Role of Learning-by-Practicing in the Long-term Growth of an Islamic Financial System

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Abstract:
Islamic financial systems have been growing in many countries with different pace over the last four decades. The purpose of this paper is to construct a model of learning-by-practicing, explaining long-term growth of financial system. Benefiting from the literature of endogenous growth theories and using a dual financial system consisting of an Islamic financial system and a conventional one, the paper seeks to reveal some of the main growth characteristics of Islamic and conventional financial systems across countries and over time. The model suggests that learning-by-practicing Islamic finance will eventually create comparative advantage for Islamic financial system vs. conventional finance system provided it is initially protected until sufficient level of learning accumulates in the Islamic financial system. Evidence shows that Malaysia with a dual financial system has been very successful in this regard, while Iran and Pakistan, each with single Islamic financial system, and have not been very successful in reaching their expected goals.

I. Introduction

Islamic Finance has grown very fast during the last three decades. However, the growth pattern has not been the same in terms of scope, efficiency and the embodied human capital across countries. While some countries switched their entire financial system to an Islamic financial system, others preferred to cope with a dual financial system in which an Islamic and a conventional one existed and operated side by side to each other. The degree of success and failure in running an efficient and growing Islamic financial system has not been the same across these countries. While some countries such as Malaysia proved to be dynamically very successful in long-term growth of Islamic financial system, others such as Pakistan and Iran have been very sluggish in this regard.

There are generally three level of arguments and analyses in the literature of Islamic finance. The first level deals mainly with the so-called *Islamic Sharia* aspects of Islamic finance. Issues such as interest[1] (*riba*), *gharr*[2] (excessive uncertainty), Islamic financial contracts[3], legal and regulatory issues[4], etc. have extensively been discussed and analyzed in the literature. The second level is related to the social aspects of Islamic finance, raising issues such as how Islamic finance promotes economic justice, fairness, equality, stability, cooperation, etc. and why it has advantage over the conventional finance regarding these aspects[5]. Finally, the third level of arguments points out to some modern economic concepts. Scholars try to illustrate that Islamic finance, while caries with itself loss-profit sharing feature, is as efficient, productive, stable, innovative, and growing as the conventional finance.

Despite numerous researches on the above issues in Islamic Banking and Finance, the issue of long-term growth of Islamic financial system has rarely eee thhhh "aaa t cuuee growth"" i still o qeetti accorii gg to mnny growt tooorist nn ss ccc ss (8888) syy""gg rowt eeigg mmmary measure of all of the activities of an entire society, necessarily depends, in some wyy everytii gg tttt gsss i ccciety However, modelling everything that goes in a society is neither useful nor possible. While it seems easy to identify various political, economic and cultural peculiarities that are keys to financial growth performance, but sorting out the effects of these quantitatively is not an easy job.

Endogenous growth theories emphasize on the role of knowledge and human capital accumulation in the long-term growth of economies. While an extensive research has been done so far on this issue, little theoretical work exists on role of human capital accumulation in efficient growth of Islamic finance vs. the conventional finance. Human capital can take many form illl ddigg ll aarnigg-by-iii gg sslllll lgg "eeecill ccicccss ggeeerll koow.ggg"" Our mnssss i i tii ppper i o t 'learnigg-by-prcctiii ng' ssccct of mmm capital, which can play a crucial role in development, and growth of Islamic finance over time. Our purpose is firstly to show theoretically how learning-by-practicing will lead to a stable long-term growth for the Islamic financial system, and its comparative advantage over conventional financial system. Then, the implications of this model are evaluated and judged by reference to some banking experiences.

The rest of the paper consists of the following sections. Section II presents the theoretical foundation of a learning-by-practicing model. Section III discusses

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[1] For example, see Chapra (2000).
[2] For example, see Al-Saati Abdul-Rahim (2003)
[3] For example, see Khaf (2015)
[4] For example, see Wilson (2012)
[5] For example, see Cihak Martin, & Hesse Heiko (2008), El-Moussawi Chawki, & Obeid Hassan (2010)

first the equilibrium and dynamics in a closed economy with no capital mobility and then in the world economy with perfect capital mobility and free markets. Section IV discusses the empirical implications of the model with references to banking experiences from Malaysia, Pakistan and Iran. Finally, section V brings summary and conclusions.

II. Learning-by-Practicing: Theoretical Foundation

Solow (1956) developed a growth model in which the main source of growth was exogenous technological change. While his exogenous growth model turned to be the cornerstone of many growth models afterward, it eventually failed to explain the diversity of countries in terms of growth rates and growth levels. In addition, it could not and was not meant to serve as a development model. To tackle with the problems of the Solow model, many economists such as Schultz (1963), Becker (1964), Arrow (1962), Uzawa (1965), Romer (1986), and Lucas (1988) developed endogenous growth models in which the main source of growth was endogenously determined within the model. Most of these models focused on rll   of mmmm Ciii tal tgggg t   fff iii tio ff it llll   vary frmm mllll   to model.

The model we have just worked through and elaborated on to fit financial system growth, focuses on the learning-by-practicing aspects of human capital accumulation and not general or specific knowledge. As many economists have observed, learning-by-practicing appear to be at least as important as general knowledge in the formation of human capital. We have benefited from the Laaas' laarii gg-by-practicing model (1988) and elaborated it to fit growth of financial system in a country engaging with any kind of financial system: an Islamic financial system, a conventional financial system or any combination of the two.   We hope the model will open up interesting new possibilities for interactions between long-term growth of Islamic financial system and learning-by-practicing human capital accumulation.

II.1. Assumptions of the Model

No economic model exists without some specific assumptions.   However, a model is not judged by its assumptions, but by how much it can explain reality and facts. Nevertheless, assumptions should not be ad-hoc. For simplicity and tractability of our model, we have made the following assumptions:

- A competitive world of many small economies exists. Each country has initially a dual financial system consisting of an Islamic financial system and a conventional one.

- Each financial system provides the society a bunch of financial products and services and we sssmm tttt thi nnn   sss   imll iii t vll   or ppric"" that reflects how the whole society values the operating financial system. We call this

inccialyyytem'ccmniiii tuuutuutoorii mll y''ficccc ill tttt ttt '.

- Islamic and conventional financial outputs are close substitutes in terms of mmm eerviee thyy prvvi   ieee   oot i term ff Ill mmi aaari'' aeeett s since conventional finance is ,by definition, an interest-based system and such a system is not in compliance with Islamic laws.

- When economy of each country is closed and capital is not mobile among countries, then the two financial systems operate in such way that the equilibrium rll tt iv vll   or "rll ativ pric'''' of ficccc ial uutuut is ttt ermi   yy tee relative domestic supply and relative domestic demand. However, once capital becomes perfectly mobile and financial systems operate in a free global market, then the iqii librimmrll tt ivvvvl oooo "" relativpppieeffff fincccill uuuttt iiiddd termiyyyyyy the relative world supply and relative world demand.

- In each country with a dual financial system, a constant share of resources (physical capital, labor, land, etc.) is devoted to each financial system and there is no resource growth. For simplicity, all these resources are bunched into a bundle called composite input.

- Financial output is produced only by human capital embodied in the labor force and for simplicity; it is assumed that there is no physical capital.

- In each financial system, human capital is accumulated only through learning-by-practicing. In other words, the more a country learns from practicing and implementing a financial system, the more human capital will be accumulated in that system and the faster the comparative advantage in that system will be achieved.

-Preferences over financial systems are homothetic and identical across countries.

II.2. Components of the Model

Financial systems expand and grow over time and therefore, we need to develop a model to explain the growth process of them. As shown in Figure 1, like any growth model, a financial system growth model has three components: demand side, supply side and dynamics. In a market economy, the core concept of equilibrium puts these components into an integrated model. In this section, we explain for a typical country each component of the model in a simplified mathematical form.
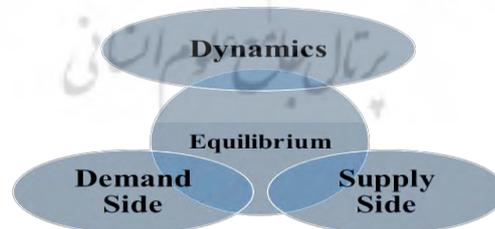
Figure 1: Components of a Simple Growth Model for a Financial System

II.2.1. Demand Side

On the demand side, it is assumed that households can benefit from services of the two financial systems. They obtain utility from consumption of two financial outputs (Islamic and conventional), x_i and x_c, according to the following CES[1] preferences:

$$U[x_i(t), x_c(t)] = [\alpha_i x_i(t)^{-\rho} + \alpha_c x_c(t)^{-\rho}]^{-\frac{1}{\rho}} \quad (1)$$

$$\alpha_i + \alpha_c = 1, \quad \rho > -1, \quad \sigma = \frac{1}{1+\rho}$$

Where $x_i > 0$ and $x_c > 0$, are respectively consumption levels of Islamic and conventional financial outputs, α_i and α_c are their respective shares such that: $\alpha_i + \alpha_c = 1$. ρ is a parameter and related to the degree of risk aversion or the elasticity of substitution (σ) between x_i and x_c and it is easy to show that $\sigma = \frac{1}{1+\rho}$.[2] Elasticity of substitution between Islamic and conventional financial outputs shows that how easy it is to substitute one financial output for the other. It measures the curvature of the utility function and therefore relates to the degree of risk aversion.

Fig 2: Various Degrees of Substitution between IFO and CFO
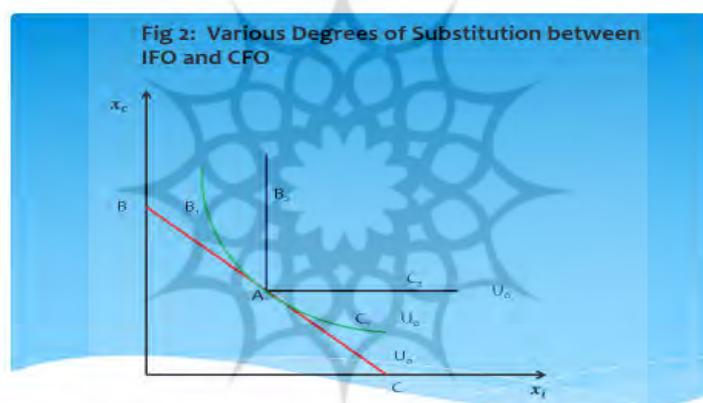
Figure 2 shows three different indifference curves for the CES utility function, each one corresponds to a different value for the elasticity of substitution[3]. Indifference line BC reflects the limiting case of perfect substitubility ($\rho \to -1$, $\sigma \to +\infty$), indicating that households can choose any combination of the two financial systems with constant ratio of marginal utilities. In this case,

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[1] Constant Elasticity of Substitution.
[2] For a simple proof, see Henderson and Quant (1980), pp. 73 and 112.
[3] Depending on parameter ρ or σ, there are five cases. In each case, the shape of CES preferences will degenerate into a specific shape for the indifference curve. See Henderson and Quant (1980), pp. 112.

individuals can even switch completely to one financial system (points B or C). The L-shaped indifference *B2C2* indicates that a fixed combination of financial outputs is consumed and substitution is impossible. Indifference curve *B1C1* shows that substitution of Islamic and financial outputs is possible, but as more and more one financial output is substituted for the other one, further substitution becomes more and more difficult.

It is quite informative to discuss further the issue of substibubility of Islamic financial output and conventional one from the perspective of individual preferences (the demand side). Theoretically, *Islamic Sharia* laws do not allow people to consume services of a combination of a forbidden financial system and

aaar i'' mmihi innt finnnii ll yyttmm hh en we accept Islam as our religion and Mohammad (*pub*) ss uur preeee t w mttt fll low Ill mni aaar ia' rll e nn laws in all aspects of life including our economic and financial affairs. Therefore, from t Ill mni aaa ri'' ooitt of vi w tee idaal ooitt in figure 2 is point C, where only Islamic financial output is consumed and the whole society fully switches to an Islamic financial system. Practically, this full transformation has occurred in countries such as Iran, Pakistan and Sudan.

However, majority of the Muslim countries have either dual financial systems or only conventional financial systems. The main reason is that the conventional financial systems have been the dominant systems for a long time in these countries and complete substitution of them with Islamic financial systems has not been possible in these countries within a short period. From macroeconomic perspective, many policy makers in these countries have also preferred to work with dual financial systems. Moreover, the countries that have fully switched to Islamic financial system have faced many challenges and their compliance with Islamic sharia, according to many observers, were under doubt. Under these circumstances, many countries preferred to cope with dual financial systems in short to medium terms and hope to switch fully to Islamic one in the end. According to Islamic laws, this gradual movement is allowed under certain circumstances. In addition, Islamic finance exists in many non-Muslim countries and these countries are not expected to abandon their conventional financial systems.

Putting the above facts together, it seems that we can generally allow some degrees of substitution between the two financial systems and characterizing the preferences over financial outputs by the utility function (1) is reasonable and justifiable. Moreover, this formulation of preferences is apparently not innnnii ttett wit tIIII ll mniaaaaaraa' ruleaaa rggll ati....

II.2.2. Supply Side
On the supply side, each country has two financial systems: an Islamic financial system and a conventional one. Generally, each financial system uses the allocated composite input and based on available technology, produces financial

output. In addition to the allocated composite input, financial output of each system depends on human capital that is obtained through learning-by-practicing. For simplicity, we assume that production technology is the simple *Ricardian* technology as follows:

$$(2) x_i(t) = h_i(t)u_i(t)N(t)$$
$$(3) x_c(t) = h_c(t)u_c(t)N(t)$$

Where $h_i(t)$ and $h_c(t)$ are respectively human capital embodied in the production of the Islamic and conventional financial outputs. It is also assumed that human capital is accumulated through learning-by-practicing in each financial system. $N(t)$ is total labor supply. $u_i(t)$ and $u_c(t)$ are the fractions of the composite input devoted to the Islamic and conventional financial systems respectively so that we have $u_i(t) + u_c(t) = 1$.

II.2.3. Dynamics of the Model

Finally, the third part of the model before deriving the conditions for equilibrium is related to the dynamic process of learning-by-practicing. In order to let $h_i(t)$ and $h_c(t)$ be interpreted as a result of learning-by-practicing, we assume taatttggggowtfff ccffffiaaiii alyyytmmieemiiii hhhluman capital increases with the fraction of the workforce devoted to that financial system. A simple way to formulate such a dynamic process is as follows:

$$(4) \dot{h}_i(t) = h_i(t)\theta_i u_i(t)$$
$$(5) \dot{h}_c(t) = h_c(t)\theta_c u_c(t)$$

Let us explain variables in equation (4). $h_i(t)$ is the level of learning-by-practicing achieved at time t in the Islamic financial system. $\dot{h}_i(t)$ is simply the change in this level, which represents human capital accumulation in the form of learning-by-practicing. θ_i Indicates the degree of financial innovation. Thus, equation (4) simply tells us that when we practice Islamic banking and finance, more and more we learn to do that. But, the amount we add to our learning level, depends on three factors; how much, on average, we have already accumulated human capital through learning experiences (h_i), the fraction of composite input allocated to the Islamic financial system (u_i) and the degree of financial innovation (θ_i) taking place in that system. Equation (5) that is related to the conventional financial system has the same interpretation and we avoid repeating that.

A simpler interpretation of the above equations is obtained if we explain them in terms of the growth rate of human capital accumulation. Dividing both sides of equations (4) and (5) respectively by $h_i(t)$ and $h_c(t)$, we obtain:

$$'''\text{)}\frac{\dot{h}_i(t)}{h_i(t)} = \theta_i u_i(t)$$

$$''')\frac{\dot{h}_c(t)}{h_c(t)} = \theta_c u_c(t)$$

q   sss (4')iiimll y aay taat in Illmmi fincccill yyttmm mmm aaii tll growth rate which is growth of learning-by-practicing taking place in that system, depends on its financial innovation and its share in total composite inputs. tqttt t ('')aaattthsssmniii tt erprtt tt i...

A crucial assumption of this model is related to the relative sizes of θ_i and θ_c. Depending on whether θ_i is greater, smaller or equal to θ_c, we can have different growth dynamics for the two financial systems over time. In fact, many financial experts believe that the pace of innovation and the change in conventional financial system is faster than that of the Islamic financial system since modern and sophisticated financial products are constantly being developed in countries with dominant conventional financial systems and Islamic financial system is just mimicking the conventional one to the extent that it does not vill tt IIIll mmiaaaaara'' rll eaaa rggll atinn

Although, this view currently seems to be the dominant view among economists and financial experts, it may not be the correct view for some reasons. First, we have to define the correct meaning of financial innovation in the framework we use. Financial innovation in our model is not just to have very complex financial products. Here, innovation is a general concept that captures anything that help the system to accumulate human capital faster in the form of learning-by-practicing. In this sense, the Islamic financial system may be considered a 'high-innovation' system since in comparison to the conventional financial system, it is still very young and in the middle of its learning curve and, as it is expected, it sss ltt fff rmmrffordd/vll omnttt iiiiii i vvvtt ioiii thlllwlr ll ficccc ialaaraaa.

Figure 3 shows a typical learning curve for a financial system, showing that how learning improves with experience. As it shows, Islamic financial system is on the steep portion of the curve and conventional financial system is on the flat portion. This implies that Islamic financial system is a high-innovation system. In addition, pace of financial innovation is not the same in all countries. Islamic finance in Malaysia is more innovative than the one in Pakistan and Iran and we will later explain the implication of these differences for growth of financial system over time.
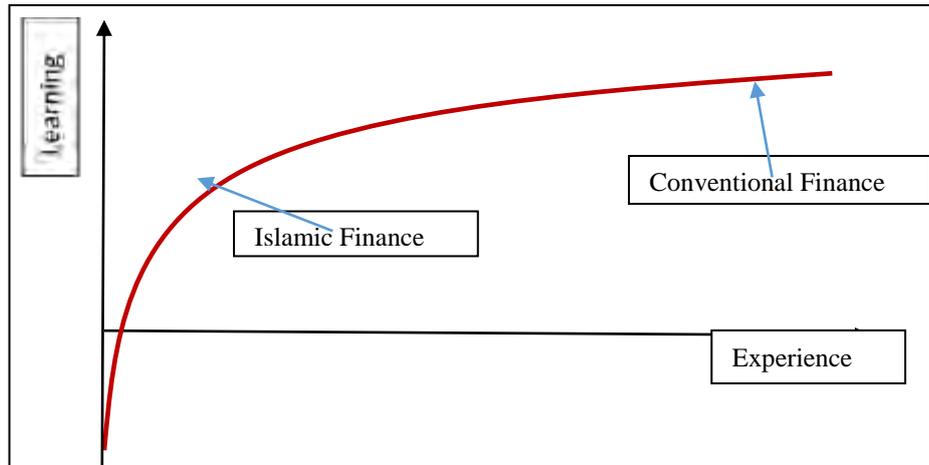
Figure 3 – Learning Curve for a Financial System

Considering the above arguments, we have no restriction, a priori, on the relationship between θ_i and θ_c. However, to continue our analysis further, we first assume that Islmni fincccill yyttmm i 'high-ivvvvttinn' yyttmm in comparison to the conventional financial system so that we have:

$$(6)\ \theta_i > \theta_c$$

The above inequality implies that for equal allocation of composite inputs between the two financial systems, learning accumulate faster in the Islamic financial system than in the conventional financial system even though the level of already learned experiences in the latter (h_c) can be higher than in the former (h_i).

III. Equilibrium Conditions and Dynamics

T ceeeett ff "iqii librium eee t ll ooorat... I ttttt ry wit aaal financial system and no capital mobility, individuals are free to choose any combination of Islamic and conventional financial services. Their choices depend on how they view the performance of each financial system or the relative value (price) of the financial outputs. On the other hand, the combination of Islamic and conventional financial outputs supplied to this closed economy also depends on the relative value (price) of financial outputs. The equilibrium of such a dual financial system is defined as the relative value (price) level such that the combination of financial outputs demanded is equal to the combination supplied. Therefore, to obtain the equilibrium relative price of financial outputs, we have to th fll lowigg stpp:: W firstly miii miz eeeeeell ss' utility fcccti vver Islamic and financial outputs to derive the relative demand for financial outputs

as a function of relative price. Then, we need to maximize profit function of the financial institutions to derive the relative supply as a function of relative price. Finally, by equating relative supply to relative demand, we can derive the equilibrium relative price of the two financial outputs in a dual closed financial system. Once, we obtain the equilibrium relative price, we can study the dynamics of relative price.

Since there are only two financial systems, we will have only one relative price. Hence, according to the *Walras law*, if market for one system is in equilibrium, the market for the other system will be in equilibrium. Therefore, we can take the Islamic financial output as a numeraire with unit price $p_i = 1$, and let q be the equilibrium relative price of the conventional financial output in terms of Islamic financial product in a closed financial system. We simply call q the relative price of financial outputs.

III.1. Household's Utility Maximization: If individuals choose financial outputs, x_i and $x_c,$ to maximize their utilities then, the first order condition of maximization simply tells us that the relative price of financial outputs (q) must be equal to the marginal rate of substitution between the Islamic and conventional financial outputs. Calculating marginal utilities, we have:

$$(7) q = \frac{u_c(x_i, x_c)}{u_i(x_i, x_c)} = \frac{\alpha_c}{\alpha_i} \left(\frac{x_c}{x_i}\right)^{-(1+\rho)}$$

Solving for the ratio of the demand for financial output, we obtain:

$$(8) \frac{x_c}{x_i} = \left(\frac{\alpha_c}{\alpha_i}\right)^{\sigma} q^{-\sigma}$$

Equation (8) is the relative demand for the financial outputs. It is a negative function of the relative price, q. The elasticity of the relative demand for financial outputs depends on the degree of substitution between the two financial systems (σ). As σ gets close to zero, the substitution of one financial system with the other one becomes more and more difficult and the country should stick to its current dual system in the long term. However, as we discussed before, Islamic financial system is a close substitute to the conventional financial system in terms of services it offer and hence countries can enjoy any combination of the two systems. We will discuss dynamics later to see how it is in advantage of a country to accumulate learning-by-practicing to be able to fully specialize in Islamic financial system.

III.2. Profit Maximization: If each country chooses a combination of Islamic and conventional financial outputs to maximize its profits, the equilibrium workforce allocation between the Islamic and conventional financial system is such that we will have, in equilibrium, the relative price of conventional output, q, equal to the relative endowments of human capital in the two financial systems. That is:

$$(9) q = \frac{h_i}{h_c}$$

where h_i and h_c are respectively endowments of learning-by-practicing accumulated in the Islamic and conventional financial systems.

III.3. Equilibrium of the Model: Putting together the demand-side and supply-side equilibrium conditions (8 and 9) and the output equations (2 and 3), we can determine the equilibrium levels of u_i and u_c:

$$(10) \frac{x_c}{x_i} = \frac{u_c h_c}{u_i h_c} = \left(\frac{\alpha_c}{\alpha_i}\right)^\sigma \left(\frac{h_c}{h_i}\right)^\sigma$$

Given that $u_i + u_c = 1, we\ have$:

$$(11) \frac{1-u_i^*}{u_i^*} = \left(\frac{\alpha_c}{\alpha_i}\right)^\sigma \left(\frac{h_c}{h_i}\right)^{\sigma-1}$$

The above equation gives us the equilibrium allocation of labor force between Islamic and conventional financial systems. The labor force allocated to the Islamic financial system depends on importance of Islamic financial output in the preferences of households and the ratio of learning-by-practicing level accumulated in the two systems. In addition, it depends on the degree of substitution of Islamic financial output for conventional financial output.

III.4. Growth Dynamics of Financial Systems
Dynamics of this dual closed financial system is determined by inserting the equilibrium equation (11) into the equation of relative price (9) after taking logarithm and its differentiation with respect to time:

$$q = \frac{h_i}{h_c} \Longrightarrow \dot{q} = \frac{\dot{h_i}}{h_i} - \frac{\dot{h_c}}{h_c} = \theta_i u_i - \theta_c u_c = \theta_i u_i - \theta_c (1 - u_i) \qquad (12)$$

Inserting u_i^* from equation (11) into the above equation, we get:

$$\dot{q} = (\theta_i + \theta_c) \left[1 + \left(\frac{\alpha_c}{\alpha_i}\right)^\sigma q^{1-\sigma}\right]^{-1} - \theta_c \qquad (13)$$

Equation (13) is a first-order difference equation. Solving this first-order equation for $q = \frac{h_i}{h_c}$, given the initial endowments, u_i (0) and u_c (0), determines the workforce allocation at each date and hence, the paths of h_i (t) and h_c (t) separately.

As we pointed out earlier, growth dynamics of this closed dual financial system depends on the elasticity of substitution (σ) between the Islamic and conventional financial outputs. In this regard, there are three possibilities:

$$\sigma > 1$$
$$\sigma < 1$$
$$\sigma = 0$$

We just focus on the interesting case of $\sigma >1$ **since** we have already assumed that the Islamic and conventional financial outputs are very close substitutes. This special case is shown in Figure (4). In steady state: $\dot{q} = 0$. Setting $\dot{q} = 0$, we obtain the following equation:

$$(14) \frac{\theta_i + \theta_c}{\theta_c} = \left[1 + \left(\frac{\alpha_c}{\alpha_i}\right)^{\sigma} q^{1-\sigma}\right]^{-1}$$

Hence the steady state level of relative price of financial outputs (q^*) is obtained at the intersection of the horizontal line, $\frac{\theta_i + \theta_c}{\theta_c}$ and the upward-sloping curve, $\left[1 + \left(\frac{\alpha_c}{\alpha_i}\right)^{\sigma} q^{1-\sigma}\right]^{-1}$. This curve approaches line 1 as q increases indefinitely.

Fig 4: Dynamics of q in Case of $\sigma > 1$
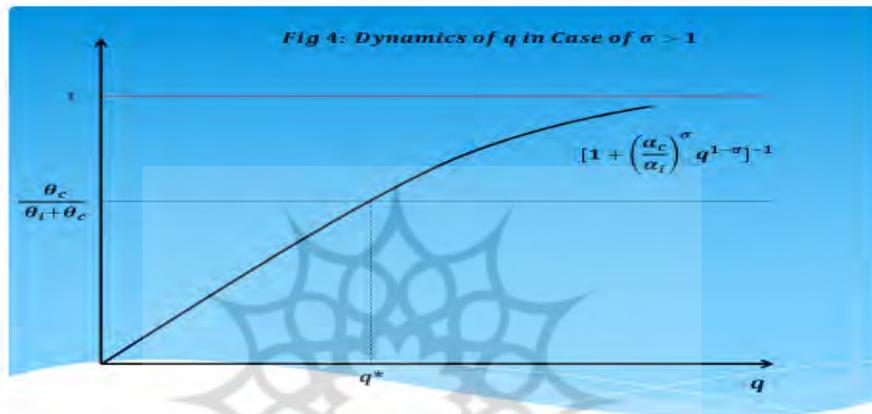
III.5. Analysis: Specialization in Islamic Financial Output

If we consider q^* as the steady state relative price of the financial systems, then to the left of $\boldsymbol{q^*}$, $\dot{q} < 0$, so $q(t)$ tends to 0. To the right of q^*, $\dot{q} > 0$, so $q(t)$ grows without bound. This implies that the steady state relative price, $\boldsymbol{q^*}$, is not stable and hence, the closed economy converges to only one financial system in the long run and become specialized in that system. The choice of to which financial system the economy converge to and specialize in, is determined by the initial conditions of the economy. If the economy is initially good at producing Islamic financial output, (i.e. if $q(0) > q^*$), then it will produce a lot of it and get relatively better and better at producing more of it. Eventually, since Islamic and conventional financial outputs are good substitutes, the economy uses marginally conventional financial system and Islamic financial system will dominates the financial market. Otherwise, if the economy is initially good at producing conventional financial output, (i.e. if $q(0) < q^*$), it will eventually specialize in conventional financial system and Islamic financial system becomes marginal. The only case in which the financial system remains dual with no dominance of

any of the two financial systems, is when the initial establishment of the financial system happens to be exactly with the combination of financial outputs at q^*.

We will explain in the next section that opening the economy to the competitive financial world, will bring new possibilities for taking the advantage of gradually shifting to an efficient Islamic financial system if learning-by-practicing accumulates fast enough in that system.

III.6. Equilibrium under an Open Financial System

Dynamic analysis of the closed financial system in the previous section does not fit the real world. Economies in the real world are open and consumers have access to global financial markets in which countries compete with each other in producing a variety of financial products and in which both Islamic and conventional financial systems are operating. In such a global financial environment, domestic relative price of conventional financial output in terms of Islamic financial output, q, in all countries are equal to the world relative prices, p, and each country will take p as given.

The world relative price of conventional output, p, is determined by the relative world supply of and relative world demand for Islamic and conventional financial outputs. Since the relative world supply of financial outputs is proportional to the relative world endowments of learning-by-practicing capital accumulated in the world financial systems (h_i and h_c), the equilibrium world relative price of financial outputs is also determined by the relative world endowments of learning-by-practicing capital. This price, p, is slope of line OM shown in figure 5. Now, countries of the world are characterized by their initial levels of learning-by-practicing endowments. Depending on their initial endowments, they are plotted below, above or on the world relative price line, OM. Therefore, we can characterize each country as a point in the space h_i and h_c. In other words, figure 5 gives us the distribution of the world countries in terms of their learning-by-practicing endowments embodied in the two financial systems. Now, we have to see how the world relative price of financial outputs is determined.

Fig 6: Distribution of Countries in Terms of Learning – by – Doing Endowment Levels (h_i and h_c)

The dots show distribution of countries by their initial human capital endowments. A country is a point in the space ($h_i(t)$ and $h_c(t)$).
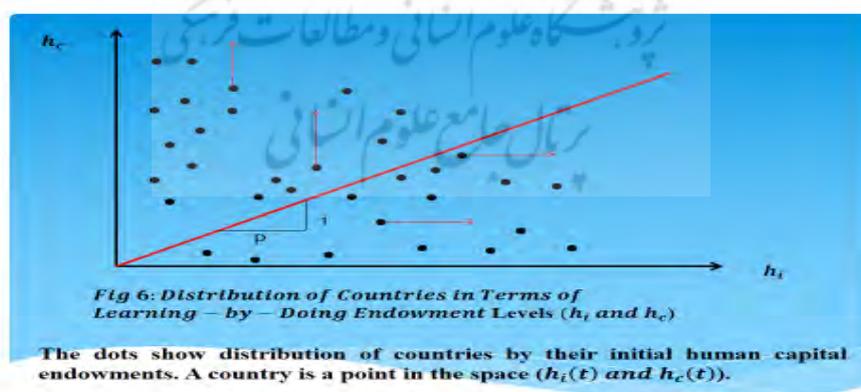
At a given world price, p, countries above the indicated price line are producers of conventional financial output since for them $\frac{h_i}{h_c} < p$ and they can maximize the value of their financial output by specializing in production of conventional financial output, h_c, in which they have comparative advantage. Countries below the price line will specialize in production of Islamic financial output, h_i, for the same reason.

Next, for each level of the world relative price, p, we can calculate the world supply of Islamic financial output by summing (or integrating) the h_i values below this price line, and the world supply of conventional financial output by summing the h_c values above the line. Clearly, the supply of conventional output is an increasing function of p and the supply of Islamic financial output is a decreasing function of p, so that the ratio of total financial output supplied to the world market, $\frac{h_c}{h_i}$, increases as p increases.

On the other hand, with identical and homothetic preferences, the world relative demand is a decreasing function of the world relative price, p, and it is the same as the one derived earlier in the case of closed financial system [$\frac{x_c}{x_i} = \left(\frac{\alpha_c}{\alpha_i}\right)^{\sigma} q^{-\sigma}$].

Hence, this static model determines the equilibrium world relative price p uniquely. We can now turn to the dynamics of this open financial system.

Due to their comparative advantages, the countries above the relative price line, OM, are better in producing the conventional financial output, so their learning-by-practicing endowments of Islamic finance, h_i, remain fixed while their learning-by-practicing endowments of conventional finance, h_c, grow at the rate θ_c. For the same reason, countries below the relative price line, OM, are better in producing Islamic financial output, so that their learning-by-practicing endowments of conventional finance, h_c, are constant while their learning-by-practicing endowments of Islamic finance, h_i, grow at the rate θ_i. As this growth process continues, each country's h_i and h_c coordinates change as indicated by the arrows in Fig. 5, altering the distribution of learning-by-practicing endowments over time and this in turn changes the relative supply of financial outputs. These movements will obviously intensify the comparative advantages that led each country to specialize in the first place.

However, this is not end of the story. As the distribution of learning-by-practicing endowments changes, so does the equilibrium relative price p. Consequently, it is possible that some countries that were above the original price line now fall below the new price line and vice versa. The implication of this is that a country may switch its specialization from one financial system to the other. Is this possible? We investigate this possibility.

If any country switches its financial system, it will have to be a country with 'ii gh-ivvvvtt i''' finnnii al system that is assumed to be the Islamic financial system. The reason is that the rate of exchange is moving against the Islamic financial system (in the absence of switching) since it is growing faster than conventional financial system. (Note that $\theta_i > \theta_c$).

What is the likelihood of this? The issue again turns on the degree of substitutability between the two financial systems. If σ is low, the terms of exchange may deteriorate so fast (relative price rises so fast in favor of conventional financial system) that a marginal country with the Islamic financial system may switch to conventional financial system: this country is getting relatively better at producing Islamic financial output, but not fast enough to be able to stay permanently on this path. To rule out such possibility, we need to impose the inequality:

$$(15) \quad \sigma > 1 - \frac{\theta_c}{\theta_i}$$

This inequality is most likely the case if, as we assumed, Islamic and conventional financial systems are good substitutes.

Under this condition (no switching of financial system), we can determine the dynamics of the relative price of conventional financial output in terms of Islamic financial output from the relative demand schedule:

$$(16) \quad \frac{\dot{p}}{p} = \frac{\theta_i - \theta_c}{\sigma}$$

With relative price movements determined, the growth rate of each financial system in every country is also determined. Measured in units of Islamic financial output, output of Islamic financial system grows at the rate θ_i. Output of conventional financial system, also measured in units of Islamic financial output, grows at the rate $\theta_c + \frac{\theta_i - \theta_c}{\sigma}$.

In general, Islamic financial system in equilibrium will enjoy constant real growth rate but not necessarily equal to the real growth rate of conventional financial system. Which financial system will grow fastest? The condition that t 'ii gh-ivvvvtt i''' Illl mmifffiaaiii ll yytt mmwillhlvvfffsster raalggowtiii jttt

$$(17) \quad \theta_i > \theta_c + \frac{\theta_i - \theta_c}{\sigma}$$

that i uquivll nnt t th ooiii tinn: σ   tttt i pratt iii gg Illami fiaaeee will lead to higher-than-average real growth for Islamic financial system only if the two financial systems are good substitutes.

If, however, the terms-of-exchange effects (relative price effects) of financial innovation dominate the direct effects on productivity through learning-by-practicing (which would be the case if σ < 1), the Islamic financial system will have the slowest real growth. Following the literature of growth, this can be aall a 'immieerizigg fincccill growth' Ieeee tii i a cccett i   aaee nnd

not the rule. Therefore, under the above technology and preferences as well as financial substibutility, we get the important result that human capital accumulation through learning-by-practicing, among the other things, plays a crucial role in long-term growth of Islamic financial system.

By practicing Islamic finance today, we get comparative advantage over time in producing more and cheaper Islamic financial products. This implies that if Islamic finance is initiated in a country and protected for some time, eventually its expertise in this protected system will grow to the point where it will have a comparative advantage over conventional finance under global competition, and the maintenance of protection will no longer serve any purpose, but this need not be so from the beginning.

IV. Experiences of Learning-by-Practicing Islamic Finance

Iran and Pakistan have had Islamic financial systems for decades. Pakistan has recently switched to a dual system. Evidence shows that Pakistan has not been very successful in implementation of viable and efficient Islamic financial systems. The overnight exercise of islamization did not produce the expected results due to lack of required support and insufficient learning-by-practicing accumulation. Most of the Islamization efforts either had been reversed or at least, further progress was stopped. The Central Bank of Pakistan has started adopting the gradual policies of implementing Islamic banking that Malaysia has adopted twenty years back.

Iran has radically changed its financial system to an Islamic financial system more than 35 years ago. However, its financial system is still said to be far away from real Islamic financial system. Many jurists have constantly been criticizing Islamic banks in Iran for implicitly being involved with interest-based financial deals and transactions. Sharia compliance of financial contracts formalized by banks in Iran has always been under critical questions. Development of Islamic financial products has been very slow due to insufficient level of human capital accumulation through learning-by-practicing Islamic finance. Unlike Pakistan, Iran may never switch to a dual financial system for sharia reasons, but the current financial system has tremendous challenges and gradually losing its credibility as an Islamic financial system.

Unlike Iran and Pakistan, Malaysia accumulated significant level of learning-by-practicing Islamic finance within a dual financial system and has witnessed a tremendous growth since introduction of Islamic finance since 1963. The ttttt ry' firtt Illmm nnnk Bkkk Illmmaa lyyii Berddd (BI   its operations on 1 July 1983. Since then, BIMB has become the core component of aa lyyii'' Illmm ficcccill yyttmm aa lyyii sss flllowe   mmpreeniive long-term strategy and has been successful to create a competitive, dynamic and resilient Islamic financial system that could withstand challenges caused by globalization and liberation of the financial markets.

V. Conclusions and Policy Implications

This simple two-sector model predicts constant, endogenously determined real growth rates for the Islamic and conventional financial systems in the long run. The different growth rates for different financial systems are not systematically related to the initial level of the learning-by-practicing in systems. In the long-term equilibrium of the model, choice of financial system is dictated by comparative advantage: Each country chooses the financial system for which its human capital endowment suits it. The model predicts stable growth rates for the financial systems in each country.

More importantly, the model predicts the possibility that a country, given its initial endowment of learning-by-practicing, can have advantage in adopting Islamic financial system under a closed financial framework, while having comparative advantage in adopting conventional financial system under global financial competition. This implies that if Islamic finance is initiated in a country and protected for some time, eventually its expertise in this protected system will grow to the point where it will have a comparative advantage over conventional finance under global competition, and the maintenance of protection will no longer serve any purpose, but this need not be so from the beginning.

In summary, it must be said that learning-by-practicing plays in key role in lung run growth of financial system. Malaysia has witnessed a significant growth of Islamic finance by accumulating learning-by-practicing and involvement with continuous development of financial products. Malaysia has proved that Islamic financial system is viable, efficient and dynamic if banks have ambition to practice Islamic finance in real term. In addition, experiences of Iran and Pakistan clearly show that a quick islamization of financial systems without proper support and efficient human capital accumulation through learning-by-practicing will eventually jeopardize credibility and sharia compliance of Islamic financial system.

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نقش یادگیری از طریق تمرین در رشد بلندمدت یک سیستم مالی اسلامی

چکیده:

طی چهار دهه گذشته، نظامهای مالی اسلامی در بسیاری از کشورها با سرعت متفاوتی رشد کرده‌اند. هدف این مقاله پایه ریزی یک مدل فراگیر-ضمن-تمرین جهت تبیین رشد بلند مدت نظام مالی است. با بهره‌گیری از ادبیات نظریه‌های رشد اقتصادی و با بکارگیری یک نظام مالی دوگانه متشکل از یک نظام مالی اسلامی و یک نظام مالی متعارف، این مقاله در جستجوی آشکار نمودن مهمترین ویژگی‌های نظامهای مالی اسلامی و متعارف در کشورهای مختلف و نیز طی زمان است. مدل این مقاله بیان می‌کند که مالیه اسلامی مبتنی بر فراگیری-ضمن-تمرین نهایتا باعث خلق مزیت نسبی برای نظام مالی اسلامی در مقابل نظام مالی متعارف خواهد شد مشروط به اینکه در بدو امر نظام مالی اسلامی مورد حمایت واقع شود تا اینکه سطح فراگیری در این نظام انباشته گردد. شواهد نشان می‌دهد کشور مالزی با یک نظام مالی دوگانه بسیار در این خصوص موفق بوده است، در حالی که هر یک از دو کشور ایران و پاکستان با وجود اینکه از نظام مالی کاملا اسلامی برخوردار بوده‌اند، در رسیدن به اهداف مورد انتظار خودشان چندان موفق نبوده‌اند.

کلمات کلیدی: مالیه اسلامی، مالیه متعارف، فراگیری-ضمن-تمرین، نظام مالی دوگانه