General equilibrium model of Islamic macroeconomic framework tracing through *Zakat*, profit share, and producers' Maslahah

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Abstract

Purpose – This paper is trying to build an analysis framework that can work like IS-LM in Western economics. Regarding the methodology, the discussion is developed from the role of profit share rate and zakat of unemployed (uninvested) wealth.

Methodology – The research method is the first step to build an equilibrium Islamic financial market. In the Islamic financial market, Islam has prohibited interest rates due to usury (riba) and, as a bride, uses the concept of profit and loss sharing. The second step is to establish a goods market equilibrium. The last step is to build an equilibrium financial and goods market in Islamic macroeconomics.

Findings – The result of the vestige finds two curves: first, the one representing the equilibrium in the commodity market (IP). At the same time, the other shows the equilibrium in the financing (counterpart of credit) market (FF). Those curves can then do the traditional task of IS and LM. So, the found framework can comprehensively analyze an economy of the Islamic type.

Implication – This research uses the basic intuition of Islamic teachings, such as the role of the zakat of uninvested funds. In this arrangement, the zakat of uninvested funds is a "penalty" for not investing in the fund.

Originality – The study is original in build models general equilibrium model of islamic macroeconomic framework tracing through zakat, profit share, and producers' maslahah.

Cite this article:
Misanam, M. (2023). General equilibrium model of Islamic macroeconomic framework tracing through Zakat, profit share, and producers' Maslahah. *Jurnal Ekonomi & Keuangan Islam*, 9(2), 286-310. https://doi.org/10.20885/JEKI.vol9.iss2.art10.

Introduction

The economy of Moslem populated countries is now experiencing a growing of its' Islamic economic share. The source of growth is contributed by Islamic banking, Islamic insurance, and Islamic microfinance. The practices of this segments are expected to expand in the future. Even in some countries like Malaysia, Indonesia and some other middle east countries dual banking system has been introduced. The system is so far running well. There is a tendency that any instrument in conventional area of finance has a counterpart in Syariah finance. This fact convinces that in the near future Islamic finance would colorizes the entire economy in those countries.

Islamic economic is of some characteristics that distinguishes it from conventional economic of the West. First, is the prohibition of interest and the pursuance of trade. Due to the absence of interest, the economy produces financial instruments that is basically of trade in nature, with the form of profit sharing, in replace of interest. In profit sharing arrangement (*Mudharaba*),

agents cannot determine the payback of their deposit in advance because any deposits they put in the bank will be considered an investment in which the return has a probability distribution. Any deviation of the expected value represents the risk of investment. So, in this system any agent should not only consider the return but also assume the risk of investment.

Moreover, there is also other arrangement in this system, which is recently experiencing a growing in popularity, that is, sale-purchase arrangement (*Murabaha*) which represents trade between two parties. In this arrangement Islamic banks act as the seller of the merchandise the finance (borrower) needs to buy with the compensation of getting profit of the sale. As the form of trade, however, the finance has a chance to bargain the profit margin the banks would get.

Second is the institutionalization of *zakat* (charity) in the economic realm. *Zakat* is not only a tool of income distribution but also an instrument available to policy makers to organize the economy. The *zakat* that has this kind of nature is *zakat* of accumulated wealth. In Islamic teaching, any act that leaves the wealth unemployed is considered a wasting which is a violation of Islamic law. To prevent this kind of conduct from happening, Islam charges a *zakat* aiming to penalize the act of leaving wealth unemployed.

Third, is forbiddance of Gharar (*speculation*). In view of Islam, *gharar* is considered a gambling which has property of zero-sum game: the number of object, under the game, one player gets is the number the other player losses. This is completely the opposite of trade which has a nature of positive-sum game, both parties involved in it get benefit; or, at least there is no party to be sacrificed (Abu-Saud, 1990). The main cause of this situation is uncertainty. Unless, otherwise, agent has additional relevant information, any decision taken under this situation produces risk. Consider, that there are two parties in the playfield one has advantageous information while the other doesn't. To be sure the second will be a victim of the game.

The situation represented above does, in view of Islam, lower the *maslahah*. Recall that according to Islamic values, *maslahah* is the only way a Moslem could reach the goal of his/her life: *falah*. Any act that hinders Moslem from reaching *falah* is prohibited. Therefore, *gharar* which carries gambling property is of anticipated risk and must be avoided (Al-Sadr,1985). The prohibition of *gharar* proof to have big significance recently. This is because the recent collapse of international financial system is due to allowing speculation to take place (Ali, 2005). As a matter of fact, the persistent escalating international price of petroleum, that makes people all over the world suffered during periods of 2006-2006, is partly due to the speculation in the future/commodity market. Off course, there is a real change in world demand for petroleum. But this demand gets bigger as speculators take part in future/commodity market which result in an ever-increasing price of the commodity.

Fourth, is the fulfillment of Islamic law of transactions. This is one of very important part of Islamic business. The aim of this arrangement is to remove uncertainty that may be deliberately fashioned by misconduct agents. Removal of this misconduct would allow economy to grow (Archer & Abdel-Karim, 2007). Fifth, is the pursuance of Islamic ethic. This is to ensure that every Moslem economic agent behaves in accord to Islamic ethic (Chapra,1992). This is very important in business, without which business will turn to be a thief field. In addition, the fulfillment of ethic will create a more balance welfare in the system, and further, a harmonious environment that humanity would share (Chapra, 2000).

The implication of the practice of Islamic teaching in economic realm will be an emergence of new system of economy which does not compare to the existing traditional and conventional economy. This creates a problem to macroeconomic policy makers since any policy formulation based on the conventional economic will not work to organize the economic which is of new system. Therefore, there is a need to know the framework of the system from which policymakers are able to formulate the instruments to deal with the problem that may arise.

To deal with a system of economy one needs to have a framework by which he/she understand how the system works. Since the system has many elements that interrelated each other it creates an issue of how to understand it in a much easy way. This is nothing but to set up a system model. This paper is trying to build it as it is in Western economics theory which employs a general equilibrium model.

Literature Review

The issue of general equilibrium has become a concern of economists. The work done by Walras as outlined in the article Éléments d'économie politique pure (Jaffe, 1969), has made Walras the father of general equilibrium theory. He pointed out that economic system can be in existence by itself and is gigantic, beautiful, and self-organizing like the following quotation:

"Thus, the system of the economic universe reveals itself, at last, in all its grandeur and complexity, a system at once, vast and simple, which for sheer beauty, resembles the astronomic universe".

The initial version of general equilibrium carried out by Walras still has some drawbacks, one of which is the assumption of convexity. However, the problem has been resolved at subsequent times by his successors. Starr (1969) who applied the Shapley–Folkman–Starr theorem has proven that even though there is no convex preference in the economy, a situation that approaches or much similar to equilibrium (approximate equilibrium/quasi concave) can still be found. In conducting the analysis, Starr (1969) did not impose many conditions/requirements. The only condition imposed here is that the economy is large enough so that number of existing economic agents exceeds the dimensions of the goods present in the economy. In a later development this general equilibrium approach has become the general approach adopted by most economist in conducting macroeconomic analysis even in entrepreneurial and firm (Kihlstrom & Laffont, 1979).

The formulation of classical macroeconomics is described as a complex relationship between the various existing markets, namely: the goods market, the labor market and the money market. Since according to the assumption of competitive equilibrium in every market in the economy, everyone is supposed to be able to find the equilibrium in general for all existing markets (Mc Kenzie, 2002). It is this general balance that builds the macro behavior of an economy. With this general equilibrium modeling and analysis the behavior and predictions of Classical macroeconomics can be well structured (Black, 1995).

On the other hand, the Keynesian school, which does not accommodate equilibrium conditions and does not have a strong micro base in its macro model representation, experiences difficulties in making adjustments to this powerful analytical tool (Arestis & Skouras, 1985). In the explanation of the model, it is not found how the process of linkages between markets at the micro level is then transformed into a macroeconomic one which is the basis for teaching formulations in the field (Biven, 1989). This issue has been a demand of classical supporter. But to some extent, Hicks (1937) had come up with a reinterpretation of Keynes' ideas and introduced a model representation of Keynes's thinking that was also very efficacious, namely the IS-LM analysis model.

Even though this model cannot still represent the production sector that is viewed as a center of output generation, but this model can fit the general equilibrium analytical tool. This is so because the model accommodates the linkage of two markets: the goods market and the money market, each of which is in an equilibrium position. The two markets that are in equilibrium position are allowed to interact with each other and then reach a general equilibrium of the two markets. Because of these characteristics, this model meets the criteria to be called the Walrasian equilibrium model (Black, 1995).

Indeed, there are various weaknesses concerning the model. One of them is as to what steps should be taken when facing the issue of non-convex or concavity from consumer preferences. This is required to guarantee that the claimed situation of equilibrium that occurs in each market is truly based on the optimum choice conditions of the agents (Claar & Forster, 2019). If the requirement is fulfilled, the situation in each market is really showing equilibrium, not just an assumption. This issue has not received the attention it deserves in the Keynesian world (Hillier, 1991). This can be so because Keynesian does not have a micro base that can be used for a bridge to fix the existing problems such as the issue being discussed. In the explanation of the model, it is not found how the process of interrelationship between one market and another, at the micro level, can provide support for Keynesian in making predictions of macroeconomic behavior which is the basis of teaching formulations.

However, in the area of model selection in statistic, the selection criterion is not only goodness of fit of the model which selects the model based on as to how the model best approaches

the data very well. This is equivalently to arrange an ex-post simulation. This is another way of saying that the selection criteria are to find best model from fulfilment of its' diagnostic. The alternative is to check predictive accuracy (Kadane & Lazar, 2004) In this arrangement, the selection may also be based on the ability of the model to replicate the movement of future data. This may be accomplished by employing ex-ante simulation. The ex-ante simulation is nothing but examining predictive validity. IS-LM model, with all the weaknesses aforementioned above, may have low diagnostic value test. But, this model fits many data from countries in the world as it is shown by examination results' so far (Mankiw, 2009). This is showing that it has high value of predictability test. Therefore, based on this argument, one may still use IS-LM model to represent an economy for the pedagogical purposes (Clower, 1965).

Before discussing the issue in a more depth, there is an important matter that needs to be set. This matter is concerning to what type of economy is Islamic economy. The type of economy determines the selection of the type of general equilibrium kind that will be explored in this exercise (Choudury & Malik, 1992). Talking about Islamic economy one may view that it is of classical property. This may be seen from real nature of Islamic economy in the sense that there is no room for monetary variable taking place in the economy. This is much alike to classical-type macroeconomic where monetary policy is absence from the economy (Barro, 1976; Barro, 1977). Barro's argument gets support from Lucas and Sargent (1979). All of these arguments are later form a New Classical macroeconomics (Hoover, 1988). To finalize this footnote explanation, its noteworthy to say that this postulation later gets formalized into Rational expectation hypothesis (Attfield et al., 1991) that until now is in existence.

Upon discussing the validity of IS-LM model, we need to go further to start to discuss the center of the issue. Before doing so we need to track the development of the issue. The general equilibrium approach to Islamic economic has been a concern of Metwally (1984). This article is trying to develop the Metwaly's work (1992) by adding the micro foundation by which agents are making their decision. Furthermore, this article inserts the role of zakat of uninvested wealth (maal) which none concerns on it. This is done since in Islam the uninvested wealth is subject to zakat payment (Haq et al., 2005a; Haq et al., 2005b). Concerning to this very specific issue, this kind of zakah may be felt as a penalty to the holder for not investing the fund. Due to it's role which is felt like a penalty, this will influence the decision whether to accept the project or not. So it is reasonable to believe that this variable is taken into account in the decision making process. Furthermore, this article explores the role of producers' maslahah as a step to reach moslem goal (Misanam et al., 2008). Also, it scrutinizes the role of profit share in determining the intention to invest.

All these variables have interrelated each other in a specific way and finally end up in a decision whether to invest or not. All the micro representations are expressed in mathematical equation and based on which the graphical representation is built. These graphics are then used for finding the general equilibrium of Islamic macroeconomic which gives rise the available policies carries in it. This section does not get a full development in Metwaly's work. The model is then expected to be a well representation of the Islamic macroeconomic.

As it is in the conventional economy, one may see there are two kinds of markets determining the performance of the entire economy: commodity and money market in conventional economic (Sinclair, 1983). The Islamic counterpart of this is commodity and financing market. Commodity market determines the extent to which the market could provide commodity and the appropriate price of it. This market has also important role to determine the size of investment needed to produce a given amount of products that can satisfy the need of society in the system (Choudury, 2007). While the financing market concerns on the question as to how financing market determines the number of funds that should be available that conforms the activity of commodity market. The interaction of those markets determines the organization and mechanism of the economy.

Research Methods

This paper builds a general equilibrium model of Islamic macroeconomics framework as it is in Western economics theory. The Islamic macroeconomic market consists of a financial market and

a goods market. The first step is to build an equilibrium Islamic financial market. In the Islamic financial market, Islam has prohibited interest rates due to usury (riba) and as a bride uses the concept of profit and loss sharing. In addition, the zakat variable is included in the investment theory model. The second step is to establish a goods market equilibrium. The objective of producer in Islam is to seek Maslahah. Maslahah consists of profits and blessings (Berkah). The last step is to build an equilibrium financial and goods market in Islamic macroeconomics.

Results and Discussion

The following discussion is trying to explore the mechanism by which financing market reach it's equilibrium. Especially, the discussion is to show how the supply of and the demand for fund interact to establish equilibrium in the economy of Islamic type. Financing market is the market where a group of agents are seeking to find financing for their project. They offer an arrangment by which the financer (fund supplier) could get compensation from the project. By and large, the particular arrangement is of profit and loss sharing in nature and is called *mudharabah* (Khan,1990). In this arrangement, financee who is agent of the project is offering a given a rate of profit share and provide information about the profitability of the project. Financer will make an analysis over which they make a decision whether to finance the project or not.

The action of these agents creates two lines in the market, supplier and demander of fund. Those who seek the fund are the demander while the other side are supplier. It's noteworthy to know that the demander in this market are the same as the one in commodity market. The separation of commodities and financing market lies in the the activity the people are in. When the people are seeking fund to finance the project, they are in the financing market. While those people are marketing their product, they are in commodity market (Choudury,1997).

Financing Market

Islamic fundamental teaching on investment

One big and determining component in Islamic economy is investment; It has been a central issue. This is not only that Islam views investment as the way to pursue peoples' welfare, but also that Islam consider that investment is the most appropriate way to do so. This originates from the fundamental Islamic economic policy that recommends avoid doing *riba/usury* (Henry & Wilson, 2004). As the consequence of this teaching, investment plays a very important role in economic. By definition, investment is an expenditure that does not provide an instant pay back. The benefits of the expenditure will be paid later in the future (Mohsm, 1978). According to this definition there are varieties of investment. Social investment is believed as one of the oldest forms of investment. In this area, people are trying to set up rules and teach it to the other generations to get better social life for their descendant. The other form of investment is individual-driven social investment. This kind of investment happens when an individual is trying to get private benefit from what he is doing now with a direct consequence of better social life. An example of this kind of investment is a person giving charity (*sadaqah*). From this activity, the individual gets an individual benefit of good life in hereafter, while the activity directly affects the social life in this worldly life (Choudury, 2007). The other kind of investment is purely individual. This kind of investment is done to get a gain that benefits the person who done this. Example of this type of investment is person pursuing their higher education with the aim of getting better life. A businessman who invests in a business to get maximum profit that satisfies him is another example.

However, Islam does not recommend any kind of investment that benefits someone but to the expense of others. This is an anti-social investment (Siddiqi, 2003). This is so because Islam dictates that any activity should be *barakah*-generating. Only with *barakah*, agents can create *maslahah* which is the only path to reach the ultimate goal: *falah* (worldly and hereafter welfare). Furthermore, *barakah* can be generated only from doing anything that obeys the Islamic values. This teaching implies that a businessman should invest and get profit and *barakah* simultaneously.

The following sections will be exploring discussions addressed to find the equilibrium in both commodity and financing market and the general equilibrium among them.

Investment Criteria from Fund Providers' View

In this occasion we proceed to discuss the private/business investment. In this respect, one can see that business has a specific criterion for doing investment. To see the criterion, let's see again the Islamic criteria that should go with investment. As it is mentioned in the front, the investment should generate *barakah* from which the business can get *maslahah*. Consequently, there will be a question as to how business can get barakah from their investment. The answer is simple, that is, doing business that is Islamically permissible (Sattar, 1990). This is to say that the business does not violate the Islamic teaching as it is mentioned in the *Qur'an* and valid *Hadith*. At this point, its noteworthy to tell that one of the Islamic teachings is to make business pay Zakah to the needy. In this regard, we will make a specific discussion that embodies *zakah* into the business consideration.

In doing business, a businessman is obligated to pay *zakah* for his profit/return he got from his investment, Z_R. For our convenience, in this opportunity we neglect the role of rate of the *zakah* in investment. With this thing in mind, we can accordingly determine the number of *zakah* payment from business sector, which is $Z_R R$, with R stands for return. Moreover, businessman is also made to pay another type of *zakah*. The object of this type of *zakah* is idle fund. This is the Islam way to avoid economic inefficiency stemming from idle/unused fund. Every idle or uninvested fund is subject to *zakah*. Let the rate of zakah for uninvested fund is Z_U and the number of uninvested funds is U we can compute the number of zakah paid at this category, that is, $Z_U U$.

Assume further that the total amount of money in the economy is T and I is the invested amount. From this we can make a simple expression of the amount of money as follows:

$$T = I + U \tag{1}$$

The investment component (I) of equation (1) generates return I to the businessman which is subject to pay *zakat* . Since the rate of *zakat* of this kind is Z_R, it follows that the amount of *zakat* the agent pays is: $Z_R R$. Islamic teaching dictates that any fund that left idled is subject to pay *zakat*. Assume also that every Moslem is shari'ah comply, it follows that from the uninvested component of fund (U) of the same equation, there must be *zakat* paid. Since the rate of *zakat* of this kind is Z_U, the total amount of *zakat* of this kind is as much as $Z_U U$.

It's noteworthy to say that *zakat* cannot be considered a deductible toward net return. This is considering that *zakat* of this kind is levied on return and not on revenue. Moreover, *zakat* paid based on return actually lies beyond the control of businessman. So, it implies that buinessman may not take it into accout when considering whether to do the business or not.

Now, assuming that every businessman is shari'ah comply. As long as the prerequisite condition has been fufilled, according to Islamic law, in no way the economic agent avoid paying *zakat* of any type (Gulaid et al., 1995). It implies that whenever they get profit (return) from the business, they must pay *zakat*. The situation is a bit different from the case of *zakat* of uninvested fund, $Z_U U$. Economic agent can avoid incurring *zakat* of this type as long as they, according to Islamic law, is excluded from doing so. The prerequisite condition for Moslem to be excluded from this order is simply not leaving the fund uninvested (Siddiqi, 2005). If all funds have been invested, the master of the fund is excluded to pay *zakat* of this kind. Therefore, fund holders have a full control on the decision of whether to fulfill the prerequisite for being excluded to pay the *zakat* or not.

Furthermore, financers have another thing to consider, that is, profit share. Profit share, τ, is the target of bargain between the would-be financer and financee. If the profit share, τ, is big enough it has power to attract the financers to finance the project, or vise versa.

Based on this argument one can simply model the net return (NR) as the following expression:

$$NR = \tau R - Z_U U \tag{2}$$

Let Π is profitability of the investent and I is the number of fund invested in the business. The definition of return can be set up as:

$$R = \Pi I \tag{3}$$

Rewrite equation (1) to be:

$$U = T - I \tag{4}$$

Equation (2) can be rewritten by substituting equation (3) and equation (4) into equation (2), to get:

$$NR = \tau\Pi I - Z_U(T - I)$$
$$NR = \tau\Pi I - Z_U T + Z_U I \tag{5}$$

Equation (5) shows that *zakat* on return does not enter the consideration as it comes from equation (3), this is because *zakat* of this type is not under the controll of businessman; while the zakat of uninvested fund does enter the consideration because businessman have full control whether to fulfill the prerequisite, for being excluded to pay *zakat*, or not.

Consider further that equation (5) is considered to be the function toward which businessman are concerned, and therefore, to be the object of maximization. The maximization mechanism is simple, that is, like the usual maximization in calculus area. The condition for maximum is:

$$\frac{dNR}{dI} = 0$$

The expression that fulfills the condition for maximum is therefore:

$$\frac{d}{dI}NR = \frac{d}{dI}(\tau\Pi I - Z_U T + Z_U I)$$

Recall that Z_U does affect I, as it was discussed before. But this is not the case when the relationship is converted. This is because Islamic teaching does not allow the size of *zakat* rate varies in accord with investment. This means that:

$$Z_U \rightarrow I, \text{ but } Z_U \xleftarrow{\times} I$$

This implies that the condition for maximum net return (NR) is:

$$(\tau\Pi + Z_U) = 0$$
$$\tau\Pi = -Z_U$$

To make it simpler, let's assume that profit share is given so the expression of condition is:

$$\pi = -Z_U \tag{6}$$

The above equation is the implied condition for maximum. The left hand side of condition, π, is financers share of profitability. To get the intuitive meaning of the condition expressed above, it needs further explanation as to why the financers' share of profitability is negative since it seems to carry a counterintuitive meaning. While there is nobody wants to accept the negative rate of profitability.

The explanation is simple, however. Moslem agents have two alternatives to choose with each has a corresponding consequence. First, is to invest all their fund which freed them from paying *zakat*; Or, leave some of them unemployed and assume to pay the *zakat*. This is the basic rule for moslem businessman to investing. Let's suppose that a moslem investor is facing zero profitability. According to rational axiom, in no way can anybody willing to invest in that situation. But this is not the case for moslem investor since he/she should, instead, pay the zakat for the uninvested fund, Z_U, if he/she choose not to invest the fund. Rather than to pay the *zakat*, he/she better to accept the zero profitability. Even when the profiability is negative, he/she should keep investing the fund, as far as the magnitude of the profitability, which is negative, does not exceed the size of *zakat* obliged to him/her. It's clear now why the condition for maximum return is negative.

Investment Function

Now, it's the turn to further discuss to find the framework of analysis with which agents do investment. To plan an investment project, investor needs to see the behavior of investment with respect to the change in profitability. Unfortunately, one cannot see through the entire dynamic behavior of the profitability which affects the decision whether to invest or not. The above

condition is manual guidance that helps businessman to do investment. The manual provides important information as to what extent the investment could get the highest return (Pindyck, 1991).

To expand the discussion, we need to see the mechanism in which the businessman uses the condition for maximum return presented above to come up with the investment decision. Let's assume also that the investor is initially facing a situation of sub-optimal return. This situation, according to assumption of rational agent, drives the investor to move toward the optimum state (Schumpeter, 1954). This is done by expanding the number of invested funds in a given investment project. As the investment expanding, the profitability is going down, and so is the return, following the law of diminishing return. This process continues until the magnitude of return exactly matches the *zakat* paid for leaving the fund uninvested. At this stage there is no more incentive for investor to add the number of investments. This is the investor equilibrium condition and is located at point A in the following figure. To see it in detail, let's draw the condition for maximum investment in equation (6) into the following figure.
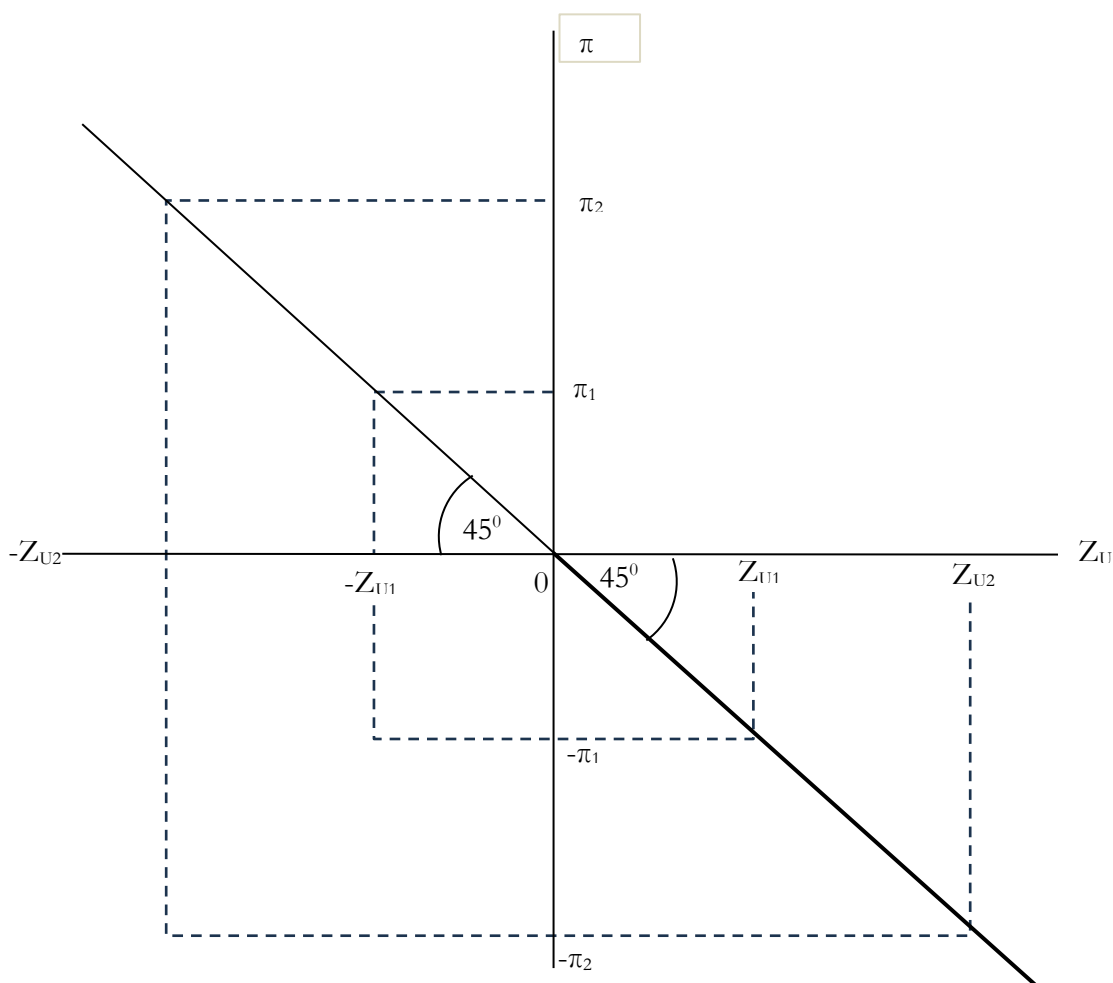
Figure 1

The graphical expression in the above can be converted into an axis system that match with the aim of the analysis at this occasion, that is, by changing the positive vertical axis to, now, represent the number of investment (I) while other things are unchanged. This may be seen in the following graphs.
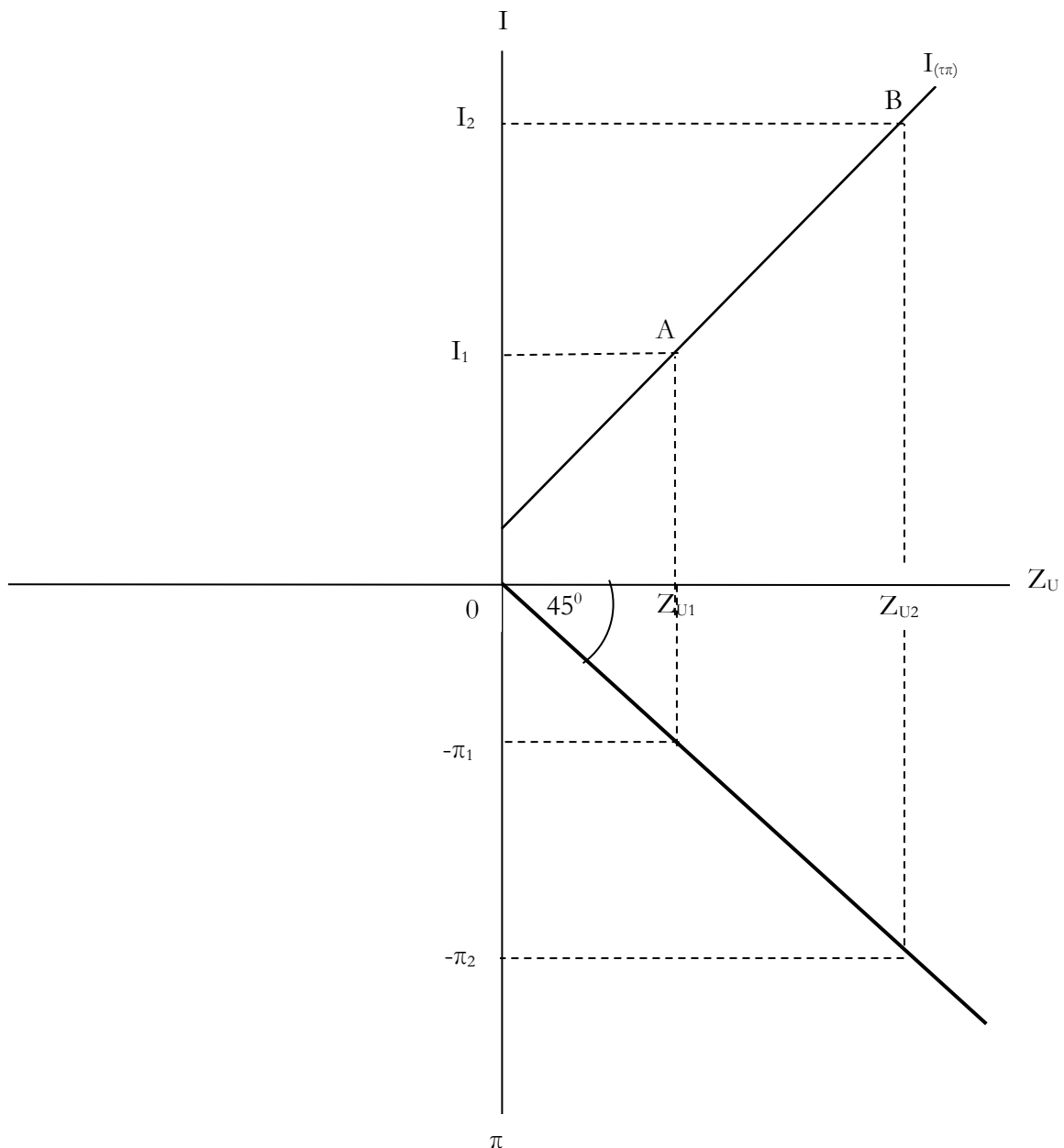
Figure 2

The condition for maximum return is represented by a ray drawn from the point of origin going down-right forming a 45° angle. With this characteristic, one can say that any point in the ray represents the equality between Z_U and $-\Pi$ which is actually the condition for maximum return. At profitability of Π_1, the mirror reflection is negative Π_1 and is therefore the corresponding Z_U that meets the condition of maximum is Z_{U1}. At this rate of *zakat*, the number of investments is I_1. This is the equilibrium situation. After locating $-\Pi_1$ and Z_{U1} in its' respective axis, we can, then, identify the point of maximum which is A. Suppose now that due to an exogenous shock, the profitability changes to Π_2. Doing the same way and mechanism as we did to find point A, finally we will find the new point of maximum which is B. Every time an investor can face one point of maximum, like point A and point B, and is experiencing several points of maximum during the life of their business. If we connect these points, we will end up with the investment curve/investment function.

Alternatively, one may interpret the graph in figure 2 as the relationship between the quantity of investment and the rate of *zakat* of uninvested fund, Z_U, for given profit shae, τ, and profitability, Π. To formalize the relationship and how they work, it's better to present it in the following figures.
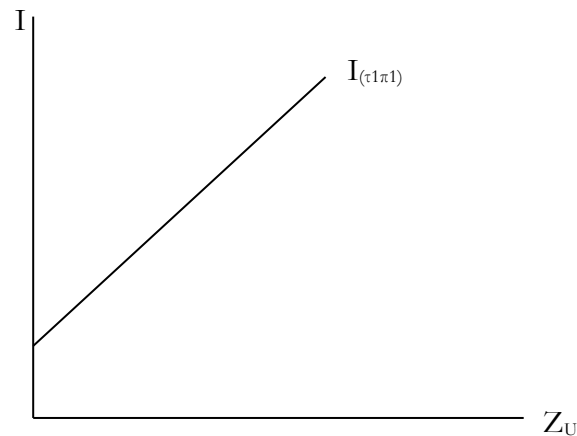
Figure 3

The graph shows a positive relation between investment, I, and *zakah* for uninvested fund, Z_U. To show the effect of profit, Π, and profit share τ, however, the investment curve shoud shift to the right/left to represent a bigger/lower magnitude. This is represented in the following graphs.
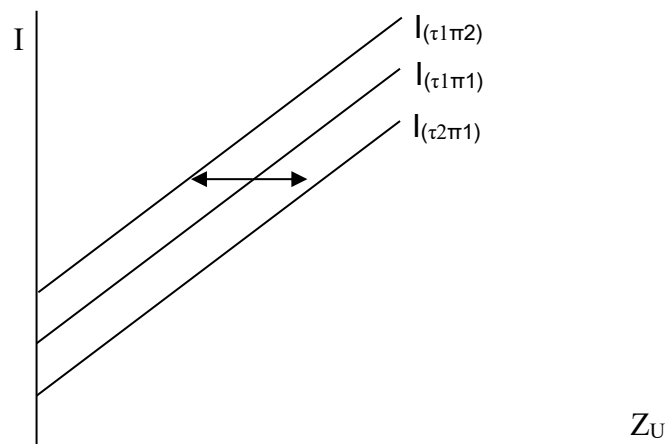

Figure 4

Supply of Financeable Fund

To continue the exploration, let's consider the cooperation arrangement between fund seeker and fund provider. The arrangement brings them, according to Law of Islam (*Shariah*), into mutual understanding, that is, both parties should share the profit fairly (Lewis,1999). *Shariah* does not provide a strict proportion of share that has to go to each party. Hence, the both parties should bargain to reach a deal (Usmani, 2005). Assume that the final bargain reaches an understanding that the share going to fund provider is τ; The remaining, which is (1- τ), belongs to fund seeker. This implies that the portion of return going to fund provider is $\tau\prod$I. This is what has been discussing so far. The corresponding condition for maximum net return and also quantity of investment is expressed in figure 3. While figure 4 shows the change in investment due to the change in the underlying fctors from the initial situation.

Actually, investment function expressed in figure 2 is expressing the number of supplied fund, and therefore, can be considered a supply function. However, the way it states the supply function is not common since it relates the quantity of investment to *zakat* of uninvested fund and not to profit share, τ. The coming section is presenting the process by which a standard supply function is found.

To begin, let's consider any situation where the rate of *zakat*, Z_U is given. At this rate, investment function in figure 4 can be presented in the followingg figure.
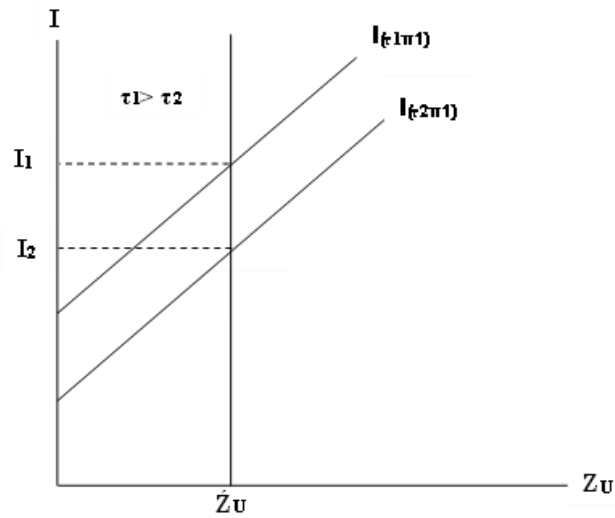
Figure 5

To finalize, the above graph needs to be redrawn by flipping it to the left and rotating clockwisely as in figure 6 in the following.
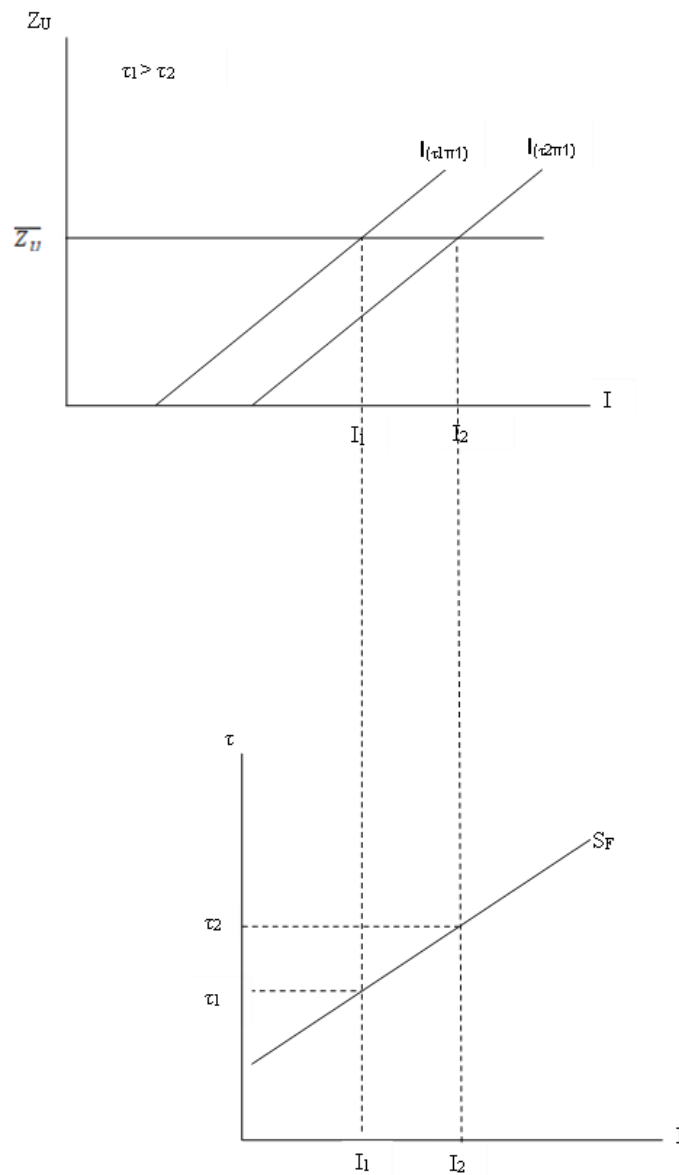

Figure 6 & Figure 7

Demand for Financeable Fund

Demand for financeable fund is derived from the activity of fund seekers. The most popular investment in Islamic tradition is *Mudharabah*. This is an investment arrangement where the investor called *Mudharib* share his labor and entrepreneurial skill to manage the firm while the owner share the fund. In this arrangement, financee bears the opportunity cost because he/she is not paid for his/her work. The only compensation he/she gets is the shared profit generated by the project. Both parties expect profit and also assume risk of loss. Both profit and risk of loss will be shared. If the project generates profit, they will share it according to the previously agreed proportion. In the case of loss, however, the financer bears all the financial loss while the financee suffers from having their sacrification, his/her work devoted to the project, uncompensated. Financee (*mudharib*) is assumed to be rational, implying that he/she is concerned on the earnings that will be acquired. The symbolic expression of this is:

$$I_t = f[E_{t+1}(NY)] \tag{7}$$

where I is the amount of investment that needs financing. While the term in the right-hand side, $E_{t+1}(NY)$, is expected net yield which is:

$$NY = (1 - \tau)R - P \tag{8}$$

Where τ and R have the same definition as that they did before. While P is opportunity cost the financee is facing.

Substituting equation (8) into equation (7) to get:

$$I_t = f\{E_{t+1}[(1 - \tau)R - P]\}$$
$$I_t = f\{(1 - \tau)E_{t+1}(R) - E_{t+1}(P)\} \tag{9}$$

To get macro perspective, one needs to aggregate the behavior of agents. Agents need to predict the magnitude of R in the period to come by using a proxy. The best available proxy for them in this field is society's spending (C) that is determined by their income (Q). So, the symbolic representation of this is

$$E_{t+1}(R) = f[E_{t+1}(C)], E_{t+1}(C) = f(Q_t) \tag{10}$$

Combining the terms in equation (10) and those in equation (9) and simplify them to get:

$$I_t = f\{\tau, Q_t, P\} \tag{11}$$

The following derivatives hold for the expression in equation (11)

$$\frac{dI_t}{dQ_t} > 0, \frac{dI_t}{dP} < 0 \tag{12}$$

$$\frac{dI_t}{d\tau} < 0 \tag{13}$$

The geometric expression of the derivative in (13) can be seen in the Figure 8.

Figure 8 carries information about the relationship between profit share (τ) and the quantity of investment. The expression brings an intuitive interpretation as to what extent does the fund seeker should add up his/her investment. When the profit share going to fund provider (τ) is big, there is a disincentive in the fund seeker's side to do business. This is because of natural aspect of economic agent that like to get bigger money than smaller one (more is preffered to less).

Now, we need to go further to put the issue of investment in the context of financing. Investment does need money, without which it will be called just a proposal of investment project. Therefore, upon deciding to invest, the investor tries to get fund to finance the investment project. The fund comes from people who have excess money that want to find the project that needs financing. The interaction between two parties forms a market for financeable fund. Viewing from this perspective, we can see that demand for investment is nothing but the demand for financing. Therefore, one can consider the graph in the Figure 8 a curve of demand for (financeable) fund.
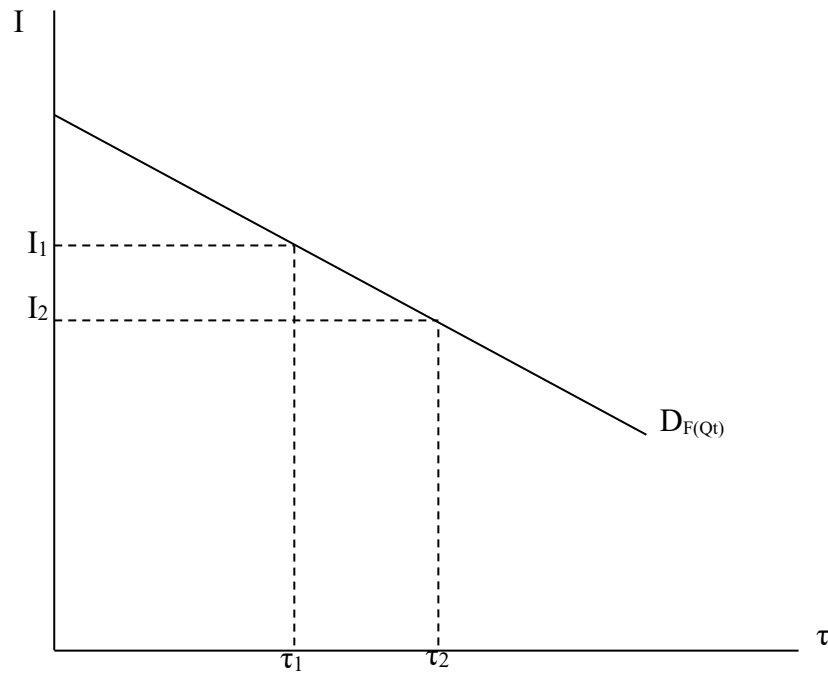
Figure 8

Derivation of Equilibrium in Financing Market

Having built the supply of and the demand for financeable fund, we need to combine them altogether to see the equilibrium of the market. To see this, let's put them in one set of axes like in the following figure.

Equilibrium of financing market

To locate the equiibrium point, one needs to put the supply and demand curve altogether. To ovoid confusion, the supply curve as it is shown in figure 7 needs to be flipped arround: profit share, τ, that is used to be in vertical axis now needs to be placed in horizontal one. The full representation obout this is expressed in the following figure.
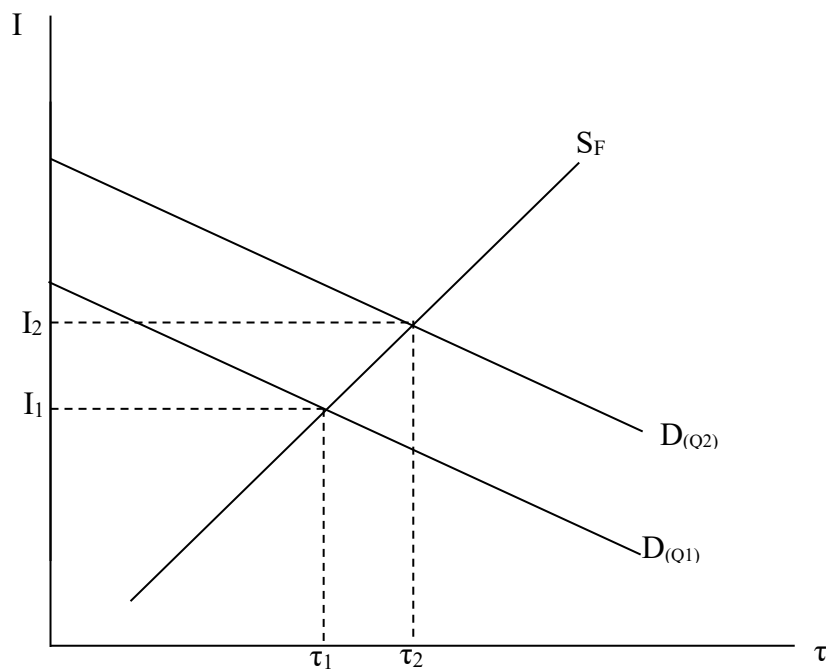
Figure 9

　　　　Let the initial situation has the supply of and the demand for financeable fund of, respectively, S_F and $D_{F(Q1)}$. At this situation the equilibrium is achieved with the level of profit share and investment being τ_1 and I_1, correspondingly. At this level of demand, the amount of income is Q_1. Now, suppose there is an exogenous shock resulting income to increase to Q_2. With this change, financee expects that the people spending will soon increase that will drive the purchase to rise in the near future. This, further drives financee's expectation of escalating return in the future. Facing this situation, financee does not want him/herself to loss the chance to make money, and therefore, he/she thinks that this is the time to add up investment. With the new plan of investment he/she should get the source of fund to finance his/her investment. Therefore, the demand for financeable fund increases to $D_{(Q2)}$ as shown in the above figure. The final result is the establishment of new market equilibrium with profit share and investment of, respectively, τ_2 and I_2.

　　　　We can summarize this entire process by saying that when income, Q, increases the profit share, τ, indirectly follows. The geometric expression of this process can be shortly shown in the following figure.
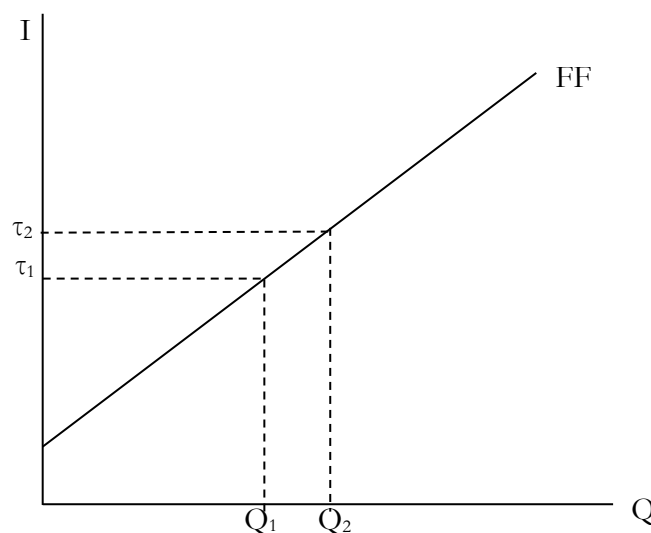

Figure 10

Comparative Change of The Market

Upon getting the curve showing the locus of equilibrium of financing market, FF curve, one needs to know how it operates especially as to how it responds to the determinant variables. To see this, the following figure shows how it works.
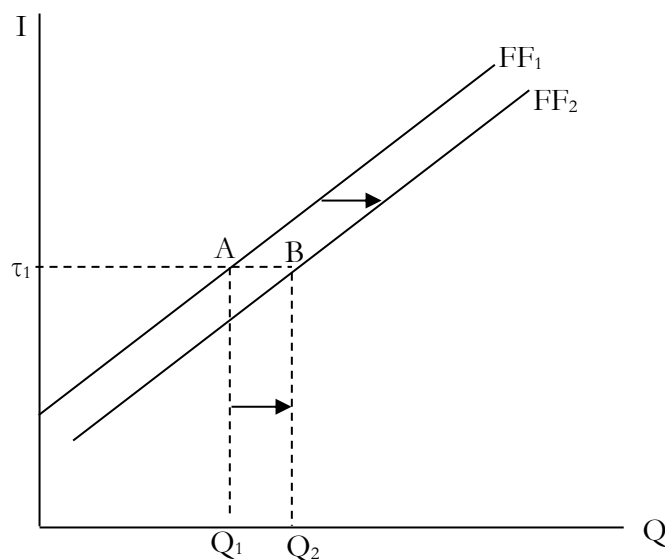

Figure 11

Suppose that the initial situation of equilibrium in this market is at point A with the rate profit share is τ_1 and income is τ_2. Assume that there is an exogenous shock that makes the profitability increases which drives fund seekers' to expand their business. As a result, the fund seekers continue to get more fund to finance the project. On the other hand, the fund providers are happy with the new situation cause they are facing a chance to make bigger money. Since they share the same goal, the financers supply the additional fund needed to finance the new/additional project. This makes the equilibrium in the market changes with higher quantity of channelled fund and keeping the rate of profit share constant. This is represented by the shift of FF curve to the right, from FF_1 to FF_2 showing higher income (income moves from Q_1 to Q_2) at the same rate of profit share, τ_1.

The same effect will also happens when there is an increase in any other variable determining it. Moreover, the reverse result will be in effect as a consequence of the change in determining variable having negative impact.

Commodity Market

The aim of the discussion for this market is to determine equilibrium of it. To do this, we need to see a condition by which producer is guided to get maximum *maslahah*. There are two alternatives to choose, i.e.: production and investmen approach.

Production approach

In this procedure, the equilibrium is approached from mechanical procedure by which producer could get maximum *maslahah*. To start with, recall that Misanam *et.al* (2008) has found the condition, that is:

$$BPdQ = dTC + dTB \tag{14}$$

Suppose now there is an increase, *ceteris paribus*, in investment. Assuming that the investment has a standard *barakah* content implying that there is also an increase in *barakah* with a given amount. Accordingly, one may rewrite equation (14) to be:

$$^BPdQ = dTC + \overline{dTB} \tag{15}$$

The bar sign indicates that the change is given. With this new formulation, one may think that the change in the *barakah* must be there, and hence, there is no reason to ask it's existence. For this reason for the time being equation (15) falls into the following expression.

$$^BPdQ = dTC \tag{16}$$

Now recall that investment can be considered an expenditure. In macro perspective, however, any expenditure is cost to produce output (composite good). In this perspective, the increase in investment implies that the right-hand side of equation (16), which is the change in total cost, increases also which makes the producer departs from the optimum condition which results in the sub optimal condition. The producer does not like this situation. He/she tries to put back their business into the optimal situation by fulfilling the optimum condition. This can be carried out by increasing the term in the left-hand side. Assuming that the economy does not yet reach full employment, this implies that the change in the number of productions, dQ, would be positive; Even though this will also heighten the price (^BP). The increase in production is nothing, but the increase in supply of goods. The increase in the supply is indicated by the shift of supply curve to the right in the Figure 12.

Having represented the change in investment-induced supply of goods in figure 12, one may construct a new curve that's representing a relationship between investment, and equilibrium position, as in the Figure 13.
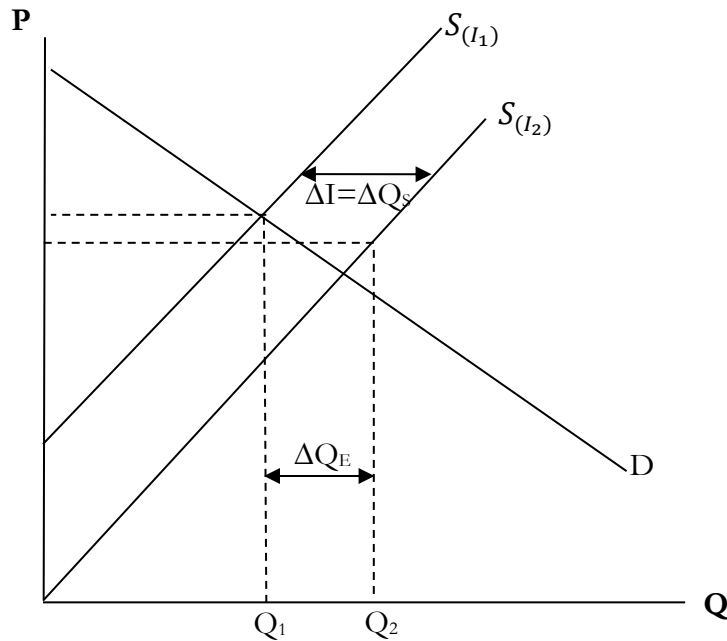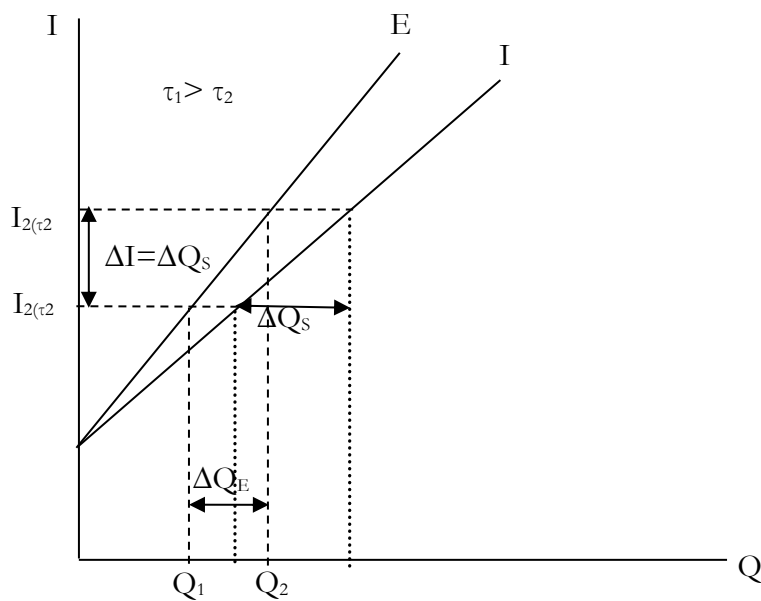
Figure 12

Figure 13

The graph presented in Figure 13 shows, in a more specific way, the situation shown in figure 12. In figure 13, there are two graphs showing the change in investment (I) and the change in equilibrium (E).

Let's interpret the I and E curve in figure 13. Any change in investment will alter the supply of goods in the market. Its noteworthy to know that the magnitude of the change in supply is not the same as the size of the change in equilibrium. Suppose that the size of the change in investmentt is ΔI which is transformed linearly to supply of output that is shown in the vertical axis of figure 13. Of course, this further results in the increase in supply as much as ΔQ_S, which is shown by the slope of I curve. However, the magnitude of the change in equilibrium, as a result of change in investment, is not that much. This is because equilibrium is not only resulted by the change in supply but also by the chage in demand. This change in equilibrium is shown by E curve. In this curve, the change in investment with the size of ΔI results in a change of equilibrium quantity with the size of ΔQ_E, or it is represented by the gradient of E curve.

Deriving producers' rule

Let's further explore this issue to find a locus of equilibrium in this market. To begin, we need to see this from the inner side of the commodity market which is producer. Specifically we need to see the behavior of producer when dealing with the lack of fund to facilitate the production. When dealing with the lack of fund to run the business, the producer will find it in financing market. We're not going to discuss yet the financing market, but to discuss the mental model that generates the rule by which producer behaves in this situation.

We need to discuss this issue deeper by digging the condition over which the investment decision is made. First of all, we should think as the investor (*mudharib*) who always concerns on the magnitude of the share of yield he gets. In this perspective, we can see that the higher the share to them, the bigger the incentive for the investor (*mudharib*) to do business. This can be expressed as:

$$I = f(NY) \tag{17}$$

where NY is net yield.

Suppose that the share he has to give up to fund provider (*shohibul Maal*) is τ. This implies that the share he gets is (1-τ). According to this definition, we can set up the net yield as:

$$NY = (1 - \tau)\Pi I - P \tag{18}$$

Π is profitability of the investment and P is the opportunity cost of running business.
Inserting equation (18) into equation (17) to get:

$$I = f(NY) = f[(1 - \tau)\Pi I - P] \tag{19}$$
$$\frac{\partial I}{\partial \tau} < 0 \tag{20}$$

Deriving the locus of equilibrium of commodity market

To derive the locus of equilibrium, we need to convert E curve in figure 13, which is showing the chnge in equilibrium, into another curve that shows the relationship between profit share, τ, and the change in equilibrium. To do this, put the condition derived in equation (20) altogether with the result implied by equation (15), and alter the graph into the following, figure 14.
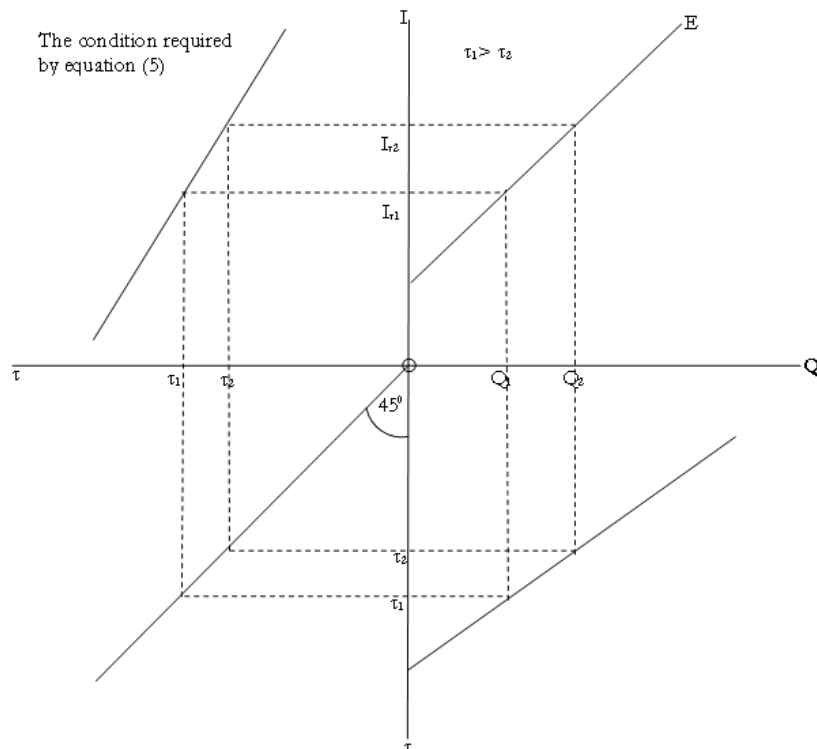

Figure 14

The upper right panel in figure 14 is definitely graph in figure 13. The graph in Quadrant II, which is lower right, shows the relationship between profit share (τ) and the change in the equilibrium of commodity market. To formalize it, the graph is taken off and replotted in the following, figure 15.

The IP curve, in this Figure , is a curve that is showing the relationship between equilibrium in commodity market and the correspondig profit share, τ. It also represents the locus of equilibrium in commodity market with various size of profit share, τ.

Investment approach

The afforementioned approach traces the equilibrium in commodity market through the producers' activity in making goods.
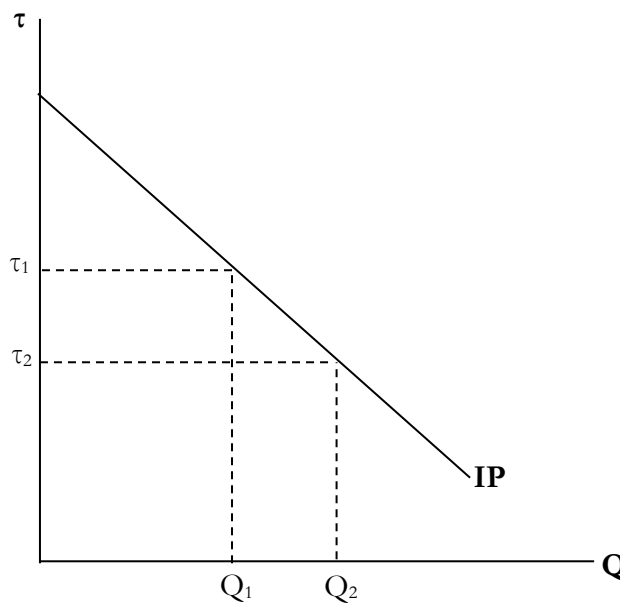

Figure 15

While the investment approach is tracing through the behavior of fund providers that need to invest their fund in the business sector. Their activity, of course, meets the wish of fund seekers that are trying to get financing for their project. As a result production sector will be affected by the decision of both parties in financing market. Given the behavior of fund provider, producers, then, determine how much of goods will they produce. Their behavior will determine the equilibrium in commodity market. Consequently, this approach dictates the use of investment function that has been found in the financing market.

Let's approach the commodity market through Keyness identity. Assuming we're in a closed economy, the identity can be written as the following.

$Y = C + I + G$

It is clear that there are three component driving the output of the economy, i.e.: consumption, investment and government sector. For convenience, in order to match with the previously used symbol, the symbol for output/income Y from now on will be replaced with Q, in lower panel of Figure 16.

According to Islamic teaching, however, production-driven economic growth is more permissible than consumption one. This is because driving consumption may trigger to an overly consumption that may end up with unecessary spending which is close to *israf* (excessive) and is forbidden. Accordingly, investment which gives way to production is the concerned of the economy. This means that investment acts as foreperformer in Islamic economic. Consequently, the concern is now focused on investment to develop the discussion in commodity market. To construct the equilibrium, let's bring the investment curve in Figure 5 into the following, Figure 16.
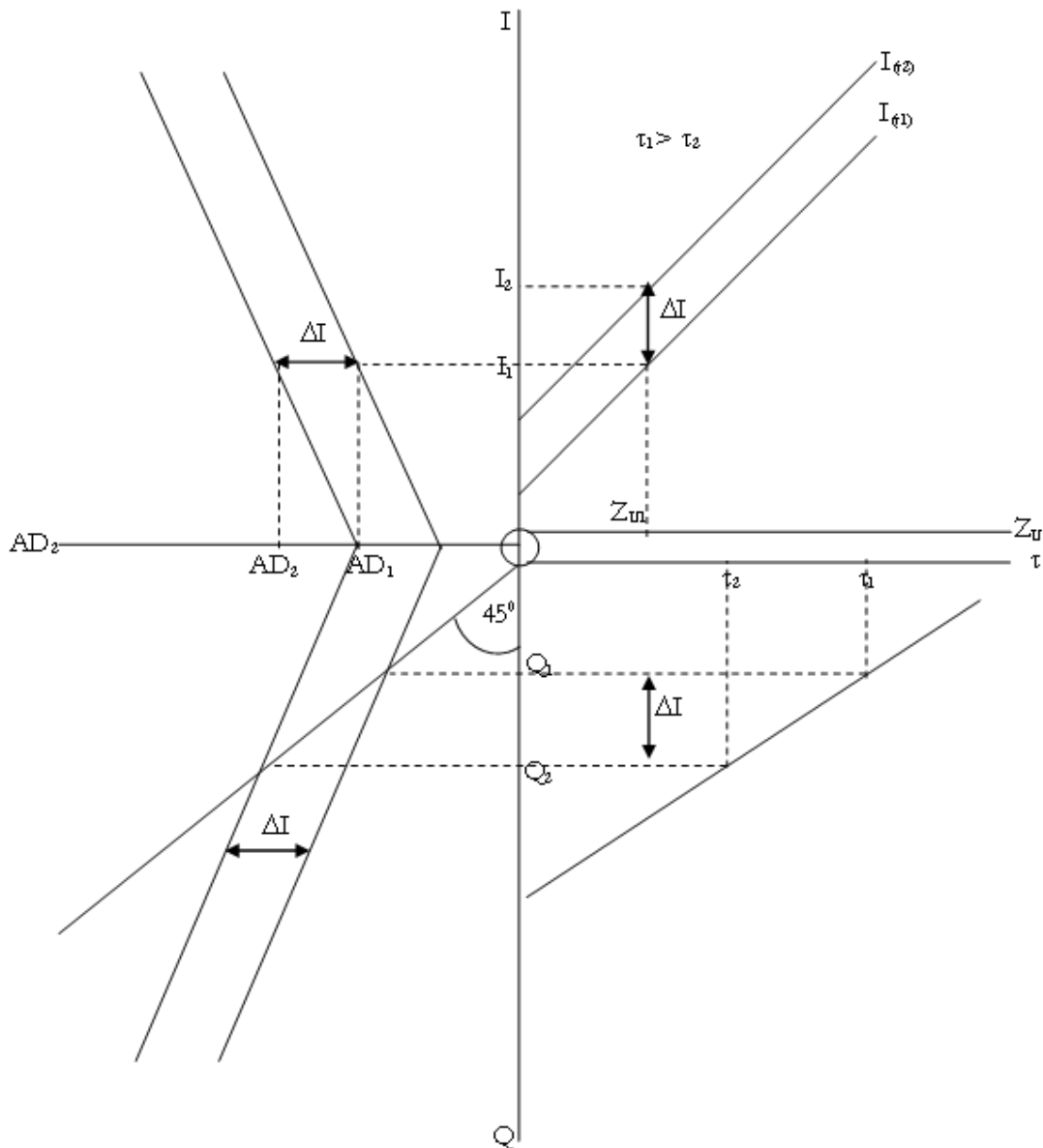
Figure 16

The consequence of the identity where investment is a part of output, one may see from the left panel that any change in investment will be transformed into aggregate demand (upper left) and also output (lower left).

To develop further, we need to show how a change in profit share (τ) may have an effect on investment and output. First, one could refer to right panel of Figure 7. Given the size of Z_U, and any other else, when there is a drop in profit share from τ_1 to τ_2 the size of invested fund increases. This is because the businessmen feel that the share going to them is bigger (since the share that they have to give up decreases). This results in an increase in business volume, and hence, output. The lower left panel of Figure 16 represents the change in equilibrium output due to this reason where output in this figure changes from Q_1 to Q_2 with the size of the change is exactly the same as that of investment, ΔI.

To see this in a simpler manner, one needs to make a curve that directly relates profit share (τ) and output (Q). This can be seen from lower right panel of figure. To formalize it, we need to take it off and put it separately from Figure 16. Since output in horizontal axis is from equilibrium locus, the relationship that is represented by the following figure is the locus of equilibrium of commodity market. To be specific, one may interpret the figure as to how the change in profit share, τ, affects the equilibrium in commodity market.
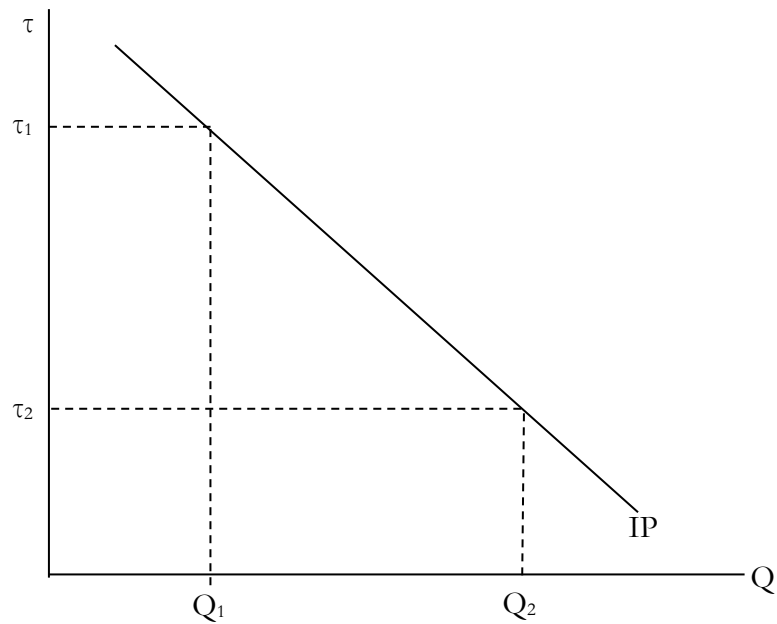
Figure 17

Comparative change of the market

After the curve showing the locus of equilibrium of commodity market, IP curve, has been established one needs to know how it operates especially as to how it responds to the determinant variables. To see this, the Figure 18 show how it works.

Suppose, after the equilibrium is reached there is an exogenous shock in the field of production, i.e.: technical change-induced efficiency. This results, ceteris paribus, in an increase in profit which drives output to increase. This change is represented by a shift in IP curve to the right
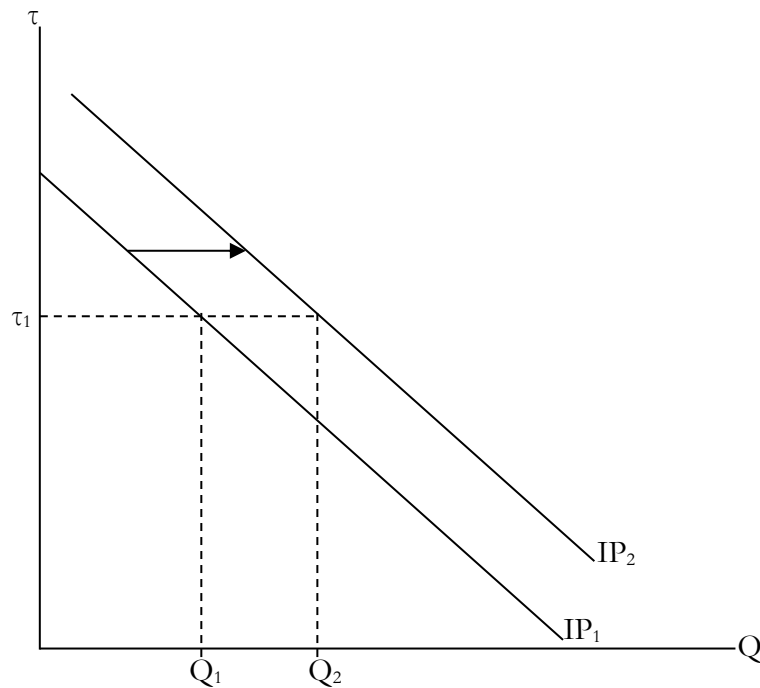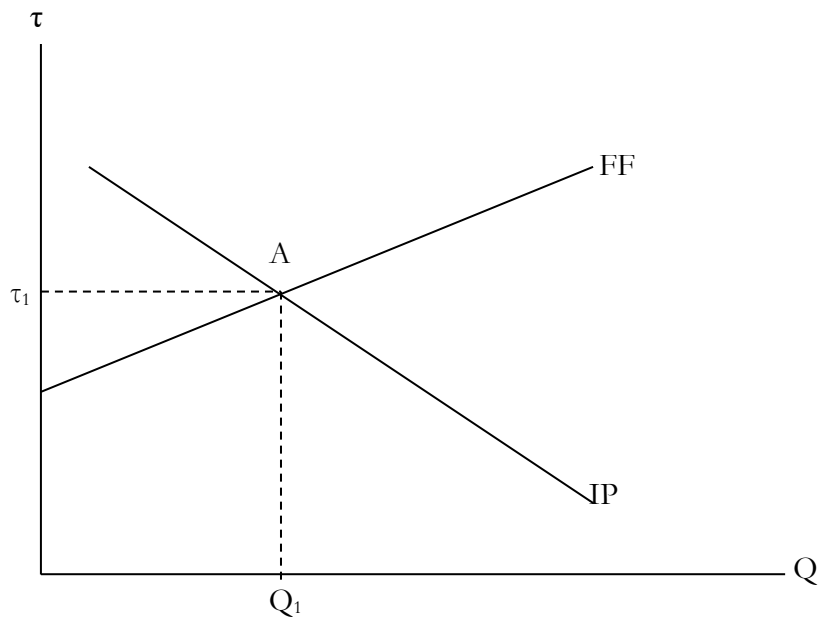

Figure 18

General Equilibrium of Commodity and Financing Market

So far, we have been discussing each market separately. Now, having established the equilibrium in each market, we actually have found a device for analyzing the issues as to how the financing

and commodity market are related. Furthermore, with this tool one can predict what is going to happen if there is a change in one of the variables in either market and take a necessary policy to deal with the situation. The full representation can be seen in the following figure.

Figure 19

Point A shows the general equilibrium of commodity and financing market with the number of output and rate of profit share are, Q_1 and τ_1, respectively.

Now, we need to demonstrate how the device works. The following figure represents this.
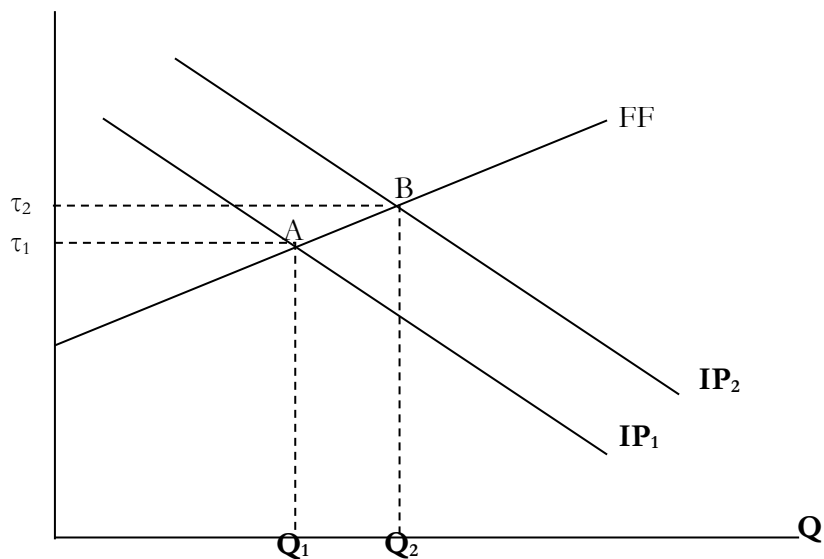
Figure 20

Let's point A is the initial situation of equilibrium in the economy. Assume that, due to external sources, the demand for goods increases that makes aggregate demand, and hence profitability, to elevate. This results in a stronger desire to invest, and hence, a higher level of investment. The increase in investment is represented by the shift of IP curve, from IP_1 to IP_2. The equilibrium in the economy settles at point B with the profit share's rate of τ_2. The increase in profit share to τ_2 is unavoidable since this is needed to attract fund holder to provide more financeable fund from which investor can use for boosting up investment. The increase of profit share, on the other hand, partly offsets the desire to invest so as to make the actual investment is lower than it was desired.

Further, we need to demonstrate the movement from financing market side. The following figure provides a full description about it. Let's point K represents the initial state. If there is a lower propensity to consume, in a given amount of income, the supply of fund available for finance increases. The FF curve shift from FF_1 to FF_2. This makes the profit rate share decreases from τ_1 to τ_2. The decrease in the rate of profit share attracts businessman to expand the business and finally create more output. On the other hand, the decrease in the rate of profit share, assuming that the rate is still higher than that of zakat, partly offsets the intensity of supply of fund.
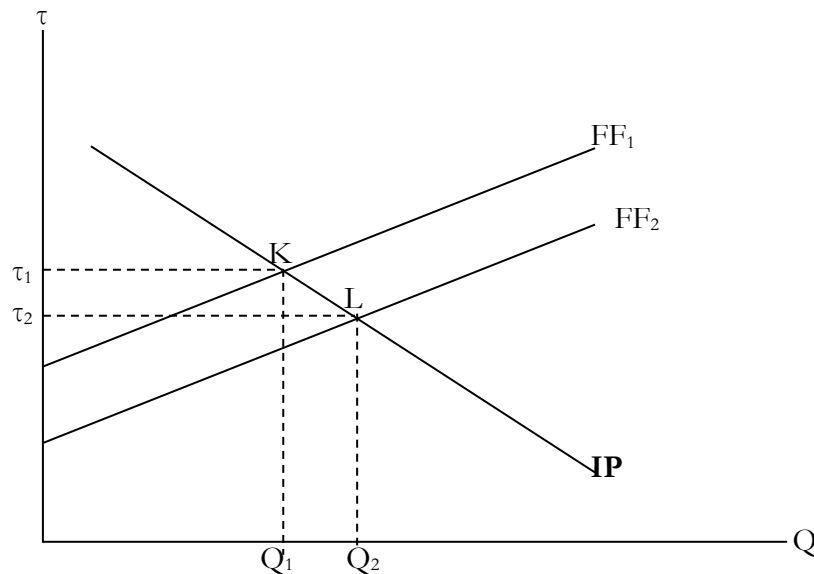

Figure 21

Conclusion

The results This model can well represent the operation of an Islamic economy. This model makes use of basic intuition of Islamic teaching such as the role of zakat of uninvested fund. In this arrangement zakat of uninvested fund plays a central role as something like "penalty" for not investing the fund. This model is also traced from the intuition of supplier of fund through investment function. The underlying operation begins from the interest of fund owner whether to outflux their fund or not, subject to a given profitability, profit share and zakat of uninvested fund. This investment function is representing the behavior of fund provider in channeling the fund in condition of a given zakat of uninvested fund, profit share and profit. From this investment function the supply curve for financeable fund may be built.

While from the side of fund seeker (demander), the demand is built through hooked relationship between expected vale of Net Yield to finance, return, investment, income and opportunity cost. From the structural equation that relates all the aforementioned variables the demand function can be generated. It is found that the final equation carries the intuitive relationship that has, so far, been understood upon which the derivative of on variable with respect to the other may be set. Based on these derivatives, the relationship between a variable and the other and investment demand curve may be determined.

To get the equilibrium in financing market is simply to combine the supply of and the demand for financeable fund. In the form of model, this is just to put the supply and demand curve of financeable fund altogether in a system of axis under which the location of equilibrium may be represented. Several equilibriums may appear with respect to the change in profit share, and hence, a graphic representing the locus of these equilibrium may be determined. In this writing, it's called FF curve.

In commodities market, this writing traces the relationship through the very micro intuition that is from producers' rules in where producers always need to get the best result for their business, not only from physical consideration, profit, but also from transcendent view, *barakah*. In a deeper sense it is represented by the net yield (NY) to the producers. From the mathematically done, it

found the relationship of profit share (τ) and investment (I) or income (Q). This article also shows that in this part, the relationship is also approached from other angle, that is, macro side by making use of investment characteristic. In this respect, the writing utilizes Keynesian principles combined with micro foundation to set up the relationship between profit share (τ) and investment (I) or income (Q).

Regardless of the approach used, any of them produces the same locus of equilibrium of commodities market, anyway. So, no need to discuss further. This commodities-market equilibrium altogether with the financing-market equilibrium determines the position of general equilibrium of the economy. The following graphics show all the items found in the writings and show how this model can be used for representing the operation of the entire economy, exactly like IS-LM model in Western Economic.
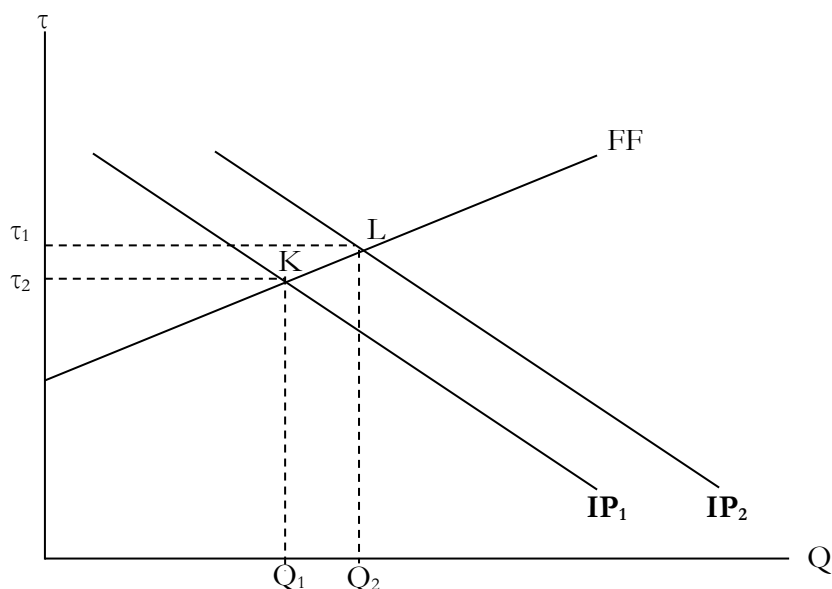

Figure 22

The above representation shows the case where there is an expansion in commodities market, this drives the equilibrium locus of commodities market out to the right and resulting in a higher income, on one hand, and higher profit share, on the other hand. The higher profit share is due to the absence of any of variables working in financing market making the FF curve unchanged. The situation is different when there are changes in any variables working in both markets like it is presented below where there is a simultaneous expansion in both markets with smaller size happens in commodities market. This results in a higher both profit share and output.
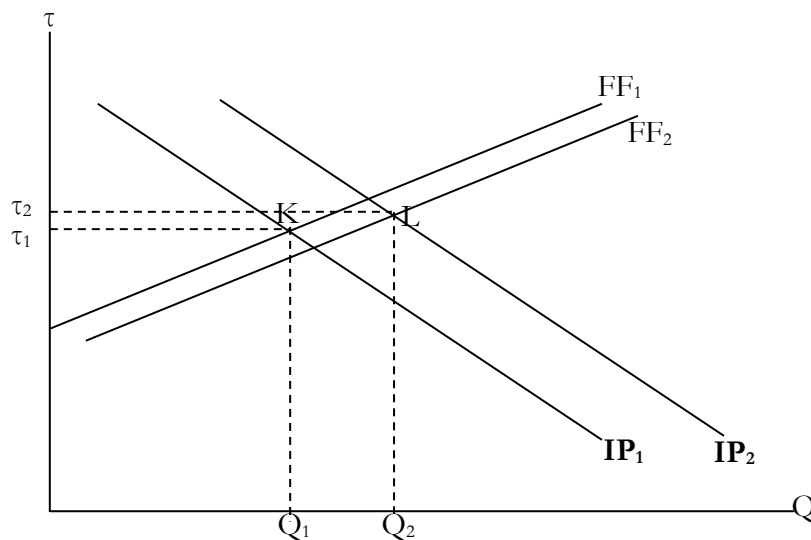

Figure 23

This representation is actually what one has been seeing in Western economic analyzed trough IS-LM model with τ is substituting for interest. While variable Z_U, zakat of uninvested fund, and maslahah to producers are the variables that does not have counterpart in Western economic and is playing an important role in Islamic economic. At this final point one may see that the writing is saying that it positions the Z_U as instrument in Islamic economic, and hence, in the model.

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