THE METHODOLOGY OF
ISLAMIC ECONOMIC AND
SOCIO-SCIENTIFIC INQUIRY

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This paper searches for the universal epistemological foundations of socio-scientific theory. Within this quest there is no parochial domain of the Islamic, for the Islamic idea finds itself in methodological, consistent, explanatory, and applied and inferential ways in the domain of what Barrow (1991) refers to as “everything.” Thus, the methodology that is inherent and is to be introduced here, but with the extensive details left elsewhere (Choudhury, 2011), is not an isolated one for emulation by what we refer to as misnomer – Islamic economics, finance, society, and the socio-scientific order; in other words the ensemble of “everything” (Hubner, 1985).

The methodology of the Qur’an far from being a parochial domain is indeed the central epistemic commonness of all the sciences – of “everything.” Is this a dogmatic claim or a reality? On the methodological front the reality of the statement is proved by the attributes of universality and uniqueness in methodological content combined by its methodical application in “everything.” Besides, the derivation of the Qur’anic methodology and application in the concept of “everything” and its economic, finance, and society subset arises strictly from the Qur’an. These are not derived from a personal domain of thought or from the realm of rationalism. The methodology then drives all the experiential consequences, not vice versa.
This paper is written in this light of such methodological quest followed by its substantive empirical application and exemplification.

A REVIEW OF THE LITERATURE ON METHODOLOGICAL ISSUES OF ONENESS

There are the interesting words of Myrdal in respect of the universality and commonness of what a scientific problem means:

From then on more definitely I came to see that in reality there are no economic, sociological, psychological problems, but just problems and they are all mixed and composite. In research the only permissible demarcation is between relevant and irrelevant conditions. The problems are regularly also political and have moreover to be seen in historical perspective. (Myrdal, 1979, p. 106)

Likewise, unity of knowledge as episteme in the methodological core of all the sciences points to a unified worldview of matter (res extensa) and mind (res cogitans). Yet this methodological aspiration remains a lament in Kant’s problem of heteronomy (Kant, 1949); a dream of theoretical physics (Feynman, 1966); and an explanation of complexity in the unified multiverses, yet not invoking formalism and measurement (Gregersen, 2004). Even in the Aristotelian order of universal holism and ethics one finds the quest for an understanding of organic unity in the scheme of things res extensa. Yet this exists as a metaphysical precept (Al-Farabi, 1998; Welldon, 1897).

In spite of such earnest search by the greatest thinkers of all times, where did the precept of unity of knowledge miss out in the construction of a unified worldview of the socio-scientific order? The dismay can be expressed in the words of Hawking in his Cambridge University lecture: “Even if we do achieve a complete unified theory, we shall not be able to make detailed predictions in any but the simplest situations” (quoted in Boslough, 1985, p. 120).

The root of such a missing foundation in the sciences is found in the yet-to-be universalizing methodology of the episteme of unity of knowledge that endogenously unifies morality, ethics, and thereby knowledge with a unique and universal epistemic core. According to the search and discovery of such a mainstay of the socio-scientific methodology there can be no plurality in the conceptualization of the methodology of “everything.” Simply the diversity of issues and problems of the interdisciplinary types would prevail. Nonetheless, such diversities are examined and analyzed by the same unique and universal methodology of unity of knowledge. It prevails between
disciplines, matter-mind comprehension, and the diverse systems and variables describing the world-system in its coalescing parts.

The numinous nature of unity is not at play, as otherwise Capra (1983) describes his notion of systemic unity. Rather, a configured world-system arises from the methodology of unity of knowledge; organically unifying all relations, variables, and entities continuously – across continuums of interacting, integrating, and evolutionary learning world-systems. Such is the nature of evolutionary learning. It simulates itself and never attains optimality by terminal perfection.

This paper thereby establishes the methodology of the Islamic (Qur’anic) socio-scientific world-system in the framework of the universal and unique epistemological foundation that remains at the core of “everything.” On such a matter of epistemological universality commented the great poet Goethe: “If this is Islam, are we not all in it?” In accomplishing the task this paper is focused on theory and application and is a rigorous undertaking within the comparative critical framework of analytical inquiry.

Islamic Economics and Finance as Embedded Moral–Social System

Islamic economics and finance – better captioned as Islamic political economy and world-system – is embedded in the most generalized field of socio-scientific inquiry by means of the episteme of unity of knowledge and its epistemic influence on the construction of the world of unified forms and relations. These together form the functional ontology of the constructed moral–social world-system and every issue and problem in it.

Thus from here on we will synonymously refer to the Islamic world-system by the domain of unity of knowledge as the episteme of “everything.” The unity of the monotheistic law is the central and inexorable axiom of the Islamic (Qur’anic) worldview. By methodology thereby we will mean the epistemologically derived conceptualization, explanation, and identification of forms and relations that comprise the socio-scientific worldview. This worldview is thus premised on the episteme of unity of knowledge appearing as the functional ontology of oneness followed by its application in the organic unification of the matter-mind span of the multiverses.

We commence our conceptual journey in methodology in this paper by defining and explaining some critical terms. The focus of this paper is on methodological issues, which by their own right belong to the realm of
conceptualization of abstract, formal, logical, and inferential system of thought. Yet we also point out some applied directions of the methodology in the field of economics and finance that can be governed by the episteme of unity of knowledge.

WHAT IS THE IDEA OF THE WORLDVIEW OF EPISTEMIC ONENESS VERSUS THE CONTRASTING SOCIO-SCIENTIFIC PARADIGMS?

The question posed opens up a critical search for the ultimate roots of unity of knowledge. We begin by inquiring: Why is epistemic oneness the necessary and sufficient foundation in establishing the ultimate nature of all scientific inquiry?

We answer by noting that the ultimate goal of science is to discover the minimal premise that can explain the maximum extent of all phenomena res extensa. That is how Hawking (1988, p. 10) understood unity of the sciences in his words: “The eventual goal of science is to provide a single theory that describes the whole universe.” Sztompka (1974) writes similarly regarding the organic unity of the social universe: “What is the most general image of society inherent in sociological functionalism? How is the subject matter conceived in broadest terms?” Radcliffe-Brown (1935) wrote: “If functionalism means anything at all, it does mean the attempt to see the social life of a people as a whole, as a functional unity” (p. 634). Ledger and Pickard (2004) quote Gunton (1993): “Gunton argues that God is a being-in-relation and that a dynamic or relatedness marks God’s creative activity in the world. The network of relations between God and humankind, among humankind and between humankind and the rest of the universe find their basis in the relational nature of God’s creative being. The world’s unity and diversity are born of God. The complexity of the world and its interrelations, according to a trinitarian understanding of creation, is natural and is manifested in the relations between the smaller physical particles as well as in ecosystems and human social structures.” Foucault writes on the unity precept of the idea of episteme:

By episteme we mean ... the total set of relations that unite, at a given period, the discursive practices that give rise to epistemological figures, sciences, and possibly formalized systems ... The episteme is not a form of knowledge (connaissance) or type of rationality which, crossing the boundaries of the most varied sciences, manifests the sovereign unity of a subject, a spirit, or a period; it is the totality of relations that can be
discovered, for a given period, between the sciences when one analyses them at the level of discursive regularities. (quoted in Sheridan, 1983, p. 191)

Yet for all the massive scholarship bestowed on the search for unity of knowledge, where was this Holy Grail lost? The core problem lay on the inability to bring God by the divine law into the world-system.

This problem is revealed in Kant’s problem of heteronomy – problem of synthesis between a priori and a posteriori reasoning. This problem produced the dualism between God and the world-system of matter-mind as otherwise ought to be constructed by the divine law and its functional ontological formalism. Kantian problem of heteronomy failed to synthesize the a priori and the a posteriori, and thereby between the deductive and inductive reasoning, and the normative and the positive law in scientific conceptualization. Carnap (1966) explains the dualism problem of heteronomy. We interpret it as follows: While the compartmentalization of the human mind harbors the a priori law wherein God may exist; and the a posteriori as the worldly domain, yet between these two domains there is a third one that should explain the transmission of the divine law of oneness into the world-system. But such a mechanism does not exist in all of received socio-scientific, religious, and philosophical thoughts despite this aspired for goal for the ultimate resolution of scientific wholeness.

On the other hand, it is the completion of this third transmission medium by the interrelationship between the divine law and the world-system that marks the completion of Islam in relation to God (divine law), Man and the world-system. Such a comprehensive totality comprising the divine law of monotheism as the representation of the act of creation, self and the world establishes what we refer to as the worldview – the theory of “everything.” Such then is the defining role of the divine law as the universal and unique law that establishes the ultimate core of the socio-scientific methodology, its episteme of oneness. We refer to this core premise of the socio-scientific intellection as the epistemic unity.

UNIVERSALITY AND UNIQUENESS OF THE DIVINE LAW OF EPISTEMIC ONENESS IN “EVERYTHING”

Universality

Universality of the divine law in reference to the mind-matter interrelationship in the world-system is established by the extension of organic unity in
reference to the principal tenets of the divine law. The projection of the
divine law enables systemic unification between variables, their relations,
and all entities by virtue of functional ontology of epistemic unity. The
ontology of the divine law is the law of unity of God – monotheism, which
in the Qur’an is referred to as Tawhid. The organic unity of the originary
ontology is established by its formal function. This causes the functional
ontology to describe the unified world-system by a learning process that we
will explain. The combination of the originary ontology and its artifacts,
law, and formalism derived from the originary ontology of divine oneness in
the details of mind-matter experience establishes the comprehensive
methodology of monotheism. Tawhid becomes the primal and irrevocable
axiom of the Islamic worldview for “everything.”

Contrary to this continuity of the law of monotheism and its formal
mind-matter construction of the unification process in “everything” is the
law of the divine a priori that is broken up by the problem of lack of
synthesis in Kantian heteronomy. Heteronomy marks the dualism between
the moral imperative and the world-system. Likewise, in Darwin the same
dualism is cast in the impossibility of God and oneness in the open-universe.
Such is also the universe as of Popper’s (1988), of Samuelson (1963), and the
critique done by Boland (1989). Husserl (1965) laments over this state of
moral loss in Occidental science caused by the impossibility of the mind and
worldly construction to bridge the gap that is explained by Carnap in terms
of the Kantian problem of lack of synthesis between the a priori and the a
posteriori in Kant’s heteronomy.

Uniqueness

In reference to the attributes of the precept of universality given above, the
axioms and thereby the worldview of the originary law must prevail in
“everything.” To see this fact, let there contrarily be two axiomatic sources,
A and B, which map onto the same mind-matter unified worldview and
world-system. In that case, A and B must be the same, or are linear
combinations of each other, or they are monotonic transformations of one
another. Accepting pluralism of the transformation between A and B in
respect of the unique law of unity caused by human perceptions, the
emanation from A to B must nonetheless be in a law that remains bereft of
perceptions in the originary state. To this both A and B converge. Other
than this phenomenon, if the emanation and nature of A and B are dif-
ferentiating then they belong to distinct epistemologies. Marx referred to
such a case as the problem of overdetermination in scientific doctrinaire. Thus, the uniqueness of the law of oneness in its originary state is proved by the unification of the a priori with the a posteriori via functional ontology as the formalism of the core of epistemic unity mapping onto the world-system with A and B being convergent to this episteme. Otherwise, differentiation and dualism between A and B result in a denial of oneness in its functional form with the law and the world-system.

THE QUR’ANIC REASONING AND FORMALISM IN ISLAMIC METHODOLOGY: DEFINITIONAL GROUNDS

The world-system is referred to in the Qur’an as the alameen.¹ The alameen transcends the geopolitical and rationalistic world-system that neoliberal thought builds (Braudel, 1980; Choudhury, 2008a; Wallerstein, 1974). It embraces the domain of the ontological beginning of all reality, and thus explains all things in evident ways. That is through the intellection processes of abstraction and unraveling in the light of the oneness of God (Allah) (monotheism = Tawhid) in relation to all world-systems – that is “everything.”² The concept of “everything” thus encompasses the conditions of universality and uniqueness. It is enabled and well defined by the existence of the singular law and analytics, reasoning and unraveling from the formalism of the law, though the problems of the world-systems embedded in “everything” would be diverse and different.

What is the Meaning of the Qur’anic Socio-Scientific Order?

The socio-scientific order represents unification between all the sciences to answer the holistic problems of humanity. This kind of interdisciplinary unification between the embedded areas of human inquiry and human needs comprises the symbiotic uniqueness and universality of the methodology that governs, explains, and thus unifies all areas of human pursuits. The Qur’an prevails on such a universal, unique, and holistic but commensurable nature of the worldview. This is manifested in the following verses that explain the world-systems (alamteen) and within that the socio-scientific order:

(i) “Everything” is paired for the sole worship of Allah.³
(ii) Allah (divine law) self-references in “everything.”⁴
Anything that does not comply with Tawhid (monotheism) in our active intellection and reconstruction of thought and action is rejected in the Qur’anic meaning and methodology of the world-system. Such pluralism can be accepted as a rationalistic development of the human desire, yet they do not form part of the Qur’anic methodology in the socio-scientific disciplines including economics and finance. Indeed, there is no compulsion in religion; but there is the Tawhidi precept of universality and uniqueness in its methodology.

The methodological formalism in this paper is based on the episteme of monotheism as oneness by the divine law and its symbiotic construction of unified world-system as derived from the Qur’an. It is not the contrary: the methodological characterization and derivation of the rules and attributes arise from the epistemological premise of the Qur’an not vice versa. Such reverse causality would otherwise be illogical in as far as a universal and unique theory cannot be based on changes caused by the consequences of the world-system. Rather, the epistemological axioms construct both the theory and its application to the world-system.

In the derivation of the theory of epistemic oneness derived from the Qur’an the fundamental axiom of monotheistic oneness as the divine law is invoked. Upon this the construction of the worldview comprising the monotheistic law and its constructive impact on the world-system, and the mind (res cogitans)-matter (res extensa) themes of unity of knowledge are induced by the tenets of the monotheistic law, the law of organic oneness implemented in the world-system by details of issues and problems. The Qur’an refers to this latter phenomenon as pairing (i.e. organic unity) between “everything” (see Qur’an Chapter 36, verse 36).

From the Qur’an is also derived the principle of learning by the process of unraveling the principle and evidence of such paired (organic) unity – originative creative evidences (khalq in-jadid). The Qur’an also declares the high water mark of the institution of discourse that enables learning in cooperation within the consultative social whole – the shura. The shura establishes the learning process by reference to epistemic unity observed in “everything” (thus the Signs of God, ayath al-Allah) in the order and scheme of things (alameen). This kind of learning process in self and the other in respect of mind-matter investigative experience comprises the domain of the Qur’anic worshipping world in consciousness (tasbih). The shura as institution thus discourses in the new depths of meaning and implications of epistemic unity in relation to the mind-matter order of experience. Such a
learning experience is referred to in this paper as the *tasbih-shura* characterization of the essence of cosmic learning process.\(^6,^7\)

The continuous learning extending across system-continuum in evolutionary learning processes driven by the epistemic oneness is established by the *Qur'an* by the principle of monotheism in the beginning (*Tawhid*) and in the end (*Tawhid* = the Hereafter *Akhira*). These two terminal points of the very large universe are equivalent to Great Events of the self-actualized multiverses in the dimensions of knowledge, time, and space. The *Qur’an* establishes the universality and uniqueness of its worldview in “everything” by its principle of self-referencing. This is a mathematical formalism for proving truth by truth; falsehood by falsehood. Within the whole stretch of the temporal multiverse learning from the beginning (*Tawhid*) to the end (*Hereafter*) lies the open evolutionary domains of all categories. This totality comprises the unified worldview and world-system; the differentiated world-system; and the mix of these.

Because of the existence of all such diverse categories that learn continuously across system-continuums, optimality cannot exist in learning processes. Likewise, there cannot be steady-state equilibriums. The latter are replaced by evolutionary learning equilibriums having their own distinctive properties in dynamic systems, and in all forms of world-systems extending between truth and falsehood in respect of their determination by the monotheistic law. This is a central part of the *Qur'anic* methodology epistemologically premised on *Tawhid*.

By the symbolic understanding of *Tawhid* at work in the organically constructed moral–social world-system, the principles of normative and positive law; deductive and inductive reasoning; a priori and a posteriori antinomies are all unified together to generate the moral–social reconstructed world-systems and relations out of a fallen world-system of social differentiation.

In the differentiated world-system relations premised in systemic complementarities and participation as consequential signs of unity of knowledge in mind-matter issues cannot exist. Instead, the differentiated states represent competing and individualistic schemes of action and responses (Holton, 1992). These are reconstructed by the normative law reforming the normative orders of epistemic oneness by the law and its implements.

Yet in the *Tawhidi* learning methodology such a moral–social transformation is never claimed to be a perfect actualization at any time and state. Evolutionary learning prevails in the moral–social reconstruction by combining the normative with the positive; the deductive with the inductive;
the a priori with the a posteriori, even as the evolutionary learning processes proceed on across system-continuums in reference to epistemic oneness and its unification consequences.

Throughout the evolutionary learning system the evanescence of the learning process in epistemic unity of knowledge invokes participation and complementarities. These form the evidential signs of organic unity realized in the knowledge-induced systems by way of the oneness of being and becoming objectified in the goal of the unified world-system. The pervasiveness of participation and complementarities in the act of learning institutionally in concert with the organic world-system described by its state, institutional, time, preferences, and policy variables and the like, causes all such variables and relations to be interactive and integrative by the *tasbih-shura* attribute of learning processes of discourse. Interaction leading to integration results in evolutionary learning across new processes.

Such interactive, integrative, and evolutionary variables in the continuums of discursive processes and systems are necessarily endogenous in nature. Now in the entirety of the learning world-system and in the methodology established by epistemic oneness only the beginning and the end characterized by the terminal points of monotheistic oneness (equivalently the Hereafter) remain exogenous. No other worldly variables by their continuity of relationship can be exogenous. When exogenous relations between the variables exist as the positivistic state of the examined issue and problem, that is because of the decadent nature of the world-system remaining away from directing its organization toward the goal of unity of being and becoming. In such wide and all possible states of the world-system in its diversity, learning assumes its sway over what Myrdal (1968) referred to as “the wider field of valuation.”

**A CONTRASTING EXAMPLE TO EPISTEMIC ONENESS IN THE NATURE AND LOGIC OF POLITICAL ECONOMY**

As an example, when one deals with problems of political economy, the above definitions of world-system and socio-scientific order need to be understood in context. Widely apart is the scope of political economy and world-system concepts between the monotheistic epistemological worldview and the other.
The study of political economy in the case of the monotheistic world-system is not that of production and distribution of wealth under conditions of power and conflict per se, as is customary in mainstream study of political economy (Phelps, 1985; Staniland, 1985). In this latter case, while cooperation and coordination are emphasized in the economy of diversified types, yet the axioms of scarcity of resources, competition, and efficiency in the linear sense of individuated participation by agents and agencies are retained. The mainstream concept of economic rationality enters lock, stock, and barrels in the study of political economy from institutional and government interventionist viewpoints.

Contrarily, the theory of political economy derived from the epistemology of the monotheistic law is to study the fallen conditions marked by human deprivation, conflict, and marginalism; wealth and power; and then to reconstruct the world-system by invoking the principle of unified reality. In this intellectual enterprise, self and society, economics, finance, institutions, social contract and morality, ethics, and the divine law, all get endogenously embedded to learn, act, respond, and evolve. An endogenous process of learning in unity of knowledge to reconstruct a fallen world of moral imperfection is unleashed, formulated, understood, studied, and applied with due consequences. The sustainability of such learning process in unity of knowledge and the world-system then perpetuates the political economy and world-system of epistemic oneness across the endogenously organized moral–social reconstruction. Yet such a moral–social reconstruction remains always incomplete of moral perfection while the process in transformation learns pervasively. That is between truth and error the learning process is always improving but never perfecting, as in the rational foolishness of optimality and termination of innovation. Shackle (1971) refers to such an end state of innovation in optimality and steady-state equilibrium.

The problems of political economy and world-system between Islam and the other are the same for the case of Global Political Economy (GPE) (Palan, 2000) and International Political Economy (Ruggie, 1998). Such studies of political economy are post-institutionalist emergences, in which political economy is pursued in the framework of understanding the relations between state and multinationals, or in the area of the material dimensions of human choices in forming political and economic choices while keeping the social goals in view. The end result of these research projects has been a sharpened convergence into the use of the same methodologies of conflict and competition that political economy has dealt with traditionally.
On the sociological side, the works of Weber (1978) and Durkheim (1938) emphasize the cultural overtones of neorealist and neoliberal theories of international relations. The pointer is once again to the rationalist basis of human thought and actions.

Wallerstein’s (1998) world-system theory is equally mired in a sea of rationalist, neoliberal, and capitalist dynamics that define the growing complexity of competition and emergence of the strong in his postmodernist model. Using sociological method Wallerstein paints such conflicts as taking place inexorably over the space-time of the social universe.

Mainstream scholarship and its practice in the framework of science and society, knowledge and intellection proceed on, thus deepening the occidental paradigm of rationalism. In it, morality and ethics, consciousness and the subsequent reconstructive norms, and the deconstructive meaning of “everything” are cast in the framework of social Darwinism, collective individualism (public choice theory), and institutionalist-world power.

But, even in western scholarship, Husserl (1965) remains its critique. He points out the lack of moral consciousness of science. Dampier (1961) laments on the moral failure of western science for having ignored the academic moral socio-scientific enterprise. Alternatively, the scientific values do have scope of incorporating morality and ethics, and thereby to examine the greater vista of the scientific meaning encompassing God and Truth contra rationalism and illogicalness of falsehood. In the absence of including the moral remiss, knowledge and thought, institutionalism, and the global social contract have not been able to comprehend the greater part of human reality. God and the monotheistic law have been left out of the purview of a theory of “everything.” This intellectual remiss should reenter the true constitution of human liberty and scientific fullness. Here then is the missing role of the divine law of oneness in the relationship between God, the world-system and the socio-scientific universality, analytics, reasoning, evidences, consciousness, and consequences.

It is clearly noted from our above explanation that the Tawhidi methodology of epistemic unity in “everything” does not reject the reality of the differentiated political economy (thereby world-system) in conflict and competition of power, production, and ownership of wealth and resources. The monotheistic law presents the normative methodology toward intra and intersystemic unity of being and relationship that can be established; thus attaining a moral–social transformation. The universality and uniqueness of the monotheistic law in the moral–social reconstruction of “everything” then suggests adoption of this model of change.
ON THE PRIMAL AXIOM OF THE QUR’ANIC
SOCIO-SCIENTIFIC WORLDVIEW IN
ACTION: TAWHID

Thus no intellection, explicit, or implicit, without the active invocation and utilization of the epistemology of monotheism (Tawhid) to realize scientific universality, uniqueness, analytics, reasoning, evidence, consciousness, and consequences can be accepted as an Islamic act. Such other approaches would at best remain a rationalist endeavor even with a mere claim invoking Tawhid, as in Islamic economics and finance field today Yet there would not be a substantive understanding of the organic unity of relationships between the good things of life in contrast to the relationships between the differentiated world-systems of logical falsehood. But this is the same thing as the exogenous treatment of morality and ethics in all of economics and finance theories today – indeed in all of science.

The endogenous treatment of integrating ethics qua morality in economic, financial, and socio-scientific theory has escaped a substantive treatment even in Islamic economics and finance today. Choudhury (2006a) has pointed out that nowhere among the contemporary Islamic gurus has Tawhid been used as the epistemology to develop the socio-scientific thought with the monotheistic law and the consequential unified world-system that learns in the light of endogenous relations of morality and ethics with God self and the world-system. Such endogenous ethics are like what Krugman refers to as self-governing behavior in matters of complex economic relations. Choudhury (2004) refers to them as the endogenizing of unity of knowledge in the unified structure of world-systems.

REJECTING THE NON-TAWHIDI NATURE OF ISLAMIC SOCIO-SCIENTIFIC STUDY: THE AXIOM OF SCARCITY AND MARGINALISM

Islamic economics and finance holds on to the mainstream economic axiom of resource scarcity and accepts the central mainstream postulate of marginal rate of substitution. Yet this is a most untenable axiom in the Tawhidi epistemological worldview under conditions of learning in unity of knowledge and its construction of the unified continuum of world-systems. How does Islamic argumentation bring into effect the phenomenon of abundance dispensing away with the scarcity axiom and the postulate of
marginal rate of substitution between competing ends in all of economics, finance, social, and scientific intellection? The argument is that a continuously learning world-system in diversity and having the monotheistic perspective of unity of knowledge, participation, and complementarities between the good things of life presents the purpose and objective of the Qur'anic Law. In worldly affairs including the socio-scientific phenomena this emergent law is premised on the purpose and objective of the Islamic Law concerning the good things of life. This core purpose and objective of the Islamic Law is termed as the maqasid as-shari’ah.

The idea of diversity in unity extending over ever-spanning domains of possibilities is well known in the literature. Yet what is new in the Tawhidi monotheistic worldview in respect of the principle of unity in diversity is the force and consequences of such dynamics. In the monotheistic law in relation to the unity of the world-system the sole cause of creation is knowledge emanating from the monotheistic law. This establishes the world-system of the same nature, namely unity of being by the interactive relations of becoming across the processes of learning in system diversity. The Tawhidi principle of unity in diversity is thus concerned with the creative dynamics of the monotheistic law in mind-matter consequences.

The economic and financial world-system now is a continuous reproduction of output and resources, cooperation and empowerment, distribution and simultaneity of knowledge and the world-system by virtue of linkages between the possibilities as created by knowledge production across learning processes that always refer to the purpose and objective of the monotheistic law, the maqasid as-shari’ah. Consequently, the emergent dynamic principle of pervasive complementarities caused by continuous knowledge-flows across system diversity (continuums) cannot sustain the case of scarcity. Knowledge breeds knowledge incessantly as flows. There is no static stock, as evolution remains pervasive over the dimensions of knowledge, time, and space.

Thus, along with the illogicalness of the postulate of scarcity of resources the postulate of marginal rate of substitution cannot be retained. Marginal rate of substitution is the relational way of explaining competition and conflict between competing substitutes along an optimal resource allocation surface under the postulate of scarcity. In the end, the postulate of scarcity and competition for resources, form the static non-learning idea, even with the use of intertemporal allocation mechanism. Polanyi (1977) emphatically critiqued the idea of scarcity in differentiated economic reasoning by referring to historical cases.

Contrary to such core economic concepts, continuous intra and inter-system learning in unity of knowledge liberates and creates additional
resources. Thus comes about the end of scarcity. Resource abundance causes the well-being criterion function (maslaha) connected with the maqasid as-shari‘ah to evolve continuously. Optimization of the well-being criterion function is logically abandoned and replaced by the objective of simulation by learning and process. The Qur‘an refers to such a learning phenomenon in pervasive system continuity as reoriginated newness (khalq in-jadeed)

Yet there are those who argue that optimization and steady-state equilibrium are constrained by the available resources (resource budget). This argument is untenable. The presence of knowledge in system-continuum and continuous learning in the Tawhidi unity of knowledge worldview causes the budget line to shift continuously, randomly and permanently. Thereby, the coefficients of the budget line (prices) vary parametrically with their probability distributions, even as the force of knowledge reproduction continues. Consequently, no steady-state equilibrium can exist, only punctuated evolutionary learning equilibriums do (Grandmont, 1989).

Indeed now, the budget line cannot be held fixed on any optimal surface. This result is carried on to stochastic surfaces as well, since a stochastic surface is simply an assumed mathematical expectation of given probability distributions. But assigned probabilities are themselves deterministic consequences of stochastic surfaces. Evolutionary learning stochastic instead are formed by repeated stochastic surfaces of previously determined stochastic surfaces and so on. On such a physical phenomenon write Hawking and Mlodinow (2010, p. 80, edited): “…for a general system, the probability of any observation is constructed from all the possible histories that could have led to that observation. Because of that (t)his method is called the ‘sum over histories’ or ‘alternative histories’ formulation of quantum physics.” Now what is true of this idea of probabilistic valuation in the physical universe remains applicable for the stochastic surface estimation in any science including economics and finance.

What about the household budget allocation to purchase, say, tea, and coffee as substitutes? What about a firm’s allocation of its cost of production between the production of tea and coffee as substitutes? Tea and coffee appear as substitutes because the commercial world has not allowed for the possibility of blending these beverages, as it is done in say carrot-orange blended juice and the like. Likewise, tastes have not been developed to overcome the scarcity problem driven by the assumed static nature of tastes and preferences in the socioeconomic models. Yet in a dynamic preference changing environment of decision-making and choices it is possible for households to choose complementary goods, such as rice,
wheat, and fertilizers by technological fusion, conservation, and recycling of waste on reproductive resources. Next to this is the development of complementary technological change. It is the static nature of preferences and production functions linked with the assumptions of scarcity and competition of the commercial world-system that has perpetuated the scarcity axiom of economics.

Islamic economics and finance have accepted such mainstream assumptions without questioning. The discipline has not understood the function of the Tawhidi law underlying the pervasively complementary (participatory) domain of continuous and evolutionary learning by organic linkages between the good things of life. Hence, a unified world-system under the impact of a continuous production of knowledge and learning processes in the light of the epistemology of unity of knowledge and its induced unified possibilities in the choices of the world-system remains absent in scholarship.

The result has been that Islamic economics has not understood the Tawhidi epistemological methodology and its dynamics in constructing the Islamic economic, financial, social, and socio-scientific worldview. The Qur’anic precept of pairing resulting in abundance, as the understanding and pursuit of learning experience, has not moved the Muslim mind to actualize the learning universe in the framework of the Tawhidi unity of knowledge and its construction of the world-system. This methodological approach otherwise is the project of the Tawhidi induced socio-scientific intellection.

THE GENERAL EQUILIBRIUM RELATIONS IN PRODUCTION AND CONSUMPTION: SCARCITY EVERYWHERE

The core postulate of resource scarcity and the nature of optimal allocation of resources between competing ends hold true simultaneously for consumers and producers. This is the case of the general equilibrium resource allocation problem. For the budget line touches simultaneously the production possibilities surface and consumer indifference curves at the common point of optimality of production possibility curve and consumer indifference curve. If a contrary case exists between such two optimal points converging into a common point, then market exchange goes into disequilibrium and may have to be corrected by policy variables to restore
equilibrium. In the interactive, integrative, and evolutionary learning case of
the monotheistic law applied to the general equilibrium case, any such
equilibrium is temporarily attained.

Only in the core of economics (Debreu, 1959), which is a region of
instantaneity, there can theoretically exist a steady-state equilibrium. Such a
situation is untenable in a learning world-system or in the midst of
continuous perturbations of the economic and financial systems. Conse-
quently, no steady-state equilibriums can exist either in the consumption or
production cases in a learning resource production and allocation situation.

Consequently, no optimal allocation of resources can exist anywhere.

Thereby the postulate of resource scarcity does not abide.

Consequently, marginalism cannot exist either. Opportunity cost of
competition between substitutes is annulled. These are logical results
emanating from the methodology of epistemic oneness and its moral–social
construction of the evolutionary learning processes. Only evolutionary
learning equilibriums can be actualized.

DEFINING CONSUMER AND PRODUCER
BEHAVIORS IN THE EVOLUTIONARY LEARNING
WORLD-SYSTEM WITH INTERACTION AND
INTEGRATION: THE TAWHIDI CASE

Pervasive participation and complementarities in the mind (res cogitans)-
matter (res extensa) organization of the world-system brings about
intersystemic complementary linkages between production and consump-
tion as also within them. An example of such a unifying case is the
environmental good in exchange. There now comes about inter-agent
awareness on the environment good. Consumer behavior now agrees with
the technological change that affects production along the environment
friendly directions of reuse, recycle, reproduce, and re-consume in diversity
of ways. But learning introduces continuously embodied technological
change in production function. Subsequently, the general equilibrium
learning equilibrium states, as described above, simultaneously describe the
evolutionary learning behavior in the general equilibrium framework of
dynamic consumption preferences and production menus.

In such a case, let the preferences of the ith individual be denoted by \{φ_i\}
induced by unity of knowledge-flows emergent from the individual con-
sciousness of epistemic oneness (Tawhid and the world-system). Thus,
\{ \varphi_i = \varphi_i(\theta, x(\theta)), \theta \in \text{monotheistic law; subject to the budget constraint of the shifting type under the force of learning in diversity with unity of relationship and being}. \} \text{ The monotheistic law is denoted by } \Omega (\text{Qur'an}), \text{ which is transmitted by the guidance of the Prophet Muhammad denoted by the transmission correspondence, S. Thus, the monotheistic law is denoted by } (\Omega, S).

Such dynamic preference regimes have been ingrained in the conscious individual over Islamic history. It is marked in the Qur'anic principle of avoidance of waste and excessiveness (israf). Basic-needs regime is the characteristic of the Islamic paradigm of development. This comprises the well-being criterion in the production and consumption of life-fulfilling goods and services termed as necessaries (dhururiyath), comforts (hajiyyath), and refinements (thasanniyyath) (Masud, 1997). In present times the aspiration of Islamic banking is to actualize such a social order of participatory development. Every Muslim country and communities around the world practice the ethics of consumption and production according to their shari'ah permissibility.

\section*{FORMALISM OF DYNAMIC LEARNING PREFERENCES: INDIVIDUAL LEVEL AND SOCIAL AGGREGATION}

The simultaneity of the learning process along the development trajectory is implied by the \((\theta, x(\theta))\)-vector of diversely integrated variables. This vector is determined by interaction, integration and evolutionary learning in the generalized learning system involving dynamic consumer preferences as shown above in relation to the dynamic (joint) production menus as explained above.

Learning as process is permanently a social exchange. Thus, the individual is not limited to itself in choices and decision-making, as is the case of methodological individualism. Thereby the consequences of competition, self-interest and marginalism as by scarcity of resources and the consequential results of steady-state equilibrium and optimality, both in the static and the intertemporal cases, cannot exist. Consequently, the individual and its preferences and the producer’s menus are linked with the entire social construct. Such individual and production menus embedded in the social order cannot be individuated.

That is \( \cap_i \{ \varphi_i = \varphi_i(\theta, x(\theta)), B(\theta, x(\theta), \theta \in (\Omega, S)) \neq \phi \}. \) This means that the individual is a conscious participant in the social whole. Besides, we can now
well-define a social well-being function \( W(\cdot) \) (maslaha) on \( \{\varphi_i\} \), such that,
\[
W = W(x(\theta)), \quad dW(x(\theta))/d\theta_N > 0; \quad \theta_N \text{ denotes new process-knowledge-flows}
\]
along the IIE-learning processes The properties of dynamic learning preferences at the individual level and its social aggregation are as follows:

Social aggregation \( \cap_{i \in \Theta} \{\varphi_i(\theta, x(\theta))\} \neq \emptyset \), with \( \theta \in (\Omega, S) \}, \) with \( \{\varphi_i(\theta, x(\theta))\} \) as individual preferences based on the three kinds of consumption goods of the dynamic basic-needs regime of production and development; namely, needs (dhururiyath), comforts (hajiyath); and refinements (tahsaniyath).

\( W(\cdot) \) is simulated subject to the circular causation relations of the learning budget constraints. The following are the circular causation relations: \( B(\theta, x(\theta)) = \sum p_{ij} x_{ij} \) with the circular causation relations for the \( i \)th individual:
\[
x_1 = f_1(\theta, x_2, x_3, \ldots, x_0); \quad x_2 = f_2(\theta, x_1, x_3, \ldots, x_n); \ldots; \quad x_n = f_n(\theta, x_1, x_2, \ldots, x_{n-1}).
\]
Finally, the monotonic relationship with the well-being index \( W \) is now proxied by \( \theta = F(x_1, x_2, \ldots, x_m) \). Every variable, including the price-vector \( \{p_i\} \), which is taken along with the \( x(\theta) \)-vector, is \( \theta \)-induced. The circular causation relations establish the normatively constructed complementary relations between the variables. Such variables then enter the individual well-being function \( W_i(\cdot) \).

Since the individual is not consciously an asocial being, therefore, the total well-being function can be represented in the product form denoting complementarities between the consumers in the social ensemble:
\[
W = \Pi_i W_i(x(\theta)).
\]
The simulation of the aggregate well-being index \( W \) is similarly done in respect of the circular causation relations. Now, \( B(\theta, x(\theta)) = \sum \sum p_{ij} x_{ij} \) circular causation relations span over the \( \{x_{ij} = f_{ij}(\theta, x_{ij})\} \) relations. The monotonic representation of the well-being function now is \( \theta = \{F(x_{ij})\}; \quad i = 1, 2, \ldots, m; \quad j = 1, 2, \ldots, n \).

It is to be noted that the type of aggregation permissible in reference to the Tawhidi epistemology for the social economy can be of the multiplicative type. The linear addition of individual preferences to the social level is a utilitarian idea of independently poised individual decision-makers (Harsanyi, 1955). Since independence of relations and the core of methodological individualism in the implications of such aggregation are simply antonyms in epistemic oneness, therefore, the utilitarian approach to social aggregation is not logically acceptable in a discursively characterized interactive, integrative and evolutionary learning environment. The lateral aggregation of utilitarianism does not abide in this case, even with exogenous moral–social norms as was tried by Hammond (1987). Of course much has been written in the literature on the problems facing the utilitarian idea of social welfare and social choice (Sen, 2002). For these reasons the derived implications from the epistemic oneness for individual and social preference
and production choices are explained by non-null intersection $\cap_i$, meaning interaction leading to integration by convergent $\theta$-value through discourse (tasbih-shura). Thereafter, $dW(\theta)/d\theta_N > 0$ signifies evolutionary learning with $\theta \in (\Omega, S)$.

The social cooperative and participatory nature of individual preferences embedded within a community, describes the worldview of unity of knowledge. This was the quality of the early Muslims in the City State of Madinah during the time of the Prophet Muhammad. The basic-needs model of sustainable development is another glaring example of sustainable development today on which Streeten (1981, p. 331) writes: “... basic needs spells out in considerable detail human needs in terms of health, food, education, water, shelter, transport, energy, simple household goods, as well as non-material needs such as participation, cultural identity and a sense of purpose, which interact with the material needs. Basic need is a more positive concept than the double negatives of eliminating or reducing unemployment or alleviating poverty.”

DIAGRAMMATIC REPRESENTATION OF RESOURCE ALLOCATION IN THE LEARNING SPACE

In the three-dimensional Fig. 1, the impact of $\theta$-values on socioeconomic vector $x(\theta)$ is shown. Note the evolution of the fuzzy space of actions, the sets $T_n, i = 1, 2, ..., n$, driven by the IIE-learning dynamics. This evolutionary fuzzy bundle is made up of evolutionary resource trajectories as shown.
OT₁, OT₂,… OTₙ are typical evolutionary learning trajectories. On each of these are evolutionary learning equilibriums caused by the internal and system-continuum dynamics of interaction, integration and evolution. The surfaces shown here may not be restricted to Cartesian framework. Essentially the underlying learning dynamics and systemic interdependence make the surfaces of the non-Cartesian type, as of Hahn-Banach topology (Maddox, 1970).

Incidentally, such evolutionary economic phenomena were studied by the Austrian School of Economics (Hayek, 1945). Nelson and Winter (1982) also studied evolutionary economics. Boulding (1967) contributed much to the development of evolutionary economics. Yet, except for Boulding who did not adopt a neoclassical methodology, evolutionary economics has remained a continuation of the postulates of neoclassical economics of scarcity, competition and optimization, or of conflict as of social Darwinism. These attributes formed the basis of the evolutionary study. Likewise, Hegel and Marx conceptualized their ideas of political economy on the premises of an evolutionary dialectical world-system of conflicts between power, ownership and distributive equity. The epistemology of overdetermination as opposed to unification was applied to explain social transformation out of the conflicting forces (Resnick & Wolff, 1987). Thus in the end, no fresh epistemology other than the dialectical and Darwinian ones was invoked. This is the splitting point where the evolutionary learning methodology and its consequences in this paper differ much from the contributions in the field of evolutionary economics.

REJECTING THE POSTULATE OF CONSTRAINED UTILITY AND WELFARE MAXIMIZATION IN ECONOMICS AND FINANCE: THE IMPOSSIBILITIES OF ISLAMIC ECONOMICS, FINANCE AND SOCIO-SCIENTIFIC ANALYSIS

This section will prove by logical contradiction the futility of the utility function and utilitarian analysis, once endogenous (learning) ethical values are introduced. That is, the moral law and ethical values cannot be induced in utilitarian analysis as by the knowledge-value set {θ}. The underlying utilitarian methodology does not generate learning behavior. Consider the following problem:

Let \( U_i = U(\theta, x(\theta)) \), \( i = A, B \) (1)
denote the utility functions with the assumed presence of knowledge, $\theta$, and the knowledge-induced vector $x(\theta)$ – if this was at all possible. A, B are agents or alternatives. Consider the budget constraint,

$$B_i(\theta, x(\theta)) = [p(\theta) \cdot x(\theta) + r(\theta) \cdot \theta]_i$$

By the properties of the knowledge-induced complementarities representing unity of knowledge derived as in expression (2), it is clear that $B_i$ cannot be subject to the postulate of resource scarcity. Besides, the learning nature of the goods and price vectors suggest that unique points of optimality and equilibrium cannot be determined on any of the surfaces, such as the production possibility curve, individual utility indifference curve, and social welfare surface. That is, in the continuous learning case, no relative-price determination is unique at any point on the surfaces embedded in continuously learning probabilistic fields. A range of possibilities in a random field exists surrounding any point on the surfaces. According to these fields two kinds of probability limits of relative prices may exist, and they are never convergent to the “core” market equilibrium. Next let,

$$L(\theta, x(\theta)) = U(\theta, x(\theta)) + \lambda [B(\theta, x(\theta)) - (p(\theta) \cdot x(\theta) + r(\theta) \cdot \theta)]$$

denote the Lagrangian, whose classical constrained maximization yields,

$$\frac{dL}{d\theta} = \theta = \left[ \frac{\partial U}{\partial \theta} + \left( \frac{\partial U}{\partial x} \right) \cdot \frac{dx}{d\theta} \right] + \lambda \left[ \frac{\partial B}{\partial \theta} + \left( \frac{\partial B}{\partial x} \right) \cdot \left( \frac{dx}{d\theta} \right) \right]
- \left[ \frac{p \cdot dx}{d\theta} + \frac{x \cdot dp}{d\theta} + r + \frac{\theta \cdot dr}{d\theta} \right]$$

But contrarily, by the monotonic function of knowledge-flows, that is $\theta$-related conditions mentioned above, we deduce,

$$\left[ \frac{\partial U}{\partial \theta} + \left( \frac{\partial U}{\partial x} \right) \cdot \left( \frac{dx}{d\theta} \right) \right] + \lambda \left[ \frac{\partial B}{\partial \theta} + \left( \frac{\partial B}{\partial x} \right) \cdot \left( \frac{dx}{d\theta} \right) \right] > 0, \quad \text{given } \lambda > 0$$

Because $[\partial (U/\partial \theta + (U/\partial x) \cdot (dx/d\theta)) > 0$, therefore, from the monotonicity condition induced by $\theta$-values, we obtain,

$$\left[ \frac{p \cdot dx}{d\theta} + \frac{x \cdot dp}{d\theta} + r + \frac{\theta \cdot dr}{d\theta} \right] > 0$$

By the stabilizing relations between $\theta$ and $p(\theta)$ and $r(\theta)$, Eq. (7) will be true over dynamic sustainable basic-needs regimes of development. Along these regimes “$p$” and “$r$” will increase in a stable way under the force of learning,
yielding sustainability and productive gains. Or they will remain constant, which is less likely. Thus,

\[
\frac{x(\theta) \cdot dp(\theta)}{d\theta} + \frac{\theta \cdot dr(\theta)}{d\theta} \geq 0
\]

(7)

Also clearly,

\[
p(\theta) \cdot \left( \frac{dx(\theta)}{d\theta} \right) + r(\theta) > 0
\]

(8)

That is, we write Eq. (8) as

\[
dx(\theta)/d\theta = a - ((r(\theta)/p(\theta)), \quad a > 0
\]

(9)

is arbitrary. Thereby,

\[
x(\theta) = a \cdot \theta - \int \left( \frac{r(\theta)}{p(\theta)} \right) d\theta
\]

(10)

Now it is very likely that \((r(\theta)/p(\theta))\) will increase over dynamic (evolutionary) basic-needs regimes of development. Consequently, \(dx(\theta)/d\theta\) will decrease over such increasing price-relatives. This is a contradiction to the property of monotonic positive relationship between \(\theta\) and \(x(\theta)\).

Next consider Eq. (7), and simplify it as follows: \(dp/dr \geq 0\). Thus for an arbitrary positive value ‘\(b\)’ we write, \(dp/dr = b - (\theta/x)\). That is, \(p = \int (b - \theta/x)dr = (b - \theta/x) \cdot r\), or \(r/p = x \cdot (bx - \theta)\). \(\theta\)-induction of all the variables is assumed.

Writing this value of relative price, \(r/p\) in Eq. (7) yields,

\[
\frac{dx}{d\theta} = \frac{b - x}{(bx - \theta)} > 0
\]

(11)

That is,

\[
\frac{x(\theta)}{\theta} > \frac{b}{(1 - b^2)}
\]

(12)

Eq. (12) gives a truncated (piecewise) range of continuity for the \(x(\theta)/\theta\) relationship, which is not valid in the interval-range less than the value for \(b/(1 - b^2)\) for given arbitrarily set of \(b\)-values. For the minimum possible value \(b = 0\), many of the results shown above become invalid within the characteristics of \(\theta\), \(x(\theta)\), \(p(\theta)\) and \(r(\theta)\). Hence Eqs. (10) and (11) reach contradictions in terms of the results arising from the learning relations of unity of knowledge and the unified world-system. The results given above can be further generalized in their vector forms.
Thus, the so-called knowledge-induced “utility” function examined above in reference to the epistemology of unity of divine knowledge (Tawhid) denies all the properties of classical and neoclassical utilitarian analysis. This happens due to resource augmentation and distribution between pervasively complementary maqasid as-shari’ah possibilities. Thus, the maqasid-variables are not the competing and substitute “alternatives” of classical and neoclassical analysis – indeed of all of economic and socio-scientific analysis in mainstream case.

Therefore, no “utility” function and its optimality and equilibrium, scarcity and competition and conflict (marginalist, opportunity cost) kinds of properties can exist for the Islamic well-being criterion. They are properties instead of the utility and welfare social choice criteria of mainstream economics.

TAWHIDI METHODOLOGY IN ISLAMIC ECONOMICS, FINANCE, AND THE SOCIO-SCIENTIFIC ORDER: A MODEL FORMALISM

From our foregoing discussions it is clear that the dynamics of unity of knowledge is essential in understanding and constructing the Tawhidi methodology of the Islamic world-system. The failure to comprehend this essential and indispensable foundation of the Qur’anic epistemology has been the root cause of the predicaments of anything that can be proudly called the theory and practice of Islamic economics and finance, Islamic political economy, and Islamic social and scientific inquiry. Consequently, no fresh intellection demands were made in these disciplines. They staggered into disuse and fell prey to the sheer mechanical application of some superficial color of shari’ah-compliance as opposed to the principles of maqasid as-shari’ah. The result was to the sole benefit of the rich man and the principal shareholders’ interests served by Islamic banks, Islamic financing, and their clamor of interest-free ways of private financing. Despite all these claims we still find that the participatory real economy linked development financing instruments have been increasingly abandoned by Islamic banks and finance houses. The focus throughout has shifted to secondary financing instruments and sukuk bonds. These have many shari’ah financing debilities in the modes of financing (Choudhury, 2008b; Kahf, 2007).
The emergence of the Tawhidi methodology with the epistemology of unity of knowledge and the world-system induced by such knowledge-flows is the way to substantially understand the logical negation of many of the postulates of mainstream economics and finance theory and practice. Some of these were mentioned above. On the other hand, to understand the substantively endogenous and applied worldview of Tawhid, the methodology underlying the Tawhidi epistemology must be understood. We present such a formalism to standardize a general theory of “everything” premised on Tawhid. The reader can refer to many of the works by the author (Choudhury, 2006b; Choudhury & Hoque, 2004) on a vast extension of the Tawhidi methodology in economics, political economy, finance, society, and science.

The method of circular causation, alternatively referred to as cumulative causation by Myrdal (1958), and continuity model of unified reality in Islamic world-system, is explained by the string relation in expression (13). This is a version of the formal Tawhidi knowledge model and is referred to as the Tawhidi String Relation (TSR):

**THE FORMAL MODEL OF THE TAWHIDI STRING RELATIONSHIP IN EVOLUTIONARY LEARNING SPACE**

\[
\begin{align*}
\Omega & \rightarrow S \theta \rightarrow f_1 \{\theta_1\} \rightarrow f_1 x_1 \{\theta_1\} \\
\downarrow & \\
(\Omega, S) & \rightarrow (\theta_1, x_1 \{\theta_1\}) \rightarrow \text{Simulate } W(\theta_1, x_1(\theta_1)) \text{[see appendix]} \tag{13}
\end{align*}
\]

Subject to circular causation between the variables to bring firstly their actual state of relations in the problem under study followed by reconstruction to establish pervasive complementarities between all the variables determined by the maqasid as-shari’ah

Recalling \((\Omega, S)\) \(\downarrow\)

\(\rightarrow g_2 \{\theta_2\} \rightarrow f_2 x_2 \{\theta_2\} \rightarrow \)

\(\downarrow\)

Simulate \(W(\theta_2, x_2(\theta_2))\)

Subject to circular causation \(\rightarrow\) as in process 1, etc. \(\rightarrow \ldots\) \((\Omega, S)\) recall until \((\Omega, S) \equiv \text{Hereafter Akhira}\), Great Event.
All the symbols of expression (13) were defined earlier. Additionally one notes how \( \Omega \) is treated in analytical formalism. Now \( \Omega \) denotes the super-cardinal topology (Dewitt, 1992; Maddox, 1970) of the Tawhidi stock of knowledge, which is the totality of the divine law (Qur’an refers to it as Lauh Mahfuz,\(^9\) Umm al-Kitab). Alternatively, it is the complete stock of knowledge of the Qur’an. Hence the term super-cardinality is used. Rucker (1983) refers to such large topological entities as having “large cardinalities.”

The discursive mechanism of deriving \( \{ \theta \} \) on the basis of the Qur’an and the Sunnah (guidance of the Prophet Muhammad) i.e. (\( \Omega, S \)), is called the consultative institution of the shura (consultation) fired by ijtihad (search for rules from epistemological sources). The abstraction and analysis carried out in respect of the problems under discourse in the shura reveal the abstraction of the normative world-system for the problem under study. The resulting mind-matter consciousness marks the intrinsic learning of the world-system in unity of knowledge (tasbih-shura).

We next explain the properties of the learning process in unity of knowledge in terms of interaction, integration and creative evolution continuously across system-continuum of knowledge, time, and space dimensions. The tasbih-shura is an action and response experience in the total learning process firstly taking shape at the interaction level. This stage unravels the diversity of being and approaches to human intellection for comprehending the Tawhidi implications of rules that are derived through a consensual medium of discourse. The stage of interaction leads to a discursive consensus on rules and their interpretations in respect of specific issues and problems. This second stage is termed as the stage of integration. \( \{ \theta \} \)-knowledge-flows denote derived-rules and interpretations leading to the formation of consensual knowledge-value. Such a knowledge-value is denoted by \( \{ \theta \}_1 \) obtained through the discursive medium. The knowledge-flows are then used for mind-matter formalism, which is denoted by “\( f \)” Gruber (1993) refers to such logical formalism as engineering ontology. We term the same in this paper as functional ontology. The idea is contrasted with metaphysical ontology as in the case of Heidegger’s Dasein (1988). The functional ontology denoted by “\( f \)” is the enabling medium of normatively evaluating the moral–social world-system in respect of the general and the particular perspectives.

“\( f \)” denotes the mapping of such normative perspectives in the light of the law of epistemic oneness via correspondences like \( f \{ \theta \} \) “onto” specific sets of variables and their relations.

The first set of interaction leading to integration is indicated by “1.” This set comprises many rounds of interaction leading to consensus or
integration in the understanding of rules and guidance derived from \((\Omega, S)\), being specific to the issues and problems that are subjected to the *tasbih-shura* discourse. This part of the learning experience develops mind *(res cogitans)*-matter *(res extensa)* consciousness by discourse. Such a discursive idea in moral–social reconstruction is similar to Gauthier’s (1986), except for the widening divide between Gauthier’s rationalistic approach and our approach premised on the monotheistic law.

Subsequently, at the point of consensus (or majority rule, not unanimity), post-evaluation is carried out to reveal the socially reconstructed (normative state) versus the prevalent (positive state) state of the problem under investigation. Now the *maslaha* or well-being function arising from the epistemology of *Tawhidi* oneness is simulated in reference to the circular causation, that is, complementary interrelationships between the variables. Because of the need to restore or improve the participatory (complementary) nature of the moral–social symbiotic variables, the system of such relations assumes the form of circular causation. The well-being *(maslaha)* function is thus simulated subject to the system of circular causation relations between the variables. See appendix for an empirical evaluation of the well-being function by simulation using circular causation relations between complementary variables.

Following this stage, a new round of learning process arises at the end of the first process. Now \((\Omega, S)\) is recalled to restart the second process with fresh knowledge-flows denoted by \(\{\theta_2\}\). Such an emergence of the new process following the previous one after post-evaluation by the well-being function marks the creative evolution in the learning process. Each learning process is an experience of the derivation of knowledge-flows premised on the *Tawhidi* unity of knowledge and its induction of the problems at hand. The interrelated knowledge-flows and the knowledge-induced variables are shown by the *functional* ontologies (the \(f\)-mappings). The domain of the problem under analysis is thus characterized by the well-being function and the interrelationships between the variables of the circular causation relations, all of which are endogenous variables because of pervasive learning in complementarities. In the circular causation method the positivistic state is the estimated one. It is followed by normative moral–social reconstruction, which gives the simulated state.

Learning in unity of knowledge and its induction of the problem under investigation continues on till the Hereafter. The Hereafter is referred to as the *Qur’anic Great Event* and is denoted by the ultimate completion of the knowledge stock in the closure by the very large universe. Thus \((\Omega, S)\) is attained after proceeding through the continuums of *Interactive, Integrative*
and Evolutionary (IIE) systems-wide experience spanning the total of all
learning processes in respect of given issues and problems of the world-
system.

The essence of unity of knowledge derived from the epistemic origin of
\((\Omega, S)\) is simultaneously induced into the mind (\textit{res cogitans})-matter (\textit{res ex tensa}) variables, \(\{x_1(\theta_1)\}\), using the functional ontology of \textit{tasbih} (\textit{res ex tensa})-\textit{shura} (\textit{res cogitans}) denoted by \textquote{\textit{f}} and \textquote{\textit{f}_1\textquote{}} in expression (13).

The evaluation of the prevalent positivistic relations of the world-system
are then normatively reconstructed or improved by estimation of the well-
being criterion (\textit{maslaha}). The new vector of variables is denoted by the
\(\{\theta_1, x_1(\theta_1)\}\)-tuple.

The social well-being function is represented by \(W = W(\theta_1, x_1(\theta_1)), dW(\theta) / d\theta_N\), for the general representation of knowledge-flows \(\{\theta\}\) and the process-
specific values \(\{\theta_N\}\) The estimated/simulated value of \(W(\cdot)\) is equivalently
represented by the estimated \(\theta\)-relation that appears as one of the circular
causation relations with ranked \(\theta\)-values, in general without subscripts. \(\theta\)-
values are ranked values set in references to the complementary
performance of the \(x(\theta)\)-vector of variables respecting the good things of
life, and ideally combined with \textit{tasbih-shura} discourse. Such is a common
practice in development planning. Such calculated ranks for \(\theta\)-values are
then averaged across the \(x(\theta)\)-values. \(W(\cdot)\) or the estimated \(\theta\)-relation is
thus the result of post-evaluation of a normatively reconstructed system
with unity of knowledge represented in the reformation of an existing
positivistic scenario. The well-being function is thus the functional ontology
whose form, estimated value, and simulated form through circular causation
yield complementary possibilities. These signify the degree to which the
system has been engineered toward a unified perspective by application of
the \textit{Tawhidi} methodology along the IIE-learning processes. Appropriate
institutional and market ethical transformations, strategies, choices, and
policies and the like are derived by and for normative evaluation by the well-
being function.

Following post-evaluation of \(W(\cdot)\) in terms of \(\{\theta, x(\theta_1)\}\), creative evolu-
tion of similar \textquote{processual} orders arise. Interaction leading to Integration
through a set of \textit{tasbih-shura} discourses within Process 1 finally leads to
\textit{Evolution} by recalling of the epistemological beginning in subsequent
learning processes. Such learning processes perpetuate in the midst of the
epistemology of unity of knowledge with induction into the unified world-
system. Expression (13) referred to as the \textit{TSR} describes how the \textit{impact} of
the divine law of oneness is learnt by simulation in the learning universe of
unity of knowledge and the unified world-system.
Since all the inputs and outputs of this learning system are both knowledge-induced, therefore, systemic “universal complementarities” are established by means of unification between knowledge and the knowledge-induced variables. The principle of pervasive complementarities signifying the continuously participatory nature of the Tawhidi worldview and worldview-system is the surest commensurable expression of the Tawhidi unity of knowledge in action in the mind-matter multiverses.

The $f$'s and $g$'s denote mappings signifying the functional ontological derivations of rules and guidance from the epistemic reference. They are ontological forms expressing the endogenous nature of morality and ethics in the learning system. The sequences, $P_i = \{\theta_i \rightarrow f_i \{x_i\} \rightarrow g_{i+1}\{\theta_{i+1}\}\}$, $i = 1, 2, \ldots$, shown in the expression (13) comprise the chain of $tasbih-shura$ experiences of unity of knowledge. The IIE-properties of learning processes are thus realized both within each of the processes as also across similar ones in extensively participatory types of multidimensional systems.11

The methodological formalized above including the underlying method of circular causation for estimating and then simulating the social well-being function in terms of unity of knowledge is a most generalized worldview. By it both the mainstream socio-scientific methodology and the moral–social reconstructed worldview can be approached. For details see Choudhury (2000).

**THE TAWHIDI METHODOLOGY OF UNITY OF KNOWLEDGE APPLIED TO SELECTED ECONOMIC ISSUES**

*Resource Mobilization versus the Resource Allocation Question*

With the utility function, the social welfare function, and marginalist principle of relative price determination being absent in Tawhidi methodology of resource allocation, the neoclassical idea of opportunity cost of resource allocation cannot exist anymore. Instead, we define relative unit cost of allocating resources between complementary possibilities rather than between neoclassical “marginal substitutes.”

The well-being function in the Tawhidi framework becomes the criterion for evaluation of the $f$-mappings in terms of $\{\theta, x(\theta), \phi(\theta)\}$. $\{\phi(\theta)\}$ denote knowledge-induced dynamic preferences. Equivalently, these mappings can
be changed for production menus and social choices. If we consider the resource allocation problem, as shown in Fig. 1 in respect of the allocation of the \( \{\theta_i, x_i(\theta)\} \)-tuple, \( i = 1, 2 \), the concept of a “differential cost” for choosing the complementary possibilities with \( i = 1, 2 \), can be used for cost comparison between possibilities as being the difference between the ratios of the goods in demand and their effective prices. These possibilities are determined by ethicised market exchange.

Markets in Tawhidi Reference

The market system in mainstream economics and the prevalent approach to Islamic economics and finance are influenced by exogenous preferences and production menus (technology). The market is thus a consequentialist venue of ethics and values determined by exogenous individual behavior. This is unlike the endogenous knowledge induction of preferences in Islamic ethicizing markets.

Islamic behavior in the ideal markets of Islamic economics is a predetermined prescription. Its forces are not the result of a discursive learning process. Chapra (1992) for instance used a concept of moral filter in the pricing and resource allocation mechanism of Islamic economics. According to this concept, market prices are assumed to be governed by the perfect Islamic baskets of goods and services to the exclusion of imperfect ones. The filtered output is the ideal Islamic one, and prices are thereby ideal with respect to such a filtered basket of goods. The market order is then segmented into a shari’ah recommended part (halal) and a shari’ah-impermissible part (haram). The moral filter guides preferences toward the prescribed segmented market within such an assumed differentiation.

In all of the above studies on consumer behavior the role of learning that progressively breaks down the market duality by moral induction is replaced by prescribed behavior. Hence a price-discriminating model is implied between the segmented markets. No analytical explanation is made clear regarding the gradual transition from one market sub-system to another by the force of intersystemic learning, organic unification, and growing consciousness.

Instead, in the Tawhidi methodological worldview markets are progressively ethicized by the selections and choices of goods according to the maqasid as-shari’ah. The inherent learning process in such selections and choices, as induced by unity of knowledge, causes dynamic preferences to learn and evolve. Dynamic preferences thereby codetermine the choices of
maqasid as-shari’ah goods, and the progress of the Islamic political economy along the dynamic (by evolutionary learning) basic-needs regimes of life-fulfilling goods and services. Such was the social market trajectory of Imam Fahraddin Razi (see Noor, 1998), Imam Ghazzali (Karim, n.d.), and Imam Shatibi (see Masud, 1997).

In reference to expression (13) the dynamic learning transformation of embedded markets as multimarkets ($M$) into ethicized ones is defined by the following market topology (Choudhury, 1999):

$$M(\theta, x(\theta), p(\theta), R(\theta), \theta(\theta)).$$

The circular causation relations are symbolized by $\otimes$ underlying the IIE-learning processes. The circular causation relations occur between the following variables: \{\(x(\theta) \otimes p(\theta) \otimes R(\theta) \otimes \theta(\theta)\)}, subject to the inherent relations as follows:

$$\left[ \Omega, S \leftrightarrow \theta \leftrightarrow \theta(\theta) \right] \rightarrow \left[ x(\theta) \otimes \theta(\theta) \leftrightarrow (\Omega, S) \leftrightarrow \theta(\theta) \right] \quad (14)$$

The immanent simulation of well-being by circular causation between the variables takes place continuously across continuums of systems. The evolutionary ethicized multimarkets and socially embedded political economy in complex aggregation via dynamic preferences characterize the complexity of the circular relations and the aggregation of well-being indexes and the learning variables.

Money and Real Economy

In the language of 100% reserve requirement monetary system (especially with the gold standard in the case of Islamic economy) (Choudhury, 2008c), $Y$ (real economy output and prices) prevails over the savings environment (prevalence of interest, $i$, as savings have the positive relationship, $S = S(i^+)$). In the Islamic case the function of money is to finance $Y$. $S$ is then treated as continuously mobilized funds out of savings converted into spending in generating and sustaining $Y$. The implication here is that the function of money is understood simply in terms of its relation with $Y$ in the expression, $MN = MN(Y)$, and mobilization of $S$ is a connector that brings the monetary sector and the real economy into complementary relationship.

Thereby, this money-expression ($MN$) can be extended by replacing the rate of interest by a rate of return $r(p)$ on $Y$ as a function of its price $p$. Now, $M = M(Y, r(p))$. But the way that $r(p)$ arises is important to note. By extending to vector variables ($Y, r(p)$), for example, including real economic activity ($Y$) and respective rates of return, we write,
In this form of the money equation resembling the quantity theory of money and prices, money denotes the total value of spending in *maqasid as-shari’ah* goods and services (good things of life). Thus the flow of money equals the value of mobilized resources in the directions guided by *maqasid as-shari’ah* and the simulation of the social well-being function.

Furthermore, spending in the *shari’ah* recommended market activities are found to be the source of economic stabilization, economic growth, and social well-being. The last concept was explained in terms of the principle of universal complementarities between knowledge-induced goods and services. In the case of expression (15) such complementarities are found to exist between money, output, and real rates of returns.

As one example of the form for expression (15), the total spending variable $S$ can be related to real output by the equation,

$$S = A \cdot \left( \frac{Y}{p} \right)^a$$

(16)

where, $Y$ denotes nominal GDP; $p$ denotes the price level; $A$ is a constant; $a$ and $b$ are spending elasticity coefficients of output and price level, respectively.

Expression (17) is written in terms of growth rates as,

$$g_s = a_1 \cdot g_Y + c \cdot g_u$$

(17)

where

- $g_s$ denotes the growth rate of spending;
- $g_Y$ denotes the growth rate of output;
- $g_u$ denotes the growth rate of the random variable.

It is known that the real aggregate demand (spending) function would be flatter than the supply curve of real output. Hence, $g_s < g_Y$. Therefore, the rate of growth of real output growth is expected to be higher than the real spending rate. Consequently, price-stabilization is realized.

The continuity of circular causation relations will depend on the formation of preferences of productive spending in accordance with the *maqasid as-shari’ah*; that is in accordance with the usage of *shari’ah* financial instruments that generate complementary relations between money and the real economy. Such complementary relations bring about linkages...
in the general equilibrium system by the IIE-processes involving money, real economy and spending variables in the direction of *maqasid as-shari’ah* possibilities. The dynamic preferences so formed are carriers of knowledge formation in the large-scale general equilibrium system of learning relations. The analytical implications of circular causation relations between $MN, Y, r(p)$ and $S$ all induced by $(\theta, \phi(\theta))$ as explained above, can be explained.

**CONCLUSION**

This paper has contributed an original methodological thought that is expected to be fresh for both mainstream socio-scientific theory and the prevalent Islamic economics and finance studies. The contribution is in the socio-scientific extension of the methodology of monotheistic oneness as the epistemology followed by its consequences in normatively constructing the relations of the world-system by the episteme of unity of knowledge. The emergent methodology of unity of the monotheistic law and its creative rendering to the organic unity of details of the world-system is presented first as a generalized methodology that applies to “everything” as a scientific terminology. The generalized theory emanating from the *Qur’an* is established in terms of the principles of universality and uniqueness that must characterize any socio-scientific inquiry. The general model for “everything” in the socio-scientific domain with its pertinent methodology termed as the *Tawhidi* epistemological worldview derived from the *Qur’an*, and the guidance of the Prophet Muhammad (*Sunnah*), is applied to the case of selected problems of both mainstream and Islamic economics, political economy, and finance.

The *Tawhidi* methodology derived from the *Qur’an* and the *Sunnah* in terms of a logical and extensively comparative literature review, and as a universal and unique one, is presented in rigorous analytical formalism to establish its claim for all the sciences in the extended perspective of scientific inquiry. Toward attaining this goal the theoretical formalism of the *Tawhidi* methodology in its methodical character is driven by the logical formalism of model estimation and simulation. These two steps first evaluates the world “as is” and secondly simulates the estimated results to construct the moral–social transformation “as it ought to be” in the framework of unity of the monotheistic law in relation to the choices of the good things of life.
Here the individual consumer, producer, and the social perspective of dynamic preference aggregation and dynamic basic-needs regimes of development are invoked. The simulation exercise leads into the empirical evaluation of a factual case of Islamic finance in the light of the method of circular causation. Estimated/simulated regression equations are examined. The technique of Spatial Domain Analysis of Geographical Information System is applied as an innovative approach in socioeconomic problems to study the social topography, now applied by circular causation in the perspective of moral–social transformation with organic unity of knowledge between the variables.

Yet there are further aspects that the study of methodology in the comprehensive sense of its extension over all of socio-scientific inquiry ought to cover. These are huge areas of investigation in all of science (Dilworth, 2007). As far as interest is on rigorous methodological development, the issue of Universality and Uniqueness is of critical importance in respect of establishing the Tawhidi methodological worldview res cogitans and res-estensa via the organic unified interrelationship between them in the Tawhidi epistemic reference. This topic was briefly touched here.

In the end, the paper is an original contribution in the area of extending the prevalent socio-scientific methodologies by boldly questioning them, as in the case of classical and neoclassical assumptions and their consequences of mainstream economics and in Islamic economics and finance as they exist today. The monotheistic law is brought into the framework of rigorous scientific methodology to extend the bounds of scientific inquiry into what it ought to be in order to realize the fullest extent of the moral–social and methodological potential. The methodology and its logical formalism presented is a rigorous one as scientific inquiry must necessarily formalize beyond simply descriptive languages. Mounce (2001, p. 48) commenting on Wittgenstein's theory of language in his Tractus Logico-Philosophicus writes, "Indeed it is only in symbols that the world appears to us." Furthermore, on the kind of Tawhidi methodology for the entire socio-scientific worldview of reality that we have presented in this paper there are the words of Kuhn (1970, p. 152) in respect of scientific revolution: "... scientific revolutions are (here) taken to be those noncumulative developmental episodes in which an older paradigm is replaced in whole or in part by an incompatible new one."
UNCITED REFERENCES

Campbell (1988); Kahf (1978).

NOTES

1. Qur'an (1:2): “Praise be to God, the Cherisher and Sustainer of the Worlds.”
   The worlds are world-systems (alameen).

2. Qur'an (65:12): Conveys the transcendental nature of the monotheistic law over
   “everything.”

3. Qur'an (36:36): God has paired, that is, complemented together by symbiotic
   relations all things, whether these are seen or unseen (physical or symbolic).

4. Qur'an (42:53), also Qur'an (20:23): “Verily, all matters at the end go to God.”
   The principle of self-referencing is implied here on all things in respect of God and
   the world-system.

5. Qur'an (2:42): “And mix not truth with falsehood, nor conceal the truth.” That
   is noncompliance with Tawhid as the truth of monotheism is not acceptable as a
   viable axiom within Qur'anic (Islamic) methodology of the socio-scientific universe.

6. The words of Cassirer mentioned by Herman Weyl (2009, p. 195) are worthy of
   note here: “Man,” he says, “no longer lives in a merely physical universe, he lives in a
   symbolic universe.”

7. I remain obliged to my colleague Dr. Mohammed Nasser Al-Hejry of the
   Department of Economics and Finance, College of Commerce and Economics,
   Sultan Qaboos University, Muscat, Oman for enlightening me on the tasbih-shura
   precept of the Qur'an.

8. Qur'an (15:21): “And there is not a thing but its treasures are with Us; but We
   only send down thereof in due and ascertainable measures.” The meaning of the
   principle of abundance by due measure is conveyed.

9. Qur'an (85:21,22): “Nay, this is a Glorious Qur'an, (inscribed) in a Tablet
   Preserved.” The Tablet is the Lauh Mahfuz.

10. Qur'an (78:1-5): The Great Event is equated with Tawhid, the Qur'an, the
    Hereafter, and the Prophet Muhammad’s mission (sunnah).

11. Qur'anic verses (13:1-5) bring out the nature of the pairing universe across and
    between diversities of multidimensional systems. Thus, unity in diversity is conveyed
    in the light of the universality of the divine law.

12. My thanks are to Professor Mohammad Shahadat Hossain of the Department
    of Computer Science, Chittagong University, Bangladesh for helping out in the SDA
    construction.

ACKNOWLEDGMENTS

I thank the College of Commerce & Economics for approving my research
leave for a Summer 2011 Visiting Professorship at the Social Economy
Center, University of Center, where the writing of this paper commenced.
The above verses are sufficiently robust to establish that the grand design of the *Qur’anic* worldview of world-system is uniqueness and pervasiveness of organic unity as they refer to the divine law (*Tawhid*) in everything by way of self-referencing methodology.

**REFERENCES**


TECHNICAL APPENDIX: SIMULATING WELL-BEING FUNCTION SUBJECT TO CIRCULAR CAUSATION SYSTEM OF RELATIONS

Estimation by Circular Causation Relations and Implications of the Results

Recalling the expression (13), we note first the $\theta$-knowledge flow that exists at the level of primal epistemological derivation. One such derived value is the use of Islamic financing to attain complementarities between the selected variables in the expression of the functional ontological form. This is the well-being function. The well-being function although so understood is next estimated by ranked $\theta$-values calculated in reference to observation of the state of the financing $V$-variables defined below. Thus the primal and ranked $\theta$-values are different. But through the medium of circular causation relations to explain the reconstructed complementarities between the $(\theta, V(\theta))$-tuples the primal $\theta$ knowledge-flow defines the role of the ranked $\theta$-values. The latter values are set by observation and consultation in the light of the financing data and the ontological expectations of Islamic financing under the Tawhidi unity of knowledge and its effect on systemic unity that realizes the complementarities between the maqasid as-shari'ah variables (Table A1).

Table A1. Data for Simulation of Wellbeing Criterion by Circular Causation Relations.

<table>
<thead>
<tr>
<th>Mill Rupiah</th>
<th>V1 (%)</th>
<th>V2 (%)</th>
<th>V3 (%)</th>
<th>$\theta_1$</th>
<th>$\theta_2$</th>
<th>$\theta_3$</th>
<th>Avg. $\theta = \theta$</th>
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<td>2,049,793</td>
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<td>11.31</td>
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<td>3.01</td>
<td>112.25</td>
<td>6.75</td>
<td>10.00</td>
<td>5.30</td>
<td>7.35</td>
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</table>

*Source*: Islamic Banking Directorate, Bank Indonesia, Jakarta, Indonesia, 2008.

V1: % change in total financing; V2: paid in capital (shareholders financing) as ratio of total financing (%); V3: (Finance/Deposit) FDR (%); Avg. $\theta = (\theta_1 + \theta_2 + \theta_3)/3$. 
Estimated Regression Equations in Circular Causation

\[ \ln \%V1 = -13.0 + 0.455 \ln \%V2 + 1.40 \ln \%V3 + 4.77 \ln \theta \]
\[ R^2 = 93.6\% \quad DW = 2.0027 \quad (A1) \]

\[ \ln \%V2 = -18.6 + 1.27 \ln \%V1 + 1.65 \ln \%V3 - 6.99 \ln \theta \]
\[ R^2 = 75.5\% \quad DW = 1.60445 \quad (A2) \]

\[ \ln \%V3 = -5.60 + 0.099 \ln \%V1 - 0.0404 \ln \%V2 - 0.641 \ln \theta \]
\[ R^2 = 44.8\% \quad DW = 2.49040 \quad (A3) \]

\[ \ln \theta = 3.15 + 0.192 \ln \%V1 - 0.0982 \ln \%V2 - 0.367 \ln \%V3 \]
\[ R^2 = 96.2\% \quad DW = 2.24375 \quad (A4) \]

The generic estimated equation for the well-being index (\( \theta \)) is,

\[ \theta = e^{3.15} \cdot (\%V1)^{0.192} \cdot (\%V2)^{-0.0982} \cdot (\%V3)^{-0.367} \quad (A5) \]

Most of the estimated signs of the coefficients are consistent with the expectations of Islamic financing for complementarities. But the undesired negative coefficient of \( \%V3 \) in relation to the expected negative sign of the coefficient of \( \%V2 \) in the learning system between \( \%V1, \%V2, \%V3 \) suggests that Islamic bank financing in Indonesia depends heavily on principal shareholders’ capital. The excessive values of Finance/Deposit Ration (FDR) shows incompatibility with the regulatory target of FDR = 90% suggested by the Shari'ah Directorate of Bank Indonesia. Ideally FDR should be equal to 100%.

Simulation of (A5) is required because of the above observation. Such a simulation can be taken up in the estimated circular causation model system as follows:

Simulate the following well-being index by learning behavior in the coefficients \((\alpha, \beta)\):

\[ \ln \theta = 3.15 + 0.192 \ln \%V1 - \alpha \cdot \ln \%V2 + \beta \ln \%V3 \quad (A6) \]

where \( \alpha \in (-1.65, -0.50); \beta \in (1, 1.50) \).
Such kinds of extended simulations were done by means of Spatial Domain Analysis (SDA). The results of simulation by the SDA are simply shown here in respect of variation of the coefficients in the range mentioned above (Fig. A1).

\[
\ln \theta = 3.15 + 0.192 \ln \% V1 - \alpha \cdot \ln \% V2 + \beta \ln \% V3 \quad (A7)
\]

The differently colored lines [not shown] joining \( \theta \) with the shaded areas of \( V1, V2, \) and \( V3 \) denote different values of the simulated coefficients \( \alpha \) and \( \beta \) in their range as provided above.

Such simulations result in the following simulated well-being index:

\[
\theta = e^{3.15} \cdot V1^{0.192} \cdot V2^{-0.178} \cdot V3^{0.117} \quad (A8)
\]

This is a better representation of the needed complementarities for sustaining a self-reliant development of Islamic banks, compared to the results obtained for the estimated form, that is (Fig. A2),

\[
\theta = e^{3.15} \cdot V1^{0.192} \cdot V2^{-0.0982} \cdot V3^{-0.367} \quad (A9)
\]

*Fig. A1.* Interaction Levels of Variables \( V1, V2, \) and \( V3 \) Against Knowledge Level

When the Value of \( \alpha \) is Simulated Around \(-1.65\) and the Value of \( \beta \) is Simulated Around \(1\).
\[ \ln \theta = 3.15 + 0.192 \ln \% V1 - \alpha \ln V2 + \beta \ln V3 \quad (A10) \]

The explanation of Fig. A2 is similar to that of Fig. A1. The desired well-being index takes the form,

\[ \theta = e^{3.15} \cdot V1^{0.192} \cdot V2^{(-0.278, -0.05)} \cdot V3^{(0.389, 0.611)} \quad (A11) \]
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