

Islamic Finance and the New Technology Challenges

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Abstract— Islamic finance, as a new economic paradigm based on ancient principles and rules, needs to embrace the new IT opportunities in order to be up to date with the contemporary financial industry. This process will become a “bridge” between the past and the future of socially responsible financing. The world’s financial and economic environment in our days is marked with immense inequality and imbalance. With the emergence of the global capital structures, solely ruled by the principles of the financial markets, the main focus of the economy shifted from real entrepreneurship to a form of capital bureaucracy. The financialization of the economy is a crucial phenomenon of contemporary capitalism, which could lead the world economy nowhere. Structures such as hedge funds, venture capitals and private equities create no real value. The main objective of such financial management firms is short term profits. By cutting costs (firing workers, reducing investments etc.) they have harmful impact on the companies they invest in. In order to evade deleterious effects on the economy, caused by the financialization, an interest free environment and financial technology (fintech) development need to be implemented. Islamic finance as a no-interest based intermediary can be fully embedded in such processes. By nature the Islamic mode of financing excludes the dealing with debt and purely monetary activity. The digital disruption can bring independence, shrink costs, and improve services as a whole. Blockchain is the technology which provides the contemporary base for development of the fintech. On one hand it enables maximum security of transactions and on the other it energizes crowdfunding. In the Islamic finance context of the profit and loss sharing paradigm, the new disruptive technology has the potential to reduce the risk and to increase productivity. In the end by increasing trust, blockchain and Islamic finance can mitigate debt-based financing.

Keywords- *Islamic finance, blockchain, financialization, fintech, crowdfunding.*

I. INTRODUCTION

Inequality is a major concern in society. From social and economic perspective inequality is a wide researched area of study. This topic has attracted the attention of many scholars, scientists and writers. Since the time of David Ricardo and after that Karl Marx many bright minds (and others not so prominent) have touched upon the theme. Inequality is a fact which is so important that it needs to be discussed in depth and observed not only by philosophers, economists, sociologists etc. but from all who can share their thoughts on it. Politics are deeply influenced by the same phenomenon. If the members of the society exploit the natural and production goods unfairly, this will lead to uncertainty and unsustainable growth. There is always conflict between different social classes on how to

distribute wealth. In our day, in the era of widespread information, disruptive information technology provides a significant opportunity to enhance the discussion and take action towards solving the problem. We need calm observations and analyses of all statements and facts related to the economic, political and social mechanisms that might answer the question of wealth distribution and social justice.

Without a doubt inequality is a matter of perception. There are no scientific clues as to what its ideal state should be. It is more or less a philosophical category. Nevertheless, to achieve such a state in which the economy is growing and wealth distribution is fair, we need a well balanced mix of policies and institutions.

The contemporary world’s financial and economic environment is marked with immense inequality and imbalance. With the emergence of the global capital structures, solely ruled by the principals of the financial markets, the main focus of the economy shifted from real entrepreneurship to a form of capital bureaucracy. The financialization of the economy is a crucial phenomenon of the contemporary capitalism, which could lead the world economy nowhere. Structures such as hedge funds, venture capitals and private equities create no real value. The main objective of such financial management firms is the short term profits. By cutting costs (firing workers, reducing investments etc.) they have harmful impact on the companies they invest in.

Islamic finance has principles that makes it very close to social finance like risk sharing and calls for social justice and welfare. There are solid and undeniable evidences in Islamic history for financing the social sector using Islamic financial tools like *zakat* (obligatory charity) *sadaqa* (voluntary charity) and *waqf* (perpetual endowment) [1].

The aim of this research is to elaborate probable opportunities of the Islamic finance, combined with the latest information technologies, to mitigate the harmful effects on the economy, caused by financialization.

Islamic finance as a socially responsible activity could be used to shrink such negative economic effects. The core principles of asset-based financing, combined with disruptive technologies such as blockchain present new challenges to contemporary financing.

II. FINANCIALIZATION AND ISLAMIC FINANCE

The phenomenon “financialization” arises after the collapse of the Bretton Woods Agreement. According to Noam Chomsky in the mid 1970s, after years (1945 – 1975) of

unprecedented economic growth in the developed capitalist countries, the economic situation changed. The financial system prevailed over production and sustainable development. The finance was freed, speculation boomed, huge amounts of capital started going into speculation against currencies and other paper manipulations, and the entire economy became financialized [2]. Chomsky was probably the first voice to signal the problem that was the immense power of the financial institutions. After the financial crisis in the USA from 2007-2008, the consequences of the financialization became apparent and many economists started to address this issue.

What exactly is the phenomenon financialization? Why is it so important? Gerald Epstein defines financialization as: “the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies” [6]. The financial sector is vital to any economy. Without investment there is no development. But the devil is in the details. Here we do not deal with the normal banking activity where a financial institution lends money on purpose to create value. Structures such as hedge funds, venture capitals and private equities create no real value. The main objective of such financial management firms is the short term profits. By cutting costs (firing workers, reducing investments etc.) they have harmful impact on the companies they invest in. The capitalist economy is considered a structure which comprises different spheres of activity – namely production, circulation, and distribution – among which production is dominant [7]. Production creates value. Finance as a part of circulation does not create value. The effects of financialization increased after the appearance of a global spread of financial markets. Bank behavior is derived from market-related financial transactions.

Speaking of value we should mention Mariana Mazzucato and her term “value creation – value extraction”. Even big multi-national companies, which create value in a similar way, extract value. With different, mainly financial techniques such as tax-evasion, share buy-back, they feed the financialization of the economy. Rather than reinvest they transfer capital to the closest group or individual shareholders. The social, economic and political impact of value extraction is huge. Prior to the 2007 financial crisis, the income share of the top 1 per cent in the US rose from 9.4 per cent in 1980 to a staggering 22.6 per cent in 2007. Since 2009 inequality has been increasing even more rapidly than before the 2008 financial crash. In 2015 the combined wealth of the planet’s sixty-two richest individuals was estimated to be about the same as that of the bottom half of the world’s population – 3.5 billion people [8].

We can see a similar process depicted in Figure 1. - Inequality is rising almost everywhere, but at a different pace:

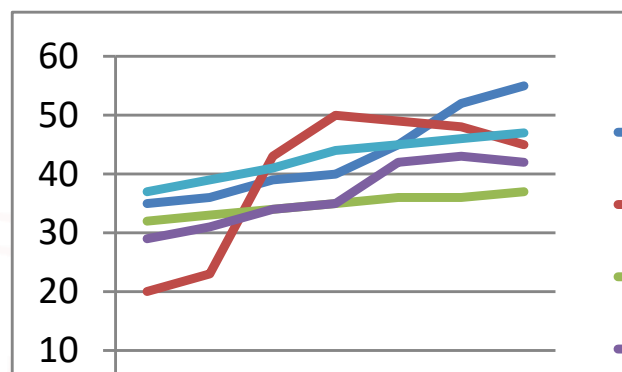


Figure 1: Top 10% income shares across the world, 1985–2015.

Source: World Inequality Report 2018

This inequality is born from debt - one whose burden is carried by the middle class. The working people are encouraged to experience more and more debt. This, no doubt, will lead to a financial bubble which was the cause for the last world financial crisis. The governments rescued the financial institutions responsible for this economic crash with public resources.

Financialization as a phenomenon of the advanced capitalist economies has enormous influence on banks, non-financial enterprises and households. More and more non-financial enterprises are involved in pure financial activity. We observe a huge increase of the financialization of the productive sector. There are many examples of that. In the 2000s, the US arm of Ford made more money by selling loans for cars than by selling the cars themselves. Over the same period GE Capital, the finance arm of the enormous General Electric group, made around half of the whole group’s earnings [8].

Let us remember what Islamic finance means. Definitions vary from very narrow (interest-free banking) to very broad (financial operations carried out by Muslims). Here we deal with the type of financial operations governed by the Sharia.

From here the following definition of ‘Islamic financial institutions performing Islamic financial operations’ can be derived: Islamic financial institutions are those, whose objectives and operations are firmly based on the principles of the Quran and the sunnah.

In this way they differ from the conventional institutions (be they Muslim as well), which do not have such considerations or concerns. This definition exceeds the mere equalization of Islamic financing with ‘interest-free’ banking. It allows for operations which can or cannot be interest-free, but are still influenced by certain Islamic principles to be taken into account. Such principles include the avoidance of *riba* (usury) and *gharar* (uncertainty, risk, and speculation), the focus on *halal* (religiously permissible) activities, as well as in general the search for equity and other moral and religious purposes. There are two aspects of Islamic finance that must be clearly distinguished:

- The first is the philosophy of risk sharing – the lender must share the risk with the borrower. The fixed interest rates determined in advance (in the case of conventional banking) guarantee return on investment to the lender and that they are taken up by the party receiving the loan. From Islamic point of view these interest rates are seen as exploitative and socially unproductive. The preferred financing method is sharing both the profit and the loss (PLS).

- The second is the encouragement of economic and social development by means of specific business practices and through *zakat* (alms). Most of but not all Islamic institutions have a board of religious advisors, whose opinion regarding the acceptability of new methods is highly sought after. Essentially their function is carrying out a religious audit of the activities of the bank.

The Islamic financial principles ensure the preservation of the contractual agreement and the balance between the borrower and the lender for the sake of mutual benefit. Every Islamic financial transaction suggests direct involvement in asset efficiency (in some cases this can be realized with a special purpose vehicle - SPV). The investors have clearly defined rights and obligations specified in the financial agreement's predetermined parameters, which ensure return on investment proportionate to the amount of money invested by each party. The Sharia law forbids the trade with debt as a means to acquire interest (*riba*), the use and transfer of economically inactive assets without ramification, as well as contractual uncertainty. Interest-free forms of financing are deemed acceptable only if they do not involve pork, alcohol, gambling or pornography. According to the Sharia, profiting from and paying to use a particular asset is permissible if both parties adhere to the PLS principles. The very same principles stipulate that returns are not guaranteed but are realized if there is income.

To sum up, the main difference between both methods of financing is that while conventional financing usually only aims at maximizing profit, within the confines of a given regulatory frame, Islamic financing is also governed by particular social and moral tenets.

There is a plenty of space for social impact financing in order to diminish poverty and inequality in the world economy. In this context, the Islamic financial instruments can be considered in line with the same objectives and requirements social impact investments that generate social and economic benefits. Biancone and Radwan [9] considered that unconventional financing alternatives provided by Islamic finance can be used in impact investing. Impact investing and Islamic finance are highly complementary as both of them upholding rigorous moral and social criteria for investments and emphasize on inclusiveness.

Some authors [4] see a correlation between economic growth, Islamic finance and financialization. Unlike financial capitalism or financialization, Islamic financing is purely a real goods financing. No financing can find its way to the Islamic system without passing through the production and exchange of real goods and services. Such asset-based activity is

fundamental for economic growth and real value creation. Islamic financing is essentially connected with the goods and commodities market and it is limited by the volume of finance required by actual transactions that take place in this market. Islamic financing is limited by the size of the transaction in the goods and services market whether it is done by means of sharing, sale or lease contracts. This makes Islamic modes of financing direct and strongly linked to real physical transactions. Sharing modes are only possible for productive enterprises that involve real-life businesses that increase quantity or improve quality or enhance usability of real goods and services. Such businesses generate a return that can be distributed between the entrepreneur and the financier. Even the sale-based modes are those that involve actual physical exchange of commodities from one hand to another whereby financing is measured only by real sale of commodities and can only be provided to the extent of the real value of the goods exchanged. The same thing also applies to leasing where leased assets are the pivotal thing around which financing is built.

III. BLOCKCHAIN AND ISLAMIC FINANCE

The revolutionary uniqueness of blockchain technology is the reliability and trustiness of information transferring. With its self-controlling peer-to-peer algorithms users can be sure that the system would reject any malicious attempt. The other key feature of this technology is its decentralization, which can change the world in a disruptive way, much like the Internet and smart phones are capable of doing. The intermediation of a third party is gone which automatically shrinks security risks.

The blockchain became popular with the development of cryptocurrencies such as Bitcoin. This is only a single feature of the technology. Except currency, blockchain enables contracts and applications. This provides an opportunity for wide application in the social, economic, health, art, etc. areas of society. With this technology immediate digital currency payments as well as more complicated financial contracts are possible. Any currency, financial contract, or hard or soft asset may be transacted with a system like the blockchain. Furthermore, the blockchain may be used not just for transactions, but also as a registry and inventory system for the recording, tracking, monitoring, and transacting of all assets. A blockchain is quite literally like a giant spreadsheet or ledger for registering all assets, and an accounting system for transacting them on a global scale that can include all forms of assets held by all parties worldwide. Thus, the blockchain can be used for any form of asset registry, inventory, and exchange, including every area of finance, economics, and money; tangible and intangible assets [10].

Many authors [12] depict blockchain as a genealogical tree. But at the same time they clarify that genealogy is not sufficient to explain all the features of the technology. Blockchain uses cryptography and hashes extensively for data protection and deterring hackers. The key concepts of blockchain are Bitcoin, peer-to-peer network, cryptography and hash functions, and ledger.

Encryption is the process of converting plaintext into incomprehensible text, called ciphertext. Decryption is the

reverse process of turning back the incomprehensible ciphertext in to plaintext.

The encryption algorithms used by Bitcoin mining are hash functions. A hash function is a function that maps data of any size to data of a fixed size. The values returned by a hash function are called hash values or simply hashes. A cryptographic hash function allows one to verify easily that some input data maps to a given hash value. However, the reverse – when the input data is unknown - is practically infeasible as it requires reconstructing the input plaintext from a hash value. In other words, hashing is a one-way operation. Another notable attribute of a hashing function is that a minor change in the input plaintext will result in a completely different hash value. This feature is desirable for safeguarding information as any tiny change to the original data by a hacker results in a visibly different hash. That is why blockchain is such a reliable technological tool.

There are three categories (generations) of blockchain:

- Blockchain 1.0 - cryptocurrencies
- Blockchain 2.0 – smart contracts
- Blockchain 3.0 - applications

Blockchain 1.0 stands for the decentralization of money and payments. Blockchain 2.0 stands more generally for the decentralization of markets. It is concerned with the transfer of many other kinds of assets beyond currency using the blockchain; from the creation of a unit of value through every time it is transferred or divided.

The information (Bitcoin or else) transferred through blockchain is not saved somewhere in a folder. The transactions are recorded in a ledger, which uses the resources of a large peer-to-peer network to verify and approve each transaction. The operations run on computers provided by volunteers around the world, hence there is no central database to hack. This type of distribution together with public appearance (anyone can view it because it resides on the network) and the above-mentioned encryption guarantees the security, decentralization and efficiency of the blockchain. In the context of efficiency we should point out the relatively low number of transaction per second. But this is the cost paid for the balance between decentralization, security, and scalability.

Islamic finance is a socially responsible and ethical financing method. Is there compatibility between Islamic finance and blockchain? The answer is not unambiguous. If we take into consideration Bitcoin or any other cryptocurrency, the answer should be negative on the forgoing question. The Islamic scholars still have not come to a decision on this issue. If we take into consideration asset-based principles in Islamic finance, then probably, according to Sharia, cryptocurrency is not permissible. But the focus here should be on the potential of the blockchain technology to fund start-up projects on peer-to-peer basis. With its decentralization, security and scalability it brings value and encourages entrepreneurship.

The key word in both Islamic finance and blockchain is “trust”. The Sharia prohibits contractual uncertainty and

deceiving methods. The global ledger of the blockchain works under a similar direction: it keeps information truthful thus creating an environment of trustworthiness. In the pre-blockchain world trust in transactions came from individuals, intermediaries, or other organizations acting with integrity. Because we often cannot know our counterparties, let alone whether they have a reputation for integrity, we have come to rely on third parties not only to vouch for strangers, but also to maintain transaction records and perform the business logic and transaction logic that powers commerce online. These powerful intermediaries—banks, governments, PayPal, Visa, Uber, Apple, Google, and other digital conglomerates—harvest much of the value [11].

One possible way to embed blockchain in Islamic financial activity is by using smart contracts. Smart contracts are a complex suite of software codes with components designed to automate execution and settlement of contractual agreements. They are programmable contracts which self-execute the stipulations of an agreement when predetermined conditions are achieved. Once two or more parties consent to all of the terms within the contract, they cryptographically sign the smart contract and deploy it to a distributed ledger. When a condition specified in the code is met, the program automatically triggers a corresponding action. By lack of any direct human involvement, a deployed smart contract on a distributed ledger could make contractual relationships more efficient and economical with potentially fewer opportunities for error, misunderstanding, delay or dispute [5].

Following the principles of Islamic financial contracts, we would compare them to the aforementioned smart ones. In the case of *mudaraba* or *musharaka* contracts there is a reliable and trustworthy opportunity for crowdfunding. In general, crowdfunding is used to finance start-ups, small and medium enterprises, expansion projects and capital increase. It is also used to finance all works, creative ideas and works of art such as films and charity projects such as relief campaigns and others. It is based on the principle of social solidarity to serve an idea or a project, and the redistribution and better utilization of financial resources. This is in line with the essence of Islamic finance, which is considered a revolution in the financing methods in the Islamic world if properly invested [13]. When a *mudarib* for instance needs funding for his start-up or already functioning business, blockchain technology could provide such support.

Sukuk as a main contemporary method of fundraising for infrastructure projects and business development in Islamic financing is possible to be integrated in smart *sukuk* contracts. Hussein Elasad [5] stated that, the smart *sukuk* structure has strived to use the blockchain and boost efficiency, transparency, reduce the cost and make it possible for small and medium enterprises, social impact projects, groups and associations to issue their own *sukuk* using the new technology. The world’s first innovation in smart *sukuk* was introduced by Blossom finance. The facility endeavored to change the conventional ways of *sukuk* issuances using the blockchain. Blossom’s smart *sukuk* uses Ethereum blockchain smart contracts in order to strengthen the efficiency and make it a

globally acceptable *sukuk*. The most significant feature of smart *sukuk* is standardizing and automating the accounting. Legal and overhead payments of conventional *sukuk* offerings are all fully backed by a licensed legal entity in the issuing country [5]. We could emphasize too on shrinking of the financialization effects, as an addendum of such assertion. The conventional *sukuk* issuance is delivered by powerful institutions and government agencies and despite the core principles of the Islamic finance there is a possibility for short term profit striving and rising of the inequality. As is visible on the following chart (Figure 2), income inequality is highest in the Middle East.

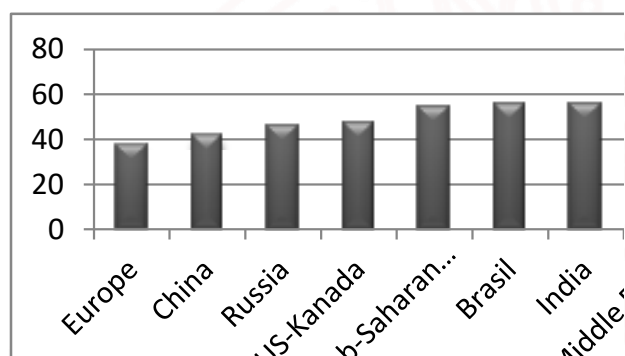


Figure 2: Top 10% national income share across the world, 2016

Source: World Inequality Report 2018

Good application of the blockchain could also be observed in *zakat* administering. *Zakat* is one of the main pillars of the Islamic economy and the basic principle of distribution of social goods. It relies on both approaches - voluntary in the form of alms and obligatory, to tackle poverty and social inequality. Here there is a divergence with conventional, secular-type economies, where the issue of social well-being is a matter of a government-run macro-economic approach through the collection of population taxes. The Islamic approach to taxation policy involves taking social policy management out of the government's reach. This lack of government regulation, relative to decentralization in the blockchain technology, leads us to the conclusion that blockchain can be used successfully in *zakat* practice.

According to some authors [5] there is already obligation for Muslims linked to cryptocurrency. The amount of *zakat* is calculated at 2.5% of liquid assets held for at least a full year: gold, silver, cash, savings, investments, rent income, business merchandise or profits, shares, securities, and bonds all qualify as part of the calculation. Since cryptocurrency like Bitcoin qualifies as a liquid asset, Muslims must take care to include their cryptocurrency assets in the calculation for their *zakat* obligation, as well as to keep track of how much cryptocurrency they've held for a full year, since assets held for less than one year need not be included in this calculation.

IV. CONCLUSION

As set out herein, we can conclude that there is an extensive interconnection between financialization of the economy, blockchain and Islamic finance. Based on common principles the last two can work in symbiosis in order to mitigate the negative effects on the economy and so to all society. The implementation of the new information technology in Islamic financing is not only vital for the future of socially responsible financing. The advantage is that it will bring more trust and business prosperity, especially in the middle class.

Blockchain as a new disruptive technology is a tool for relieving the economy of financial "illnesses". Blockchain has a potential to return the entrepreneurship back to life. On the other hand, Islamic finance, based on its own fundamental principles (real asset-based activity, money is not asset, they are just means), could support the process of sustainable economic development. The institution of profit-loss sharing by definition excludes speculative motives in an investment so that the interests of borrowers and lenders in a common project are met. Crowdfunding supported by blockchain could thrive and thus develop sustainable growth.

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