



**ÇANKAYA UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
FINANCIAL ECONOMICS**

MASTER THESIS

**HOUSING FINANCE FOR CONVENTIONAL AND ISLAMIC BANKS
IN TURKISH BANKING SYSTEM**

RABAB MILAD ALI

JULY 2017

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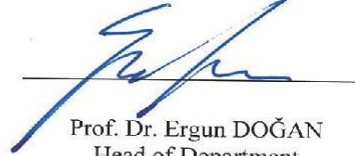
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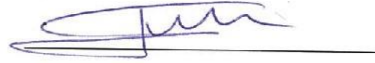
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ABSTRACT

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July 2017, 79 pages

As it is known, the global financial crisis through 2008-2009 in the world had also affected Turkish economy. This crisis pushed Turkey to implement the macro-prudential policies to avoid potential future crises. In that respect, this thesis aims at examining the effectiveness of LTV policy in reducing systemic risk arising from property markets, and to examine if it has the same impact for conventional and Islamic banks in Turkey. For this purpose, housing finance in conventional and Islamic banks are reviewed, and impact of LTV policy in conventional and Islamic banks in Turkey is explained. Further, the relationship between the amount of housing loans and their delinquencies in conventional and Islamic banks and LTV policy is analyzed with tests of difference, Chow test and time-series regressions between the non-LTV period and LTV-period. These tests show that the response of the amount of housing loans and mortgage delinquency to LTV intervention in conventional banks is greater than in Islamic banks.

Keywords: Conventional and Islamic Banks, Housing Finance, Loan To Value Policy.

ÖZ

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Tez Yöneticisi: Assist. Yrd. Doç. Dr. Burak PIRGAIP

July 2017, 79sayfa

Bilindiği üzere, 2008-2009 küresel finans krizi Türk ekonomisini de etkilemiş; ileride karşılaşılabilecek potansiyel krizlerin önlenmesini teminen birtakım makroihtiyati politikaların benimsenmesini gerektirmiştir. Bu kapsamda, tez çalışmasında söz konusu politikalardan biri olan kredi-değer oranının gayrimenkul piyasalarından kaynaklanan sistemik risklerin azaltılmasındaki etkinliğinin geleneksel ve İslami bankalar açısından karşılaştırmalı olarak incelenmesi amaçlanmıştır. Buna göre, konut finansmanı sistemi geleneksel ve İslami bankalar için ayrı ayrı irdelenmiş ve söz konusu sistemde kredi-değer oranına ilişkin düzenlemelerin etkisi ortaya konmuştur. Çalışmada, geleneksel ve İslami bankalar tarafından kullanılan konut kredilerinin miktarı ve takibe dönüşüm miktarları ile kredi-değer oranı politikası arasındaki ilişkiler fark testleri, Chow testleri ve regresyon analizleri yardımıyla açıklanmıştır. Kredi-değer oranının uygulanmadığı dönemler ile uygulandığı dönemlerin söz konusu testlerle mukayese edilmesi sonucunda elde edilen bulgular, kredi değer oranı düzenlemesinin konut kredilerinin miktarı ve takibe dönüşüm miktarları üzerindeki etkilerinin geleneksel bankalarda İslami bankalardan daha anlamlı olduğunu göstermektedir.

Anahtar Kelimeler: Geleneksel ve İslami bankalar, Konut Finansmanı, Kredi/Değer Oranı Politikası

ACKNOWLEDGEMENTS

Firstly, I would like to express my deepest gratitude to my supervisor Dr. Burak Pirgair for his guidance, advice, criticism, encouragements, patience and insight throughout the research.

I would also like to convey my heartfelt thanks to my family who have been very understanding and supportive throughout the course of my studies. Thanks for their endless love and support that guided me through the hard times when I was studying away from home.

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INTRODUCTION

Banks play significant role in the economy through providing several services and facilities to individuals and communities. One of the important facilities that provided by banks is housing finance.

In this study, we are going to explore how housing is financed by conventional and Islamic banks in Turkey. There are different points in these banking facilities, however almost same rules and regulations apply for both. In that respect, it is worthwhile to find out whether or not these rules and regulations impact both banks in the same way. We intend to analyze a macroprudential tool, i.e., loan to value (LTV) in order to compare both type of banks.

This study will be divided into four chapters. Chapter one will be about conventional and Islamic banks, their history, definitions, resources and uses of funds, also will discuss and show the similarities and differences of these banks. Chapter two will define and explain how housing is financed in conventional and Islamic banks, in addition will show how financial crisis affects both banks. Chapter three will shed light on the regulationsthat use by both banks to control the finance of housing and will focus on LTV regulation. Chapter four will measure the impact of LTV ratio on conventional and Islamic banks in Turkey. Chapter five will conclude.

CHAPTER 1

Conventional and Islamic Banking

1.1. Conventional Banking

1.1.1. A Brief History of Conventional Banking

First occurrence of banks goes back to ancient times in both Babylonia and Assyria where merchants provided loans to farmers. Then, in ancient Greece and during the Roman Empire, lenders provided loans with novel means: the exchange of currency and the acceptance of deposits. The presence of money lending activity was also shown by archaeology from this period in ancient India and China.

Conceptually, banking dates back to Middle Ages and to Italian cities such as Venice, Florence and Genoa in early renaissance period. Banking was dominated by the Peruzzi and Bardi families in the fourteenth century. On the other hand, the Medici bank, founded by Giovanni Medici in 1397, was about the most famous Italian bank.

Also in Amsterdam in the sixteenth century and in London in the seventeenth century, banking extended through Europe as significant innovations took place. Through the twentieth century, informational technology lead radical changes to the way banks operated, and they enjoyed a dramatic increase in size and gained geographic spread (Cruz, 2016).

1.1.2. Definitions of Conventional bank

Several definitions have been given to describe a conventional bank, which include the viewpoint of a classical or modern approach.

From a classical point of view, it can be defined as a financial intermediary between suppliers and demanders of funds where the former wants to keep and develop funds for future profits, and the latter needs funds for investment or operations (Akrani, 2011).

Conventional bank is also known as "*a financial institution and a financial intermediary that accepts deposits and channels those deposits into lending activities, either directly or through capital markets. A bank connects customers that have capital deficits to customers with capital surpluses*" (Meena, 2016).

From a modern point of view, it is defined as a financial institution that accepts deposits in order to support the national economy for example in terms of development of savings and investments, including contributing to the creation of projects and what request of banking, commercial and financial operations as defined by the central bank (Heffernan, 2005).

1.1.3. Sources and Uses of Funds in Conventional Banks

1.1.3.1. Sources of Funds in Conventional Banks

Financial sources occur in the liability side of bank's balance sheet and can be divided into three groups:

Capital: Capital is the net worth that constitutes the difference between a bank's assets and liabilities. Capital is classified as follows:

- Paid-up capital.
- Revenue Reserves.

Deposit: Bank deposits are funds that are placed into bank by depositors for safekeeping. Conventional banks mainly depend on all kinds of deposits as sources of funds. Deposits of bank are liabilities and should be returned to the owners on demand. There are many types of deposits such as:

- Current deposits (demand deposits).
- Saving deposits.
- Fixed deposits.

Borrowings: Sometimes conventional banks resort to borrowing from Central Bank and other banks or institutions to raise funds. But, by nature, these sources should only be used when the bank is unable to meet the commitments of its own (Stephen D. Simpson, 2015).

- A. Borrowing from the central bank.
- B. Borrowing from over-the-counter market:
 - Interbank market.
 - Money market.
 - Repo arrangements.
- C. Borrowing from international markets:
 - Bonds issued by the bank.

1.1.3.2. Uses of Funds in Conventional Banks

There are two fundamental uses of funds in conventional banks: lending and investment.

Lending: Banks employ most of their funds into providing loans and advances to their clients, and in return get interest income. Loans and advances are provided to the commercial and industrial businesses, agriculturists, housing building companies and individuals. Conventional banks provide loans and advances in various forms such as: call loans, overdrafts, cash credit, loans, housing finance loans, and discounting bills of exchange.

Investments: Conventional banks generally invest in fixed income securities and shares in the open market. The bank can earn money as dividends on its equity investments or it may earn fixed or variable interest on bonds. Banks allocate their fund in the following types of investment:

- Government securities.
- Provincial and local government bonds.
- Corporate securities.
- Foreign governments' bonds.
- Others securities (Althea, 2015).

1.2. Islamic Banking

1.2.1. Chronology of Islamic Banking and Finance

Islamic banking has recently become an alternative, if not a competitor, to conventional banking and is experiencing a fast growth in not only in Muslim countries but also in non-Muslim ones as well. Some critical milestones in this growth period are summarized as follows:

- Before-1950s. Barclays Bank opens its Cairo branch to arrange financial transactions with respect to construction of the Suez Canal in 1890s. Operations of the bank were challenged and criticized by Islamic scholars due to interest considerations. As the criticism became widespread in other Muslim countries, Islamic scholars declare that any form of interest is deemed to be “riba” which is prohibited.

- 1950s–60s. Theoretical studies in Islamic economics were initiated in 1953. In that respect, the first description of an interest-free bank was offered by Islamic economists based on either two-tier mudarabah or wakalah, which are both described in the following sections. Mitghamr Bank in Egypt and Pilgrimage Fund in Malaysia begin operations among 1950s–60s. Mitghamr Bank Local Savings Bank is the first Islamic bank ever. The bank operated on the basis of Shari’ah law and flourished because it was able to meet the savings and credit requirements of its customers in an Islamic way. It was followed, in 1967, by the Nasir Social Bank as the first social bank under Shari’ah principles.

- 1970s: The Dubai Islamic Bank (1975) in Dubai, the Islamic Development Bank in Saudi Arabia (1975), the Faisal Islamic Bank in Egypt (1976) and the Faisal Islamic Bank of the Sudan (1977) in Sudan were established. An International Association of Islamic Banks was established in 1977 in Saudi Arabia so as to coordinate Shari'ah principles between Islamic banks in several countries. Following that, the Jordan Islamic Bank (1978), the Jordan Financial and Investment Bank (1978), the Jordan Islamic Bank (1978), the Islamic Investment Company Ltd in the United Arab Emirates (1978) and Kuwait Finance House (1979) were founded.

- 1980s: The first Islamic bank, Islamic Bank of Investment and Development, was established in Luxembourg, which is a non-Muslim country, in 1980. The Islamic Research and Training Institute is established in 1981. Banking systems in the Iran, Pakistan, and Sudan are converted to an interest-free banking system. Countries like Bahrain and Malaysia promote Islamic banking parallel to the conventional banking system. Other Islamic banks were established in Abu Dhabi, Qatar, Mauritania, Iraq and etc. between 1980-1986.

- 1990s: Accounting and Auditing Organization of Islamic Financial Institutions, was established. The market witnessed Islamic equity funds and Islamic insurance products. The Dow Jones Islamic Index and the FTSE Index of Shariah -compatible stocks are developed.

- 2000–the present: In 2002, Islamic Financial Services Board is established to promote Islamic banking (Van Greuning & Iqbal, 2008; Venardos, 2012) and to deal with supervisory, regulatory and corporate governance issues. Sukuks, i.e. Islamic bonds, were launched and the United States and United Kingdom start to offer Islamic mortgages.

1.2.2. Islamic Banking

Some have argued that the only difference between Islamic banking and conventional banking is the word “interest” and Islamic banks are structured in a way

where the seller changes ownership to the bank and then the bank sells it to the ultimate buyer(Iqbal & Llewellyn, 2005).

The Organization of Islamic Conference defined Islamic banking as “*a financial institution whose statutes, rules and procedures expressly state its commitment to the Principles of Islamic Shariah and to the banning of the receipt and payment of interest on any of its operations*”(Hassan & Lewis, 2009).

Islamic banks are the banks that do all necessary banking operations for different transactions and invest the money in all aspects of the various and diverse economic activity, in accordance with the provisions of Islamic Shariah law(El-Gamal, 2006).

From the definitions above, one can understand that trade in goods and services is not the essential purpose for which Islamic bank was created. Rather it was intended to provide same services offered by conventional banks to the Muslim world, so that Muslims can avoid paying or taking interest and at the same time can find profit on his savings and financing of his business. In addition, previous definitions stand for the following most important goals of Islamic banks:

- To make an Islamic alternative to remove hardship on Muslims.
- To comply with the provisions of Islamic law in banking operations carried.
- To provide necessary funds for business owners in a legitimate way for the purpose of support economic and beneficial social projects.
- To encourage investment by creating opportunities and numerous formats for investment commensurate with individuals and companies.
- To achieve a real solidarity between suppliers and users of funds, by linking depositors' return with the results of employing money by these users whereby they may have a profit or loss.
- To develop ideological and moral values in the transaction and install them among workers and clients.
- To help clients in the performance of Zakat on their money, and do their part to participate in economic and social development(Norrahman, 2014).

1.2.3. Principles of Islamic Banking

In this section, a brief summary of the principles that drive the activities of Islamic banks is provided.

Prohibition of Riba (Interest)

Riba is any kind of monetary or non-monetary increase of the principal in a loan that must be paid by the borrower to the lender along with the principal as a condition¹ of the loan or for an extension in its maturity. According to a consensus of fuqaha' (Islamic jurists), riba has the same meaning as the modern concept of interest in conventional banking (Iqbal & Molyneux, 2005). The Holy Qur'an bans the taking and the paying riba (interest) as it is common in conventional banking, so investors must be aware by other means. Also it is stated in the Holy Qur'an that those who disregard the prohibition of interest are at war with God and His Prophet Muhammad (Kabir Hassan, 1999). The following verses of the Holy Qur'an explicitly prohibit riba:

“And for their taking riba although it was forbidden for them, and their wrongful appropriation of other people’s property. We have prepared for those among them who reject faith a grievous punishment.” Surah al-Nisa', verse (4: 161).

“That which you give as riba to increase the people’s wealth increases not with God; but that which you give in charity, seeking the goodwill of God, multiplies manifold.” Surah al-Rum, verse (30: 39).

“O believers, take not doubled and redoubled riba, and fear Allah so that you may prosper. Fear the fire which has been prepared for those who reject faith, and obey Allah and the Prophet so that you may get mercy.” Surah Al-e-Imran, verse (3: 130).

“Those who take riba shall be raised like those who have been driven to madness by the touch of the Devil; this is because they say: ‘Trade is just like interest’ while God has permitted trade and forbidden interest. Hence those who have received the

¹Thus if the borrower give any excess without compact and without the existence of a custom or rule that force him to give such excess, is not considered as a riba.

admonition from their Lord and desist, may keep their previous gains, their case being entrusted to God; but those who revert, shall be the inhabitants of the fire and abide therein forever.”Surah al-Baqarah, verse (275).

*“And if the debtor is in misery, let him have respite until it is easier, but if you forego it as charity, it is better for you if you realize.”*Surah al-Baqarah, verse (280).

Verses of Surah al Baqarah above, not only describe the prohibition of riba, but also give a comprehensive principle for determining whether or not a transaction includes riba(Ayub, 2009).

The Prohibition of Gharar and Maysir

Any transaction should be free from Gharar which stands for uncertainty, risk or speculation. Parties should have perfect knowledge of deferred payments and deliveries as a result of their transactions. Under Islam deferral of payment is an acceptable type of debt, in contrast to predetermined debt in conventional finance. Further, profit cannot be predetermined by parties. Protecting the weak from exploitation was the reason behind forbidding of gharar. Thus, futures and options, expected to be very risky, are supposed to be prohibited (Kettell, 2011).

Maysir, however, means gaining something valuable easily without making any effort for it or without paying an equivalent indemnification for it or without taking responsibility against it, by way of a game of chance. Gambling and wagering as defined by the word “Maisir” in the Holy Qur’an are prohibited(verses 2: 219 and 5: 90, 91)(Ayub, 2009).

Haram/Halal

Islamic financial activities operate under a strict code of ‘ethical investments’. There are some activities and items that cannot be financed by Islamic banks since these are forbidden (that is haram) in Islam. For example, it is haram to deal in pigs and their byproducts in all forms or trade of alcoholic beverages. Moreover, as the fulfillment of material needs assures a religious freedom for Muslims, Islamic banks are urged to

give primacy to the production of essential goods and services that meets the requirements of the Muslim community. From a religious viewpoint it is inadmissible to participate in the production and marketing of luxury activities, since it is “Israf wa traf” (wastefulness and luxury) when Muslims suffer from a lack of food, shelter, education and health(Hassan & Lewis, 2009).

Shari’a board

A Religious Supervisory Board is expected to be established by Islamic banks to ensure that all of their practices and activities are in accord with Islamic law. The board consists of independent Muslim jurists who are involved in auditing existing contracts, inspecting all new contracts, and approving new developments of product. Also, the collection and distribution of zakat is monitored by Shari’a Board. This governance structure is completely different than the one in any conventional bank(Hassan & Lewis, 2009).

1.2.4. Sources and Uses of Funds in Islamic Banks

1.2.4.1.Sources of Funds in Islamic Banks

Sources of funds in Islamic banks can be classified in two groups as internal and external sources.

Internal Sources

They represent the capital, reserves and retained earnings. Capital is very important in Islamic banks where it represents the safety valve that is used to protect bank from the expected losses. Moreover, it is the basic source of funds used to start the operations. Capital is safety cushion for clients.

External Sources

Islamic bank depends on deposits as main resources that can be used in mobilizing and attracting the savings from individuals. Deposit is an agreement for an Islamic bank where it receives an amount of money that is paid by depositor in one of the

different means of payment. Deposits in the Islamic banks can be categorized as follows:

- Current Accounts (term or demand deposit).
- Saving Accounts.
- Investment Accounts(Elseoudi et al., 2012).

1.2.4.2. Uses of funds in Islamic banks

Islamic banks use funds by offering financing facilities in order to generate revenue. Financing facilities have to be done based on the Islamic concepts accepted by the Islamic bank Shariah Council. Islamic banks generally employ following concepts:

Murabaha (Cost Plus / Mark up): Murabaha is the best mode that Islamic banks prefer to use. Briefly, the bank provides funds for the purchase of goods by buying it on behalf of its customer and adding a profit mark-up before reselling it to the customer on a cost-plus basis contract.

Ijara and Ijara Wa Iqtina (Leasing): Under Ijara, banks purchase machinery or equipment and lease it out to their clients, where they can buy this machinery at the end of leasing period. Periodical payments include rental for the use of these goods towards the purchase price.

Qard Hasan (benevolent loans): Qard Hasan is the zero return type of loan that the Holy Quran motivates Muslims to make obtainable to those who need them. Just the principal must be repaid to the bank by the borrower, but the borrower can pay additional amount to the bank as gift.

In addition, Islamic banks use some other modes of finance such Bai' muajjal (deferred payment), Bai' salam (prepaid purchase), Istisna (manufacturing) and Mudaraba (Alfatakh, 2016).

1.3. Similarities and Differences between Islamic and Conventional Banks

1.3.1. Similarities

Both banks provide many similar services to their customers such as:

- Acceptance of deposits.
- Cheque collection and payment.
- Money transfers and collections on behalf of the customers.
- Consultancy. Banks hire financial, legal and market experts, who provide advices to customers relating to investment, trade, industry, income, tax etc.
- Marketable securities trading on behalf of customers.
- Providing services of keeping, cashing and transportation of money and values.
- Foreign currency exchange. Banks deal with foreign currencies, as requested by customer, banks exchange foreign currencies with local currencies.
- Money transfers and collections on behalf of the customers.
- Bank Guarantee. Both banks offer bank guarantees to customers. When customers have to deposit certain fund in governmental offices or courts for specific purpose, bank can present itself as the guarantor for the customer, instead of depositing fund by customers(Alfatakh, 2015).

1.3.2. Differences

This section will shed light on the differences between both banks in accordance to their sources and uses of fund, but before that it is better to know the features of conventional and Islamic banks.

1.3.2.1. Basic Characteristics of Conventional and Islamic Banks

According to Wahab et al. (2014) characteristics of conventional and Islamic banks can be portrayed as follows:

Table 1.1. Certain Characteristics of Conventional and Islamic Banks

No	Conventional Banks	Islamic Banks
1	Activities are based on manmade principles.	Activities are based on Islamic Shariah principles.
2	Its goal is to maximize profit in an unlimited manner.	Its goal is profit maximization in line with Shariah limits.
3	Predetermined rate of interest are guaranteed to the investor.	They encourage risk sharing between supplier (investor) and demander (entrepreneur) of funds.
4	They provide loan with compounding interest.	They do partnership participation business.
5	In case of defaulters it charges compounded interest and extra money as a penalty.	Islamic banks do not demand extra money from defaulters. But small amount of compensation and the income will be given away in charity.
6	No consideration exists for Zakat.	Islamic banks consider Zakat and it operates as a Zakat Collection Centre and they also pay out their own Zakat.
7	All deposits are under guarantee.	Islamic banks can only guarantee deposits for deposit account (al-wadiah), thus, the depositors are guaranteed repayment of their funds.
8	Most often the banks own interest is prominent. It makes no effort to ensure growth with equity.	The public benefit is given due importance. Its ultimate aim is to ensure growth with equity.
9	It gives little concern to improving expertise in project appraisal and evaluations since they earn fixed income advances.	Islamic banks pay greater attention to project appraisal and evaluations because they share profit and loss.
10	Conventional banks can easily borrow from money market.	It is not easy for Islamic bank to borrow from money market, because of Sharia restrictions.
11	The status of a conventional bank, in relation to its clients, is that of creditor and debtors.	The status of Islamic bank in relation to its clients is that of partners, investors and traders, buyers and sellers.
12	Credit-worthiness of the clients is very important.	Greater emphasis is on the feasibility of projects.

1.3.2.2. Deposits

Both types of banks collect deposits from savers regardless of the banking scheme. The distinction lies in predetermined return. In conventional banks, return is predetermined as an interest rate offered to the depositors while Islamic banks cannot offer fixed or predetermined return. It is variable on profit and loss basis (Hanif, 2014). As mentioned earlier, Islamic banks operate deposits into current,

savings and investment accounts. In current accounts, Islamic bank does not pay any return and are only used for liquidity purpose, since there are no profits to share. In saving accounts holders may get a return from Islamic banks as hiba for their deposits. An investment accounts holder receives a higher return, but they also share in the risk of losing money if the bank makes a loss (Hassan & Lewis, 2009).

The difference from Islamic bank deposits is that conventional pay a fixed and predetermined interest to depositors at the end of term whenever they make profit or loss. The depositors have nothing to do with the loss of bank (Kesowani, 2012).

1.3.2.3. Financing and Investment

Both banks provide funds in order to obtain return. But, conventional banks provide loan for an interest which Islamic banks are prohibited to do. Islamic banks can make profit only on investment. Three types of loans issued by conventional banking are overdrafts, short-term loans and long term loans. Islamic banks can only offer interest free loans (Qarz e Hasna) for any emergency, even so they can do business by providing the desired asset to customer (Hanif, 2014).

-overdraft / credit cards

In conventional banks customers get the facility of overdrawing from its account on interest. Using credit card is one of its forms where the bank determines the overdrawing for customer. By using credit card a customer does not have to carry cash to meet its need. Islamic banks cannot offer such a facility of financing except in the form of Murabaha (where in Murabaha Islamic bank hand over the required commodity and not the cash). However, needs that meet by facility is provided through debit card by which a customer is able to use his card if his account carries credit balance. In conventional banks a customer has to pay interest when he uses the facility but under Murabaha only profit is due when customers receive the commodity from Islamic bank. Otherwise, conventional banks charge more interest from customers for the extra period of default while under Murabaha in Islamic banks extra charging is forbidden.

Under conventional banks customers can come into a new covenant and benefit from the opportunity of rescheduling to pay interest for extensive period, which is not the same in Islamic banks. Under Murabaha, Islamic banks have the right to claim only the original receivable amount concurrent in initial contract. Also, another practical matter under Murabaha in Islamic banks is how to deal with intentional defaulters. In Islamic banks, there are various options to deal with intentional defaulters which includes putting them in black list and do not provide any more financing facility to them, stipulating in the contract that defaulter have to pay all installments at once, stipulating in the contract a punishment will be imposed on defaulter but this will use for charity since it cannot be the same as income of Islamic banks(Hanif, 2014).

-short term loans

Conventional banks provide short-term and medium-term loans to customers to meet working capital requirements of firms. Islamic banks use Murabaha to invest in inventory. Also, Islamic banks provide participation term certificates to meet day to day expenses of business where profit of a specific period is divided by Islamic banks on a proportional basis. However, because of risk involved for Islamic banks in the transaction using participation term certificates for financing is not as easy as a short-term loan from conventional banks. Firm that wants to get short-term facility/business to the gratification of investor. Under Islamic banks there is still no arrangement to the working capital needs of nonprofit organizations. Also, personal consumption loans are not provided by Islamic banks, whatever any individual of sound financial position can obtain anything for his personal use under Murabaha financing where Islamic banks add a certain percentage of profit on cost.

Murabaha is asset based on financing which can be requested by anyone from Islamic banks for provision of an asset to be used for halal (lawful) purposes(Hanif, 2014). In default case, under conventional banks an idlers customers have to reschedule their debt, generally at a higher rate. The aim of imposing this extra interest cost on the customer is to motivate him to pay on time. While under Islamic banks in the Murabaha agreement, banks can stipulate that in case of customer's delay in payment without veritable reason, all residual installments will be due; so,

the customers will have to try to be more regimental. Islamic banks under its contracts in case of default customer should pay to charity. But for really unable customer it will not be charged any such penalty (Ayub, 2009).

- Medium to long-term loans

Purchase or building of fixed assets by firms to substitute or extend the existing assets can be provided by medium to long-term loans. Under Islamic banks, Murabaha, Bai Muajjal (credit sale) and Istasna (forward selling agreement) are used to fulfill individuals and firms requests. There is one more financing option, which is profit sharing under Musharaka (partnership) and Mudaraba (type of partnership) for long-term financing. Though financing under Murabaha, Istasna and Bai Muajjal is very similar to loans in conventional banks with the only difference which is providing of asset rather than cash to customer however differences exist in the contract which convert the nature of returns and risk. In Islamic banks and firms it is challenging to use financing under Mudaraba and Musharaka. Under sharia based financing schemes (Mudaraba and Musharaka) in Islamic banks firms have to demonstrate the profitability and feasibility of the business to the satisfaction of Islamic banks to obtain the requested finance because of the risk of losing the amount is involved (Hanif, 2014).

- Leasing

Leasing or Ijara in Islamic banks is the most popular mode of financing, also in conventional banks this mode becomes more important. Leasing in conventional banks is considerably provided through specialized companies, while it is a part of core business in Islamic banks (Iqbal & Molyneux, 2005). Under Ijara the customer can obtain asset to be used without transfer of ownership for a given period of time in exchange for agreed rentals. At the end of lease term, the ownership of asset can be transferred to client through joint agreement. During Ijara period all risks of ownership are born by Islamic banks. Under both banks there are differences in the leasing transaction. The first difference is lessee under Ijara in Islamic banks do not pay any rental until he receives the asset for use. Second, Islamic banks cannot claim extra rent in case of default, but they can impose penalty, which cannot be income of

Islamic banks. Third, Islamic banks cannot demand for rent during major repair period. Fourth, all risks of ownership are born by Islamic banks. Therefore, they cannot demand more installment if the asset is lost or destroyed.

- Agricultural loans

Both types of loans short-term and long-term are comprised under agricultural loans. Farmers request for short-term loans to buy grain and fertilizers while request for long-term loans to improve more lands and buy fixtures and equipment. Usually, these loans are returning to banks after farmers selling their finished harvest. Conventional banks as usual charge interest on such loans. Islamic banks, however, offer same facility under Bai Salam, Bai Murabaha, Mudaraba and Musharaka. Under Bai Salam farmers get cash to buy grain and fertilizers however this is not loan rather purchase of finished harvest to be delivered by farmers. For buying of equipment, Islamic banks use Murabaha facility and for improving more lands they use Mudaraba and Musharaka. Farmers have to convince Islamic banks about profitability of the project (Hanif, 2014).

- Investments

Conventional banks have many ways to maintain liquidity by investing in government securities, bonds, shares etc. Conventional banks can issue to make liquidity. Central banks also protect conventional banks into provide liquidity. Deposits of interbank are also rewarded in the form of interest by commercial banks.

For Islamic banks, there are very limited avenues that can be used to create desired liquidity since they cannot invest in short-term loans, government securities, bonds etc. due to interest considerations. Islamic banks maintain mandatory reserve with central bank but there is no reward on it like conventional banks. Moreover, as regards investment in marketable Islamic banks cannot invest in any security because of these two reasons. First, business of the underlying firm is required to be Halal. Second, reason financial operations of underlying firm should be free of interest. Due to the dominance of conventional banks and existing business practices is concluded that small number of firms meet both conditions.

Lately, Islamic banks have started to meet their liquidity needs by issuing Sukuk (Islamic bonds). Sukuks can be issued against Ijara receivables. Under Ijara Sukuks, first, asset is leased to the client for a specific period and ownership remains with Islamic banks. Islamic banks issue Sukuks to the investors equal value of asset to meet requirements of liquidity, hence, ownership of asset is transferred to Sukukholders. However, rentals of the asset is known and predetermined with sureness to the investors. Murabaha's sukuks cannot be sold except at par being sale of loans. Other kinds of sukuks (Mudaraba etc.) are not having fixed return despite tradable in secondary security market. Underlying rule in issuing Sukuks is that illiquid assets should dominate in the portfolio against which Sukuks are issued (Hanif, 2014).

- Housing finance

In conventional banks loans are provided to customer for interest (Hanif, 2014). While Islamic banks have used Murabaha as a method for financing home sales in accordance with Shariah requirements. In addition, the mostly used method of housing finance is diminishing Musharaka (Kettell, 2011). Under diminishing Musharaka a home buyer and Islamic bank jointly own a home and overtime the bank's share diminishes constantly as the home buyer's share increases. Usually, diminishing Musharaka is combined with Ijara. Also, Islamic banks can use Ijara Wa Iqtina and Istisna (only during the construction period) as sharia compliant home financing products (Visser, 2013).

Housing finance will be explained in detail in the next chapter.

CHAPTER 2

HOUSING FINANCE

2.1. Meaning of Housing Finance

Housing finance refers to the funds that can be used to construct and maintain housing stock in the nation. Also, it refers to the money we need to pay for it, in the form of mortgage loans, repayment and rents.

Some of the reasons that show the need of housing finance are:

- To build new homes.
- To cover the costs of a household housing such as mortgage repayments, rents.
- To finance necessary amendments and maintenance to houses.
- To manage the housing stock in order to ensure it to meet certain social and political objectives, such as fulfilling urgent housing needs.

So it is clear that any of these objectives cannot be achieved without finance (King, 2009).

2.2. Major Elements of Housing Finance

Major elements of housing finance are listed as follows:

1. Self-finance: The buyer (owner) provides the finance with personality.
2. Seller finance: Seller accepts payment for the sale of the by extending an implicit loan to the buyer. The loan is originated, funded and serviced by the seller. The house is used as the collateral which is known as mortgage.

3. Third-party finance (family or friend): The owner can get a loan from his family or friend, and thus he can originate, fund and service it.
4. Third-party finance (a bank or other depository): Owner can obtain a loan from the bank, and thus originate, fund and service it.
5. Third-party finance (an insurance company): The insurance company funds and services mortgages, whereby in turn, obtains its funding from the premiums paid by its insurers.
6. Third-party finance (a finance company): If a finance company holds mortgages, it cannot originate them. But, they would be originated by a mortgage banker, and be bought by the finance company that funds and services it. In turn, funds of finance company come from its borrowings in capital markets.
7. Third-party finance (government): Mortgage could be provided by government, with funding eventually or by government borrowing or by taxpayers.
8. Third-party finance (mortgage-backed security): The mortgage is packaged into a “pass-through” security that is sold to a party that wishes to hold the security and receive the interest and repaid principal. That funder may be a mutual fund, a bank, a pension fund, a private investor, an insurance company which is attracted to the mortgage-backed security as an investment.

2.3. Five Main Housing Financing Systems

Housing finance systems can be classified as to how they are financed as follows:

- Deposit based housing finance systems.
- Bond market based mortgage institutions (mortgage banks).
- Housing loans provided by national housing agencies, State housing banks and housing funds.
- Securitization.
- Other financial sources.

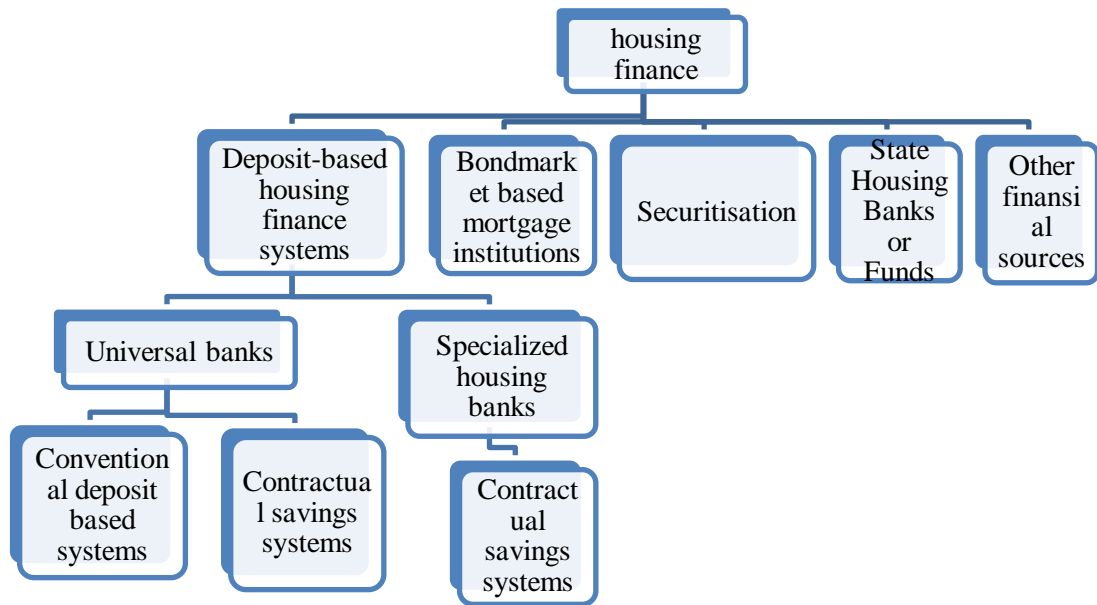


Figure 2.1. Housing finance

Deposit banks and mortgage credit institutions are the main housing financing institutions. However, there are considerable differences between jurisdictions in terms of the market shares of relevant institutions(King, 2009).

2.4. Mortgage

A "mortgage" represents a legal claim on the property that secures the promise to pay the debt(Sentowski, 2007).Also, it can be explained as putting up real estate to secure a loan. In this case, whenborrower fails to pay installments, the lender can sell borrower's house to get back the money that was borrowed to buy it.Mortgage is an agreement where the borrower gives the mortgage, and the lender provides the funds (Talamo, 2008).

2.5. Housing Finance Markets

Housing finance markets can be split into two main categories, as follows:

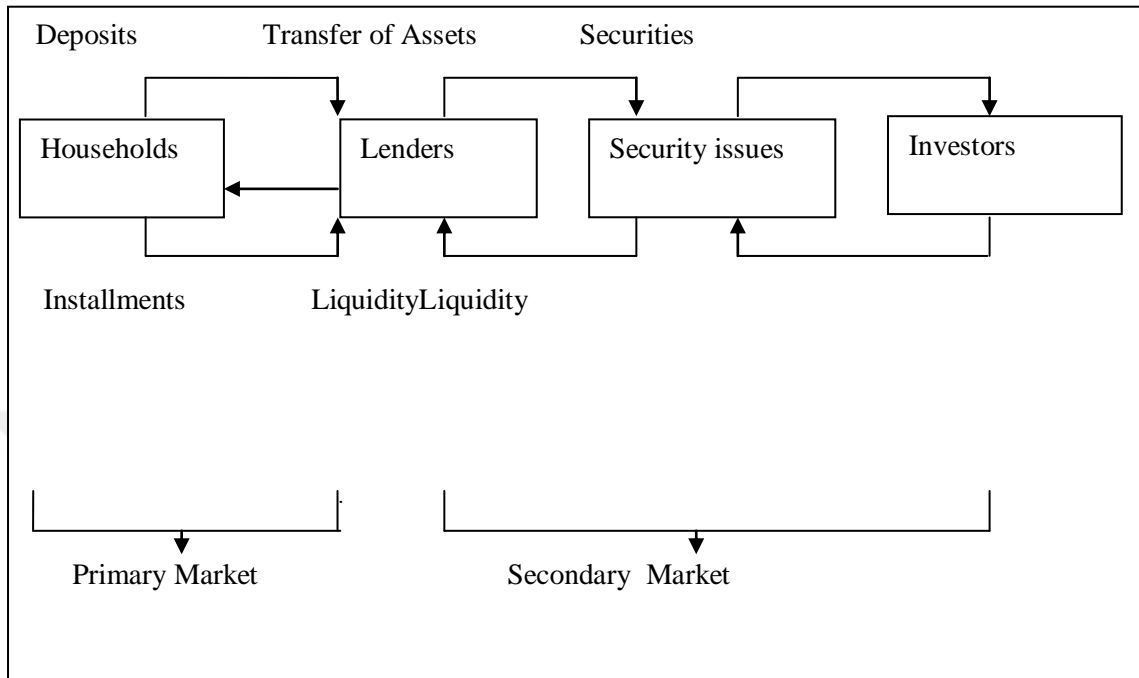
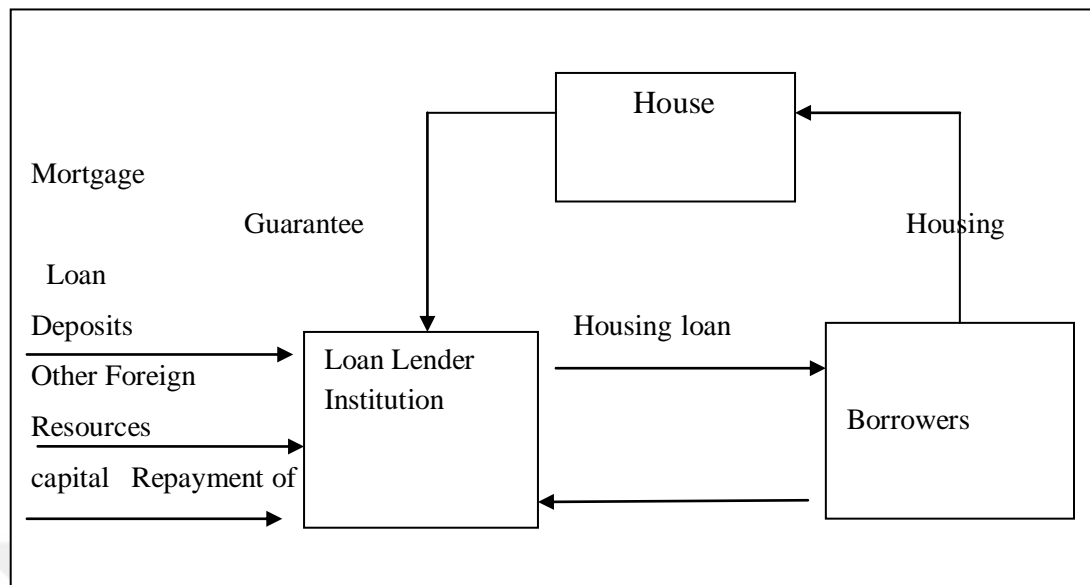


Figure 2.2. General Framework of Housing Finance Markets

From Figure 2.2, we can see that borrowers do not have any role in the secondary market since it is a place where lender's obtain liquidity by issuing relevant financial instruments.

2.5.1. Primary Market

The primary market is the market where borrowers and lenders meet. In this market the financial institutions lend the funds to the consumers as housing loans. By way of that, the loan relations build up between the borrower and lender and the transactions related to this loan are called primary market. This market practices traditional lending activities. The Figure 2.3.belowshow the primary markets for housing loans.



Source: Aydın (2006)

Figure 2.3. Primary Markets for Housing Loans

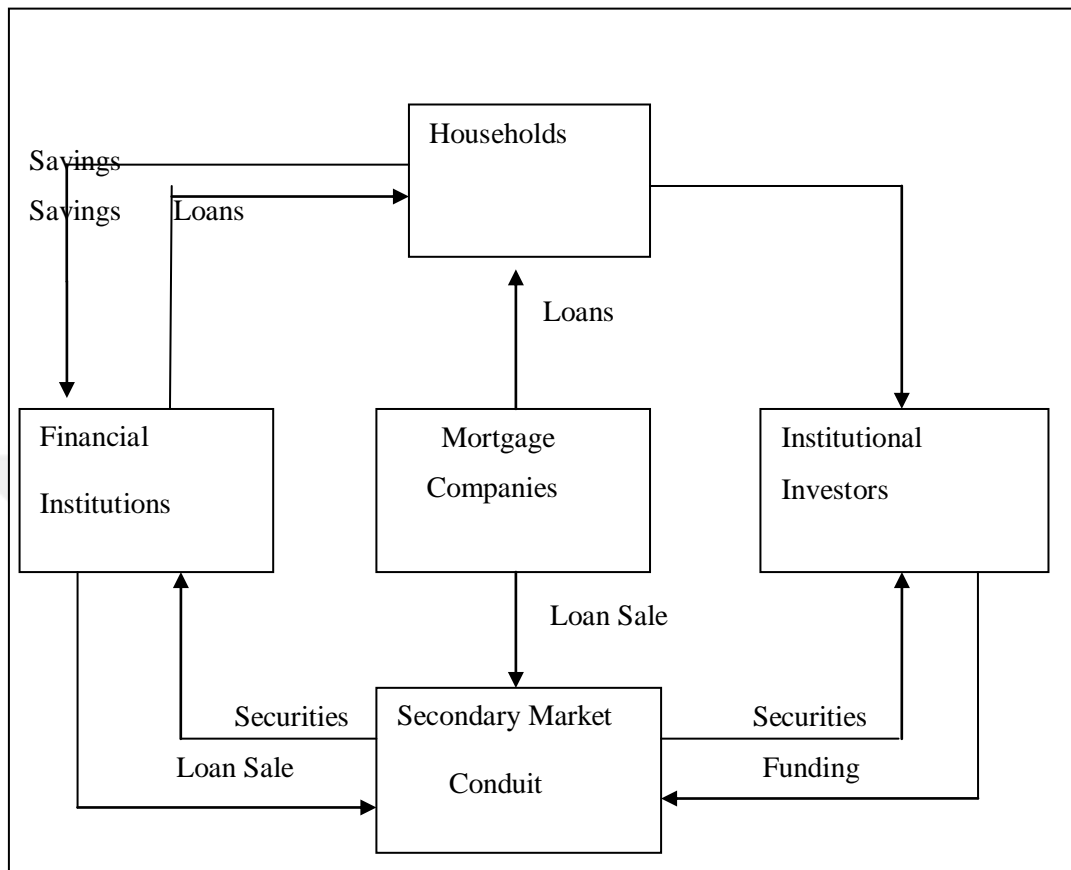
In the primary market there are various types of housing loans, which are provided by financial institutions operating as lenders such as commercial banks and specialist housing finance institutions.

2.5.2. Secondary Market

Secondary market is the market where lender creates funds by two ways, the first way issuing bonds covered by these loans. Loan lenders can issue bonds of which the collaterals are mortgage loans, and sell them to investors in the capital markets to create funds. These bonds are called mortgage covered bonds. The other way will be selling the loans to another institution in order to be securitized. Lenders in this market can sell their loan portfolio to another institution to be securitized as mortgage backed securities where in this way the risks and ownership of mortgage loans are transferred to a third party.

Mortgage backed securities are proper to be traded in the market and may be issued in terms and with coupons since their cash flows are backed by the principal and

interest payments of pooled housing loans(Aydın, 2006). Figure 2.3 shows how the secondary market operates:



Source: Aydın (2006)

Figure:2.4. Operation of Secondary Market with a Conduit

2.6. Housing Finance Systems in Turkey

In Turkey, the governments have applied different housing finance systems and different housing policies, where one of the housing finance systems applied in Turkey is as non-institutional and institutional structures. Both will be explained below:

2.6.1. Non-Institutional Structure of the Turkish Housing Finance System

Personal savings and non-institutional sources were mostly used by people to meet their housing requirements since there was no established housing finance system in Turkey achieved sufficient number of housing production and provides the required financing.

In Turkey, the largest resource for homeownership is personal savings. In addition to this, people sell their old houses and valuable assets to obtain funds and finance their housing needs. Furthermore, they can obtain funds from friends, relatives, inheritances, savings from abroad are widely used in Turkey to become a homeowner. The people after obtaining housing funds from non-institutional sources apply various strategies to produce home in Turkey. People in Turkey purchase houses from housing contractors with term loans or cash payment, obtain houses through private building cooperatives and also prefer to build their own houses.

2.6.2. Institutional Structure of the Turkish Housing Finance System

In Turkey since the 1920s, governmental or private organizations accomplished and supported housing production. These organizations are social security institutions, such as Social Security Institution (SSI), Self Employed and Army Aid Institution (OYAK) and other Social Insurance Institution for Tradesmen and Craftsmen, and local municipalities, local organizations, Real Estate Investment Trusts(REITs) and commercial banks.

2.6.2.1. Social Security Institutions

Some institutions provide housing loans to their members with low interest rates and in various terms, such as Social Insurance Institution for Tradesmen and Craftsmen and Other Self Employed (Bag-Kur) and OYAK, the SSI. These institutions collect and transfer insurance premiums to their members' housing cooperatives as housing loans. Although SSI and Bag-Kur stopped extending such loans, OYAK still provides cooperative housing loans, individual housing loans and mass housing loans for houses constructed by Oyak Construction Company.

2.6.2.2. Real Estate Bank

The Real Estate Bank was established as a state-owned bank "Emlak Bank" in 1926 to provide housing loans and support housing production. The Real Estate Bank had different housing finance policies in different periods. Nonetheless, in general, housing loans with low interest rates in long-term payment periods were provided by the Real Estate Bank "Emlak bank" to households that opened accounts with the building saving system. The Real Estate Bank provided its funds, by collecting from households as housing loans to the right owners. Also, long-term bonds were issued by the Real Estate Bank to provide necessary funds for housing loans. This bank extended various housing credits as building saving loans, cooperative loans and construction repair loans, etc.

Since 1926 the Real Estate Bank have contributed to urbanization. Nevertheless, the Real Estate Bank was closed following the economic crisis in 2001.

2.6.2.3. Commercial Banks

Because of high inflation and interest rates in Turkey for many years, commercial banks only provided housing loans with short-term monthly repayment policies. Hence, people have mostly applied for non-institutional sources or used their personal savings. The commercial banks increased significantly after 2002 because of the economic stability achieved. Also, after 2004, amount and percentage of housing loans of commercial banks have increased dramatically.

Commercial banks play important roles in stimulating the housing and real estate sectors.

2.6.2.4. Real Estate Investment Trusts (REITs)

REITs are investment companies, which provide funding for every kind of real estate through its own equity or using the collected capital of many investors. Where in 1995 they started to be established in Turkey. And in 1997 the first public offering of the shares of a real estate investment trust was realized. REITs' stocks are quoted in Borsa Istanbul, while the Capital Markets Board of Turkey regulate their activities(Gülter & Basti, 2014).

2.7. Housing Finance in Conventional Banks

2.7.1. Fixed Rate Mortgages

The fixed interest rate mortgage (FIRM) is the traditional way to finance a home. Many years ago the most lenders were offering just this type of mortgage. Also, this type can be easily understood because there are no changes over the life of the loan. In FIRM the borrower can get loan with a set rate of interest requiring an equal payment for a specific number of years.

When interest rate is low, the fixed interest rate mortgage is the best loan you can get if you want to keep your property for many years. But why is the interest rate always a little higher for fixed rate loans?

Because of that, the interest rates may increase over the years, but not for fixed rate loan, so the lenders will structure the loans to protect themselves by charging a higher rate of interest and in many instances, higher fees than other loans with an interest rate that would adjust (change) as market rates changed(Talamo, 2008).

2.7.2. Adjustable Rate Mortgage

Most of lenders prefer the adjustable rate mortgage (ARM). The lenders see that this type of mortgage is fair to all parties since it changes to reflect current market conditions. So, when you obtain an adjustable rate mortgage, the interest rate of your

mortgage follows the falling and rising of the interest rates according to a previously determined index, such as Treasury bill rates.

An index is a publicly published interest rate, such as the interest paid on a treasury bill. In adjustable rate mortgage interest rate is tied to such an index. The index can actually be anything agreed upon, but most ARMs are indexed to a one-year treasury, or a LIBOR.

The advantage of adjustable rate mortgage is that when there is an expectation that the rates will stay the same or decrease for the long term. An adjustable rate gives you the advantage of a lower start rate with the possibility of going even lower rate later on(Talamo, 2008).

2.7.3. Hybrid Mortgage

Recently, hybrids have become more and more popular type of mortgage. A hybrid loan is simply a combination of a fixed and an adjustable rate mortgage where the rate is fixed for a predetermined number of years after that it turning into an adjustable rate mortgage for the remaining life of the loan. In this type of mortgage, the starting rate is lower than a fixed rate mortgage, but a slightly higher rate than an adjustable rate mortgage. Most hybrids are fixed initially for three or five years. Also, some hybrids have fixed terms that go as high as ten years, but they may not make much sense. If their rates are higher than comparable fixed rates(David, 2008).

The advantages of a hybrid mortgage are:

- In hybrid mortgage the fixed interest rate period is at a lower rate than a fixed rate loan for the entire term.
- The risk of a higher rate is delayed for three to ten years rather than three months to one year with a standard adjustable rate mortgage. In this case, you get more time to increase your savings or income if the new rate require a higher payment(Talamo, 2008).

2.8. Islamic Housing Finance Product Concepts

Islamic financial institutions have introduced a number of Shari'ah-compliant modes, which are permissible in Islam for home ownership. Three most widely used Islamic technique of housing finance are: murabaha, ijara wa iqtina' and diminishing musharakah and ijara.

2.8.1. Murabahah

In the Murabahah function, the customer selects the house he wants to buy and agrees on the price with the vendor. After that, the customer asks the bank for financing facility. Subsequent to that, the bank commences standard guarantee measures and a self-determining assessment of the house. Then, the bank contracts to buy the house from the vendor at the price agreed between the customer and vendor. The bank uses its individual funds to purchase the house. After that, the bank will sell the house to the customer at the agreement price (which includes a predetermined profit over the cost of the item). The customer will pay regular monthly installments until the purchase price is finally paid(Almutairi, 2010).

This mode of housing finance has pros and cons. One of the advantages to the customer is the transparency of murabahah since the cost and amount of mark-up is fully disclosed. Secondly, the monthly repayment is fixed, where banks cannot charge fine from the customer if he is late in making the monthly repayments. The other advantage for the customer is that the house will be registered in his name throughout the tenure of the mortgage. The disadvantage is that if he makes early repayments he will not get rewarded because of that monthly repayments are inflexible.

The advantage of murabahah to the bank is that they carry low risk since it is fixed and predetermined; also it is simple and convenient to them. The disadvantage to the bank is that if the customers make late repayments the financier cannot punish them by charging fine. As a result, the cost will increase and making the product seems expensive and unattractive to customers(Samad, 2007).

2.8.2. Ijara Wa Iqtina' (Lease and Purchase)

Under ijara wa iqtina, the customer finds a house and asks the bank to buy it. Then the bank buys the house and sells it to the customer against deferred payment, probably at the same price, but the bank will retain title until the last payment has been made by the customer. The lease agreement must be separated from the purchase agreement, as the sharia requires a separate contract for each individual transaction. The customer has to make monthly payment including both rent and the principal. These monthly lease payments are usually geared to an interest rate and will be periodically revised (Visser, 2013).

The bank receives monthly installments from the customer, each installment consists of a fixed payment to pay for the house price, with a variable rent payment under the leasing contract. The rent paid can be generally reviewed on a quarterly or semi-annual basis allowing the rent rate to be changed based on an agreed benchmark.

The ijara wa iqtina method for housing finance has decreased in popularity for the reason that the customer is paying rent, despite part of this rent is to cover the purchase of the property. This part of the rent payment does not create any ownership right as the ownership will only be transferred at the end of the contract when the customer will exercise the promise to sell (Millar & Anwar, 2009).

2.8.3. Diminishing Musharakah

Diminishing musharakah operates on the basis of partnership agreement, by which the bank and the client buy the house, which becomes their joint property, according to their rate of participation to the cost. Then the bank will lease its share to the client for a specified periodic rent. The share of the bank in the ownership of the house will be divided into shares. These shares will decrease since the client will buy one of them through each payment of the rent. In consequence, the rental amount is reduced, and the client's share in the ownership of the house will increase until he has

complete ownership of the house at a period when both the partnership agreement and the lease contract come to an end(Hanafii, 2012).

One of the advantages of this method to both its clients and bank is that the clients have the ability to increase ownership at any time without being charged penalties. Another advantage is that the risk is not just borne by the client, but shared between the client and the banks(Samad, 2007).

2.9. Global Financial Crisis 2007-2008

The recent financial crisis is considered as the most dangerous in the history of financial crises, especially after the global economic system proved that it is unable to contain and mitigate its effects quickly and effectively. The causes of the financial crisis of 2007 -2008 will be explained below.

2.9.1. Common Causes

The first cause is the rapid financial expansion or, particularly, a credit boom. Credit booms are typically associated with high leverage, where loans become non-performing.

A second cause is the speedy increase of housing prices. Because houses are used as collateral underlying mortgage credit, their increasing values speed up credit extension, and thus are often related with a rapid growth in household credit and increased leverage, all of which then heightens the risks and inverse consequences of a subsequent bust.

The third cause of crisis is the creation of new instruments whose returns depend on continued favorable economic conditions. In this case, the rapid growth of structured credit instruments depended in complicated ways on the payoffs to other assets. Often the risks associated with the new products are not fully comprehended or appreciated by rating agencies.

Finally, the fourth cause of the crisis is financial liberalization and deregulation. For example, in the United States observers have emphasized such moves as the removal of barriers between investment and commercial banking and the greater dependence of banks on internal risk management models, all this happened without a proportionate buildup in supervisory capacity. On the contrary, supervision and regulation failed to restrict excessive risk-taking because they were slow to catch up with new developments.

2.9.2. New Causes

The first new cause was the widespread and sharp increase of households' leverage and subsequent defaults on loans. This occurs since there were no established best practices for how to deal with large scale households' defaults and associated possible future moral hazard problems, and equity and distributional issues.

A second new cause was how increased leverage manifested itself across a wide range of agents – financial institutions, households – and markets. While a buildup in leverage was not new, the system's ability to ingest even small shocks was limited by the extent of many classes of borrowers' reliance on finely priced, illiquid collateral. This led to a rapid decline in collateral values. Fear of counterparty defaults in major financial institutions that were highly leveraged, thinly capitalized, short of funding liquidity and had extensive off-balance sheets exposures – rose dramatically early on in the crisis, freezing market transactions and making valuations of underlying assets even more problematic. The emergence of systemically important non-bank financial institutions added to overall risks, and in some cases required public backstops for the first time. The systemic vulnerabilities that were building up eventually helped turn a liquidity crisis into a solvency crisis.

A third new cause which led to increased opacity and complexity, resulting largely from private label securitization of weak credits, the explosive growth in derivatives globally, and the murky operations of the shadow banking system. The complexity of

the securitized products with their differential maturities of liabilities and assets, raise the risk of rollovers to a loss of certainty in the values of the underlying assets. These expansions fostered excessive use of short-term wholesale funding in diverse forms that was not well understood, setting the stage for a confidence crisis.

Fourth, international financial integration had increased greatly over the years before the crisis. Global finance no longer involves just a few players, but many from different countries and diverse markets. The advanced economies and by the official sector in several emerging markets hold many mortgage backed securities and other U.S. originated instruments. This led to sharply increased in cross-border banking and other capital flows, notably for and among advanced European countries. While these developments undoubtedly had benefits during “normal” times, they quickly translated the turmoil in the United States into a global crisis. Therefore, turmoil in countries in the euro area led to multiple rounds of cross-border spillovers and further crises.

In addition, the scholars had suggested other contributing factors include too loose monetary policy and weaknesses in fiscal policy. Even though, it is generally agreed that the causes were many and the “solutions” to prevent future crises will equally have to be found in a combination of important changes to national and international regulatory frameworks, the conduct of monetary policy and fiscal policies, and legal and institutional environments (Claessens & Kodres, 2014). In the next chapter we will focus on the banking regulations and their importance. Also on loan to value macroprudential policy.

CHAPTER 3

BANK REGULATIONS

The expansion of lending and other commercial activities cause rise to different types of bank risk exposures and this can give an explanation of the need for the prudential banking regulation (Bitar, 2014).

3.1. Regulate Banks

Banks operate to make a profit and bankers are free in making a lot of decisions in their daily operations, in spite of that, banking is commonly treated as a matter of public interest. Banking regulations and laws extend to many aspects of banking, including who can open banks, what services can be offered, and how banks can expand. Therefore, a familiarity with regulatory objectives and purposes is essential for understanding how bank regulation and supervision originated and what the aim of particular regulations might be².

The next part focuses on several of the more commonly accepted goals of bank regulation. Likewise, because of the possibility for conflict among regulatory goals, special attention is given to what banking regulation should not do.

3.1.1. Protection of Depositors

Depositor protection is the most basic reason for regulation of banking. Pressure for such regulation arose as businesses and individuals began holding a significant

²Banking regulation in its strictest sense refers to the framework of laws and rules under which banks operate. Narrowly defined, supervision refers to the banking agencies' monitoring of financial conditions at banks under their jurisdiction and to the ongoing enforcement of banking regulation and policies. Throughout this book, however, regulation and supervision will be viewed in a more general sense and, in many cases, will be used interchangeably.

portion of their funds in banks, and as the public began making financial transactions through banks.

Banking poses a number of unique problems for clients and creditors. First, plenty of bank clients use a bank primarily when writing and cashing checks and carrying out other financial transactions. To do so, they must maintain a deposit account. As a result, bank clients assume the role of bank creditors and become linked with the fortunes of their bank. This contrasts with most other businesses, where clients simply pay for services or goods and never become creditors of the firm.

A second problem for bank depositors is that fractional reserve system of banking as in the U.S., deposits are only partially backed by the reserves banks hold in the form of cash and balances maintained with the Federal Reserve. As a result, depositor safety is related to many other factors as well, including the capital in a bank and the value and condition of its loans, securities, and other assets.

Bank depositors may have more difficulty protecting their interests than customers of other types of businesses. While depositors could feasibly make general judgments about the condition of banks, the task would still be hard, costly, and occasionally prone to error. These facts, especially when combined with the history of depositor losses before deposit insurance, explain much of the public pressure for banking regulation to protect depositors.

3.1.2. Monetary and Financial Stability

Just being concerned about individual depositors is not enough itself, banking regulations have to seek to provide a stable framework for making payments. With the large size of transactions conducted every day by businesses and individuals, a safe and proper means of payment is critical to the health of our economy. In fact, it is difficult to conceive how a complicated economic system could operate and avoid serious disruptions if the large group of daily transactions could not be completed with a high degree of certainty and safety. Ideally, bank regulations have to keep

fluctuations in business activity and problems at individual banks from interrupting the flow of transactions across the economy and threatening public confidence in the banking system.

Another policy aspect of monetary stability is supervision and regulation of the banking system. In order to provide stability, banking regulation should enhance the development of strong banks with enough liquidity and should hinder banking practices that might harm depositors and damage the payments system.

In banking regulation, the purpose of monetary stability has been closely connected with the aim of depositor protection. Financial crises and unintended fluctuations in the money supply have been obviated primarily by fostering confidence in banks and guaranteeing the safety of deposits.

3.1.3. Efficient and Competitive Financial System

One more aspect of a good banking system is that quality services are provided to customers at competitive prices. Therefore, creating a regulatory framework that fosters efficiency and competition and ensures a sufficient level of banking services throughout the economy is one of the purposes of bank regulation.

The foundation of an efficient and competitive banking system carries a number of implications for regulation. Competition and efficiency depend on the number of banks working in a market, the freedom of other banks to go in and compete, and the ability of banks to attain a suitable size for serving their customers. For example, too few banks in a market could encourage monopolization or collusion, while banks of a suboptimal size might be unable to serve major customers and might be operating inefficiently. Therefore, regulators have to be concerned with the focus of resources in the banking industry and with the opportunities for entry and expansion across individual banking markets.

Banking regulation must also take an approach that does not needlessly restrict activities of commercial banks, place them at a competitive disadvantage with less regulated firms, or impede the ability of banks to serve their customers' financial needs. Finally, regulation should promote a banking system that can improve and adapt in response to changing economic conditions and technological advances.

3.1.4. Consumer Protection

Another aim of banking regulation is to protect consumer interests in several aspects of a banking relationship. The previous regulatory goals serve to protect consumers in many ways, especially through safeguarding their deposits and foster competitive banking services. However, there are other ways in which consumers are protected in their banking activities. These further forms of protection have been executed through a series of legislative acts passed over the past few decades.

Consumer protection goals are commonly consistent with good banking principles. In fact, credit and deposit disclosures and informed customers should be of most benefit to bankers offering competitive services. Also, equal and nondiscriminatory treatment of borrowers is requisite for any banker pursuing to maximize profits. Consumer protection has become a very complicated and detailed regulatory process as a result of the growing complexity of financial instruments and the uniqueness of individual customers(Spong, 2000).

In order to understand the regulations and their importance as a means of protection we will shed light on the risks involved in mortgage that can lead to bankruptcy and may lead to serious financial problems such as the global financial crisis.

3.2. Risks Involved in Mortgages

Lenders and investors of mortgages are anxious about varied risks facing when making loans and investments. In addition to predictable inflation, they are concerned about whether interest rates and returns available on mortgages compensate

adequately for risk. Below we will explain four major risks: the default risk, the interest rate risk, the prepayment risk, and the liquidity risk, which are affecting mortgages. According to (Çobandağ, 2010) risks of mortgage will be explained as follows.

3.2.1. Default Risk

Default risk can be defined as the risk that borrowers will default on obligations to repay interest and principal of their loans. It varies with the kind of the loan and the creditworthiness of individual borrowers. The potential of default by a borrower means that a premium or higher rate of interest will be charged by lenders to offset possible loan losses.

The probability that a borrower's income may fall after a loan is made and as a consequence the receipt of future mortgage payments gets risky is the situation of default risk. Likewise, loan balance could get higher than a property's value at some future time and that can make the borrower default on payments.

3.2.2. Interest Rate Risk

Lenders and Investors could also face with the risk that the interest rate charged on a specific loan gets inadequate when there is a considerable change in the economic conditions after a loan is made. The volume of these changes may have required a higher interest rate when the loan was made.

Subsequently, interest rate risk can be defined as the uncertainty about what interest rate to charge when a loan is made. A major source of risk to the lender is the likelihood that a very low interest rate is charged at the time the loan is made. Thus, a premium for this type of risk must also be charged or reflected in the market rate of interest. The fixed-rate mortgages are affected mainly by interest rate risk. Adjustable rate mortgages are created to decrease the interest rate risk for the lenders.

As an example, it was stated that savings and loan associations in the United States had faced with significant interest rate risk linked with making long-term fixed rate mortgages funded by short term deposits. While adjustable rate mortgages decrease the interest rate risk for lenders, they raise it for borrowers, which may lead to high default by borrowers in unsteady economies.

3.2.3. Prepayment Risk

Homeowners have the right to choose to prepay their mortgage in whole or in part at any time they desire. Usually, there is no penalty imposed on the homeowner for prepaying the mortgage except if it is stated contractually. Therefore, because of the prepayment option granted to the homeowner, the investor in a mortgage cannot be sure of the cash flow. It is called as the prepayment risk if there is uncertainty about the cash flow due to the prepayment option. An investor is exposed to prepayment risk for a pool of mortgages and for an individual mortgage. Therefore, any security backed by a pool of mortgages exposes an investor to prepayment risk.

The falling of the current mortgage rate by an adequate amount below the contract rate is one of the reasons why a homeowner desires to prepay the loan. Lenders have to forgo the opportunity to earn interest income that would have been earned at the original contract rate if loans are prepaid when interest rates fall. Also, a lower rate of interest will be earned when funds from the prepaid loans are reinvested by lenders. However, when interest rates rise, the loan is not as likely to be prepaid.

3.2.4. Liquidity Risk

Liquidity risk is the risk that an asset cannot be easily and speedily sold for cash at its current value. Securities that can be easily sold and resold in well-established markets will necessitate lower premiums than those that are more difficult to sell.

The long term nature of loans rises liquidity risk in mortgages. Individual mortgages may not be easily turned into cash, and the money can be wanted before it is due. A

lender faced with short term and unsteady sources of funds may not make mortgages due to the risk that it cannot match cash outflow needs by selling its loans. Also, the liquidity risk of mortgages can be increased from illiquid assets that are pledged for mortgages which cannot be pledged as collateral for short term borrowings(Çobandağ, 2010).

These risks can be contained by practice of macroprudential regulation. Practicing this type of regulation has been very important, especially after the global financial crisis (GFC)(Morgan, Regis, & Salike, 2015a). Below we will mention them.

3.3. Most Common Regulatory Instruments

There are a range of tools to handle aggregating weakness and individual failures that must be deployed by macroprudential policy. Since various sources of systemic risk unlikely to be addressed by a single tool, the macroprudential authority must be qualified to tailor specific macroprudential instruments to the particular vulnerabilities identified by its analysis. Following are the most common macroprudential instruments:

- Limits on maturity mismatch.
- Caps on the loan-to-value (LTV) ratio.
- Reserve requirements.
- Caps on the debt-to-income (DTI) ratio.
- Countercyclical capital requirements.
- Caps on foreign currency lending.
- Time-varying/dynamic provisioning.
- Ceilings on credit or credit growth.
- Restrictions on profit distribution.
- Limits on net open currency positions/currency mismatch(Lim et al., 2011).

These tools can be divided from three different perspectives:

- **Liquidity-related:** limits on net currency position or net currency mismatch, limits on maturity mismatch, core funding requirements, limits on funding gaps and prudential stability levies/taxes.
- **Credit-related:** caps on the loan-to-value (LTV) ratio, caps on the debt-to-income (DTI) ratio, limits on foreign currency lending, mandatory insurance for riskier loans and caps on credit volume or credit growth.
- **Capital-related:** countercyclical or time-varying capital requirements (including changes in the risk weight of certain loans), dynamic or time varying provisions, reserve requirements and restrictions on profit distribution (Ruiz, Matías, Alfonso, & Enestor 2014).

The global financial crisis (GFC) of 2007–2009 emphasized the necessity for central banks and financial regulators to adopt a macroprudential perspective on financial risk, for example, to supervise and regulate the buildup of systemic financial risk in the economy as a whole, as opposed to simply monitoring the condition of individual financial institutions (microprudential regulation) (Morgan et al., 2015a).

In advanced countries are using Borrower-based policies (such as caps on loan to value (LTV) and debt to income (DTI) ratios) more relatively. And some policies are used in most by all countries to reduce systemic risks turn up from intra-financial system vulnerabilities, involving from dominant banks and interconnections among banks (Cerutti, Claessens, & Laeven, 2015).

LTV ratios are imposed all the time by a few economies, while others impose them only as required. Debt-service-to-income (DTI) ratios are an alternative to LTV ratios, and implement minimum levels of the expected ability of borrowers to service debt, offering another cap on exaggerated lending (Morgan, Regis, & Salike, 2015b). We will shed light on LTV ratio as follows:

3.3.1. Loan-To-Value Ratio

Determining the value of the property is one of the standard procedures before making a loan. This can be done by an appraisal that determines a value for the property for loan purposes. The lender may have its own appraisers (in-house appraisers), or it can use an independent (outside) appraiser.

Loan-to-value ratio can be defined as the amount of money customer asks the bank to lend him compared to the value of the property. The lower the ratio, the lower the risk for the lender. While the lower the ratio, the lower your credit score can be for customer(Talamo, 2008).

As the loan to value ratio reflects the amount of equity borrowers have in their homes. The higher the loan to value the less cash homebuyers are having to pay out of their own funds. Thus, lenders to protect themselves against possible loss in case of default, higher LTV loans (80% or more) usually require mortgage insurance policy(Sentowski, 2007).

The thing we should know about LTV is that lenders don't want our property; they just want to get their money back quickly. If they only lend up to 80% (or less) of the property's value, they can sell the property at less than top-dollar to recover their funds(Pritchard, 2016).

3.3.2. Calculating the Loan to Value Ratio

As we saw above, loan-to-value describes the way in which the amount of money customer has borrowed relates to the value of his house. Generally, a loan-to-value calculator will express it as a percentage.

For example, if a customer is wants to buy a house valued at \$200,000, and has saved up a deposit of \$50,000, you will need a mortgage of \$150,000.

Mortgage ÷ whole value = 0.8

$$\$150,000 \div \$200,000 = 0.75$$

$$0.75 \times 100 = 75 \text{ (75 per cent)}$$

His loan-to-value would be 75 per cent, meaning that the money he is borrowing adds up to 75 per cent of the value of the property, and he owns 25 per cent of it outright.

The \$50,000 deposit (available upfront as cash) is described as 'equity'. As a homeowner constantly pays back the money borrowed, the equity will increase.

For example, if, after five years, customer has managed to pay back \$50,000 of the loan, his equity will increase to \$100,000 (\$50,000 deposit + \$50,000 paid back).

$$\text{New equity value} \div \text{whole property value} = 0.5$$

$$\$100,000 \div \$200,000 = 0.5$$

$$0.5 \times 100 = 50 \text{ (50 per cent)}$$

He now owns 50 per cent of the value of his home, and his loan-to-value will decrease to 50 per cent, the remaining value (team, 2015).

The following chapter will be an empirical analysis of how the loan to value ratio works in Islamic and conventional bank.

CHAPTER 4

LTV INTERVENTION ON CONVENTIONAL AND ISLAMIC BANKS: AN EMPIRICAL ANALYSIS

Having discussed housing finance in an Islamic manner and loan-to-value (LTV) regulations in previous chapters, in this section we assess the effectiveness and drawbacks of maximum loan-to-value (LTV) ratios as a macroprudential tool based on Turkish experience and econometric analyses.

The aftermath of the 2008-09 global financial crisis had been tough in all circumstances and it has been announced as the worst period after the Great Depression. IMF declared that the accumulated wealth has been lost in its most accelerated speed in the last forty years. Unemployment levels rocketed, the ratio of budget deficits to GNP and public debt stock to GNP levels increased, capital flows to emerging markets declined and the uncertainty in the financial sectors increased.

It has also demonstrated that monetary policy and microprudential banking regulations are not sufficient to prevent the build-up of systemic risk. There is a growing consensus that macroprudential policy should complement the existing policy frameworks of central banks/supervisory authorities to address systemic risk. Maximum LTV ratios on mortgages are being considered or have been recently adopted by some countries as a macroprudential instrument to fill the policy gap.

Despite wider recognition of LTV policy in the policy community, empirical evidence with regard to some key issues remains scant. First, how effective is LTV policy in reducing systemic risk arising from the boom-and-bust cycle of property markets? Secondly, does it have the same impact for Islamic banks either?

In this regard, we begin with a brief history of the LTV policy in Turkey. Afterwards, we provide empirical evidence of above two key issues using econometric analyses.

4.1. A Brief History of the LTV Policy in Turkey

Banking Regulation and Supervision Agency (BRSA) is the responsible governmental body aiming at enhancing banking sector efficiency and competitiveness; maintaining confidence in the banking sector; minimizing the potential risks to the economy from the banking sector; and protecting the rights of the depositors.

Like many other developing countries, the need to take action against the potential risks in the financial system emerged in Turkey following the Global Financial Crisis. From 2010 onwards, BRSA made many regulations. In addition, Turkey adopted Basel III standards to a large extent. In the period following the 2008-2009 Global Financial Crisis the key drivers, that pushed Turkey to implement the macro-prudential policies, were the rapid economic recovery and the excessive rate of credit growth, which surpassed 30% in 2011.

In that respect, BRSA has recently taken various macro-prudential measures on banking sector in order to accomplish these goals by minimizing the impacts of economic crisis in global financial markets.

Macro-prudential measures were taken for limiting the retail loans, which increased sharply in the latest periods in order to decrease the current account deficit in the economy and decrease the indebtedness of household by increasing the savings rates. BRSA aimed to protect the financial stability and the soundness of banking sector by taking these macro-prudential measures (Bumin and Taşkın, 2015).

Macro-prudential measures were taken basically in four areas; i) limitations towards consumer loans, ii) limitations brought to the usage of credit cards, iii) increasing ratios for loan loss provisioning, iv) increasing the risk weight ratios of loans on the calculation of capital adequacy ratio. Within this scope, macro-prudential measures

taken by the BRSA for protecting the sound structure of banking sector are given below under these four areas (Bumin and Taşkın, 2015). The following table summarizes these measures in a nutshell:

Table 4.1. Macro-Prudential Policy Tools Used in Turkey 2010-2015

Macro-prudential policy tools used in Turkey, 2010-2015

Broad classification of tools	Macro-prudential policy tools	Measures came into effect
• Credit-related	• Limiting credit expansion	2010, 2011, 2013-2015
	• Changing Loan-to-Value ratio	2011, 2014
	• Changing Debt-to-Income ratio	2013
	• Limiting foreign currency lending	X
○ Liquidity-related	○ Limiting net open foreign currency position	X
	○ Limiting currency mismatches	X
	○ Limiting maturity mismatches	2011, 2013, 2015
	○ Changing reserve requirements	2010-2015
	○ Non-traditional macro-prudential instruments related to reserve requirements	
	- The ROM	2011-2015
	- Leverage based reserve requirements	2014-2015
○ Liquidity coverage ratio	2015	
○ Net stable funding ratio	X	
▪ Capital-related	▪ Countercyclical capital requirements	2011-2015
	▪ Changing loan-loss provisions	2010-2011, 2013, 2015
	▪ Limiting profit distribution	2010
	▪ Limiting leverage ratio	2015
	▪ Capital conservation buffer	
	▪ Cyclical capital buffer	α

Note. α : These tools are put into practice in 2016. Source: Lim et al. (2011), BIS (2011), BRSA, CBRT.

Credit-related macro-prudential measures were the limitation of maturities of car loans and general-purpose loans and LTV ratio brought to mortgage and car loans. By limiting the maturities of consumer loans, it was aimed to reduce the growth rate of these loans. Besides, total amount of consumer loans was targeted to be reduced by increasing the amount of down payment made by consumers in mortgage and car loans by introducing the loan to value ratio (Bumin and Taşkın, 2015).

As mentioned earlier, we are interested in the LTV measure put for mortgage loans in this study. LTV ratio is a countercyclical tool for managing the developments in the credit volume in an economy.

With the BRSA Board Decision dated 16.12.2010, it is decided that for loans extended to consumers for mortgage as well as consumer loans extended under mortgage collaterals, the amount of the loan shall be limited to 75%³ of the value of the real estate subject to collateral and the valuation of real estate's taken as collateral shall be made by valuation companies authorized by the Board or Capital Markets Board (Bumin and Taşkın, 2015). Enforcement of a regulatory LTV requirement for mortgage lending has helped to contain risks associated with household mortgage indebtedness. On the other hand, after a long period of no changes in macroprudential standards for mortgage loans since December 2010, The LTV Ratio has been increased from 75 percent to 80 percent by September 2016.

To the best of our knowledge, none of the studies regarding LTV includes assessments about housing loans in Turkey. For example, an empirical study was published recently regarding the LTV arrangements in Turkey . Arslan, Kabaş & Taşkın (2015) investigated whether the BRSA's LTV arrangements on vehicle loans affected the demand for the cars with a value exceeding TRL 50,000, or not. They estimated the effect of the LTV measure by using monthly data before, and, after the arrangement. Their results suggested that the arrangement led to a fall in the demand for more expensive cars immediately after it was put into effect in 2014. However, when the authors tested their model for various periods, the results showed that the effect of the LTV arrangement petered out in one year.

In another study, Balcı and İşcan (2016) evaluate the impact of macroprudential measures introduced since 2013 by BRSA on personal vehicle and consumer loans by using difference-in-differences method. The results of the study indicate that the maturity restriction and loan-to-value ratio on personal vehicle loans have been considerably effective in slowing down these loans. Although maturity restriction on consumer loans introduced at the end of 2013 was effective in the short-term in slowing down the growth of these loans, this impact became statistically insignificant after 3 months' period. However, 13 months after this measure, the impact became

³ The BRSA also put a 50% cap on the LTV ratio, for the corporate loans provided to purchase commercial real estate.

statistically significant again. The results indicate that besides interest rate policy, macroprudential measures can also be used as important policy instruments to keep the growth of loans under control.

In order to fill the gap, we intend to perform empirical analyses to figure out the effectiveness of LTV regulation and reveal the differences, if any, between conventional banks and Islamic banks.

4.2 Empirical Analysis of the Impact of LTV Policy in Conventional and Islamic Banks in Turkey

LTV is identified as the most common macroprudential measure that is used. Although some advanced countries employ previously, LTV has mostly been implemented during mid-2000s in Asian countries such as Korea, Hong Kong, Singapore and China without being referred to as a macroprudential measure until recently. Studies based on these countries show that LTV measures on housing loans have been effective. The analysis on Hong Kong housing markets indicates that cyclical loan-to-value policy decreased the possibility of the formation of a bubble in housing markets and contained the effect of the volatility in housing prices on the real economy. Tightening in the LTV and debt-to-income ratio (DTI) decreased buying and selling activities in housing markets at a significant rate in Korea during 2001-2010. Following the tightening, buying and selling activities declined within 3 months and deceleration of prices takes up to 6 months. Furthermore, the fluctuation in prices is more responsive to LTV tightening. Moreover, in countries implementing the LTV policy, fall in prices significantly diminishes the effect of the default rate in housing loans. LTV and DTI policies significantly lower the growth of housing loans. LTV can be designed to target specific objectives. When a real estate bubble occurs, LTV is best option to curb it. After the implementation of LTV, credit growth and asset price inflation declines. In addition, LTV reduces the procyclicality of credit growth by 80 percent. These studies all together suggest that LTV can be useful for controlling systemic risks generated by credit growth or asset price inflation in housing markets (Arslan et al., 2015).

In this framework, we test for the impact of LTV on housing loans in Turkish banking system, which has not been taken attention before.

4.2.1. Descriptive Statistics

Same rules of BRSA apply for both conventional and Islamic banks in Turkey in terms of loan origination. This is also the case for housing loans and relevant LTV regulations. In this regard, descriptive statistics about amount of housing loans granted by conventional and Islamic banks throughout 2005/1-2017/3 are displayed in monthly basis in Table 4.2.

Table 4.2.Housing Loans Granted by Conventional and Islamic Banks

Year	Month	Housing Loans (mn TL)		Year	Month	Housing Loans (mn TL)	
		Conventional	Islamic			Conventional	Islamic
Non-LTV Period				LTV-period			
2.005	1	2.113,94	202,03	2.011	1	56.715,66	3.281,63
2.005	2	2.346,91	208,84	2.011	2	58.070,90	3.395,28
2.005	3	3.022,09	229,65	2.011	3	60.014,12	3.547,57
2.005	4	3.711,99	248,81	2.011	4	61.650,92	3.650,15
2.005	5	4.484,84	282,25	2.011	5	63.301,54	3.793,24
2.005	6	5.273,98	349,44	2.011	6	65.146,00	4.030,50
2.005	7	6.178,99	378,96	2.011	7	65.813,84	4.316,09
2.005	8	7.021,31	412,52	2.011	8	66.286,50	4.435,12
2.005	9	8.062,83	408,57	2.011	9	66.809,24	4.498,65
2.005	10	9.075,52	422,05	2.011	10	67.852,96	4.653,83
2.005	11	9.939,83	442,53	2.011	11	67.921,29	4.782,58
2.005	12	11.315,23	531,24	2.011	12	68.323,02	4.912,25
2.006	1	11.992,11	552,96	2.012	1	68.235,69	5.022,40
2.006	2	13.439,17	611,76	2.012	2	68.407,24	5.056,86
2.006	3	15.110,16	710,96	2.012	3	69.060,44	5.112,46
2.006	4	16.555,86	791,85	2.012	4	69.756,57	5.175,78
2.006	5	18.319,08	888,91	2.012	5	70.820,27	5.313,67
2.006	6	19.270,15	961,45	2.012	6	71.756,66	5.443,26
2.006	7	19.431,69	995,51	2.012	7	72.451,82	5.587,46
2.006	8	19.553,23	1.009,83	2.012	8	72.957,35	5.698,98
2.006	9	19.816,58	1.020,36	2.012	9	74.078,31	5.871,81
2.006	10	20.008,74	1.028,82	2.012	10	75.279,79	6.071,73
2.006	11	20.363,27	1.056,70	2.012	11	76.823,61	6.255,04
2.006	12	20.791,87	1.086,35	2.012	12	78.535,81	6.507,40
2.007	1	20.944,34	1.093,01	2.013	1	80.095,76	6.765,12
2.007	2	21.258,83	1.112,80	2.013	2	81.771,40	7.009,28
2.007	3	21.722,71	1.147,47	2.013	3	83.899,64	7.325,57
2.007	4	22.230,43	1.184,48	2.013	4	85.822,00	7.574,13
2.007	5	22.955,46	1.214,62	2.013	5	88.760,58	7.784,98
2.007	6	23.795,58	1.227,65	2.013	6	91.667,26	7.845,76
2.007	7	24.598,70	1.236,58	2.013	7	94.028,51	8.134,06
2.007	8	25.466,45	1.246,53	2.013	8	95.204,93	8.334,69
2.007	9	26.260,39	1.258,27	2.013	9	96.744,88	8.580,24
2.007	10	26.968,16	1.261,66	2.013	10	97.433,99	8.668,69
2.007	11	27.998,54	1.269,03	2.013	11	99.026,18	8.865,59
2.007	12	28.732,14	1.272,66	2.013	12	100.563,30	9.024,87
2.008	1	29.445,79	1.290,00	2.014	1	101.600,28	9.108,62
2.008	2	30.402,74	1.312,52	2.014	2	101.878,51	9.058,33

Table 4.2. Housing Loans Granted by Conventional and Islamic Banks (cont'd)

2.008	3	31.496,42	1.236,74	2.014	3	102.344,47	9.050,86
2.008	4	32.062,46	1.268,40	2.014	4	102.725,04	9.101,25
2.008	5	32.735,07	1.299,94	2.014	5	103.715,26	9.361,84
2.008	6	33.743,86	1.338,20	2.014	6	104.759,93	9.563,41
2.008	7	34.107,93	1.386,46	2.014	7	105.768,81	9.726,31
2.008	8	34.348,45	1.410,90	2.014	8	107.167,91	9.886,69
2.008	9	34.456,57	1.440,99	2.014	9	109.279,66	10.116,68
2.008	10	34.569,17	1.440,48	2.014	10	110.584,59	10.249,44
2.008	11	34.284,79	1.416,62	2.014	11	112.278,36	10.566,57
2.008	12	33.837,65	1.391,61	2.014	12	114.469,38	10.820,06
2.009	1	33.691,49	1.377,22	2.015	1	115.042,18	10.950,49
2.009	2	33.729,47	1.386,11	2.015	2	116.808,31	11.108,28
2.009	3	33.961,29	1.418,31	2.015	3	119.558,36	11.355,60
2.009	4	34.380,51	1.484,26	2.015	4	121.938,77	11.713,08
2.009	5	34.770,23	1.542,39	2.015	5	123.690,72	12.037,59
2.009	6	35.326,81	1.635,75	2.015	6	125.673,47	12.155,12
2.009	7	35.616,84	1.736,37	2.015	7	126.423,63	12.015,71
2.009	8	35.842,83	1.832,31	2.015	8	127.926,60	11.928,12
2.009	9	36.665,68	1.874,36	2.015	9	128.688,63	11.856,50
2.009	10	37.797,80	1.921,28	2.015	10	129.212,83	11.824,11
2.009	11	38.853,70	2.006,77	2.015	11	129.762,06	11.818,50
2.009	12	39.880,11	2.087,62	2.015	12	131.138,55	11.946,25
2.010	1	40.637,13	2.184,60	2.016	1	131.687,64	11.970,27
2.010	2	41.531,65	2.250,35	2.016	2	132.503,66	12.066,32
2.010	3	42.862,55	2.363,29	2.016	3	134.209,51	12.293,78
2.010	4	44.363,45	2.474,30	2.016	4	135.442,26	12.354,80
2.010	5	45.542,19	2.562,56	2.016	5	136.951,27	12.344,92
2.010	6	46.852,05	2.677,43	2.016	6	138.686,29	12.393,93
2.010	7	47.927,60	2.745,48	2.016	7	139.020,00	11.194,88
2.010	8	48.890,66	2.797,86	2.016	8	140.578,86	11.144,28
2.010	9	49.903,51	2.852,11	2.016	9	142.873,46	11.171,99
2.010	10	51.655,42	2.956,68	2.016	10	145.764,64	11.296,01
2.010	11	52.973,01	3.078,21	2.016	11	148.930,36	11.460,94
2.010	12	55.547,56	3.226,76	2.016	12	151.982,98	11.612,77
				2.017	1	153.658,79	11.656,93
				2.017	2	155.971,51	11.796,51
				2.017	3	160.267,32	12.164,63

As can be seen from Table 4.2., amount of housing loans granted by conventional banks are far higher than the ones granted by Islamic banks. On the other hand, both loan types are showing an increasing trend throughout years. This is visually portrayed in Figure 4.1.

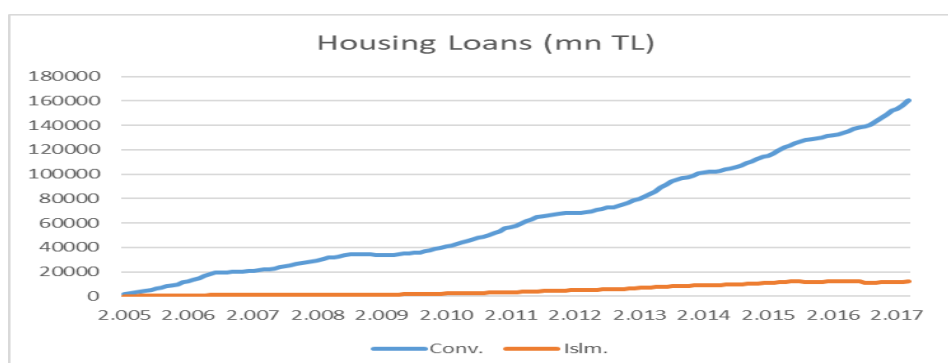


Figure 4.1 Housing Loans Granted by Conventional and Islamic Banks

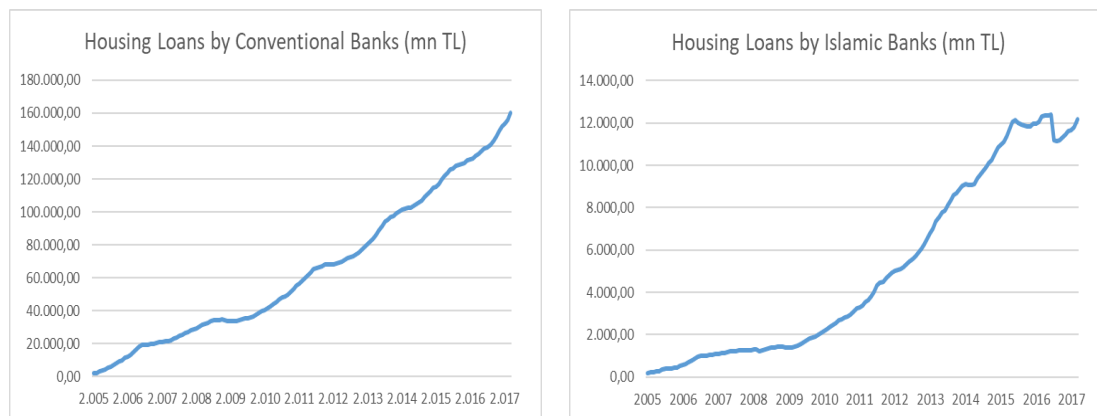


Figure 4.1 Housing Loans Granted by Conventional and Islamic Banks (cont'd)

Mean, standard deviation, minimum and maximum values of conventional and Islamic housing loans are provided in Table 4.3. As it is clear, mean and median values of conventional housing loans are about 13 and 17 times greater than Islamic housing loans, respectively.

Table 4.3. Mean, Standard Deviation, Minimum and Maximum Values of Conventional and Islamic Housing Loans

conventional				
	Percentiles	Smallest		
1%	2346.91	2113.94		
5%	7021.31	2346.91		
10%	15110.16	3022.09	Obs	147
25%	29445.79	3711.99	Sum of Wgt.	147
50%	58070.9		Mean	65488.97
		Largest	Std. Dev.	43902.04
75%	102344.5	151983		
90%	131687.6	153658.8	Variance	1.93e+09
95%	140578.9	155971.5	Skewness	.4431025
99%	155971.5	160267.3	Kurtosis	1.972884
islamic				
	Percentiles	Smallest		
1%	208.84	202.03		
5%	408.57	208.84		
10%	710.96	229.65	Obs	147
25%	1269.03	248.81	Sum of Wgt.	147
50%	3395.28		Mean	5065.52
		Largest	Std. Dev.	4249.905
75%	9101.25	12293.78		
90%	11818.5	12344.92	Variance	1.81e+07
95%	12037.59	12354.8	Skewness	.5131484
99%	12354.8	12393.93	Kurtosis	1.68374

Descriptive statistics about mortgage delinquencies in conventional and Islamic banks throughout 2005/1-2017/3 are displayed in monthly basis in table 4.4.

Table 4.4. Mortgage Delinquent Loans in Conventional and Islamic Banks

Year	Month	Mortgage Delinquent Loans (mn TL)		Year	Month	Mortgage Delinquent Loans (mn TL)	
		Conventional	Islamic			Conventional	Islamic
Non-LTV Period				LTV-period			
2.005	1	9,83	0,64	2.011	1	813,22	38,98
2.005	2	9,76	1,71	2.011	2	768,21	38,89
2.005	3	10,71	2,14	2.011	3	753,49	37,66
2.005	4	11,58	2,25	2.011	4	738,60	37,16
2.005	5	12,28	2,10	2.011	5	657,72	32,51
2.005	6	12,14	2,36	2.011	6	681,61	31,04
2.005	7	12,54	1,97	2.011	7	683,08	30,40
2.005	8	12,52	2,41	2.011	8	677,04	30,16
2.005	9	14,00	2,15	2.011	9	673,19	29,83
2.005	10	14,22	2,67	2.011	10	654,94	28,36
2.005	11	15,54	2,62	2.011	11	644,51	28,13
2.005	12	16,23	2,41	2.011	12	627,31	25,74
2.006	1	16,13	1,69	2.012	1	631,36	27,02
2.006	2	15,69	2,18	2.012	2	622,12	26,11
2.006	3	17,05	2,45	2.012	3	607,69	25,58
2.006	4	17,75	2,90	2.012	4	593,74	26,48
2.006	5	19,71	4,69	2.012	5	585,93	25,50
2.006	6	21,53	4,94	2.012	6	607,07	26,03
2.006	7	23,68	5,76	2.012	7	611,77	27,70
2.006	8	28,19	5,73	2.012	8	626,71	28,59
2.006	9	30,65	6,26	2.012	9	642,51	28,60
2.006	10	35,17	6,53	2.012	10	646,73	30,01
2.006	11	41,63	7,21	2.012	11	649,26	30,98
2.006	12	48,10	8,03	2.012	12	673,17	27,51
2.007	1	54,90	8,63	2.013	1	686,49	27,89
2.007	2	65,71	10,22	2.013	2	682,19	27,70
2.007	3	74,62	11,55	2.013	3	662,39	27,17
2.007	4	86,31	11,95	2.013	4	662,31	28,60
2.007	5	100,80	11,71	2.013	5	645,22	28,38
2.007	6	106,40	12,45	2.013	6	648,66	27,03
2.007	7	118,53	12,27	2.013	7	647,70	27,57
2.007	8	133,71	12,97	2.013	8	655,71	29,43
2.007	9	146,08	14,54	2.013	9	650,78	30,76
2.007	10	160,43	15,26	2.013	10	657,92	30,63
2.007	11	187,25	17,44	2.013	11	644,67	30,72
2.007	12	203,35	13,41	2.013	12	631,31	32,19
2.008	1	219,79	13,08	2.014	1	628,46	33,91
2.008	2	234,05	13,95	2.014	2	618,03	33,44
2.008	3	251,04	14,49	2.014	3	584,26	33,41
2.008	4	259,85	15,94	2.014	4	583,61	35,59
2.008	5	270,52	18,22	2.014	5	576,34	36,30
2.008	6	295,56	20,39	2.014	6	579,09	38,42
2.008	7	311,26	21,92	2.014	7	580,18	36,84
2.008	8	339,15	22,55	2.014	8	585,88	38,41
2.008	9	350,36	25,73	2.014	9	579,46	38,53

Table 4.4. Mortgage Delinquent Loans in Conventional and Islamic Banks (cont'd)

2.008	10	382,67	28,09	2.014	10	586,64	41,42
2.008	11	413,57	31,34	2.014	11	586,71	39,29
2.008	12	486,66	33,28	2.014	12	569,72	39,52
2.009	1	525,56	36,71	2.015	1	610,42	40,59
2.009	2	574,34	38,57	2.015	2	596,24	42,13
2.009	3	645,56	36,80	2.015	3	590,45	41,38
2.009	4	684,02	37,30	2.015	4	588,76	43,78
2.009	5	722,03	39,24	2.015	5	598,65	45,73
2.009	6	755,35	38,23	2.015	6	585,53	46,98
2.009	7	793,84	40,19	2.015	7	597,15	46,01
2.009	8	838,14	44,46	2.015	8	598,70	47,49
2.009	9	875,70	47,26	2.015	9	610,01	49,33
2.009	10	887,44	48,14	2.015	10	617,22	51,07
2.009	11	897,45	47,33	2.015	11	610,91	54,86
2.009	12	911,71	45,18	2.015	12	612,38	53,30
2.010	1	908,39	44,84	2.016	1	624,66	57,38
2.010	2	886,67	43,42	2.016	2	622,27	57,39
2.010	3	861,12	42,58	2.016	3	617,90	56,97
2.010	4	846,81	41,66	2.016	4	623,60	57,93
2.010	5	835,17	40,58	2.016	5	635,98	60,99
2.010	6	872,06	49,71	2.016	6	670,59	64,38
2.010	7	878,88	50,67	2.016	7	709,19	47,52
2.010	8	887,94	47,88	2.016	8	733,62	49,48
2.010	9	875,17	45,27	2.016	9	780,81	52,53
2.010	10	852,55	44,47	2.016	10	800,64	52,85
2.010	11	821,52	42,18	2.016	11	804,29	53,03
2.010	12	816,72	38,36	2.016	12	823,05	53,74
				2.017	1	812,57	57,66
				2.017	2	813,56	57,87
				2.017	3	809,63	56,05

As can be seen from Table 4.4, amount of mortgage delinquent housing loans in conventional banks are far higher than the ones in Islamic banks. On the other hand, mortgage delinquency in both loan types is showing an increasing trend throughout years. This is visually portrayed in Figure 4.2.

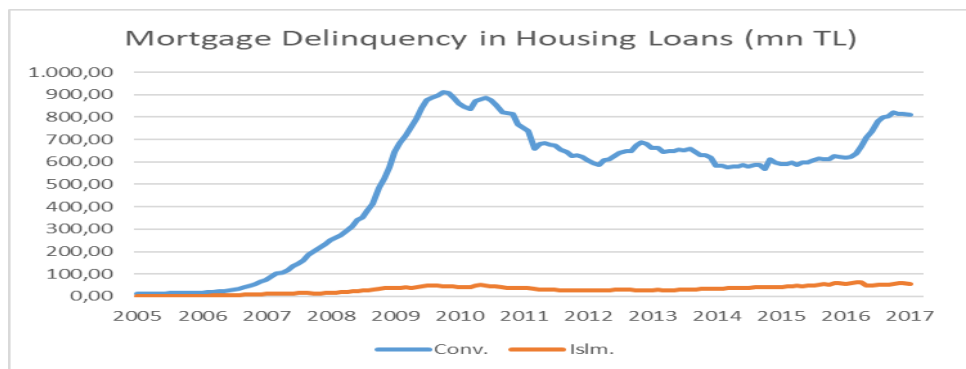


Figure 4.2. Mortgage Delinquency in Conventional and Islamic Banks

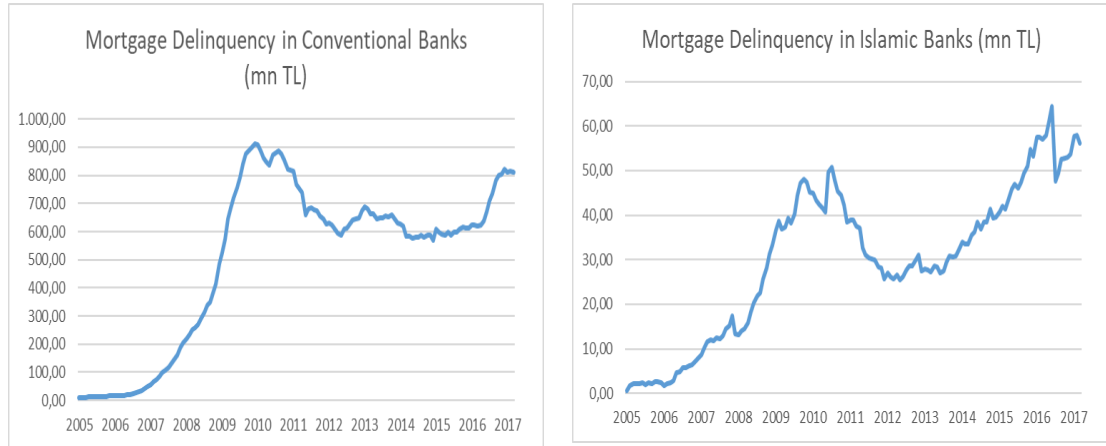


Figure 4.2. Mortgage Delinquency in Conventional and Islamic Banks (cont'd)

Mean, standard deviation, minimum and maximum values of mortgage delinquent conventional and Islamic housing loans are provided in Table 4.5. As it is clear, mean and median values of mortgage delinquent conventional housing loans are about 17 and 20 times greater than the ones in the Islamic banks, respectively.

Table 4.5. Mean, Standard Deviation, Minimum and Maximum Values of Mortgage Delinquent Conventional and Islamic Housing Loans

conventional					
	Percentiles	Smallest			
1%	9.83	9.76			
5%	12.54	9.83			
10%	17.05	10.71	Obs		147
25%	219.79	11.58	Sum of Wgt.		147
50%	610.91		Mean		503.924
		Largest	Std. Dev.		291.7329
75%	682.19	887.94	Variance		85108.07
90%	835.17	897.45	Skewness		-.6185787
95%	875.7	908.39	Kurtosis		1.964044
99%	908.39	911.71			
islamic					
	Percentiles	Smallest			
1%	1.69	.64			
5%	2.18	1.69			
10%	2.67	1.71	Obs		147
25%	14.54	1.97	Sum of Wgt.		147
50%	30.76		Mean		30.18197
		Largest	Std. Dev.		16.83671
75%	42.58	57.87	Variance		283.4748
90%	52.53	57.93	Skewness		-.202046
95%	56.97	60.99	Kurtosis		2.05884
99%	60.99	64.38			

Table 4.7. Test for Differences for Mortgage Delinquent Housing Loans

Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
preltvcm	71	.062253	.006715	.0565819	.0488603	.0756457
postltvcm	71	.0001692	.0033063	.0278597	-.0064251	.0067635
diff	71	.0620838	.0078635	.0662592	.0464005	.0777671

mean(diff) = mean(preltvcm - postltvcm) t = 7.8952

Ho: mean(diff) = 0 degrees of freedom = 70

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0

Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
preltvim	71	.0576745	.019122	.1611249	.0195369	.0958122
postltvim	71	.0045253	.0067122	.0565581	-.0088618	.0179123
diff	71	.0531493	.0207492	.1748361	.0117663	.0945323

mean(diff) = mean(preltvim - postltvim) t = 2.5615

Ho: mean(diff) = 0 degrees of freedom = 70

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0

Pr(T < t) = 0.9937 Pr(|T| > |t|) = 0.0126 Pr(T > t) = 0.0063

Table 4.9. The Short-Term Impact of LTV Intervention (LTV period)

Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
prel~mst	12	-.0091684	.0063094	.0218565	-.0230554	.0047186
post~mst	12	-.0219877	.0105952	.036703	-.0453077	.0013322
diff	12	.0128193	.0091562	.0317179	-.0073332	.0329719

mean(diff) = mean(preltvcnst - postltvcnst) t = 1.4001

Ho: mean(diff) = 0 degrees of freedom = 11

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0

Pr(T < t) = 0.9055 Pr(|T| > |t|) = 0.1891 Pr(T > t) = 0.0945

Paired t test

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
pre~imst	12	-.0136344	.0213869	.0740863	-.0607066	.0334377
pos~imst	12	-.0332625	.0120945	.0418964	-.0598823	-.0066428
diff	12	.0196281	.0245645	.0850939	-.034438	.0736942

mean(diff) = mean(preltvimst - postltvimst) t = 0.7990

Ho: mean(diff) = 0 degrees of freedom = 11

Ha: mean(diff) < 0 Ha: mean(diff) != 0 Ha: mean(diff) > 0

Pr(T < t) = 0.7794 Pr(|T| > |t|) = 0.4412 Pr(T > t) = 0.2206

However, for Islamic banks, there seems to be no short-term difference between pre-LTV and post-LTV period. For instance, neither the mean change in housing loans (p-value: 0.411) nor the mean change in mortgage delinquent loans (p-value: 0.221) between 2010 and 2011 is significant.

A brief interpretation as a whole would be that Islamic banks are more conservative in the non-LTV period, and though LTV intervention had an economic impact (and statistically significant for periods between 2005-2010 and 2010-2016) on the amount

of housing loans and mortgage delinquent loans, it is smaller than the one found in conventional banks. In summary, in line with our expectations, LTV regulation has proved to decrease the level of housing loans and mortgage delinquency.

4.2.2.2. Testing for Structural Break

Following tests of mean differences, we employ Chow Tests and Time-Series Regressions in order to figure out whether LTV regulation of 2011 constitutes for a structural break.

We have two general models to be estimated. First model intends to test the LTV impact with respect to the change in housing loans as the dependent variable. Second model, however, has the change in mortgage delinquent housing loans as the dependent variable.

Independent variables are housing price index (HPI) produced by Central Bank of Turkey, interest rates and inflation rates. HPI aims to monitor price movements in the Turkish housing market. Price data related to all houses subject to sale, regardless of the construction year are used to develop the HPI. In the housing market, as the prices of properties become available when they are actually sold, house prices indicated in valuation reports prepared at the time of approval of individual housing loans are used as a proxy for price. The actual sale of the property and utilization of the loan is not required and all houses appraised are included in the scope. To construct the HPI representing the whole country, all valuation reports are used. HPI data is available since 2010 on a monthly basis. The data is provided in Table 4.10.

Table 4.10. Data of Housing Price Index (HPI)

Month	HPI	Month	HPI	Month	HPI	Month	HPI
2010/1	96,92	2012/1	116,22	2014/1	147,55	2016/1	202,32
2010/2	97,22	2012/2	117,97	2014/2	148,98	2016/2	203,95
2010/3	97,77	2012/3	119	2014/3	150,81	2016/3	206,22
2010/4	98,39	2012/4	120,56	2014/4	153,41	2016/4	208,52
2010/5	98,95	2012/5	121,83	2014/5	155,4	2016/5	211,93
2010/6	99,47	2012/6	123,16	2014/6	157,92	2016/6	213,89
2010/7	100,05	2012/7	124,13	2014/7	160,63	2016/7	217,41
2010/8	100,94	2012/8	125,32	2014/8	162,72	2016/8	219,7
2010/9	101,59	2012/9	125,97	2014/9	164,02	2016/9	221,38
2010/10	102,2	2012/10	126,72	2014/10	166,05	2016/10	222,45
2010/11	102,88	2012/11	127,46	2014/11	168,26	2016/11	224,05
2010/12	103,56	2012/12	128,61	2014/12	169,99	2016/12	225,95
2011/1	104,29	2013/1	130,06	2015/1	172,19	2017/1	228,61
2011/2	105,45	2013/2	131,86	2015/2	175,16	2017/2	231,14
2011/3	106,61	2013/3	133,46	2015/3	178,78	2017/3	233,74
2011/4	107,76	2013/4	135,14	2015/4	181,79		
2011/5	109,41	2013/5	136,73	2015/5	184,98		
2011/6	110,51	2013/6	138,54	2015/6	187,83		
2011/7	111,22	2013/7	140,13	2015/7	190,75		
2011/8	111,42	2013/8	141,24	2015/8	192,42		
2011/9	112,68	2013/9	142,21	2015/9	194,36		
2011/10	113,63	2013/10	143,22	2015/10	197,1		
2011/11	114,3	2013/11	145,35	2015/11	199,59		
2011/12	115,3	2013/12	146,37	2015/12	201,28		

The trend in HPI is shown in Figure 4.3.as follows.

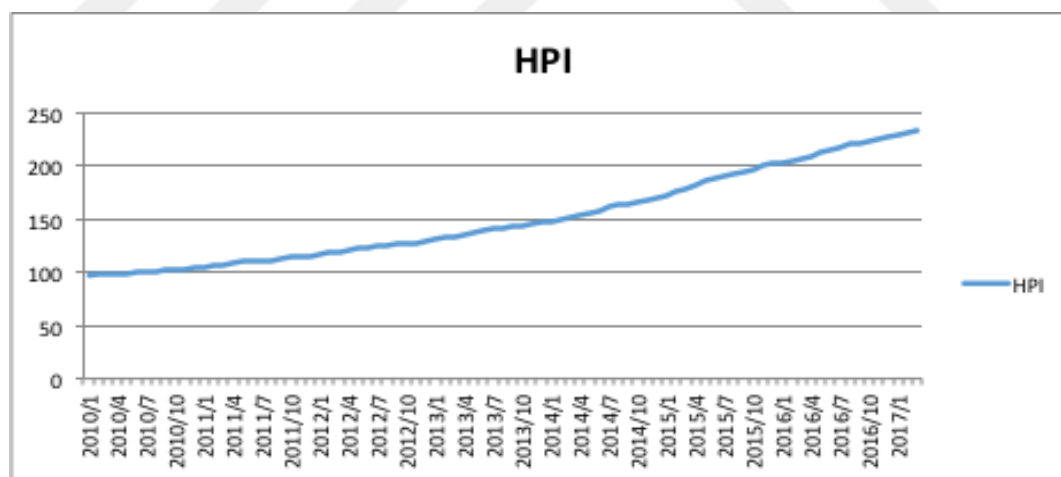


Figure 4.3.The Trend in HPI

Interest rates are defined as the monthly interest rates set for housing loans in the market. This data is retrieved from Central Bank of Turkey. Inflation rates are the consumer price index values on a monthly basis. All of the data are transformed into a “change” variable by $\ln(x_t/x_{t-1})$ formula. Data analyses are performed by Stata-14.

4.2.2.2.1. Testing Structural Break: Chow Test

The Chow Test examines whether parameters (slopes and the intercept) of one group are different from those of other groups. In our case, we are interested in examining whether parameters of variables that belong to pre-LTV period are different from those of that belong to post-LTV period. In this regard, we would be able to infer that LTV regulation creates a structural break for conventional and Islamic banks or not.

We estimate two pooled models, which assume variables of both periods have the same slopes and intercept.

$$\Delta HL_i = \alpha_0 + \alpha_1 \Delta HPI_i + \alpha_2 \Delta INT_i + \alpha_3 \Delta INF_i + \varepsilon \quad (1)$$

$$\Delta MD_i = \alpha_0 + \alpha_1 \Delta HPI_i + \alpha_2 \Delta INT_i + \alpha_3 \Delta INF_i + \varepsilon \quad (2)$$

In (1), ΔHL_i stands for monthly change in housing loans; ΔHPI_i is the monthly change in housing price index; ΔINT_i is the monthly change in interest rates; and ΔINF_i denotes for the monthly change in inflation rates. In (2), however, ΔMD is the monthly change in mortgage delinquent housing loans.

We expect that, as housing prices increase, amount of housing loans would increase as well, since consumers would need to obtain more loans to own a property. On the other hand, we expect that, as housing prices increase, amount of mortgage delinquent housing loans would decrease, since the value of the house would offset the amount of loan at the end of the day. We estimate these models for conventional banks and Islamic banks one-by-one.

We suppose that the impact of change in HPI on housing loans varies across periods; the slope of ΔHPI_i of one period, i.e. pre-LTV, is different from the slopes of other period, i.e. post-LTV. We consider two periods ($d = 1$ or 0), and ΔINT_i and ΔINF_i are covariates in this test.

For the Chow Test, we create an interaction term of the ΔHPI_i and the dummy variable “d”, and then fit the models in (1) and (2) with the interaction and the dummy as follows:

$$\Delta HL_i = \alpha_0 + \alpha_1 \Delta HPI_i + \alpha_2 \Delta HPI_i * d + \alpha_3 d + \alpha_4 \Delta INT_i + \alpha_5 \Delta INF_i + \varepsilon \quad (3)$$

$$\Delta MD_i = \alpha_0 + \alpha_1 \Delta HPI_i + \alpha_2 \Delta HPI_i * d + \alpha_3 d + \alpha_4 \Delta INT_i + \alpha_5 \Delta INF_i + \varepsilon \quad (4)$$

The coefficient of d is the deviation of the post-LTV period’s intercept from the pre-LTV intercept ($d=0$). Likewise, the coefficient of ΔHPI_i is the slope of the pre-LTV period, and the coefficient of interaction variable is the deviation of the post-LTV group's slope from the pre-LTV slope.

Then, we conduct the Chow Test using the `.test` command. The null hypothesis is that two periods have equal parameters for ΔHPI_i and intercept; deviations of the slope and intercept are not statistically discernible from zero.

```
. test _b[ $\Delta HPI_i$  _d]=0, notest
. test _b[d]=0, accum
```

The `notest` option suppresses the output, and `accum` tests a hypothesis jointly with a previously tested one. Rejection of the null hypothesis means that two periods do not share the same intercept and slope of ΔHPI_i .

We first employ Chow Test with respect to model (3) for conventional banks and obtain the results displayed in Table 4.11, which suggests that LTV intervention creates a structural break (p-value: 0.0006) for conventional banks in terms of change in the amount of housing loans.

Table 4.11. Chow Test with Respect to Model (3) for Conventional Banks

```
. glm c_loan hpi intr inf
```

```
Iteration 0: log likelihood = 81.088466
```

```
Generalized linear models          No. of obs    =      24
Optimization      : ML              Residual df   =      20
Scale parameter   = .0000817        (1/df) Deviance = .0000817
Deviance          = .0016332303      (1/df) Pearson = .0000817
Pearson           = .0016332303
```

```
Variance function: V(u) = 1          [Gaussian]
Link function     : g(u) = u         [Identity]
```

```
Log likelihood    = 81.08846634      AIC           = -6.424039
BIC              = -63.55944
```

c_loan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi	1.171665	.645264	1.82	0.069	-.0930287	2.43636
intr	-.1400114	.0438914	-3.19	0.001	-.2260369	-.0539859
inf	-.261618	.1782623	-1.47	0.142	-.6110056	.0877696
_cons	.0166778	.0050305	3.32	0.001	.0068181	.0265375

```
. glm c_loan hpi_d d intr inf
```

```
Iteration 0: log likelihood = 86.150008
```

```
Generalized linear models          No. of obs    =      24
Optimization      : ML              Residual df   =      19
Scale parameter   = .0000564        (1/df) Deviance = .0000564
Deviance          = .0010711841      (1/df) Pearson = .0000564
Pearson           = .0010711841
```

```
Variance function: V(u) = 1          [Gaussian]
Link function     : g(u) = u         [Identity]
```

```
Log likelihood    = 86.15000825      AIC           = -6.762501
BIC              = -60.38195
```

c_loan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi_d	2.435533	.6957309	3.50	0.000	1.071925	3.79914
d	-.0260465	.0068948	-3.78	0.000	-.0395601	-.0125329
intr	-.1066805	.0413371	-2.58	0.010	-.1876998	-.0256612
inf	-.1375427	.1569829	-0.88	0.381	-.4452236	.1701381
_cons	.0262119	.0023676	11.07	0.000	.0215715	.0308524

```
. test _b[hpi_d]=0, notest
```

```
( 1) [c_loan]hpi_d = 0
```

```
. test _b[d]=0, accum
```

```
( 1) [c_loan]hpi_d = 0
```

```
( 2) [c_loan]d = 0
```

```
chi2( 2) = 14.74
Prob > chi2 = 0.0006
```

Similar results are obtained when we employ Chow Test with respect to model (4) for conventional banks as portrayed in Table 4.12.

Table 4.12. Chow Test with Respect to Model (4) for Conventional Banks

```
. glm md_cloan hpi intr inf
Iteration 0:  log likelihood = 53.86704

Generalized linear models          No. of obs    =      24
Optimization      : ML              Residual df   =      20
Deviance          = .015784241      Scale parameter = .0007892
Pearson           = .015784241      (1/df) Deviance = .0007892
                                           (1/df) Pearson = .0007892

Variance function: V(u) = 1          [Gaussian]
Link function     : g(u) = u          [Identity]

Log likelihood    = 53.86704005      AIC            = -4.155587
                                           BIC            = -63.54529
```

md_cloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi	-4.74952	2.005975	-2.37	0.018	-8.681159	-.8178806
intr	.1016751	.136448	0.75	0.456	-.1657582	.3691083
inf	.5506471	.5541758	0.99	0.320	-.5355175	1.636812
_cons	.0143538	.0156388	0.92	0.359	-.0162977	.0450053

```
. glm md_cloan hpi_d d intr inf
Iteration 0:  log likelihood = 55.617119

Generalized linear models          No. of obs    =      24
Optimization      : ML              Residual df   =      19
Deviance          = .0136422576     Scale parameter = .000718
Pearson           = .0136422576     (1/df) Deviance = .000718
                                           (1/df) Pearson = .000718

Variance function: V(u) = 1          [Gaussian]
Link function     : g(u) = u          [Identity]

Log likelihood    = 55.61711869     AIC            = -4.218093
                                           BIC            = -60.36938
```

md_cloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi_d	-6.463413	2.482861	-2.60	0.009	-11.32973	-1.597095
d	.03123	.0246056	1.27	0.204	-.0169961	.0794561
intr	.1851166	.1475201	1.25	0.210	-.1040175	.4742508
inf	.7067172	.5602263	1.26	0.207	-.3913061	1.804741
_cons	-.0083303	.0084494	-0.99	0.324	-.0248908	.0082303

```
. test _b[hpi_d]=0, notest
( 1) [md_cloan]hpi_d = 0

. test _b[d]=0, accum
( 1) [md_cloan]hpi_d = 0
( 2) [md_cloan]d = 0

      chi2( 2) =      9.15
Prob > chi2 =    0.0103
```

As it is seen from Table 2.12 LTV intervention creates a structural break (p-value: 0.0103) for conventional banks in terms of change in the amount of mortgage delinquent housing loans.

When we examine Islamic banks with respect to model (3) and (4), we obtain the results displayed in Table 4.13. and Table 4.14., respectively.

Table 4.13. Chow Test with Respect to Model (3) for Islamic Banks

```
. glm c_iloan hpi intr inf
Iteration 0:   log likelihood = 75.414824

Generalized linear models              No. of obs   =          24
Optimization      : ML                 Residual df  =          20
Scale parameter = .000131
Deviance          = .0026204954        (1/df) Deviance = .000131
Pearson          = .0026204954        (1/df) Pearson  = .000131

Variance function: V(u) = 1           [Gaussian]
Link function     : g(u) = u          [Identity]

Log likelihood    = 75.41482391        AIC          = -5.951235
BIC              = -63.55846
```

c_iloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi	-1.081079	.817345	-1.32	0.186	-2.683045	.5208882
intr	.1168294	.0555965	2.10	0.036	.0078624	.2257965
inf	-.6016684	.2258018	-2.66	0.008	-1.044232	-.159105
_cons	.0467869	.0063721	7.34	0.000	.0342978	.059276

```
.
. glm c_iloan hpi_d d intr inf
Iteration 0:   log likelihood = 74.797395

Generalized linear models              No. of obs   =          24
Optimization      : ML                 Residual df  =          19
Scale parameter = .0001452
Deviance          = .002758855        (1/df) Deviance = .0001452
Pearson          = .002758855        (1/df) Pearson  = .0001452

Variance function: V(u) = 1           [Gaussian]
Link function     : g(u) = u          [Identity]

Log likelihood    = 74.79739546        AIC          = -5.81645
BIC              = -60.38026
```

c_iloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi_d	-.5824713	1.116538	-0.52	0.602	-2.770847	1.605904
d	.001016	.0110651	0.09	0.927	-.0206712	.0227032
intr	.1143067	.0663396	1.72	0.085	-.0157165	.2443298
inf	-.5670426	.2519329	-2.25	0.024	-1.060822	-.0732633
_cons	.0408442	.0037997	10.75	0.000	.033397	.0482915

```
. test _b[hpi_d]=0, notest
( 1) [c_iloan]hpi_d = 0

. test _b[d]=0, accum
( 1) [c_iloan]hpi_d = 0
( 2) [c_iloan]d = 0

      chi2( 2) =    0.63
Prob > chi2 =  0.7313
```

Table 4.13 points that LTV intervention does not create a structural break (p-value: 0.5510) for Islamic banks in terms of change in the amount of housing loans. Similarly, Table 4.14 suggests that LTV intervention does not create a structural

break (p-value: 0.7313) for Islamic banks in terms of change in the amount of mortgage delinquent housing loans.

Table 4.14. Chow Test with Respect to Model (4) for Islamic Banks

```
. glm md_ciloan hpi intr inf
Iteration 0:   log likelihood = 35.794459

Generalized linear models           No. of obs   =       24
Optimization       : ML             Residual df   =       20
Deviance           = .0711692249    Scale parameter = .0035585
Pearson            = .0711692249    (1/df) Deviance = .0035585
                                      (1/df) Pearson = .0035585

Variance function: V(u) = 1        [Gaussian]
Link function      : g(u) = u      [Identity]

Log likelihood     = 35.79445863    AIC           = -2.649538
                                      BIC           = -63.48991
```

md_ciloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi	-5.926703	4.259512	-1.39	0.164	-14.27519	2.421787
intr	-.0746819	.2897354	-0.26	0.797	-.6425529	.4931891
inf	-.2664022	1.176744	-0.23	0.821	-2.572777	2.039973
_cons	.0217503	.0332076	0.65	0.512	-.0433354	.0868361

```
.
. glm md_ciloan hpi_d d intr inf
Iteration 0:   log likelihood = 35.415789

Generalized linear models           No. of obs   =       24
Optimization       : ML             Residual df   =       19
Deviance           = .0734508368    Scale parameter = .0038658
Pearson            = .0734508368    (1/df) Deviance = .0038658
                                      (1/df) Pearson = .0038658

Variance function: V(u) = 1        [Gaussian]
Link function      : g(u) = u      [Identity]

Log likelihood     = 35.41578897    AIC           = -2.534649
                                      BIC           = -60.30957
```

md_ciloan	Coef.	OIM Std. Err.	z	P> z	[95% Conf. Interval]	
hpi_d	-6.179549	5.761129	-1.07	0.283	-17.47115	5.112057
d	.043822	.0570938	0.77	0.443	-.0680799	.1557239
intr	-.1212213	.3422997	-0.35	0.723	-.7921165	.5496738
inf	-.3045958	1.299926	-0.23	0.815	-2.852405	2.243213
_cons	-.0148201	.0196057	-0.76	0.450	-.0532466	.0236064

```
.
. test _b[hpi_d]=0, notest

( 1) [md_ciloan]hpi_d = 0

. test _b[d]=0, accum

( 1) [md_ciloan]hpi_d = 0
( 2) [md_ciloan]d = 0

      chi2( 2) =      1.19
      Prob > chi2 =      0.5510
```


Results show that LTV intervention had a very important impact on the way of doing business in conventional bank sector. Pre-LTV period and post-LTV period for these banks are statistically different from each other. However, this is not the case for Islamic banks. LTV regulation does not have such a structural impact on their business.

4.2.2.3.A Time Series Regression to Measure the Impact of LTV Regulation

At this point, it is worth to explore whether or not the LTV regulation had the desired impact on the amount of housing loans granted to individuals, which is the aim of the intervention.

We employ a time-series regression model constructed as follows in order to find out the economic impact of LTV regulation in conventional and Islamic banks.

$$\Delta HL_i = \alpha_0 + \alpha_1 \Delta HPI_i \times I_{LTV_i} + \alpha_2 \Delta HPI_i \times I_{NLTV_i} + \alpha_3 \Delta INT_i + \alpha_4 \Delta INF_i + \varepsilon \quad (5)$$

$$\Delta MD_i = \alpha_0 + \alpha_1 \Delta HPI_i \times I_{LTV_i} + \alpha_2 \Delta HPI_i \times I_{NLTV_i} + \alpha_3 \Delta INT_i + \alpha_4 \Delta INF_i + \varepsilon \quad (6)$$

In (5) and (6) I_{LTV_i} (I_{NLTV_i}) is a dummy variable for the periods with (without) LTV policy. The specification assumes that the change in the amount of housing loans or mortgage delinquent housing loans (ΔHL_i and ΔMD_i) is correlated with the growth in real property prices (ΔHPI_i). Change in the interest rate (ΔINT_i) and change in the inflation rate (ΔINF_i) are included to control for differences in the aggregate level of monetary conditions.

We hypothesise that LTV policy reduces the responsiveness of housing loans and mortgage delinquency risk to changes in property prices. This implies that the estimated coefficients of $\Delta HPI_i \times I_{LTV_i}$ and $\Delta HPI_i \times I_{NLTV_i}$ (i.e., α_1 and α_2 respectively) should be negative, with the absolute value of α_1 smaller than that of α_2 . A positive estimate of α_3 and α_4 is expected, because a higher interest rate (inflation rate) implies a higher debt-servicing burden for mortgagors.

When we employ model (5) for conventional banks, we obtain the following results in Table 4.15.

Table 4.15. Time Series Regression for Conventional Banks in terms of amount of housing loans

c_loan	Robust					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
hpil	1.134905	.5401074	2.10	0.036	.0763141	2.193496
hpinl	2.655777	1.281598	2.07	0.038	.1438904	5.167664
intr	-.0545112	.0421984	-1.29	0.196	-.1372185	.0281961
inf	-.1939494	.1250373	-1.55	0.121	-.4390179	.0511192
_cons	.011293	.0057038	1.98	0.048	.0001137	.0224724

Table 4.15 suggests that there is a positive relationship between changes in amount of housing loans and housing price index. Though this is not compatible with our expectations, we can see that this relationship is weaker in absolute terms (coefficients of 1.1343 versus 2,6558) in the post-LTV period. So, we can infer that LTV regulation has restricted the growth of amount of housing loans granted by conventional banks, which was a potential aim of the intervention.

In case of mortgage delinquent loans in the conventional banking sector, Table 4.16 shows that there is a negative relationship between changes in mortgage delinquent loans and housing prices as expected. Furthermore, the absolute value of the $\Delta HPI_i \times I_{LTV_i}$ coefficient is smaller than the one that belongs to the pre-LTV period, which is expected as well. So, we can say that LTV regulation has restricted the mortgage default risk, which is another aim of the intervention.

Table 4.16. Time Series Regression for Conventional Banks in terms of mortgage delinquent housing loans

md_cloan	Robust					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
hpil	-3.814055	2.058288	-1.85	0.064	-7.848226	.2201152
hpinl	-4.199438	3.297994	-1.27	0.203	-10.66339	2.264512
intr	.0296313	.079662	0.37	0.710	-.1265033	.1857659
inf	-1.728668	.5567932	-3.10	0.002	-2.819963	-.6373735
_cons	.0244659	.0185057	1.32	0.186	-.0118047	.0607365

In Islamic side, the results are somewhat different than the ones obtained for conventional banks in terms of amount of housing loans. For example, Table 4.17 points that the absolute value of $\Delta HPI_i \times I_{LTVi}$ is smaller as expected, but it is not statistically significant.

Table 4.17. Time Series Regression for Islamic Banks

c_iloan	Robust					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
hpil	.3512997	.8126527	0.43	0.666	-1.24147	1.94407
hpinl	.6789398	1.748615	0.39	0.698	-2.748283	4.106163
intr	.0778337	.0766372	1.02	0.310	-.0723725	.2280398
inf	-.4960347	.2570043	-1.93	0.054	-.9997539	.0076844
_cons	.0341427	.0088592	3.85	0.000	.0167791	.0515063

On the other hand, results regarding mortgage delinquent housing loans are very similar to the ones obtained for conventional banks. As can be seen from Table 4.18. Below, there is a negative relationship between changes in mortgage delinquent loans and housing prices as expected. Furthermore, the absolute value of the $\Delta HPI_i \times$

I_{LTV_i} coefficient is smaller than the one that belongs to the pre-LTV period, which is expected as well. So, we can say that LTV regulation has restricted the mortgage default risk in Islamic banking case either.

Table 4.18. Time Series Regression for Islamic Banks in terms of mortgage delinquent housing loans

md_ciload	Robust					[95% Conf. Interval]	
	Coef.	Std. Err.	z	P> z			
hpil	-8.333699	3.32172	-2.51	0.012	-14.84415	-1.823247	
hpinl	-13.00351	5.860716	-2.22	0.027	-24.4903	-1.516715	
intr	-.2111397	.3007634	-0.70	0.483	-.8006253	.3783458	
inf	-1.724114	1.102855	-1.56	0.118	-3.88567	.4374414	
_cons	.0647709	.0444551	1.46	0.145	-.0223594	.1519012	

In summary, LTV intervention had a significant impact on mortgage delinquency risks in both conventional and Islamic banks. Interestingly, mortgage delinquency and housing price relationship is stronger in Islamic case, which makes us think that housing loans in Islamic banks are more sensitive to house prices. In this regard, it is worth to figure out the reasons behind this sensitivity and we think that this can be due to consumer characteristics. Hence, we leave analysing Islamic housing participant characteristics for future research.

CONCLUSION

This thesis aims to assess the impact of LTV policy in conventional and Islamic banks in Turkey. By using data retrieved from Central Bank of Turkey. First, we started with descriptive statistics about amount of housing loans granted by conventional and Islamic banks and descriptive statistics about mortgage delinquencies in both banks throughout 2005/1-2017/3. From this it was found that the amount of housing loans granted by conventional banks are far higher than the ones granted by Islamic banks. On the other hand, both loan types are showing an increasing trend throughout years. Also the amount of mortgage delinquent housing loans in conventional banks are far higher than the ones in Islamic banks. On the other hand, mortgage delinquency in both loan types are showing an increasing trend throughout years. In summary, conventional banks outperform Islamic banks in housing loan origination. Similarly, mortgage delinquent loans are also greater in conventional banks when compared to the ones in Islamic banks.

Second, we employed test of mean differences between amount of housing loans and mortgage delinquent loans in the non-LTV period and LTV period. In order to take the scale effect into account, we use the monthly changes in each data. We simply expect that after LTV intervention at the beginning of year 2011, the change in the amount of housing loans and mortgage delinquent loans are lower than the ones experienced in the non-LTV period.

The test proves that in the non-LTV period before 2011, mean changes in the amount of housing loans are statistically higher than the ones in the LTV-period after 2011 in the conventional banks case. This is also true for Islamic banks. Indeed, mean changes in the amount of housing loans are statistically higher than the ones in the LTV-period after 2011. On the other hand, t-statistic for conventional banks is greater

than t-statistic for Islamic banks, which implies that conventional banks have a greater response to LTV intervention.

When we test for differences for mortgage delinquent housing loans, we obtain similar results. The response of mortgage delinquency is greater in the conventional bank case as the t-statistic is much higher than the one in Islamic banks.

In order to measure the short-term impact of LTV intervention, we define non-LTV period as 2010/1-2010/12 and LTV period as 2011/1-2011/12, and we find that the results do not change at all for conventional banks. However, for Islamic banks, there seems to be no short-term difference between pre-LTV and post-LTV period. For instance, neither the mean change in housing loans nor the mean change in mortgage delinquent loans between 2010 and 2011 is significant.

A brief interpretation as a whole would be that Islamic banks are more conservative in the non-LTV period, and though LTV intervention had an economic impact (and statistically significant for periods between 2005-2010 and 2010-2016) on the amount of housing loans and mortgage delinquent loans, it is smaller than the one found in conventional banks. In summary, in line with our expectations, LTV regulation has proved to decrease the level of housing loans and mortgage delinquency.

In addition, we employed Chow Tests and Time-Series Regressions in order to figure out whether LTV regulation of 2011 constitutes for a structural break. The results are obtained when we employ Chow Testis that LTV intervention creates a structural break for conventional banks in terms of change in the amount of housing loans. Also, creates a structural break for conventional banks in terms of change in the amount of mortgage delinquent housing loans.

On the other hand, when we examine Chow Test for Islamic banks, we obtain the results that LTV intervention does not create a structural break for Islamic banks in terms of change in the amount of housing loans or in terms of change in the amount of mortgage delinquent housing loans.

Results show that LTV intervention had a very important impact on the way of doing business in conventional bank sector. Pre-LTV period and post-LTV period for these banks are statistically different from each other. However, this is not the case for Islamic banks. LTV regulation does not have such a structural impact on their business.

Finally, we explored whether or not the LTV regulation had the desired impact on the amount of housing loans granted to individuals, which is the aim of the intervention. For this we used Time Series Regression. For Conventional Banks, we found that there is a positive relationship between changes in amount of housing loans and housing price index. So, we can infer that LTV regulation has restricted the growth of amount of housing loans granted by conventional banks, which was a potential aim of the intervention.

In case of mortgage delinquent loans in the conventional banking sector, there is a negative relationship between changes in mortgage delinquent loans and housing prices. So, we can say that LTV regulation has restricted the mortgage default risk, which is another aim of the intervention.

In Islamic side, the results are somewhat different than the ones obtained for conventional banks in terms of amount of housing loans. On the other hand, results regarding mortgage delinquent housing loans are very similar to the ones obtained for conventional banks. There is a negative relationship between changes in mortgage delinquent loans and housing prices. So, we can say that LTV regulation has restricted the mortgage default risk in Islamic banking case either.

In summary, LTV intervention had a significant impact on mortgage delinquency risks in both conventional and Islamic banks. Interestingly, mortgage delinquency and housing price relationship is stronger in Islamic case, which makes us think that housing loans in Islamic banks are more sensitive to house prices.

GLOSSARY AND TRANSLITERATION

gharar – risk or uncertainty, forbidden if excessive and avoidable.

hiba – gift

ijara – lease or hire contract.

istisna – commission to manufacture

mudaraba – silent partnership

murabaha – cost-plus sale, often combined with bay' bi-thaman 'ajil.

Qarad- loan of fungible property .

Qur'an – ultimate Islamic canon, believed to be the revealed word of God.

riba – major prohibition of Islam, similar but not equivalent to either usury or interest.

salam – forward sale with prepaid price.

Shariha – revealed divine law in Qur'an and Sunna.

Bay' [Bai'] – sale .

Bay' al-murabahah – sale of a commodity at cost price plus a known profit .

Bay' mu'ajjal – deferred payment sale

Halal – acceptable and lawful

Haram [Haraam] – unacceptable or prohibited

Hiba [Hibah] – gift

Maisir [Maysir] – game of chance

Qard Hassan – interest free loan

Sukuk – certificates of investment

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