

Research Article

Information and Islamic Finance in the Digital Era

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INTRODUCTION

The fact that information is valuable is not a surprise to a layperson, yet economists outside the realm of new institutional economics (NIE) would be amazed by this fact (Stigler 1961). This is because information in neoclassical economics is assumed to be perfect and costless, and such an assumption is a foundation stone for much economic theory, including the efficient market hypothesis. Refuting the costless information assumption renders many neoclassical economic interpretations of reality irrelevant and naive (Furubotn and Richter 2005). Given the vast economic literature on the value of information and the costs of transactions, it may well be best to start any discussion on the benefits of information technology (IT) in the context of such economic literature. More importantly, given the theoretical importance of information and transactions in financial systems, as well as the role of IT, it seems inevitable that IT in the light of NIE literature has a major role to play in financial systems.

Keywords: Transaction cost, New institutional economics, Islamic finance contracts, Information technology, Digitization

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THE ECONOMICS OF INFORMATION AND TRANSACTIONS

Transaction economics is the unit of study in NIE, which is closely linked to information economics. Transaction cost is “the resources necessary to transfer, establish and maintain property rights” (Zerbe and McCurdy 1999). In explaining the rationale behind the existence of organizations and intermediaries, Coase (1937) described transaction costs as including the cost of “discovering what the relevant prices are” and the cost of “negotiating and concluding a separate contract for each exchange transaction which takes place on a market,” and “it seems improbable that a firm would emerge without the existence of uncertainty”. In addition, “uncertainty, frequency of exchange, and the degree to which investments are transaction-specific” are transactional aspects which affect the economics of transactions and the behavior of parties in such transactions (Williamson 1979).

While neoclassical economics may accept with reluctance the role of intermediaries in markets, NIE is more conscious of their role: the intermediary role of financial institutions illustrates well the role of financial systems in decreasing transaction costs. Financial institutions evolve and excel in financial systems by decreasing the costs and risks of doing finance through markets and the price mechanism (Levine, Loayza, and Beck 2000). Such cost minimization is achieved not only through specialization and economies of scale, but also through diversity and economies of scope (Mishkin 2015).

Agency theory explains a more specific cost related to transaction costs and information asymmetries. According to Jensen and Meckling (1976), agency has a cost, which consists of the cost of monitoring by the principal, the cost of bonding the agent, and a residual loss caused by divergence from pursuing the interest of the principal despite the aforementioned costs.

The Jensen and Meckling theory explains a number of behaviors proposed in the pecking order model (Myers and Majluf 1984), which provides that due to asymmetric information, firms will prefer to raise capital through internal equity, followed by debt, and finally through external equity. The pecking order model is explained by the superior knowledge that managers have about the company, which indicates that managers will serve their interest best by raising capital through internal equity; if they resort to debt, they then put themselves at risk of the aftermath of insolvency (and the subsequent loss of control over the firm). Reluctance to take the first two options and resorting to external equity may indicate that the managers are less confident in the value of the firm.

To summarize, information has a cost, which includes not only the cost of searching for information, but also the cost of processing it by humans with bounded rationality. In addition, transactions have a cost, which include aspects beyond information costs, such as the indirect cost of mistrust in the market. Because of the costs of information and transactions, financial intermediaries are incentivized to minimize such costs in the concerned economies. Given information and transaction costs, participants in financial markets engage in behavior that will economize on such costs. This has led to the predominance of the pecking order model, and the subsequent adjustment in the products and services offered by conventional financial institutions.

INFORMATION AND TRANSACTION COSTS IN ISLAMIC FINANCE

Information is the most valuable resource in financial markets. A World Bank report defined financial development as “a process of reducing the costs of acquiring information, enforcing contracts, and making transactions” (World Bank 2012). This definition highlights the main functions of financial systems, the explanation behind their evolution, and what they do best, as described by the World Bank as follows (World Bank 2012):

- 1- Information production: by producing information about possible investments, they facilitate information and price discovery, minimizing adverse selection, and improved efficiency of resource allocation.
- 2- Intermediation: they intermediate in packaging and mobilizing savings and funds from economic units with surplus funds to those in deficit.
- 3- Corporate governance: they facilitate corporate governance and monitoring of firms that receive investments, minimizing moral hazard.
- 4- Risk management: they facilitate risk diversification and management.
- 5- Trade: they facilitate the exchange of goods and services.

Information is not only the basis for financial sectors, but also a source of their failure. Solving information asymmetries is a significant justification for the evolution of financial institutions, markets, and systems. Asymmetric information is “a situation that arises when one party’s insufficient knowledge about the other party involved in a transaction makes it impossible to make accurate decisions when conducting the transaction” (Mishkin 2013). Asymmetric information before a transaction is adverse selection, and *ex post* asymmetric information is a moral hazard. Financial regulators attempt to decrease the cost of information through transparency and disclosure requirements. The superiority of intermediaries (compared to open financial markets) is explained by their private information superiority and the unique tools they have in their disposal to minimize the effects of information asymmetries.

Islamic finance contracts share a great deal of the issues of information costs with conventional finance. Due to the prohibition of Riba in Sharia, other modes of finance exist in Islamic finance which can mimic to a large extent the agency relationship. While Sharia does not permit loan with interest, it permits contracts which create debt. Other Islamic finance contracts mimic the effect of equity finance. There is an unsettled dispute in Islamic finance about the question of whether debt contracts are morally inferior to equity contracts, with each party citing valid evidence from Sharia (Khan 1996).

The main source of such dispute is the similarity between debt Islamic finance contracts and the conventional loan contract, and the desire to differentiate Islamic finance from conventional finance. In addition, risk-sharing contracts can be described as more compassionate on finance seekers, whereas debt contracts are less sensitive and empathetic. Furthermore, risk-sharing contracts reflect good economics because they encourage entrepreneurship and economic development and enhance the resilience of the financial system and the economy in general.

Given the permissibility of both debt and risk-sharing contracts, much of the literature

on the capital structure of firms given information asymmetry is applicable in Islamic finance. Yet the reasoning behind the behavior of a Sharia-compliant stakeholder (e.g. firm, bank, and investor) in an economy can be different. While Sharia can be described as imposing limitations on the action profiles of stakeholders, it can also be considered as proposing opportunities for them because of the altruistic goals of Muslims in life for reward in the hereafter. As a result, a Muslim will have interest in achieving the comprehensive development goals proposed by Sharia, which varies depending on faithfulness. Such results can be better achieved with more risk-sharing contracts. However, given the strength of all forces influencing the utility of each stakeholder, especially the one proposed by the agency theory, there is no guarantee that risk-sharing becomes the equilibrium point for Muslim stakeholders.

ISLAMIC FINANCE AND INFORMATION TECHNOLOGY

Given the costs and issues related to information and transactions, technology in this respect may well be the solution. Technology in economics is a metaphor for knowledge that increases production given the same input of land, labor, and capital (Lewis 2013). The goal of IT is to solve many of the issues related to information and transactions, which is also the ultimate goal of financial development.

IT has distorted somehow much of NIE's realistic economic theory, unintentionally in favor of the neoclassical idealistic paradigm. This is because IT and the goods related to it (e.g. information goods) decrease information and transaction costs so much that they cause the economy to behave in a manner similar to the one predicted by idealized neoclassical models, yet some aspects of such models are changed due to the unique contributions of IT to overcome transaction costs, as shown in the following illustrations (Shapiro and Varian 1998). First, while natural monopolies are considered a form of market failure worthy of government intervention, IT makes the initial fixed cost of entering the market low enough to encourage contesting the position of the natural monopolist. This reduction of cost influences the market environment in a manner that encourages participants to contest the monopolist position and hope for some of its supernatural profit. As a result, thanks to IT, natural monopolies are not considered that much of a market failure. Second, it has been known in neoclassical economics that due to the difficulty in discriminating between customers, the distribution of consumer welfare gives some customers far more welfare given the price they are willing to pay. However, IT lowers information and transaction costs to the extent of making it possible and efficient for producers to get information about the preferences of their customers and target their discrimination accordingly. Third, the searching cost borne by both producers and consumers is vastly decreased through IT, decreasing market ignorance and maximizing social welfare in a manner closer to the theoretical expectation of neoclassical economics. Fourth, IT enhances the effect of bundling and switching costs, which decrease consumer welfare, and may arguably warrant government intervention. Fifth, IT enhances the network effect, the property that the value of some goods increases with the increase of its consumption, making it rise in price with scale somehow against the law of diminishing returns.

IT can contribute to financial development in a number of ways. First, IT can decrease the cost of searching given the bounded rationality of humans. For example, by facilitating the sharing of information among relevant parties, IT can enhance the collective wisdom of the financial system, minimizing adverse selection, and moral hazard. Second, IT can be used to minimize transaction costs. For example, a conventional loan can be requested and delivered from the mobile phone of the client of a bank, which is made possible with several technologies being implemented and operated seamlessly. In this sense, IT can be used to facilitate transactions which were originally made through costly means (e.g. papers and physical presence). For an indirect transaction cost reduction, the existence of IT can enhance trust in the system, which is a systemic transaction cost.

Because of the complexity of Islamic finance contracts, Islamic finance can benefit the most from IT. For example, a credit card issued by an Islamic bank can be based on Murabaha, in which case when an end-user buys something from the card, he concludes a digital contract with a digital signature through that card and the price of the goods he purchases will be charged on him with a mark-up seamlessly. The person can log in to a mobile banking application and request the bank to allocate a portion of funds for Mudaraba investment. Sharia itself is not a barrier to digitization, and many of the rules related to digital commerce and transactions have been discussed in research and resolutions issued by the OIC Fiqh Academy and others.

It is definitely the case that more can be done through IT to minimize information and transaction costs in Islamic finance. While a great deal of the benefits of IT is directed towards minimizing transaction costs, much can be done to minimize adverse selection and moral hazard. For example, a centralized system of market intelligence in a bank will empower each of its staff to minimize adverse selection. In addition, the more the financial system uses IT in inter-connections with data sources, the more information asymmetries can be minimized. In the example presented above, adverse selection can be better minimized if financial institutions have a digital communication channel with the national credit bureau. Moreover, such benefits can be enhanced if financial institutions share their private data about clients with each other.

A great deal of moral hazard in Islamic finance can be minimized through IT solutions. First, Islamic finance can use IT solutions for purposes that are similar to those of conventional finance. For example, in both conventional and Islamic insurance, car insurance claims can be settled by a central investigation unit (e.g. the police), and insurance awards can be issued faster with a communication channel with such a central unit. Second, moral hazard can be minimized in a manner that better suits the contracts that fulfill Sharia objectives, such as risk-sharing Islamic finance contracts. For example, a financier can request a manager in a Mudaraba contract to connect its compliance digital data (e.g. accounting, disclaimers, and compliance with covenants) to the digital platform of the financier. As such, the financier will get the due-diligence information he needs in real time, avoiding the need to wait for periodic data or the extra costs of monitoring.

IT and digitization can bring many benefits to Islamic finance. First, minimizing information and transaction costs will facilitate economies of scale and scope. Second,

such a move will make Islamic finance more accessible and inclusive, especially given its complexity. A low-income citizen will be able to open an account from his mobile, receive and manage his limited funds with little transaction costs, and receive financial products and services without the need to leave his rural area. Third, this transition will improve the corporate governance of the clients of Islamic finance institutions. Fourth, IT is perceived by many customers in IT-friendly societies as providing a better customer experience.

On the contrary, and without discrediting the benefits, the financial industry needs to be wary of the risks of IT. To begin with, there are risks that relate to IT irrespective of the industry. First, a notable example is the risks of cybersecurity, which are far more severe in the case of financial institutions because of the higher stakes. Second, there are other minor issues related to the cost of implementation and the expertise needed in each institution, yet such costs are retrievable given the efficiency gains of implementing such solutions. Third, there is a risk in the network effect of adapting IT to the society in which the financial market exists (Economides 1996). For example, a society with low IT adaptation may find it less acceptable to use branchless banking. Yet, once the network effect is accumulated, the same society may take a shortcut and jump to the latest technology, in this case using branchless banking without going through banking with branches.

In addition to purely IT risks, there are risks related to the interests of various stakeholders in the financial industry. For example, minimization of moral hazard through IT is not common in the financial industry for a number of reasons. First, over time, stakeholders reach equilibrium which enables them to use contracts that minimize agency cost by design, such as by following the pecking order (Jensen and Meckling 1976). Second, while self-compliant firms are rewarded by a higher market value (Jensen and Meckling 1976), such restraint (and the signals it emits) needs to be perceived by market participants. As a result, firms can hide their lack of restraint as long as it goes unnoticed, and investors will tend to rely more on contracts with low agency costs. Put differently, while it is possible for firms to share more of their compliance data through IT, they will tend not to do so as long as they can get the market value they desire without it. In addition, investors will put more faith in low agency cost contracts than search for companies that publish more of their compliance data.

Another such concern is the risk that financial institutions will have low motivation to connect with one another in order to prevent the sharing of superior information, thereby maximizing their comparative advantage. This risk is valid in theory given the importance of information in financial systems, and the superiority that private information can give to financial institutions. Some financial institutions may go as far as refusing to cooperate in sharing data with other institutions to prevent them from extending their economies of scale and scope.

In addition, there are major risks related to empirical data. While many innovative IT solutions can serve the interests of financial systems in theory, there is no guarantee that they will give the expected benefits in practice. In reality, testing the IT in financial systems can reveal many unforeseen risks and behaviors, such as those related to stakeholder

interests discussed above. As a result, stakeholders need to be vigilant when implementing IT in financial systems.

Much of the pros and cons discussed above are applicable to Islamic finance, yet there are other concerns that are unique to Islamic finance. First, IT facilitates almost instantaneous financial transactions, which can make some transactions seem artificial and manipulative of Sharia. For example, some banks offer Tawarruq cash finance through mobile applications within a short time after request, which makes observers wonder whether genuine sales have taken place or not, or whether Tawarruq is permissible in Sharia at all. If the transaction was not that quick, its manipulative nature would not be so eminent. The same applies to many similarly manipulative transactions in Islamic finance.

The future of Islamic finance is definitely moving towards digitization and IT, and ancient Islamic finance institutions will decline. There will be a trend towards branchless banking, and stakeholders will have to manage the opportunities and risks of digitization. However, this is only the near future, or arguably, the past which modern economies should have reached.

The medium- to long-term future may not even include banks in the first place. In fact, the move towards such a future started a decade ago when Satoshi Nakamoto wrote his white paper on a peer-to-peer currency that needed no central trusted authority (Nakamoto 2008). While this may be the future finance in general, including Islamic finance, others have considered this as the future of economy, including Islamic economics. For example, Ethereum is an IT protocol that extends the trustless nature of Bitcoin to the entire economy through the introduction of smart contracts (Wood 2014). Such smart contracts are described as unstoppable because, similar to Bitcoin and many distributed ledger technologies, they do not rely on a central trusted authority for its execution and enforcement. Returning to the World Bank definition of financial development presented above, minimizing enforcement cost is the missing piece in the puzzle, for which smart contracts were created.

CONCLUSION

Whereas the future seems vague and daunting to many in the financial industry who are used to a great deal of accumulating literature in economics, including macroeconomics, monetary policy, and financial evaluation theory, much of such literature is susceptible to change. Instead of adapting the future according to our understanding of the past, we need to break free of the mental limits imposed by the past and understand the future as it is.

BIBLIOGRAPHY

- Coase, R. H. (1937). The Nature of the Firm. *Economica* 4, no. 16: 386–405.
- Economides, N. (1996). The Economics of Networks. *International Journal of Industrial Organization* 14, no. 6: 673–99. [http://doi.org/10.1016/0167-7187\(96\)01015-6](http://doi.org/10.1016/0167-7187(96)01015-6).
- Furubotn, E., & Richter, R. (2005). *Institutions and Economic Theory* (2nd ed.). Ann Arbor: The University of Michigan Press. https://www.press.umich.edu/6715/institutions_and_economic_theory.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3, no. 4, 305–60. [http://doi.org/10.1016/0304-405X\(76\)90026-X](http://doi.org/10.1016/0304-405X(76)90026-X).
- Khan, T. (1996). An Analysis of Risk Sharing in Islamic Finance with Reference to Pakistan. Thesis, Loughborough University. <https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/6960>.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics* 46, no. 1: 31–77.
- Lewis, W. A. (2013). *Theory of Economic Growth*. London: Routledge.
- Mishkin, F. S. (2013). *The Economics of Money, Banking and Financial Markets* (10th edition). London: Pearson.
- Mishkin, F. S. (2015). *The Economics of Money, Banking and Financial Markets* (11 edition). London: Pearson.
- Myers, S. C., & Majluf, N. S. (1984). Corporate Financing and Investment Decisions When Firms Have Information that Investors Do not Have. *Journal of Financial Economics* 13, no. 2: 187–221. [http://doi.org/10.1016/0304-405X\(84\)90023-0](http://doi.org/10.1016/0304-405X(84)90023-0).
- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. *Bitcoin*. URL: <https://bitcoin.org/bitcoin.pdf>.
- Shapiro, C., & Varian, H. R. (1998). *Information Rules: A Strategic Guide to the Network Economy*. Boston: Harvard Business Press.
- Stigler, G. J. (1961). The Economics of Information. *Journal of Political Economy* 69, no. 3: 213–25. <http://doi.org/10.1086/258464>.
- Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. *The Journal of Law and Economics* 22, no. 2: 233–61. <http://doi.org/10.1086/466942>.
- Wood, G. (2014). Ethereum: A Secure Decentralised Generalised Transaction Ledger. *Ethereum Project Yellow Paper* 151: 1–32.
- World Bank, ed. (2012). *Rethinking the Role of the State in Finance*. Washington, DC: World Bank.
- Zerbe, R. O., & McCurdy, H. E. (1999). The Failure of Market Failure. *Journal of Policy Analysis and Management* 18, no. 4: 558–78.