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Portfolio and Default Risk of Islamic Microfinance Institutions

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Abstract

Islamic microfinance is a growing sector that is expected to provide a long-term solution to poverty in the Muslim world. The role of microfinance institutions in poverty alleviation is still debatable, however established literature provides assurance that microfinance does contribute to the development of financial sector and reduction of poverty in developing countries. The rise of competition in the microfinance sector has forced many microfinance institutions to resort to commercial funding and lending activities, which according to some studies has led microfinance institutions to become riskier. The paper explores portfolio and default risk of Islamic Microfinance Institutions (IMFIs) and find that they are facing relatively lower risks than conventional MFIs. Using Ordinary Least Squares regression to analyse portfolio risk of IMFIs, the research finds unexpected result. Since IMFIs are facing challenging working environment and are operating in some of the poorest countries in the world with frequent natural disasters or armed conflicts, we predicted that they will be riskier. We also find that IMFIs are also less vulnerable despite their clients are from the poorest segment in the society, often with lower educational level, and the nature of Islamic financial products are relatively unknown to most clients. Many of the IMFIs and their clients live in countries considered to be high risk or have histories of instability, either politically or economically.

Keywords: Islamic microfinance, Portfolio risk, Poverty

1. Introduction

> "Microfinance: not as risky as you think", Financial Times, 25 May 2007
> "Microfinance: Risky and Expensive", Wall Street Journal, 23 June 2010

Microfinance institutions (MFIs) are thriving in many developing countries and increasingly becoming an important instrument in serving development agenda, particularly poverty alleviation and financial inclusion. The success of many MFIs rests on effectiveness of loan delivery, high interest rate, and even higher repayment rate from the borrowers. Repayment rate of most MFIs are remarkably high, often above 90%, depending on how they manage repayment cycles and collections (Godquin, 2004).

Microfinance has created opportunities for the poor and microenterprises. It is claimed that microfinance has helped millions of poor people moving out of poverty, with a moderate estimate suggesting that over 200 million clients have been reached by MFIs worldwide (Maes and Reed, 2012). This figure represents about 17% out of 1.2 billion poor people who live with less than $1.25 a day, based on the World Bank estimates (Olinto *et al.*, 2013). Although, there are debates on the impact of microfinance on poverty reduction, the opportunity created by microfinance to the poor has enabled them to venture into microbusiness or use the loan to meet immediate needs.

In relations to risk and vulnerability, Swain and Floro (2014) claim that involvement in microfinance such as through self-help group membership has reduced the poor's households vulnerability caused by market liberalization and poverty. At the minimum, loans from MFIs have helped poor families to meet their immediate needs, or often referred to as income smoothing loans. At the other end of the value chain, microfinance as an investment portfolio or asset class is also considered of high value, as studies have noted

that microfinance could provide investors with attractive returns (Galema *et al*. 2011), reduced portfolio volatility (Krauss and Walter, 2009), and investment opportunity with stable returns and lower total risk than other assets class (Janda and Svárovská, 2010).

Islamic microfinance is unique in relation to the nature of risks it faces, as well as from the type of borrowers that it serves (Tamanni and Liu, 2017). On the one hand, it faces multitude of risks originating from peculiar Islamic financial mechanism and contractual framework, arguably different from risks faced by conventional MFIs, and secondly it also has to deal with the nature of borrowers or customers it aspire to serve, who are mostly live in vulnerable regions or countries. In addition, Islamic microfinance must also deal with risks associated with microfinance lending i.e. non-collateral, which are much higher compared to risks facing commercial financial institutions such as banks, which are heavily protected and regulated.

As such, the study of risk in Islamic microfinance deals with issues related to the magnitude of internal hazards facing IMFIs, as well as challenging external risks that many IMFIs face while operating in hostile environment and conflict-laden countries. This paper aims to shed some lights on the study of risks facing Islamic microfinance by looking specifically at the risk profile of IMFIs, both at the quality or riskiness of their lending and clients portfolio as well as at the riskiness of IMFIs as investment portfolio. It seeks to address the research questions as follows, a) are IMFIs more risky than conventional MFIs, and if so, how risky? b) what are the determinants of portfolio and default risk of IMFIs? and finally, c) what are the effects of portfolio risk on the profitability and outreach of IMFIs?

The following section will discuss sources of risk and the issues of portfolio quality in microfinance literature, followed by an overview of Islamic microfinance institutions and their risk profile. The sections that follow will deal with data, analysis and results before a conclusion.

2. Risk in Microfinance: A Survey of Literature

Risk has become a critical issue in microfinance, as the sector is growing and evolving into a full-fledged financial industry. The recent crisis in India is one important case to consider, where local government of Andhra Pradesh closed down 50 branches of two large MFIs due to accusation that these MFIs have employed 'forced loan recovery practices', which had caused several clients to commit suicide out of shame (Shylendra, 2006). In retrospect, the crisis could have been averted should the authorities and MFIs consider broader risk factor in the district, among others seasonal droughts, 'frenzy lending' of commercial microcredit to clients who are used to subsidized loans, and multiple borrowings practice by mostly farmers who used the loans for consumption purposes (Taylor, 2011; Mader, 2013).

While microfinance is known for its very high repayment rate, MFIs can still face inevitable and pressing challenges. The unique lending model without any collateral to the poor, as well as the vulnerability of their clients' businesses due to their small scale and unpredictable market conditions, can create real problems for MFIs. In fact, high repayment rate that is built on classic model where early repayment is encouraged by the group lending mechanism may inhibit growth of microenterprises and potential impact on poverty alleviation, as borrowers are prevented from investing in risky or longer term businesses (Field *et al*., 2013).

This section will identify and explain major risks that could adversely affect all type of MFIs, to be followed by an overview of existing empirical studies that look at the impact of risks on IMFIs. The 'myth' that microfinance lending structure is robust, especially with group lending that guarantees the loans are always repaid, will also be examined. With the increasing number of IMFIs that use individual lending approach, they may no longer be able to rely on inherent resilience of group solidarity, and hence the robust structure will gradually weakened. This development poses IMFIs with range of issues that could damage their performance and reputation. Therefore, in addition to sources of risk with the borrowers and organization or governance of IMFIs, high repayment rate practice will also be reviewed here to understand any potential vulnerability to the microfinance system.

2.1 Sources of Risk and Vulnerability in Microfinance

2.1.1. Borrowers

Borrowers are the first and possibly the main source of risk in microfinance, particularly related to uncertainty and vulnerability of their micro-businesses in the current economic climate, followed by risk factors within the MFIs such as lack of governance, and other risk factors related to market environment (Lascelles *et al*., 2014). There are two reasons for this claim. First, most of the borrowers of microcredit do not have any financial security to protect them from any loss of exposure to risks. Minor problem with their shop or farm would have devastating consequences to income flows to the poor's family. As demonstrated in the case of Andhra Pradesh, inability to repay debts to microfinance institutions had caused few poor clients to commit suicide (Shylendra, 2006). This tragic outcome could stem from lack of education on the clients part, but ultimately MFIs should recognize and identify ways to minimize and mitigate risks exposed to their clients.

The second argument is the inherent risk in the nature of businesses many micro borrowers have. The money they borrowed from MFIs is often used for trading activities in the market, petty shop at home, or some craftsmanship activities. These are types of businesses that are vulnerable to both seasonal and business factors i.e. the small scale makes them prone to losses or low sales volume. Should the borrowers fall into slight difficulty, they immediately find themselves unable to repay the loan and meet the weekly or monthly instalments due to MFIs.

For the borrowers, lack of financial security and unpredictability of microbusiness are the two main sources of their vulnerability. For borrowers in the rural farming sector, they are also facing other risks related to weather, pests, climate change, and other natural hazards (Isakson, 2015). In general, micro borrowers must also deal with risks related to the operations of their microbusiness, effective use of loan, commodity price volatility or adverse market conditions, increasing competitions, and other external factors.

Most of the risks related to internal deficiencies have been addressed in most microfinance programmes, especially through group lending strategy that impose peers pressure and control system among the borrowers. In fact, Crabb and Keller (2006) suggest that group lending methodology reduces risk in microfinance portfolio, while individual lending tends to increase risk for MFIs. Hence, for MFIs that are adopting individual lending system there are still more risks that need to be addressed, especially credit risk.

2.1.2. Commercialization and Competition of Microfinance Sector

Commercialization is alleged to be responsible for the rising of risk profile among MFIs. It has invited different kind of risk to microfinance, including the international market risk resulted from the exposure of MFIs to international and commercial funding sources. Some studies suggest that commercialization is responsible to the increase in vulnerability of MFIs. This claim is evident from a slight shift in the literature on the effect of external shocks to microfinance institutions. Most studies in 1990s suggest that MFIs are relatively immune and unaffected by few major financial crises, most notably the Asian financial crisis in 1997/98. For instance, Krauss and Walter (2009) using dataset from 1998 to 2006 find that there is no significant relationship between MFIs and global market movements or external shocks. They suggest that MFIs seems to be 'detached' from any shocks affecting global capital markets.

However, there are also competing claim on the impact of commercialization. In a more updated study and using more recent dataset Wagner and Winkler (2013) find the contrary to previous studies. They find that during the global financial crisis of 2008-2009, there has been a negative impact on real credit growth of MFIs across the world, especially those MFIs that enjoyed rapid growth few years before the crisis. This study confirms a presence of boom-bust theory in microfinance.

The prevalent of commercialisation also encourage the emergence of many studies on its impact. This is evident in the increasing interest of many researchers on commercialization and competition in the microfinance sector. Commercialization and subsequent trade-off between sustainability and poverty outreach are among the most widely discussed aspects of the recent microfinance studies. The issue of commercialization has attracted many researchers and observers to explore the topic (Hamada, 2010).

These studies have gradually contributed to the emergence of a new sub-topic of its own within

microfinance studies i.e. microfinance as asset class or mission drift. The main reason for such growth of this particular subject is the inconclusive outcome from most studies. There is no definite winner in this debate whether a commercialization is ever presence, or whether the MFIs have indeed been drifting away from its main cause, and most importantly whether the commercialization is bad or good for the poor.

The debate is triggered among others by potential implications these studies could have on policy and structural design of microfinance programmes. If the trade-off is indeed established and valid, microfinance stakeholders must choose for one that is most suitable for their circumstances. If the main objective is reaching out to as many poor people as possible, then they must sacrifice or bear with potential lack of profitability or sustainability, and vice versa.

Likewise, the interest of international investors to microfinance, which is considered as an 'asset class', is also on the rise. From the commercial investors' point of view, microfinance is seen as an attractive choice for portfolio diversification measured in terms of risk-return profile (Galema *et al*., 2011). Specifically, MFIs operating as rural banks are more attractive than other forms such as NGOs for international investors. Undoubtedly, rapid growth in the microfinance industry has intensified competition among MFIs and in the process their exposure to newer and more severe risks. This development sanctions the need for MFIs to consider more sophisticated risk management approach and strategy.

2.1.3. External Factors: Socio-Economic and Political Forces

Microfinance sector may also face external risks such as natural disasters, armed conflicts, war, famine, and macroeconomic difficulties. External risks are still the main concern for nearly all microfinance institutions in developing countries. Natural disasters and similar risks may lead to business failure or crop failure, whereby many developing countries have suffered from floods, cyclones, or other calamities that destroyed many of the income generating assets of the poor. Localized epidemics and illnesses could also affect the ability to earn a livelihood or to repay the loans. Calamities in the family might result in loan funds being diverted into non-income generating activities.

In a specific case, microfinance sector may also derive risks from its geographical location, as many MFIs operate in the poorest regions in the world, which mostly are also affected by continuous arms conflict, recurring natural disasters, or situated in landlocked countries. For instance, Gunter (2009) and Casselman *et al*., (2014) illustrate the issues faced by microfinance institutions in post-conflict Iraq, where microfinance is used as both economic re-development tool and peace building apparatus.

2.2 Type of Risks Faced by Islamic Microfinance Institutions

All types of microfinance institutions face similar forms of risks, to a certain degree. As a financial institution, MFI deals with similar risks faced by other financial institutions such as commercial bank. In general, MFIs must deal with such risks as credit or portfolio risk, liquidity risk, interest rate risk, default risk, operational risk, and other types of risk (Ledgerwood and White, 2006). However, although MFIs might face similar risks to financial institutions, they do have unique features that cause MFIs facing different set or magnitude of risks. What differentiates MFIs from commercial banks is the magnitude of each risk exposed to each one of them.

MFIs are more likely to face less severe risks compared to commercial and large scale banks or investment companies, given the scale of lending MFIs are making. For instance, commercial banks may face massive credit risk from their exposure to volatile the housing sector as the financial crisis of 2008 illustrates. However, smaller degree of magnitude may not necessarily mean less catastrophic for the microfinance sector. As will be discussed in later section, exposure to risk in irresponsible lending have led MFIs in Andhra Pradesh, or other places, to face unprecedented loss and reputational damage (Mader, 2013).

Hence, the number of risks that may affect microfinance can be classified into at least three categories, for instance Steinwand (2000) proposed three main categories of risk, namely a) financial risks, b) operational risks, and c) strategic risks. In a different arrangement, Ledgerwood and White (2006) suggest that MFIs are prone to such risks as a) ownership or governance risk, b) credit risk, c) liquidity risk, d) operational risk, e) interest rate risk and f) reputation risk. The classification as suggested by Steinwand (2000) is summarized in Table 1.

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Table 1: Categories of risk facing MFIs

Financial Risks	Operational Risks	Strategic Risks
a. Credit Risk – Transaction risk – Portfolio risk	a. Transaction Risk – Human resources Risk – Information and technology risk	a. Governance Risk – Ineffective oversight Poor governance structure
b. Liquidity Risk	b. Fraud (Integrity) Risk – Legal and Compliance Risk	b. Reputation Risk
c. Market Risk – Interest rate risk – Foreign exchange Risk – Investment portfolio risk		c. External Business Risks – Event risk

Source: Steinwand (2000)

The main risk category that all MFIs are facing is financial risk, and in particular credit or portfolio risk. MFIs face various and endless uncertainties related to credit risk of their borrowers on a daily basis. Although microfinance is known for its high repayment rate, mainly due to peer monitoring in the group lending structure (Stiglitz, 1990), default or payments delinquency due to lack of good governance or poor financial performance may cause MFIs to face serious problems (Ayayi, 2012).

Secondly, operational risk, which includes risk due to information technology malfunction and fraud, has little precedent in microfinance. However, this category is an important risk factor that requires careful mitigation and management. One of the contributors to the microfinance crisis in Andhra Pradesh district of India was irresponsible lending in pursuing 'reckless growth' and loans recovery by field officers of the MFIs in the district (Mader, 2013).

Finally, the main issue in the strategic risk is governance. Governance risk is related to a possible influence of shareholders, donors and even regulators on the performance of the MFIs, either financial performance of social performance. This type of risk is particularly devastating for MFIs operating as non-governmental organizations (NGOs) that are dependent on external parties for funding such as development agencies and donor organization. Empirical studies on governance and ownership also share the same conclusion, that a well-defined governance structure (Mersland and Øystein Strøm, 2009) and to a lesser degree, ownership (Mersland and Strøm, 2008) are important performance determinants for MFIs.

In addition to these risks, IMFIs and other Islamic financial institutions face unique set of risks unlike their conventional counterparts. In addition to dealing with risks associated with overall banking or financing operations, they may also face risks relevant only to Islamic financial institutions. IMFIs may face different risks that emanates from its distinct features compared to conventional financial institutions such as use of profit and loss sharing contracts in their funding and financing (Salem, 2013), or the complexity of Islamic financing modes and risk aversion and religiosity of its clients (Abedifar *et al*., 2013).

These features may expose IMFIs to different kind of financial risks. Such distinctive possible risks for Islamic financial institutions are summarized in Table 2.

Table 2: Specific characteristics and possible risks facing IMFIs

No.	Islamic financial institutions	Conventional financial institutions	Possible risks for IMFIs
1	Must comply with Islamic principles	Non-existent	1. *Sharia* compliance risk
2	Prohibition of *riba* (usury, interest)	Based on interest rates	2. Rate of return risk 3. Mark-up benchmark risk
3	Lending facilities must be backed by physical assets	Lending facilities are money based on interest rates	4. Commodity price risk 5. Increase operational risk for delivering/holding assets or inventory
4	Variety of contracts, ie. profit loss sharing (PLS)	Non-existent	6. Equity investment risk 7. Increase operational risk (and

			asymmetric information)
5	Restriction in requesting collaterals and penalties	No restrictions imposed	8. Increase credit risk
6	Investment accounts (deposits) are based on profit loss sharing *(mudarabah)*	All deposits are determined by interest rates	9. Displaced commercial risk
7	Restrictions on secondary markets and interbank activities	Secondary markets witness continuous innovations	10. Increase liquidity risk

Source: Salem (2013)

More comprehensively, the range of risks confronting Islamic financial institutions are similar with the risks faced by other financial institutions which stem from the two types of risks, namely financial risk and operational risk. The former consists of credit risk, market risk, liquidity risk and equity investment risk, while the later consists of internal operational risks and external or business risks.

As mentioned in the earlier sections, IMFIs are facing multitude of risks originated from its unique condition. IMFIs may be affected by risks that come from institutional uniqueness of Islamic financial institutions as discussed in the earlier section and also due to its nature as microfinance institutions, Islamic or otherwise. In addition, Islamic microfinance must also confront risks from its geographical location, as many IMFIs are based in the poorest and most vulnerable regions in the world. Countries where IMFIs are located often affected by continuous arms conflicts, recurring natural disasters, and infrastructure bottleneck specific to poor countries. For instance, Gunter (2009) and Casselman *et al*. (2014) illustrate the issues faced by microfinance institutions in post-conflict Iraq, where microfinance faces tremendous challenges and at the same time opportunity as an economic re-development tool and peace building apparatus.

2.3 Impact of Risk on Microfinance Institutions

Microfinance sector is vulnerable to all similar forms of risks affecting financial services industry, especially credit and market risk. Higher indebtedness of the borrowers have caught the attention of researchers and policy makers recently, as the microfinance crisis of Andhra Pradesh district in India shows (Taylor, 2011). Several cases of suicide in the district were allegedly related to microfinance borrowing, and these incidents had led the local government to freeze all microfinance activities for several months in 2006, until the case was resolved in 2007.

The main problem with Andhra Pradesh was competition and client selection. In pursuit of portfolio growth, MFIs offer loans often to borrowers who already have loans from other MFIs. In turn, this aggressive lending, and subsequently when the borrowers were unable to pay, few of these MFIs resorted to aggressive loan recovery. Shame was used by the collectors, and in many traditional society 'shame' is a lethal weapon, which led some borrowers to commit suicide (Mader, 2013). In the end, proper client selection and portfolio management is key to minimize credit defaults, since the majority of MFIs have very few defaults or delay in their payments as illustrated by high repayment rate of well-known MFIs such as the Grameen Bank. Therefore, the MFIs have the main responsibility in managing their portfolio and clients.

Portfolio quality is indeed an important aspect for MFIs. In a study involving 350 MFIs from 70 countries, D'Espallier *et al*. (2011) find that type of borrowers may have a different outcome for MFIs and they suggest that lower portfolio at risk and lower write-off rates are associated with higher proportions of women borrowers. Although this finding is not supported in the case of Andhra Pradesh, where clients are women, attention to portfolio quality is key to risk management for MFIs. On the other hand, Zeballos *et al*. (2013) find that the borrowers at risk of defaulting are not necessarily those investing in risky projects or risk takers. In a study involving 200 borrowers in Bolivia, the authors find that the defaulters are in fact 'take too little investment risk'.

In term of funding source, especially related to exposure to external or international funds, MFIs could also be exposed to events taking place in the international financial markets. Wagner and Winkler (2013) find that the global financial crisis in 2008 to 2009 has had a significant impact on global MFIs, especially in terms of real credit growth extended to their poor clients.

However, Krauss and Walter (2009) suggest that MFIs are somewhat 'detached' from international

capital markets, unlike other asset classes in mostly emerging markets criteria. This is due to ownership structure of most MFIs that are privately held with long-term strategic interest and not driven by market forces. MFIs are also less dependent on capital markets for funding, as they are being supported by international development agencies. This ownership and funding structure has created stability with MFIs, at least until quite recently. However, they warn that as the MFIs becoming more commercialised, the stability advantage provided by such ownership and funding structure may deteriorate and their exposure to market risk will increase.

2.4 Risk Management

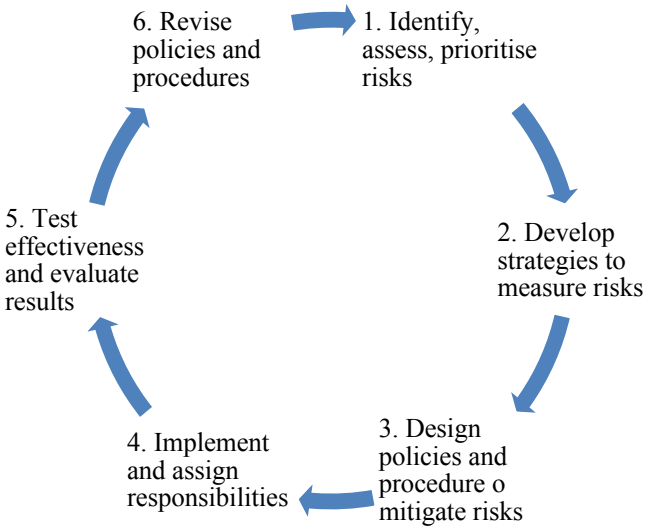
As borrowers are the main risk factor, clients' selection and portfolio management are key to risk management for IMFIs. IMFIs could mitigate adverse selection in their lending process by among others imposing strict clients selection or risk scoring, as ex ante measures in making loans to the poor. Hernandez and Torero (2014) find that non-parametric risk scoring test is a better evaluation method that may prevent including potential 'bad' borrowers from microcredit markets, and at the same time may help include 'good' borrowers into the markets.

In addition, some forms of social risk management and micro-insurance have been proposed, ex post, to equip micro borrowers and lenders with some tools to deal with exposure to risks. Multilateral organization such as the World Bank is a keen promoter of social risk management in a broader public finance context, as evident from key publication such as Holzmann and Steen (2001). In practice, social risk protection takes the form of micro-insurance and in the form of limited liability lending or group lending method employed by majority of MFIs, which in effect are a combination of ex ante and ex post measures of risk management.

In terms of risk management and mitigation, there has also been a surge in studies in the field of microfinance. Some papers suggest a comprehensive approach to risk mitigation. This is due to the fact that MFIs face multitude of risks, not only credit risk but also risks associated with liquidity management, market conditions, transactions, fraud, governance, and reputation (Khan and Ashta, 2013). Therefore, they suggest that MFIs should manage all risks by assessing repayment abilities of their clients by using tools such as social collateral, management information systems, and at the same time invest in products and markets diversification, and engagement with all stakeholders.

Financial risk management for microfinance institutions are structured around four main areas of concerns, namely portfolio quality, capital adequacy, liquidity management and asset-liability management (Ledgerwood, 2013). More specifically, Fernando (2007) proposes that risk management is a continuous process as shown by Figure 1.

Figure 1 – Risk Management Process or Cycle



Source: Fernando (2007)

Risk management is often also driven or initiated by the borrowers. For instance, Lahkar and Pingali (2014) find that microfinance borrowers may diversify their exposure to risk in a group liability lending model by engaging in multiple borrowing. The study argues that instead of creating debt trap for themselves, these borrowers become members in different groups to split up the risk into small parts. The core principle of risk management in Islamic finance is risk sharing (Lewis *et al*., 2014). This is evident from the initial structure of Islamic finance that rest on the profit and loss sharing principles.

3. Hypothesis Development

This study aims to address the main inquiry whether IMFIs are facing different set of risks compared to mainstream microfinance, and to what extend do portfolio and default risk affect performance and sustainability of IMFIs. In particular, the section proposes to answer the following questions; a) are IMFIs more risky than conventional MFIs, and if so, how risky? b) what are the determinants of portfolio and default risk of IMFIs? and finally, c) what are the effects of portfolio risk on the profitability and outreach of IMFIs?

Studies of risk in conventional microfinance have evolved from examination of loan use or misuse by poor clients and its impact on MFIs to the vulnerability of MFIs as investment vehicle or asset class. However, studies of risk in Islamic microfinance are still limited, and existing literature provides only general observation on the impact of risks associated with the nature of Islamic financial transactions, i.e. profit-loss sharing mechanism. Although the existing studies do provide important perspectives on the riskiness of Islamic microfinance due to its reliance on risky financing mechanism, i.e. profit and loss sharing, a detailed analysis on how financial or market risks affect IMFIs is still currently missing. This gap prevents proper understanding on the types, and most importantly magnitude, of risks exposed to and created by IMFIs and how they mitigate these risks.

Therefore, the first hypothesis will be developed to answer questions on the nature and magnitude of risk faced by IMFIs, as well as whether these risks are similar or different with conventional MFIs. Once the type of risks is understood, the next hypothesis would be on the factors that determine risks at IMFIs. The final hypothesis will infer the effects of portfolio and defaults risks on IMFIs, especially in the context of sustainability and poverty alleviation objectives.

3.1 Are IMFIs More Risky?

Islamic microfinance and Islamic finance in general is considered to be more risky than its conventional equivalent. The use of profit and loss sharing mechanism is the main reason for this claim, where Islamic financial institution and its borrower are entering into profit or loss-sharing contract made for a financial transaction.

The contract can be designed where both bank and clients are sharing financial capital (*musharakah* or partnership scheme) or one being the capital owner while the other party is managing the venture (*mudharabah*) (Smolo and Ismail, 2011). The key risk feature of these financial contracts rest on the floating of risk and return, and the system does not guarantee any return for the IMFIs or to the depositors or investors, unlike conventional financing.

The other risky aspect of Islamic financing is related to the shifting of credit risks from financial institutions to depositors or investors (Hesse *et al*., 2008). Hesse et al. argue that profit-loss sharing mechanism also increases the overall risk on the asset side of the balance sheet, because it makes Islamic banks, or for that matter also IMFIs, more vulnerable to risks associated with equity instead of debt.

In addition, socio-economic and political conditions in the countries or regions where most IMFIs operate are fragile and uncertain. In recent years, countries like Sudan, Syria, Iraq, or Afghanistan where many IMFIs are located have been afflicted with prolong armed conflicts or war. The case study of microfinance in Iraq during and post Iraq war by Gunter (2009) provides an insight into the severity of situations the MFIs are facing. Likewise, countries such as Bangladesh, Pakistan, and Indonesia have suffered from severe natural disasters such as floods or tsunami, which set back many of the progress made by numerous IMFIs in these countries.

However, despite this dire situation, Islamic microfinance sector survives and continues to develop in

many developing countries in the Muslim world. One explanation for this encouraging development, despite challenges, is that Islamic microfinance being used as a tool to combat conflicts and rebuild communities rather than being treated as an object of disaster or victim of armed conflict (Hudon and Seibel, 2007).

This research covers a period from 1998 to 2014, during which time few major crises have taken place in the countries and regions under study, either armed conflicts or natural disasters. As such, IMFIs in this study have experienced some difficult periods and therefore affected by socio-political risks discussed above, and at the same time they survived the calamities and enjoyed periods of recovery and growth.

Hence, to the first question we argue that IMFIs are relatively more risky compared to conventional MFIs, mainly due to the distinct operational characteristics and product specifications, as well as socio economic characteristics of locations where IMFIs operate.

$H1_0$: There is no difference between risk of Islamic and Conventional MFIs.

$H1_A$: IMFIs have higher risk than conventional MFIs.

3.2 What are Key Determinants of Portfolio and Default Risks Facing IMIFs?

Number of borrowers is the main contributor to performance of any MFIs, as borrowers or clients determine how much revenue or returns will MFIs made for any given period. In relation to this, credibility of borrowers is also important, to ensure consistent repayment schedules and enable MFIs to use the instalments for new borrowers. This is the backbone of microfinance i.e. rotation of small capital or funds that MFIs have to reach out to large number of poor people.

IMFIs engage with customers who are mostly poorer than the average customers of conventional MFIs, hence they would contribute to higher probability of higher risk to IMFIs as explained in the first hypothesis. Therefore, number of active borrowers or scale of outreach will be an important determinant of risk factors for IMFIs.

Likewise, D'Espallier *et al*. (2011) claim that higher women participation in (conventional) MFIs is associated to lower portfolio at risk, write offs ratio, and also provision to loan loss. Hence, the assumption is also in line with such study and predicts that percentage of female borrowers will be significant to portfolio at risk and write off ratio indicators.

In addition, availability of funds is critical to the ability of IMFIs to continue making micro loans to the poor. Majority of IMFIs rely on donor or charitable institutions for their sources of funding, thus provide them with less, or often no obligation to return the funds unlike savings or investments from commercial investors. Regardless, cost of funds in the form of borrowings and deposits will contribute significantly to risk profile of IMFIs.

Finally, IMFIs operating in difficult regions must employ field officers who are not only capable to mitigate hostile working environment, but also equipped with sufficient understanding of Islamic financial transactions. Unfortunately, this type of workforce is not easy, nor cheap, to find. In the end, IMFIs must operate at a much higher overall cost than their conventional counterparts or other competition.

However, no indicator that captures this factor in the current dataset. The regional control variable is the only indicator that reflects the impact of socio political risks on microfinance. Although crises, armed conflicts, or natural disasters do not discriminate countries based on their regional locations, unfortunately recent political crises and fatal disasters tend to concentrate in certain regions. Thus, regional control variable may provide some hint on the determinant of risks, especially socio-political, on IMFIs. Therefore, the second hypothesis is as follows:

$H2_0$: Portfolio and credit risk are not influenced by any factors.

$H2_A$: Portfolio and credit risk are influenced by outreach and operational cost.

3.3 What are the Effects of Profitability and Outreach on Portfolio Risk?

Higher percentage of portfolio at risk or write off ratio could reduce the ability of IMFIs to extend their outreach, as the funds that are available must be set aside for mitigation, as well an increase in portfolio recovery cost. As previous hypothesis suggests that outreach is an important determinant in measuring portfolio and default risk profile of IMFIs. In addition, profitability will also deteriorate, as IMFIs must deal with risk and increased cost. Therefore, higher portfolio at risk will adversely affect both profitability and

outreach of IMFIs.

One of the effects of higher risk profile is increase in the price or interest rate charged (Gutiérrez-Nieto *et al*., 2016), as MFIs recover their lost from the borrowers. Gutiérrez-Nieto *et.al* further suggest that high interest rates is unavoidable due to high risk nature of microfinance lending, as well as high cost of funds, high personnel and administrative costs. In addition, risk management and mitigation is even more important for MFIs in dealing with portfolio risk, since ex post loan recovery is costly and there is no guarantee of its success.

While this negative causal effect is foreseeable, the main question is whether poverty alleviation or profitability objectives have any effect on risk profile of IMFIs i.e. whether outreach and return on assets have any effect of portfolio at risk and write off ratio. As IMFIs set out their primary objectives, either outreach or profit – or both, they may inadvertently increase portfolio at risk or even credit risk potentials in their loan portfolio.

It is expected that profit oriented IMFIs will be reluctant to lend to high risky projects and avoid risk-taking borrowers, as suggested by Shahriar *et al*. (2016). They also claim that for profit oriented MFIs target borrowers who already have established and high turnover businesses, rather than start-ups that may have high potentials of failure. Likewise, it is safe to say that non-profit oriented IMFIs will be more likely to finance high risky business ventures and support poor borrowers who use their loans for start-up business activities.

These characteristics entail that non-profit oriented IMFIs, thus putting more emphasis on outreach rather than ROA, will likely to have higher portfolio risk and perhaps also credit risk. On the hand, profitability will have negative relationship with portfolio at risk, as profit orientation leads to less risky projects and lower portfolio at risk and write off ratio. Hence, the third hypothesis is as follows:

$H3_0$: No relationship between outreach, profitability with portfolio, credit risk.

$H3_A$: Outreach and profitability will have opposite relationship with respect of portfolio and credit risk.

4. Data and Estimation Methods

4.1 Dataset

Data for this study is derived from the MIX Market database that is accessible from its website (www.mixmarket.org). MIX database has been used by similar researches and studies, including Cull *et al*., (2009) and Mersland and Strøm (2010), as it is currently the most comprehensive and reliable database provider on global microfinance institutions. The panel dataset covers the period from 1998 to 2014 and include microfinance institutions in four regions that have IMFIs, namely East Asia and Pacific, South Asia, Middle East and North Africa and Eastern Europe and Central Asia.

Table 3 summarizes the distribution of IMFIs vis-à-vis conventional microfinance institutions across regions. IMFIs constitute only 3.4% of the overall samples of MFIs, and they are located in four major economic regions in the developing world. Although the sample of IMFIs is relatively small compared to the total MFIs, it reflects the actual situation where total IMFIs in the world is still relatively small compared to the universe of microfinance institutions. One estimates from recent CGAP study also suggests that the share of IMFIs is still around 2-3% compared to the total (El-Zoghbi and Tarazi, 2013).

Table 3: Distribution of MFIs across Countries

Region	MFI Type		Total (Obs.)	IMFIs share (Obs.)
	Conventional	Islamic		
East Asia and the Pacific	1,888	32	1,920	1.7%
Eastern Europe and Central Asia	2,832	13	2,845	0.5%
Middle East and North Africa	484	151	635	23.8%
South Asia	2,449	70	2,519	2.8%
Total	7,653	266	7,919	3.4%

MIX database classifies MFIs into several categories, based on regional location, legal status, profit orientation, and age. There is also quality of the reports submitted by MFIs into the system, where MIX categorise these MFIs according to the number of diamond each MFI deserves, where 1 diamond for being less reliable and 5 diamonds being the most reliable or verified by audited reports.

However, MIX Market does not classify MFIs into type of business, i.e. Islamic or conventional. This category was introduced into the current dataset, where all of the MFIs are classified into MFI Type Islamic and MFI Type Conventional. This research employs manual method to classify MFIs, where all MFIs that offer Islamic micro financial services and products are labelled as IMFIs, regardless whether their MFIs are fully Islamic (full-fledged IMFI) or partially, where Islamic micro loans are offered in parallel with conventional products and services (often referred to as 'Islamic windows').

4.2 Descriptive Statistics

The summary statistics of all variables measured in this chapter is presented in Table 4. The variables that have significant differences with each other, i.e. between conventional MFIs and Islamic, are highlighted.

The first striking difference is portfolio at risk past 30 days for IMFIs that is significantly higher than conventional MFIs, or 12% versus 6%. In microfinance literature, any portfolio at risk higher than 10% is considered to be risky while any ratio lower or around 5% is regarded as healthy or reasonable. The higher portfolio at risk indicates that IMFIs have more borrowers who delay their loans instalments for more than a month, or in practice constitutes 4-5 weekly payment cycles.

The second notable difference is the positive return on assets for conventional MFIs and negative for IMFIs. It may suggest that IMFIs are operating at significantly disadvantage position vis-à-vis conventional MFIs, however we shall confirm this status with the regressions.

The other noticeable difference is with average loan balance/size, in both nominal term and ratio to income per capita. The average loan size per borrower of conventional MFIs is more than USD4200, or more than four times that of IMFIs at just above USD900, while the average loan balance per borrower to GNI/Capita is nearly three times that of IMFIs. The main contributor to this important different is the size of conventional MFIs in the dataset, which include some of the largest MFIs in the world including Bank Rakyat Indonesia and Grameen Bank.

Finally number of active borrowers (NAB) highlights the capacity and ability of conventional MFIs to serve poor customers, where NAB for conventional is more than double that of IMFIs. The huge gap may be due to the state of conventional MFIs that started much earlier than IMFIs, such as Grameen Bank and Bank Rakyat Indonesia who are pioneers in Bangladesh and Indonesia, respectively. This difference might impair the capacity of IMFIs to compete financially with much powerful conventional MFIs in the current situation.

Table 4: Summary Statistics Comparison

	Islamic MFIs			**Conventional MFIs**		
Variable	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
MFI type – Islamic	266	1	0	7653	0	0
MFI type – conventional	266	0	0	7653	1	0
Portfolio at Risk > 30 days	209	0.12	0.40	5846	0.06	0.15
Portfolio at Risk > 90 days	159	0.05	0.05	4604	0.05	0.09
Write off ratio	186	0.01	0.05	5172	0.01	0.07
Return on assets	207	-0.03	0.17	5764	0.01	0.16
Operational self sufficiency	239	1.25	0.44	6399	1.15	0.88
Cost per borrower	196	184.95	254.89	5297	226.70	687.78
Log cost per borrower	196	4.60	1.18	5266	4.22	1.52
Number of active borrowers	246	45379.94	116781.40	6974	90255.39	504556.00
Log number of active borrower	246	8.92	1.88	6948	8.71	2.30
Avg. loan balance per borrower	245	911.23	1117.73	6914	4268.12	145883.20
Avg. loan balance per borrower to	242	0.58	0.78	6868	1.58	46.81

GNI/Capita						
Percentage of female borrowers	191	0.56	0.23	5180	0.62	0.26
Yield on gross loan portfolio (real)	125	0.26	0.13	4293	0.24	0.16
Log borrowing	176	14.16	2.34	4798	14.57	2.28
Log deposits	201	4.40	8.05	5308	6.48	8.80
Age – new	258	0.25	0.43	7354	0.20	0.40
Age – young	258	0.29	0.45	7354	0.22	0.42
Age – mature	258	0.47	0.50	7354	0.57	0.49
Profit status orientation (non)	260	0.65	0.48	7212	0.59	0.49
Profit status orientation (for)	260	0.35	0.48	7212	0.41	0.49
Legal status – bank	263	0.16	0.37	7587	0.13	0.34
Legal status – Credit Union	263	0.06	0.25	7587	0.18	0.39
Legal status – Non Bank/NBFI	263	0.27	0.44	7587	0.29	0.46
Legal status – NGO	263	0.51	0.50	7587	0.34	0.47
Legal status – rural bank	263	0	0	7587	0.03	0.18
Legal status – other	263	0	0	7587	0.02	0.12
Region – East Asia & Pacific	266	0.12	0.33	7653	0.25	0.43
Region – East. Europe & C. Asia	266	0.05	0.22	7653	0.37	0.48
Region – Middle East & N. Africa	266	0.57	0.50	7653	0.06	0.24
Region – South Asia	266	0.26	0.44	7653	0.32	0.47

In general, IMFIs are markedly different from conventional MFIs in key performance areas, mainly portfolio risk, profitability, outreach, and cost. This descriptive statistics provides an indication on the area of differences, but this needs to be tested and analysed further in the regressions.

4.3 Empirical model

This study will use Ordinary Least Squares (OLS) regression to analyse performance of risk indicators for Islamic microfinance institutions vis-à-vis its conventional MFIs. The estimation model follows Abedifar *et al*. (2013) who employ the same model in their study of risk in Islamic banking.

$$Y_{it} = \alpha + \beta_1 IMFI_{it} + \beta_2 Profitability_{it} + \beta_3 Outreach_{it} + \beta_4 Cost_{it} + X_{it} + \varepsilon_{it}$$

Y is set of dependent variables consisting of portfolio and default risk indicators, namely; a) Portfolio at risk past dues more than 30 days (PaR>30days); b) PaR>90days; and c) Write off ratio. These dependent variables follow the approach of Cull *et al*. (2007) and Crabb and Keller (2006) in measuring portfolio quality using Portfolio at Risk past 30 days (PaR>30days), PaR>90days, Loan Loss Rate and Write off ratio. Loan loss rate, which is similar to write off ratio, is not included in this study.

Portfolio at risk is defined by MIX Market as "the value of all loans outstanding that have one or more installments of principal past due more than [XX] days. This includes the entire unpaid principal balance, including both the past due and future installments, but not accrued interest. It also includes loans that have been restructured or rescheduled." Hence, Portfolio at Risk that is due more than 30 days, or PaR>30 days, represents all loans that are due or late in their instalment by the borrowers for thirty days of more with respect to total gross loan portfolio. Such delay in repayment or instalment is considered a warning for MFIs, since MFIs have usually gone through four to five collection cycles. Therefore any loan portfolio that registers persistent PaR>30 days of more than 10% from the total loans, or in some cases as low as 5%, should send a warning to MFIs.

Likewise, PaR>90 days is an indicator similar to PaR>30 days, but for longer period. As a general rule, any loan portfolio with PaR>90 days of more than 10 percent has more likelihood of default than for shorter period PaRs. Therefore, this indicator represents a more severe situation for IMFIs; the more portfolios that are delayed by more than ninety days, the more risky the IMFIs are.

Finally, Write off ratio represents all loans that have been written off by MFIs during a given period. In the words of MIX Market, "a write-off is an accounting procedure that removes the outstanding balance of the loan from the Loan Portfolio and from the Impairment Loss Allowance when these loans are recognized as uncollectable." Therefore, write off ratio (WOR) is a percentage of write off from the total gross loan

portfolio at any given period.

Explanatory variables consist of key indicators that influence and determine the level of risk and its determinants for IMFIs, namely a) MFI Type, b) Profitability/Yield, c) Outreach, d) Cost indicators, e) Set of control variables (age, region, profit orientation), and f) Error term.

The dummy variable MFI Type (MFItype_Islamic) is the main explanatory variable that measures the relationship between portfolio and default risk and IMFIs. This variable represents all MFIs in the dataset that are offering sharia-compliant microcredit products and services, either as full-fledged IMFIs or as unit/division within conventional MFIs.

The second group of explanatory variables consist of variables that explain the models. This includes a) Yield, b) Outreach, c) Portfolio quality, and d) Cost indicators. These indicators are revenue or real yield to gross loan portfolio (YieldonGLP_real); outreach variables (only for profitability regression) of log_NAB or number of active borrowers for scale of outreach and Avg_loan GNIP and percentage of women borrowers are measuring the depth of outreach.

Yield is the most important contributor to profitability of MFIs, and it represents interest charges for the clients. Yield is measured in term of interest and fees received on loan portfolio, either nominal or the ratio between interest and fees and average gross loan portfolio, or real, which is nominal yield adjusted to inflation rate. For IMFIs, yield is in the form of profit margin, fees or other *Shari'ah* compliant pricing mechanism. For this research, the yield used in the model is the Real Yield on Gross Loan Portfolio.

Further, outreach is a proxy to the measurement of poverty alleviation impact by microfinance intervention. Outreach can be examined in two aspects, scale or breadth of outreach and depth of outreach. The former is measured by number of active borrowers served by IMFIs. The latter measures whether microfinance is really targeting the poorest segment of the community, through indicators such as Average Loan Balance to the GNI/Capita and Percentage of Female Borrowers.

Cost indicators consist of variables that represent cost factors that are used by IMFIs in their operations. These indicators have been used in relevant literature, especially Kar (2011), namely Cost per borrower, Deposits and Borrowing. Cost per borrower represents operational cost in serving each borrower or client, while deposit and borrowing represent funding mobilization activities that will incur some costs for the IMFIs, either in term of profit sharing to depositors or investors and cost of borrowing to the lenders.

The third group of independent variables are control variables X_{it}. The control variables are Age, to control effects of age of the MFIs to the models, next is the differences in legal status of IMFIs, differences in respective regions where MFIs are located, and finally differences in profit orientation of the MFIs (non-profit versus for-profit). These variables have been used in the existing literature, especially Cull *et al*. (2007) and Kar (2011).

Finally, ε_{it} is error term, where individual effect assumption of $\varepsilon_{it} = 0$ is expected to hold. It is included to accommodate any other factors that may affect the model but unaccounted for.

5. Results and Discussion

The main hypothesis of this research is that IMFIs face a higher exposure to portfolio and credit risks of their clients, due to unique characteristics of Islamic financial products that are more risky and prevalent uncertainty in the socio-economic and political situation in many Muslim countries. In essence, portfolio quality of IMFIs is predicted to be lower than the conventional MFIs. Portfolio quality constitutes the most important aspect of the performance, sustainability, and survival of IMFIs. The discussion on regression results will centre on some of the characteristics of the portfolio quality of IMFIs as measured by two indicators, namely portfolio at risk past 30 days and portfolio at risk past 90 days. On the other hand, credit or default risk will be measured by Write off ratio, as this indicator represents the percentage of loans in the portfolio that have to be written off.

The variable of PaR>30days measures the percentage of gross loan portfolio that is overdue more than thirty days, and the borrowers have not made any payment or instalment of the loans since then. This variable is a useful proxy to potential default, because when the loans are due and past thirty days, it means the borrowers have missed at least four meetings or instalment cycles. PaR>30days indicator is not only an early warning signal, but also a default warning for small and subsidy dependent IMFIs. When there are large number of clients who are unable to meet instalments schedule more than four times (four weeks/30 days), IMFIs will face significant liquidity problems and inevitable portfolio or credit risk.

Likewise, Par>90days also provides similar information and signal for IMFIs, and this variable measures percentage of late payments/instalments for longer period than the former. In some cases, late instalment by one month may be considered very conservative and inflexible to clients, especially if their micro-businesses are having slightly longer business cycles, i.e. more than one month. Hence, PaR>90days can be used as an extended proxy to potential default with the gross loan portfolio. Finally, when all precautionary measures have been put in place, there is an ultimate indicator that amount for problems in the portfolio that is Write-offs Ratio. This ratio sums up all the defaults and bad loans in the portfolio, which need to be cleaned and written off from the financial books of MFIs.

The following discussions deal with the magnitude and impact of portfolio risk to IMFIs in details. The discussion will be divided into three parts, namely the magnitude of portfolio quality and default risk faced by IMFIs, the determinants of these portfolio and default risks, and the impact of portfolio and default risks on the sustainability and poverty outreach of IMFIs.

5.1 How risky are Islamic microfinance institutions?

The main regression results in Table 5 suggest that portfolio quality of IMFIs is significantly negative, for all indicators. Portfolio at Risk past 30 days of the IMFIs is lower by 2.2 percent compared to conventional MFIs, while PaR past 90 days is lower by 2.9 percent. Likewise, Write off ratio is significantly negative and lower by 1 percent than other MFIs. The results indicate that despite difficult socio-economic condition in many countries where IMFIs located, they are unaffected as shown by the lower portfolio at risk and write off ratio. However, the result is different with the hypothesis on portfolio quality of IMFIs, which was assumed to be much poorer. The result suggests that IMFIs are less risky than conventional MFIs.

It could be suggested that IMFIs are relatively safe from default, as indicated by lower percentage of Portfolio at Risk (PaR) and Write off ratio (WOR). The negative signs signify that IMFIs have managed their loan portfolio at a healthy level, and reflect the lower riskiness of their borrowers. The results are also different from summary statistics table, where mean values of portfolio at risk for IMFIs are higher than the conventional MFIs. The summary statistics table measures central tendency of all variables, including PaR > 30 days, while panel data regression measures PaR>30 days in relation to all relevant variables such yield, number of active borrowers, deposit, and more.

Further, the percentage of loans due more than thirty days (PaR>30days) is significantly lower by more than 2 percent, and so does the portfolio with more than three months delay of repayment/instalment (PaR>90days). This consistently low portfolio at risk, as well as lower write off ratio, implies that the borrowers are neither delaying payments to IMFIs nor avoiding them altogether. The assumption that IMFIs face a higher exposure to portfolio and credit risks of their clients is not evident in this regression, despite unique characteristics of Islamic financial products that are more risky and uncertain in socio-economic and political situation.

Intuitively, these results suggest that clients of IMFIs have no difficulty to repay their loans in either the short period of one month or in the relatively longer period of three months. Hence, it could be argued that IMFIs are less risky than conventional MFIs. These regression results provide evidence to suggest that IMFIs are less risky or facing less risky clients than conventional MFIs. The following discussions deal with the determinants and impacts of risk factors to IMFIs in details.

5.2 Determinants of Portfolio and Default Risk

For the first model, the results show that IMFIs have a significantly lower short-term portfolio at risk, as indicated by negative coefficient of 2.2 percent. The results imply that portfolio quality of IMFIs is relatively higher than conventional MFIs, possibly resulted from more rigorous portfolio management of the IMFIs or repayment characteristics of their borrowers (El-Komi and Croson, 2013). As mentioned in the earlier section, this lower portfolio at risk is achieved despite unfavourable condition facing IMFIs.

From the regressions, the relationship between profitability and portfolio risk is significantly negative, and as the return on assets increases by 1 percent, the percentage of portfolio at risk will decline by 29.3 percent. The result is consistent with theory and hypothesis, which says that since the profitability of IMFIs negative then portfolio at risk would be higher or positive. Yield on loan portfolio is also significantly negative to the first model of portfolio at risk, which is consistent and similar with the relationship between

ROA and PaR>30days.

Further, the result shows that percentage of female borrowers is negatively related to portfolio at risk and write off ratio, which denotes that a decrease in one percentage of female borrowers at IMFIs will increase percentage of portfolio at risk by 4.9 percent, and even default. This result emphasizes an important point on the approach of IMFIs that target 'family' rather than commonly targeted women borrowers. The negative relationship implies that if IMFIs were to minimize portfolio risk, they should increase participation of women borrowers in their portfolio. In microfinance literature, the repayment rate and compliance of women borrowers are significantly higher than men, hence it makes sense why women borrowers are less risky in microfinancing (D'Espallier *et al*., 2011). While the approach of targeting family as a unit has its merit, targeting women borrowers will in the end also assist the family, and perhaps more so because when women participated more actively in economic activities, income and welfare of the family would improve.

Number of active borrowers or outreach is also an important determinant for portfolio quality of IMFIs. The result suggests that an increase in one percent of the number of active borrowers will adversely affect portfolio at risk by 1.8 percent. This negative relationship implies that larger number of clients increase riskiness of IMFIs. This result also suggests that additional clients increase risk profile and potentially portfolio risk of IMFIs. Implicitly, IMFIs should impose rigorous clients' selection process, because by design an increase in number of clients will entail more exposure to portfolio and other type of risks brought by larger and more diverse borrowers.

Similar to PaR>30days, the second model PaR>90days embodies portfolio risk of MFIs for loans that are due and have not been paid by the borrowers. This indicator measures the percentage of loans that could pose potential risk to MFIs, as denoted by the percentage of loans that are due for more than ninety days or three months. This indicator represents a higher risk for MFIs as the delays in payment are more than twelve payment/collection cycles, assuming MFIs are having four weekly group meetings for collection, disbursement, or payment each month. As the IMFIs dummy variable is significantly negative in this second estimate, it means that the percentage of loans that are due more than three months are lower for IMFIs.

Likewise, percentage of female borrowers also adversely affect the portfolio at risk past due 90 days by 2.3 percent, as it does to portfolio at risk past 30 days. This negative relationship highlights the importance of female borrowers to portfolio quality of IMFIs. While the current approach of targeting family as clients has its advantage in terms of broadening clients' base, the result merits consideration.

In addition, age of IMFIs is an important determinant. As the institutions begin their journey in microfinance, IMFIs are expected to be more cautious and vigilant in their client selection process. The result suggests that older IMFIs has significantly positive relationship with PaR > 30days by 2.6 percent, but negative by 3.1 percent with PaR>90 days. It means that older IMFIs have higher percentage of portfolio at risk in the short term (over one month) but lower portfolio at risk over a longer-term period (over three months). The borrowers of IMFIs are only delaying their repayment or instalments, and eventually settle their loans. This finding challenges the results of studies on the business cycle of microfinance, for instance Wagner (2012) and Hollis and Sweetman (2001) that indicate more mature MFIs suffer higher risks than the younger ones.

5.3 Determinants of Default

Performance of IMFIs is also determined by percentage of losses recorded in their book, or write off ratio. The final model summarizes the results of these bad loans and indicates whether write off ratio is detrimental to IMFIs or not. The result shows that write off ratio of IMFIs does not pose any concern, as it is significantly negative. Hence, there is a strong evidence to suggest that write off ratio for IMFIs is lower by 1 percent than their conventional counterparts.

A significantly lower write off ratio can be explained by number of active borrowers, percentage of female borrowers, cost per borrower, borrowings and deposits. The first two indicators represent outreach; both scale and depth of outreach, and the rest of the significant variables represent cost factors. The scale of outreach indicator shows that an increase in one percent of Number of Active Borrowers will increase Write off ratio by 0.5 percent, while an increase in Percentage of Female Borrowers will reduce Write off ratio by 0.9 percent. This different effect of scale and depth of outreach to default risk indicates that depth of

outreach is more significant to IMFIs. Percentage of female borrowers is indeed an important factor for portfolio quality of IMFIs, as previously been discussed in PaR>30days and PaR>90days models.

This result confirms that higher participation of women borrowers reduces exposure to risks and default of IMFIs (D'Espallier *et al*., 2011). Although most of IMFIs do not specifically target women borrowers, this finding suggests that conventional practice of serving only women borrowers has sound empirical support. Probably it is about time for IMFIs to consider their approach in selecting clients.

5.4 The Effect of Outreach and Profitability on Risk Profile of IMFIs

Overall, the main effect of lower poverty outreach or profitability on portfolio at risk and write off ratio is mixed. As predicted, outreach indicators are mainly negative to portfolio at risk and write off ratio, suggesting that increase in number of borrowers, including higher percentage of female borrowers, will reduce portfolio at risk, but not write off ratio. It seems that higher scale of outreach will increase write off ratio. This latter result implies that large number of borrowers in IMFIs loan portfolio are high risk or involved in high risky ventures, which in hindsight is consistent with the hypothesis that non-profit MFIs will take more risk than profit oriented ones. Since most of IMFIs are non-profits, this result is consistent and reasonable.

Further, percentage of female borrowers seems to be an important factor for overall portfolio quality of IMFIs. This proxy to depth of outreach is significantly negative for both portfolio risk indicators and write off ratio. This result confirms that higher participation of women borrowers reduces exposure to risks and default of IMFIs by 0.9 percent. Although most of IMFIs do not specifically target women borrowers, this finding suggests that conventional practice of serving only women borrowers has sound empirical support. Based on this result, IMFIs could consider their approach related to clients' selection that involves family unit and not just women.

However, for profitability indicator, the relationship with portfolio at risk and write off ratio is only significant for one model, i.e. portfolio at risk past 30 days. Despite insignificant result, return on assets indicator has a negative relationship with all risk indicators. This negative relationship implies that higher profitability will reduce portfolio and default risk, which is consistent with the hypothesis.

Finally, although the R-squared of the estimation results are very low, unlike previous studies by Cull *et al*. (2007) or Crabb and Keller (2006), the overall regression results in Table 5 provides some clues on the portfolio quality of IMFIs and its determinants. Profitability, outreach, and cost are certainly the main contributor to portfolio quality and credit risk of IMFIs.

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Table 5: Regression results of IMFIs Riskiness (OLS)

	PaR>30days	**PaR>90days**	**Write off ratio**
MFI type – Islamic	-0.022**	-0.029**	-0.010***
	(0.010)	(0.014)	(0.003)
Return on assets	-0.293***	-0.023	-0.018
	(0.094)	(0.042)	(0.018)
Yield on GLP – real	-0.035*	-0.016	0.003
	(0.021)	(0.020)	(0.005)
Log no. of active borrowers	-0.018***	0.004	0.005***
	(0.005)	(0.004)	(0.002)
Average loan balance per borrower to GNI/capita	0.003	-0.0006	-0.0005
	(0.003)	(0.001)	(0.000)
Percent. of female borrowers	-0.049***	-0.023**	-0.009*
	(0.016)	(0.011)	(0.005)
Log cost per borrower	-0.015**	0.005	0.009***
	(0.007)	(0.007)	(0.003)
Log total borrowings	0.003	-0.003	-0.002**
	(0.003)	(0.002)	(0.001)
Log total deposits	0.008***	-0.0002	-0.003***
	(0.002)	(0.002)	(0.001)
Age – young	0.007	-0.030**	0.009
	(0.016)	(0.014)	(0.006)
Age – mature	0.026*	-0.031**	0.006
	(0.013)	(0.014)	(0.004)
profitstatus_for	0.012	0.003	-0.005*
	(0.008)	(0.008)	(0.003)
legalstatus_bank	0.029	-0.089	-0.024
	(0.021)	(0.084)	(0.015)
legalstatus_creditunion	0.017	-0.070	-0.020
	(0.020)	(0.089)	(0.015)
legalstatus_nbfi	0.009	-0.091	-0.022
	(0.018)	(0.085)	(0.015)
legalstatus_ruralbank	-0.007	-0.067	-0.024
	(0.025)	(0.085)	(0.016)
legalstatus_ngo	0.039*	-0.073	-0.023
	(0.020)	(0.088)	(0.015)
Region – E. Asia & Pacific	0.024*	-0.012	0.007*
	(0.015)	(0.012)	(0.003)
Region – M. East & N. Africa	0.007	0.013	0.004
	(0.020)	(0.025)	(0.005)
Region – South Asia	0.003	0.009	0.015**
	(0.020)	(0.019)	(0.007)
Constant	0.132***	0.157	0.009
	(0.047)	(0.115)	(0.016)
N	746	785	746
adj. R-sq	0.077	0.035	0.062

Robust standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.010

6. Conclusion

This paper aims to shed some lights on the performance of IMFIs and their encounter with portfolio and credit risks. The paper also examines the response of IMFIs when exposed to different types of risks vis-à-vis their primary objectives of poverty alleviation and sustainability. The overall results suggest that IMFIs are facing different but less severe risks than their conventional competition due to funding mechanism and the nature of Islamic financial contracts.

While the majority of IMFIs clients are from the poorest segment in the society, often with lower educational level, and live in countries considered to be high risk or have histories of instability, the risk profile of IMFIs remain moderate and manageable. In fact, Islamic microfinance sector survives and thrives in many countries with history of prolong conflict and natural disasters. In some instances, the IMFIs are relatively able to contribute to poverty alleviation in these countries and sustain their operations. The main contributing factors to the resilience of IMFIs are their unique funding mechanism and lack of leverage.

As for the results, this paper finds that IMFIs are less vulnerable and face lower percentage of payment delays and default. Likewise, determinants or factors contributing to portfolio and credit risk at IMFIs are profitability or return on assets, percentage of women borrowers, and cost of funds. These indicators are important for the survival of IMFIs in the long run, as they will face tougher competition and intense commercialization.

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