Islamic Banking and Firm Performance:
Costs, Benefits, and Lessons from the Global Financial Crisis

Özgür Arslan-Ayaydin, Mahir Binici, and Robert S. Chirinko*

May 2018

PRELIMINARY

* Robert S. Chirinko, Department of Finance, 2333 University Hall, University of Illinois at Chicago, 601 South Morgan (MC 168), Chicago, Illinois, USA 60607-7121
PH: 312 355 1262, FX: 312 413 7948, EM: Chirinko@uic.edu

Özgür Arslan-Ayaydin, Department of Finance, 2429 University Hall, University of Illinois at Chicago, 601 South Morgan (MC 168), Chicago, Illinois, USA 60607-7121
PH: 312 355 0882, FX: 312 413 7948, EM: orslan@uic.edu

Mahir Binici, Banking and Financial Institutions Department, Central Bank of the Republic of Turkey, İstiklal Cad. No:10 Ulus, 06100 Ankara, Turkey
PH: +90 (312) 507 72 45, EM: mahir.binici@tcmb.gov.tr

Islamic Banking and Firm Performance:
Costs, Benefits, and Lessons from the Global Financial Crisis

Abstract

The roles played by Western-oriented banks in creating and exacerbating the Global Financial Crisis invite investigation and comparison of alternative banking arrangements. The dual-banking system in Turkey allows us to obtain a better understanding of Islamic banks in resolving the two fundamental finance problems -- transferring funds from savers to borrowers and efficiently allocating those funds among competing borrowers. We are particularly concerned with the effects of that resolution on real activity by non-financial firms. Islamic banking relations are analyzed in terms of secular, Western-oriented, finance concepts and the ways in which they reduce financial frictions. Islamic banking relationships attenuate financial frictions and shift risk from firms to banks (where risk can be borne more efficiently). The extent to which these features of Islamic banking relationships affect firms and improve or impair real economic performance are evaluated empirically. With a unique dataset of 100,000 firm/year observations, we document the advantages of an Islamic banking relationship in normal times in terms of increasing investment and expanding the size of the firm. During abnormal times, we find that firms with an Islamic banking relationship investment much less, suggesting the dark side of an Islamic banking relationship. Religiosity is an important factor in the adoption decision by firms for an exclusive Islamic banking relationship. We use this "instrument" to re-examine the sensitivity of investment, expansion, and cash holdings to an Islamic banking relationship. Propensity score matching and control function estimates confirm our previous findings.

Islamic Banking and Firm Performance:
Costs, Benefits, and Lessons from the Global Financial Crisis

Table Of Contents

Islamic Banking and Firm Performance:
Costs, Benefits, and Lessons from the Global Financial Crisis

Introduction

Two of the fundamental problems in finance are how to transfer funds from savers to borrowers and how to allocate those funds among firms and households. In a frictionless world with perfect and widely-dispersed information, these transfers and allocations are independent of existing financial markets and intermediaries, and the institutional structure of the financial system is of little importance. Financial frictions emerge, however, for a variety of reasons.;[1] in this case, the financial infrastructure matters a great deal for addressing the two fundamental finance problems. How the financial system deals with financial frictions has major impacts on the transfer and allocation of funds and the performance of the real economy.[2] This point was brought home with great force during the recent Global Financial Crisis. The poor performance of Western-oriented banks during this crisis invites an investigation of alternative banking arrangements.

This paper undertakes such an investigation. We exploit the dual-banking system in Turkey to get a better understanding of the roles played by Islamic banks in resolving the fundamental finance problems and, most importantly, the effects of that resolution on real activity by firms. Those roles have received scant attention in the finance literature.[3] Owing to economies of scale and scope, banks play an important role in financing, monitoring, and governing firms. In Turkey, these channels are particularly strong, as banks are the only major financial intermediary. Thus firms are highly dependent on bank financing and banking relationships. Critical to our study is that Turkish firms have a meaningful choice

---

[1] We define financial frictions very broadly as the interesting economic features excluded in the models of Modigliani-Miller and Arrow-Debreu (as applied to financial markets).   These features include costs arising from agency, imperfect information, and asymmetric information problems, from transaction, search, and other coordination issues, and from limited liability.

[2] The literature on financial frictions is voluminous; for comprehensive surveys, see the early work of Hellwig (1991) and Allen and Gale (2001) and, more recently, Gertler and Kiyotaki (2010), Adrian and Shin (2010), Hall (2011), and Brunnermeier, Eisenbach, and Sannikov (2013).

[3] Islamic finance and banking has received very little attention in the finance literature. For example, a search of the word "Islamic" in all articles appearing in *The Journal of Finance* yields three hits. Two papers mention Islamic finance in passing; one hit is a listing for a paper presented at the 2012 annual meeting that appears never to have been published. A search of the word "Islam" yields three hits, all of which refer to an author's name.

between a conventional bank that follows Western-oriented practices and an Islamic bank that observes *Sharia'a* Law.[4] (In a sense, firms with a conventional banking relationship serve as a control group to assess the impacts of an Islamic banking relationship.) Given this choice set and unique financial statement panel data for Turkish firms and banks, we analyze the impact of an Islamic banking relationship on economic performance in normal and abnormal times. We are thus in a position to assess the extent to which the unique risk-shifting and profit-sharing arrangements associated with Islamic banking ameliorate or exacerbate financial frictions and improve or impair economic performance.

The primary purpose of our paper is to use information on Islamic banking relations to understand how the Islamic banking relationship impacts affiliated firms. Apart from this goal, obtaining a better understanding of the benefits and costs of Islamic banking is important given its exponential growth.[5] Between 2003 and 2013, worldwide banking assets in Islamic banks grew by 25% per annum, much greater than the 6% and 10% growth rates for financial assets of U.S. private financial institutions and worldwide banking, respectively.[6]

Our paper proceeds as follows. Section 1 offers an overview of the unique characteristics of Islamic banking and interprets them through the lens of traditional, Western-oriented, secular financial concepts (hereafter referred to as conventional banking). We identify the core concept – making money from money is proscribed – and show how it determines other salient, though subordinate, characteristics of Islamic banking. We analyze the ways in which Islamic banking relationships reduce financial frictions. The two dominant contracts by which Islamic banks provide funds have a common basis in requiring linear payouts. Section 2 describes the unique dataset of nearly 100,000 firm/year observations that is the basis for our study. We combine these financial statement data with data on whether a

---

[4] Section 1 will provide an overview of *Sharia'a* Law and its implication for Islamic banking.

[5] Islamic banking has expanded recently in Turkey. The Turkish regulatory authority (BRSA) has authorized the creation of two new Islamic banks, Ziraat Participation Bank (May 2015) and Vakif Participation Bank (February 2016). Both banks will be state-owned.

[6] The growth rates are from IMF (2016a), Board of Governors (2016, Table L.110), and IMF (2016b), respectively. The figure for worldwide banking is computed as the product of the cross-country median ratio of bank assets to GDP multiplied by worldwide GDP. Provided the country ratio and country GDP data are uncorrelated, this computation generates an unbiased estimate of worldwide bank assets.

firm has an Islamic banking relationship, a conventional banking relationship, or both. Section 3 estimates the long-run impact of an Islamic banking relationship on firms' real and financial and documents the salutary effects of an Islamic banking relationship relative to a conventional one: investment is higher and firms operate at a greater scale. The conclusions from these cross-section regressions are supported by an application of Leamer's Extreme Value Analysis. In combination, the results in these two sections decidedly reject the Khan (2010)-Kuran (2004)-O'Hara (2016) hypothesis that Islamic financial relationships are merely repackaging of conventional financial relationships.

Section 4 analyzes the impact of the Global Financial Crisis in a difference-in-difference model. The results are consistent with the cross-section analysis, and we uncover some evidence about the dark side of an Islamic banking relationship.

All of the above results are based on the assumption that the decision to have an Islamic banking relationship is exogenous. Section 5 tackles the important question about why firms choose an Islamic banking relationship. A logit model is estimated and identifies a role for religiosity in determining an Islamic banking relationship. These results allow us to compute propensity score matching estimates and control function estimates, which are consistent with the above evidence.

Section 6 concludes.

1. Islamic Banking: An Overview[7]

Islamic financial relations are based on Islamic religious law, referred to as *Sharia'a* Law. Such a foundation is a substantial departure from conventional Western finance, which has emerged almost exclusively as solutions to various economic and financial problems.[8] The one notable exception is the ban on usury.[9] The main source of *Sharia'a* Law is the Holy Koran (*Qur'an*). In addition, Islamic finance has been influenced (in order of importance) by the *Sunnah* of the Prophet (utterances of the Prophet Mohammad other than those in the Koran, as well as statements with which the Prophet agreed), the *Ijma* (consensus opinions of learned men and jurists), and the *Qiyas* (analogies to existing laws).

These four documents lead to a large number of restrictions on and complexities with Islamic financial relationship. For the purposes of this paper, it is convenient to differentiate between the sources and uses of funds. The <u>sources of funds</u> are from three types of accounts – current, saving, and investment. The current account, like a conventional interest-free checking account – does not earn any return. The other two accounts earn returns based on pre-announced schedules that correspond to expected returns from risky investments and that are computed over a long horizon. In our paper, we will not be concerned with the sources of funds. Instead, our focus is on the <u>uses of funds</u> by the Islamic bank and the four main principals governing financial transactions pertinent to Islamic banking.[10] They are given a secular interpretation in terms of the concepts used in conventional, Western-oriented financial analysis.

---

[7] The material in this section draws on the excellent description of Islamic banking in Kettel (2010, Chapters 1 and 2), though several interpretations differ in important ways.

[8] See Goetzmann (2016) for a recent discussion of this thesis and documentation based on a wealth of historical examples.

[9] The definition of usury has varied over time from initially referring to any interest payments to the more restrictive, modern definition of "exorbitant" interest payments.

[10] In addition to these four principals, financial activities must be in compliance with the moral imperatives in Islam. The resulting set of proscriptions (*haram*) can be long and complex, but some of the most important restrictions apply to activities involved with alcohol and gaming. Contracts must be fair and honest; the principle of *caveat emptor* does not exist under *Sharia'a* Law.

1.1 Making Money Out Of Money Is Proscribed

This is the essential restriction that influences the other three Islamic banking principles discussed below. Under *Sharia'a* Law, savers are not permitted to earn a return based solely on providing accumulated funds.[11] Money is viewed as having no value in and of itself. Rather it is a means of exchange and a unit of account. Of course, these characteristics are the same as those ascribed to money in Western-oriented money and banking textbooks (e.g., Mishkin, 2013). The proscription from *Sharia'a* Law reflects a deep point in economic analysis that money per se does not generate value. In general equilibrium models, a positive interest rate is ultimately determined by the return to physical capital via a production function or services provided for intertemporal trades via intergenerational transfers in overlapping generations models. *Sharia'a* Law encourages these uses of accumulated funds. This principle has significant implications for the following three subordinate principles; the relations are highlighted in top part of Figure 1.

1.2 The Payment Of Interest Is Proscribed

Since money cannot make money, interest payments (*riba*) are strictly prohibited under *Sharia'a* Law. The notion of interest payments is broad and includes in kind services and other advantages that savers might receive from depositing their funds.

1.3 Speculation Is Proscribed

Speculative behavior is considered gambling (*maysir*). Gaming activity is clearly prohibited by the injunction against "making money out of money" and by the moral code embedded in *Sharia'a* Law. More importantly for purposes of the financial analysis in this paper, speculation is also considered as creating prohibited uncertainty (*gharar*), which takes two forms. In one case, uncertainty refers to asymmetric information among contracting parties where one set of agents has relatively superior information. Second, uncertainty also refers to "Knightian uncertainty" (immeasurable risk) and the lack of any reliable information

---

[11] Aristotle held a very similar view: "For money was intended to be used in exchange, but not to increase at interest. And this term interest [*tokos*, literally 'offspring'], which means the birth of money from money, is applied to the breeding of money because the offspring resembles the parent. Wherefore of all modes of getting wealth this is the most unnatural" (McKeon, 1947, p. 572). Nonetheless, interest payments were made in ancient Greece.

with which to base business judgments. Ceteris paribus, avoiding either situation leads to financial relations that are less risky than would occur in conventional banking relations.

1.4 Bearing Risk In Financial Transactions Is Prescribed

The principle against "making money out of money" and the subsequent prohibitions against interest and speculation lead to lending relations that must be asset based. These relations are described in Figure 1. Under *Sharia'a* Law, the only permissible way for accumulated funds to earn a return is for both lenders and borrowers to share in project risk. In this structure, savers are not depositors but rather effectively investors who bear risk either directly or indirectly through an Islamic bank. The latter relationship will be studied in this paper. The Islamic Development Bank (Iqbal, Ahmad, and T. Khan (1998, pp. 15-16), as quoted in F. Khan (2010, p. 807)), summarizes the lending requirement as follows:

> The most important feature of Islamic Banking is that it
> promotes risk sharing between the provider of funds (investor)
> on the one hand and both the financial intermediary (the bank)
> and the user of funds (the entrepreneur) on the other hand… In
> conventional banking, all this risk is borne in principle by the
> entrepreneur .

This requirement is met by all *Sharia'* compliant financial products.

1.5 Islamic Banking Products

In this sub-section, we focus on two classes of financial instruments – a Profit-Sharing-Contract (PSC) and a Deferred-Sales-Contract (DSC) – offered by Islamic banks.[12] In order to be *Sharia'* compliant, these contracts connect the Islamic bank to risks associated with the ownership of real assets. We focus on how these contracts shift risk and reduce a variety of financial frictions -- agency and transactions costs, asymmetric information, and misvaluation risk, thus lowering the cost of capital. Common to both contracts is a linear payoff structure, which has been shown to be optimal in some important circumstances.

1.5.1 Profit-Sharing-Contract (PSC)

The basic PSC (*mudaraba*) creates a financial relationship between the Islamic bank and the borrower for a specific project with limited duration. The lender (*rab al mal*)

---

[12] Islamic finance encompasses the full range of financial instruments in addition to the lending instruments discussed in the next two sub-sections: bond-like securities (*sukuk*, an asset-backed bond), equity-like securities, investment funds, and insurance (*takaful*).

provides the funds and the borrower/entrepreneur (*mudarib*) the project idea, management, and labor ("sweat equity"). All management decisions reside with the borrower, and thus the bank is passive. The payout of the profits is determined ex-ante according to fixed percentages of the profit. There may be an incentive clause for the borrower if profits exceed a certain benchmark. Losses are borne by the Islamic bank, though liability is limited to the amount of invested capital. Importantly, there is no collateral on which the saver can draw to recover the invested funds and no recourse to the assets of the borrower. The PSC exhibits a fundamental asymmetry with respect to profits and losses, as profits are shared according to a pre-determined formula, while financial losses are borne entirely by the Islamic bank. Of course, the borrower bears the implicit loss of the labor put into the project.

There are two variants on the basic PSC. A closely-related and more frequently used PSC brings three sets of agents together in financial relations that are in accord with *Sharia'a* Law. In a two-tiered PSC (also known as a *mudaraba*), investors (*arbab al mal*) deposit their funds with an Islamic bank that, in turn, forms many basic PSC's with borrowers as discussed in the above paragraph. Investors are compensated by the Islamic bank based on the profits earned from the multiple PSC's. Usually the payments to depositors do not reflect just the current profits, but rather smoothed profits based on the Islamic bank's financial results over several years and many projects. A second PSC variant (*musharaka*) brings together several Islamic banks (or other investors) into a contractual relation where the profits are again shared in proportions determined ex-ante and losses shared proportional to invested capital.[13] The one important difference between a *musharaka* and a *mudaraba* is that, in the former, the investors may participate in the business decision making and exert managerial control.

Regardless of the specific variant, the key characteristic of a PSC is that it lowers the cost of capital relative to that obtained with conventional loans. This reduction is achieved by attenuating financial frictions due to the following agency problems:

1. **Free cash flow:** All of the project's cash flows are easily observed, and the ability of manages to misuse or misappropriate funds is very limited. The finite duration of the project also attenuates free cash flow problems.

2. **Adverse selection and moral hazard:** The small number of participants and the exposure to project risk incentivizes Islamic banks to carefully evaluate projects before committing funds and to monitor ongoing developments.

---

[13] There are two variants of a *musharaka* contract depending on the extent to which partners provide guarantees for the other partners corresponding loosely to joint liability (*mufawada*) and several liability (*shirkah al'inan*).

3. **Financial distress:** The small number of participants lowers the cost of work-outs in resolving financial distress.

4. **Underinvestment and asset substitution biases**: In conventional financial lending arrangements, the different payout streams associated with of debt and equity lead the well-known underinvestment bias (Myers, 1977, where projects that would increase the total value of the firm are not pursued because the benefits redound to debtholders, especially when the firm is in or near financial distress) and asset substitution bias (Fama and Miller, 1972; Jensen and Meckling, 1976, where shareholders (and managers acting on their behalf) of firms close to financial distress have an incentive to "go for broke," undertaking risky projects with a negative NPV that discriminate against existing debtholders). In a PSC, there is only one payout stream, and hence no scope for underinvestment and asset substitution biases.

In addition to these reductions in agency problems, the PSC shifts risk to the Islamic bank. Since the Islamic bank is in a better position to manage idiosyncratic risk than its client firm (Diamond, 1984), the premium for bearing this risk does not increase pari passu, and the firm's cost of capital decreases.[14]

The PSC shares some common elements with other conventional financing instruments -- equity finance, project finance, and a limited partnership. These relations are discussed in Appendix B. The payoff structure of PSC is linear. As shown in a formal model by Carroll (2014), linear contracts are optimal when the bank is uncertain as to what actions are available to the firm and adopts a robust decision rule that focuses on worst-case outcomes.[15]

As an aside, it is interesting to note the PSC-type relations existed in the Middle Ages and antiquity. In 12th century Italy, merchants used *commenda* contracts in which "[t]he *commendator* (or group of commendators) invests capital while the *tractator* invests labor. In a standard contract, the commendator would invest in a merchant voyage, and on its return, would receive three-quarters of the profits" (Goetzmann, 2016, p. 241). This share of the profits would be distributed according to how much capital had been contributed. The very focused nature of investment on a voyage with a beginning and ending date and the absence

---

[14] Pappas, Ongena, Izzeldin, and Fuertes (2015) document that Islamic banks face lower failure risk (both unconditionally and conditional on bank-specific, macroeconomic, and market structure characteristics) than conventional banks.

[15] In their important paper on linear contracts, Holmstrom and Milgrom (1979) note the puzzling prevalence of linear contracts in practice, yet the difficulties of formulating an appealing theoretical framework.

of an elaborate legal system with which to pursue purported damages ensured that liability was limited. A similar arrangement is to be found in the circa 18th century BCE trade expeditions in Mesopotamia (Goetzmann, 2016, pp. 53-54).

1.5.2 Deferred-Sales-Contract (DSC)

The second type of financial instrument used by Islamic banks is a Deferred-Sales-Contract (DSC) where the Islamic bank purchases an asset at the request of its client/firm and then allows the client/firm to use the asset for a specific period of time. The DSC specifies the asset cost and a markup collected by the bank in two different arrangements. In a *murabaha* contract, payments are made in installments or a lump-sum at the end of the contract period; in either case, the firm takes ownership of the asset in proportion to the cumulative payments. In an *ijara* contract, the payments are also made in installments. However, at the end of the contract period, ownership remains with the bank, and thus an *ijara* contract is similar to a conventional operating lease. This contract can be modified (*ijara thumma bai*) at or near the end of the contract period so that, like a conventional financial lease, ownership is transferred to the firm at the end of the contract period.[16]

There is a controversy as to whether DSC's conform to *Sharia'a* Law or whether they are merely a re-packaging of the terms of a conventional loan. There are three important characteristics that differentiate DSC's. First, in a DSC, if contractually agreed upon payments are not forthcoming, the payments are suspended and no financial penalties are assessed (there are sometimes efforts to "blacklist" firms by circulating information about their non-payments). For those firms who realize unfortunate productivity shocks, this DSC

---

[16] There are two other types of deferred sales contracts, both of which contract for a tangible good that does not yet exist. In an *istisna'a* contract, an Islamic bank arranges with a selling firm (e.g., a manufacturer or fabricator) to create a tangible good and pays installment or lump-sum payments to the selling firm. (The Islamic Bank is entitled to monitor the manufacturing/fabrication process during the contract period.) At the end of the contract period, the Islamic bank owns the tangible good and then sells it to a using firm, who makes installment of lump-sum payments to the Islamic bank. At the end of this second contract, the using firm owns the asset. (Technically, these two contracts in combination are known as a parallel *istisna'a* contract.) A *salam* contract is similar to a forward contract and is used mostly for agricultural products. In this case, the Islamic bank is an intermediary, locating a firm that can deliver the tangible good in the future and paying now for that future delivery. The Islamic bank then receives payments from the using firm between now and when the tangible good is delivered. The main difference between *istisna'a* and *salam* contracts is that, during the initial contract period, the tangible good is/is not being built during the *istisna'a/salam* contract periods. Under either contract, the Islamic bank bears risk associated with a tangible asset.

characteristic lowers the cost of financial distress relative to a conventional loan for which interest continues to accrue.

Second, during the contract period, ownership continues to reside with the Islamic bank, and thus it bears business and obsolescence risks associated with ownership. The nature of asset ownership is an important distinction between a DSC and a standard bank loan from a conventional bank, where ownership fully resides with the client/firm. Grossman and Hart (1986) and Hart (1995) have emphasized the critical role of ownership in allocating residual control rights and attenuating agency problems in those numerous situations when it is impossible to write complete contracts.

Third, collateral is forbidden in *Sharia'a* compliant financial products (with the exception of *salam* contracts) because it effectively entitles the bank to a portion of the return without bearing an appropriate amount of risk. By contrast, collateral is an essential element in conventional lending. However, it can become entangled in moral hazard problems from both lenders and borrowers. Since the collateral is under the control of the potentially distressed or blatantly dishonest firm, its value may be compromised from actions by the firm. The main concern of lenders is the return of capital plus contractually agreed interest. In order to meet this goal, lenders may force a firm into bankruptcy and liquidate the collateral, even though the firm has reasonably healthy prospects as an ongoing profitable enterprise. When the return on the project is not guaranteed through collateral, the bank has heightened incentives to monitor, and the capital allocation process is improved. Asset ownership associated with DSC's offers several benefits relative to conventional financing arrangements.

Apart from attenuating agency costs, a DSC also reduces misvaluation risk and transactions costs. Since the bank is a repeat purchaser of similar assets, the bank has superior knowledge and organizational capital to assist in a proper valuation of assets. Moreover, the bank enjoys economies of scale in purchasing assets on favorable terms. Lower misvaluation risk and transactions costs, coupled with the lower agency costs discussed above, reduce the cost of capital for firms using a DSC.

The relative advantages of a DSC can be seen with respect to the purchase of real estate (either for business or personal use). A purchaser using conventional financing relies on both a real estate agent (RA) and a conventional bank (CB) to attenuate financial frictions. Most purchasers face a major asymmetric information problem because they have only limited exposure to and knowledge about the local real estate market. Consequently, they retain the services of an RA for a fee proportional to the sales price. The RA's incentives

favor rapid sales at high prices. Thus, relying on an RA largely replaces the asymmetric information problem with an agency problem.   The conventional bank (CB) becomes engaged in the transaction by independently assessing the value of the real estate. It is not necessarily interested in the most accurate value, just the minimal value needed to secure its loan. Misvaluation risk is borne by the homeowner. Alternatively, under a DSC such as a *murabaha* contract, the Islamic bank (IB) purchases the house, and then executes a contract with the ultimate purchaser, who pays in installments over several years. Like the CB and RA, the IB has expertise in the housing market. But, by contrast, the IB retains partial ownership of the asset, thus incentivizing it to give an accurate evaluation. In this example, the IB reduces financial frictions more efficiently than the combined efforts of the RA and CB. Of course, the IB bears more risk, but it is in a better position to bear this idiosyncratic risk than individual households or firms.

1.6 Summary

This brief survey of a complicated topic has introduced a blizzard of facts. The purpose of this discussion is not to present a formal theory of Islamic banking contracts. Rather, this section is merely presenting plausible scenarios that suggest the possibility of differential behavior by firms with Islamic and conventional banking relationships. The critical conclusion are that Islamic banking products

-- promote risk-sharing,

-- attenuate a variety of financial frictions, and

-- lower the cost of capital.

Under a PSC, the risk sharing is in terms of profit flows. Under the DSC, it is the business risk involved with owning a fixed asset. Whether the PSC and DSC arrangements conform to *Sharia'a* Law is an important issue for those wishing to honor the dictates and directives of the Muslim faith. Such an issue, however, is both well-beyond the competency of the authors and not relevant for the focus of our study. What is relevant is the extent to which, if at all, an Islamic banking relationship reduces financial frictions, lowers the cost of capital, and affects firm behavior.

We turn to that empirical analysis of this issue in the remaining part of this paper by examining the impact of an Islamic banking relationship on investment, profitability, and

cash holdings. We distinguish between normal and abnormal times. During normal times, the lower cost of capital associated with an Islamic banking relationship will stimulate investment and lower average profitability, which comprises both an ordinary return to capital (equivalent to the cost of capital) plus non-competitive rents.[17] The risk-shifting associated with PSC's and DSC's lowers the need for funds to cover liquidity shocks, and hence firms associated with an Islamic bank should have lower cash holdings.

In abnormal times, we expect an Islamic banking relationship to have the opposite effects. We define an abnormal time as one characterized by an aggregate shock whose magnitude is rare by historical standards. The Global Financial Crisis in 2008 and 2009 surely qualifies as such a shock. Since, ceteris paribus, Islamic banks are bearing more risk than their conventional counterparts, we expect them to cut back on financing, and for those firms with an Islamic banking relationship to have lower investment, higher profits, and higher cash holdings relative to firms with conventional banking relationships.

All of these implications are summarized in Table 1.

---

[17] Rents could increase sufficiently to offset the lower normal return to capital. This change in rents depends on, *inter alia*, parameter determining the wage bargain and the elasticity of substitution between capital and labor. This issue will be analyzed in a formal model to be presented in Appendix C in a future draft.

2. Dataset Of Turkish Firms

This paper uses a comprehensive dataset compiled by the Central Bank of the Republic of Turkey (TCMB) that provides financial information on a wide variety of traded and non-traded firms in Turkey. We have approximately 100,000 firm/year observations. Annual financial statement data are available for the period 2005 to 2013. The data are similar to those found in CompuStat. Summary statistics of the variables and details about trimming are presented in Table 2; a glossary describing variable names, variable construction, and data sources is contained in Appendix D.

The TCMB dataset also has data on bank affiliation for 51 commercial banks comprising the Turkish banking industry; see Figure 2 for an overview of the Turkish banking system. Forty-four are private banks and seven are state banks. Of the 44 private banks, 40 are (or have been) conventional banks. Some of these conventional banks have ceased operations due to mergers or closures, and the dataset used in Section 5.1 reflects consolidates the data to reflect these changes. Four private banks are Islamic banks (Bank Asya, Türkiye Finans, Albaraka Turk, and Kuveyt Turk). These data are available for the period 2006 to 2013.

[Next draft: Table 2 will be discussed here regarding a comparison between firms with Islamic vs. Conventional banking relationships and that are private vs. state.]

Bank affiliation determines the value of an indicator variable for Islamic Banking Relations (IBR). The IBR variable takes the value of one if a firm's only banking relationship is with an Islamic bank, zero if a firm's only banking relationship(s) is with a conventional bank. Thus, "mixed" firms with both Islamic and conventional banking relationships are excluded.

Table 3 presents data on the geographical distribution of firms with Islamic banking relations across the seven regions in Turkey. Panel A contains the raw data; Panel B the percentage of a given variable relative to the country as a whole. The regions are ordered in terms of income per capita. Region 1 is Istanbul and it, along with regions 2 and 4, constitute the Western Region of Turkey. There are marked differences between the Western and Eastern Regions. Income per capita is 60% lower in the Eastern Region relative to the Western Region. The Eastern Region contains 25% of the firms and firm/year observations in the dataset, but 32% of the branches of Islamic banks. For each of the four Eastern

regions, the percentage of Islamic bank branches is greater than the percentage of firms. Three of the four regions comprising the Eastern Region are the less economically developed regions in Turkey (the exception is Region 3, which contains the national capital city), and also the most conservative and religious. These relations suggest loosely that the decision to have an Islamic banking relationship may be driven, in part, by exogenous religious preferences and analyzing this decision requires appropriate conditioning on regional effects.

3. Long-Run Regressions

3.1 Cross-Section Results

We begin our empirical analysis by focusing on how an Islamic Banking Relationship affects firms behavior in the long-run by focusing on the cross-section dimension of the data. Relying on cross-section data has the additional advantage of avoiding specification issues with respect to dynamics and transitions to steady states. If these elements are specified incorrectly, estimated coefficients may be biased. For example, if firms smooth earnings, then annual earnings will be a misleading measure of period *t* profitability; the averaging procedure used here is unaffected by this intertemporal distortion. Pesaran and Smith (1995) and Chirinko, Fazzari, and Meyer (2001) have considered similar issues in a formal analysis. When interpreted in the frequency domain with spectral methods, averaging the data over several years is equivalent to concentrating the spectral weight on the 0th frequency. Thus, several considerations suggest a cross-section analysis of the dataset.

$$Y_f = \beta \ IBR_f + \sum_{c=1}^{C} \Gamma^c \ X_f^c + \varepsilon_f, \qquad (1)$$

where Y_f is one of three outcome variables (investment/capital ratio, average return to capital (ARC), or cash holdings / total assets ratio), IBR_f is an indicator variable for an Islamic banking relationship, X_f^c are control variables, and ε_f is an error term. The estimated parameters are β and the Γ^c's. Firms are indexed by f. Equation (1) does not throw-away information by aggregating across time. Rather it is based on the notion that time variation is dominated by transitory variation that is of no importance to the estimation of the long-run effects of interest in this study. Note that equation (1) will not allow us to evaluate the interactions between the Global Financial Crisis and Islamic banking relationships, a task that will be undertaken in the next section.

Before proceeding to the econometric analysis of the IBR, we need to specify the control variables. We first identify a set of variables that plausibly influence firm behavior: cash flow, leverage, and tangibility (each divided by total assets), firm age, firm size, sales growth, and volatility. Firm age and firm size may be particularly important control variables, as Islamic banks tend to focus on smaller, younger firms. Models are estimated with all of these control variables, and the insignificant control variables are identified and discarded in the models presented in Table 4. Industry and region fixed effects are included in all models. Given our focus on the cross-section, firm and time fixed effects are excluded.

Table 4 presents results with the data averaged in the time dimension with a select set of control variables. Column 1 contains the results for investment in physical capital. The coefficients on the control variables echo similar results in the literature: cash flow and sale growth have positive impacts and smaller and younger firms invest more. Most importantly for the current investigation, the IBR variable is positive and statistically significant at the 1% level.

Column 2 contains the results when profitability is the dependent variable. As found frequently in the literature, leverage lower profitability. Firm age, firm size, sales growth, and volatility have positive impacts. It is important to keep in mind that profitability is measured as average concept, profits per outstanding assets, and that factors that lower the cost of capital will have a negative impact on profitability. Tangibility lowers the cost of finance and thus has a negative impact on profitability. An IBR has the same impact, significant at the 1% level, lowering the cost of finance and the overall return to capital, as measured by the profitability variable.

Column 3 contains the results for cash holdings. The IBR variable is significant, but only at the 10% level. The negative coefficient indicates that firms with an IBR hold less cash.

These point estimates are also economically significant. Relative to mean values, switching from a conventional to an Islamic banking relationship, ceteris paribus, would increase investment by 37%, decrease profitability by 28%, and decrease cash holdings by 6%. These results are consistent with the view that an Islamic banking relation lowers the cost of capital and stimulates investment and firm expansion (thus lowering average profitability).

3.2 Extreme Value Analysis (EVA)

The selection of control variables is admittedly arbitrary. Fortunately, the structure of our empirical investigation lends itself to an application of the Extreme Value Analysis (EVA) of Leamer (1983), which allows us to investigate the extent to which the control variables influence our empirical evaluation. The EVA assesses robustness by dividing the regressors into two groups, one is the variable(s) of primary interest, and the second is the control variables that may or may not be important but whose coefficients are not of essential interest to the question being studied. To examine the robustness of the results, we estimate equation (1) with all possible combinations of the dispensable control variables. Robustness is

assessed with the first two moments of the distribution of the estimated α coefficients and the associated t-statistics. In our case, with only one coefficient of interest, it is straightforward to implement an EVA.

The results are presented in Table 5 and offer a striking confirmation of the prior results. Regardless of which set of control variables are used, the estimated coefficient on the IBR variable is always positive for the investment model and negative for the profitability model. (Industry and region fixed effects are included in all models.) The associated t-statistics are always significant at conventional levels and, in most cases, at the 1% level. Reflecting the less precisely estimates for cash holdings in Table 4, the estimated coefficients vary widely in the third column of Table 5, suggesting much less confidence in the effect of an IBR on cash holdings.

4. Difference-in Difference Regressions

The above results document that the IBR has quantitatively important impacts on firm behavior. We now turn to the question of the how firms with an IBR fared during the Global Financial Crisis (GFC) in 2008 and 2009. We answer this question with a difference-in-difference model. As discussed in Section 1, the critical impact of an IBR is to lower the cost of capital due to a favorable treatment of agency problems and to shift risk to Islamic banks in normal times who are well-positioned to bear this risk in normal times. However, in times of great financial stress, the Islamic banks will become weaker than conventional banks, lending will be restricted, and the firms with an IB will be forced to contract. We assess this impact with the following econometric equation,

$$Y_{f,t} = \beta\, IBR_{f,t} + \gamma\, GFC_t + \delta\, IBR_{f,t}\, GFC_t + \sum_{c=1}^{C} \Gamma_c\, X_{f,t}^c + \lambda Y_{f,t-1} + \alpha_f^I + \alpha_f^R + \varepsilon_{f,t}, \quad (2)$$

where GFC_t is an indicator variable taking the value of one in 2008 and 2009 (0 otherwise), $Y_{f,t-1}$ is a lagged dependent variable, α_f^I and α_f^R are fixed industry and regional effects, respectively, and γ, δ, and λ are additional estimated parameters. The coefficient on the interaction term, δ, is used to evaluate any differential effects for firms due to an Islamic banking relationship during the Global Financial Crisis.

The results of estimating equation (2) are presented in Table 6. The signs on and the precision of the coefficients on the control variables are similar to those in Table 5 with the one exception of the coefficient on firm size in the investment equation, which is now significantly positive. We focus on three coefficients across the three models. First, the coefficients on the IBR variable are quite similar to those presented from the cross-section models: the coefficient from the investment model is positive and significant, from the profitability mode negative and significant, and from the cash flow model negative but less precisely estimated. Second, as expected, the coefficient on the GFC indicator variable is negative and significant for investment and profitability models, and positive and significant for the cash holdings model. Third and of primary importance for assessing the extent to which an IBR helped or hurt during the GFD, the coefficient on the interaction term is negative and statistically significant only for investment. This suggests that the extra risk borne by the IB's is a liability during abnormal times, and thus indicates the dark side of an IBR. In normal times, firms with an IBR have investment that is higher by 2.791, 35% higher than the average investment for the sample of all firms. However, in abnormal times,

this favorable effect is more than erased for IBR firms. Their investment falls by 4.288, a 54% decline relative to firms with a conventional banking relationship. These point estimates suggest that an important exposure to risk by firms with an IBR.

There are no significant impacts on profitability and cash holdings of firms associated with an Islamic bank. The profitability result is a bit puzzling in light of the long-run regression results and requires further analysis.

5. Why Do Firms Choose An Islamic Banking Relation?

5.1. Logit Results – Economic Factors

In this section, we begin to explore what factors determine an IBR and use this information to sharpen our evaluation of the IBR. We begin with a set of economic variables and run the following logit model,

$$\text{PROB}\left[\text{IBR}_{f,t} = 1\right] = \sum_{c=1}^{C} \Gamma_c \, X_{f,t}^c + \alpha_f^I + \alpha_f^R + \varepsilon_{f,t} \,, \tag{3}$$

where the dependent variable is the probability that the IBR indicator variable is one, The control variables are the same set as used in the above regressions and are listed in Table 7.   As shown in columns 1 and 2, firm age and firm size are negative and significant highlighting that younger and smaller firms tend to form an Islamic banking relationship. Conditional on these variables, firms with greater reliance on external finance (as measured by leverage) also favor and IBR (though the positive effect of cash flow militates against this conclusion).

5.2. Propensity Score Matching Results

We use the information from the logit to compute standard Propensity Score Matching (PSM) estimates (Heckman, Ichimura, and Todd, 1997, 1998). This approach has the decided benefit of refining the comparison group to one that was approximately likely to establish an IBR but did not. The results are presented in Table 8 and confirm the prior results for the effects of an IBR: positive for investment, negative for profitability, and positive for cash holdings, though the precision of the estimates has dropped.

5.3. Logit Results – Religiosity

All of the above analyses have taken the decision to affiliate with an Islamic bank as exogenous and unrelated to any of the outcome variables, conditional on the independent variables. That is, the conditional mean assumption (Cameron and Trivedi, 2005, p. 863) was assumed valid. Underlying the prior results is the implicit assumption that the decision is largely driven by exogenous religious preferences, not economic factors. If this assumption is incorrect, the prior coefficient estimates may be biased and conflating a true causal effect

and a selectivity effect whereby, for example, firms with an IBR just so happen to be growing faster and hence investing more than the complementary class of firms.

We explore the validity of the exogenous religious preference assumption in this sub-section by using the information about religious preferences contained in provincial voting patterns. There are 81 provinces in Turkey that are mutually exclusive and exhaustive (with some minor exceptions). We know the percentage of votes for the AKP party of President Erdogan, which is the sole and dominant party with a pro-Islamic political and economic agenda. Religiosity is measured by the percentage of votes for the AKP party in the province in which a firm is headquartered. This instrument is used to study the adoption decision by firms who have an exclusive Islamic banking relationship. Equation (3) is augmented by $REG_{f,t}$ is the share of the vote for the AKP party in the province in which the firm is headquartered.

The results for the logit model are reported in columns 3 and 4 of Table 7. The coefficients on the economic control variables are largely unchanged. Most importantly for our purposes, the coefficient on the religiosity variable is positive and very precisely estimated. This result supports our previous assumption that there is an exogenous religious component to adopting an IBR.

5.4. Control Function / IV Results

The propensity scores estimated with the religiosity variable are valuable to "soak-up" and remaining endogeneity in our outcome equations for investment, profitability, and cash holdings. We adopt a control function approach that adds the estimated propensity scores to the outcome equation. A statistically important religiosity variable is critical for achieving identification. Apart from the non-linearities introduced in the logit model, the included propensity scores would be linearly dependent on the control variables. Since the addition of the estimated propensity score is meant as a general-purpose correction, we include quadratic and cubic terms as robustness checks.

The results for the IBR, Global Financial Crisis, and interaction coefficients are presented in Table 9. For convenience, we repeat the results from Tables 4 and 6 from the OLS models. Differences between the OLS and control function estimates are minor, a result that is consistent with our assumption that there is an exogenous religious-based motive for adopting an IBR.

6. Conclusions

This study has examined the dual-banking system in Turkey to begin to understand the roles played by Islamic banks in resolving the fundamental finance problems and, most importantly, the effects of that resolution on real activity by firms. We document that firms that have an exclusive Islamic banking relationship have different real behavior, thus decidedly rejecting the Kuran-Khan-O'Hara hypothesis that Islamic banking merely repackages conventional financial instruments. Specifically, Turkish firms with an Islamic banking relationship have higher investment and expand more than firms (as shown by lower average return to capital) with an exclusive conventional banking relationship in long-run regression, difference-in-difference, propensity score matching, and control function/IV models. Our analysis of the profit-sharing-contracts and deferred-sales-contracts suggest that these favorable effects in normal times are due to a reduction in the cost of capital.

That is the bright side of an Islamic banking relationship. The dark side is in abnormally bad times, such as the 2008-2009 Global Financial Crisis, firms that are associated with Islamic banks are expected to perform worse. We document this channel for investment spending, but do not find any evidence the firm expansion or cash holdings are affected differentially for IBR firms.

The benefits of an Islamic banking relationship documented here raise the question why conventional banks have not offered lending products with similar risk characteristics. The hallmark of an IBR is that an Islamic bank bears more risk than a conventional bank. For a conventional bank to introduce similar products would require it to assume more risk. There may be institutional rigidities or regulatory imperatives that prevent the introduction of new products. It is interesting to observe that in the United Kingdom, some conventional banks are beginning to offer *Sharia'* compliant financial products. It will be interesting to see if these offerings are an experiment that does not gain traction from borrowers or the beginning of a long-term trend.

Whether the benefits of an IBR can continue to be offered to Turkish firms remains an open question. Figure 3 shows that Turkish Islamic banks have been more profitable than their conventional counterparts but that there has largely been convergence in more recent years. One important source for the profitability advantage of Turkish Islamic banks has been access to a cheap source of funds via deposits. As shown in Figure 4, deposits were 85% of liabilities for Turkish Islamic banks in 2005, much higher than the comparable 60% figure for Turkish conventional banks. That substantial advantage has narrowed in recent

years. In 2013 (the last year for which we have data), the ratios are 65% and 55%, respectively.   It remains for future research and the passage of time to determine the impact of these trends on the real impacts of Islamic banking relationships in Turkey.

References

Acharya, Viral V., Almeida, Heitor, and Campello, Murillo,, "Aggregate Risk and the Choice between Cash and Lines of Credit," *The Journal of Finance* (forthcoming).

Adrian, Tobias, and Shin, Hyun Song, "Financial Intermediaries and Monetary Economics," in Benjamin M. Friedman and Michael Woodford (eds.) *Handbook of Monetary Economics* Volume 3 (Amsterdam: Elsevier, 2010), 601-650.

Almeida, Heitor, and Campello, Murillo., "Financial Constraints, Asset Tangibility, and Corporate Investment," *Review of Financial Studies* 20 (2007), 1429-1460.

Allen, Franklin, *Comparing Financial Systems* (Cambridge: MIT Press, 2001).

Appelbaum, Eileen, and Batt, Rosemary, *Private Equity at Work: When Wall Street Manages Main Street* (New York: Russell Sage Foundation, 2014).

Arslan, Yavuz, Bulut, Yunus Emrah, Büyükbaşaran, Tayyar, and Kabaş, Gazi, "Liquidity Management of Non-Financial Firms: Cash Holdings and Lines of Credit Evidence from Turkey," TCMB Working Paper No. 16/04 (February 2016).

Arslan-Ayaydin, Özgür, Florackis, C. and Ozkan, A., "Financial Flexibility, Corporate Investment and Performance: Evidence from Financial Crises", *Review of Quantitative Finance and Accounting* 42 (2014) 211-250.

Becht, Marco, Bolton, Patrick, and Roell, Ailsa, "Corporate Governance and Control," in George Constantinides, Milton Harris, and Rene M. Stulz (eds.), *Handbook of the Economics of Finance* (Amsterdam: Elsevier, 2003), 1-109.

Bertrand, Marianne, Duflo, Esther, and Mullainathan, Sendhil, "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics* 119 (2004), 249-275.

Binici, Mahir, and Mehmet Yorukoglu, "Capital Flows in the Post Global Financial Crisis Era - Implications for Financial Stability and Monetary Policy," *BIS Papers*, 57 (2011), 319-343.

Board of Governors of the Federal Reserve System, *Z.1 Release Financial Accounts of the United States* (2016), Retrieved on February 17, 2016 from http://www.federalreserve.gov/releases/z1/current/z1.pdf.

Brunnermeier, Markus, K., Eisenbach, Thomas, and Sannikov, Yuliy, "Macroeconomics with Financial Frictions: A Survey," in Daron Acemoglu, Manuel Arellano and Eddie Dekel (eds.), *Advances in Economics and Econometrics, Tenth World Congress of the Econometric Society*, Vol. II: Applied Economics (New York: Cambridge University Press, 2013), 4-94.

Cameron, A. Colin, and Trivedi, Pravin K., *Microeconometrics: Methods and Applications* (Cambridge: Cambridge University Press, 2005).

Carroll, Gabriel, "Robustness and Linear Contracts," Stanford University (June 2014).

Chemmanur, Thomas J., and John, Kose, "Optimal Incorporation, Structure of Debt Contracts, and Limited-Recourse Project Financing," *Journal of Financial Intermediation* 5 (1996), 372-408.

Chirinko, Robert S., Fazzari, Steven M., and Meyer, Andrew P., "A New Approach to Estimating Production Function Parameters: The Elusive Capital-Labor Substitution Elasticity," *Journal of Business & Economic Statistics* 29 (October 2011), 587-594.

Chodorow-Reich, Gabriel, "The Employment Effects of Credit Market Disruptions: Firm-level Evidence from the 2008-09 Financial Crisis," *The Quarterly Journal of Economics* 129 (2014), 1-59.

Diamond, Douglas M., "Financial Intermediation and Delegated Monitoring," *Review of Economic Studies* 51 (1984), 393-414.

Fama, Eugene F., and Miller, Merton H., *The Theory of Finance* (New York: Holt, Rinehart, and Winston, 1972).

Finnerty, John D., *Project Financing: Asset-Based Financial Engineering*, Second Edition (Hoboken, New Jersey: John Wiley & Sons, 2007).

Gertler, Mark, and Kiyotaki, Nobuhiro, "Financial Intermediation and Credit Policy in Business Cycle Analysis," in Benjamin M. Friedman and Michael Woodford (eds.) *Handbook of Monetary Economics* Volume 3 (Amsterdam: Elsevier, 2010), 547-599.

Goetzmann, William N., *Money Changes Everything: How Finance Made Civilization Possible* (Princeton: Princeton University Press, 2016).

Grossman, Sanford J., and Oliver D. Hart, "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy* 94 (August 1986), 691–719.

Hall, Robert E., "The High Sensitivity of Economic Activity to Financial Frictions," *Economic Journal* 121 (May 2011), 351-378.

Hart, Oliver, *Firms, Contracts, and Financial Structure: Clarendon Lectures in Economics* (Oxford: Oxford University Press, 1995).

Hasan, Maher, and Dridi, Jemma, "The Effects of the Global Crisis on Islamic and Conventional Banks: A Comparative Study," IMF Working Paper 10/201 (September 2010).

Heckman, James, Ichimura, Hidehiko, and Todd, Petra, "Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme," *Review of Economic Studies* 64 (1997), 605-654.

Heckman, James, Ichimura, Hidehiko, and Todd, Petra, "Matching as an Econometric Evaluation Estimator," *Review of Economic Studies* 65 (1998), 261-294.

Hellwig, Martin F., "Banking, Financial Intermediation and Corporate Finance," in Alberto Giovannini and Colin Mayer (eds.) *European Financial Integration* (Cambridge and New York: Cambridge University Press, 1991), 35-63.

Holmström, Bengt, and Milgrom, Paul, "Aggregation and Linearity in the Provision of Intertemporal Incentives," *Econometrica* 55 (1987), 303-328.

International Monetary Fund (IMF), (2016a), Retrieved on February 17, 2016 from http://www.imf.org/external/themes/islamicfinance/#2 .

International Monetary Fund (IMF), (2016b), Series NGDPD, Retrieved on February 18, 2016 from http://www.imf.org/external/pubs/ft/weo/2015/02/weodata/download.aspx .

Iqbal, M., Ahmad, A., Khan, T., "Challenges Facing Islamic Banking," Islamic Development Bank, Islamic Research and Training Institute Occasional Paper #1 (1998).

Jensen, Michael, and Meckling, William H., "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics* 3 (October 1976), 305-360.

John, Teresa A., and John, Kose, "Optimality of Project Financing: Theory and Empirical Implications in Finance and Accounting," *Review of Quantitative Finance and Accounting* 1 (January 1991), 51-74.

Kettell, Brian, *Islamic Finance In A Nutshell* (Chichester: John Wiley & Sons, 2010).

Khan, Feisal, "How 'Islamic' Is Islamic Banking?," *Journal of Economic Behavior & Organization* 76 (2010), 805-820.

Kuran, Timur, *Islam and Mammon* (Princeton: Princeton University Press, 2004).

Leamer, Edward E. E., "Let's Take the Con Out of Econometrics," *American Economic Review* 73 (March 1983), 31-43.

Lindberg, Leon L. N., Campbell, John J. L., and Hollingsworth, J. Rogers, "Economic Governance and the Analysis of Structural Change in the American Economy," in John L. Campbell, J. Rogers Hollingsworth, and Leon N. Lindberg (eds.) *Governance of the American Economy* (Cambridge and New York: Cambridge University Press, 1991).

McKeon, Richard (ed.), *Introduction to Aristotle* (New York: Random House, 1947).

Mishkin, Frederic S., *The Economics of Money, Banking, and Financial Markets* (Business School Edition) 4th Edition (Boston: Pearson Addison Wesley, 2013).

Myers, Stewart, C., "Determinants of Corporate Borrowing," *Journal of Financial Economcis* 5 (1977), 147-175.

O'Hara, Maureen, *Something for Nothing: Arbitrage and Ethics on Wall Street* (New York: W.W. Norton & Company, 2016).

Ongena, Steven and Şendeniz-Yüncü, Ilkay, "Which firms engage small, foreign, or state banks? And who goes Islamic? Evidence from Turkey," *Journal of Banking and Finance* 35 (2011), 3213-3224.

Pappas, Vasileios, Ongena, Steven, Izzeldin, Marwan, and Fuertes, Ana-Marias, "Do Islamic Banks "Live Free and Die Harder"?," University of Bath (June 2015).

Peek, Joseph, and Rosengren, Eric, "The International Transmission of Financial Shocks: The Case of Japan," *American Economic Review* 87 (September 1997), 495-505.

Pesaran, M. Hashem, and Smith, Ron, "Estimating Long-Run Relationships From Dynamic Heterogeneous Panels," *Journal of Econometrics* 68 (1995), 79-113.

Rajan, Raghuram G., "Presidential Address: The Corporation in Finance," *Journal of Finance* 67 (August 2012), 1173-1217.

Roe, Mark J., *Strong Managers, Weak Owners: The Political Roots of American Corporate Finance* (Princeton: Princeton University Press, 1994).

Roy, William G., *Socializing Capital: The Rise of the Large Industrial Corporation in America* (Princeton: Princeton University Press, 1997).

Shleifer, Andrei, and Vishny, Robert W., "A Survey of Corporate Governance," *The Journal of Finance* 52 (June 1997), 737-783.

Appendix A. A Formal Model Of Risk-Shifting: Profit-Sharing-Contracts vs. Conventional Loans

[Not included in this draft]

Appendix B. Comparing A Profit-Sharing-Contract To Equity Finance, Project Finance, A Limited Partnership, And A *Commenda* Contract

This appendix compares the project characteristics of a Profit-Sharing-Contract (PSC) to several conventional financing arrangements -- equity finance (EF), project finance (PF), a limited partnership (LP) – as well as a *Commenda* contract (CC). We focus on the six project characteristics listed in Table B.1, all of which apply to a PSC. The project characteristics for the PSC are discussed in Section 1.5.1.

Table B.1

Project Characteristics For Various Financing Arrangements

Project Characteristic	PSC	EF	PF	LP	CC
	(1)	(2)	(3)	(4)	(5)
Limited Liability	Yes	Yes	Yes	Yes	Yes
Managerial Independence	Yes/No	No	No	Yes	Yes
Proportional Profit Sharing	Yes	No	Yes	No	Yes
Limited Duration	Yes	No	Yes	No	Yes
Specific Focus	Yes	No	Yes	No	Yes
Limited Number Of Investors	Yes	No	Yes	Yes	Yes

B.1 Equity Finance (EF)

The PSC is quite distinct from the EF. While shareholders also enjoy limited liability, the other five investor characteristics do not obtain. Voting rights give shareholders indirect control of managerial decisions, and the priority status granted debt finance and preferred equity results in a non-proportional sharing of profits. The indefinite life of a C corporation, its involvement in a wide-variety of projects, and the large number of shareholders further differentiates EF from the PSC.

B.2 Project Finance (PF)

By contrast, the PSC is closely related to project financing (PF) in traditional Western-oriented models.[18] Finnerty (2007, p. 1) offers the following definition of PF:

---

[18] The choice between PF and other financing structures has been analyzed in formal models of asymmetric information. Shah and Thakor (1987) show that PF minimizes signaling costs when project risk is relatively greater than the risk for the corporation as a whole. John and John (1991) focus on agency costs, and they demonstrate that the associated underinvestment problem is

"…the raising of funds on a limited-recourse or nonrecourse basis to finance an economically separable capital investment project in which the providers of the funds look primarily to the cash flow from the project as the source of funds to service their loans and provide the return on of and return on their equity invested in the project." PF results in a legally separate entity. Investors participating in a PF have limited, if any, ability to recoup invested funds from companies related to the other PF investors. All returns derive from the profits of the project. Projects supported by either an Islamic PSC or a conventional PF involve a small number of financiers investing in a well-defined project with a finite duration and sharing the profits proportionally. The one notable difference is that the PF usually allow investors to be actively involved in the management of the project. As discussed in section 1.5.1, such involvement is prohibited in a *mudaraba* PSC but permitted in a *musharaka* PSC.

B.3 Limited Partnership (LP)

Some but not all PF's are financed via partnerships.[19] Limited partnerships (LP) have and many limited partners and one or more general partners who manage the partnership (as well as assume unlimited liability for the actions of the partnership).[20] LP's are similar to PSC's by capping the liability of its limited partners and having a limited number of investors. This limited liability holds only if the limited partners do not have any authority with respect to managerial decisions. But there are several important differences relative to PSC's. LP's are usually formed for a 10-year period (with the possibility of one or two year extensions) and partnership assets are invested in a portfolio of companies. Thus, some of the information problems facing shareholders remain with LLP's. Profits are not shared proportionately; returns to limited partners [general partners] are typically 80% [20%] of the profits once the general partners' management fee (typically 2% of investment assets), debt payments, and a target return of approximately 8% have been met (Appelbaum and Batt, 2014, p. 51). This compensation structure leads to perverse incentives for the general

---

attenuated by PF relative to EQC. In both models, PF emerges as a rational response to the economic environment, rather than as a ploy to hide debt off the balance sheet.

[19] For example, the $7.7 billion (as of 1969) Trans Alaska Pipeline System project was organized with 10 large oil companies having undivided joint interests, a fraction of ownership in each part of the project (Finnerty, 2007, pp. 424-425).

[20] General partners sometimes are able to retain limited liability by having the legal entity serving as a general partner adopting an organizational form that enjoys limited liability.

partners, as they have incentives to undertake risky investments given the small investment (typically 1% to 2% of the initial capital) and potentially lucrative return of 20% of profits (Appelbaum and Batt, 2014, pp. 252-255).

B.4 *Commenda* **Contract (CC)**

The CC was used in 12th century Italy. It is very similar to a PSC, sharing all of the major project characteristics. See section 1.5.1 for further discsussion.

Appendix E. Financial Statement Data for Private Conventional and Private Islamic Banks

A. Levels – Thousands Of Turkish Lira

PRIVATE CONVENTIONAL BANKS - PCB										
(All in Turkish Lira 000)	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Loans	114,065,677	170,884,192	218,982,088	280,251,888	279,075,633	365,543,110	484,607,830	566,232,136	734,156,734	387,466,701.4
Financial Leasing	3,976,473	5,760,027	8,415,949	10,337,433	8,198,965	7,729,364	11,210,959	12,648,775	18,035,095	10,292,070.9
All Else	140,997,727	180,375,512	187,047,481	231,488,334	281,932,259	315,317,105	356,378,567	377,770,405	445,145,089	296,931,844.0
Total Assets	259,039,877	357,019,731	414,445,518	522,077,655	569,206,857	688,581,718	852,205,217	956,651,316	1,197,336,918	694,690,616.3
Deposits	157,464,204	212,415,227	241,895,469	310,070,928	336,390,280	403,715,143	482,838,126	533,906,554	660,888,596	397,765,040.4
Foreign currency denominated d	38,583,306	44,470,157	46,667,856	62,997,310	53,963,393	70,609,468	98,882,378	97,905,867	140,356,867	76,981,662.0
All Else	29,924,023	62,969,774	87,386,012	90,994,179	101,439,826	125,239,680	172,966,994	205,325,581	268,238,207	139,320,031.6
Equity	33,068,344	37,164,573	38,496,181	58,015,238	76,783,358	89,017,427	97,517,719	119,513,314	127,853,248	80,545,132.3
Profitability	1,699,551	6,068,576	8,888,538	8,754,143	13,353,145	15,327,874	14,873,670	16,945,812	18,569,594	12,847,669.0
Total Liabilities	259,039,877	357,019,731	414,445,518	522,077,655	569,206,857	688,581,718	852,205,217	956,651,316	1,197,336,918	694,690,616.3
{Loans + Financial Leasing}	118,042,150	176,644,219	227,398,037	290,589,321	287,274,598	373,272,474	495,818,789	578,880,911	752,191,829	397,758,772.3
	TOTAL BANKS; 2005 = **40**, 2006 = **34**, 2007 = 32 , 2008 = **32**, 2009 = **32**, 2010 = 32, 2011 = **32**, 2012 = **32**, 2013 = **33**									

PRIVATE ISLAMIC BANKS - PIB										
(All in Turkish Lira 000)	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Loans	6,667,018	9,895,494	14,520,520	19,541,546	24,958,265	32,172,534	41,023,885	50,234,688	66,373,460	32,340,049.0
Financial Leasing	814,615	806,536	812,420	570,258	323,729	239,456	509,103	811,639	1,874,555	743,462.0
All Else	2,462,593	3,027,690	4,102,142	5,658,323	8,346,044	10,890,143	14,493,072	19,249,237	27,773,656	11,692,538.4
Total Assets	9,944,226	13,729,720	19,435,082	25,770,127	33,628,038	43,302,133	56,076,929	70,244,695	96,021,671	44,776,049.4
Deposits	8,401,424	11,237,284	14,943,071	19,209,851	26,841,970	33,827,541	39,869,282	49,151,455	63,210,195	32,286,331.1
Foreign currency denominate	310,633	370,435	939,038	1,519,695	592,999	1,763,261	6,152,438	8,620,707	14,935,143	4,361,714.5
All Else	284,747	562,284	1,189,162	1,311,652	1,773,505	2,254,248	3,861,895	5,095,728	9,043,689	3,136,520.4
Equity	947,422	1,559,717	2,363,811	3,728,929	4,419,564	5,457,083	6,193,314	7,376,805	8,832,644	4,991,483.4
Profitability	247,882	391,368	527,382	647,861	705,081	759,183	803,589	915,956	1,051,633	725,256.6
Total Liabilities	9,944,226	13,729,720	19,435,082	25,770,127	33,628,038	43,302,133	56,076,929	70,244,695	96,021,671	44,776,049.4
{Loans + Financial Leasing}	7,481,633	10,702,030	15,332,940	20,111,804	25,281,994	32,411,990	41,532,988	51,046,327	68,248,015	33,083,511.0
	Total **4** SCB BANKS; 2005 to 2013									

B. Growth Rates (%)

PRIVATE CONVENTIONAL BANKS - PCB									
(Growth Rates)	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Average**
Loans	-----	49.81	28.15	27.98	-0.42	30.98	32.57	16.84	29.66	26.95
Financial Leasing	-----	44.85	46.11	22.83	-20.69	-5.73	45.04	12.83	42.58	23.48
All Else	-----	27.93	3.70	23.76	21.79	11.84	13.02	6.00	17.83	15.73
Total Assets	-----	37.82	16.08	25.97	9.03	20.97	23.76	12.26	25.16	21.38
Deposits	-----	34.90	13.88	28.18	8.49	20.01	19.60	10.58	23.78	19.93
Foreign currency denominated d	-----	15.26	4.94	34.99	-14.34	30.85	40.04	-0.99	43.36	19.26
All Else	-----	110.43	38.77	4.13	11.48	23.46	38.11	18.71	30.64	34.47
Equity	-----	12.39	3.58	50.70	32.35	15.93	9.55	22.56	6.98	19.26
Profitability	-----	257.07	46.47	-1.51	52.54	14.79	-2.96	13.93	9.58	48.74
Total Liabilities	-----	37.82	16.08	25.97	9.03	20.97	23.76	12.26	25.16	21.38
{Loans + Financial Leasing}	-----	49.65	28.73	27.79	-1.14	29.94	32.83	16.75	29.94	26.81

TOTAL BANKS; 2005 = **40**, 2006 = **34**, 2007 = 32 , 2008 = **32**, 2009 = **32**, 2010 = 32, 2011 = **32**, 2012 = **32**, 2013 = 33

PRIVATE ISLAMIC BANKS - PIB									
(Growth Rates)	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Average**
Loans	-----	48.42	46.74	34.58	27.72	28.91	27.51	22.45	32.13	33.56
Financial Leasing	-----	-0.99	0.73	-29.81	-43.23	-26.03	112.61	59.43	130.96	25.46
All Else	-----	22.95	35.49	37.94	47.50	30.48	33.08	32.82	44.28	35.57
Total Assets	-----	38.07	41.55	32.60	30.49	28.77	29.50	25.26	36.70	32.87
Deposits	-----	33.75	32.98	28.55	39.73	26.02	17.86	23.28	28.60	28.85
Foreign currency denominate	-----	19.25	153.50	61.84	-60.98	197.35	248.92	40.12	73.25	91.65
All Else	-----	97.47	111.49	10.30	35.21	27.11	71.32	31.95	77.48	57.79
Equity	-----	64.63	51.55	57.75	18.52	23.48	13.49	19.11	19.74	33.53
Profitability	-----	57.88	34.75	22.84	8.83	7.67	5.85	13.98	14.81	20.83
Total Liabilities	-----	38.07	41.55	32.60	30.49	28.77	29.50	25.26	36.70	32.87
{Loans + Financial Leasing}	-----	43.04	43.27	31.17	25.71	28.20	28.14	22.91	33.70	32.02

Total **4** SCB BANKS; 2005 to 2013

Figure 1
The Uses Of Funds By An Islamic Bank
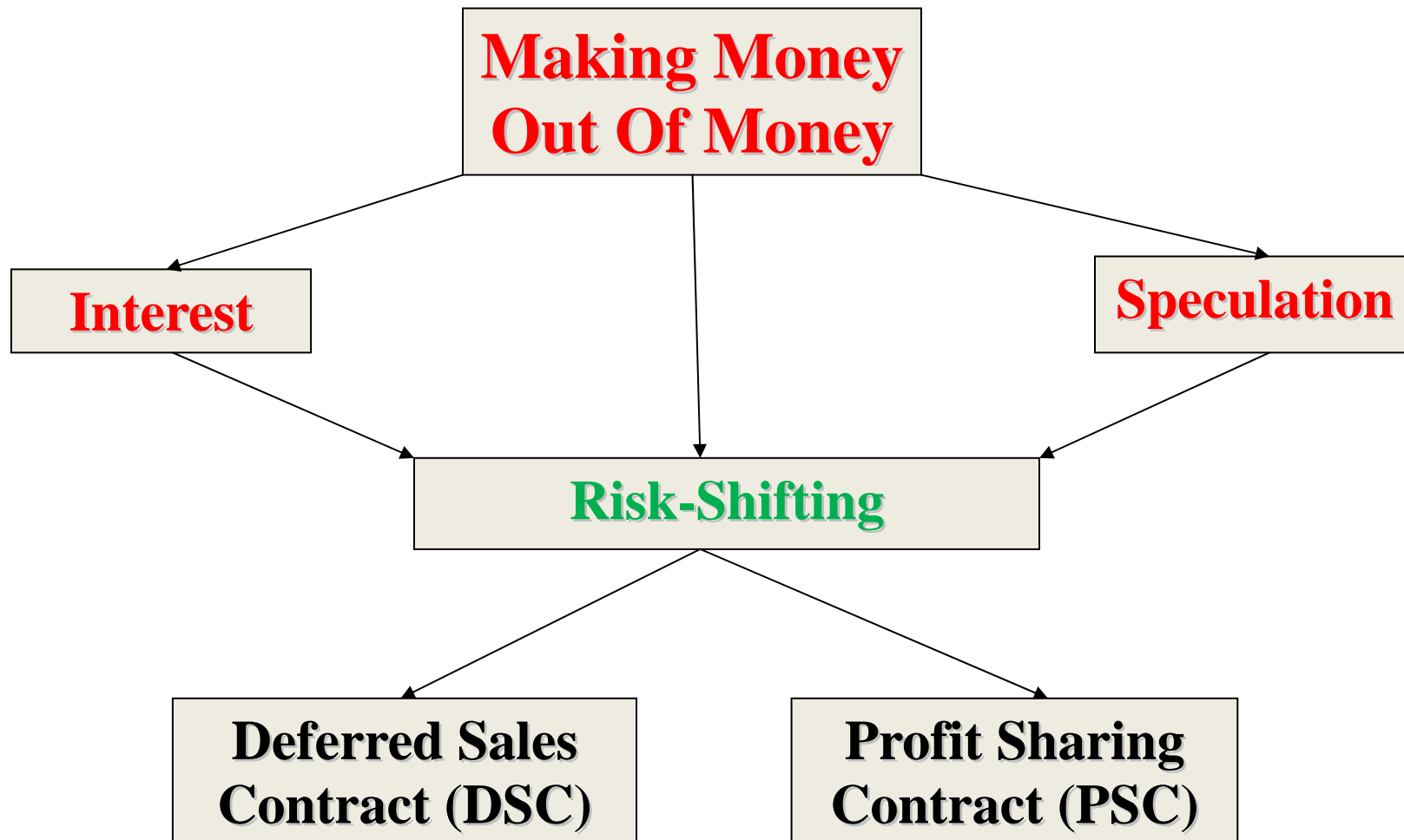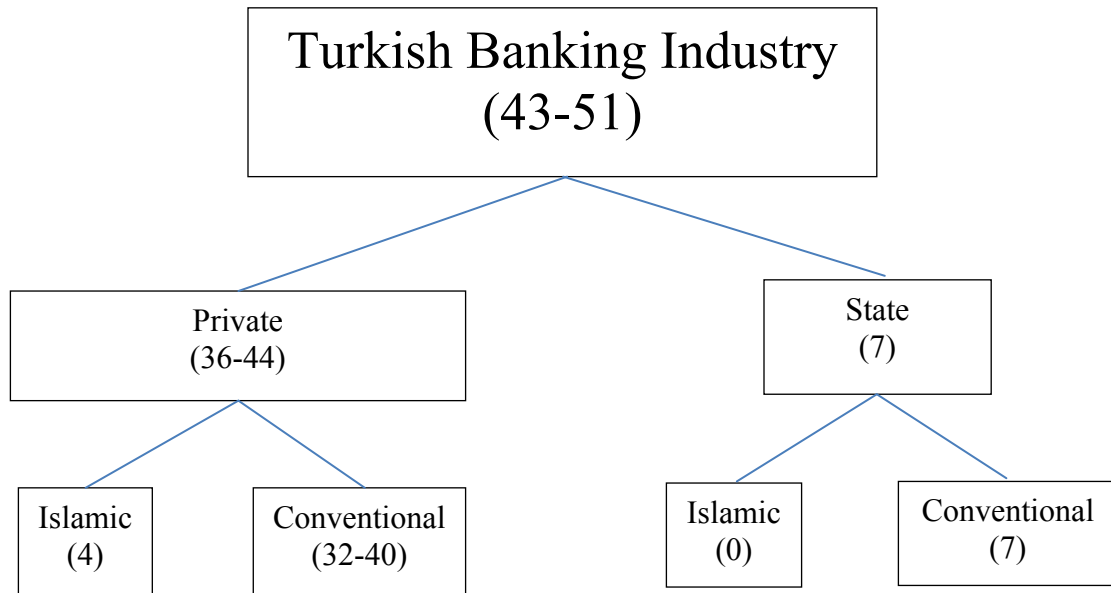**Three Proscriptions And One Prescription**

Figure 2

Figure 2. Turkish Banking Industry
The number of conventional private banks fluctuates over the sample period due to mergers and closures.
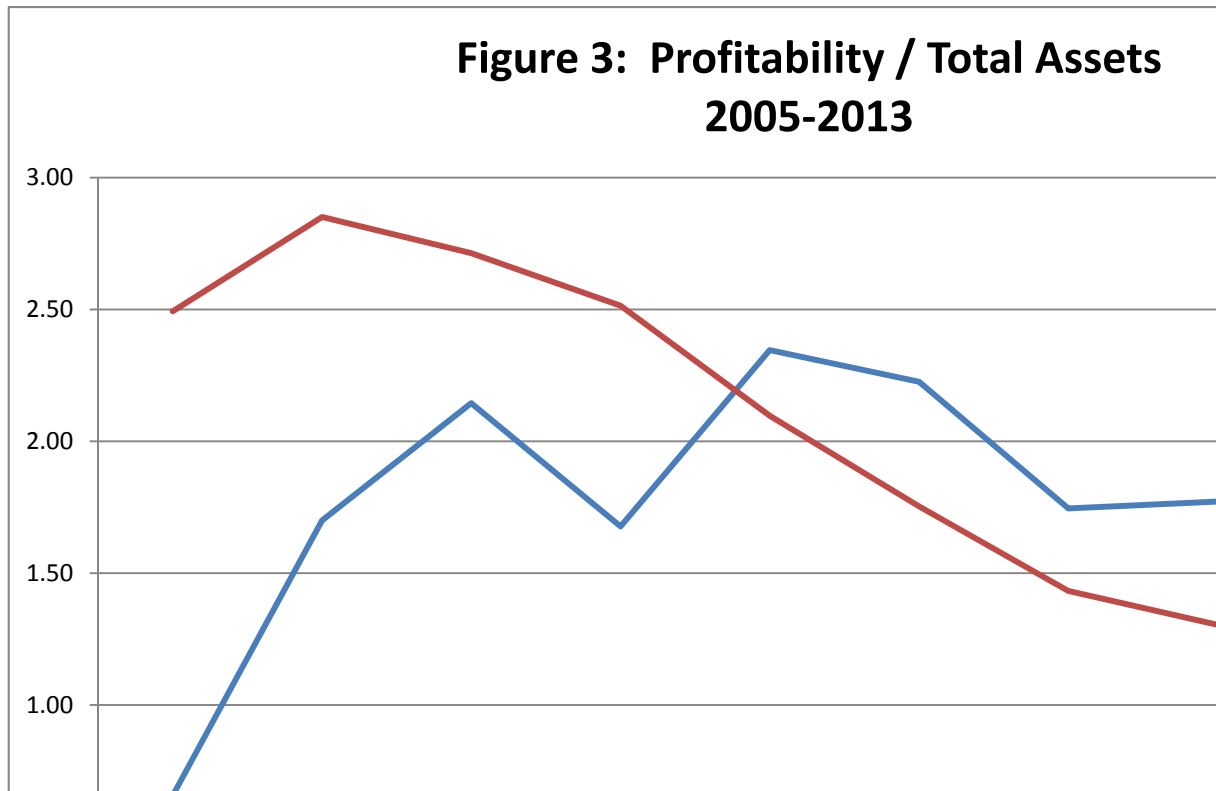
Figure 3. Profitability / Total Assets
The figure contains the ratio of profitability to total assets for private commercial banks (PCB, the blue line) and private Islamic banks (PIB, the red line) for the period 2005 to 2013. The ratios are stated as percentages.

Figure 4. Deposits / Total Liabilities
The figure contains the ratio of deposits to total liabilities for private commercial banks (PCB, the blue line) and private Islamic banks (PIB, the red line) for the period 2005 to 2013. The ratios are stated as percentages.
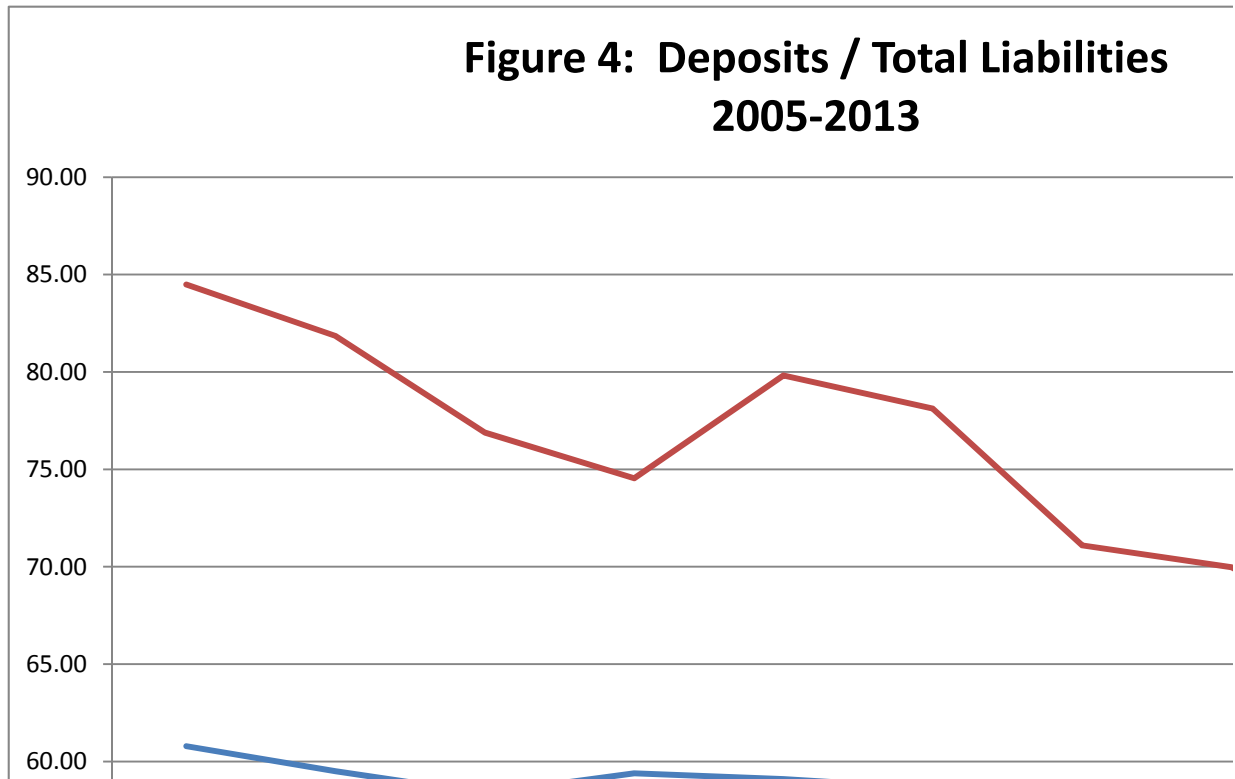
Table 1. Summary Of Empirical Implications Of An Islamic Banking Relationship

Variable	Normal Times	Abnormal Times
	(1)	(2)
Investment	+	-
Profitability	-	+
Cash Holdings	+	-

The table summarizes the empirical implications for a firm with an Islamic banking relationship, per the discussion in Section 1.

Table 2. Summary Statistics

	Mean	St. Dev.	Median	Min.	Max.	N
	(1)	(2)	(3)	(4)	(5)	(6)
Cash Flow$^{\#}$	5.993	14.505	4.331	-99.812	100	106,267
Cash Holdings$^{\#}$	10.114	14.460	4.014	0.000	100	106,745
Firm Age	2.546	0.824	2.708	0.000	5.438	101,816
Firm Size	11.423	1.605	11.378	0.049	19.618	106,794
Fixed Assets$^{\#}$	36.915	27.384	31.548	0.000	100	106,796
Islamic Banking Relation-A	0.027	0.163	0.000	0.000	1	60,603
Islamic Banking Relation-B	0.016	0.126	0.000	0.000	1	103,249
Islamic Banking Relation-C	0.019	0.136	0.000	0.000	1	46,131
Investment$^{\#}$	7.921	26.039	0.701	-24.141	323.016	83,540
Leverage$^{\#}$	63.679	27.839	67.114	0.000	199.878	106,225
Profitability$^{\#}$	2.291	9.574	1.622	-40.655	99.301	105,225
Sales Growth	15.241	62.690	13.144	-279.069	421.483	79,827
Tangibility$^{\#}$	27.315	24.601	20.560	0.000	100	106,794
Total Assets	81,200,000	577,000,000	16,000,000	127	60,300,000,000	106,031
Volatility	8.568	7.890	6.368	0.000	93.538	106,031

This table provides descriptive statistics from 2006 to 2013 of the sample, excluding utilities and financial firms. The data on Variable definitions are provided in Appendix D. $^{\#}$ indicates that the variable is divided by Total Assets. The upper and lower 1% of the data have been trimmed except for series whose extreme values are unquestionably legitimate data (e.g., 0 or 1 for a binary variable) and for those series whose components have been trimmed.

Table 3. Turkey's Geographical Regions:
      Demographic, Economic, and Religious Characteristics

Panel A:							
Region	Population	GVA	Firms	OBS	IBB	CBB	AKP Votes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	22,253	411,452	12,387	55,275	339	3,642	41.57 %
2	9,608	126,180	2,645	12,296	57	1,361	42.78 %
3	11,788	136,838	3,688	16,674	107	1,430	58.01 %
4	9,358	97,135	2,092	9,521	54	1,004	42.73 %
5	7,050	67,730	936	4,380	45	787	57.15 %
6	7,769	44,513	924	3,794	34	393	48.66 %
7	5,808	37,035	325	1,301	22	322	48.44 %
Total	73,630	920,884	22,997	103,241	658	8,939	

Panel B: (%)							
Region	Population	GVA	Firms	OBS	IBB	CBB	Major Cities
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	30.22	44.68	53.86	53.54	51.52	40.74	Istanbul[W]
2	13.05	13.70	11.50	11.91	8.66	15.23	Izmir[W]
3	16.01	14.86	16.04	16.15	16.26	16.00	Ankara[E]
4	12.71	10.55	9.10	9.22	8.21	11.23	Adana[W]
5	9.58	7.35	4.07	4.24	6.84	8.80	Samsun[E]
6	10.55	4.83	4.02	3.67	5.17	4.40	Gaziantep[E]
7	7.89	4.02	1.41	1.26	3.34	3.60	Van[E]
Total	100	100	100	100	100	100	

This table provides demographic, economic, and religious characteristics of Turkey's seven geographical regions. Definitions of each region are provided in Appendix 3. *Population* is the number of people (in thousands) living in the each region. Unless otherwise noted, the sample period is an average for the period 2006 to 2013. *GVA* is the average regional gross value added (in millions of Turkish Lira) at current basic prices for the period 2007 to 2011. *GVA* is obtained from the Turkish Statistical Institute (www.tuik.gov.tr). *Firms* is the number of firms in the each region. *OBS* is the number of firm/year observations for the each region. *IBB* is the average number of branches of Islamic banks in the region for the period 2007 to 2013. *IB* data are obtained from Participation Banks Association of Turkey (www.tkbb.org.tr). *CBB* is the average number of branches of conventional banks in the region for the period 2007 to 2013. *CBB* data are obtained from The Banks Association of Turkey (www.tbb.org.tr). *AKP Votes* is the average of the percentages of AKP votes during the general elections of 2007 and 2011. *Major Cities* indicates the largest city in a region.

Table 4. Islamic Banking Relationship: Investment, Profitability, Cash Holdings Cross-Section Regressions

Variables	Investment	Profitability	Cash holdings
	(1)	(2)	(3)
Islamic Banking Relation	2.935***	-0.632***	-0.610*
	(0.588)	(0.214)	(0.338)
Cash Flow	0.034**		
	(0.016)		
Firm Age	-3.502***	0.340***	-0.501***
	(0.281)	(0.077)	(0.122)
Firm Size	-0.853***	0.241***	-0.487***
	(0.110)	(0.042)	(0.066)
Leverage		-0.132***	-0.100***
		(0.003)	(0.004)
Sales Growth	0.081***	0.004***	0.009***
	(0.007)	(0.001)	(0.002)
Tangibility		-0.053***	-0.125***
		(0.003)	(0.004)
Volatility		0.063***	0.088***
		(0.011)	(0.013)
Constant	36.707***	7.192***	31.196***
	(6.887)	(1.355)	(5.794)
FIXED EFFECTS			
Firm	No	No	No
Industry	Yes	Yes	Yes
Region	Yes	Yes	Yes
Year	No	No	No
R^2	0.130	0.239	0.125
Observations /Number of firms	15,099	15,097	15,108

This table shows the cross section regressions. The sample period is between 2006 and 2013. Variable definitions are provided in Appendix D. *P*-values reported in parentheses are based on *t*-statistics estimated using standard errors robust to clustering at the firm level and heteroskedasticity. ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively

Table 5. Islamic Banking Relationship: Investment, Profitability, Cash Holdings
Cross-Section Regressions. Extreme Value Analysis

Variable: Islamic banking relation	Investment	Profitability	Cash Holdings
COEFFICIENT			
	(1)	(2)	(3)
Mean	4.652	-0.911	-0.038
Standard Deviation	1.857	0.367	0.388
Minimum	2.567	-2.980	-0.625
Maximum	7.919	-0.462	0.931
t-statistics			
Mean	3.457	-3.560	-0.061
Standard Deviation	1.111	1.448	0.748
Minimum	2.204	-7.226	-1.975
Maximum	5.422	-1.796	1.873
FIXED EFFECTS			
Firm	No	No	No
Industry	Yes	Yes	Yes
Region	Yes	Yes	Yes
Year	No	No	No

This table shows extreme value analysis for all possible combinations of the control variables (with the exception that industry and region fixed effects are included in all models). The sample period is between 2006 and 2013, Variable definitions are provided in Appendix D.

Table 6. Islamic Banking Relationship: Investment, Profitability, Cash Holdings Difference-In-Difference Regressions

Variables	Investment	Profitability	Cash Holdings
	(1)	(2)	(3)
Islamic Banking Relation	2.791***	-0.703**	-0.768*
	(1.030)	(0.343)	(0.417)
Global Crisis	-0.972***	-0.717***	0.267**
	(0.236)	(0.095)	(0.111)
Global Crisis x Islamic Banking Relation	-4.288**	-0.348	-0.475
	(2.153)	(0.670)	(1.060)
Cash Flow	0.006		
	(0.007)		
Firm Age	-1.776***	0.122*	0.021
	(0.207)	(0.063)	(0.077)
Firm Size	0.300***	0.156***	-0.100***
	(0.065)	(0.029)	(0.033)
Leverage		-0.110***	-0.041***
		(0.002)	(0.002)
Sales Growth	0.024***	0.028***	0.004***
	(0.003)	(0.001)	(0.001)
Tangibility		-0.044***	-0.073***
		(0.002)	(0.002)
Volatility		0.050***	0.036***
		(0.011)	(0.009)
Lagged Investment	0.134***		
	(0.011)		
Lagged Profitability		0.365***	
		(0.008)	
Lagged Cash Holdings			0.637***
			(0.007)
Constant	6.438	8.027***	8.738
	(6.578)	(3.106)	(.)
Long Run Impact of Islamic Banking Relation	3.223*	-1.107**	-2.117
	(1.859)	(0.564)	(1.306)
Long Run Impact of Global Crisis	-1.123***	-1.130***	0.737**
	(0.273)	(0.151)	(0.308)
Long Run Impact of Global Crisis x Islamic Banking Relation	-4.952*	-0.548	-1.310
	(2.628)	(1.056)	(2.924)

FIXED EFFECTS			
Firm	No	No	No
Industry	Yes	Yes	Yes
Region	Yes	Yes	Yes
Year	No	No	No
R^2	0.054	0.334	0.480
Observations /Number of firms	30,154	43,107	43,865

This table shows the difference-in-difference regressions. The sample period is between 2006 and 2013. Variable definitions are provided in Appendix D. *P*-values reported in parentheses are based on *t*-statistics estimated using standard errors robust to clustering at the firm level and heteroskedasticity. ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively

Table 7. Logistic Regressions, Firms Affiliated with All Types of Banks

Variables	Cross-Section	Panel		Cross-Section	Panel
	(1)	(2)		(3)	(4)
Cash Flow	0.010***	0.006**		0.010***	0.006**
	(0.003)	(0.003)		(0.003)	(0.003)
Firm Age	-0.533***	-0.552***		-0.516***	-0.552***
	(0.034)	(0.043)		(0.034)	(0.043)
Firm Size	-0.200***	-0.249***		-0.207***	-0.249***
	(0.022)	(0.026)		(0.022)	(0.026)
Leverage	0.005***	0.004***		0.005***	0.004***
	(0.001)	(0.001)		(0.001)	(0.001)
Sales Growth	0.003***	0.001		0.003***	0.001
	(0.000)	(0.001)		(0.000)	(0.001)
Tangibility	-0.000	0.001		-0.000	0.001
	(0.001)	(0.002)		(0.001)	(0.002)
Volatility	0.004	-0.002		0.004	-0.002
	(0.003)	(0.005)		(0.003)	(0.005)
Constant	-1.018	0.256		-1.018	0.256
				(0.883)	(0.962)
AKP Vote Share				0.033***	0.024***
				(0.004)	(0.005)
FIXED EFFECTS					
Firm	No	No		No	No
Industry	Yes	Yes		Yes	Yes
Region	Yes	Yes		Yes	Yes
Year	No	No		No	No
Observations	xx	43,783		xx	43,783

This table shows the logistic regressions for firms affiliated with all types of banks. Complete Sample analyses the years between 2006 and 2013. The Crises Sample analyses the years 2008 and 2009. Variable definitions are provided in Appendix D. *P*-values reported in parentheses are based on *t*-statistics estimated using standard errors robust to clustering at the firm level and heteroskedasticity. *, **, and *** denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 8. Propensity Score Matching, Firms Affiliated with All Types of Banks

Variables	Investment	Profitability	Cash Holdings
	(1)	(2)	(73
Islamic Banking	1.996*	-1.211***	--0.956
Relation (IBR)	(1.232)	(0.385)	(0.631)
Observations	43,242	43,444	43,793
n0	42455	42636	42982
n1	787	808	811

This table shows the propensity score matching estimates for the years between 2006 and 2013. The Crisis Sample analyses the years 2008 and 2009. Variable definitions are provided in Appendix D. *P*-values reported in parentheses are based on *t*-statistics estimated using standard errors robust to clustering at the firm level and heteroskedasticity. ∗, ∗∗, and ∗∗∗ denote statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 9. Control Function / IV And OLS Regressions

	Cross-Section			Panel Model	
	Control Function / IV	OLS		Control Function / IV	OLS
	(1)	(2)		(3)	(4)
A. INVESTMENT					
IBR	2.590***	2.935***		2.698***	2.791***
	(0.589)	(0.588)		(1.036)	(1.030)
Global Crisis				-0.928***	-0.972***
				(0.256)	(0.255)
Global Crisis x IBR				-4.429**	-4.288**
				(2.166)	(2.153)
B. PROFITABILITY					
				-0.897***	-0.703**
IBR	-0.806***	-0.632***		(0.343)	(0.343)
	(0.214)	(0.214)			
Global Crisis				-0.701***	-0.717***
				(0.092)	(0.092)
Global Crisis x IBR				-0.254	-0.348
				(0.671)	(0.672)
C. CASH HOLDINGS					
IBR	-0.708**	-0.610*		-0.710*	-0.768*
	(0.338)	(0.338)		(0.418)	(0.417)
Global Crisis				0.273**	0.267**
				(0.112)	(0.113)
Global Crisis x IBR				-0.534	-0.475
				(0.817)	(0.819)
FIXED EFFECTS					
Firm	No	No		No	No
Region	Yes	Yes		Yes	Yes
Industry	Yes	Yes		Yes	Yes
Year	No	No		No	No