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Theoretical and Analytical Approach of Financial Stability: Islamic Perspective [1]

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Abstract: This paper theoretically investigates financial stability and assesses the impacts of central bank policies on the banking system. The Islamic finance system has empirically shown relative stability to the waves of the 2007-2008 international financial crisis and reduced volatility of global financial markets. By using the sharing rule and stochastic dominance, we prove that the investor's expected payoff in the stochastic return model is superior and falls between the expected payoffs of the investor and financier in the fixed return model, respectively. Financial instability can stem from banking and financial markets deviations, asset bubbles, and money market fluctuations. Current economic and financial theories, rooted in the risk-shifting and interest rate smoothing models, have proven inadequate. New principles are needed to address financial instability and mitigate the devastating impacts of financial crises. Western attempts to address financial instability will prove unattainable as long as they depend on banking interest and credit multiplier systems. From the Islamic economics paradigm, financial stability hinges on two key conditions: the prohibition of interest rates and the institutionalization of contractual finance in accordance with Islamic Shariah. We propose that synchronized (or desynchronized) interactions between financial and business cycles positively (or negatively) affect both the banking system and the real economic domain, leading to stable (or unstable) states. Given the financial system's prohibition of interest rates and the real economy's adherence to Shariah jurisprudence, we theoretically envisage that the series of procyclical and countercyclical behaviors of financial variables would contribute to improve the financial stability since the financial cycle is too close to real cycle.

Keywords: Financial stability, Synchronization, Financial cycle, Profit-Loss-Sharing finance, Shadow banking, Monetary policies, Policy reforms, Policy analysis.

JEL Classification: G2

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Introduction

Financial stability refers to a financial institution's liquidity, solvability, and positive net worth. This definition extends to the entire banking system, which is considered stable when it maintains liquidity, solvency, and positive net worth. A financially stable bank is capable of meeting all obligations using its own or borrowed funds. If a bank cannot fulfill payment obligations due to a lack of funds and is denied loans from the central bank and interbank market, it may require recapitalization or face bankruptcy. A maturity mismatch, like funding long-term assets with short-term deposits, poses a risk to financial stability. Additionally, impaired assets can erode net worth, jeopardizing a bank's stability and potentially leading to bankruptcy. Interest-based debt has been condemned in all divine revelations, it is forbidden in Islam as indicated in the Quran in Surah 2 verse 276: 'Allah condemns Riba, and He blesses charities. Allah does not love any sinful ingrate.' Conventional banking is inherently unstable because it issues interest-based debt. Reinhart and Rogoff (2008) displayed a detailed quantitative overview of the history of financial crises from 1300 to 2006. Also, in view of the severe periodic banking crises in the commercial nations since the early 1800s, this fact needs no proof because immense literature has covered it as Hume (1752), Gouge (1833), and Carroll (1850s). Conventional banking was not able to operate in a commodity money environment as exemplified by the UK gold suspension in 1931 and the US gold suspension in 1971 (See e.g. Simons 1947, Minsky 1986, Carré and Maux 2022).

To prevent debt deflation and ensure debt repayment, both the fiat money base and bank credit must continuously expand.[3] In 2008, trillions were spent bailing out conventional banks, whereas in the 1929 Great Depression, thousands of banks failed, devastating depositors. Since 2008, many advanced nations pursued excessively expansionary monetary policies to bolster conventional banking stability. However, this led to record debt accumulation and historic stock price bubbles, posing renewed threats to banking stability. In essence, conventional banking relies on daily central bank support and cannot sustain itself independently.

Islamic finance rejects interest contracts, opting for risk-sharing instead (Siddiqi 2004, 2007). This Shariah-compliant system eliminates the instability of conventional interest-based debt, fostering the development of various financial products in both Islamic and non-Islamic nations. A robust Islamic legal framework for financial infrastructure and markets, alongside dynamic regulation and supervision, enhances banking system stability (Askari et al. 2010). Conventional banking involves a simple lender-borrower relationship, while Islamic banking entails a complex investor-entrepreneur dynamic, with various inherent risks like liquidity, credit, and market risk tied to ethical financial contracts. Managing inherent risks is crucial in Islamic finance, especially under the Profit-Loss Sharing (PLS) and mark-up financing (Murabahah) models, necessitating quantification to assess stability.

Islamic finance stability thrives on diverse funding, risk-sharing sans interest debt, and a strong mix of debt (mark-up) and equity financing. It frequently operates alongside conventional systems, often via Islamic windows.[4] Islamic intermediation prioritizes trade, business, and investment, enhancing financial stability. In

[3] The 'debt-deflation' cycle involves falling asset and goods prices, driving up real interest rates and debt values, leading to borrower defaults. According to Fisher (1933), depression crises do not spare the banking system, as banking issues and asset/commodity prices are intertwined.

[4] Qatar and other nations in Asia and the Middle East have transitioned to financial systems characterized by specialized institutions, eliminating mixed-system approaches.

contrast, conventional finance, reliant on interest-based debt and leveraged funds, heightens the risk of instability. From the latter half of the 20th century onward, significant leveraging has been evident across households, corporations, and governments in many countries.

Islamic banks offer unique financial products like Murabahah, Musharakah, Mudarabah, Sukuk, and Amanah (Askari et al., 2010; Khan, 2010), demonstrating that Islamic finance is a structured alternative to conventional banking. Islamic financing comprises two contract types: (i) Profit and Loss Sharing (PLS) contracts such as Musharakah and Mudarabah, where returns are stochastic and tied to investment outcomes. (ii) Contracts like Murabahah, Ijarah, Salam, and Sukuk involve the sale of goods and services on credit (mark-up financing) or leasing assets (Sukuk), resulting in fixed-price indebtedness for the buyer inclusive of commercial profit (Hassan and Lewis 2007). In Islamic banking, risks stem from the structure of the business model for the two contract types. The first feature reveals the close connection between Islamic banks' operations and the real economy, potentially mitigating the risk of financial crises. However, the variety of financial product methods may lead to legal ambiguity, increasing operational risk for both contract types.

Studying the theoretical stability of Islamic banks requires distinguishing them by their balance sheet asset structures. Initially, Islamic banks used single-layer Mudarabah, directly investing liabilities into opportunities, but faced significant operational risks.[5] Islamic banks transitioned to a multi-layer Mudarabah model, financing assets and liabilities through the PLS system. In contrast, the conventional system's multi-layer ownership structure might leave the final investor without deposit recovery in case of default. In the Islamic system, investors have clear ownership rights, and their returns depend on the profit or loss of a group of assets. Under this PLS system, investment depositors (equity investors) assume credit risk in proportion to their share in the funded project, increasing the overall risk on the bank's asset side. This risk-sharing system promotes market discipline and stability in the financial sector. Conversely, banks holding debt face losses in the event of failure. The PLS system, with its stochastic returns and lack of collateral, carries inherent risk. Islamic banks also employ fewer risk-hedging instruments compared to conventional banks. Expanding Islamic money market instruments, with implicit central bank support, could provide necessary liquidity for all Islamic banks during exceptional events.

Several factors make Islamic banks more stable than conventional banks. Risk-sharing arrangements on deposits provide a protective layer alongside book capital. Limited liquidity access and the need to offer competitive returns to investment depositors may prompt conservative behavior in Islamic banks. Islamic banks may hold higher liquidity reserves in such scenarios. Yet, with Islamic investments carrying greater risk than conventional ones, the primary concern for financial stability is whether their returns sufficiently compensate for these increased risks.

The Islamic financial system's core feature is the prohibition of interest rates, which inherently stabilizes Islamic banking. Unlike conventional banks, Islamic banks do not use the credit multiplier to create or destroy money; instead, they attract savings and employ incentive mechanisms to encourage investment (Iqbal and Llewellyn 2002, Iqbal and Mirakhor 2011). Islamic banks aim to match deposit maturities with investment

[5] Operational risk in Islamic finance highlights complexities in monitoring PLS models and mark-up financing to prevent negligence and misconduct among entrepreneurs and consumers.

maturities, utilizing longer-term deposits for long-term investments. Additionally, in the Islamic financial system, assets and liabilities are assumed to have matched maturities. Islamic banks' superior performance in profitability and stability during the 2007-2008 financial crisis and beyond may be attributed to their higher capitalization and liquidity reserves (Berger et al., 2019). Islamic banks demonstrated stability during the initial phase of the 2007-2008 global crisis and helped dampen volatility in global financial markets (Beck et al., 2013). Additionally, their limited integration into the global financial system, as they are restricted from dealing with derivatives and loans, may also contribute to their resilience.

Interest-bearing modes and leveraging are major sources of instability, whereas equity financing, as in Islamic finance, can enhance immunity against financial shocks. In Islamic finance, institutions bear losses proportionally to their share in invested capital. Moreover, the absence of debt and leveraging, apart from hedge funds and securitization, confines financial failures to client investors, safeguarding other institutions (Boyd and Runkle, 1993). The Islamic Financial System operates on a risk-sharing model, where returns depend on realized profits or losses, distributed to depositors similar to equity shareholders. This direct association with real activities enhances transparency. In Islamic finance, whether through debt-sale-based or equity-based financing, there is a direct link between the financial sector and real economic growth. Debt-sale-based financing, using contracts like Murabaha, is often employed for purposes such as home and vehicle financing. The Islamic financial system allows diverse debt-sale financing but strictly prohibits involvement with Riba (interest). As debt for investment is less common, depositors typically face minimal risk of losing financial assets, except for those with investment bank accounts. Moreover, specialized banks allocate ‘good loans,’ which are interest-free debts aimed at specific groups for social purposes.

This study significantly contributes from an Islamic theoretical perspective by providing deep explanations and analyses of the theoretical foundations of financial stability and the financial cycle. It questions Western approaches and explains the potential of Islamic economics paradigm and Islamic financial systems. Many Western economists indicate that traditional theories based on the risk-shifting model are inadequate, prompting the need for new frameworks to address contemporary economic and financial challenges. In Islamic economics, prohibiting interest rates and adhering to the Shariah jurisprudence in all transactions, we expect that the interaction between pro-cyclical and counter-cyclical behaviors in financial variables would enhance financial stability, given the closeness of the financial cycle with the real cycle. From an Islamic viewpoint, we suggest that financial cycles can synchronize with the real economy. The Islamic financial system and its markets have the potential to synchronize financial and business cycles, advocating stability. Yet, deviations from Shariah finance and Islamic economic models could expose the system to various shocks. In contrast to the risk-shifting of Western financial models, Islamic banking, operating on principles of risk-sharing and interest-free transactions, faces lower instability risks. This is because fluctuations in asset values directly correspond to changes in liabilities. As revealed by many economists, Western strategies aimed at mitigating financial instability may be ineffective as long as they rely on banking interest and credit multiplier systems. Some Western economists argue that full reserve banking is a more efficient method for allocating savings and real investment. Also, Muslim economists argue that for a nation to attain sound money, long-term financial stability, and sustained economic growth, it should implement a one hundred percent reserve banking system, eliminating the debt money creation inherent in fractional reserve banking.

The remaining parts of this study are structured as follows: Section 2 addresses the theoretical background of financial stability, the financial cycle, and their interaction. Section 3 suggests a theoretical model of Islamic financial risk-sharing, showing the preeminence of stochastic returns over fixed returns in the risk-shifting model. Section 4 discusses the policy reform programs aimed at confronting financial instability within an inherently unstable system, using contradictory policy rules and introducing new financial institutions like money market funds, which complicate the severity of ongoing financial crises. Section 5 displays the major conclusive outcomes.

Theoretical background of financial stability and financial cycle

Defining financial stability or instability

The definition of financial stability depends on cognitive perception and the economic system's paradigm. However, it varies across banking institutions, regulatory bodies, and academic research institutions (Istrefi et al., 2023). Western legislation lacks an unanimous definition of financial stability, leading some academics to prioritize defining financial instability instead. Financial instability occurs when problems within institutions, markets, or payment systems disrupt credit intermediation services, significantly impacting expected economic growth. Discrepancies in money markets, banking and financial markets, including derivatives markets, as well as asset bubbles, can create conditions of financial instability. Financial instability is the threat to financial markets or institutions, requiring public intervention to restore stability. Regulatory measures are guided by the definition of financial stability, aiding in addressing crises by identifying key issues.

Schinasi (2004) defined financial stability as the solution to internal or external financial discrepancies, arising as unforeseen shocks. These imbalances hinder the normal evolution of the real economy and erode confidence among firms and individuals. The financial system fails to effectively allocate savings into productive investments and lacks proper risk distribution or redistribution among contractual parties. This normative definition of financial stability emphasizes the financial system's capacity to fulfill three objectives: efficient resource allocation, effective risk assessment and management, and resilience to external shocks through self-corrective mechanisms. Financial stability characterizes a state in which the financial system, comprising major markets and institutions, demonstrates resilience to economic shocks and effectively executes its core functions: intermediating financial funds, managing risks, and facilitating payments. Assessing financial stability is exceptionally complex because of the interconnectedness among banks and economic entities, alongside their interactions. For central banks, managing the complexities of interactions and interconnectedness, particularly when banks underestimate risks (Chen, 2022), poses significant challenges in supervising the banking system.

Having revealed that, Shinasi's (2004) normative definition overlooks a fundamental issue in the financial system: the predetermined nature of interest rates, contrasting with the variable nature of profit rates in the real economic sector. This capitalistic conception implies that numerous economic activities are held hostage by the financial sphere. Financial stability, in essence, is when the mechanisms for pricing, allocating, and managing financial risks operate effectively to support economic performance.

Using the Islamic paradigm and Islamic economic system, the definition of financial stability requires at least two conditions: first the abolition of the interest rates system as in the occidental system, second the instauration of the Profit-Loss Sharing system and contractual finance in compliance with Shariah. Financial markets and financial institutions are considered stable in Islamic system when they can provide households, communities, and businesses with the resources, services, and products they require to invest, grow, and participate in a well-functioning economy.

In the conventional economic and finance literature, there are many definitions of financial stability. Financial instability is defined by its negative effects on both the banking system and the economy. This perception leads to define the financial stability in financial markets, which have evolved to reduce the ongoing asymmetric information problems of adverse selection and moral hazard (Mishkin 1997, 1999). The causes of financial instability are primarily linked to rising interest rates, with heightened uncertainty playing a secondary role. Minsky (1992) showed that financial crises mostly occur when the financed agents have hedging, speculative and Ponzi behaviors.[6] When the two latter behaviors have great weight, the economy is deviation-amplifying system, and the financial relations become unstable. In Minsky's (1992) perspective, within the capitalist economic model, financial instability is predicated on endogenous shocks that give rise to business cycles of varying intensity and severity. He emphasized that booms turn into busts due to interest rate hikes facilitated by financial innovations steeped in interest rate logic. Also, he considered that the business cycles are aggravated by the system of interventions and regulations that are elaborated to recover the economy. Also, Wolfson (1993) has explored financial crises, elucidating their connection to business cycles by framing them as credit-market crises.

The functioning of financial markets is perturbed when shocks occur for multiple reasons (Goodhart 2006). These shocks reduce financial markets' ability to finance productive investments, leading to higher interest rates, increased uncertainty, and potentially lower asset prices. In response to shocks, banks raise interest rates, implement credit rationing, and demand greater safety collaterals. This shifts risk to high-risk borrowers who may exacerbate financial instability with further shocks (Carroll 1850s, Fisher 1933). The monetary and financial authorities of the government could fail in supervising banks and could not limit the impacts of the financial crisis. Also at the macro level, the high degree of domestic illiquidity, caused by debt contraction following the rapid credit growth, could explain why debtors cannot meet their short-term financial foreign or domestic obligations, even if inflation and budget deficit are low (Mishkin 1999). If feasible, the government can reassure depositors and foreign lenders by injecting liquidity through monetary and financial authorities. This measure helps prevent financial system collapse and facilitates economic and financial recovery.[7] The monetary authority permits banks to create credit money through the credit multiplier, which is contingent on the 'legal' reserves rate. This mechanism, increasing credit availability without real money, exacerbates matters. It is a fundamental aspect of the banking system reliant on the willingness of families and corporations to take out loans.

[6] This behavior is related to the psychological factors that can generate cycles of optimism and pessimism, thereby perturbing the banking system and financial markets.

[7] Indeed, this is the policy of the US Federal Reserve, European Central Bank, and Bank of Japan. Moreover, swap facilities between central banks insure plentiful foreign exchange in every major financial market.

Financial instability impacts not only the financial system, including banks, non-banks, stock markets, debt markets, and payment and settlement infrastructure,[8] through sudden changes in various financial prices or costs but also generates significant disruptions in the real economy (Large 2003, Allen and Wood 2006). It is not easy to detect an early macroeconomic impact of financial instability in the short run unless the financial system has experienced a similar previous financial crisis. Empirical studies rely on standard and specific data to analyze the spread of financial instability, distinguish its temporal nature, and evaluate its impacts on both the financial system and the real economy over the short and long term (Ghassan et al. 2011, 2015).[9]

Theoretical explanations of financial crises

Minsky's (1992) theoretical explanation of financial crises focused solely on the domestic context. Detzer and Herr (2014) highlighted that within a Keynesian paradigm, Minsky presented the most comprehensive model for explaining financial crises. Minsky's perspective asserts that financial instability grows with rising debt levels, particularly when short-term debt proportions increase alongside higher interest rates. He proposed that financial crises occur when agents struggle to repay debt and must borrow to cover interest payments, leading to economic instability.[10] As a post-Keynesian institutionalist, he believed the Federal Reserve could stabilize financial markets and prevent crises by acting as a lender of last resort. He stressed that lender-of-last-resort actions are insufficient, advocating for regulations and reforms to curb risky financial practices.

Wolfson (2002) proposed extending Minsky's theory of financial crises globally, incorporating key elements from various global financial crises of the 1980s and 1990s. He elucidated that the global interconnectedness of banks and financial markets precipitated financial disruptions on a global scale. He proposed factors for a global theory of financial crises, suggesting that Minsky's framework can be expanded internationally due to cross-border lending and investment. Cross-border debt increases financial fragility in borrower countries, as they borrow at low short-term rates and lend at higher long-term rates in other nations. He also argued that exchange-rate fluctuations contribute to global financial fragility; we expect that these dynamics are influenced by the financial and monetary policies of borrower countries. Therefore, the rise in interest rates can spread financial crises from lender countries to borrower countries. Moreover, any worsening of exchange rates alongside rising interest rates will exacerbate debt repayment challenges, amplifying global financial instability.

With increasing loan defaults in the borrower country, Minsky's approach suggests the necessity of a lender of last resort to prevent debtor insolvency. The borrower country's central bank would serve as a lender of last resort, providing support in domestic currency rather than in the borrowed currency. With no global central bank or government, according to Wolfson (2002), the borrower country's government intervenes by coordinating with the lender country through macroeconomic policies to mitigate financial crisis effects. We anticipate that borrower countries may progressively lose financial and economic autonomy, becoming reliant on multinational agencies such as the International Monetary Fund and World Bank, which are governed by creditor countries. Despite

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8 The financial infrastructure includes legal frameworks, accounting, auditing, external monitoring and corporate governance.

9 A detailed literature review of the empirical, theoretical, and other studies related to the financial stability in Islamic finance is well-documented in Belouafi et al. (2015).

10 Minsky (1986) posited that financial woes stem from growing payment obligations due to debt, not insufficient profits.

international institutions' prescribed roles in financial and economic policies, increased capital mobility, foreign debt, and deregulation have fueled ongoing financial crises at both domestic and global scales.

Despite Minsky and Wolfson's theoretical analysis, they maintained significant conviction in the capitalist system and its capacity to address financial crises through financial and economic reforms. We expect that their confidence appears biased and contradicts their analysis of the fundamental aspects of financial crises. This pertains to the manipulation of bank interest rates and unrestricted money issuance by banks, benefiting powerful lobbying groups that control both global financial and goods & services markets.

Theoretical background of financial cycle

Many studies on financial crises overlook the interactions between real and financial cycles, focusing primarily on macroeconomic implications. Theoretical models deeply explaining the interactions between business and financial cycles are still lacking. The current theoretical literature still falls short of fully explaining the connections between the real economy and the financial sector (Claessens et al. 2012). Almost all published papers concentrate on quantitatively documenting the primary features of business and financial cycles to infer some modellable regularities. To illustrate the origins of domestic and global financial crises, it is essential to consider the co-movements between business cycles and credit cycles, given the significant risks associated with such crises. It remains that the modeling of such interconnections may not offer objectively useful insights for the policy purposes of economic, financial, and monetary authorities. The concept of the financial cycle underpins financial stability analyses in many policy institutions.

Financial crises often result from unsustainable booms in either financial or business cycles. Changes in asset prices, product market prices, and interest rates, along with other global economic shifts caused by both exogenous and endogenous factors, elicit various objective and subjective responses. These reactions influence both expansion and contraction phases, shaping recessions marked by disruption and recoveries characterized by booms within bust-boom cycles (Claessens et al. 2012). Increased indebtedness among firms and households, fueled by credit expansions, can trigger economic booms, contributing to the onset of systemic financial crises. Short-term speculation in asset markets, often linked to credit expansion and fraudulence, hastens financial crises and worsens wealth inequality in society.

Using a vast database spanning numerous countries and a consistent set of criteria, Claessens et al. (2012) empirically showed robust interactions between business and financial cycles through panel regressions with fixed effects. They found that output cycles reveal significant linkage with credit and house price cycles, whereas there is less cohesion with equity price cycles. They used Bry and Boschan's (1971) algorithmic method to pinpoint turning points in series' log levels, identifying cycle dates and assessing phases based on duration, amplitude, and slope. While Claessens et al. (2012) may potentially overlook certain details regarding the interactions between the business and financial sectors by focusing on the main regularities defining various phases of business and financial cycles, including their duration and amplitude during recessions and recoveries, their empirical methodology offers insights into both short and long-term effects shaping the financial system and the real economy.

To establish a conceptual basis for panel long-run relationship (cointegration) and its empirical application, coherent economic and finance theories are essential. These theories should elucidate the effects of heightened financial interconnectedness, such as financial integration between banks and shadow banks, on the intensity of the financial cycle. The financial cycle encompasses the interplay among equity prices, house prices, asset prices, and risk factors (Borio et al. 2020). Dahlhaus et al. (2018) consider the cointegration to approximate a stochastic Kuramoto-type model (1975).[11] They suggested that the cointegration model encompasses both synchronized and unsynchronized phases. Sectoral panel cointegration tests can reveal long-run relationships, signaling synchronization between banks, shadow banking, and business cycles. We suggest that synchronization implies increased interactions between business cycle and financial cycle phases due to certain relationships affecting both real and financial sectors. Additionally, synchronization can occur among components of financial variables, such as credit, housing prices, and equity cycles, either within individual countries or across multiple countries. Moreover, the bootstrap sequential panel cointegration test can identify the banks that contribute or detract from financial stability by tracing micro-fluctuations. Such mechanisms are due to many factors, varying from over-optimism to over-pessimism behaviors (Mian and Sufi 2018), and can be evaluated using empirical explorations at micro-level of the banking system. The testing methods are imperious to improve our understanding of the effects of likelihood synchronization or sub-synchronization between financial and business variables. The testing outcomes would significantly influence sectoral policies, potentially requiring tailored solutions and coordinate efforts between the government and the central bank.

Given the previous theorization about the interaction of financial and business cycles, we suggest within the Islamic perspective that synchronization or desynchronization can occur between Islamic banks' financial cycles and the economy's real cycles. Despite initially varying in their financing approaches through Profit Loss Sharing contracts, banks may tend to synchronize, moving in tandem to stabilize the financial system by directing financing toward the real economy. The key issue is the lack of inherent synchronization between financial and real economic flows, requiring dynamic human behaviors in the Islamic financial and real economic spheres to achieve synchronization. However, we propose that the PLS system, a primary structural feature of the Islamic financial system, can synchronize financial cycles with business cycles, enhancing financial stability. Furthermore, the Islamic financial system, including mark-up financing, could face shocks stemming from deviations from Shariah finance and economic models.

In Islamic economics, we suggest that synchronization or desynchronization between bank micro-cycles and key economic sectors' micro-cycles affects both the banking system and the real economy, signaling systemic stability or instability. Financial instability arises when financial cycles notably outpace business cycles, causing a lack of synchronization between the financial and real economy. The intensity and depth of these cycles vary depending on whether shocks are financial or real. These findings enhance our understanding of the financial-business cycle relationship.

The fluctuating nature of a financial variable varies cyclically, alternating between pro-cyclical and counter-cyclical phases, influencing financial stability. The pro-cyclicality of financial variables may exacerbate financial instability. The countercyclical capital buffer (CCB) is a regulatory measure imposed on banks by monetary

[11] For more detail about this model see: https://www.complexity-explorables.org/explorables/ride-my-kuramotocycle/

authorities to enhance stability. It is designed to mitigate the cyclicality of banks by being increased during upswings and decreased during downturns.

We expect that the interplay between pro-cyclicality and counter-cyclicality in financial variables is intricate, influenced by factors assessing asset values and risks for stakeholders. Balancing these behaviors is not straightforward. In environments where agents have limited information, the consequences of adopting either pro-cyclical or counter-cyclical strategies in financial systems, especially those influenced by interest rates, remain uncertain and unpredictable. Many Western empirical studies, such as Borio (2020, 2012) and Claessens et al. (2012), indicate that the financial cycle surpasses the business cycle in duration, depth, and magnitude. In Islamic finance, where interest rates are prohibited and the real economy adheres to Shariah jurisprudence, we anticipate that the interaction between pro-cyclical and counter-cyclical behaviors in financial variables would enhance financial stability due to the closeness of the financial cycle to the real cycle.

Modeling Islamic financial risk-sharing

Many eminent western economists as Fisher (1933), Simons (1947) and Friedman (1969) have argued that the current (one-sided liability) interest-based financial system is fundamentally unstable. Also, the new economists as in the Institute for the new economic thinking (INET 2012) considered that the current economic and financial theories, based on risk-shifting paradigm, have many deficiencies and require new concepts to face economic and financial challenges. The stability of the financial system requires a greater role for equity and risk-sharing and tying the credits to the real economy. Such conditions in a new paradigm of the financial framework and a new paradigm of the social-economic system would preserve the market discipline leading to stabilize financial system and promote socio-economic well-being of the society (Kuanova et al. 2021).

In principle, the profit rate system, named here stochastic return (SR) model, is an optimal standard contract that proves the inferiority of the deviant interest rate-based debt contract, named here fixed return (FR) model.[12] But the debt market dominates throughout the world. In a dual banking system where Islamic and conventional banks coexist under the same monetary authority, the optimality of Islamic financing could enhance the payoff of the SR model by increasing additional profits. Considering investor risk aversion levels and by using the expected utility function, we prove that the SR model, by more evenly distributing risk, outperforms the FR model.

Financial and technical hypotheses

In contrasting the SR and FR models, we present four hypotheses. Our first hypothesis (H1) posits an unambiguous financial market, suggesting that investment projects are uncorrelated under normal economic conditions. The separation hypothesis (H2) stipulates that project performance remains independent of financing decisions, thereby mitigating potential moral hazard issues. In the risk aversion hypothesis (H3), we posit that investors are not risk-neutral, a scenario that aligns well with the SR model due to its prevalent use of equity in the firm's capital

[12] In theory, the PLS system can optimally allocate financial resources, enhancing welfare across all investment projects and ultimately benefiting the entire economy.

structure. The identical return likelihood hypothesis (H4) assumes that investors and banks in each banking system share identical and costless information, relying on rational expectations from both investor-producer and investor-bank interactions.[13]

In addition to financial and economic hypotheses, technical hypotheses are necessary to distinguish between the SR and FR models. The first technical hypothesis concerns investment funds and returns (H5). Considering L as total supply of investment funds: $L = Z_1 + Z_2$, $Z_1 = \beta\, L$, and $Z_2 = (1-\beta)L$ with $0 < \beta < 1$, where Z_i is the amount of funds that finance investment projects according to model i. The SR model stands for $i = 1$, and $i = 2$ represents the FR model. Let $Z_i R_i$ be the amount of profits realized by the investors in model i where R_i is the rate of return on investment. R_i is considered a stochastic variable and having real and positive values where $\mu_{R_i} = E(R_i)$ and $\sigma_{R_i}^2 = V(R_i)$: $R_i \sim$ i.i.d.$\left(\mu_{R_i}, \sigma_{R_i}^2\right)$ with $0 < R_i < 1$. This distribution of returns implies that:

$$E(Z_i R_i) = Z_i E(R_i) \quad \text{and} \quad V(Z_i R_i) = Z_i^2 V(R_i).$$

The FR model, a prevailing financial system centered on loans, involves lending a sum of money (principal) to an investor under the condition that the principal plus a fixed interest (as a fixed percentage of the principal) is repayable at a specified future date with a fixed amount of money noted $Z_2(1+D)$ where D is the interest rate charged by bank. We assume that if the earnings fall below this fixed amount, then a lesser amount will be paid:

$$\text{if } R_2 \geq D\text{: the lender will receive } D$$
$$\text{if } R_2 < D\text{: the lender will receive the entire } R_2.$$

Contrary to FR model, the SR model operates on profit-sharing basis. In this model, the financier earns a share of the project's return, and in the event of a loss, neither party gains anything.

The second technical hypothesis concerns the aggregate payoffs of financier and investor (H6), assuming no collateral is required from investors in either model. In FR model, the financial contract stipulates that:

$$P_2 = Z_2 \min(R_2, D) \qquad Y_2 = Z_2 \max(R_2 - D, 0) \qquad 0 < D < 1$$

where P_2 is a semi-stochastic variable and Y_2 is a stochastic variable, they represent the aggregate payoffs for banks (lenders) and investors (borrowers) respectively. While in SR model, the financial contract specifies that:

$$P_1 = (1-\alpha)Z_1 R_1 \qquad Y_1 = \alpha Z_1 R_1 \qquad 0 < \alpha < 1$$

where P_1 and Y_1 are stochastic aggregate payoffs for financiers with a share of $1-\alpha$ and investors with a share of α, respectively. Following these specifications, the task is to identify the best contract in the financial market, i.e., the preferred choice among available contracts.[14]

Risk under SR and FR Models

As the investor represents the demand side, they can choose the suitable source of funds from either SR or FR to finance their investment endeavors. Determining the best contract involves two methods. We employ the expectation approach by assuming that the financier can be less or more risk-averse. It is possible for an investor

[13] Stiglitz and Weiss (1981) argued that asymmetry of information between banks and borrowers results in increased credit rationing. Due to the limited information about the true risk level of each loan, the banks set interest rates based on the average expected risk level.

[14] Optimal allocation of financial resources relies on a PLS system, enhancing the welfare of all parties involved in the SR model without detriment to any individual investor. The key principle is non-harm, ensuring mutual benefit without reciprocating harm.

seeking for the best financing model to find the interest rate D and the share α of investor so that: D, α exist such that $E(Y_1) = E(Y_2)$. At this point, the choice of the contract also depends on the preference of the financier. Also, we assume that the financier is risk neutral to find D and α so that: D, α exist such that $E(P_1) = E(P_2)$. At this point, the choice of the contract depends on the preference of the investor.

Proposition 1: Let D be a fixed interest rate, α a share of the investor in the stochastic aggregate payoff where $\alpha \in [0,1]$. Then, it exists $\alpha^* \in]\alpha, 1[$ such that $E(P_2) = E(P_1)$. Besides, for $\alpha < \alpha^*$: then $E(P_1) > E(P_2)$.

Proof: Consider a continuous function $h(\alpha)$: $h(\alpha) = E(P_2) - E(P_1)$

$$h(\alpha) = (1-\beta)L\, E[\min(R_2, D)] - (1-\alpha)\beta L\, E(R_1)$$

$h(0) = L\big[(1-\beta)E\big(min(R_2, D)\big) - \beta E(R_1)\big]$, $h(1) = L\big[(1-\beta)E[\min(R_2, D)]\big] > 0$,

As R_1 is positive, and $E(R_1) > 0$, by comparing $h(0)$ to $h(\alpha)$: we find that $h(0) < h(\alpha)$. Also, we use the intermediate value theorem twice, since $h(0) \neq h(1)$: $h(0) < h(1)$. As h is continuous, there exists $\alpha^* \in]\alpha, 1[$ such that: $h(\alpha^*) = 0$ which implies that: $E(P_1) = E(P_2)$.

As $h(0) < h(\alpha) < h(\alpha^*) < h(1)$, we have $0 < \alpha < \alpha^* < 1$ such that: $h(\alpha) < 0 \Rightarrow E(P_1) > E(P_2)$ ■

This finding suggests with α^* that the bank could reach a point of indifference between the two models. For all α inferior to α^*, the expected payoff in FR model is less than in SR model. The rational bank will always opt for the SR model over any other model, as it consistently yields a superior expected payoff.

Determination of a best choice

For the investor to select the optimal financial contract, it is essential to pinpoint the point at which the expected utility of the payoff is the same across both models. Initially, an investor, inclined towards risk aversion, would favor a less volatile income stream, provided it offers the same expected payoff as other options. Subsequently, it is crucial to ascertain the level of risk inherent in the payoffs of both models. Specifically, in the FR model and SR model, we have: $Y_2 = Z_2 \max(R_2 - D, 0)$ and $Y_1 = Z_1\ (\alpha R_1)$, and at α^* as proved in proposition 1, it exists D^*: $E(Y_1) = E(Y_2)$.

By considering U the aggregate utility function of the investors, U is supposed non-decreasing, concave and bounded with $U' > 0$ and $U'' < 0$ (i.e. risk aversion i.e. having low risk tolerance and then diminishing marginal utility of wealth). If the investor has a risk neutral behavior (i.e. having constant marginal utility of payoff), then $E[U(Y_1)] = E[U(Y_2)]$ i.e. the expected utility of each payoff of the investors is identical in SR and FR models.

Suppose for the stochastic variable of the payoff Y that there exists probability distribution functions f_1 and f_2 and their respective cumulative distribution functions F_1 and F_2. By supposing that $F_1 < F_2$ i.e. the cumulative distribution of payoff A lies below that of payoff B for any given level of return R. This also implies in terms of risk that payoff A is more desirable than the payoff B, and $U(Y_1)$ first-order stochastically dominates $U(Y_2)$. There exists at least one value of the return Y such that $Y \in [a, b]$ where a and b represents the lower and the upper bound, respectively. We have to proof that the expected utility from payoff A of the SR investor is no less than from payoff B of the FR investor irrespective of their risk attitude: $E[U_A(Y_1)] > E[U_B(Y_2)]$. Irrespective of the

nature of the utility function, since that $F_1 < F_2$, the expected return of payoff A is greater than the expected return of payoff B i.e., $E_A(Y_1) > E_B(Y_2)$.

Proposition 2: Under the risk aversion hypothesis and with the previous conditions on the utility function of the investor, the SR model will be preferred since the expected value under f_{Y_1} is higher than under f_{Y_2}, so that we have the following first order stochastic dominance[15,16]: $E[U(Y_1)] > E[U(Y_2)]$.

Proof: By definition, the expected utility of each payoff is defined as

$E[U(Y_1)] = \int_a^b U(Y)dF_1(Y)$ and $E[U(Y_2)] = \int_a^b U(Y)dF_2(Y)$

Payoff A dominates payoff B in first-order stochastic dominance (FSD) if the expected utility of A's return is greater than the expected utility of B's return i.e. A dominates B in FSD if

$$\int_a^b U(Y)dF_1(Y) > \int_a^b U(Y)dF_2(Y) \Rightarrow \int_a^b U(Y)d[F_1(Y) - F_2(Y)] > 0$$

By using the integration by parts rule, we have

$$E[U(Y_1)] - E[U(Y_2)] = \int_a^b U(Y)d[F_1(Y) - F_2(Y)] = \left[U(Y)[F_1(Y) - F_2(Y)]\right]_a^b - \int_a^b [F_1(Y) - F_2(Y)]\, dU(Y)$$

Since $F_1(b) = F_2(b) = 1$ and $F_1(a) = F_2(a) = 0$, the first term is equal to zero. Then,

$$E[U(Y_1)] - E[U(Y_2)] = -\int_a^b U'(Y)[F_1(Y) - F_2(Y)]\, dY$$

Because $U'(Y) > 0$ and $F_1(Y) - F_2(Y) < 0$, we deduce that

$$E[U(Y_1)] - E[U(Y_2)] > 0 \qquad \blacksquare$$

In the FR model, the investor, being risk-averse, anticipates a lower expected payoff due to their aversion to risk. Conversely, in the SR model, the investor is risk-enthusiast,[17] experiencing an increasing marginal utility of payoff. In the SR model, investors with PLS contracts are prone to taking risks in investment projects as risk sharing occurs between the investor (entrepreneur) and the financier (Bank). Conversely, in the FR model, investors bear sole responsibility for undivided risk.

Proposition 3 elucidates the efficiency of the Islamic finance model over conventional finance. Defining the α-sharing rule and stochastic dominance (Merton 1992), notably the Mean Preserving Spread (MPS, Rothschild and Stiglitz, 1970 and 1971) is essential to grasp the properties of R.

Definition of α-sharing:

Inspired by Merton (1992), we define an α-sharing rule as a real function α-sharing such that:[18]

(i) $0 < S(R) < R < 1$

[15] For more details on this concept, see Sriboonchita et al. (2009).

[16] This proposition also works when using the payoffs of banks.

[17] Islamic banks mitigate risk and uncertainty like Gharar through oversight by Shariah boards and self-regulation by managers. They ensure compliance with legal transactions like profit-loss sharing, lease-based, and debt-sale-based finance.

[18] The Merton share serves as a practical guideline for assessing risk decisions based on expected returns.

(ii) $E\big(S(R)\big) = \alpha E(R) = \alpha\mu_{S(R)}$ where α is the sharing rate for investors in SR model,

(iii) $\sum_k S_k(R) = 1$ where k stands for a shareholder in a risky investment.

Definition of MPS (Strict Stochastic Dominance):

Suppose that there exists probability distribution functions f_{R_1} and f_{R_2} and their respective cumulative distribution functions F_{R_1} and F_{R_2} with the same mean. A Mean-Preserving Spread of α-sharing signifies that $S_Y(R_2)$ is more risky that $S_Y(R_1)$, it is defined as follows:

$$S_Y(R_2) = S_Y(R_1) + Z_2 \quad \text{or} \quad S_Y(R_2) > S_Y(R_1)$$

where $S_Y(R_2)$ is a mean-preserving spread of $S_Y(R_1)$ i.e. f_2 is MPS of f_1,[19] and Z_2 is a random variable that is statistically independent (or at least uncorrelated) with $S_Y(R_1)$ such that $E(Z_i) = \mu_{Z_i} = 0$ and $V(Z_i) = \sigma_{Z_i}^2 > 0$. The stochastic variable Y stands for the aggregate payoffs for investors. The expected payoff will be defined as:

$$E[S_Y(R_2)] = E[S_Y(R_1)] + E(Z_2) = E[S_Y(R_1)]$$

and the preserving spread is defined as follows:

$$V[S_Y(R_2)] = V[S_Y(R_1) + Z_2] = \sigma_{R_1}^2 + \sigma_{Z_2}^2 > \sigma_{R_1}^2$$

We deduce that if f_2 is a mean-preserving spread of f_1, then f_2 has a higher variance than f_1 and the expected values of f_1 and f_2 are identical. Then, f_1 will be preferred by all expected utility maximizers having concave utility i.e., risk-taking behavior. Also, if f_2 is MPS of f_1 and given non-decreasing and concave utility function with $U' > 0$ and with $U'' < 0$, then f_1 is second order stochastically dominant (i.e., less risky) over f_2.

Intuitively, it is easy to expect that the risk averse associated with $S(R_1)$ implies the preference of $S_Y(R_1)$ to $S_Y(R_2)$. Indeed and due to variance parameter, the risk aversion shows that $S_Y(R_2)$ is riskier than $S_Y(R_1)$. We can prove proposition 3 separately, establishing the double inequality, by using a Mean Preserving Spread (MPS) of α-sharing and the second-degree Taylor expansion. This finding displays that, regardless of the risk aversion utility function, conventional banking institution would prefer its desirable sharing of $S_P(R_2)$, higher expected payoff, over to α-sharing of Islamic investor with $S_Y(R_1)$. As a result, the conventional financier $S_P(R_2)$ is preferred to $S_Y(R_1)$ which, in turn, is preferred to $S_Y(R_2)$. Proposition 3 further reveals through transitivity, that the α-sharing investor of $S_Y(R_1)$ would be preferred to the sharing of $S_Y(R_2)$. This result shows that the SR model is better and medium between the two expected payoffs of the FR model.

Proposition 3: Consider $S_Y(R_2) = \max(R_2 - D_Y, 0)$, $S_P(R_2) = \min(R_2, D_Y)$, $S_Y(R_1)$, $S_P(R_1)$ where S_Y and S_P verify the three conditions of α-sharing rule. Then, for any monotonic non-decreasing concave, bounded utility function U, any sharing rule and particularly α-sharing rule of $S_Y(R_1)$, we have

$$E\big[U\big(S_Y(R_2)\big)\big] < E\big[U\big(S_Y(R_1)\big)\big] < E\big[U\big(S_P(R_2)\big)\big].$$

Proof: Letting $S_Y(R_1)$ be the random α-sharing rate, and U the utility function of $S(R)$ which is assumed with risk averse i.e., $U''\big(S(R)\big) < 0$. By using Taylor expansion, and assuming that $S_Y(R_2)$ is more risky that $S_Y(R_1)$, the expected utility of $S(R)$ i.e., $E\big[U\big(S(R)\big)\big]$ is as follows

[19] It also comes that f_1 is a Means-Preserving Contraction of f_2.

$$U\big(S_Y(R_2)\big) = U(S_Y(R_1) + Z_2) \approx U\big(S_Y(R_1)\big) + U'\big(S_Y(R_1)\big)Z_2 + \frac{1}{2}U''\big(S_Y(R_1)\big)Z_2^2$$

Then, given the hypothesis H2, the variable Z_2 is not correlated to $S_Y(R_1)$, and the expected value gives:

$$E\big[U\big(S_Y(R_2)\big)\big] = E\big[U\big(S_Y(R_1)\big)\big] + E\big[U'\big(S_Y(R_1)\big)Z_2\big] + \tfrac{1}{2}E\big[U''\big(S_Y(R_1)\big)Z_2^2\big]$$

$$= E\big[U\big(S_Y(R_1)\big)\big] + \frac{1}{2}E\big[U''\big(S_Y(R_1)\big)\big]E(Z_2^2) \ , \quad E(Z_i) = 0$$

$$E\big[U\big(S_Y(R_1)\big)\big] > E\big[U\big(S_Y(R_2)\big)\big] \ , \quad E\big[U''\big(S_Y(R_1)\big)\big] < 0 \text{ and } \sigma_{Z_2}^2 > 0.$$

In the same way, the second inequality shows that $S_Y(R_1)$ is riskier than $S_P(R_2)$. By using a MPS, there exists Z_1 is a random variable such that $S_Y(R_1) = S_P(R_2) + Z_1$ which $S_P(R_2)$ is a random sharing rate. The expected utility gives:

$$E\big[U\big(S_Y(R_1)\big)\big] = E\big[U\big(S_P(R_2)\big)\big] + E\big[U'\big(S_P(R_2)\big)Z_1\big] + \tfrac{1}{2}E\big[U''\big(S_P(R_2)\big)Z_1^2\big]$$

$$= E\big[U\big(S_P(R_2)\big)\big] + \frac{1}{2}E\big[U''\big(S_P(R_2)\big)\big]E(Z_1^2) \ , \quad E(Z_i) = 0$$

As $E\big[U''\big(S_P(R_2)\big)\big] < 0$ and $\sigma_{Z_1}^2 > 0$, we get that $E\big[U\big(S_P(R_2)\big)\big] > E\big[U\big(S_Y(R_1)\big)\big]$.

Consequently, we obtain that

$$E\big[U\big(S_Y(R_2)\big)\big] < E\big[U\big(S_Y(R_1)\big)\big] < E\big[U\big(S_P(R_2)\big)\big]$$ ■

Furthermore, the SR model significantly influences the stability of a financial system, as it does not rely on a debt expansion or contraction system, which often complicates firms' investment financing endeavors. Consequently, this outcome holds significant relevance for financial policy objectives. Real macroeconomic investment could potentially be greater in the SR model compared to the FR model, primarily due to its lack of mandatory collateral requirements and its potential to incentivize risk-taking behavior.

The ethical framework of risk-sharing, without dual and mixed systems, is not fully implemented to allow the setting up of genuine Islamic finance except in very few institutions. As indicated by Hassan and Adebayo (2010), the ethical dimension requires a sincere implementation of Islamic theory of finance allowing to solve expected financial crises. Islamic banks are still in the stage of shaping themselves to adhere strictly to Shariah-complaint principles, while economic and financial behaviors remain influenced by Western models marked by greed, resource inequality, and excessive consumption. However, the prevalence of a mixed-financial systems in many Islamic countries poses challenges in empirically proving the stability of Islamic banks relative to conventional banks. Moreover, within a mixed financial framework, the competitive dynamics in the banking sector hinder Islamic banks from attaining optimal size, as biased competitive conditions affect the profitability and stability of all banks, particularly Islamic ones (Ghassan and Fachin 2016).

Brief Policy programs for financial stability

Policy Reforms

Many policy proposals such as Dodd-frank US legislation, Basle III, and others have been offered to regulate more the conventional financial system. According to the monetary approach of Friedman (1992), the 100 percent

reserves against deposits and a steady growth in the money stock would help the conservative objective of monetary policy to reduce the money supply volatility and the part of the business cycle caused by monetary instability. During the 2007-2008 international financial crisis, discounts and advances to the banking system played a key role for central banks to liquefy the financial system. The crisis 2007-2010 shows that the Basle risk-based capital requirements were extremely low; the third Basel accord have raised capital and liquidity requirements in relation to the risk-weighted assets. The Basel III framework (2008) defined that banks have to maintain a minimum capital requirement, ensuring that they can meet their obligations and face unexpected losses following shocks of financial crisis. This framework aims to make banks responsible in the first line against shocks without resorting to regulatory changes by the central bank. The central banks and the regulatory authorities have made considerable progress in every country in the implementation of the Basel III standards. Obviously, there are empirical questions related to the macroeconomic impacts of Basle III that await empirical insights from future economic and financial research.

According to Krainer (2013), the advantage of 100 percent reserve banking system aside tighter monetary policy is that the government would not need an expensive regulation requiring deposits insurance in addition to the costly supervision and monitoring of banks. He indicated that there is a dilemma for central banks between price-level stability and financial stability. To deal with the 2007-2008 international financial crisis, central bank authorities focused on achieving financial stability even if there will be a danger of increased inflation in the future. Krainer considered that the full reserve banking system is one solution to the incompatibility between safeguarding deposit money and risk intermediation, this is why it can lead to financial stability. The goal of this solution is to stabilize the growth rate of the money stock. He showed that the financial system stimulates growth by enhancing real business investment, and reducing asymmetric information and moral hazard problems between savers and investors. The full reserve banking system would be a more efficient allocation of saving and real investment. The cyclical fluctuations in finance,[20] driven in part by bank credit creation, highlight the system's inclination towards funding not only risky real investments but also speculative ventures. The idea of Krainer is that checking account money would become national money like currency, and then both currency and checking account money would be a liability of the government, with cost borne by taxpayers. In such settings, the financial system would see a rise in non-bank financial institutions compared to commercial banks. These institutions would provide business and consumer loans while investing in risky securities.

The central banks focus on the monetary objective of financial stability related to the dynamics of both interest rates, inflation, and output gap. Obviously, the volatility of real GDP represents a proxy for macroeconomic-risk facing firms. The stylized facts indicate that interest rates move gradually in reaction to changes in macroeconomic conditions and financial markets. By making interest-rate variability smaller, the central bank could lower the risk of bank insolvency and then decrease the volatility of banks' profits. Many studies examine the relationship between financial stability and price stability, both essential goals of central banks, covering institutional, theoretical, and empirical aspects.

[20] The dynamic nature of financial variables exhibits cyclical behavior, characterized by phases of pro-cyclicality and counter-cyclicality, as discussed in the preceding third Section.

Interest rate spread and financial instability

Granville and Mallick (2009) empirically explored the relation between monetary policies and financial stability, focusing on fluctuations in key variables within the real economy, including (i) share prices, (ii), interest rate spreads (iii) nominal effective exchange rate, (iv) deposit-loan ratio in banks and (v) house price inflation. The first three variables are regarded as indicators of financial stability, while the two last variables reveal the monetary policy oriented toward price stability. Their empirical work aims to address the "credibility paradox" of monetary policy as discussed by Borio (2006). This paradox suggests that lowering interest rates to boost liquidity may inadvertently result in heightened asset price volatility, thereby exerting adverse macroeconomic effects. Using data from European Monetary Union countries, Granville and Mallick (2009) examined whether recent policies aimed at achieving price stability can also bolster financial stability. They proposed a model wherein monetary policy shocks, affecting the real sector, require prolonged time lags, suggesting that a focus on price stability could gradually improve financial stability.

They found that the inherent pro-cyclicality between financial and real economy variables indicates long-term financial stability, suggesting there is no trade-off between monetary and financial stability over time. Empirically, there is still no consensus on this matter, despite investigations like those by Rotondi (2011) and Poloz (2006). The pro-cyclical relation holds only when there are no shocks to asset prices. If there is a shock stemming from speculative behavior rather than macroeconomic fundamentals, the government must implement multiple measures to stabilize asset prices.

As per findings by Celasun and Harms (2011) based on panel data spanning sixty-five developing countries and emerging markets, it appears that in recent years, the private sector has contracted a greater portion of external debt compared to the public sector. According to Hallak (2013), the effects of such a major phenomenon in international financial markets remain unexplored. He found that, in the presence of international capital market distortions, a larger private sector share of external debt has a positive impact on interest spreads. Hence, private sector external debt becomes a catalyst for financial instability unless the government intervenes to alleviate capital market distortions, irrespective of economic fundamentals. Also, in cases where public-sector assets possess legal immunity, private-sector assets are vulnerable to liquidation threats, serving as a self-monitoring mechanism. This could partially explain the efficiency in using borrowed foreign funds. He concluded that the optimal approach to improving financial stability is to promote the growth of the private sector. However, we expect that the private sector might exploit financial market distortions, causing international financial instability within the current system of floating exchange rates and globalized finance. Moreover, amidst rising financial globalization, Obstfeld et al. (2008) argued that foreign reserve accumulation serves as a crucial instrument for addressing both domestic financial instability and exchange rates. They asserted that the substantial recent accumulation of reserves by emerging markets with pegged or semi-pegged exchange rates (e.g., China) defies empirical explanation. The practice of central banks in these economies lack western coherence, posing an economic puzzle or policy challenge.

Shadow banking and financial instability

Categorized as 'shadow banking' entities, the Money market funds (MMF) operate with high liquidity levels and provide long-term financing for businesses, thereby contributing to financial stability. However, these institutions experienced asset price declines during the 2007-2008 global financial crisis in both the US and the EU. The panic within money market funds spreads through various transmission channels to the banking sector, precipitating financial instability. Fitch Ratings (2008) suggested that MMF allocation is more attractive for banks and other investors due to its competitive returns compared to standard bank accounts. Additionally, it provides diversification across securities and issuers that fall outside the scope of deposit guarantee schemes.

MMFs accumulate funds through subscriptions but lack money creation abilities like banks. They also lack central bank refinancing access and engage in riskier, less transparent investments compared to banks, with interconnection through interest rate mechanisms. Shadow banking entities like money market funds and special purpose vehicles[21] exhibit significant interconnections with the banking system, posing numerous risks and contributing to financial system instability. As per Fève et al. (2019), MMFs amplify the transmission of structural shocks by circumventing macro-prudential constraints imposed on banks. A rigorous regulatory framework, both domestically and internationally, is imperative to safeguard savers and ensure global financial stability.[22] Huang (2018) indicated that shadow institutions (like MMF, investments banks, hedge funds, private equity funds, mortgage lenders) are inherently pro-cyclical, meaning they take on significant risks during boom periods and suffer during bust periods. He emphasized that the pro-cyclical nature of the shadow banking sector, where financial variables fluctuate around a trend with economic cycles, results in excessive endogenous risk, leading to financial instability. After the 2007-2008 financial crisis, MMFs were subject to new regulatory oversight by the Securities and Exchange Commission (SEC) in early 2009 (Financial Stability Board, FSB 2011). This reform package introduced information, diversification, credit risk and maturity requirements. While aiming at enhancing liquidity management, these measures may mitigate, but not entirely prevent, the transmission of contagion and challenges from the MMF sector to the banking sector. Arora and Kashiramka (2023) empirically found that the shadow banking sector increases the vulnerability of the financial system, exacerbating overall instability.

Bengtsson (2013) suggested during financial instability, there are typically no investor runs on MMFs due to the lack of transparency in their asset composition compared to banks. Despite this lack of transparency, it appears that the low probability of future runs on MMFs in the U.S. and E.U. contributes to enhancing financial stability. He examined how MMFs contributed to the global financial instability of 2007–2008 and analyzed the transmission channels through which instability may spread from MMFs to the broader financial system. He attributed the persistence of these risks to credit rating agencies placing greater emphasis on their ratings and the Basel III liquidity framework requiring banks to hold liquid assets as support for MMFs within the banking group. Understanding the impact of non-bank financial intermediaries on financial stability is crucial to mitigate future crises.

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21 These tools create a stratification of loans within the financial system (Bouguelli 2020).

22 In Islamic finance, monetary and financial authorities must efficiently establish stabilization strategies by prohibiting interest rates and preventing commercial banks from creating money through the credit multiplier mechanism.

Contradictory policy rules

Smith and Van Egteren (2005) theorized that central banks aim to smooth fluctuations in interest rates, believing it directly enhances financial stability. However, they also suggested that there are indirect effects leading to financial instability because monetary policy changes the behavior of banks, indirectly promoting risk-taking. This occurs as banks transfer their liquidity risk to the central bank. Managing the interplay between interest rate smoothing policy and financial stability is complex, especially with conflicting objectives and stringent capital requirements. Di Giorgio and Rotondi (2011) indicated that central banks should smooth interest rates to stabilize basis risk, thereby contributing to financial market stability. They detected the absence of discussions on banks' interest rate risk management in the literature examining the connection between monetary policy and financial stability, particularly in terms of stabilizing basis risk in central bank reaction functions. Grimm et al. (2023), using long-term historical data, questioned whether prolonged loose monetary policy periods heighten financial fragility and the likelihood of financial crises. They found that when monetary policy remains accommodative for extended periods, the probability of financial turmoil substantially rises. Also, they argued that credit expansion and overheating of asset prices serve as significant intermediary channels that hasten the onset of financial instability.

Initially, Di Giorgio and Rotondi (2011) considered that the crisis emanates from an inadequate and inefficient regulatory framework. They showed an overreliance on conventional quantitative risk models, which are minimally adaptable, such as leverage ratios. They explored the implications of interest rate smoothing policy when the monetary authority considers banks' risk management practices. To provide their theoretical framework, They adhered to the standard literature on new Keynesian micro-founded dynamic general equilibrium models, specifically emphasizing interest rate smoothing theory as a potential remedy for financial instability. They focused on basis risk 'BR' in modelling banks' hedging strategies, assuming that the 'natural' rate of interest r_t^n follows an autoregressive process and corresponds to an investment-saving shock. They assumed the monetary policy is expressed through a 'backward' or 'forward' rule for interest rate smoothing. The equation below illustrates a 'backward' rule, where the last two terms represent the monetary authority's aim to stabilize at least one source of basis risk:

$$r_t = \theta_1 \pi_t + \theta_2 y_t + \theta_{BR}[(\log P_t^A - \log P_{t-1}^A) - (\log F_t - \log F_{t-1})]$$

where r_t is the nominal short-term interest rate, which is supposed to be negatively related to the output-gap y_t. The inflation rate π_t is assumed to be positively related to the output-gap and future expected inflation. F_t denotes a bank's tool risk management tool using futures, specifically the price of a one-period Eurodollar future contract. P_t^A represents the price of the asset underlying such a future, namely, a one-period Eurodollar deposit. They also assumed the presence of complete financial markets and the absence of arbitrage opportunities, specified by $r_t = \log(R_t)$, where R_t is the gross nominal interest rate on a risk-free one-period bond. The last term in the policy rule equation describes the central bank's objective of stabilizing basis risk. This term supposes that financial institutions manage their risk by using Eurodollar futures. They supposed that central bank smoothes the ratio P_t^A over F_t instead of the spread, considering the variables are in logarithmic form.

From the second policy rule formulation, $r_t = \theta_1 \pi_t + \theta_2 y_t + \theta_{BR}[\log(P_t^A/F_t) - \log(P_{t-1}^A/F_{t-1})]$, the central bank is equivalently concerned about the deviation between the growth of asset prices and the growth of

the price of a one-period Eurodollar future contract. The central bank smoothes the ratio P^A/F instead of the spread. This concern highlights that not adjusting reserves in response to unexpected rate variations would directly impact on the balance sheet and profitability of banks. By assuming that future and forward prices are perfect substitutes i.e., $F_t = P_t^A e^{\log R_t}$ and with $r_t = \log R_t$, Di Giorgio and Rotondi (2011) obtained the following equilibrium policy rule by putting this relation in the first equation of interest rate smoothing: $r_t = \theta_1\pi_t + \theta_2 y_t - \theta_{BR}(r_t - r_{t-1})$. By setting $\rho = \theta_{BR}/(1+\theta_{BR})$ with $0 \leq \rho < 1$ and $\psi_i = \theta_i/(1+\theta_{BR})$, the policy interest rate smoothing rule becomes: $r_t = \rho r_{t-1} + \psi_1\pi_t + \psi_2 y_t$ and can be written as a partial adjustment mechanism: $r_t = \rho r_{t-1} + (1-\rho)(\theta_1\pi_t + \theta_2 y_t)$ which corresponds to a convex combination between the reaction of monetary policy to changes in macroeconomic conditions and its lagged interest rate. The coefficient ρ measures the implied degree of interest-rate smoothing coherent with basis risk stabilization goal. In case of backward policy rule, they proposed that excessive concern for financial stability i.e., $\theta_{BR} \to +\infty$, leads to that $\rho \to 1$. This causes the current interest rate to revert back to its previous level, with the second term of the adjustment mechanism approaching zero, resulting in negligible change in basis risk. They also incorporated a second type of basis risk, represented by the spread between the Libor rate and overnight rate, in establishing a forward policy rule based on future expected inflation. The equation for forward smoothing, shaping the adjusted policy, is defined by $r_t = \rho E(r_{t+1}) + \psi_1\pi_t + \psi_2 y_t$. Nevertheless, in their modelling the indeterminacy of the equilibrium state of the economy persists. Excessive concern on financial stability may imply macroeconomic instability. In monetary policy, there is a trade-off between macroeconomic stability and financial stability. Considering basis risk stabilization might limit the ability to achieve macroeconomic price stability.

Our Islamic critique of the previous approach and its main findings encompass Western literature on financial instability. Theoretical explorations often propose addressing financial instability through the interest rate mechanism using various versions of the Taylor rule. However, the core of the problem lies within the interest rate system itself, which adversely affects borrowers, lenders, and the economic system that upholds it. Di Giorgio et al. (2011), after expanding the Taylor rule with basis-risk adjustments, demonstrated that even with inflation and economic growth control, financial stability and economic stability conflict, leading to persistent economic indeterminacy. These outcomes suggest that Western solutions to the problem of financial instability will remain elusive as long as they rely on the banking interest system and the credit multiplier system, which grants banks the power to create money out of nothing. Hence, it becomes evident that the principles of Islamic economics alone can achieve the optimal harmony between economic and financial stability.

Financial reform policy and Policy Analysis

Given that banks play crucial roles in payments and investment intermediation, they should not have the privilege of money creation. Askari and Krichene (2016) showed that the condition for a country to have sound money and long-term financial stability and sustained economic growth is to establish via the monetary authority a one hundred percent reserve banking.[23] This system involves disallowing the creation of debt money by banks within the fractional reserve banking framework. Furthermore, they argued that the adoption of the gold standard monetary system leads to a stable monetary system. They explained that debt money by banks caused (i) excessive

[23] Historical examples were the Bank of Amsterdam (1609) and the Bank of Hamburg (1619).

government debt, (ii) speculative bubbles, (iii) fueled inflation, (iv) exchange rate instability, (v) reduced investment, (vi) economic recession, (vii) unfair distribution of wealth. All these problems impact the economic and financial system, leading to substantial financial instability.

Askari and Krichene (2016) explained that the debt-based monetary system cannot sustain itself without central bank liquidity interventions and government bailouts, particularly evident since the 2007-2008 international financial crisis. The debt-based money rises at rates that far exceed real economic growth. Through leverage process, the bank earned interest income on capital which it did not possess.[24] It has resulted in adverse social implications around the world. According to the US data the money supply reached around $13 trillion versus debt with $46 trillion as of March 2016.[25] Setting interest rates close to zero is most distortive banking policy. Such policy leads to huge borrowing by real estate markets, incites more consumption via loans, and causes distortions in investment processes. To mitigate capital depletion, volatility, and inequitable wealth redistribution caused by inflation, Askari and Krichene (2014) proposed gradually phasing out the fractional reserve banking system and reinstating a gold standard through a purely political decision. This reform entails tying changes in the money supply to fluctuations in gold and foreign exchange reserves until the local currency achieves a stable value relative to gold.

Askari and Krichene (2016) emphasized that eminent economists as Rothbard (1962) proposed a gold standard with the dollar always tied to gold at a fixed weight. Also, Simons (1947) deplored money as an instrument policy and considered discretionary policy as a form of lawlessness; he emphasized that the best investment banking is the one that has no fixed money contracts at all, viz. Islamic finance. Rothbard advised to replace the name of 'dollar' by gold ounce or gold gram. Rothbard argued that abolishing the Federal Reserve and reinstating the gold standard would, at the very least, significantly diminish business cycles and inflation. Askari and Krichene (2014) indicated that the gold standard system allows to implement a financial deepening as in Simons's (1947) statement and Shaw's (1973) model. Simons preferred that investment banks issue more equities than interest-bearing loans in attracting savings; and Shaw (1973) stated the importance of financial deepening through the investment banks and more generally the financial sector. Such investment banks can borrow, issue bonds or Sukuks for real economic purposes, and commercialize equity securities. Hence, under such a financial framework, long-term investment banks could mitigate moral hazard between debtors and creditors, and reduce their risks by linking the costs of their resources to assets returns.

Conclusions

The persistence of traditional banking systems, built upon the foundation of interest-based debt, has perpetuated inherent instability, leading to a litany of financial complications and crises spanning from the 14th century to the contemporary era. During the 2007-2008 financial crisis, major central banks intervened with massive bailouts and near-zero interest rates to avert a banking collapse. Financial instability emanates from escalating interest rates and increased uncertainty. Banks are intricately linked to money market funds (MMF) through interest rate

[24] A classical leverage was the Bank of England which had a paid-in capital of £72,000 and lent to the Treasury £1,200,000 in 1694 in form of convertible banknotes.

[25] https://www.federalreserve.gov/releases/h6/current/ and https://fred.stlouisfed.org/series/totalns

mechanisms, and shadow banking, including MMF and special purpose vehicles, exhibits significant interconnections with the banking system, posing various risks and destabilizing the financial system. The Islamic finance system prohibits interest contracts, opting for risk-sharing finance like profit-loss sharing (PLS) and mark-up financing. This system attracts savings into investment accounts, fostering real investments in the economy. With its risk-sharing approach, Islamic banking, free of interest, faces lower instability risks as asset value fluctuations correspond directly to liability changes.

Financial stability's definition varies with economic paradigm, leading to multiple interpretations. Instability can stem from asset bubbles, banking deviations, and fluctuations in financial and money markets. Grimm et al. (2023) argued that credit creation and overheated asset price serve as pivotal intermediaries hastening financial instability. The Western paradigm employs interest rate manipulation to mitigate the destructive effects of financial crises, while the Islamic economics paradigm emphasizes two key conditions: prohibition of interest rates and establishment of PLS systems in line with Islamic Shariah. Wolfson (2002) posited that rising exchange-rate risk and interest rates amplify concerns over debt repayment, heightening global financial instability. We expect that this trend could erode borrower countries' financial and economic sovereignty, rendering them dependent on multinational agencies controlled by lending countries. We expect Western economists' perspectives to bias their analyses of crucial aspects of financial crises, including bank interest rate manipulation and uncontrolled money issuance, favoring influential lobbying groups that self-regulate financial and goods & services markets at both local and global levels.

The conventional explanation for financial crises attributes them to unsustainable booms in both the financial and business cycles. Claessens et al. (2012) demonstrated that output cycles are strongly linked to credit and house price cycles but have little correlation with equity price cycles. From an Islamic viewpoint, we suggest that financial cycles can synchronize with the real economy. The Islamic financial system and its markets may help synchronize financial and business cycles, promoting stability. Yet, deviations from Shariah finance and Islamic economic models could expose the system to various shocks. In Islamic economics, synchronized interactions between financial and business cycles benefit banking and the real economy, implying stability, while desynchronization poses risks. We anticipate that the shift between procyclical and countercyclical behavior of financial variables is complex, influenced by factors assessing asset values and risks. In a Shariah-compliant system without interest rates, we predict that this sequence would bolster stability, aligning the financial cycle closely with the real cycle.

New Western economists suggest traditional theories relying on the risk-shifting model are insufficient, prompting the need for new frameworks to tackle modern economic and financial challenges. In the stochastic return (SR) model with PLS contracts, investors share risks with financiers, promoting risk-taking in investment projects, unlike the fixed return (FR) model where investors bear all the risk. Using the α-sharing rule and stochastic dominance, we prove that the investor's expected payoff in the SR model is better and lies between those of the investor and financier in FR model.

Di Giorgio and Rotondi (2011) argued that the crisis stems from ineffective regulation and propose monetary policy be guided by either a 'backward' or 'forward' rule for interest rate smoothing. Their model highlights ongoing indeterminacy in the economy's equilibrium state, cautioning that excessive focus on financial stability

might trigger macroeconomic instability. We expect that most theoretical explorations suggest facing financial instability through the interest rate mechanism, often advocating the augmented Taylor rule. However, the fundamental issue lies within the interest rate system itself. Consequently, Western strategies to combat financial instability may prove futile as long as they depend on banking interest and credit multiplier systems. Hence, it becomes evident that Islamic economic principles can achieve an optimal harmony between economic and financial stability. We must embrace Islamic finance, implementing 100% reserve banking and replacing interest-based debt with risk-sharing investment banking. This theory has been advocated since the 19th and 20th centuries and is crucial for enhancing financial depth, boosting investment, and fostering sustainable economic growth. Krainer (2013) argued that full reserve banking is a more efficient way to allocate savings and real investment. Askari and Krichene (2016) showed that for a country to achieve sound money, long-term financial stability, and sustained economic growth, it must establish a one hundred percent reserve banking system, eliminating debt money creation inherent in fractional reserve banking.

Exploring further avenues in developing the theoretical framework of Islamic finance requires adopting an integrated approach that encompasses individual, sectoral, and macro levels. Achieving financial stability necessitates dynamic, coordinated synergy among these three layers which are interconnected and mutually supporting within the Islamic paradigm. Such an approach to conceptualizing financial stability facilitates a deeper comprehension of the mechanisms underpinning the connections between financing and real economic activities. The challenge ahead involves further theorizing on the individual and sectoral aspects within the Islamic conceptual framework, while integrating the core principles and regulations delineated in the Quran and the Sunna as most widely interpreted and accepted by the nation's scholars. Expanding the theoretical modeling approach of Islamic financial risk-sharing to the sectoral level could provide valuable insights into why the stochastic return model of a specific real sector might outperform the fixed return model within that sector. Similarly, further theoretical inquiries are imperative to delineate an equitable definition of money suitable for the financial sector and to devise a just integrated financial intermediation system aimed at curbing speculative behaviors across both the real and financial sectors of the economy. The scholars of Islamic finance and monetary issues must define a unified money of exchange, particularly in Islamic nations, eliminating disparities in their current currency values, similar to standardizing meters and weights.

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