

# Potential of Cash *Waqf* for Poverty Alleviation in Malaysia: A System Dynamics Approach

*(Potensi Wakaf Tunai bagi Pembasmian Kemiskinan di Malaysia: Pendekatan Sistem Dinamik)*

**Shahida Shahimi**

Faculty of Economics and Management  
Universiti Kebangsaan Malaysia

**Mohd Umar Mohd Marzuki**

RAM Rating Services Berhad

**Zaini Embong**

Faculty of Economics and Management  
Universiti Kebangsaan Malaysia

## ABSTRACT

Poverty alleviation has always been one of the top agendas in any country, including Malaysia. This is evidenced from the spending of the government for the purpose of uplifting the income of the poor. The objective of this paper is therefore to explore alternative tool in eradicating poverty, specifically in Malaysia, by exploring the role of cash waqf. This paper examines the potential impact of cash waqf on the Malaysian economy. Cash waqf is specifically analysed in this paper as an alternative instrument that can improve the overall social welfare system and reduce poverty rate; and at the same time, lessen the burden of the government. To analyse the potential of cash waqf model in a dynamic system, this study employs system dynamics methodology. The feedback nature of the whole system is modelled and outputs in the form of figures are derived from simulations. With two different cases (i.e. set of assumptions) under study, the model simulations show that cash waqf is significant in alleviating poverty by up to 50 per cent for both cases. Apart from that, government spending can also be significantly reduced. Total savings can go over RM13 billion or an average of RM433 million a year over 30 years. Given the findings, the government can take into account the potential of implementing cash waqf in Malaysia.

*Keywords:* Cash waqf; microfinance; poverty alleviation; system dynamics

## ABSTRAK

Pembasmian kemiskinan telah sentiasa menjadi salah satu agenda penting di mana-mana negara, termasuk Malaysia. Ini terbukti berdasarkan perbelanjaan kerajaan bertujuan meningkatkan pendapatan golongan miskin. Kajian ini akan meneroka potensi wakaf tunai sebagai instrumen alternatif yang dapat meningkatkan kebajikan sosial dan mengurangkan kadar kemiskinan, serta pada masa yang sama mengurangkan beban kerajaan. Objektif kajian ini ialah untuk meneroka wakaf tunai sebagai alat alternatif bagi membasmi kemiskinan, khususnya di Malaysia. Kajian ini mengkaji potensi wakaf tunai berdasarkan kesannya terhadap pembolehubah ekonomi dalam sistem yang dinamik. Bagi tujuan ini, kajian ini menggunakan kaedah sistem dinamik. Sifat maklum balas daripada keseluruhan sistem akan dimodelkan dan output dalam bentuk angka diperolehi berdasarkan kaedah simulasi. Dapatan kajian menunjukkan bahawa wakaf tunai mampu membasmi kemiskinan sehingga 50 peratus. Selain itu, kerajaan mampu menjimatkan perbelanjaan sehingga melebihi RM13 bilion atau purata RM433 juta setahun dalam tempoh 30 tahun. Justeru, kerajaan boleh mempertimbangkan pelaksanaan wakaf tunai di Malaysia sebagai alat pembasmian kemiskinan.

*Kata kunci:* Pembasmian kemiskinan; pembiayaan mikro; sistem dinamik; wakaf tunai

## INTRODUCTION

Poverty is an issue widely debated and it is an apparent problem in both developed and developing countries, let alone the underdeveloped. The Government of Malaysia over 55 years of independence has contributed a lot of efforts and measures in alleviating poverty; however,

the poverty rate seems to be stagnant across time. Most governments in the world nowadays are facing the crisis of insufficient fund to fully address the public welfare. Given the growing amount of public debt, there have been questions raised against the increasing commitment in terms of budget allocation by the government to eradicate poverty.

The objective of this paper, therefore, is to explore alternative tool in eradicating poverty, specifically in Malaysia, by exploring the role of cash *waqf*. This paper examines the potential impact of cash *waqf* on the Malaysian economy. Cash *waqf* is specifically analysed as an alternative instrument that can overall improve the social welfare and reduce the poverty rate and at the same time, lessen the burden of the government against another available alternative, namely microfinance institution. The study brings forward the potential that the model has, in terms of how much poverty can be reduced and the amount of money can be saved by the government.

The paper proceeds with reviews of some existing literatures on cash *waqf* and poverty alleviation. *Waqf* or cash *waqf* specifically will not be discussed thoroughly through the Islamic jurisprudence and legal perspectives due to the nature of this paper. However, some basics on *waqf* from economic view, i.e. poverty alleviation will be presented as background information. The legal issue of *waqf* in Malaysia has to be avoided in order to make room for the discussion on economic aspect. Next, the methodology used in the undertaking of the study is presented. As system dynamics methodology in economic analysis is relatively new, the audience will be taken through the background of it. Some of the research limitations when using system dynamics methodology are also discussed. The findings are not impaired by these limitations because all the assumptions are made based on other realistic proxies. Structure of the proposed cash *waqf* model is discussed thoroughly together with the details of the model/program implementation. Findings of the study are then discussed, followed by policy implication and conclusion.

## LITERATURE REVIEW

### CONCEPT OF *WAQF*

*Waqf* is one of the charitable practices on voluntary basis in Islam since the era of Prophet Muhammad SAW. *Waqf* is an Arabic word, literally means detention, confinement and prohibition or causing a thing to stop or stand still (Hassan (1984) as cited in H. S. Nahar & H. Yaacob 2011). The legal meaning of *waqf* according to Imam Abu Hanifah is the detention of specific thing in the ownership of *waqi* (owner of property who puts his/ her property as *waqf*) and the devoting of its profit or products "in charity of the poor or other good objects". According to Imam Abu Yusuf and Imam Muhammad, *waqf* signifies the extinction of the *waqf*'s ownership in the thing dedicated and detention of all the thing in the implied ownership of God, in such a manner that its profits may revert to or be applied "for the benefit of Mankind".

M. T. Sabit (2011) stated that *waqf* in Islam is both charity and enterprise thus could be a self-sufficient NGO

or organisation. *Waqf* refers to Islamic public charity or trust for socio-economic causes, whereby the object or property is perpetually non-transferrable; an object, under this type of charity, is donated so that the beneficiaries can enjoy it, or the trustee of the charity is required to give the income of it to them. A donor may give any type of property but preferably if it is immovable. Properties the income of which is distributable on the beneficiaries is the dynamic form of *waqf* which make these charities enterprises that should be treated as any investable property in current business terms and the best use and maximum income of which needs to be stressed.

As the word suggests, *waqf* in Islamic law refers to the holding of certain properties and preserving them for the specified use. Another type of *waqf* in Islamic history was when the Companions, during the reign of Caliph Umar, with the addition of family *waqf*. Under this type of *waqf*, the beneficiaries can only be specified to family members. The property put up as *waqf* can be in the form of land, building or even cash. Kahf (2003) noted that the *waqf* can also be in the form of books, agricultural machinery, livestock and shares. The specified use is normally for the benefits of society at large, especially the underprivileged groups such as the poor. The *waqf* property is to be used for a specific purpose in accordance to the wish of the *waqif*.

*Waqf* is therefore different from other forms of charity in the manner that the use of *waqf* is specified. *Waqf* is essentially a contract between the *waqif* and the administrator of the *waqf*. *Waqf* can then be seen as a more organized charity. The beneficiaries of *waqf* are neither limited to individuals nor specific to certain group of the society such as only the poor. However, since the use of *waqf* is specified, this underprivileged group can be singled out as beneficiaries. Unlike other charities such as donation or *sadaqah*, *waqf* assets (such as estates) cannot be disposed off. Instead, the beneficiaries benefit from the use of these assets. In this sense, *waqf* is a perpetual charity. This perpetual characteristic makes *waqf* a better alternative to other forms of charity (Sadeq 2002).

### HISTORY OF *WAQF*

Although the general idea of *waqf* is as old as humanity, Muslim jurists argue that the first *waqf* ever existed is the sacred building of Ka'abah in Makkah since the Holy Quran mentions that it is the first house of worshipping God set for people. There is no direct injunction of the Holy Quran regarding *waqf*, the real idea on *waqf* took place in Madinah when Prophet Muhammad PBUH asked for someone to buy the well of Bayruha' and designate it as free public utility for drinking water. This brought about a wide range of *awqaf* that serves the welfare of the society.

In a *hadith*, the Prophet PBUH also advised Caliph Umar to assign his land in Khaybar as a *waqf* for the poor and needy, "Ibn Umar reported, Umar-Ibn-Al-Khattab

owned a piece land in Khaybar, so he came to Prophet Muhammad PBUH and asked him for an advice. The Prophet said, "If you like, make the property inalienable, and give the profit from it to charity." It goes without saying that Umar gave it away as alms, that the land itself would not be sold, inherited or donated. He gave it away for the poor, the relatives, the slaves, the jihad, the travelers and the guests. Also, it will not be held against him who administers it if he consumes some of its yield in an appropriate manner or feeds a friend who does not enrich himself by means of it.

#### CASH WAQF

It can be seen that the early form of *waqf* is in property. While most of *waqf* created are real estate, the cash *waqf* dates back to as early as the turn of first century of *Hijrah* (Ahmed 2007). The classical jurists are divided on the validity of cash *waqf*, probably due to the perpetual nature of *waqf* assets, which is not apparent to some in cash. Few in the past and more today find perpetuity in cash, if it is used for loans or investment. The contemporary jurists also justify the validity of the cash *waqf*, because it is in the interest of the *waqf*, its beneficiaries and the society (M. T. Sabit 2011). M. T. Sabit (2011) based on Dunya (2002) and Maiman (2006) listed the significances of cash *waqf* as follows:-

1. many members of the public have cash as compared to immovable property;
2. the best way for a joint-*waqf* (*waqf mushtarak/waqf juma'i*), thus it attracts financing of the development of diverse and big projects;
3. can be invested in diverse economic activities, therefore greater revenue can be expected;
4. can be for any objective, and any social purpose;
5. chances for growth are higher; and
6. easily liquefiable compare to realty.

According to Cizakca (2004), during the Ottoman period cash *waqf* was used as a source of microfinance. Recently, there have been attempts to revive cash *waqf* as a social instrument. Mannan (1998) tried to socialize cash *waqf* in Bangladesh through Social Investment Bank Limited (SIBL). SIBL issues Cash *Waqf* Certificates to collect funds from the rich and distributes gains of the managed funds to the poor (Dian Masyita et al. 2005). Although the study on the implication of such instrument is barely noticeable, there have been several studies that try to analyse the cash *waqf* framework introduced, with the hope to apply it outside Bangladesh.

Most of the studies of the contemporary cash *waqf* refer back to the Cash *Waqf* Certificate introduced by Social Islamic Bank Limited in Bangladesh. Mannan (1998) had summarized the objectives of cash *waqf* certificate concisely as:

1. to equip banks and other *waqf* management intuitions with cash *waqf* certificate;

2. to help collect social savings through cash *waqf* certificate (cash *waqf* certification can be done in the name of other beloved family member to strengthen family integration among rich families);
3. to help transform the collected social savings to social capital, as well as to help develop social capital market;
4. to increase social investment;
5. to encourage the wealthy communities to be responsible in the social development of their environment; and
6. to stimulate integration between social security and social welfare.

All in all, cash *waqf* is capable of creating more economic stimulus, and it can be a welfare fund used to sponsor many educational, social and health projects. Based on the above objectives, several cash *waqf* models have been introduced (at least theoretically) to further integrate the cash *waqf* into the economy and society. Back in the eight century, Imam Zufar made a *fatwa* (opinion) that the corpus of the cash *waqf* should be invested through *mudarabah* and the return be used for the original purpose of the *waqf*. This however did not find application in reality (Cizakca 1998). *Mudarabah* does not find its place in the practical world mainly due to its long-term and risky nature. Lahsasna (2010) suggested that the cash *waqf* fund be invested in debt financing (low risk investments: *murabahah*, *ijarah*, *istisna*, *bay' bithamanajil*) by Small and Medium Industries Development Corporation (SMIDEC) in Malaysia.

Ahmed (2007) proposed a model of cash *waqf* utilization with cash *waqf* institutions as microfinance institutions (MFIs), lending out money to the "un-bankable". Tohirin (2010) also proposed an almost similar model, by matching cash *waqf* institutions with those that need them. In this context, he suggested that funds be channelled to Small and Medium Enterprise (SME), that is, for those with prospective business ventures but no capital through the profit and loss sharing mechanism. The proceeds of this partnership could later to be utilized towards the benefits of the beneficiaries.

M.T. Sabit (2011) proposed the establishment of a *waqf* bank as potential tool for the poor and underprivileged-unattended to by current banking system, through the allocation and concentration of adequate liquid funds to this third sector economy, i.e. microfinance. Dian Masyita et al. (2005) however had a different idea. According to them, given the economies of scale, *waqf* institutions should be centralized in order for the funds to be able to generate maximum return and be distributed with utmost effectiveness.

#### STUDIES ON WAQF

Studies on *waqf* are considered new if compared to the studies on *zakat* although both are charity giving

mechanism in Islam. The recent interest in *waqf* studies can be due to surveys on *waqf* estates that being conducted throughout Muslim countries. The first land survey in Egypt conducted during Muhammad Ali's rule indicated that 600,000 acres of land were *awqaf* out of a total of 2.5 million acres of cultivable land; most of these *waqf* were for mosques and education and a great chunk was for Al-Azhar itself (Ahmed 2007). However, the growth of *waqf* contribution has stagnated in recent time. In this century, population has increased enormously but real property has not augmented accordingly. Therefore, many Muslims do participate in *waqf* endowment because they perceive that *waqf* can only be in the form land (Chowdury et al. 2011).

It can be seen that the traditional endowment of lands or other physical properties has lost its relevance in the modern days. The *waqf* of property may benefits more people as opposed to if it stayed in the hand of private owner. Properties are however, owned by a rich few and not all properties can be put up as *waqf*. In Islam, everyone is encouraged to give charity, even the smallest amount. The easiest way to contribute is by giving cash, often in the form of *sadaqah*. In this manner, every single person can contribute to those less fortunate.

As highlighted by Griffiths and Tan (2007), cash and other direct donations are not sustainable form of aid. For example, Afghanistan received more than US\$2 billion in 2005 in economic aid (NationMaster.com), but was still in poverty seven years later. What is needed is a concerted and organized charity. The most readily available asset that everyone can spare is cash. This can be put to good use through cash *waqf*. Even individual philanthropist in developed countries realized this and starts giving to a more organized charity organization rather than directly to recipients of the charity (Hassan & Abdul-Latif 2009). The concept of philanthro-capitalism that leads to the establishment of social entrepreneurs is gaining popularity, and by characteristics, is similar to the concept of cash *waqf*. Therefore the aim of this study is to highlight the potentials of cash *waqf* as an alternative to traditional *waqf*.

#### WAQF AND POVERTY ALLEVIATION

Sadeq (2002) went further to contend that *waqf* could be a better mechanism in alleviating poverty compared to *zakah* and *fitrah* which are obligatory charity in Islam. This is because while this obligatory charity takes a redistributive approach, where the benefit could be a one-off effect, *waqf* can be used to enhance capabilities which in return could improve the standard of living of the beneficiaries. Griffiths and Tan (2007) agreed and highlighted that direct aid or charity had failed to eradicate poverty; and suggested to create a sustainable way of alleviating poverty. This can be achieved through *waqf*.

#### POVERTY ALLEVIATION THROUGH MICROFINANCE

Robinson (2001) emphasized that among the economically active poor of the developing world, there is strong demand for small-scale commercial financial services – for both credit and savings. Where available, these and other financial services help low income people improve household and enterprise management, increase productivity, smooth income flows and consumption cost, enlarge and diversify their micro business and increase their income.

Remenyi et al. (2000) found that household income of families with access to credit is significantly higher compared to households without access to credit can be attributed to microfinance. For example, in Indonesia, a 12.9 percent annual average rise in income from borrowers was observed while only 3 percent rise was reported from non-borrowers. Remenyi et al. (2000) again noted that, in Bangladesh, a 29.3 percent annual average rise in income was recorded for borrowers compared to only 22 percent rise for non-borrowers. Sri Lanka recorded a 15.6 and 9 percent increase in income for borrowers and non-borrowers respectively. Finally, in the case of India, 46 percent annual average rise in income was reported among borrowers with only 24 percent reported from non-borrowers.

Similar study by Khandker (2001) reported a positive effect of microfinance in Bangladesh based on the result of household survey in 1991/1992 and the result from the follow up of the same survey in 1998/1999. The study showed that microfinance participants performed better than non-participants for both 1991/1992 and 1998/1999, in terms of per capita income, per capita expenditure and household net worth. Microfinance in Bangladesh, albeit some might argue does not play a significant role in poverty alleviation, still manages to smooth the income fluctuation among the poor in Bangladesh.

#### POVERTY ALLEVIATION THROUGH MICROFINANCE IN MALAYSIA

Numerous studies have been carried out on relationship between microfinance and poverty alleviation in Malaysia especially programmes by Amanah Iktiar Malaysia (AIM), which is the largest Malaysian microfinance institution (MFI). The concept of AIM is to create out of the hardcore poor households, highly motivated individuals who are committed to earn an honest living and eventually move out of the poverty level. The strategies are by giving out to borrower interest free loans to undertake income generating projects such as trading and farming. The loans are to be repaid on a weekly basis. Once the loans fully paid, bigger loans are being offered. This process goes on as the need arises. Rahmah (2001) found that AIM loan has not been very successful in uplifting households out of poverty except for a few cases that are engaging trading activities. However, the level of income as well as expenditure for the experimental group was found to

be higher than those of the control group, implying that standard of living of the former is higher. In contrary, Norhaziah and Mohamed Sharif (2006) provided strong evidence that microfinance is indeed an effective tool for poverty eradication in selected rural areas in Malaysia. Nevertheless, AIM programmes reached only about 4% of the total poor in Malaysia due to lack of staff and promotion done by AIM. Chamhuri and Basri (2001) conducted microfinance capacity assessment on three MFIs and found that the AIM outreach performances of these MFIs were relatively low with scores the highest outreach. However the study showed that many poor women have benefited from the microfinance programs by these MFIs.

Given the significant number of literatures discussed, the role of MFIs in giving out microloans to the people living under the poverty line is crucial in eliminating poverty. However given the limitations that MFIs faced, there is a need for another viable, self-sustaining alternative. Hence, the paper is set to explore the potential alternative instrument in eliminating poverty for Muslims population in Malaysia. Intending to use the microfinance as part of the instrument, this study will bring forward how cash *waqf* can be a perfect alternative instrument or at the very least, a complementary effort in eradicating poverty.

In conclusion, most studies on religious endowments can be attributed to Islamic endowment, a tool that has been around for centuries and can be traced back to the Ottoman Empire era. Most existing studies identify the various aspects of *waqf* and its implementation issues to explore different theoretical dimensions and practice of *waqf*. However, the effect of religious endowments' on the economy, especially regarding poverty alleviation has not been extensively studied, in particular, the potential of cash *waqf* in poverty alleviation in Malaysia. This study is therefore aims at filling in this gap.

## RESEARCH METHOD

### MODELLING METHOD

The model was developed with system dynamics method. System dynamics, originally developed by Forrester at *Massachusetts Institute of Technology* in the late 1950s, is a computer simulation-based methodology for understanding and managing complex feedback systems. System dynamics theory posits that the behaviour of a system is determined by an interconnected web of feedback loops. Feedback loops are of two kinds: reinforcing (also known as 'positive') and balancing (also known as 'negative'). Unrestrained reinforcing loops cause runaway growth or collapse. Balancing loops are goal seeking and tend to resist change in a system. Accumulations, information delays, and non-linear relationships embedded within the feedback

structure give rise to dynamically complex behaviour. These conceptual tools allow explicit representation of mental models of problem causation; convergence of collective understanding can then be fostered through iterative cycles of model testing and revision (Sterman 2000).

This study employed system dynamics approach as it attempts to incorporate the dynamic feedback system, in which various variables change simultaneously as time progresses. System dynamics is a computer aided approach to policy analysis and design. It applies to dynamic problems arising in complex social, managerial, economic or ecological systems – literally any dynamic systems characterized by interdependence, mutual interaction, information feedback, and circular causality. Tenets of the method of particular pertinence to this study are problem solving focus. From its inception, system dynamics has emphasized practical solutions to important real-world problems, design of corporations and other decision making systems (Forrester 1961). Formal system dynamics models are used as test beds to experimentally investigate policies before real-world implementation and realistic decision-rules. Explicit account is taken of information delays and distortions and of human limitations in processing and interpreting information (Sterman 2000).

It is rather important as the study intends to simulate and analyse the behaviour of Malaysian economy given the addition of cash *waqf*. The need for computer simulation is because experimental work has demonstrated that humans face significant cognitive limitations in interpreting even simple feedback systems (Paich & Sterman 1993; Sterman 2000). Besides, for environmental systems in particular, real-world experiments are often impracticable because of long time lags between perceived causes and effects or the cost could be prohibitively high.

With regard to cash *waqf*, using computer simulation, the expected outcome of the cash *waqf* on several variables can be studied under several different assumptions. The inclusion of these uncertain assumptions are due to the fact that a structural or parametric assumption considered to be an important element of the system under study should not be ignored because its value or nature is uncertain (Forrester 1980). Uncertain assumptions that were shown to be influential through simulations are candidates for further empirical investigations.

Existing theoretical models of cash *waqf* were incorporated into the cash *waqf* model presented in this study. Since there is no similar study preceding this research in Malaysia, besides of Dian Masyita et al. (2005) and Dian Masyita (2007) for the case of Indonesia, some assumptions had to be made. However, these assumptions are logical in nature as they were extrapolated or estimated from trustworthy data. The most important data assumed in this research are the collection rate of cash *waqf*.

## ASSUMPTIONS

*Source of fund* As the name implies, the source of fund for the programmes would be in the form of cash *waqf* and is driven solely from the general public's contribution, such as voluntary giving. Voluntary giving as a source of fund has a sustainable factor that can ensure the survivability of the project. Philanthropic nature of the program, backed by the religious motivation provided by the religion Islam has what it takes to combat poverty head on. The extent of the potential collection of cash *waqf* fund per year will be presented later.

*Mobilization of fund* The collection of cash *waqf* fund would then be invested in its own Islamic financial portfolio that is well diversified in order to (1) maximize the return and (2) ensure that the fund is exposed to minimal risk. The second objective is rather important due to the nature of the fund. Since the fund is "tied" up to the term *waqf*, the perpetuity of the fund has to be ensured. Thus measures need to be taken to ensure that any exposure to risk that can be detrimental to the value of the fund is minimized. The portfolio's investment into several productive and promising Islamic investment instruments are then expected to generate return, given few underlying assumptions that are integrated into our model. This will be presented in greater details in the following sections.

*Investment proceeds allocation* After taking into account the management fee of the program, the proceeds of the profit will be utilized towards the aforementioned goals. This cash *waqf* model intends to combat poverty in both short and long term. Short term solution can be achieved through income smoothing by using periodic cash distribution. This "capital distribution" segment of the program can help relieve the poor from their immediate need and temporarily boost their consumption. As per the long term, the proceeds will be then mobilized into three other funds – microfinance, health and education funds. If cash distribution is meant to smooth the income fluctuations, these three other mechanisms target to boost the income growth among the poor, which is the key in eradicating poverty in the intermediate to long term.

## DATA

The data used in the study have been mostly derived from primary and secondary sources. Some literature reviews were done regarding system dynamics as a methodology to study the impact of cash *waqf* on the economy.

## FINDINGS

This study focuses on the potential of cash *waqf* specifically in boosting the economy in terms of

unemployment reduction and poverty alleviation. As noted by Sadeq (2002), poverty cannot be seen only as a result of unemployment but is actually related to education, health and physical facilities. Poor people are normally being denied of good education and basic healthcare, leading them not being able to get good employment. Not being employed perpetuates their poverty and the cycle repeats itself. Therefore, Sadeq (2002) suggested *waqf* be used to provide for these needs of the poor. This study is therefore an attempt to explore the potential of cash *waqf* in poverty alleviation program from financial viewpoint using system dynamics modelling. Figure 1 illustrates the overall feedback structure of Cash *Waqf* Model proposed in this paper based on the above assumptions by taking into account Malaysian economic data. The cash *waqf* model consists mainly of three major components with varying underlying assumptions in each.

## TOTAL FUND: CASH-WAQF COLLECTION/CONTRIBUTION RATE

Equally important as the other components, the potential of eradicating poverty using cash *waqf* lies in the plausible amount that can be collected given a period and the sustainability of it. Poverty elimination does not happen over merely 5 to 6 years but in fact it can take up to decades. Thus the first component is important in acting as the steam engine that drives the program over a period of time.

As displayed in Figure 2, it can be seen that the contribution rate is affected by one major factor, i.e. population. As of now, Malaysia has a population of over 28 million people with the average birth rate has been 20/1000 people and average death rate of 5/1000 people every year for the past 10 years. Given these figures, the Malaysian population can be said to grow at the rate of roughly over 1 percent per year. The main contributors however would be from the Muslims fraction of the population. From the data collected, roughly 60% of Malaysian population is Muslim and this makes up to 17 million people.

A simple assumption based on observation is made here; for the sake of simplicity and being realistic, the assumed figures are derived upon a pessimistic nature. The purpose of such measure is to analyze the potential that the program has even under the worst circumstances. It is however, not impossible for the given figures to do even better in reality. The collection rate was estimated based on the weekly charitable contribution during Friday prayer at the mosque (Muslim men whom attended Friday prayer at mosques for the ease of analysis). On average, RM1 are contributed every week per Muslim, and given the weekly donation period of 52 weeks, it would amount to RM52 per Muslim donation per year. Average contribution of RM52 per person might not be so significant at a glance, but looking at the demographic of

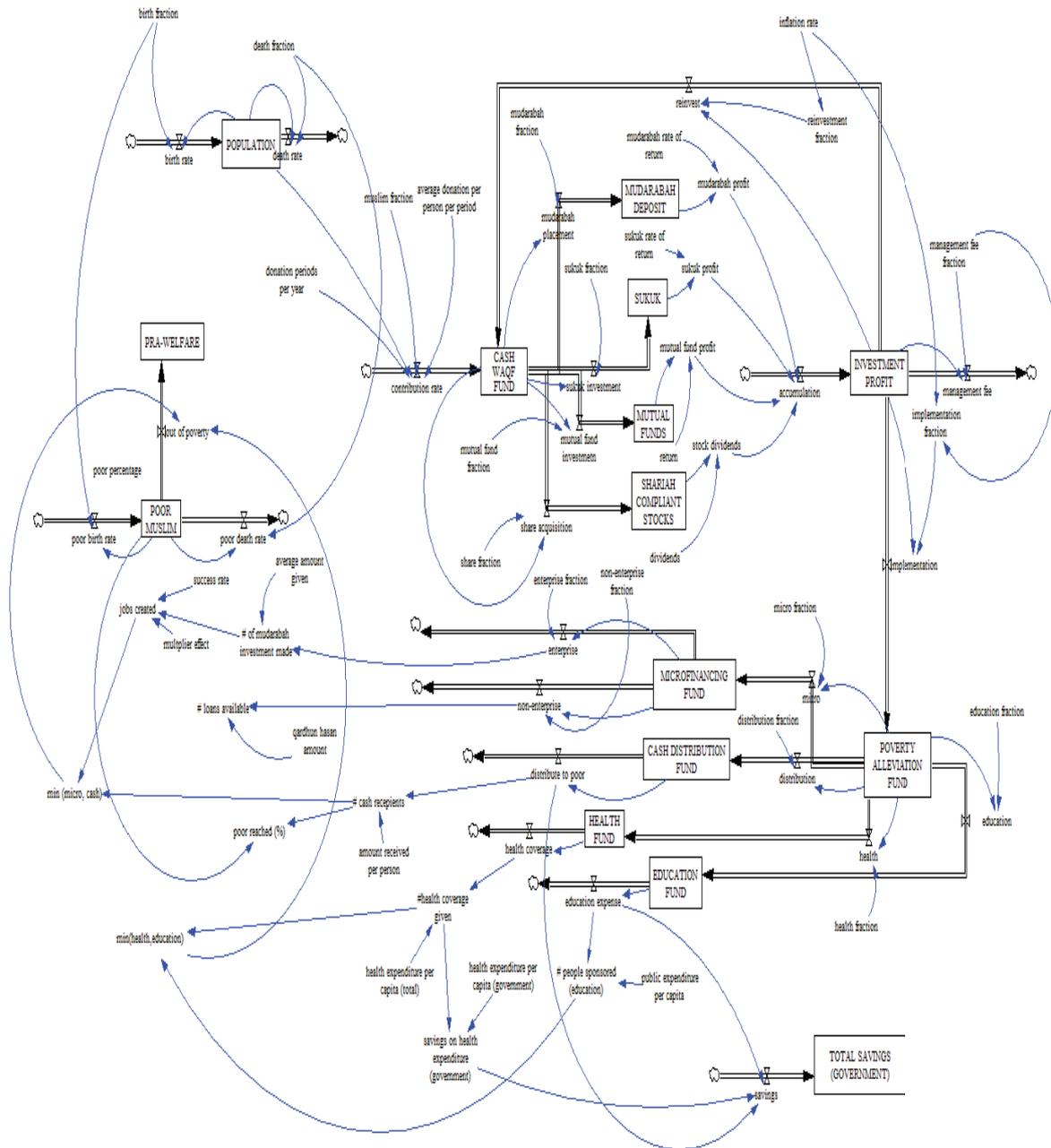


FIGURE 1. Feedback Structure of Cash *Waqf* Model based on System Dynamics

Malaysia, RM52 per person is in fact a good figure to start with. It will be shown later to what extent this amount per person can contribute to the poor and needy. On a side note, it is important to note that under the model, the contribution rate is not static as it grows alongside the population. Detailed simulations on the projected cash contribution rate can be seen from Table 1.

INVESTMENT OF FUND

Given the required perpetual nature of *waqf*, the value of the initial collected fund (nominally at least) has to

be maintained at all cost. The fund is not to be collected and immediately disbursed as there is already another instrument that does this, that is through *zakah*. Hence, the second major component of the model aims to make certain the perpetuity of the fund. The investment component of the model consists of four major investment instruments/sectors; those are *mudarabah* deposit, *sukuk* (Islamic bond), Islamic mutual fund and *shariah*-compliant stock. These investment sectors were chosen based on their shariah-compliance nature due to the strict guidelines in managing *waqf* assets. They represent the short-term as well as long-term investments in economy.

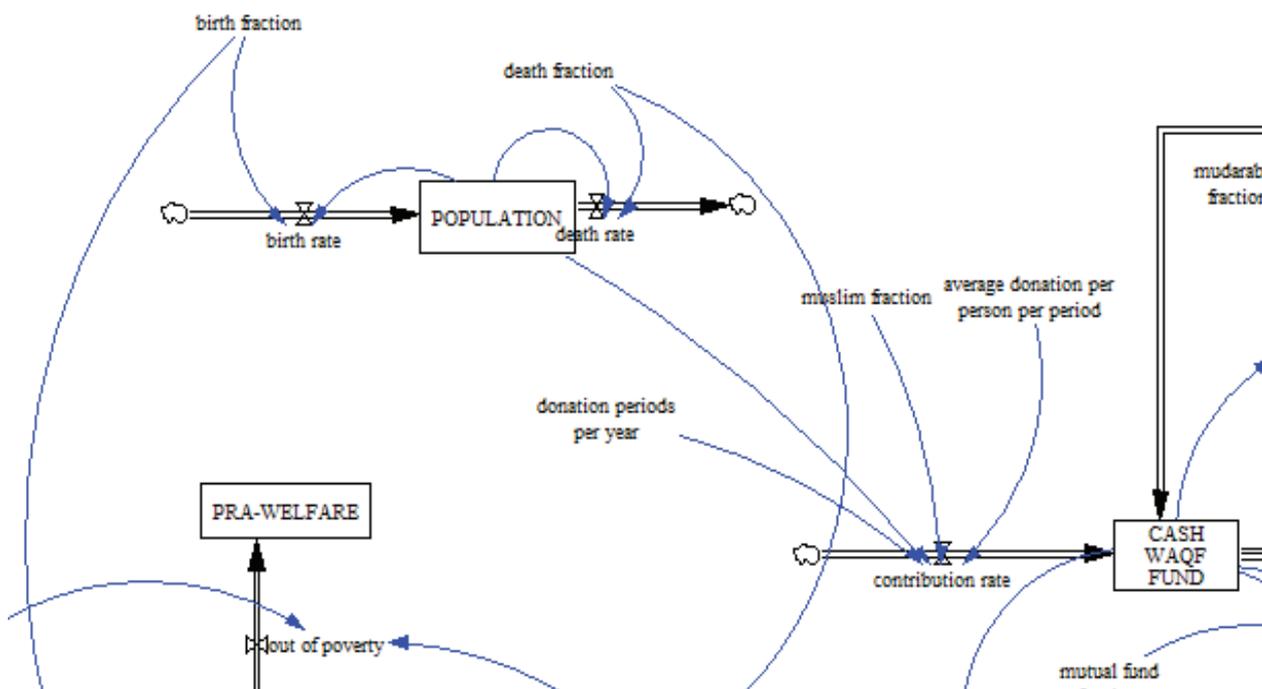


FIGURE 2. Cash Waqf Collection Component

TABLE 1. Cash Waqf: Projected Contribution Rate by No. of Population Across Time

Time (Year)	contribution rate	POPULATION
0	MYR 945,185,000.00	28401000
1	MYR 959,363,000.00	28827000
2	MYR 973,754,000.00	29259400
3	MYR 988,360,000.00	29698300
4	MYR 1,003,190,000.00	30143800
5	MYR 1,018,230,000.00	30595900
6	MYR 1,033,510,000.00	31054900
7	MYR 1,049,010,000.00	31520700
8	MYR 1,064,740,000.00	31993500
9	MYR 1,080,720,000.00	32473400
10	MYR 1,096,930,000.00	32960500
11	MYR 1,113,380,000.00	33454900
12	MYR 1,130,080,000.00	33956800
13	MYR 1,147,030,000.00	34466100
14	MYR 1,164,240,000.00	34983100
15	MYR 1,181,700,000.00	35507800
16	MYR 1,199,430,000.00	36040500
17	MYR 1,217,420,000.00	36581100
18	MYR 1,235,680,000.00	37129800
19	MYR 1,254,210,000.00	37686700
20	MYR 1,273,030,000.00	38252000
21	MYR 1,292,120,000.00	38825800
22	MYR 1,311,500,000.00	39408200
23	MYR 1,331,180,000.00	39999300
24	MYR 1,351,150,000.00	40599300
25	MYR 1,371,410,000.00	41208300
26	MYR 1,391,980,000.00	41826400
27	MYR 1,412,860,000.00	42453800
28	MYR 1,434,060,000.00	43090600
29	MYR 1,455,570,000.00	43737000
30	MYR 1,477,400,000.00	44393000

The proportion assigned to each sectors can be seen in Figure 3. It can be argued that the current fund allocation is not optimum and that a better portfolio with higher expected return and lower risk can be achieved. That however would not be the concern of this paper; as mentioned before, the model only aims at analyzing the potential impact that cash waqf can bring under the average scenario. Thus the current fund allocation is justified.

The potential earnings from each sector was then simulated under the assumption that returns on the aforementioned different “sectors” follow a normal distribution given its own minimum, maximum, mean and standard deviation values. In layman’s term, the overall expected profit from the investment was simulated based on a random investment venue placement that would give us random rate of return. As a matter of fact, this method of simulating the expected return can overcome the problem of overshooting or undershooting the target. Over-projecting the return would give an unrealistic result while under-projecting can undermine the true potential of the cash waqf. The profit simulation for each respective ‘sectors’ can be seen from Table 2. The source of cash waqf fund, referred to as social capital from now on, are injected into various said instruments that covers various productive economic sectors. The model intentionally aims to benefit all possible parties be it directly or indirectly. The extent of how these investment decisions positively affect the economy can be another area that is worth studied.

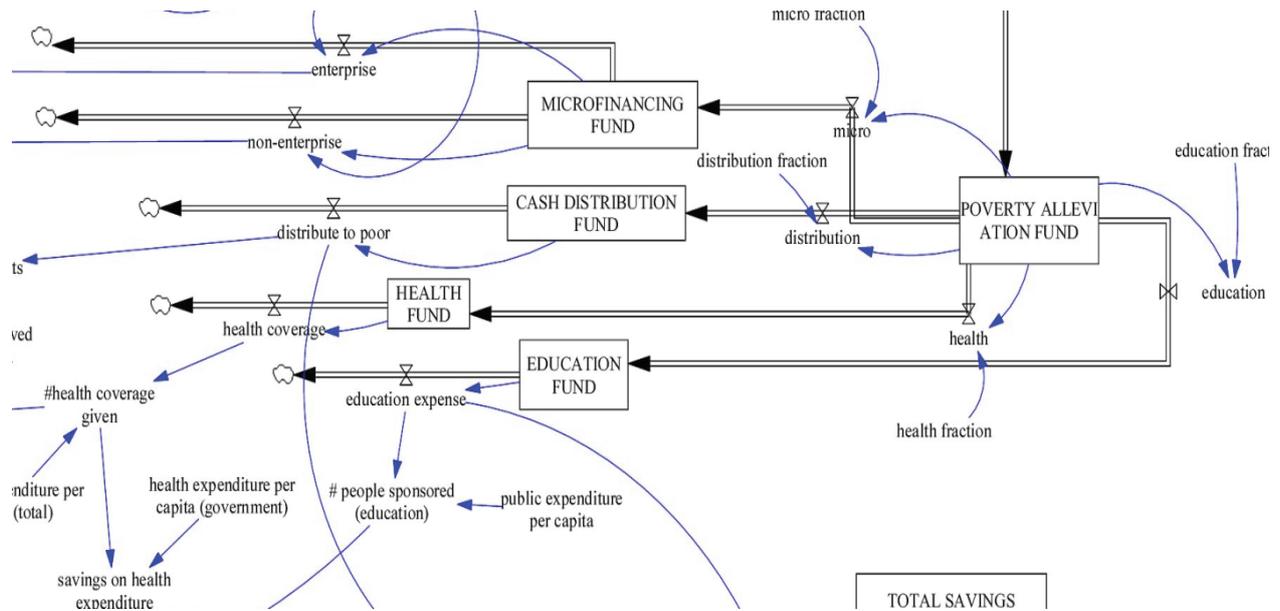


FIGURE 3. Cash Waqf Investment Portfolio

Figure 1 before shows where the proceeds of the investment would be channelled to. A segment of the proceeds is going to be reinvested into the fund pool in order to counter the inflation effect. The reinvestment fraction is currently determined by the inflation rate of 4% (taken as the average of the inflation rate over 10 years). With a 4% inflation rate, 0.04 fraction of the

investment would be reinvested to maintain the real value of the fund. Apart from the reinvestment, a fraction of the proceeds would have to be set aside for management fees. The model simulation was performed based on the assumption that 0.1 fraction of the investment proceeds is set for this purpose.

TABLE 2. Cash Waqf Investment Profit based on Portfolio Across Time

Time	mudharabah profit	mutual fund profit	stock dividends	sukuk profit
0	MYR -	MYR -	MYR -	MYR -
1	MYR -	MYR -	MYR -	MYR -
2	MYR 6,431,850.00	MYR 48,756,300.00	MYR 8,562,100.00	MYR 1,051,770.00
3	MYR 14,115,300.00	MYR 169,190,000.00	MYR 7,010,950.00	MYR 20,924,300.00
4	MYR 20,666,500.00	MYR 102,596,000.00	MYR 40,270,600.00	MYR 19,412,900.00
5	MYR 23,885,400.00	MYR 212,073,000.00	MYR 27,672,800.00	MYR 50,617,000.00
6	MYR 24,068,500.00	MYR 42,644,300.00	MYR 655,699.00	MYR 56,284,900.00
7	MYR 33,366,300.00	MYR 411,141,000.00	MYR 36,481,000.00	MYR 29,284,900.00
8	MYR 37,643,400.00	MYR 574,036,000.00	MYR 11,006,800.00	MYR 77,659,500.00
9	MYR 34,114,700.00	MYR 584,144,000.00	MYR 109,383,000.00	MYR 40,214,300.00
10	MYR 50,422,000.00	MYR 673,382,000.00	MYR 43,602,100.00	MYR 38,790,100.00
11	MYR 62,828,200.00	MYR 709,987,000.00	MYR 108,740,000.00	MYR 5,303,120.00
12	MYR 59,047,600.00	MYR 681,202,000.00	MYR 108,165,000.00	MYR 52,705,800.00
13	MYR 93,370,000.00	MYR 322,725,000.00	MYR 121,029,000.00	MYR 92,665,600.00
14	MYR 103,337,000.00	MYR 637,944,000.00	MYR 131,243,000.00	MYR 47,987,200.00
15	MYR 86,460,800.00	MYR 411,045,000.00	MYR 104,155,000.00	MYR 122,744,000.00
16	MYR 79,842,600.00	MYR 493,215,000.00	MYR 21,255,200.00	MYR 233,989,000.00
17	MYR 124,980,000.00	MYR 1,042,830,000.00	MYR 101,308,000.00	MYR 118,561,000.00
18	MYR 75,250,500.00	MYR 1,235,620,000.00	MYR 203,882,000.00	MYR 234,629,000.00
19	MYR 87,489,100.00	MYR 1,450,620,000.00	MYR 243,069,000.00	MYR 892,386.00
20	MYR 126,041,000.00	MYR 186,872,000.00	MYR 70,902,200.00	MYR 162,468,000.00
21	MYR 101,272,000.00	MYR 624,705,000.00	MYR 318,587,000.00	MYR 30,236,500.00
22	MYR 172,161,000.00	MYR 903,479,000.00	MYR 42,927,600.00	MYR 272,877,000.00
23	MYR 111,493,000.00	MYR 1,282,510,000.00	MYR 301,224,000.00	MYR 138,904,000.00
24	MYR 108,328,000.00	MYR 2,213,370,000.00	MYR 148,315,000.00	MYR 360,981,000.00
25	MYR 94,213,100.00	MYR 1,832,330,000.00	MYR 332,045,000.00	MYR 143,570,000.00
26	MYR 95,711,800.00	MYR 151,094,000.00	MYR 298,954,000.00	MYR 343,036,000.00
27	MYR 211,513,000.00	MYR 1,865,510,000.00	MYR 312,130,000.00	MYR 61,243,500.00
28	MYR 129,967,000.00	MYR 883,285,000.00	MYR 201,117,000.00	MYR 465,644,000.00
29	MYR 212,078,000.00	MYR 567,067,000.00	MYR 230,007,000.00	MYR 365,743,000.00
30	MYR 190,377,000.00	MYR 2,049,560,000.00	MYR 3,672,000.00	MYR 110,826,000.00

USE OF FUND

The final and the utmost important component of the model is the implementation component, i.e. the use of fund. It is through this component that funds can be channelled through various purposes such as health, education, micro financing and cash disbursement. For each purpose, there will be a specific account that allocated fund can be channelled to. From here, various outputs can be studied. Figure 4 illustrates categories of fund under the main poverty alleviation fund: micro financing fund, cash distribution fund, health fund and education fund.

*Microfinancing fund* Microfinancing fund can be further split into two: non-enterprise and enterprise purposes. Non-enterprise financings aim to boost short-term consumption while enterprise financings aim to stimulate income growth and stability in the long run. The former is to be given out as benevolent loans with variable repayment options. Meanwhile, the latter is to be given out as *mudarabah* funds to finance (or start) businesses. Funds for non-enterprise and enterprise purposes are separated because the model acknowledges the fact that not every poor people have the entrepreneurial capability

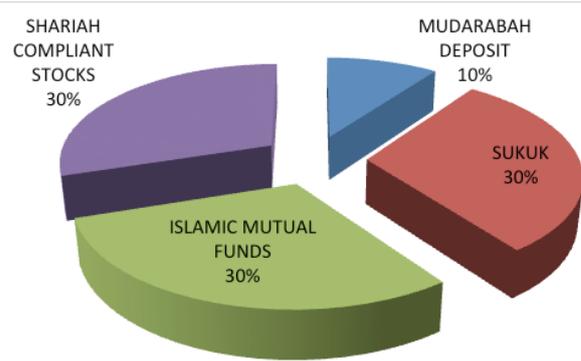


FIGURE 4. Cash Waqf: Use of Funds

and the commitment to run a business. Thus, those who are not ready to start their own business can still get access to microfinance facility. Table 3 shows the potential number of poor people that can have access to micro credit facility each year given the amount accumulated in the microfinancing fund.

Successful microbusiness will be able to generate employment opportunities and boost the income growth of the entrepreneurs and their respective employees. Note the word ‘successful’ that is attached to microbusiness.

TABLE 3. Microfinancing Output in term of No. of Jobs Created

Time	# loans	# mudarabah undertaken	jobs created	total job created
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	1393	2229	1338	0
6	4542	7267	4360	1338
7	3933	6293	3776	5698
8	6756	10810	6486	9474
9	2659	4254	2552	15960
10	10971	17553	10532	18512
11	15057	24092	14455	29044
12	16509	26414	15849	43499
13	17333	27733	16640	59348
14	19068	30508	18305	75987
15	19374	30999	18599	94292
16	13541	21665	12999	112891
17	19791	31666	18999	125890
18	15575	24920	14952	144890
19	17809	28494	17096	159841
20	29835	47736	28642	176937
21	37612	60179	36107	205579
22	38315	61303	36782	241686
23	11745	18792	11275	278468
24	23108	36973	22184	289744
25	29916	47866	28719	311928
26	39434	63094	37857	340647
27	60866	97386	58432	378503
28	51647	82634	49581	436935
29	19109	30575	18345	486516
30	52684	84294	50576	504861

The number of *mudarabah* financing given for enterprise purposes alone offers us no clue on the poverty alleviation goal. A recent survey of global entrepreneurial activity indicates that the failure rate of small businesses can be up to 80%. In other words, out of 100 newly start-up business, only 20 would make it beyond five years. The 20% however is able to provide a continuous employment opportunity. Similar study by Global Entrepreneurship Monitor has shown that those small businesses are expected to employ five people per business. The potential that this has in Malaysia can be seen from Table 3. Over the course of three years, there can be as much as 504,861 employment opportunities generated using the microfinancing fund.

*Cash distribution fund* Aiming to duplicate the current government social safety net program, a fraction of the poverty alleviation fund is allocated for cash disbursement. Also aimed to increase short-term consumption of the poor like non-enterprise micro-loan, cash disbursement however has no strings attached to it. Given the limited amount of fund available for this purpose, not all population can be reached in every year. As can be seen in Table 4, there are times when only 3 percent of the poor population can be served and there are years where almost every poor people receives the cash disbursement.

*Education and health funds* To tackle poverty in the long run, help must not be given only in terms of cash

distribution and microcredit. As noted by Sadeq (2002), education and health are important factors in determining whether or not a person can get employment. Thus, another portion of the fund will be allocated towards providing the poor with the necessary healthcare services and the rest would go towards the education of younger generation among the poor population.

By using the health and education expenditure per capita of the year 2010 as the basis, the computer can simulate the potential number of poor that can be reached every year given the allocated funds for these purposes. Based on Table 5, the number varies every year, but over a long period, the trend looks encouraging as more poor people can be served.

POTENTIAL OF CASH WAQF IN ALLEVIATING POVERTY

The answer to the question of what is the potential of cash *waqf* in alleviating poverty is then, in 30 years, over 500,000 of people can be taken out of poverty. That is over 50% reduction of Muslim poverty in Malaysia over 30 years. This is estimated from the number of employment that can be created through (successful) microbusiness, number of recipients of the cash disbursement, and finally the number of people that will have access to education and health services. It is believed that individuals who get access to all facilities that the program provides can be taken out of poverty, both in the short and long run. Apart from tackling poverty, the model can save the government up to RM13 billion in 30 years. With that

TABLE 4. Cash Recipients of Poor Muslims

Time (Year)	# cash recipients	POOR MUSLIM	poor reached (%)
0	0	690712	0
1	0	701073	0
2	0	711589	0
3	0	722263	0
4	0	733097	0
5	27865	744093	3.74481
6	90834	753917	12.0482
7	78667	760866	10.3391
8	135127	768503	17.5831
9	53171	773544	6.87368
10	219417	782595	28.0371
11	301149	783802	38.4215
12	330178	781104	42.2706
13	346664	776972	44.6173
14	381349	771987	49.3984
15	387482	765262	50.6339
16	270810	758142	35.7202
17	395820	756515	52.3215
18	311494	748863	41.5956
19	356170	745145	47.7988
20	596704	739226	80.7201
21	752234	721672	104.235
22	766292	696390	110.038
23	234901	670054	35.0571
24	462164	668830	69.1005
25	598321	656678	91.1133
26	788677	637809	123.654
27	1217330	609520	199.719
28	1032930	560231	184.376
29	382182	519053	73.6307
30	1053670	508494	207.214

TABLE 5. Education and Health Coverage Sponsor

Time (Year)	# people sponsored (education)	#health coverage given
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	13345	12213
6	43503	39811
7	37676	34479
8	64716	59225
9	25465	23304
10	105085	96168
11	144228	131990
12	158131	144713
13	166027	151939
14	182639	167141
15	185576	169829
16	129698	118693
17	189569	173483
18	149183	136524
19	170580	156105
20	285778	261529
21	360265	329696
22	366998	335857
23	112501	102955
24	221343	202562
25	286552	262237
26	377719	345668
27	583012	533542
28	494698	452722
29	183038	167506
30	504632	461813

much savings, the government can allocate its budget to other productive sectors of the economy. Summarized in Table 6 are all the significant outputs that show the ultimate finding of this study.

The outputs from the simulation in this study seem to be convincing. Poverty can be reduced by almost half in over 30 years, government can save up to RM13 billion and over 500,000 employment opportunities would be created. Microfinance can clearly help reduction in poverty and vulnerability. However, improvements to livelihood security are usually more incremental than the dramatic success stories sometimes quoted. For the people concerned, small changes in livelihoods may be significant. Microfinance clearly contributes to improvements in children's welfare through increased incomes and thus, improved nutrition, housing, health and school attendance, as well as reductions in harmful child labour (Marcus et al. 1999). Apart from that, improvements in school attendance or in provision of educational materials are also widely reported. In Honduras, participants stated that participation in the credit and savings program had enabled them to send several children to school at a time, and had reduced drop-out in the higher primary school grades (Arcon & Colindres 1997).

## POLICY IMPLICATION

Studies regarding poverty alleviation mostly end up discussing the effectiveness of micro-financing in curing this social problem. Microfinance has been extensively studied over the past 10 to 15 years and the resulting literatures are vastly available now. The results have displayed positive impacts that microfinance has brought into the playing field of poverty alleviation. Taking note that there are several factors that can be attributed to poverty, it is also important to measure the significance of microfinance in other than the income aspects.

By comparing cash *waqf* model and the MFIs model side by side, it is proven that cash *waqf* model proves to be a viable alternative instrument in combating poverty. Cash *waqf* as a poverty alleviation instrument can answer, if not all, most of the questions that have been raised against MFIs' effectiveness as a poverty alleviation solution. There are several questions posed by the opponent of MFIs mainly in the areas of sustainability, performance, impact assessment, transaction cost, high interest rate and the non-business use of the microloans. Thus this section will be concluded with the list of why cash *waqf* should be considered.

TABLE 6. Summary of Important Output

Time (Year)	Poverty Alleviation Funds	POOR MUSLIM	poor (% of total population)	PRA-WELFARE	TOTAL SAVINGS (GOVERNMENT)
0	MYR -	690712	2.432	0	MYR -
1	MYR -	701073	2.432	0	MYR -
2	MYR -	711589	2.432	0	MYR -
3	MYR 55,729,700.00	722263	2.432	0	MYR -
4	MYR 181,667,000.00	733097	2.432	0	MYR -
5	MYR 157,333,000.00	744093	2.432	0	MYR -
6	MYR 270,254,000.00	753917	2.42769	1337.51	MYR 35,705,500.00
7	MYR 106,342,000.00	760866	2.41386	5697.52	MYR 152,098,000.00
8	MYR 438,835,000.00	768503	2.40206	9473.52	MYR 252,900,000.00
9	MYR 602,298,000.00	773544	2.38208	15959.6	MYR 426,049,000.00
10	MYR 660,355,000.00	782595	2.37434	18511.8	MYR 494,181,000.00
11	MYR 693,329,000.00	783802	2.34286	29043.8	MYR 775,338,000.00
12	MYR 762,699,000.00	781104	2.30029	43499	MYR 1,161,220,000.00
13	MYR 774,963,000.00	776972	2.25431	59347.5	MYR 1,584,310,000.00
14	MYR 541,619,000.00	771987	2.20674	75987.4	MYR 2,028,520,000.00
15	MYR 791,640,000.00	765262	2.15519	94292.2	MYR 2,517,170,000.00
16	MYR 622,988,000.00	758142	2.10359	112891	MYR 3,013,680,000.00
17	MYR 712,340,000.00	756515	2.06805	125890	MYR 3,360,690,000.00
18	MYR 1,193,410,000.00	748863	2.01688	144890	MYR 3,867,890,000.00
19	MYR 1,504,470,000.00	745145	1.97721	159841	MYR 4,267,030,000.00
20	MYR 1,532,580,000.00	739226	1.93251	176937	MYR 4,723,420,000.00
21	MYR 469,803,000.00	721672	1.85874	205579	MYR 5,488,030,000.00
22	MYR 924,329,000.00	696390	1.76712	241686	MYR 6,451,930,000.00
23	MYR 1,196,640,000.00	670054	1.67516	278468	MYR 7,433,840,000.00
24	MYR 1,577,350,000.00	668830	1.64739	289744	MYR 7,734,840,000.00
25	MYR 2,434,660,000.00	656678	1.59356	311928	MYR 8,327,050,000.00
26	MYR 2,065,860,000.00	637809	1.52489	340647	MYR 9,093,720,000.00
27	MYR 764,365,000.00	609520	1.43572	378503	MYR 10,104,300,000.00
28	MYR 2,107,340,000.00	560231	1.30012	436935	MYR 11,664,200,000.00
29	MYR 1,444,810,000.00	519053	1.18676	486516	MYR 12,987,800,000.00
30	MYR 1,182,410,000.00	508494	1.14544	504861	MYR 13,477,500,000.00

## SUSTAINABILITY

The nature of *waqf* makes it more appealing for Muslims to contribute to the fund. The religious nature attached to it can attract all range of Muslims to donate (endow) and from the model we can say that a consistent rate of donation is realistic enough to be assumed. Given the perpetual feature of *waqf*, the fund can be managed without any liquidity constraint. This is different with MFI as it has to balance the deposits and the loans in managing the liquidity. On top of that, the most important factor that ensures the sustainability of the cash *waqf* model is its structure. Cash funds collected are not to be spent directly towards poverty alleviation as it would mirror *zakah*. The fund however is invested in an Islamic investment portfolio consists of several instruments mentioned earlier. Only the proceeds of the investment are to be used in the program.

## HIGH INTEREST RATE

Some of the MFIs that offer microloan charge high interest rates on the loan and require weekly repayments immediately. This is against the poverty alleviating goal as the MFIs are just another profit-making entity. Under the cash *waqf* model, non-enterprise loan is given out as benevolent loan without interest rate and charges. For the enterprise purpose, financing is given out as *mudarabah* rather than debt and again no interest rate is involved in the repayment. Note that the model does not take into account the repayment factor. This is to show that the survivability of the model does not depend on the repayments from the borrowers. Thus, borrower's credit risk is not a significant factor.

## NON-BUSINESS USE OF FINANCINGS

Some opponents of MFI's as poverty alleviation instrument are concerned that the loan taken out for business purposes ends up being used for other than the stipulated purposes. The cash *waqf* model has already taken this into consideration by separating the funds for non-business and business purposes. Under *mudarabah* concept, there will be monitoring by the *waqf* institution because the profit-sharing basis will encourage the fund provider to make sure that the return from the loan is maximized. Besides, the person who has applied for business financing can still apply for the benevolent loan. Together this will reduce the potential mismanagement of the funds given out.

In any poverty alleviation program, there must be a central (not necessarily governmental) body that executes all the efforts to combat the problem. In some cases, in Bangladesh for example, banks function as the main entity of the program. By having this central body, actions and measures can collectively be taken given the circumstances. Similar to the function of any

other MFIs, there will be an institutions or central body that acts as a catalyst to the whole project in Malaysia. This institution, Cash *Waqf* Institution (CWI) will act as the backbone throughout the whole program, as fund collector all the way to fund distributor/implementer. In Malaysia, there are several potential bodies to take the role as CWI, such as, AIM, Credit Guarantee Corporations (CGC), SMIDEC, AgroBank and SME Bank (AgroBank is now a full-fledged Islamic bank, while SME Bank is moving towards the same). If this role is to be assumed by banking institution, Islamic bank will act as trustee for cash *waqf* of which it will supervise and monitor the collection of *waqf* fund, investment and distribution of profit to the charity activities. Bank is not the only source of *waqf* fund, but all Islamic financial institutions (IFI) as well as other institutions, like government-linked companies could endow part of their shares as cash *waqf* in order to perform their corporate social responsibilities. Moreover, ordinary people may also joint by depositing in *waqf* account for a certain period and their profit portion will be distributed as donation.

Implementation of cash *waqf* model in Malaysia has a potential setback due to the legal environment; therefore the study is expected to capture the attention of the policy makers and legislators in paving ways to the actual implementation of the model. The huge potential savings can prompt the legislators and policy makers into considering cash *waqf* from legal perspective as the current legal framework of cash *waqf* in Malaysia is not conducive.

## CONCLUSION

Over the past years, the government of Malaysia has been so dedicated in ensuring equality among the population; and by no means this study intends to undermine the role that the government has played. Poverty can be eradicated faster if all parties work alongside each other with the same agenda, i.e. population equality. Based on the result from various scenario proposed, the study has shown the potential of cash *waqf* model in the poverty alleviation.

Also by no means this study tries to undermine or suggest the replacement of the institution of *zakah*. In fact, if coupled with *zakah*, cash *waqf* the potency can be taken up to another level. This study can also help the government in formulating its future policies as has been shown by the results, over 30 years it can save the government up to RM13 billion. This huge sum of potential savings can prompt the legislators and policy makers into considering cash *waqf* from legal perspective as the current legal framework of cash *waqf* in Malaysia is not conducive.

The authors acknowledge the limitations of this study. An important note to be further considered is that this study does not cover the issue of potential *waqf* mismanagement. Cash *waqf* fund was assumed

to be managed at the utmost efficiency and credibility. For the sake of not losing the focus of this study, the management problems of *waqf* could be argued and are left out for different studies. In addition, there are still many assumptions that have to be considered but not included in this study due to the lack of data and other constraints. We believe that this study is not meant to be referred to as the ultimate study on the subject matter.

It is hoped that this study will encourage more studies on the potential of cash *waqf* through microfinance in poverty alleviation and the positive impact it can have on the Malaysian economy. It also calls for more researches particularly using the system dynamics methodology in economic analysis, which is relatively new. This can be further extended into developing a complete and comprehensive system that fully mimics the real economic situation.

#### ACKNOWLEDGEMENT

This study is partly funded by research grant UKM-GUP-2011-009. The authors wish to acknowledge Universiti Kebangsaan Malaysia for this financial assistance.

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S. Shahida, Ph.D  
Research Center for Islamic Economics and Finance (EKONIS)  
Faculty of Economics and Management  
Universiti Kebangsaan Malaysia  
43600 UKM Bangi  
Selangor.  
shahida@ukm.my

Mohd Umar Mohd Marzuki, MIEcs.  
RAM Rating Services Berhad  
Suite 20.01, Level 20  
The Gardens South Tower  
Mid Valley City  
Lingkar Syed Putra  
59200 Kuala Lumpur.  
umar@ram.com.my , umarmarzuki@gmail.com

Zaini Embong, Ph.D  
School of Accounting  
Faculty of Economics and Management  
Universiti Kebangsaan Malaysia  
43600 UKM Bangi  
Selangor.  
zainiembong@ukm.my

