry. Nevertheless, the pressing need for risk management instruments should not let the IFE move from its vital role to be a destructive element for the IF through circumventing *Shariah* rules. Thus, the IFE is presently at a crossroads. The right direction is by giving due consideration not only to the literal structure of products and processes but also to their consequences for the future of the IF industry (DeLorenzo, 2007). This may seem a difficult task but not, in any way, an impossible one. In fact, contrary to common belief, the IF provides the basic blocks that can be used to build more complex financial instruments that will improve liquidity and provide risk management tools (Iqbal, 1999). With the availability of building blocks, mutuality will carry out the task. In practice, the instruments of IF may all become PLS instruments,

even if they are not by nature, by reengineering through mutual arrangements (Kafou and Chakir, 2015). The recourse to mutuality was already proposed, by several authors, as a solution for risk management. In fact, through mutual arrangements, Al-Suwailem (2006) suggested some solutions to hedge the mark-up risks while Kafou and Chakir (2015) pioneered a hedging strategy for the commodity risk. In turn, Mansour *et al.* (2015) designed a new structure that permits dealing with cash flows variability within the PLS financing modes. In sum, the imitation strategy is not inevitable, and it is possible to do without within the mutuality framework. The transition towards mutuality is compulsory for the IF to keep its distinguishing features and for the IFE to design products that offer a conceptual alternative to the conventional ones.

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