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**THE INHIBITION OF USURY (RIBA AN-NASI'AH) AND THE ECONOMIC
UNDERDEVELOPMENT OF THE MUSLIM WORLD**

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Abstract

Premised on the finance-growth-poverty nexus, economic advancement of Muslim countries must be underpinned by a robust financial system. Nonetheless, this measure requires foremost demystifying the *riba* enigma. In this paper we develop a rational expectations model to study the *riba* injunction and justify its inhibition to the: (i) potential of expropriating wealth from either borrower or lender, which leads to the onset of non-sustainable equilibrium in the long-run; (ii) susceptibility to financial fragility; and (iii) financial exclusion of the poor. We then present our perspectives on structuring financial facilities to mitigate the above issues, its ratiocination and the deeper meaning of this centuries old injunction. Our results differ from those espoused by classical *Shari'ah* scholars and political Islamic groups.

JEL Classification: G20, G32, O16, Z12

Keywords: interest, expropriation of wealth, financial fragility, financial exclusion, hybrid equity contracts, property rights.

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1. Introduction

“One of the most important problems in the field of finance, if not the single most important one, ... is the effect that financial structure and development have on economic growth”

Goldsmith (1969, p. 390)

An established body of literature affirms the positive contribution of developed financial systems towards a nation’s economic growth. The earliest study on this finance-growth nexus is traced to Bagehot (1873) and Schumpeter (1934), followed by empirical evidences from Goldsmith (1969) and McKinnon (1973). Financial systems perform a crucial intermediation function. This function serves to ameliorate market frictions accruing from information asymmetry and transaction cost which impede efficient investment decisions, allocation of scarce capital and transmission of financial transactions (Coase, 1937; King and Levine, 1993). This intermediation function in turn influences capital accumulation decisions and technological innovation that are vital in defining the rate of a nation’s long term economic trajectory (King and Levine, 1993). Whilst traditional intermediation functions remain an essential functional characteristic of a developed financial system, the emergence of financial markets and rise in financial innovation has precipitated the metamorphosis of intermediation to also encompass risk management and risk trading capabilities (Allen and Santomero, 1997). Of late, the circle of research on financial development and economic growth are augmented with the instrumental role of financial development in poverty and income inequality reduction. This is achieved foremost through economic growth and indirectly through the ‘McKinnon conduit effect’ of savings and consequent credit channel (Jeanneney and Kpodar, 2011).

In view financial development and economic growth are crucial in addressing poverty and income inequality, the persistent poor performance by the majority of Muslim countries has prompted exploratory studies on the causal factors to this apparent backwardness.¹ Among the studies concluded are impact of religion (Ragab, 1980; Grosjean, 2011), socio-political sphere (Chapra, 2008), and institutional historic (Kuran, 2005, 2009) on Muslim economic development. Far from being antithetical, Ragab (1980), and Grosjean (2011) note that Islam, its

¹ Despite accounting for nearly 22% of the total world population, Muslim countries constitute only 6% of the world’s Gross National Income (Pew Research Centre, 2009; World Bank, 2010). Based on the United Nations Human Development Index for 2010, 23 of the 56 Muslim countries received low scores whilst only five were in the high categories. Of the 14 Muslim countries included in the Financial Development Index 2010, five remained in the lowest quartile with marked deterioration from the preceding year’s ranking (Bilodeau and Harry, 2010).

espoused beliefs and behavioural norms do not retard economic growth. Chapra (2008) attributes the Muslim economic under development to political illegitimacy and injustices, particularly the disregard for property rights. Kuran (*ibid*) on the other hand, argues the rigidities of the Islamic institutional framework, particularly the opposition to interest has caused the growth of Muslim economies to falter. He (2005) contends Islam's prohibition against interest, the metaphor of current Islamic banking movement, is in itself lacks definitive consensus. Caught in a predicament, many sought to innovative '*hilah*' (legal stratagem) to comply with the *Shari'ah*.²

Whilst the above mentioned papers proffer light on the factorial relationship of the economic under development of the Muslim world, of particular interest to this paper is the above critique of Kuran (2005). Our paper aims to shed light on this issue, which has been an enigma for centuries. We model the business sector of the economy in a simple general equilibrium setting, augmented within a framework of rational expectations.^{3,4,5} We incorporate the conflict of interest (agency perspective) between risk-averse entrepreneur-manager and financier by segregating the demand and supply side of financing under the exogeneity of deadweight costs of bankruptcy.^{6,7} This approach allows us to endogenously determine the equilibrium parameters of a loan, contrary to the prognosis of

² See El-Gamal (2009) and Khan (2010) for further critique on current Islamic banking practices.

³ We chose the general equilibrium modelling for its rigour and strong following in the academic and policy communities (see Zame, 2007).

⁴ We opt for a setting involving symmetric information, as equilibrium asset prices aggregate and reveal private information (see Biais et al., 2010). Based on this, financial market participants can easily decipher any private information held by any counterparty by observing their trading patterns. This draws upon the Efficient Market Hypothesis (see Fama, 1970; Bray, 1981; Malkiel, 2003).

⁵ Maddock and Carter (1982) define rational expectations as "*the application of the principle of rational behavior to the acquisition and processing of information and to the formation of expectations*" (p.41). It is '*self-fulfilling*' in that economic agents form correct expectations, given the pricing model and information (Bray, 1981).

⁶ Agency cost of debt refers to distortions in managerial decision making that are caused by conflicts of interest between stockholders and bondholders. The finance literature generally attributes agency issues to the presence of asymmetric information (see Leland and Pyle, 1977; Harris and Raviv, 1991; Allen, 2001). Financing of real assets in a venture, however, constitutes a special case, where lenders (principals) can decipher any proprietary ex-ante information (i.e., adverse selection) held by borrowers (agents) through: (i) staged financing and board representation in the venture capital industry (see Gompers and Lerner, 2001); (ii) trading financial claims over a multi-period horizon as illustrated in the literature on insurance contracting (see Cooper and Hayes, 1987; Hosios and Peters, 1989); and (iii) by incorporating amortization (i.e., a restrictive form of sinking fund provision) in the financial contract (see Wu, 1993).

⁷ Moral hazard arises when economic agents maximize their own welfare to the detriment of others, especially in situations where they do not bear the full consequences of their actions. They therefore have a tendency to act less carefully than they otherwise would; leaving another party to bear some responsibility for the consequences of those actions (see [Kotowitz, 2008](#)). Moral hazard is generally considered in the literature as ensuing from ex-post information asymmetry. This too can be mitigated by underwriting iron-clad covenants in the financial contract (see Smith and Warner, 1979; Billet et al. 2007).

Modigliani and Miller (MM - 1958, 1963) and Miller (1977).⁸ This analytical technique is consistent with that of Allen (2001), who recommends researchers in finance to focus on the conflict of interest (agency issue) between equity and debt.⁹ We implicitly assume the existence of an *information architecture*, where property rights, foreclosure procedures, needed for the underlying real assets of a firm to serve as collateral and accurate methods of valuation are well established (see Levine et al., 2000). Reflective of its etymology, this paper treats interest and usury as one and the same.

Our efforts help us rationalize the inhibition of usury in Islam to the mitigation of the following: (i) market power of lender or borrower with potential to expropriate wealth of the other, thereby leading to non-sustainability of equilibrium in the long run; (ii) fragility of the financial system; and (iii) financial exclusion of the poor. It should be noted that our results are thoroughly grounded in economic theory and is deduced from the Holy Scriptures of the *Qur'an* and *Sunnah*.¹⁰ However, this rationale differs from that advanced by *Shari'ah* scholars, who justify the inhibition to an 'increase or growth' stemming from the grammatical delineation of the noun encompassing the Arabic word '*riba*' (see Alfattouh et al., 2006; Al-Zuhaili, 2006).¹¹ The misunderstanding by *Shari'ah* scholars has prompted widespread employment of subterfuge in present Islamic financial structures, which is contrary to the objects of the *Shari'ah* (see again Kuran, 2005). In response, we elaborate on characteristics of '*Shariah-Pareto*' optimal financial structure that is essential in calibrating existing Islamic financial architecture to redeem centuries of economic under development in Muslim countries. Our recommendations categorically differ

⁸ The MM model *aggregates* the two adversarial claimant' (debt and equity) objective functions, thereby depriving the analysis of supply and demand functions and hence the optimal pricing parameters of debt. It is construed under risk neutrality (akin to a linear programming model) yielding a multitude of solutions (i.e., the well-known invariant result) in the absence of market imperfections (such as taxes) and a corner solution (i.e., 100% debt financing) under corporate tax deductibility of interest. A crucial assumption of the above invariant result is that individuals resorting to the MM (1958) arbitrage have the same negotiating prowess with financiers as available to institutions. It should be noted that the Miller (1977) model is also subject to the same limitations as the MM (1963) analysis.

⁹ Our model employs a two-period version of the well-known Lucas (1978) model to price risk-free and risky debt claims.

¹⁰ Our deductions are drawn from the following revelations in the *Qur'an* (Muslim Holy Book) which: (i) renounces those consuming usury for it leads to expropriating another person's assets or their resources (2:275, 2:278-279, 2:281, 3:130-132, 4:161, 30:39); (ii) asks lenders to give respite to their debtors (2:280); and (iii) contrasts charity with *riba* (2:276-277, 30:39). This is explicated further by the *Sunnah* (the Tradition of Prophet Muhammad) which identifies the categorical aspects of assets and practices that are subjects of this prohibition (amongst the narrated Traditions of the Prophet (PBUH) relating to *riba* include Sahih Bukhari Vol. 3, 34:344 and 38:506; Sahih Muslim Book 10, 20:3853 and 23:3872).

¹¹ Linguistically *riba* in the *Qur'anic* texts connotes a positive nuance of increase, rise, swell, grow, raise or attributed to the nurturing or teaching (Alfattouh et. al, 2006; Al-Zuhaili, 2006). It is from the theological context that *riba* or increase in financial transactions without an equivalent counter value in a commutative transaction is impermissible (Al-Zuhaili, 2006).

from those espoused by the leaders of political Islamic groups (see Siddiqi, 1983; Chapra, 2006).

This paper is divided into seven parts. Section 2 provides the historical origins of usury, highlighting the similarities of Islam with other Abrahamic religions. In Section 3, we develop a model to illustrate the ratiocination for the inhibition of *riba* in the context of financial transactions; namely, the potential to expropriate wealth, susceptibility to precipitate financial fragility and financial exclusion of the poor. Sections 4 to 6 undertake a review of the existing literature on the aforementioned issues. In order to provide a complete perspective on these key concerns, we also incorporate in Sections 4 to 6 studies on the current mechanisms deployed to address them as well as our perspectives on the matter. Finally, Section 7 provides the concluding comments.

2. Historical origin of usury

Debate on usury remains relevant in current times as it was in antiquity. Interpretation and application of this religious commandment on prohibition of usurious pursuits in the three Abrahamic religions have over time been tempered by changes in the economic and ethical landscape.¹²

2a. Judeo-Christian perspective

Charting from the Deuteronomy prohibition on Hebrews from exacting usury (*neshek*) from a fellow brother saw early Christian exegetes and leading scholars view usury as a sin. From the stand point of Aquinas and Aristotle “*to take usury from any man is simply evil...*” since “*money was sterile and hence that the breeding of money from money is unnatural and justly hated*” (Homer, 1963, p.71). It is seen as an invasion of property rights and even declared as robbery; a sin censured under the Seventh Commandment. Nonetheless, beginning from the Eleventh century and thereafter the Canonical understanding on usury took on a more liberal tone. This is attributable to a confluence of events; congenial

¹² Muslims believe that Islam is an Abrahamic faith and shares a common ground with Christianity and Judaism: Say: “*Verily, my Lord hath guided me to a Way that is straight,- a religion of right,- the Path (trod) by Abraham the true in faith, and he (certainly) joined not gods with God*” (*Qu’ran* 6:161). “*The same religion has He established for you as that which he enjoined on Noah - The which We have sent by inspiration to thee - And that which We enjoined on Abraham, Moses and Jesus: Namely, that ye should remain steadfast in Religion, and make no divisions therein: To those who worship other things than God, hard is the (way) to which thou callest them. God chooses to Himself those whom He pleases, and guides to Himself those who turn (to Him)*” (*Qur’an* 42:13).

Injunction against usury is also explicated in the religious books of the Judaism (Deuteronomy 19:20) and Christianity (Bible – Ezekiel, 18:8, 13:7, 22:12) (see Cornell, 2006).

Christian exegetes, rise of capitalism, the Christian Reformation (Homer, 1963), effects of price inflation, weak legal system (Koyama, 2010), emergence of new economic theories of risk and time value of money (Mews and Abraham, 2007). The Reformation led to delineation between interest and usury by contemporary Christian exegetes, Luther and Calvin. To Luther, Christians are not obliged to observe the Deuteronomy prohibition on usury. Therefore, usury which is previously understood as any kind of interest including simple interest on money or goods lent above the value given is now reinterpreted by Calvin to include only excessive increment that impinges on the other contracting party. Flowing from this reinterpretation, interest taking as presently practised is legalised for it is deemed as compensation due to the creditor arising from an opportunity loss which he had incurred through lending (Homer, 1963).

2b. Islamic perspective

Synonymous with Judeo-Christianity, the prohibition of usury was revealed in the *Qur'an* and reinforced in the *Sunnah*. In Islam, there are two distinct kinds of usury; the evident and hidden. The former also known as *riba an-nasi'ah* relates to the practice during the pre-Islamic Arabia when the creditor would increase the outstanding debt amount for every delay in settlement by borrower. Instead of granting financial reprieve the creditor expropriates the debtor's property, ultimately leaving the borrower in dire financial situation.¹³

On the other hand, the hidden usury or *riba al-fadl* in the *Sunnah* is prohibited to block means that could lead towards the evident usury.¹⁴ Its prohibition acts as a public policy tool for avoidance of non-socially enhancing transactions. The impermissibility centres on: (i) delay in settlement without equivalent counter values or exchange of similar commodity with differing quantities; and (ii) the trading of money for itself. Cursorily there is nothing impermissible with respect

¹³ This is against the *riba* injunction in the *Qur'an* (2:279), which calls for preservation of rights of both parties, "*If ye do it not, take notice of war from God and His Apostle: But if ye turn back, ye shall have your capital sums: Deal not unjustly, and ye shall not be dealt with unjustly*". The term 'war' relates to the call for liberation of debtors from unjust dealings and oppressions (Ali, 2002). This is accentuated in the legal maxim '*bi-al-batil*', which criticises those who consume other people's property without right and thus, causing hardship on the affected person (Ibn Qayyim, 1973).

¹⁴ "*The evident is prohibited for the great harmfulness it involves, while the hidden is prohibited because it is a means to the evident. The prohibition of the first is one of ends, while the prohibition of the second is one of means. Prohibition [of the hidden *riba*] is in the category of blocking access to evil, a doctrine of enjoining or prohibiting actions otherwise merely permissible in order to prevent access of a greater evil*" (Ibn Qayyim, 1973, p. xx).

Hidden *riba* is drawn from the following *Sunnah*:

'Ubada reported that the Prophet Muhammad (PBUH) said, "*Gold for gold, silver for silver, wheat for wheat, barley for barley, dates for dates, salt for salt, equal for equal, thing for thing. One who increases or seeks increase has committed *riba**" (Sahih Bukhari Vol.3, 34:344 and Sahih Muslim Book 10, 20:3853).

to these transactions. However, such transactions may approximate the evident usury. Firstly, it may lead to inequality in transactions and is subject to abuses, thus affecting either party's property.¹⁵ Secondly, a just exchange of disparate commodities is best served through monetization of transactions. Therefore, the stability of monetary value is only observed if the currency is not traded for itself (Thomas, 2006).¹⁶ Despite the general conviction on prohibition of usury, interpretation on its legal cause by the classical *Shari'ah* scholars' is fraught with disparate views persisting to this modern day (see Table 1).

[Table 1 Here]

Debate on the matter can be categorically identified into two schools of thought; narrow and broad interpretation on usury. The narrow interpretation that designates *riba* to compounded interest is associated with a more liberalist stance due to its nearness to contemporary Judeo-Christian view point. Forbearance is allowed if a need arises that brings greater benefit compared to the opportunity lost if the prohibition had remained enforced. As the hidden usury relates to the commodities mentioned in the *Sunnah*, it is thus incorrect to accord the same treatment to loans (Al-Sanhuri, 1956). Interest in the current banking system should be treated differently and the interpretation of the *riba* injunction should be evaluated in light of socio-political context (Rahman, 1964). On the other hand, proponents of the broad interpretation of usury termed as the 'neo-Revivalist' by Saeed (1996, p.2), emphasised the "*permanence and immutability of the rulings or instructions given in the Qu'ran and Traditions*". Any fundamental reinterpretation of the Islamic injunctions is deemed unacceptable. Unlike Judeo-Christianity, the injunction against usury remains in the Islamic sphere albeit the differing reinterpretation and levels of observation by Islamic scholars and its community.

¹⁵ El-Gamal (2006) attributes the inhibition to inequities in barter economy. This is based on the *Sunnah*, where the Prophet Muhammad (PBUH) is reported to have recommended his companion Bilal to sell low quality dates for money and use the proceeds to buy high quality dates (see Sahih Bukhari Vol. 3, 38:506; Sahih Muslim Book 10, 23:3872). See also Guriev and Kvassov (2004) for arguments on the exploitative nature of barter transactions.

¹⁶ Explicating Aristotle and Aquinas' argument on the sterility of money, Ibn Qayyim (1973) succinctly explained that "*money is not sought as individual objects, but what is sought is use of it as a means to commodities. If it itself becomes commodities sought as individual objects, then the affairs of the people become corrupted*".

3. Model development

We present a model of usurious *financial packages* contracted between two agents (namely, an entrepreneur–manager and a financier) to illustrate the underlying ratiocination for the *riba* inhibition. Contrary to the classical *Shari'ah* scholars simplistic explication of *riba* and Kuran's (2009) contention on *riba* permeating the under development of the Muslim economy, we rationalise that *riba* leads to dysfunctional financial structures.

For simplicity and mathematical tractability, we assume a two period economy, with two agents (as stated above) and two types of assets (investments). Both agents are endowed with distinct amounts of numeraire good in our economy (e_0, e_1, e'_0, e'_1), at times $t = 0$ and $t = 1$.¹⁷ They maximise their respective welfare at $t = 0$. The investment in our economy comprise of a *real asset* and a *financial asset*. The *real assets* encompass a project, whose payoffs at time $t = 1$ constitute of: (i) a Net Operating Income ($\text{NOI} - \tilde{q}_1$); and (ii) a terminal value (\tilde{P}_1), where \tilde{q}_1 and \tilde{P}_1 are non-negative random first-order Markov processes whose probability distribution is known to the agents in the economy. The *financial asset* includes a risk-free or a risky loan encumbering the underlying real assets (of the project) and the trading of financial claims against the project's payoffs. The remaining variables representing capital resources ($Q, Q', P_0, \tilde{q}_1, \tilde{P}_1$) or consumption parameters of the two agents ($c_0, \tilde{c}_1, c'_0, \tilde{c}'_1$) are denominated in terms of the numeraire good (in *real* terms). Our analysis is carried out by modelling both agents in this economy, imposing the market clearing conditions for both loans and the project, and solving for their optimal pricing components.

3a. The entrepreneur – manager (as an *agent* in the financial contract)

The goal of this agent is to optimally undertake 's' fraction of the project and Q amount of debt, in order to maximize his expected utility of consumption.

$$\text{Max. } E_0 \{U(c_0) + \gamma U(\tilde{c}_1)\}$$

$$(\text{in } Q, c_0, c_1, s)$$

¹⁷ We assume that the endowments are not stochastic for the purpose of simplicity. If they were to be stochastic then the asset and debt pricing conditions would be contingent on the correlation between it (i.e., the endowment) and the portfolio owned by either investor. Nonetheless, the quality of our results would not change with the addition of this intricate feature of the endowment.

subject to the temporal budget constraints

$$c_0 = e_0 + Q - sP_0 = e_0 - [sP_0 - Q] \quad (1)$$

$$= e_1 + [s(\tilde{q}_1 + \tilde{P}_1) - Q(1 + \tilde{i})] \quad (2)$$

Where: $E_0\{\cdot\}$ is the expectation of the entrepreneur-manager at time 0.

$U(\cdot)$ is a strictly concave and twice continuously differentiable (Von Neumann-Morgenstern) utility function.

e_0 and e_1 are respective endowments at times 0 and 1.

γ is the discount factor.

s is the fractional investment in the project.

Q is the amount of numeraire good borrowed.

P_0 is the price of the project (incorporating all relevant transaction costs).

\tilde{i} is the real interest rate.

\tilde{q}_1 is the net operating income of the project.

\tilde{P}_1 is the terminal value of the project.

c_0, \tilde{c}_1 are the consumption of the entrepreneur at times 0 and 1, respectively.

The budget constraint at $t = 0$ (Equation 1) illustrates consumption utilization of the initial endowment (e_0), after deducting sP_0 for the purchase of 's' fraction of a project financed by a loan of Q . The budget constraint at $t = 1$ (Equation 2) incorporates consumption from the future endowment (e_1) in addition to the net payoffs of 's' fraction of a project after deducting the loan payment with interest $[s(\tilde{q}_1 + \tilde{P}_1) - Q(1 + \tilde{i})]$. Therefore, non-project resources ensuing from the initial endowment and loan proceeds are expended in period zero to consume payoffs from project (net of loan payment) in period one.

The Lagrangian L can be written as

$$L = E_0\{[U(c_0) + \gamma U(\tilde{c}_1)] + \lambda_0[e_0 - sP_0 + Q - c_0] + \lambda_1\gamma[e_1 + [s(\tilde{q}_1 + \tilde{P}_1) - Q(1 + \tilde{i})] - \tilde{c}_1]\}$$

The First Order Necessary Conditions (F.O.N.C.s or Euler Equations) are:

- (i) At the optimum, the benefit of borrowing is equal to its associated cost. This simplifies to the *demand* function for a loan described as follows. The intertemporal marginal rate of substitution (IMRS) of entrepreneur-manager

[$\text{IMRS}_{\text{EM}} = \gamma \frac{U'(\tilde{c}_1)}{U'(c_0)}$] times the compound factor, consisting of one plus the real rate of interest, is equal to the unit value of funds loaned:

$$\gamma \mathbb{E}_0 \left\{ \frac{U'(\tilde{c}_1)(1 + \tilde{i})}{U'(c_0)} \right\} = 1 \quad (3)$$

For a risk-free (RF) loan (see Figure 1) Equation (3) simplifies to

$$\gamma \mathbb{E}_0 \left\{ \frac{U'(\tilde{c}_1)(1 + i_{\text{RF}})}{U'(c_0)} \right\} = 1 \quad (3a)$$

For a risky loan (see Figure 2), Equation (3) simplifies to

$$\gamma \int_0^c \frac{U'(\tilde{c}_{1j})[\tilde{q}_{1j} + \tilde{P}_{1j}]}{U'(c_0) \mathcal{Q}_{\text{Risky}}} dj + \gamma \int_c^\infty \frac{U'(\tilde{c}_{1j})[1 + i_{\text{Risky}}]}{U'(c_0)} dj = 1 \quad (3b)^{18}$$

[Figures 1 and 2 Here]

- (ii) At the optimum, the entrepreneur will only bid for that fraction of a project that makes the net benefit of ownership equal to zero. Similarly, she will avoid investing in a project if net benefits are less than zero. This simplifies the *demand* function for a project described as follows. The price of the project bid by the entrepreneur-manager is equal to the IMRS of the entrepreneur-manager (IMRS_{EM}) times the proceeds from the net operating income plus the residual value:

¹⁸ Equation 3(b) is derived by decomposing the expectations operator in Equation (3) into two integral components: (i) incorporating states in *default* before reaching the critical state 'c'; and (ii) *normal* states above it (see Figure 2). Two important facts should be noted here. They are:

(i) The critical state 'c' is defined as the future state of the economy up to which the entrepreneur is technically in default of his loan obligations. That is, $\mathcal{Q}^*_{\text{Risky}}(1 + i^*_{\text{Risky}}) > (q_{1j} + P_{1j}) \forall j \leq c$.

(ii) The notation dj is defined as follows:

$dj = f(q_{1j} + P_{1j})d(q_{1j} + P_{1j})$, where $f(\cdot)$ represents the probability density function.

$$P_0 = \gamma E_0 \left\{ \frac{U'(\tilde{c}_1) [\tilde{q}_1 + \tilde{P}_1]}{U'(c_0)} \right\} \quad (4)$$

For a risk-free loan, Equation (4) simplifies to

$$P_0 = \gamma E_0 \left\{ \left[\frac{U'(\tilde{c}_1)}{U'(c_0)} \right] [\tilde{q}_1 + \tilde{P}_1] \right\} \quad (4a)$$

For a risky loan, Equation (4) simplifies to

$$P_0 = \gamma \int_c^{\infty} \frac{U'(\tilde{c}_{1j}) [\tilde{q}_{1j} + \tilde{P}_{1j}]}{U'(c_0)} dj \quad (4b)$$

It should be noted that a risky loan is welfare reducing as the entrepreneur loses her key asset in the default states of the economy, below the critical state 'c' (see Figure 2). Equations (4), (4a) and (4b) are similar to the two-period version of the well known Lucas (1978) model incorporating all the relevant features of the project market.

Therefore, a unique and constrained maximum on the entrepreneur's function (under each of the risk-free and risky loan) requires that the following conditions are met: First, the deterministic budget constraint (at $t = 0$) in Equation (1), and the stochastic budget constraint (for each state of the economy at $t = 1$), as shown by Equation (2), are satisfied; Second, the simplified versions of F.O.N.C.s represented by Equations (3a)/(3b) and (4a)/(4b) are satisfied. We note that the second order conditions are automatically satisfied as Chiang (1984) demonstrates that maximization of a strictly concave and twice continuously differentiable utility function with linear constraints gives a negative definite bordered Hessian matrix.

3b. The lender (as the *principal* of the financial contract)

Similar to the previous case, the goal of the lender is to optimally fund the project with Q' amount of debt to maximize his expected utility of consumption:

$$\text{Max. } E_0 \{ V(c'_0) + \gamma V(\tilde{c}'_1) \}$$

$$(\text{in } Q', c'_0, c'_1)$$

subject to the temporal budget constraints

$$c'_0 = e'_0 - Q' \quad (5)$$

$$\tilde{c}'_1 = e'_1 + Q'(1 + \tilde{i}) \quad (6)$$

Where: $V(\cdot)$ represents a strictly concave and twice continuously differentiable (Von Neumann–Morgenstern) utility function of the lender, and $(1-k)\%$ is the sum of the direct and indirect costs of loan default. Finally, the notations with primes have the same meaning as that for the entrepreneur-manager.

The budget constraint at $t = 0$ (Equation 5) denotes consumption stemming from the initial endowment (e'_0) after disbursing a loan of Q' . The budget constraint at $t = 1$ (Equation 6) represents consumption resulting from the future endowment (e'_1) along with the net reimbursement of the loan payment with interest $[Q'(1 + \tilde{i})]$. Here too, non-project resources emanating from the initial endowment are expended in period zero to consume loan payoffs in period one.

The Lagrangian L can be written as

$$L' = E_0\{[V(c'_0) + \gamma V(\tilde{c}'_1)] + \lambda'_0[e'_0 - Q' - c'_0] + \lambda'_1\gamma[e'_1 + Q'(1 + \tilde{i}) - \tilde{c}'_1]\}$$

The F.O.N.C. (Euler Equation) is:

- (i) At the optimum, the benefit of lending should equal its associated cost. This simplifies to the *supply* function for a loan described as follows. The IMRS of the lender ($IMRS_L$) times the compound factor, consisting of one plus the real rate of interest is equal to the unit value of the funds loaned:

$$\gamma E_0\left\{\frac{V'(c'_1)(1 + \tilde{i})}{V'(c'_0)}\right\} = 1 \quad (7)$$

For a risk-free loan Equation (7) simplifies to

$$\gamma \left\{\frac{V'(c'_1)}{V'(c'_0)}\right\} (1 + i_{RF}) = 1 \quad (7a)$$

For a risky loan Equation (7) simplifies to

$$\gamma'k \int_0^c \frac{V'(c'_{1j})[\tilde{q}_{1j} + \tilde{P}_{1j}]}{V'(c'_0)Q'_{\text{Risky}}} dj + \gamma' \int_c^\infty \frac{V'(c'_{1j})[1+i_{\text{Risky}}]}{V'(c'_0)} dj = 1 \quad (7b)^{19}$$

Thus, a unique constrained maximum of the lender's objective function (under each of the risk-free and risky loan) requires that the following conditions are satisfied: First, the deterministic budget constraints in both periods represented by Equations (5) and (6) are satisfied; Second, the simplified versions of the F.O.N.C., i.e., Equations (7a)/(7b) are satisfied. The second order conditions for a maximum are automatically satisfied, based on Chiang's (1984) result for a strictly concave and twice continuously differentiable utility function with linear constraints.

3c. Market clearing condition and regulatory constraint

The following conditions are necessary for equilibrium:

- (i) For the debt market to be in equilibrium:

$$\text{Funds Borrowed (Q)} = \text{Funds Lent (Q')} \quad (8)$$

- (ii) For the asset (project) market to be in equilibrium:

The fractional ownership of a project owned must total 100%. Since lenders are generally barred from direct ownership of equity in a venture due to Central Bank (Federal Reserve) regulations in many countries (see Litan, 1992):

$$s = 1 \quad (9)$$

3d. Model solutions

Assuming competitive markets and no initial capital constraints, *two* unique and distinct Rational Expectations Equilibria (REE – implying a maximum of two equilibria) are feasible for the risk-averse entrepreneur-manager under risk-free and risky debt upon satisfaction of their F.O.N.C.s as derived in Sections 3a and 3b.

¹⁹ Equation (7b) is derived by decomposing the expectation operator in Equation (7) into two integral components: (i) incorporating states in *default* prior to the critical state 'c'; and (ii) *normal* states above it (see again Figure 2). The first integral reflects the fact that, in bankruptcy, the lender recoups a fraction 'k' of the NOI plus terminal value of the project by taking over it on default. In contrast, the second integral reflects full contractual payments of principal and interests in the *normal* states of the economy.

3d(i). Necessary conditions for model solutions

Proposition 1: A REE for a risk-free loan requires satisfaction of the following necessary conditions:

- (i) Basic Condition: The payoffs of a project (composed of the sum of its NOI plus terminal value) are strictly positive even in the worst state of the economy (in the following period). That is, $\text{Min.}(q_{1j} + P_{1j}) > 0, \forall j$. This requires the underlying real assets of the project to be of high quality. This result is consistent with the prognosis of Shleifer and Vishny (1992).²⁰
- (ii) Debt Pricing Condition requires equality between the *demand* and *supply* functions for loan financing:

$$\gamma E_0 \left\{ \frac{U'(\tilde{c}_1)(1+i_{RF})}{U'(c_0)} \right\} = \gamma' \left\{ \frac{V'(c'_1)(1+i_{RF})}{V'(c'_0)} \right\} = 1 \quad (10a)$$

The above equation implies that for equilibrium to exist, the IMRS of both agents in the economy must adjust to solve for the unique price of the loan in terms of the interest rate and the loan amount.

- (iii) Asset (Project) Pricing Condition requires the current price of the loan to equal the expected value of the product of the IMRS of the entrepreneur-manager (IMRS_{EM}) times the project payoffs stemming from the NOI and the terminal value:

$$P_0 = \gamma E_0 \left\{ \frac{U'(\tilde{c}_1)[\tilde{q}_1 + \tilde{P}_1]}{U'(c_0)} \right\} \quad (11a)$$

Proof: See the Appendix.

Proposition 2: A REE for a risky loan requires satisfaction of the following necessary conditions:

- (i) Basic Conditions: (a) The loan is structured in such a way that it involves default in some state of the economy in the following period; (b) The interest rate contracted for the risky loan is greater than that for the corresponding risk-free loan solution determined above; (c) Finally, the debt ratio for the

²⁰ Shleifer and Vishny (1992) find liquidation value as a significant factor in debt capacity decisions. This is also concurred in Benmelech et al. (2005).

risky loan is greater than that for the corresponding risk-free loan solution determined above.

- (ii) Debt Pricing Condition requires equality between the *demand* and *supply* functions for risky loan financing:

$$\gamma \int_0^c \frac{U'(\tilde{c}_{1j})[q_{1j} + \tilde{P}_{1j}]}{U'(c_0)Q_{\text{Risky}}} dj + \gamma \int_c^\infty \frac{U'(\tilde{c}_{1j})[1 + i_{\text{Risky}}]}{U'(c_0)} dj =$$

$$\gamma'k \int_0^c \frac{V'(\tilde{c}'_{1j})[q_{1j} + \tilde{P}_{1j}]}{V'(c'_0)Q'_{\text{Risky}}} dj + \gamma' \int_c^\infty \frac{V'(\tilde{c}'_{1j})[1 + i_{\text{Risky}}]}{V'(c'_0)} dj = 1 \quad (10b)$$

- (iii) Asset (Project) Pricing Condition requires:

$$P_0 = \gamma \int_c^\infty \frac{U'(\tilde{c}_{1j})[q_{1j} + \tilde{P}_{1j}]}{U'(c_0)} dj \quad (11b)$$

Proof: See the Appendix.

3d(ii). Key results

Theorem:

Project financing is undertaken in a *Pareto-efficient* financial package that minimizes the *endogenous* agency costs of debt. The following general results can be inferred from the model: First, if agency costs (stemming from the risk of the project and the deadweight costs of default is low) then risky debt is at best Pareto-neutral (and *not* Pareto-optimal) to its risk-free competitor. Here, the financier prefers risky debt over the risk-free alternative, while the entrepreneur prefers the opposite. This implies: (i) the prominence of the *Pecking Order Theory* even in our framework of symmetric information; and (ii) the feasibility of risky loan equilibria (even in the absence of any corporate taxes) contrary to the Static Trade-off Theory (see again Myers and Majluf, 1984; Myers, 1984).²¹ In either case, the loan is

²¹ The results indicate a hierarchical order of decreasing *Pareto-efficiency* with increasing agency cost of debt due to default risk, ranked as follows:

priced to satisfy the Basic Condition, Debt Pricing Condition and Asset Pricing Condition described in Propositions 1 and 2. In the case of risky loan, the debt pricing condition incorporates the risk of the project that is transmitted to the lender along with the deadweight costs of default (see Equation 10b). Additionally, we find instances, where lender *or* borrower have market power to extricate wealth from the other if $i > r_{\text{unleveraged}}$ or $i < 0$, respectively where $r_{\text{unleveraged}}$ is the expected unleveraged return from the project.^{22,23} To mitigate exploitation of wealth by either lender or borrower, we posit that a just and an equitable return should be, as a rule of thumb within the following bounds:²⁴

$$0 \leq i \leq r_{\text{unleveraged}} \quad (12)$$

Second, the Pareto-neutral risky debt solution conveys fragility to the financial system. This is due to the interconnectedness of businesses and financial markets (Anand et al., 2011). When the entrepreneur defaults, it can have a domino effect on her supplier as well as client. If the supplier and/or client are serviced by the same financial institution, it has an overall negative impact on the financial system (see Figure 3). Where there is high level of uncertainty on the solvency of the firm or the financial institution, it can lead to a freeze in trade and/or financial credit market (see: (i) Akerlof (1970) on an example of breakdown in the used car market;

(i) A risk-free debt equilibrium under zero agency cost of debt is consistent with the prognosis of Myers (2001, p. 96) who states: “*Conflicts between debt and equity investors only arise when there is a risk of default. If debt is totally free of default risk, debt holders have no interest in the income, value or risk of the firm. But if there is a chance of default, then shareholders gain at the expense of debt investors*”.

(ii) A risky debt equilibrium is contingent on high risk-tolerance of lender and low costs of default. This facility is at best Pareto-neutral to that of risk-free debt. Since in the occurrence of default, lender recoups only a fraction of the project terminal value, whilst in a normal state the lender secures full payment of his principal and the contracted interest. Additionally, risky debt suffers from Myers’s (1977) prognosis of under investment issue. From the perspective of the borrower, risky debt is welfare reducing since the lender embeds the default cost when pricing the loan which is then absorbed by the borrower;

(iii) Finally, where the quality of the underlying asset is poor or there is excessive cost of default, leverage is not possible. This leads to autarky. This is in line with the seminal study by Jensen and Meckling (1976), which argues that in such extreme situation the borrower would be left to bear the entire impact of the agency costs of debt.

Our result contrasts with Aggarwal and Yousef (2000) who assume the existence of total incomplete contracts environment that is invariant to existing market mechanisms deployed to attenuate this issue (see Footnotes **Error! Bookmark not defined.** and **Error! Bookmark not defined.**).

²² Expropriation of wealth by either lender or borrower need not necessarily exist in only uncompetitive markets. This is exemplified in mortgage financing market (Bond et al., 2009), structured financial instruments (Henderson and Pearson, 2011), real estate financing (Palank, 2010) and emergency credit facility by the Federal Reserve (Harding et al., 2010).

²³ If our two-period economy is extended to a multi-period one then the solution $i > r_{\text{unleveraged}}$ *or* $i < 0$ yields a non-sustainable equilibria.

²⁴ An alternative payoff structure based on a collateralised financial package is discussed in Besley and Ghatak (2009, p. 21). The authors posit that for proper recompense of the lender, his risky interest rate (r) should be supported by the collateral value of the pledged asset (c) and opportunity cost of the loan (ρ), exemplified as follows: $r > \rho > c$. It should be noted that the above result is derived in a partial equilibrium framework (assuming the *exogeneity* of default) in contrast to our general equilibrium one with *endogeneity* of default.

and (ii) Milne and Wood (2008) on impact of credit freeze ensuing from the bankruptcy of Northern Rock in the United Kingdom). In the worst case, it could exacerbate systemic risk and cause financial contagion in neighbouring networks.

Third, if the three conditions in Propositions 1 or/and 2 are not satisfied, we will fail to have an equilibria. This implies that the *endogenous* agency costs of debt deter the exchange of financial claims leading to autarky. This situation is akin to financial exclusion of the entrepreneur, which necessitates intervention in the market. An example of government policy intervention is the Small Business Administration (SBA) in the United States that is established to assist entrepreneurs with low cost loans by providing a guarantee over the loan.²⁵ The Islamic equivalent is the employment of charitable sources to nurture those borrowers who are not catered by mainstream intermediaries.

Proof: see the Appendix.

[Figure 3 Here]

We elaborate on the above results by illustrating a numerical example (see Table 2) where agents in the economy have Constant Relative Risk Aversion

(CRRA) utility function, i.e. $U(c) = \frac{c_i^{1-a}}{1-a}$, $\forall a \neq 1$; and $U(c) = \text{Ln}(c)$, $\forall a = 1$. Here, the lender prefers the fragile risky loan as his social welfare is higher than that with risk-free alternative. The interest rate $i > r_{\text{unleveraged}}$ for default costs $(1 - k)\%$ ranging from 0 to 0.1 [i.e., $0.9 \leq k \leq 1$]. This implies extricating of wealth of borrower by the lender. In case of risk-free loan, we have $i = -1.69\% < 0$ indicating the extricating of wealth by borrower. Note that for values of k below 0.8 there are no risky equilibria indicating the detrimental impact of agency costs of debt.

[Table 2 Here]

4. Usury a mechanism to expropriate wealth

As the practice of levelling interest on capital became the accepted norm, classical economic scholars of the day were divided on its effects to society. Amongst the notable scholars are Adam Smith and Gilbert K. Chesterton who despite being strong proponents of the free market faltered at allowing the market rate to find its own equilibrium due to concerns on usury abuses and misallocation of resources to

²⁵ See Garvin (1971) on presence of capital gap for small businesses, particularly in the context of minority enterprises in the United States.

a limited segment of society (Jadlow, 1977; Mews and Abraham, 2007). For it puts the poor at a comparatively greater financial risk leading to injustice and degeneration of social order (Thomas, 2006). The many forms of expropriation include usurious rates, repressive contractual terms, manipulation of markets and unfair trading, which are in fact facets of predatory practice (Carr and Kolluri, 2001; Thomas, 2006).

The likelihood for expropriation increases where credit markets are fragmented coupled with borrower's poor credit rating (Bhaduri, 1973). The lender may price the financial commitments to induce default as a means to expropriate further wealth from the borrower (Bhaduri, 1977; Bond, 2009). This is despite the incumbent lender awareness on the poor prospects of the borrower. The provision of financing exacts the borrower's welfare in two ways: First, there is an opportunity cost on the consumption foregone by the borrower in her effort to avert foreclosure. Second, it transfers resources from the borrower to the incumbent lender (Bond, 2009, categorises these as equity stripping from the value of the property or venture and income stripping linked to the servicing of the loan up to its foreclosure). Even prime borrowers (i.e., those of lower risk) are exposed to predatory pricing, specifically where equity value of the property or venture is significant. Such abuses of market power may lead to a breakdown of morality and therefore trust in the market with repercussions akin to the Akerlof's market for lemons (Akerlof, 1970).

Expropriation risk can also arise from agency cost of debt arising from the case where: (i) borrower has an incentive to transfer downside risk of the project to lender (Smith and Warner, 1979; and Barnea et al., 1981, term this as risk shifting or asset substitution); or (ii) borrower refrains from investing if she perceives wealth from it accruing to the lender (Myers, 1977, terms it as the under investment issue). Alternatively, in the case of negative equity or investment 'underwater', borrower can inflict harm on the lender by engaging in strategic default (Foote et al., 2008).

4a. Mechanism to avoid expropriation

Ubiquity of usury laws and introduction of regulation such as the Truth in Lending Act have been promulgated as an anti-predation measure. Proponents of usury law argue that it enhances welfare through a more equitable distribution, particularly in incomplete markets and presence of moral hazard (Glaeser and Scheinkman, 1998; Coco and De Meza, 2009); as well as heightens demand for financial resources, which are essential for economic growth (Blitz and Long, 1965).

On the other hand, opponents of the law argue that contrary to its object, usury laws impede efficient allocation of resources and hence, economic growth. For a low ceiling rate has negative ramifications on the supply of credit.²⁶ It promotes private interests at the expense of potential financial exclusion of economic agents that the statute claims to protect (Jadlow, 1977; Benmelech and Moskowitz, 2010). This group of borrowers will be further repressed due to their limited personal financial resources and lack of alternative financial substitutes that they can avail to. Furthermore, non-uniformity in interstate usury laws can induce cross subsidisation between states and if acute it can precipitate predatory practices. Despite proffering rationale for the existence of usury laws, Glaeser and Scheinkman (1998, p.2) themselves opine that controls “*limit the ability of credit markets to smooth income shocks*”. Whilst “[*t*he costs of restricting interest rates are obvious; the benefits are more obscure”. Anti-predatory laws itself have also had their fair share of critiques (Zikmund-Fisher and Parker, 1999; Peterson, 2008).

Another stream of literature on mechanism to mitigate expropriation of wealth flows from studies on optimal financial contracting. Equity based profit and loss sharing arrangements are naively argued as efficient by Siddiqi (1983) and Chapra (2006). On the other hand, Ebrahim and Hussain (2010) present quasi-equity financial instruments to be more economically efficient compared to pure debt based contract in a general equilibrium setting.²⁷ If it is structured to avoid expropriation, it can lead to a more equitable resource allocation, enhances accountability in project selection and attenuates agency cost of debt issues (see

²⁶ Economic development policies offering concessionary borrowing rates, such as the small business administration loans in the United States, which is in contrast to usury leads to similar credit market distortion and unlevel interest rates.

²⁷ Information asymmetry has been cited as one of the reason for Islamic financial institutions' reluctance to fully deploy profit and loss sharing financial modes (Kuran, 1995). The primary reason for the prevalence of debt based contracts is for mitigation of the twin issues of information asymmetry and moral hazard. These are easily resolved in the business sector of the economy as elaborated in Footnote **Error! Bookmark not defined..**

Section 5 for further discussion on the Pareto efficiency of quasi-equity financial facilities).

5. Usury permeates financial fragility

Minsky's (1986) rumination more than a decade ago on fragile financial structures reflects aptly the vulnerability of present financial architecture to ruptures from economic and financial disequilibrium. The occurrence of shocks can be *exogenous*-led by events in the real sector that impairs the debt servicing capability of economic agents (Kindleberger, 2000). In a closely linked credit network economy, failure of one economic agent to honour its debt obligations can cause a domino effect on other credit linkages and in severe situations the onset of economic depression (Fisher, 1933; Anand et al., 2011). In contrast, *endogenous* shocks are linked to events emanating from within the financial system. This is the essence of Minsky's (1992) financial instability hypothesis wherein the "*cyclical tendencies which are unsteady but steadily repeated*" as propounded by Fisher (1933, p.338), accrues to the inherent characteristics of the financial system. Despite the concerted intervention and regulatory policies aimed at attenuating excessive volatilities within the system, the economy time and again exhibits susceptibility to business cycles extremities. Amongst the rich literature exploring the factor-causality of endogenous-led shocks includes combination of destabilising financial liberalisation (Jeanneney and Kpodar, 2011), excessive leverage (Fisher, 1933), substandard asset portfolio (Bernanke and Getler, 1990), dysfunctional regulatory and supervisory oversight, disruptive financial innovation and destabilising banking modalities (Diamond and Rajan, 2009).

Whilst the above mentioned literature explores the various factor-causality of a fragile state of economic and financial systems, this paper exemplifies the inherent fragility in the microstructure of pure debt based contract. We posit that such contracts form the root cause of the vulnerability of the financial system. In any economy, capital structure decision remains foremost in any business venture. With limitations on internal funding, most businesses source for external funding with preference towards debt based financing.²⁸ However, the financing terms are based on the projected returns, which quoting from Fisher (1933, p.337), "*...contains innumerable variables...Only in imagination can all these variables*

²⁸ This is based on the pecking order theory which holds true even in our framework of symmetric information (see Myers and Majluf, 1984 and our Theorem in Section 3).

remain constant and be kept in equilibrium". This is reinforced by Modigliani (1974, p.1), "[a]s long as loan contracts are expressed in conventional nominal terms, a high and variable rate of inflation—or more precisely a significant degree of uncertainty about the future price level— can play havoc with financial markets". Projects undertaken may have ex-ante states of outcome and irrespective of the state of the economy, projects are obligated to discharge the fixed debt payment schedule. In poor states of the economy where project cash flows are depressed, the debt contractual payments can be onerous. This insensitivity of the payment obligation to the actual state disconnects the interest of the lender and borrower. Even though a loan contract is renegotiable, this is nonetheless a costly option (Myers, 2001).

Figure 2 illustrates the differential between the theoretical or expected payoffs (ADE) with the real project outcome (ABDE). The extent of the departure erodes the project's margin of safety that protects the borrower. This in turn intensifies the project's leveraged position, which represses its investment value and heightens financial distress.²⁹ The ability to raise additional or new financing would be affected due to erosion in the borrower's credit rating and net worth resulting in a case of 'debt overhang'. When equity goes 'underwater', i.e. it becomes negative and serves as a 'free option' to the borrower. She may change her investment strategy by undertaking more risk. This change in behaviour is termed as moral hazard. As the borrower has 'no skin in the game', she may strategically impair the underlying assets of the firm or as illustrated in Figure 2, causing destruction to its asset value. In the worst case, she may strategically default. The close credit connection between various segments of the economy can cause a domino effect of business failures and in severest situation escalate into a banking crisis (Fisher, 1933; Anand et al., 2011). The project sustainability is thus dependent on the ability to manoeuvre beyond the critical state 'c' (see again Figure 2). Even in good states, debt based financing suffers from under investment issues and asset substitution or risk shifting that is associated with agency cost of debt (as highlighted in Section 4). In both states, debt based contract leads to socially sub-optimal outcomes.

²⁹ In the following verse, the *Qur'an* calls for creditors to provide latitude to debtors faced with financial hardship: "If the debtor is in difficulty, grant him time till it is easy for him to repay". In the second half of the same verse, the *Qur'an* enjoins a greater reward to those who forfeit the said debts: "but if ye remit it by way of charity, that is best for you if ye only knew" (*Qur'an* 2:280).

5a. Mechanism to mitigate financial fragility

At best, mechanisms to address fragility such as macroeconomic stabilisation programmes, policies on trade, financial sector and social protection addresses only short term shocks (World Bank, 2008). Whilst the G-20 report by the Basel Committee on response to the financial crisis focuses mainly on building capital and liquidity thresholds combined with strengthening risk management practices and market discipline (BIS, 2010). Given this paper's argument and other studies highlighting concerns on the fragility of a financial system built centrally on pure debt based contracts, a more fundamental step is required to calibrate the core microstructure of financial contracts.

On this matter, studies on optimal structuring of financial contract such as Smith and Warner (1979) and Billet et al. (2007) provide some initial solutions. It is said that financial contracts that are collateralised against high quality real assets illustrate a decrease in agency cost of debt (see Shleifer and Vishny, 1992). Additionally, hybrid financial structures that incorporate sharing between the financier and borrower elucidated by Ebrahim and Hussain (2010) in their model for financing real assets are said to exhibit Pareto-optimality along with reduction in financial fragility (see Corollary p.160). Applying similar form, a quasi-equity contract (see Figure 4) can embed options where the financier subsidises the project's capped fixed lease payment in return for a share in the appreciation (SAD) or income (SID) in excess of the critical capped amount of the project. Alternatively, the financier can choose a shared equity debt (SED) where the financier then becomes a co-owner of the project and share in the income of the operations. The extreme situation in SED is one where the financial contract is inhibited by agency costs of debt. Therefore, agency costs play a critical role in structuring financial contracts.³⁰

[Figure 4 Here]

A quasi-equity structure ranks higher than plain vanilla loans and is generally preferable to a convertible debt for the following: (i) its malleability to be structured based on the project specific value generation of various combinations namely appreciation, income or equity based. Therefore, fulfilling the financial objectives

³⁰ This illustrates that the assumption of perfect capital markets in the Modigliani and Miller (1958) *Capital Irrelevant Hypothesis* is quite strong one. Market imperfections stemming from agency issues are quite crucial and should be given due consideration.

of the investor as well as map their respective risk preferences;³¹ (ii) in contrast with convertible debt, quasi-equity contract allows the borrower to retain control over the project even in good state. This preserves the borrower's control rights over the project; (iii) in terms of agency cost of debt, it avoids under investment issues and debt overhang as the facility is collateralised with tangible assets of the firm; and (iv) the options embedded in a quasi-equity contract provide the 'equity kickers' for alleviating the risk-shifting or asset substitution issue of agency cost of debt (see Barnea et al., 1981). These 'equity kickers' enhance efficiency arising from the diversification within the financing structure as well as long run returns attributable to the equity returns.³²

On a macroeconomic level, a financial system operating on a participative mode exhibits loss absorbent capacity due to the direct linkage between the banks' assets and liabilities side. Furthermore, a financial system that allows equity participation by banks exhibit Pareto enhancement comparative to a specialised banking system. Apart from that, it also fulfils liquidity attributes since it can be structured for trading on the secondary market. Generally, a quasi-equity structure promotes social welfare as it increases expected utility and promotes efficient resource allocation (see Ebrahim and Hussain, 2010). In extreme cases where any form of quasi structures are infeasible, only then does the optimality of equity as discussed in Siddiqi (1983) and Chapra (2006) is realised.

6. Usury leads to financial exclusion

Beck and Demirguc-Kunt (2007, p.1) aptly states that "*[f]inancial exclusion is likely to act as a "brake" on development as it retards economic growth and increases poverty and inequality*". By enhancing access through promoting financial deepening and allowing building of financial assets of the poor, financial services enable those on the margins to build up productive assets, enhance productivity and potential for sustainable livelihoods (World Bank, 2000). Despite the known benefits of financial inclusion, there are still pockets of the underserved and unbanked.

Earliest studies on the financially excluded focused on access exclusion arising from spatial void in financial services. Subsequent research points to additional

³¹ Its malleability can address the concerns on reward-risk continuum raised by Kuran (1986). A hybrid facility can also be employed as a primary funding vehicle as well as a workout one in the aftermath of a default.

³² Refer to the portfolio diversification theory and empirical findings on the equity premium puzzle (Markowitz, 1952; Mehra and Prescott, 1985; Kocherlakota, 1996).

exclusion attributes including resource, self exclusion, conditions, price and marketing. Whilst resource and self-exclusion are caused by restraints from the demand side, the other causes arise from the strategic policies of financial institutions. Progressive financial liberalisation, deregulation coupled with technological advancements has heavily influenced the delivery and shape of financial services. The rigours of competition warrant greater operational excellence on financial institutions to preserve their charter value. Unfortunately the adoption of selective marketing, pricing structure and stringent conditionality has caused some households of being deselected by the financial institutions (Kempson et al., 2000).

Recent studies have embraced a wider view that includes impact on the individual functioning within a society arising from '*financialisation of social relations*' (Gloukoviezoff, 2007). The pervasiveness of financial relations in societal functioning results in those having financial difficulties in accessing or using such services to not only being socially excluded but also have direct linkages to child poverty incidences and costs to the benefit system (HM Treasury, 2004). This paradox is mostly experienced by the people at the bottom of the pyramid due to their personal and economic disposition (Kempson et al., 2000). Its extensiveness is exacerbated by the existence of information asymmetry (Lee et al., 2006) and poor financial literacy (HM Treasury, 2004). In absence of financing from mainstream financial institutions, these households have had to frequent high cost fringe banking institutions in order to meet their consumption-income smoothing needs, asset acquisition and utilities payment.

A classic case of the circuitous effect of financial exclusion is in the breakdown in the supply of home financing. Home ownership allows satisfaction of basic needs for shelter, permits access to asset and offers social security. In this context, financing homeownership is integral in addressing issues of homelessness (CUDS, 2000), facilitating the accumulation of wealth base (DiPasquel and Glaeser, 1999) and a healthier population (Mohnen et al., 2011). It creates rights to capital gains from the property value and this yields incentives for homeowners to invest in their properties and high participation in social network building and their neighbourhood (DiPasquel and Glaeser, 1999). Despite the significance of home financing needs particularly for the poor, this sector remains largely underserved due to lack of financial credibility, income certainty and legitimate collateral to subscribe to traditional mortgage finance. Their demand for small loans further deters the financial institutions from serving this segment of the population who are already perceived as unbankable (CUDS, 2000).

6a. Mechanism to mitigate financial exclusion

Existence of widespread financial exclusion demonstrates the market's failure to provide essential financial services. Although there have been regulatory reforms, the implementation capacity is often limited (CGAP, 2010). Given the magnitude and complexity of financial and social exclusion, government and markets alone are unlikely to solve the problem. It is realized that the 'third sector' consisting of civil societies, nonprofits and non-governmental organisation are important contributors to economic growth and welfare (Salamon and Anheir, 1996). Upholding the mandate of double bottom line of social and financial objectives, these community based organisations operate to fill the spatial gap of mainstream financial institutions where lending is extended based on economic and social principles.

Whilst this approach has the advantage of reinforcing community solidarity, its sustainability is dependent on continued member participation, existence of mutual trust and commitment to fully service their loan commitments. To ensure marginal default rates, credit is provided as a collective good and its disbursement employs the concept of group dynamics, whereby group strength, sanctions and reciprocity plays an important role in minimising information asymmetry, adverse selection and moral hazard (Ghatak and Guinnane, 1999). Despite its achievements, it should be noted that joint liability lending has its fair share of critics such as adverse effects of peer pressure on defaulting members (Banyan, 2010).

Islamic societies with its rich heritage of charitable institutions provide an alternative avenue for harnessing indigenous 'social capital' in the delivery of social services (Bremer, 2004). This concept is not just peculiar to Islam as similar recount can also be traced in the practices in Judaism. Of interest to this paper are the potential benefits that could be drawn through the integration of these charitable institutions in preserving the rights of the underprivileged in the society. Both Islam and Judaism strongly prohibit the taking of usury and arising from these restrictions "*each has developed different contractual forms of advancing funds for profitable investment that do not violate the prohibition of interest*" (Lewinson, 1999, p.334). For example, the existence of Jewish free loan societies is inextricably linked to the obligation in Judaism for extending free loans

to a poor person. In the Islamic society, *zakat*, *sadaqah* and other charitable modes are espoused in the religious tenets to assist the poor.³³

It is recognised that whilst each individual is expected to exert effort to fulfil the person's needs, there may still be situations of these needs being unmet. Therefore, charitable institutions would be required at the lower strata to help the move up the economic ladder for which mainstream financial institution can play a better role (Gloukoviezoff, 2007). These examples are among the many possibilities towards ensuring financial and social inclusion of the poor. Nonetheless, in the context of *zakat* it has yet to be institutionalised and integrated in the financial intermediation system (Kuran, 1995). Needless to say, a more comprehensive study would need to be undertaken to provide alternative public policy tool and development of a more just resource allocation mechanism.

7. Concluding remarks

“The constraints and costs imposed [by the] prohibition on interest payments may preclude a free market in financial capital, causing inefficiency, moral hazard in banking, and limiting the funds available for investment...there is no reason in modern times for the charging of interest to be considered immoral...Elaborate schemes to circumvent such transactions...serve no purpose except to increase costs and increase inefficiency”

Perkins (2003, p.6)

Premised on the Islamic Holy Scriptures and economic theory, this study anoints scepticisms on the inhibition of *riba* for the degeneration of the Muslim economy and causing a deadweight loss to financial efficiency. In contrast with classical *Shari'ah* scholars, we present the inhibition of *riba* as beyond mere increases without an equivalent counter value in exchanges, but encapsulated in the fundamentals of economic theory.

³³ The well-known Islamic scholar, Ibn Taymiyah highlights the contrast made in the *Qur'an* between *riba* (with the attribute of expropriating wealth) and charity as described in the following verse: *“That which ye lay out for increase through the property of (other) people, will have no increase with God: But that which ye lay out for charity, seeking the Countenance of God, (will increase): it is these who will get a recompense multiplied”* (*Qur'an* 30:39). He illustrates that the expropriation aspect of *riba* leads to antagonism in society. In contrast, charity cements the different social classes bring about social cohesion (see Ibn Taymiyah, 1951).

Linguistically, *zakat* means cleansing or purity. Theologically, it means spiritual purification resulting from the giving of *zakat*. It is an obligation on wealth of the rich for the benefit of the recipients institutionalized in the *Qur'an*. The aim is to uphold the principle of care that is essential in ensuring cohesiveness in communities' well-being (*Qur'an* 9:60; Esposito, 2003). *Sadaqah* on the other hand is categorized as voluntary offering or alms from a person's wealth and is a virtue that is highly promoted in Islam. Selected *Qur'anic* verses with specific references to charity include verses 2:43; 2:110 and 2:117.

[Table 3 Here]

To illustrate the underlying rationation for the prohibition, we employ a rational expectations model in a general equilibrium setting of economic agents (entrepreneur and lender) for project financing with agency costs of debt. Our findings highlight the issues with pure debt based contracts (see Table 3). First, there is potential for financier to expropriate wealth of the borrower if the financial commitment is incommensurate with the project returns, and vice-versa. This imbalance will in the long-run cause non-sustainable equilibrium. Encumbered with lender 'free-rider' issue, the borrower can exercise risk shifting strategies or refrain from investing in growth opportunities, which leads to sub-optimal resource allocation. Second, given the interconnectedness of credit markets, pure debt based contracts tend to amplify financial market volatility, and lay waste to any attempts to fire walls that are built to mitigate financial market contagion. Given the inflexibility to deleverage, any financial or economic shocks can precipitate a chain of defaults leading to a financial contagion effect. This translates to financial instability that brings about negative repercussions on economic growth and poverty reduction.³⁴ Last, there may be pockets of market segments where market clearing conditions can breakdown, particularly in the presence of agency cost of debt. With the increasing financialisation of social relations, financial exclusion can negatively affect the economic potential of the underserved and unbanked. A balanced financial deepening; a key element of financial development is thus frustrated.

Our response to the *riba* enigma is unique. We find profit and loss sharing arrangement espoused by Islamic political groups as weak, whilst pure debt based contract at best a '*Shari'ah* Pareto' inferior solution.³⁵ We advocate quasi-equity contracts which exhibit a '*Shari'ah*-Pareto' optimal solution, given the issue of agency cost and the fragility of pure debt-based contracts. These contracts are also characterised by their malleability. It can be structured to meet the financial objectives of the investor, their risk preferences, as well as fulfil liquidity attributes for secondary trading. The participatory element attenuates the inter-temporal marginal rate of substitution associated with agency cost issues as follows: (i) it preserves the borrower control rights over the said project; (ii) the collateral

³⁴ See the commentary by Gross (2011) on effects of the recent financial crises on investment incentive, sovereign debt market and overall economic growth.

³⁵ We term pure debt based contracts as '*Shari'ah*-Pareto' inferior for two primary reasons attributed to the potential of expropriating wealth. One, it is not a viable equilibrium in the long run if a firm or a financial intermediary's assets are being gradually depleted. Two, it creates social problems endangering society at large (see again Ibn Taymiyah, 1951).

requirement mitigates under investment issues and potential debt overhang; (iii) the embedded options derived from the participatory element acts as ‘equity kickers’ in alleviating risk shifting issues; and (iv) imposition of iron clad restrictive covenants should address moral hazard problems. Quasi-equity contracts can also be designed to satisfy the *Shari’ah* conditionality of financial contracts referred in Khan (2010). Where there is a breakdown in the effective functioning of the financial markets, the Holy Scriptures explicate the deployment of charitable institutions, specifically *zakat*, *sadaqah* and other charitable modes to assist the poor.

Thus far we have presented the ratiocination for the *riba* injunction and the associated ‘*Shari’ah*-Pareto’ optimal financial contracting structure. In the following final remarks we define the *riba* injunction is essentially the governing framework undergirding the organisation of transactions between contracting parties and their ensuing rights and obligations.³⁶ This is theorised in modern economic literature as institutional framework, which encompasses a state’s informal and formal system of property and contracting rights (North, 1991; Acemoglu and Johnson, 2005). If before, an informal system shaped by religious precepts and social norms are efficient in governing exchanges, shifting paradigms warrant the institutionalisation of rights in the form of formalised jurisprudence (North, 1981; Stulz and Williamson, 2003).

Various studies confirm the negative ramifications of absence of property rights on financial development and long-run economic growth. For property rights not only envelopes governance (Shleifer and Vishny, 1997), it also affects entrepreneurial incentives (Johnson et al., 2002; Besley and Ghatak, 2009), nature of financial intermediation (Levine et al., 2000; Acemoglu and Johnson, 2005) and resource allocation (Beck et al., 2003; Claessens and Laeven, 2003). Institutionalisation of property rights entitles the economic agent to its usufruct with the potential of transforming this into fungible financial commodities that could be traded and contracted upon, which are the core feature of a market economy (Hart and Moore, 1990; De Soto, 2000; Besley and Ghatak, 2009). Safeguarding of property rights rests with the state and this need to be actualised by an independent judiciary and legal system rather than aberrant actions of political elites to retain hegemony

³⁶ Ibn Khaldun (1967) points to the abandonment of property rights as a causal factor in the degeneration of a civilisation. Its importance is reiterated by Ibn Taymiyah (1983, p. 95) as follows: “*God upholds the just state even if is unbelieving, but does not uphold the unjust state even if it is Muslim*”. For the *Qur’an* enjoins the upholding of contractual obligations and abhors those who consume other people’s resources without right (*Qur’an* 2:188; 4:29 and 161; 5:1; 16:90).

(North, 1991; Chapra, 2008).³⁷ For “[a] .state has no privileged legal position as a contracting party, no overriding right of sovereignty” (Habacy, 1962, p.451). “[States] with less effective investor protection laws tend to make shareholders and creditors reluctant to invest in firms, which drives down the price of corporate securities and increases the cost of capital to firms...Legal systems influence the effectiveness of property right protection and hence the ability of firms to raise capital and grow” (Levine, 2005, p.68).

We posit that the ‘long divergence’ in the financial and economic development of Muslim countries in contrast to developed economies lie in the Islamic modern states’ failure to uphold the protection of property rights that is quintessence of the *riba* injunction. Protection of property rights implored by the *riba* injunction ensures the balancing of investment incentives and governance of all economic agents including the state. This is a critical precursor to unlocking the latent economic prospects of assets held by economic agents and provide the much needed path to the development of the Muslim economy, without which the endowed resources of a modern Muslim state remains a mere ‘dead capital’ (De Soto, 2000).

³⁷ This necessitates structuring of institutions to protect property rights and the judiciary of these institutions to be independent of the executive or administrators. This is narrated in *al-Isti’āb fi Ma’rifat al-Ashāb* (of Ibn ‘Abd al-Barr) and *Usad al-Ghābah* (of Ibn Athir) that “*Hadrat ‘Umar (the second Caliph) had appointed ‘Ubāda bin Sāmīt as a Qādi (judge) and a preacher in Syria, and he opposed Mu’āwiya (the governor) in every matter which he found conflicting with the laws of the Shari’ah. Mu’āwiya felt annoyed and said to him: I shall not allow you to stay permanently at one place, and thus sent him back to Medina. ‘Umar said to him: What brings you here? ‘Ubāda bin Sāmīt narrated him the whole story, whereupon he said: go back to your place, for Allah does not like that place from where you have been exiled. And he wrote to ‘Amir Mu’āwiya: ‘Ubāda is not under you. He is a Qādi and is thus independent.*” (Footnote 2028, Hadith No. 3852 Sahih Muslim translated by Siddiqi, 1986).

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Appendix

A. Proofs

Proof of Proposition 1:

- (i) In our risk-free setting, the underlying assets of the project are of high quality and are not susceptible to severe deterioration in its payoffs. This allows the entrepreneur to honour his loan obligation (with interest) in all states of the economy. This result is consistent with the prognosis of Shleifer and Vishny (1992).
- (ii) Equation (10a) is derived from Equations (3a), (7a), (8) and (9).
- (iii) Equation (11a) is derived from Equations (4a), (8) and (9). Q.E.D.

Proof of Proposition 2:

- (i) (a) A risky debt is characterised by defaults in some state of the economy in the future; In (b) and (c) the interest rate contracted for the risky debt and its debt ratio are greater than that of the risk-free debt, which is reflective of an upward sloping supply curve. In a risky debt setting, the entrepreneur prefers a high debt ratio, while the lender (financier) seeks extra compensation for the increased risk exposure.
- (ii) Equation (10b) is derived using Equations (3b), (7b), (8) and (9).
- (iii) Equation (11b) is derived using Equations (4b), (8) and (9). Q.E.D.

Proof of Theorem:

The Rational Expectations Equilibrium in Propositions 1 – 2 are impacted differentially by the *endogenous* agency costs of debt.

- (i) *The Prominence of the Pecking Order Theory even in a setting of symmetric information (Rational Expectations) and the feasibility of Risky Loan Equilibrium (in the absence of business taxes) in contrast to the Static Trade-off Theory.*

The risky debt and asset pricing conditions (Equations (10b) and (11b)) comprise of: (i) default states of the economy (at or below the critical ‘c’ state of the economy); and (ii) normal states. In the default states, the lender takes over the project to salvage the outstanding debt value. The lender’s ability to

full compensation is nonetheless encumbered by the presence of direct and indirect bankruptcy costs (eg. adjudication costs, value lost from asset fire sale), which limits the recovery to only a fraction (k) of the project's payoffs (as indicated by the line AB in Figure 2). This is in contrast to the normal state of the economy (as indicated by the line DE in Figure 2), where the lender receives the full contractual payments of the debt. In equilibrium, this *endogenous* agency cost of debt arising from the transmission of project risk to lender along with deadweight costs of default are accounted for in the pricing of debt. This is borne by the borrower in the form of higher interest rates in contrast to a risk-free debt (see Equation 10b).

Any debt capacity decision is largely influenced by the liquidation value of the funded project. This thus requires the project's underlying assets to hold value that fulfils the Basic Condition of Proposition 1 of Min. $(q_{ij} + P_{ij}) > 0 \forall j$. Since default costs are transmitted by the lender to the borrower (see Equation 10b), the latter's welfare is lower with a risky debt. This ensues from the fact that risky debt is welfare reducing as the borrower loses his prime asset (i.e., the project) in the poor states of the economy (below the critical state 'c'). Furthermore, equilibria with risky loans are feasible only when the agency cost of debt associated with default costs (as indicated by the triangle ABD in Figure 2) are not excessive. In contrast, equilibria with risk-free loans are feasible even when those with risky loans are unfeasible. In this context, risky debt equilibria, if feasible, are at best *Pareto-neutral* to risk-free financing facilities. This concurs with Myers (1977) who attributes agency cost of debt to *under investment* issue, whereby firms refrain from undertaking projects with positive net present value if the benefit of the project accrues to the lender on default.

(ii) *Embedded potential for expropriation of wealth in risky debt facilities.*

There is potential for expropriating wealth of either the lender or borrower if the equilibrium interest rate is outside the interval given by Equation (12) with the potential of generating non-sustainable equilibrium in the long-run. That is:

$$i < 0, \text{ or} \tag{13a}$$

$$i > r_{\text{unleveraged}} \tag{13b}$$

(iii) *Risky debt facilities imbue financial fragility.*

Low levels of risk aversion levels and default costs leads to Pareto-neutrality of risky debt. This instigates financial instability, whereby failure of the borrower to honour its financial claims causes a rippling effect of credit defaults. Its severity is dependent on the degree of interconnectedness of the financial sector (as illustrated in Figure 3).

(iv) *Financial exclusion in the credit market.*

An equilibria entails the fulfilment of all three conditions in Propositions 1 or/and 2. In a situation where there is total breakdown of the market clearing conditions, this leads to financial autarky of the borrower. Drawing from Jensen and Meckling's (1976), the borrower will be left to absorb the detrimental impact of agency cost of debt. Q.E.D.

B. Tables

Table 1: Classical *Shari'ah* scholars' perspective on the *riba* prohibition

<i>Category</i>	
<i>Riba al-fadl</i> - the hidden <i>riba</i>	<i>Riba an-nasi'ah</i> - the evident <i>riba</i>
<i>Application</i>	
Relates to spot exchanges	Relates to deferred exchanges
<i>Legal Cause</i>	
Excess in exchange without an equivalent counter value	Delay in payments with an increase above the original amount at the settlement date; or vice-versa (ie. lowering the debt in return for an accelerated payment)
<p>Specifically prohibited in transactions involving the six commodities of the <i>Sunnah</i> (see footnote Error! Bookmark not defined.). Impermissibility of their commodities is generally based on the nomenclature developed by the <i>Shari'ah</i> scholars from the major Sunni schools of thought, namely: (i) intrinsic or monetary value; and (ii) volume or weight.</p> <p>However, there are additional conditions that are not shared amongst the major <i>Sunni</i> schools, that is: (i) the commodity being edible, nutritious or storable; (ii) the threshold for which the condition on weight or volume becomes applicable; and (iii) the interpretation on 'oneness in kind' or genus of the exchanged commodities.</p> <p>Following this nomenclature, commodities that do not have these characteristics are precluded from the <i>riba</i> prohibition: (i) non-fungibles or (ii) fungibles that are measured by length or counted; which may in effect be significant. For example, in the exchange of animals or cloth.</p>	
<i>Ratiocination</i>	
<p>The <i>riba</i> inhibition is aimed at avoiding exploitation and fraud for the protection of one's property, fairness and justice. The injunction against <i>riba al-fadl</i> arises as blocking means to the evident <i>riba</i> that is preventing access to a greater evil. The restriction on the exchange of the six commodities in the <i>Sunnah</i> extends from them representing food staples and currencies, which are essential for survival and measure of price, respectively.</p>	

Source: Ibn Qayyim (1973), Ibn Rushd (1997), Alfattouh et al. (2006), Al-Zuhaili (2006)

Table 2: Simulation results for risk-free and risky loans with risk aversion level $\alpha = \alpha' = 0.25$

Case A (Risk-free loan)							
	P_0	Q	Debt ratio (%)	$r_{unleveraged}$ (%)	i (%)	SumU(Eq)	SumU(D)
	0.90193	0.7710	85.48	10.87	-1.69	0.56245	2.64019
Case B (Risky loan)							
K	P_0	Q	Debt ratio (%)	$r_{unleveraged}$ (%)	i (%)	SumU(Eq)	SumU(D)
1.00	0.9302	0.8181	87.95	7.50	11.09	0.5199	2.7422
0.95	0.9149	0.7998	87.41	9.30	11.43	0.5251	2.7434
0.90	0.8989	0.7805	86.83	11.25	11.73	0.5308	2.7438
0.85	0.8819	0.7602	86.20	13.39	11.95	0.5372	2.6355
0.80	0.8638	0.7386	85.51	15.77	12.07	0.5443	2.6256

Notes: The model is solved for the endogenous variables P_0 , Q and i where P_0 is the price of the project, Q is the loan amount, and i is the interest rate. These are used to derive the values of the sum of expected utilities of the entrepreneur and the lender, denoted as $\text{SumU}(Eq)$ and $\text{SumU}(D)$, respectively. The exogenous parameters are assumed to be as follows: (i) all agents have CRRA utility, α (coefficient of risk aversion) = $\alpha' = 0.25$, γ (discount factor) = 0.99, endowments for the periods $t = 0$ and $t = 1$ are: $e_0 = 0.18182$, $e'_0 = 1.8182$, $e_1 = 0.018182$, $e'_1 = 0.18182$; and (ii) the income plus liquidating value of the project follows an equiprobable binomial distribution such that: $\text{Min}(d_1 + P_1) = 0.75$ and $\text{Max}(d_1 + P_1) = 1.25$.

Table 3: Economic perspective of the *riba* prohibition

Category	
<i>Riba al-fadl</i> - the hidden <i>riba</i>	<i>Riba an-nasi'ah</i> - the evident <i>riba</i>
Application	
Barter transactions	Plain vanilla interest bearing contracts
Ratiocination	
Exchange is inefficient as it has the potential to expropriate assets of either party in the exchange of goods	The contract is inefficient as it has the potential to: <ul style="list-style-type: none"> (i) Expropriate assets of either lender or borrower (ii) Exacerbate financial fragility (iii) Induce financial exclusion
<p>In general, the <i>riba</i> prohibition delineates protection of rights of both contracting parties. This is retrospective of the <i>Shari'ah</i> that accords <i>protection of property rights</i> as one of the five essential elements of the object of the law.</p>	

C. Figures

Figure 1: Risk-free loan and equity payoffs

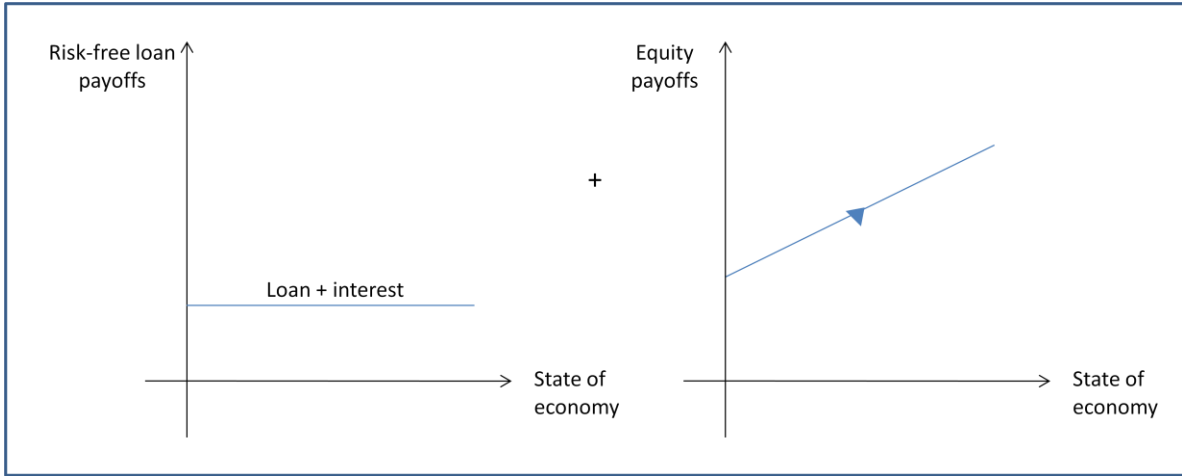


Figure 2: Risky loan and equity payoffs

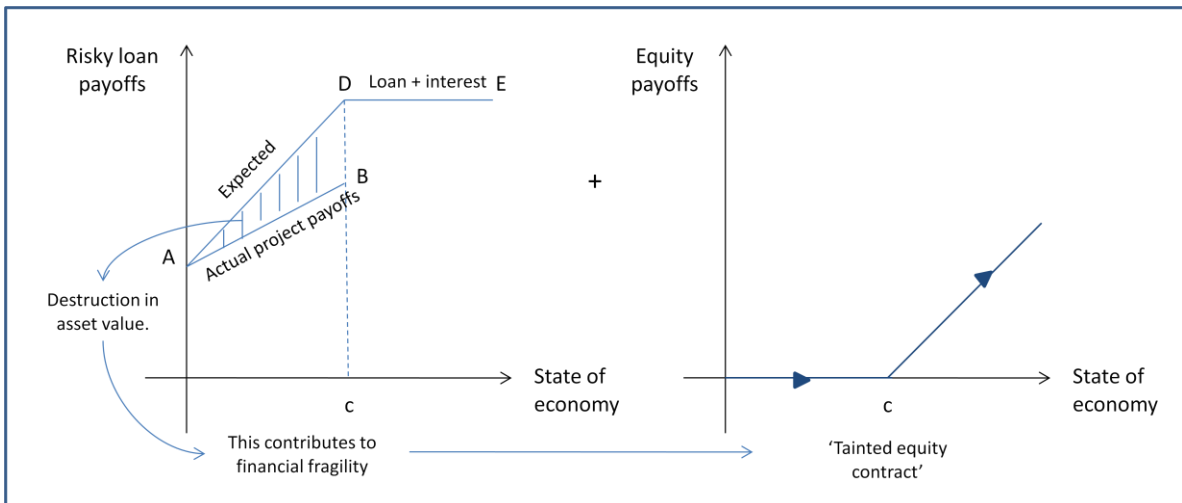
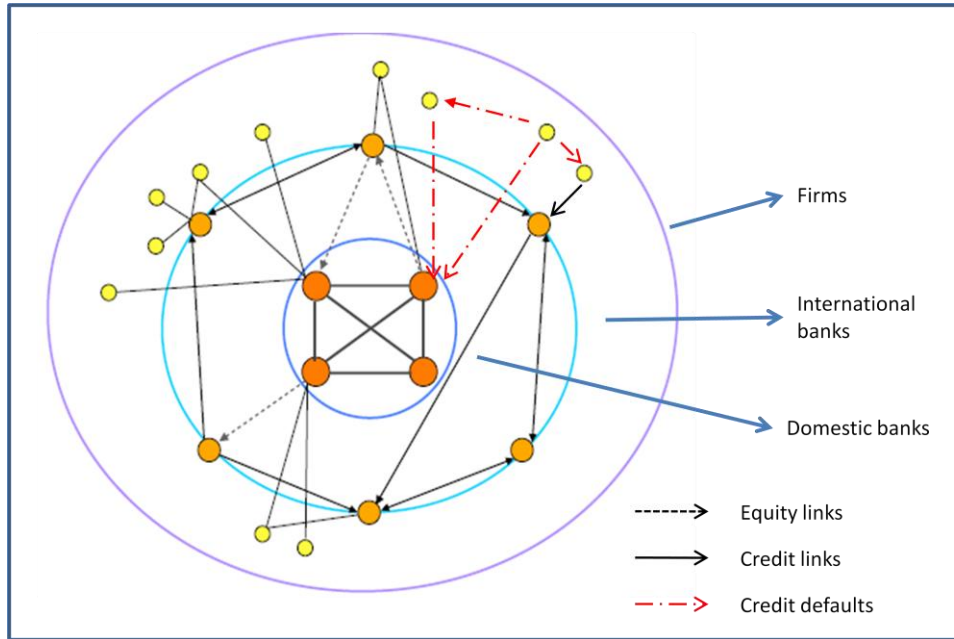


Figure 3: Stylised financial system network



Source: adapted from Anand et al. (2011)

Figure 4: Participatory project financing

