Management of Islamic Finance: Principle, Practice, and Performance

Participating Mortgages: An Alternative to Housing Finance
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CHAPTER 9

PARTICIPATING MORTGAGES: AN ALTERNATIVE TO HOUSING FINANCE

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ABSTRACT

Since the 2007–2008 financial crisis, the markets related to housing finance have been restoring their tools and instruments in order to avoid a new crisis. In this period, while attempting to eliminate structural problems in existing housing finance instruments, on the other hand new products were tried to figure out. In particular, products based on risk sharing have frequently come to the forefront, both in the academia and the industry. In this direction, one such innovative product is the participating mortgage, in which the borrower obtains below-market interest rates in return for a percentage of the property's future appreciation and/or net operating income. Particularly used in conventional markets, participating mortgage can also be applied within the Islamic finance thanks to the model it is based on. This chapter attempts to introduce the method of participating mortgage with detailed background and intellectual investigation. Including the modeling of participating mortgage, this study also shows how this method can be designed under Islamic finance. Furthermore, implications and fields of application are explored with a discussion of challenges. In this chapter, considering the achievements of participating mortgage method, it is asserted that it can enable the product diversity of the Islamic banks, thereby increasing the share in the global banking sector.

Keywords: Housing finance; participating mortgage; Islamic finance; stochastic modeling; risk-sharing; implication

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1. INTRODUCTION

The global financial crisis of 2007–2008, which still profoundly reflects its influence all over the world, has led to a reexamination of transactions in financial markets. In particular, housing finance products became one of the highly disputed issues. Following the crisis, while attempting to eliminate structural problems in existing products, on the other hand new products were tried to figure out. Housing finance products have been leading the restructure and renovation process in terms of their responsibilities and disruptiveness in the crisis. On both the legal and market sides, the need for adjustment and update of the products based on the mortgage has become the primary object in housing finance market.

Mortgage-based products have taken an important place in the global financial system during the last quarter of a century. The need for such products is mainly shaped by housing demand, although it varies according to the specific characteristics of the housing market. As an individual need of sheltering and an investment tool, the demand for the housing sector that constitutes a significant part of the real estate market is also a structural determinant of the financing instruments in the market. For this reason, the factors determining the demand for housing are the main areas of interest of the real estate market. The determinants of housing demand can be mainly categorized as hedonic, demographic, and macroeconomic. Among the hedonic determinants, the main factors such as location, size of area, number of rooms, and age of the house are shown in a general manner. In the demographic determinants, population growth, age, sex, and family structure are foreground. As macroeconomic determinants of housing demand, variables such as housing prices, income, and interest rate are generally used. In all these determinants, the interest rate, which can be considered as the cost of housing financing, appears to be the most prominent one in terms of not only borrower but also lender.

Due to the magnitude of the scale of influence created by the interest rate, which is the basic financing cost in the housing market, it seems that various methods and instruments have been applied in practice in order to reduce the cost or its effect to a minimum level. Especially for the last ten years, with the collapse of financial markets and rising of Islamic finance, products based on risk sharing have frequently been found on the agenda in the markets. Participating mortgage, based on the risk and revenue sharing principle, has come to the forefront among these products in housing market due to both its applicability and coverage. Participating mortgages (i.e., participation mortgages or PMs) allow borrowers to obtain below-market interest rates in return for a percentage of the property's future appreciation and/or net operating income. Particularly used in conventional markets, participating mortgage can also be applied within the Islamic Finance markets thanks to the model it is based on.

This study will reintroduce, explore, and expand on the financing arrangement known as a Participation Mortgage. First, this chapter will cover the features, history, types, contributions, and design in Islamic finance. Then, the chapter will focus on the modeling of participating mortgages. Thereafter, implications for participating mortgages will be analyzed. Finally, this study will explore the fields in which the PM structure can be applied.

2. WHAT IS PARTICIPATING MORTGAGE?

2.1. Definition

The recent financial crisis has proven that risk sharing may reduce the magnitude of the impact in case of the market crash. As a basic description, PM is an alternative "financial innovation where the lender accepts a below market interest rate in return for a contingent share in the cash flows from operations and/or appreciation of the property" (Ebrahim, 2006). Essentially, in this type of mortgage, the borrower receives a loan at a below-market interest rate. In exchange, s/he makes additional interest payments contingent on the net operating income of the mortgaged property and/or additional payments based on a stated percentage of the appreciation in value of the mortgaged property at the time of any stipulated "equity event" (Murray, 2006).

PM allows the borrower to have the ownership in the property while sharing the downside market risk with the lender. In conventional banking, the mortgage lender is interested with the refund of a given debt and does not consider the property appreciation. However, for a commercial PM, the expected performance and risk of the investment determines the credit and debt positions of the lender and the borrower, respectively. While the lender can receive a return higher than the market interest rate, borrowers may also have advantageous mortgage rates. Similar conditions can be transcribed for the borrower of a residential mortgage. S/he forgoes a ratio of the property's rent or sale proceeds in order to get lower mortgage payments. Additionally, participation conditions for any kind of property can be adjusted in the contract depending on the agreement between the borrower and the lender. The flow chart of PMs is ilusstrated in Figure 1.

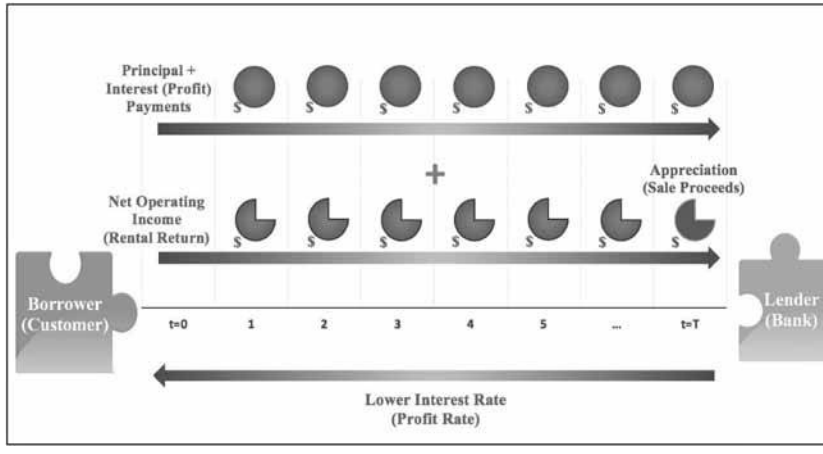

Fig. 1. Flow Chart of Participating Mortgage.

2.2. Types

Depending on the value of participation rates, various kinds of agreements can be arranged between the borrower and the lender. Three common types of participating mortgages are defined in Ebrahim and Hussain (2010) and Ebrahim, Shackleton, and Wojakowski (2011). These are shared income (SIM), shared appreciation (SAM), and shared equity mortgages (SEM). In the first one, the lender participates in the mortgage by receiving only a proportion of the net operating (or rental) income in exchange for allowing a coupon rate below the market interest rate. In SAMs, the lender participates the mortgage by receiving only a proportion of the sale proceeds in exchange for allowing a coupon rate below the market interest rate. For SEMs, the lender waives interest payments of the borrower by receiving a proportion of the net operating (or rental) income and sale proceeds.

2.3. History and Literature

Participating mortgages were first developed during the 1970s (Kiefer, 1986) when interest rates were high and became popular in the mid-1980s, as an alternative to the traditional fixed-rate mortgages. However, they were never popular enough, because borrowers were reluctant to share in the appreciation of the property and adjustable rate mortgages, which had lower initial rates, were also introduced around the same time. Another unfortunate situation for PMs is the rise of the secondary mortgage-backed securities market in that period. Furthermore, due to poorly written loan origination agreements coupled with the capital requirements of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA)[1] participating mortgages were never popular in the United States. Furthermore, in the study of SAMs and their usage in the UK, Sanders and Slawson (2005) mentions "The SAM has never been a popular alternative mortgage design, but periodically reappears like a mortgage version of a Phoenix arising from the ashes."

The majority of the literature on PMs is over two decades old, until relatively recently, little has been written on these mortgages, and even now, except Varli and Yildirim (2015) no literature has addressed the effects of default and prepayment risks in pricing such mortgages. PM needs to be reintroduced to the real estate finance community. Fortunately, "equity kickers" and "SAMs" are often used in workouts in properties recovering from the financial crisis or mezzanine loans (Coopchik & Yildirim 2015). Therefore, the use of PMs in commercial loans needs to be reintroduced to facilitate lending based on shared risk and shared profit.

Caplin, Cunningham, Engler, & Pollock (2008) argues that ''development of shared appreciation mortgage (i.e., SAM) markets in the United States would moderate the impending decline in homeownership and lower the risk of future housing crashes. SAMs can increase the affordability of homeownership by reducing the amount of monthly payments and spreading risk more broadly between borrower and lender…" Thus, the PM can be reintroduced to the market in addition to packaging mortgages and creating mortgage-backed securities to reduce the mortgage rate[2] for affordable housing. Therefore, the PM can prevent

the next potential financial crisis. However, the risk of default and prepayment for PM needs to be studied in order to prevent problem areas from arising. This study also examines these potential challenges and discusses them.

Few of the earlier studies emphasize the general framework of participating mortgages. The rest of the literature focuses on a similar but more specific type of mortgage called SAM. For example, Alvayay, Harter, and Smith (2005) represents a partial equilibrium model to estimate the extent of the lender's participation and conducts a comparative analysis of the factors affecting it. Ebrahim (1996) demonstrates that participating mortgages improve social welfare, which implies that they are Pareto superior to conventional mortgages. Ebrahim, Shackleton, and Wojakowski (2011) establish a basic framework of participating mortgages and describe a facility to the mortgage system. However, they use constant risk-free interest rate as a discount rate in their model. The definition of general participating mortgage in the chapter is split up into different forms such as SIM, SEM, and SAMs. Varli and Yildirim (2015) extend their structure into a more realistic case incorporating widely used early termination cases such as default and prepayment options, adopting stochastic interest rate model.

Initial studies on participating mortgages rely on the model as an attempt to reduce the levels of high-interest payments in the United States (Dougherty, Van Order, & Villani, 1982). Additionally, Page and Sanders (1986) and Dougherty, Van Order, and Villani (1990) also focus on the effects of interest rate risk on the SAMs. Sanders and Slawson's study (2005) is one of the more comprehensive studies that forms the mortgage pricing model for SAMs adapting the fixed-rate mortgage model of Kau, Keenan, Muller, & Epperson (1992).

2.4. Mechanism

Participating mortgage basically means that not only the debtor side but also the creditor side provides participation into the mortgage. While the standard mortgage model in general is a debt contract in a conventional manner, there is a partnership situation between the parties along with a debt in the model of PM. Here, while the debtor side shares the return provided by the real estate with the creditor side, there is a reduction in the debt obligation compared to the standard mortgage. The borrower can reduce or even reset the interest payment according to the share ratio that the borrower will make from the returns. In this context, the creditor institutions (e.g., banks) reduce interest payments on their monthly installments in proportion to their share in the returns of given real estate.

A PM is a type of loan in which portions of the excess payoffs are shared across borrower and lender for any kind of real estate. In order to get a mortgage rate below market interest rate, the borrower pays a proportion of net operating income and sale proceeds of the property. This kind of risk-sharing strategy brings beneficial outcomes for both parties in a mortgage contract especially in emerging economies. Thus, participating mortgages surpass conventional mortgage instruments for a high-return investment. The borrower owes a rate less than the market coupon rate and the lender obtains a higher yield than the conventional mortgage rate.

The findings in Varli and Yildirim (2015) show how the mortgage rate, which is one of the most important variables in mortgage financing, is constructed and then examined under base case parameters that they use in their analysis. In their base case scenario, the mortgage rate reduces to 0.89% from 8.04%, giving 10% participation to the lender in a given mortgage. It is also shown that reduction in the mortgage rate varies according the type of participating mortgage. Since their model depends on the parameters, by changing the values of the parameters, different level of mortgage rate can be reachable accordingly.

2.5. Contributions

Currently, the world has been facing higher rates of interest compared to the time of over liquidity, just after the 2008/09 financial crisis. As a result of the contraction in liquidity following the tapering initiated by the US Federal Reserve, particularly economies of emerging countries are affected. In emerging countries, investment in financial markets such as real estate has been decreasing in recent years. It is clear that asset prices that have almost reached the balloon level in the period of liquidity abundance, and the limited possibility of obtaining a return due to these prices are also effective in this decline. In particular, the real estate sector of emerging countries, especially Turkey, cannot show the old boom levels due to higher cost of financing as well as higher prices. At this point, the model of PM is likely to have several contributions, particularly in emerging countries, to offset the growing stock of real estate supply in recent years. As an alternative method of financing, PM can be transformed into practice and found in various contributions to the economies of the countries.

In general, PMs have the potential of solving problems that can lead to financial crisis. Compared to classical conventional type of mortgages, PMs are more equitable and less risky for the borrower especially in the case of having contract with high fixed rate of interest. Coopchik and Yildirim (2015) open this argument thus:

> Because profit sharing is the centerpiece of a PM, banks are forced to make more educated loans based on an in-depth inquiry into the business savvy of the borrower. However, for the extra risk, PM loans have the potential to bring in higher yields than the average fixed rate mortgage. To promote the use of PMs, they must be reintroduced with a framework that will facilitate their securitization in the secondary mortgage market, which was not the case when PMs were first used in the 1980s.

In the context of participating mortgages, lenders (banks, etc.) are attracted to PMs because they provide a "hedge" against inflation, especially in connection with long-term contracts. By participating in a given real estate, lenders can also get higher returns compared to fixed rate of interest. More importantly, PMs can provide higher yields and may be less risky in a workout transaction (Barach, 1991; Murray, 2006). In the same way, PMs also have a number of advantages that make them attractive to the borrower including less overall economic risk, hedging against high interest rates during periods of significant inflation, additional or "contingent" interest payments are fully tax deductible, the ability to retain full ownership and control of the mortgaged property up to the maturity date,

and possibly eliminating the need to obtain separate equity financing (Coopchik & Yildirim, 2015).

Ebrahim, Salleh, and Sheikh (2014) also state that

> PM confers a "preferred" status to the financier who then ranks higher than the equity-owner and it is instrumental in reconciling the conflict of interest (agency cost of debt) between financiers and real estate developers, especially in case of construction loans). This accrues to the long gestational period in real estate development to reach a state where the payoffs are sufficient to service the fixed interest obligations ensuing from a traditional mortgage. Thus, investors are in a state of predicament, as low levels of cash flow in the construction phase expose them to default risk, while financiers are debarred from benefiting from the success of the real estate venture.

3. DESIGN OF PMS IN ISLAMIC FINANCE

It is clear that scaling up the Islamic finance products based on the concepts of risk sharing, participation, etc., is a necessity in a current structure in which about 80% of the Islamic financial assets in the world are formed by banking and 90% of the instruments that are not based on risk sharing within banking. When we look at the existing Islamic banking in terms of housing finance, it appears that these banks do not generally have a unique holdout method other than the *murabaha* (*Bai' Bithaman Ajil* (BBA) – Deferred payment sale), so the share of partnership-based loans in these banks in all loans is generally less than 5% and not available to individual customers. Diminishing *musharakah* (*Musharakah Mutanaqisah* (MM) – Diminishing partnership), which is a special form of *musharakah* (Capital partnership), is used in some parts of the Islamic world such as Malaysia. However, its share in housing finance is minor compared to the widely used methods such as *murabaha* and *ijarah* (leasing).

However, although MM method of financing depends on the principles of partnership in capital, it has been implementing just as a transfer process of ownership of given property in practice. MM is based on the co-investment of borrower (customer) and lender (bank) in a given real estate. The borrower of MM is not only obliged to get the ownership shares of lender periodically, but also charged to pay rent for the use of the whole property. In theory, the payments for both share of the property and rental should be revised periodically to reflect the current market situation. In practice, however, the amounts of these payments are already determined at the beginning of contract. Therefore, MM method which is fully based on the principles of partnership has not been widely implemented so far as a product of Islamic banks. For this reason, one of the basic principles of Islamic finance, the risk-sharing principle, is unfortunately not implemented widely in the mortgage sector.

Comparing with other methods, participating mortgage can be also served as a solution to Islamic banking sector for the need in housing finance. Structure of PMs forms a benchmark model for housing finance containing risk sharing and partnership principles (see Table 1). Ebrahim, Salleh, and Sheikh (2014) elaborate the hybrid structure of PMs and introduce a facility called Participating Preferred Ijarah (PPI), which is inspired by PM. They demonstrate that a PPI based on PM

Table 1. Comparison of BBA, MM, and PM.

	Bai' Bithaman Ajil (BBA)	*Musharakah Mutanaqisah* (MM)	Participating Mortgage (PM)
Contract type	Debt	Equity	Debt + Equity
Method	*Murabaha*	Diminishing *Musharakah*	Hybrid (*Ijarah* + *Mudharabah*)
Pricing	Principal + fixed mark up	Variable principal and rental payments	Principal + variable equity payments
Risk sharing	No	Yes (for both principal and rental payments)	Yes (for equity payments)
Belonging right	Borrower	Joint (borrower and Lender by their share)	Borrower
Cost of default	Fee	No fee	No fee

is constructed by merging *ijarah* (whose payoffs are capped and reduced) facility with a *mudharabah* (equity contract with restricted voting rights) one. In this study, they also point out that

> A PPI security is generally preferable to a convertible one for the following reasons: (i) it alleviates the fragility of the financial system by 'giving respite to borrowers' (Qur'ān 2:280) and (ii) it allows an investor to retain control of the firm even in the good state of the economy, unlike convertible debt, where the conversion to equity dilutes these control rights. A PPI (in general) reduces the agency costs of debt better than plain vanilla (*ribawī* – interest bearing) debt or that of a *murabaha* or a *tawarruq* (reverse *murabaha*) facility.

Achievements of PM model can be categorized for the substance of Islamic principles:

1. *Risk Sharing*: PM offers a contract that shares the risk with all parts of the contract. This model encourages an investment opportunity instead of a debt agreement. Therefore, each part in the model shares not only the profit but also the loss. *Mudharabah* (labor and capital partnership) and *musharakah* (capital partnership) financing tools can be used in here. Also, they can be combined with some other tools and some hybrid tools can easily be constructed.
2. *Standardization*: It is known that the main reasons why partnership-based financing methods, especially in housing finance, are not attracted by Islamic banking, are difficulty of calculating such financing methods and the lack of standardization. With PM structure and modeling, a standardized product for mortgage financing is provided in Islamic principles. This model can be used for any type of mortgages and any kind of mortgage structures. PM calculates the financing condition with respect to parameters in the model, so calculations may vary with changing parameters. For example, if a borrower wants to change the term of the loan, then PM model calculates the amount of new loan. Therefore, PM proposes a model, which is out of *gharar* (uncertainty, hazard). Each part in the contract knows what s/he needs to pay (or get).
3. Interest-free modeling: Instead of using interest rate, market rate of return, which is determined in the Sukuk market or calculated using the performance of a commodity index in a given stock exchange, can be preferred in Shariah-compliant PM modeling. Therefore, PM brings fully interest-free modeling in the mortgage market.

4. Adding prepayment and default options using Islamic principles: In the advance model of PMs, early termination situations such as prepayment and default can be modeled and priced (Varli & Yildirim, 2015). This solution for prizing the early termination risks in a given mortgage type would be beneficial for Islamic banks to imply it and present their customers easily.

Due to the frequency of applications on the market, methods of *murabaha* and *ijarah* usually come to the forefront as instruments of interest-free housing financing. Similarly, most studies in the literature rely on these two methods (Chapra, 2011; El-Gamal, 2006). However, the "diminishing *musharakah*" method has often been examined in studies as a housing finance product based on partnership and risk-sharing. While Smolo and Kabir Hassan (2011) show that this method may be more appropriate in comparison with other methods in terms of Islamic finance principles, and that relevant parties may be more advantageous than conventional mortgage models and *murabaha* methods, Fauziah, Ramayah, and Abdul Razak (2008) focused on the factors that influence the practice of this method. Dinc (2017) focused on the applicability of this method in Turkey. However, the studies mentioned above on all the interest-free housing finance products have not adequately focused on the technical aspects. To the best of our knowledge, it is observed in the literature that technical models such as stochastic processes have not been used at the point of interest-free housing finance.

4. MODEL

Following Varli and Yildirim (2015), the ***profit process*** P_t (i.e., net operating income from operations by renting the property) can be defined as

$$dP_t = \left(r_t - \delta_p\right) P_t dt + \sigma_p P_t dZ_t^P \tag{1}$$

where r_t is the expected return (i.e., risk-adjusted yield) and δ_p is the constant periodic cash yield (i.e., similar to dividend yield in stock). Additionally, σ_p denotes the volatility of profit process and Z_t^p is a standard Brownian motion with respect to the physical measure. In commercial (residential) mortgage, P_t refers to operational income (rental earnings).

Real estate property value as $\boldsymbol{H_t}$ is generated in a similar way from the following stochastic process;

$$dH_t = \left(r_t - \delta_H\right) H_t dt + \sigma_H H_t dZ_t^H \tag{2}$$

Kau et al. (1992) defines δ_H as a service flow from using the real estate over time. Note that the borrower and the lender share the maintenance cost for the property, in proportion to their participation in the mortgage. The volatility σ_H indicates how the property value deviates from its mean. Z_t^H is donated as the standard Brownian motion for the process.

For the tractability of the calculations, it is assumed that the ***expected return*** on both the profit and real estate property value are the same, r_t, and follows Vasicek (1977) model (Bakshi, Cao, & Chen, 1997; Deng, Quigley, & Order, 2000);

$$dr_t = \alpha(\theta - r_t)dt + \sigma_r dZ_t^r \tag{3}$$

where α denotes the speed of mean reversion, θ is the long-run mean rate, and σ_r denotes volatility. It is also assumed for simplicity that the values mentioned above are not correlated with the expected return, i.e., $E\left[dZ_t^p dZ_t^r\right] = E\left[dZ_t^H dZ_t^r\right] = 0$.

Initial loan balance is defined as $Q_0 = L \times H_0$, where L stands for the loan-to-value ratio. The loan includes continuous mortgage payments of a_t for all $t \in [0,T]$ where T is the maturity of the mortgage, and the terminal payment (i.e., balloon payment, sometimes also called the bullet payment) B_T at maturity. *The outstanding loan balance (OLB)* at any time $s \in [0,T]$; Q_s, is equal to the sum of discounted expected value of the future mortgage payments and the terminal balance such that

$$Q_s = \int_s^T e^{-r_s(t)(t-s)} E_s\left[a_t\right]dt + e^{-r_s(T)(T-s)} E_s\left[B_T\right] \tag{4}$$

where $r_s(t)$ is the term structure of risk-adjusted yield. For simplicity, the structure of non-amortizing mortgage, also called interest-only mortgage, is employed in which there is a balloon payment consisting of the entire principal amount of the mortgage at maturity. Therefore, the OLB for each period equals to the initial loan payment, implying $Q_t = Q_0 = B_T$ for all $t \in [0,T]$. Continuous mortgage payments are determined with a constant proportion i of OLB and $a_t = iQ_t = iQ_0$ for all $t \in [0,T]$, where i is the mortgage rate representing the cost of using mortgage determined at time t. If there is no prepayment, default, and any other risk, then the mortgage rate i equals to the risk-free interest rate.

In comparison to conventional mortgage, participating mortgages offer a participative contract between the lender and the borrower. In return for reduced mortgage rate, PM promises the lender to a part of either the excess payoff from the periodic net operating income or the gain of the sale proceeds or both. In other words, the borrower compensates the declined mortgage rate in the mortgage contract by giving a share of the excess profit flow (i.e., $(P_t - K)^+$) or the appreciation of the property value at the mortgage maturity (i.e., $(H_t - H_0)^+$) to the lender. K and H_0 denote the fixed threshold for the profit flow and the initial value of the property, respectively. These threshold points can change depending on the agreement between the borrower and the lender. The share of the excess profit flow is binding by the contract, so both the lender and the borrower agree on the amount of the profit summed. Therefore, *continuous mortgage payments*, a_t, and the *remaining balance at maturity,* B_T, in participating mortgages now become:

$$a_t = iQ_t + \underbrace{\theta_p\left(P_t - K\right)^+}_{\text{Share of Excess Profit (NOI)}} \tag{5}$$

$$B_T = Q_T + \underbrace{\theta_H \left(H_t - H_0\right)^+}_{\text{Share of Appreciation}} \tag{6}$$

where θ_p and θ_H are the participation rates for the excess profit flow and the property appreciation value, respectively.

Then the *OLB* formulation for PMs is

$$Q_s = \int_s^T e^{-r_s(t)(t-s)} E_s\left[iQ_t\right]dt + \theta_p \int_s^T e^{-r_s(t)(t-s)} E_s\left[\left(P_t - K\right)^+\right]dt + e^{-r_s(T)(T-s)} Q_T + \theta_H e^{-r_s(T)} \tag{7}$$

Using the assumption of non-amortization, *OLB* becomes

$$Q_s = \int_s^T e^{-r_s(t)(t-s)} iQ_0\, dt + \theta_p \int_s^T c\left(P_s, K, t, r_s(t)\right)dt + e^{-r_s(T)(T-s)} Q_0 + \theta_H c\left(H_s, H_0, T, r_s(T)\right) \tag{8}$$

where $c(\cdot)$represents the pricing formula for European call option. Value of call option and other details can be found in Varli and Yildirim (2015).

Mortgage Rate in PM Structure: The borrower decides what percent of the excess profit flow (i.e., θ_p) and the appreciation (i.e., θ_H) to share with the lender in order to lower the mortgage rate. At the time of mortgage origination, formula for *the mortgage rate*, *i*, is

$$i = \underbrace{\left[\frac{1 - e^{-r_0(T)T}}{\int_0^T e^{-r_0(t)t}\, dt}\right]}_{\text{Conventional Rate}} - \underbrace{\left[\frac{\theta_p \int_0^T c\left(P_0, K, t, r_0(t)\right)dt + \theta_H c\left(H_0, H_0, T, r_0(T)\right)}{Q_0 \int_0^T e^{-r_0(t)t}\, dt}\right]}_{\text{Reduction in PM Structure}} \tag{9}$$

where the part in brackets on the right-hand side reflects the reduction in mortgage rate in the case of a participating mortgage in comparison to conventional mortgage. Therefore, higher participation means higher reduction in mortgage rate. Other factors effecting the mortgage rate are initial loan-to-value (i.e., LTV) ratio L and Q_0, i.e., $Q_0 = L \times H_0$.

In their study, Varli and Yildirim (2015) show that the mortgage rates can be arranged with a desired level by altering LTV ratio. In their base case scenario, while the mortgage rate in a conventional mortgage (i.e., $\theta_p = \theta_H = 0$) for LTV of 80% is calculated as 8.04%, the rate is reduced to 0.89% in a PM case with 10% participation for profit cash and property value (i.e., $\theta_p = \theta_H = 10\%$). When both participation rates are nearly 11.24%, the mortgage rate becomes zero in their base case scenario. They also illustrate how mortgage rate can be reduced in the participating mortgage setup by changing the values of participation rates and LTV ratios. However, this reduction depends on the conditions of the loan with respect to parameters employed. Furthermore, thresholds of profit and initial value of the property determine the continuous excess profit and appreciation of the property, respectively.

In this model of PMs, interest rate in the mortgage contract can be reduced to zero. With zero interest rate, the structure of PM becomes interest free and can be evaluated within the umbrella of Shariah-compliant framework. In addition, as mentioned above, without any interest it consists of two parts, namely *ijarah* and *mudharabah*.

However, since $r_s(t)$ is defined above as the term structure of risk-adjusted yield and used as a discount factor, it should be altered in order to have a fully Shariah-compliant structure. Therefore, instead of risk-adjusted yield, market rate of return which is determined in the Sukuk market or calculated using the performance of a commodity index in a given stock exchange, can be preferred in Shariah-compliant PM modeling.

5. IMPLICATIONS

5.1. Current Usage around the World

When we look at the current usage of PMs in housing finance, we find alternative names such as "shared," "contributory" mortgages, although these names refer almost to the same intuition. Another commonly used name in commercial mortgage loans is "kickers." As Coopchik and Yildirim (2015) categorized, there are four basic types of participations: (1) percentage of cash flow after debt service; (2) percentage of effective gross income; (3) percentage of appreciation of the property; and, (4) fixed fees. The current usage is being originated by National Commerce Bancorp of Memphis throughout the Southeast in the United States. It has been tried in both the United States and Europe for last 20 years. Sanders and Slawson (2005) says, "The SAM has never been a popular alternative mortgage design, but periodically reappears like a mortgage version of a Phoenix arising from the ashes." There are also some applications in the banking sector in the UK. UK banks issued SAMs with either zero coupon or coupon. For an extreme case of the zero-coupon SAM in the UK., it requires no payment due until the borrower sells the dwelling or dies (Sanders & Slawson, 2005). Products issued by SAMs can be considered as derivatives on the underlying property.

5.2. Applicability of PM in Islamic Finance

Similar to PM structure, there are some banking and capital market instruments in Islamic finance. Financing methods named *musharakah* (capital partnership), *mudharabah* (labor and capital partnership), *musaqah* (partnership in gardening), and *muzara`ah* (partnership in agriculture) are the well-known ones based on the principles of risk-sharing and partnership in Islamic finance. Since these types of financing methods include some risks for all the parts of any given partnership contract, and these risks cannot be easily structured and priced compared to fixed-income methods, they are hard to be preferred by not only lender but also borrower.

However, PM modeling introduced in this study provides a standardization as an alternative method in housing finance. Borrower of PM calculates how much s/he owes in each period with the help of the formulation of OLB. Additionally, since the model depends on the parameter, as long as the borrower has information on the parameters, the contract provides her/him not to have any asymmetric information. Within this opportunity, the principle of Islamic finance, called "out of gharar" is ensured in terms of the borrower. The lender in PM structure,

should also measure the cost of the risk s/he counters. In our current world, it is a necessity to price the risks in terms of lenders to compete in the market. In this direction, Varli and Yildirim (2015) proposes how to define early termination situations such as default and prepayment in their model and to calculate their respective market risk values. To do so, they introduce the early termination clauses of prepayment and default for the PM using the option-pricing model. Therefore, the lender of PM can price these risks as it is in the conventional types of mortgages. By implementing the basic principles[3] of Islamic finance, the early termination risks can also be priced in the framework of Shariah compliance.

With all these standardizations, Islamic banks can implement PM structure as an alternative method to their customers. Herewith, risk sharing and partnership, which are the prominent principles in Islamic finance, can be applied in housing finance. In case the model of PM is put into practice, Islamic banking, which is mostly dependent on *murabaha* method, is aimed to introduce new products by building on the basis of partnership in housing finance. The PM model can also provide significant opportunities for the housing finance of developing and Islamic countries where interest rates are generally high due to country-risk premiums. The borrower of mortgage is able to reduce the interest cost to a lesser extent (e.g., a cost reduction of more than 10% per year), and the mortgage creditor can also benefit from the appreciation of the real estate prices. In addition, this model can enable the product diversity of the Islamic banks, which are growing rapidly especially for the last 10 years, thereby increasing the share in the global banking sector.

5.3. Securitization

To gain wide usage of PMs, it is also necessary a new framework that can provide opportunities to introduce PMs into capital markets. From the first use of PMs in the 1980s, there has not been any activity in terms of their securitization. That is why there is no instrument related to PM in secondary mortgage market around the world. Regarding this issue, Coopchik and Yildirim (2015) focus on legal mechanics and drafting considerations of PMs from the point of their securitization. This chapter also explores the possibility and legality of creating PM Backed Securities to be sold in the secondary market. Searching the implications of PMs in capital markets they remark that "Legal academics and lawyers in real estate finance need to reexamine this alternative lending arrangement as much has changed since its first introduction over two decades ago. This means taking a critical look at usury laws affecting the drafting and regulations hindering the tradability of mortgages with contingent interest features. Such hurdles need to be reevaluated and removed to allow these ethical lending arrangements to grow and reach the broader public."

5.4. Challenges

On the other hand, there are some challenges in PM structure that need to be overcome in order to put it into practice as an alternative method in housing finance. First challenge is about the values of parameters in the study of Varli

and Yildirim (2015), which were selected according to the values used in previous academic literature. In a practical implication, these values are to be arranged in line with the contracts that are already employed in the market. In addition, new parameters compatible with justification of existing products would be required to be added into model of PM. Other challenge is that the structure of PMs, which includes complex math such as stochastic modeling, option pricing etc., must be transformed to a simple form that helps all parts of PM to understand the model easily. The last but not the least challenge is the necessity of the valuation of periodic net operating income (rental return) or the gain of the sale proceeds or both in a given real estate project. In the given modeling of PMs in this study, the borrower pays a proportion of periodic return and sale proceeds of the property, in order to get a mortgage rate below market interest rate. However, the literature does not provide information about how the valuation in each period and at the maturity can be carried out. Therefore, institutions that want to implement PM modeling should also determine the process of valuation. This challenge can also be overcome by academic studies if the researchers would give importance not only the theoretical but also practical applications.

We do not also see exact form of application of PMs launched by the Islamic finance principles in the market; there are similar implementations of it. In Malaysia, *musharakah*, particularly diminishing *musharakah,* is used as a tool of housing finance. Initiated by The Islamic Fiqh Academy of OIC[4] and Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI),[5] Malaysia[6] is one of the Islamic countries that has significant regulations and standards on diminishing *musharakah*. Guidance Residential LLC., has also developed diminishing *musharakah* in the United States with a different name "Declining Balance Co-ownership Program." Currently, some start-up companies around the world launched a new way of Shariah-compliant method in housing finance, which is similar to PM structure. Developed within the framework of crowdfunding, Umar Munshi and Ronald Wijaya found a platform named EthisCrowd in Indonesia for affordable housing development projects. Within a similar method, other platforms such as Yielders Ltd. and PropTech Crowd Ltd. were operated in the U. K. All these investment platforms have certificates of fatwa and rely on the partnership of return yield coming from rental income or capital growth or both. These examples straighten up the possibilities of implementation of PM structure as an alternative method in housing finance.

6. FIELDS OF APPLICATION

With the design of PMs, a partnership scheme is proposed among the parts of a given mortgage. The model of PM allows the borrower to have the ownership in the property while sharing the downside market risk with the lender. Here, the lender (e.g., banks) participates in the mortgage by receiving a proportion of either the net operating income (or rental income) or the appreciation of real estate in exchange for giving up mortgage rate below the market interest rate. Hence, the lender can receive return more than the market interest rate in some

circumstances and borrowers may have advantageous mortgage rates. Therefore, PM brings a beneficial outcome, for example, win–win strategy for every part of the mortgage. Thus, PM surpass conventional mortgage instruments for a high-return investment. The borrower owes a rate less than the market coupon rate and the lender obtains a higher yield than the conventional mortgage rate.

The benchmark model within the structure of PM can be arranged for any kind of mortgage since the model is designed as parametric. By changing the parameters, it can be applied as residential or commercial mortgages. In general, any contract that has periodic cash flow or/and appropriate for valuation can be modeled within this framework in a given circumstance. Thereupon, the PM model can also find fields of application especially for the housing finance of developing and Islamic countries where interest rates are generally high due to country-risk premiums and high inflation. Besides the housing finance, the benchmark model can also be generalized for infrastructure projects. Developing financing methods based on the model of PM can be an alternative to Public Private Partnership financing, which is widely used in emerging markets for infrastructure projects. Furthermore, with some arrangements and customizations it can also be applied to other sectors such as agriculture, defense, and energy in which some financing methods based on partnership are already employed.

Introduction of PM model in housing finance and other sectors can also boost the partnerships in relevant markets. This can provide opportunities for economically disadvantageous groups by being a partner with a group who has easy access to capital. Therefore, this disadvantageous group can find a way to reach the return created by capital gain. For example, low- and middle-income group, whose housing demand is under the potential due to high cost of financing, can have a chance to afford their housing demand in PM structure. In a similar way, if the high-return investments and projects in different areas such as infrastructure, defense industry, energy, and information technology are financed by various income group within partnership style and the return are shared with them, it would be provided that low- and middle-income group can invest in high-return investments. In this way, it can be considered that progress will be made at the point of reducing income inequality while contributing to the economy.

Contribution of partnership and risk-sharing instruments to reduce the income inequality is generally omitted. Here, it is possible to talk about the ex-ante and ex-post measures of a financial system in line with Islamic principles. One of the five basic principles in Islam is Zakat, which is the most known of the *ex post* measures. With Zakat, prosperity is shared, redistribution is ensured, and social well-being is balanced. The Islamic finance system, as it is applied today, often gives priority to *ex post* measures. However, risk sharing and instruments based on this can be expressed as an *ex ante* measure. That is, sharing of income is provided as a result of risk-sharing instruments and a preventive measure is put forward. Thus, resource transfers to the economy have been realized through both preventive and corrective measures. In other words, if both "pre" and "post" processes of an economic activity are designed with Islamic principles, it can play a role in preventing income inequality.

7. CONCLUDING REMARKS

A PM is a type of loan in which portions of the excess payoffs are shared across borrower and lender for any kind of real estate. In order to get a mortgage rate below market interest rate, the borrower pays a proportion of net operating (rental) income and sale proceeds of the property. This kind of risk-sharing strategy brings beneficial outcomes for both parties in a mortgage contract especially in emerging economies. Thus, participating mortgages surpass conventional mortgage instruments for a high-return investment. The borrower owes a rate less than the market coupon rate and the lender obtains a higher yield than the conventional mortgage rate.

In practice, it can be seen that partnership-based loans in Islamic banks is very low and is generally not available to individual customers. A method based on partnership has not been developed so far in the products of PMs in Islamic banks. For this reason, risk-sharing – one of the basic principles of Islamic finance – unfortunately, cannot be implemented in the mortgage sector. In case the model developed in this chapter is put into practice, housing finance in Islamic banking will have new products by building on the basis of partnership. The model targeted in this study will also provide significant opportunities for the sides of mortgage market of developing countries, where interest rates are generally high due to country-risk premiums. The mortgage debtor will be able to reduce the interest cost considerably (a cost reduction of more than 10% per year) and the mortgage creditor will be able to benefit from the appreciation of the real estate prices. This model will enable the product diversity of the İslamic banks and thus increase their share in the banking sector.

This chapter also aimed to create an academic basis for partnership-based interest-free housing finance. Interest-based models in the existing housing finance system are not capable of supporting asset-based economic growth. This study creates an original value in this respect and supports asset-based economic growth. In recent years, the rapid increase in the supply of housing market in developing and also Islamic countries has led to the need for the demand level to keep the supply stable. If the model in this study to be developed in this framework is put into practice, it is considered that the low- and middle-income group will be able to benefit from the appreciation of the real estate prices, thus making progress to reduce the income inequality.

NOTES

1. FIRREA chartered the Resolution Trust Corporation to manage insolvent thrifts formerly insured by the Federal Saving and Loan Insurance Corporation. It adapted a new regulation, making it difficult for saving institutions to hold certain amount of real estate loans. The total regulatory capital amount became 8% thereafter. The commercial real estate loans held by commercial banks had a 100% risk-weighted classification. Lastly, it also made banks onerous to liquidate commercial mortgages and curtailed originating them (Hayre, 2001).

2. Separating certain type of illiquid asset from the firm's general risk will allow the company raise funds at a lower cost than if it could have raised the fund by issuing debt or equity (Pennacchi, 1988). Similarly, when mortgages are packaged and mortgage-backed securities are created, it reduces the mortgage interest rates further.

3. BNM/RH/GL 008-14, Guidelines on Late Payment Charges for Islamic Banking Institutions.
4. Resolution No. 136 (2/15), 2004, p. 645.
5. AAOIFI (2008), Shariah Standard No.12, 5/1, p. 217.
6. BNM/RH/STD 028-7, 20 April 2015.

REFERENCES

Alvayay, J. R., Harter, C., & Smith, W. S. (2005). A theoretic analysis of extent of lender participation in a participating mortgage. *Review of Quantitative Finance and Accounting*, *25*(4), 383–411.

Bakshi, G., Cao, C., & Chen, Z. (1997). Empirical performance of alternative option pricing models. *The Journal of Finance*, *52*(5), 2003–2049.

Barach, A. C. (1991). A practical guide to equity participation loans: Legal principles and drafting considerations. *Real Estate Law Journal*, *20*, 115.

Caplin, A., Cunningham, N., Engler, M., & Pollock, F. (2008). *Facilitating shared appreciation mortgages to prevent housing crashes and affordability crises*. Brookings Institution.

Chapra, M. U. (2011). The global financial crisis: Can Islamic finance help? *Islamic Economics and Finance* (pp. 135–142). Basingstoke: Palgrave Macmillan.

Coopchik, S. J., & Yildirim, Y. (2014). Drafting and securitizing participation mortgages: A re-introduction. *Journal of Business, Entrepreneurship, & the Law*, *8*, 467.

Deng, Y., Quigley, J. M., & Order, R. (2000). Mortgage terminations, heterogeneity and the exercise of mortgage options. *Econometrica*, *68*(2), 275–307.

Dinc, Y. (2017). A suggestion on mortgage financing of Islamic banks: Diminishing Musharakah. *International Journal of Trade, Economics and Finance*, *8*(1), 25.

Dougherty, A., Van Order, R., & Villani, K. (1982). Pricing shared-appreciation mortgages. *Housing Finance Review*, *1*, 361.

Dougherty, A., Van Order, R., & Villani, K. (1990). *A practical analysis of shared appreciation mortgages* (pp. 43–48). Washington, DC: Housing Policy Debate, Office of Housing Policy Research, Fannie Mae.

Ebrahim, M. S. (1996). On the design and pareto-optimality of participating mortgages. *Real Estate Economics*, *24*(3), 407–419.

Ebrahim, M. S., & Hussain, S. (2010). Financial development and asset valuation: The special case of real estate. *Journal of Banking & Finance*, *34*(1), 150–162.

Ebrahim, M. S., Salleh, M. O., & Sheikh, M. (2014). Rationalizing hybrid financial instruments from an Usuli perspective. *Arab Law Quarterly*, *28*, 295.

Ebrahim, M. S., Shackleton, M. B., & Wojakowski, R. M. (2011). Participating mortgages and the efficiency of financial intermediation. *Journal of Banking & Finance*, *35*(11), 3042–3054.

El-Gamal, M. A. (2006). *Islamic finance: Law, economics, and practice*. Cambridge: Cambridge University Press.

Fauziah, T. M., Ramayah, T., & Abdul Razak, D. (2008). Factors influencing intention to use diminishing partnership home financing. *International Journal of Islamic and Middle Eastern Finance and Management*, *1*(3), 235–248.

Hayre, L. (2001). *A concise guide to Mortgage-Backed Securities (MBSs). Salomon Smith Barney Guide to Mortgage-Backed and Asset-Backed Securities* (pp. 9–68). New York, NY: John Wiley & Sons.

Kau, J. B., Keenan, D. C., Muller, W. J., & Epperson, J. F. (1992). A generalized valuation model for fixed-rate residential mortgages. *Journal of Money, Credit and Banking*, *24*(3), 279–299.

Kiefer, M. J. (1986). Participating mortgages: The risk for lenders. *Real Estate Law Journal*, *14*(3), 218–233.

Murray, J.C. (2006). Recharacterization issues in participating and "Equity Kicker" mortgages. *SL100 ALI-ABA,* 473–475.

Page, F. H., & Sanders, A. B. (1986). On the pricing of shared-appreciation mortgages. *Housing Finance Review*, *5*, 49.

Pennacchi, G. G. (1988). Loan sales and the cost of bank capital. *The Journal of Finance*, *43*(2), 375–396.

Sanders, A. B., & Slawson, V. C., Jr. (2005). Shared appreciation mortgages: Lessons from the UK. *Journal of Housing Economics*, *14*(3), 178–193.

Smolo, E., & Kabir Hassan, M. (2011). The potentials of mushārakah mutanāqisah for Islamic housing finance. *International Journal of Islamic and Middle Eastern Finance and Management*, *4*(3), 237–258.

Varli, Y., & Yildirim, Y. (2015). Default and prepayment modelling in participating mortgages. *Journal of Banking & Finance*, *61*, 81–88.

Vasicek, O. (1977). An equilibrium characterization of the term structure. *Journal of Financial Economics*, *5*(2), 177–188.