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Conventional banks versus Islamic banks: What makes the difference?

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Abstract - This paper investigates the determinants of banking profitability in the Turkish banking sector between 2003 and 2011. In addition, we calculate the effect of being an Islamic bank on banking profitability, which allows us to differentiate conventional and Islamic banks. We introduce the method of propensity score matching to the banking literature in order to estimate the average treatment effect (ATE) of being an Islamic bank in Turkey where there exists a dual banking system. The results show that in terms of return on asset (ROA) and return on equity (ROE), being an Islamic bank does not create any difference. However, being an Islamic bank turns out to have a significant and negative effect on net interest margin (NIM). These results have many policy implications in the Turkish banking industry where Islamic banks mimic others to be one of the leading examples.

Keywords: average treatment effect, propensity score matching, Islamic bank, profitability

JEL Classification: C51, G15

1. Introduction

Islamic finance is a source of funding that complies with Islamic jurisprudence. This source of funding has already been in practice in countries where the majority of the population is Muslim; however, the importance of Islamic finance has prevailed in the global financial system recently. Although the distinction between Islamic and conventional finance needs deeper understanding, the main difference within Islamic finance can be attributed to the Islamic idealism of creating a moral economy where profits come from commerce or real transactions not from money lending or speculative transactions. While conventional finance helps direct the flow of capital to investment opportunities that are supposed to provide the highest return in the market, Islamic finance allegedly seeks socio-economic optimality. Another principle of Islamic finance is that investment is expected to produce an optimal socio-economic outcome in line with Islamic norms.

The globalization has affected the scope and breadth of Islamic capital markets in a way that its pervasiveness has reached a global scale. Moreover, the financial crisis, which has recently erupted and hit the global finance and economy severely, has paved the way for other means of financial schemes. Islamic finance, which has stayed relatively resilient, became a focus of the global financial system since then.[1] The bulk of Islamic funds staying in financial hubs of many Gulf States and in global financial networks promises a lucrative and stable source of funding. Despite its growing popularity, Islamic banking remains a small part of the total financial sector and will likely remain so due to lack of penetration in the market and strong competition that is challenged from the conventional banking system.

The most explicit distinction of Islamic finance from conventional finance, where the return is based upon interest, is the prohibition of riba (interest based lending) and gharar (speculation or uncertainty). The underlying contracts of Islamic products differ from their conventional counterparts in structure as well. For example murabaha (a sale-based instrument), which is similar to a conventional loan, involves the purchase of an asset by a bank and its sale to a client at a cost plus a pre-determined profit. The structure of a sale has important legal implications according to the Islamic rules, which extensively dictate the terms of risk and mutual consent. Other sale-based products include the financing of commissioned manufacturing or construction (istinaa) and the forward-sale (salam), and these types of products require structural differences from their conventional equivalents. Lease-based instruments (ijara) are similar to the traditional leasing with certain distinctions and equity-based financial intermediation, which is known as mudaraba, takes place through profit and loss arrangements (Warde, 2010). Another product that recently became a regular budget financing instrument,

sukuk, is an asset-based instrument of which tangible assets are specified according to the type of the issuance. In comparison with conventional debt instruments, these products do not pledge fixed income or an interest-based income stream. Yet, it collects returns based on the collection of lease or sale of certain assets that are specified beforehand. These types of products are predominantly used in the Middle East, but their prevalence is visible in East Asian countries as well as developed European markets.

Islamic finance in Turkey is yet a more recent issue. Changes in domestic financial systems and public sensibilities have allowed participation banking to gradually become more visible. They have also emerged resilient in the context of two periods of economic turmoil: the domestic financial crisis of 2001 and the global financial crisis of 2008. The severe banking crisis in 2001 did not have as much inverse effects on participation banks as the conventional banks. The contagious effect of the 2001 crisis had a limited effect on participation banks due to lack of interbank activities by participation banks. The growing financial capacity of the religiously conservative public has also been another factor that made participation banks attractive (Hardy, 2012). These types of banks became the sole option for those people who are resistant to conventional banking. The increasing level of associated client portfolios and deposits have enabled participation banks to reach over 4.5 percent of market share in total assets from nearly 1 percent in 2001. Recently a new legislation passed to facilitate Islamic banking in the private sector, and government officials have indicated interest in issuing sovereign sukuk (rent certificate), comparable to bonds, for funding central government budget requirements.

Table 1–2 gives an idea about the market share and the growth of conventional and Islamic banks between 2004 and 2011. It is striking that the market share of Islamic banks in assets, equity and loans has grown from 1% to 5% approximately and the growth rate of these fundamentals have been higher than the conventional banks. Despite the fact that the growth rate has declined after the crisis in 2008, it is still higher than its counterparts.

Islamic banking in Turkey followed a parallel path to the history of the Turkish economy. Turkey had a highly centralized economy, whereby state institutions owned and managed most important industries until the beginning of the 1980s (Ozturk et al., 2010). However, the 1980s saw a period of liberalization of the tightly controlled Turkish economy. As part of a plan to attract more foreign direct investment from the Arab Gulf states, a decree passed in 1983 legalized the operation of special finance houses to provide interest-free banking. These institutions were highly regulated but they did not gain the same status as conventional banks, e.g., they were not covered by the insurance scheme the other banks in the system utilized and could not invest in government securities by its nature.[2]

Following the Asian financial crises in the late 1990s, the Turkish economy experienced tremendous volatility, which caused some consolidation of the special finance houses. Poor regulation, the accumulation of public debt, and politically driven lending habits contributed to a severe financial crisis in Turkey in 2001. This affected all strands of the domestic banking sector, although conventional banks

Table 1. Market share and growth in assets, equity and loans of Islamic and commercial banks.

	Market Share IB	Market Share CB	Growth: Assets IB	Growth: Assets CB	Market Share: Equity IB	Market Share: Equity CB	Growth: Equity IB	Growth: Equity CB	Market Share: Loans IB	Market Share: Loans CB	Growth: Loans IB	Growth Loans CB
2011	4.39	95.61	31.25	24.68	4.20	95.98	17.79	12.42	5.76	94.24	30.15	35.51
2010	4.18	95.82	25.21	17.05	4.02	95.98	26.90	22.66	5.98	94.02	28.40	22.91
2009	3.92	96.08	31.32	16.14	3.89	96.11	25.37	25.56	5.74	94.26	24.33	7.30
2008	3.48	96.52	37.18	23.98	3.89	96.11	51.83	14.91	4.99	95.01	38.31	36.32
2007	3.16	96.84	38.68	15.87	2.98	97.02	54.38	22.24	4.93	95.07	51.89	28.00
2006	2.65	97.35	60.47	28.42	2.37	97.63	81.50	12.96	4.18	95.82	67.95	49.86
2005	2.13	97.87	43.65	24.80	1.49	98.51	16.62	2.83	3.75	96.25	60.20	43.62
2004	1.86	98.14	45.21	24.26	1.55	98.45	48.25	26.97	3.38	96.62	67.69	45.87
2004–2008	2.45	97.55	47.00	23.34	2.10	97.90	50.19	21.00	4.06	95.94	61.93	41.84
2008–2011	3.99	96.01	31.24	20.46	4.00	96.00	30.47	18.89	5.62	94.38	30.30	25.51
2004–2011	3.22	96.78	39.12	21.90	3.05	96.95	40.33	19.94	4.84	95.16	46.11	33.67

Table 2. Banks' size and market share (*share of assets/**share of equity/***share of loans).

Banks	2011-Q4*		2007-Q4*		2011-Q4**		2007-Q4**		2011-Q4***		2007-Q4***	
	IB/CB	Overall	IB/CB	Overall	IB/CB	Overall	IB/CB	Overall	IB/CB	Overall	IB/CB	Overall
Akbank	11.51	10.98	12.15	11.75	12.68	12.14	14.43	13.98	10.58	9.97	13.20	12.55
Denizbank	3.10	2.96	2.66	2.57	2.85	2.73	1.98	1.92	3.38	3.18	3.71	3.53
Finans Bank	3.98	3.80	3.72	3.60	4.11	3.94	3.57	3.46	4.56	4.29	5.05	4.81
HSBC	2.08	1.98	2.39	2.31	2.02	1.93	2.75	2.66	2.08	1.96	3.33	3.17
ING Bank	1.81	1.73	2.23	2.16	1.71	1.63	1.73	1.68	2.31	2.18	3.03	2.89
Sekerbank	1.24	1.18	1.08	1.05	1.06	1.01	1.18	1.14	1.28	1.21	1.29	1.23
TEB	3.28	3.13	2.10	2.03	3.04	2.91	1.24	1.20	3.86	3.64	2.45	2.33
TR Ziraat	13.84	13.21	14.42	13.94	9.52	9.11	9.82	9.52	10.75	10.13	7.70	7.32
TR Garanti	12.63	12.05	12.04	11.64	12.70	12.15	9.37	9.07	12.62	11.88	13.27	12.62
TR Halk	7.85	7.49	7.17	6.93	6.24	5.97	5.96	5.78	8.46	7.97	6.46	6.14
TR Is	13.93	13.39	14.29	13.81	12.94	12.39	14.43	13.98	13.79	12.99	12.12	11.52
TR Vakiflar	7.68	7.33	7.56	7.30	6.72	6.43	7.11	6.89	8.63	8.13	8.37	7.96
Yapi Kredi	9.31	8.88	8.97	8.67	8.45	8.09	6.67	6.47	10.20	9.61	10.17	9.66
Albaraka Turk	18.65	0.86	18.99	0.64	16.22	0.69	22.58	0.70	17.71	1.03	18.56	0.91
Bank Asya	30.65	1.41	32.21	1.08	34.51	1.48	36.12	1.13	32.06	1.86	29.74	1.46
Kuveyt Turk	26.57	1.22	19.90	0.67	23.22	0.99	16.44	0.51	25.01	1.45	20.37	1.02
Turkiye Finans	24.12	1.11	28.90	0.97	26.05	1.12	24.86	0.77	25.22	1.47	30.97	1.52

suffered more than the special finance houses since they had a much larger role in the overall economy. Although the crisis had a major negative effect on the entire banking sector, the special finance houses also suffered. Turkish holding company Ulker purchased Faisal Finans in 2000, changing its name to family Finance House. Then, Ihlas Finans filed for bankruptcy in 2001 as the liquidity crisis in Turkey reached its peak. This showed that the participation banks were not immune to crises even tough they functioned with a different business model. The reasons for this were twofold; the participation banks were not decoupled from the whole financial system due to business connections with other banks and the economic crisis hit the overall economy. Yet, it is worth mentioning here that the prohibition of holding public debt protected the participation banks from a worse shock than what could have otherwise ensued. In the initial stages of the financial crisis, Ihlas and other participation banks, that could have held liquid government securities, were thus not as greatly affected as conventional banks. However, when the liquidity crisis hit, Ihlas exposure led it to a collapse, and it experienced a traditional bank run on its deposits.

The 2001 crisis led to a rehabilitation of Turkey's financial system, and the parliament passed a new law in order to discipline the overall banking system (Law No. 4389). In addition to strengthening banking regulations and creating new oversight bodies for conventional banks, Law No. 4389 founded the Union of Private Finance Houses in order to address common issues among participants and provide a level of state control for the sector. All special finance institutions were required to become members of this association, but they still lacked many of the privileges that conventional banks had, such as the provision of deposit insurance. In 2006, banking law No. 5411 officially replaced the term "special finance institutions" with the name "participation banking." Participation Banks Association of Turkey was established and employed with the unification of Private Finance Houses. The new law created a savings deposit insurance fund for participation banks as well. In doing so, the insurance scheme began to cover the whole banking system.

These changes may represent a shifting paradigm in the level of acceptance for participation banking in Turkey. Participation banking emerged stronger after each of these periods of instability. Evidently, participation banking's role in the economy will also likely grow as Turkey considers options for attracting investors from the Gulf region who are currently highly liquid in terms of capital and also religiously conservative. Therefore, the recent developments in Islamic banking bring old debates to discussion again whether they are really different from the conventional banks or not.

The current literature on Islamic banking addresses the issue of whether the distinction between conventional banks and Islamic banks is only their names or the distinction also appears in their business model. As a bold example, Kassim et al. (2009) questions the argument whether Islamic banks are not susceptible to the interest rate changes as compared to their counterparts where both of them operate in tandem. Their research question emanates from the basic proposition whether they differentiate in behavior to common macro-economic shocks. We aim to contribute to the current literature by putting Turkey into the center and investigating the profitability issue with a focus on Islamic and conventional bank differentiation. Although the determinants of profitability in conventional banks in Turkey have been a subject of some research, there have been a few studies conducted regarding profitability of the participation banks in the literature (Macit, 2012). Islamic banking in Turkey is under an interesting transformation that is reflected in their asset and equity growth. This transformation opens a new debate: what are the determinants of this change? Do Islamic banks really differ from their counterparts? To what extent do the dynamics associated with the performance of Islamic

banks differs from their counterparts? These questions will be addressed in this study.

We use a broad set of data to investigate the determinants of bank profitability. The bank specific variables that may have an impact on bank profitability are selected in accordance with the current literature (e.g., Athanasoglou et al. (2008); Garca-Herrero et al. (2009); Dietrich and Wanzenried (2011). The macroeconomic and industry specific variables that are considered to be influential on bank efficiency are also included. The recent financial crisis is also considered by separating the whole period as two sub-periods: pre crisis and post crisis. This approach is similar to Hasan and Dridi (2011); Dietrich and Wanzenried (2011), who separate the whole period as pre crisis and post crisis. One of the main contributions of this paper is that we introduce the method of propensity score matching to the banking literature in order to estimate the average treatment effect (ATE) of being an Islamic bank where there exists a dual banking system. The results are compared with the ordinary least squares (OLS) estimation results. We make use of a unique and up-to-date database by combining quarterly conventional bank and participation bank data. The results provide insightful policy making implications and will be discussed in the upcoming sections. All in all in our study seeks to examine a series of questions. First, the issue of being an Islamic bank on bank profitability will be mainly discussed. This issue deserves particular attention due to motivation discussed above. Beyond this main scope, the determinants of profitability of the Turkish banking industry will be explored. This is also crucial to study considering the limited number of studies specific to Turkish banking. Last but not the least, the effect of recent financial crisis on profitability of banks will be explored. The recent financial crisis that caused great havoc in the banking sector of many countries – e.g., many defaults or bail-outs have taken place very recently especially in developed country space – reasonably might affect the profitability.

The remainder of the study is organized as follows: the second section will explain the data. The data set we compile is the largest data set as to the best of our knowledge. The third section will discuss the methodology in some detail. The ATE methodology and the model specifications will be discussed in this section. The fourth section will discuss the results and policy implications. The policy implications and policy recommendation will be provided together specific to the Turkish case. The fifth section will conclude.

2. Literature review

In the studies, which investigate the Islamic banking and conventional banking dualism, the recent findings reveal that there is not a fundamental difference in terms of their routine activities. In other words, they show similar responses to basic impulses, e.g., their profitability measures respond to market interest rates in a similar way. Ergec and Arslan (2011) contend that Islamic banks, relying on interest-free banking, shall not be affected by the interest rates; however, in concurrence with the previous studies, the article finds that the Islamic banks in Turkey are visibly influenced by interest rates. This study differentiates from Kassim et al. (2009) in one respect. Kassim et al. (2009), claim that the primary reason why Islamic banking may become more stable compared to conventional banks is that they are not affected by the fluctuations on interest

rates. In other words, Islamic banks are expected to be more stable than the conventional banks where Islamic banking is not influenced by interest rates. Stability in demand for money holds some positive effects in terms of efficiency in monetary policies and the financial stability in the system. On the other hand, Kia and Darrat (2007) refer to two major reasons why interest-free Islamic banks contribute to the stability more than the others. A first reason is related with the demand for money whereas the second one is an assessment with the balance sheet perspective. Of these factors determining demand for money, interest rates appear to be the most effective component for speculation. Thus, interest free banking reduces stability in the banking system since Islamic banks shy away from interest rate. As for the balance sheet perspective, along with changes in the interest rates, the banks revalue their assets before liabilities. The loan interest rates respond to a change in the interest rate much earlier than the savings interest rates. In this case, the revaluation of balance sheet entries, a key component for profit maximization, makes the impact of interest rate changes more vulnerable. However, in the Islamic banking system, there is no need for revaluation of balance sheet entries because there is no risk of interest rate. All in all, for these two primary reasons, it is anticipated that the banking system, dominated by conventional banking, is more unstable. To test for the stability issue in the Islamic banking system, there are also plenty of studies investigating the country experiences from interest rate change perspective. All these studies present empirical findings suggesting that demand for money is more stable in banking systems where Islamic banks are the key players.[3]

Since the early works by Short (1979), Kwast and Rose (1982) and Bourke (1989), a considerable amount of recent studies have investigated some of the major determinants of bank profitability. The empirical studies have focused their analyses either on cross-country evidence or on the banking system of individual countries. The studies by Molyneux and Thornton (1992), Demirguc and Huizinga (1999), Goddard, et al. (2004), Micco, et al. (2005), and Pasiouras and Kosmidou (2007) investigate a panel data set. Studies by Berger, et al. (1987), Berger (1995), Michelle (1997), Bennaceur and Goaied (2008), Athanasoglou, et al. (2008) and Garca-Herrero, et al. (2009) center their analyses on single country cases.

Bank profitability is vastly measured as a function of return on asset (ROA) or return on equity (ROE).

Some works also add net interest margin (NIM) as a complementary measure that it related with profitability. The literature classifies determinants as being internal and external determinants. The internal determinants include bank-specific variables of which the intrinsic features of individual banks compose this bloc. The external variables reflect factors that are expected to affect the profitability of banking industry although banks are not capable of controlling them.

In most studies, variables such as bank size, risk, capital ratio and operational efficiency are used as internal determinants of banking profitability. Pasiouras and Kosmidou (2007) find a positive and significant relationship between the size and the profitability of a bank. This is due to the fact that larger banks are likely to have a higher degree of product

and loan diversification than smaller banks. Furthermore, large banks benefit from economies of scale. Berger, et al. (1987), provide evidence that costs are reduced only slightly by increasing the size of a bank and those very large banks often encounter scale inefficiencies. Micco, et al. (2005) find no correlation between the relative bank size and the return on assets for banks, i.e., the coefficient is always positive but never statistically significant. Therefore the impact of being a big bank in size on profitability is mix.

If it is the risk that is concerned in this literature, Abreu and Mendes (2002) who examined banks in some European countries, find that the loans-to-assets ratio, as a proxy for risk, has a positive impact on the profitability of a bank. Bourke (1989) and Molyneux and Thornton (1992), among others, find a negative and significant relationship between the level of risk and profitability. This result reflects the fact that banks that are exposed to high risk also have a higher accumulation of non-performing loans, and non-performing loans lower the returns of the affected banks.

Another bank feature that is suggested to be effective on the profitability of banks is the asset composition of the banks. Empirical evidence by Bourke (1989), Demirguc and Huizinga (1999), Abreu and Mendes (2002), Goddard, et al. (2004), Bennaceur and Goaied (2008), Pasiouras and Kosmidou (2007) and Garca-Herrero, et al. (2009) indicate that the best performing banks are those that maintain a high level of equity relative to their assets. The authors explain this relation with the observation that banks with higher capital ratios tend to face lower costs of funding due to lower potential bankruptcy costs. I.e., equity has the lowest order to be paid during liquidation.

One more bank-specific variable is the ownership of a bank. Private or state owned banks are the most visited separation in the literature. This separation has many insightful findings. For instance, the owner-ship structure plays an important role in explaining banking profitability. Micco, et al. (2007) found that the separation of banks as privately owned or state-owned provides insights in examining bank performance. According to their results, state-owned banks operating in developing countries tend to have a lower profitability, lower margins, and higher than comparable privately owned banks. In industrialized countries, however, this relationship is found to be much weaker. Iannotta, et al. (2007) point out that government owned banks exhibit a lower profitability than privately owned banks. Therefore, bank ownership structure is also important regardless of being developed or developing, yet the analysis suggests a different degree of significance. Another strand of bank ownership is being a foreign bank. The international connection of a bank may have a significant impact on profitability. This is plausible in a sense that foreign banks have easy access to a pool of funds abroad that domestic banks cannot easily reach. Yet in terms of profitability issues, being a foreign bank is found to have differing impact on profitability. Demirguc and Huizinga (1999) suggest a significant relationship, on the other hand Bourke (1989) and Molyneux and Thornton (1992) find this relationship insignificant.

Many studies in profitability literature take—such as central bank interest rate, inflation, GDP growth etc.—another bloc of variables that affect bank profitability.

Most studies have shown a positive relationship between inflation, central bank interest rates, GDP growth, and bank profitability (e.g., Bourke (1989), Molyneux and Thornton (1992), Demirguc and Huizinga (1999), Athanasoglou, et al. (2008), Albertazzi and Gambacorta (2009)). As per the effects of macroeconomic variables, the effect of inflation rate on bank profitability depends upon whether the inflation is anticipated or unanticipated. In the case of an anticipated inflation bank profits may improve as the banks may adjust the price of lending according to the inflation rate. However, an unanticipated inflation may have negative effects. Bourke (1989) and Molyneux and Thornton (1992) find that a higher inflation rate is associated with better profitability indicators. Recently, Macit (2012) has recorded similar findings.

To measure the effects of market structure on bank profitability, the structure conduct and performance (market-power) hypothesis states that increased market power yields monopoly profits. The inverse relation between the degree of market concentration and degree of competition has been the underlying assumption of the structure conduct performance hypothesis. The bank concentration is discussed in some studies. The Herfindahl Hirschman index was used to proxy the level of competition in the industry (see Dietrich and Wanzenried (2011)). According to the results of Bourke (1989) and Molyneux and Thornton (1992), the bank concentration ratio shows a positive and statistically significant relationship with the profitability of a bank and is, therefore, consistent with the structure conduct performance paradigm. In contrast, the results of Demirguc and Huizinga (1999) and Staikouras and Wood (2002) indicate a negative but statistically insignificant relationship between bank concentration and bank profits. Likewise, the estimations by Berger (1995) and E.C. and P.C. (2003) contradict the structure-conduct performance hypothesis. As briefly discussed above, the determinants of bank profitability can be defined with three blocks of variables briefly discussed above. The literature is more or less similar in terms of the data selection. The variation of data employed in the analysis is rather sparse. Therefore the existing literature provides a comprehensive examination of the effects of bank-specific, industry-specific, and macroeconomic determinants on bank profitability. In this study, we take being an Islamic bank as the centre and investigate the effect of being an Islamic bank on profitability. This contribution is vital in investigating the on-going transformation in the banking sector of Turkey. Considering the lack of studies on banking profitability in the case of Turkey, especially the special attention given to Islamic banks, this study bridges an important gap. Dietrich and Wanzenried (2011), underlines the relative scarcity of literature that discusses the effect of the recent financial crisis on bank profitability. In our study, we also address this issue by making pre-crisis and post-crisis analysis. The data employed in our analysis is in line with the current literature with small variations that will be discussed in the next section.

3. Data

There is a well-established set of determinants available to investigate the profitability of the banking system in Turkey. To examine the effect of being an Islamic bank on banking profitability, we rely on our data set in line

with current literature. The data is gathered from the quarterly unconsolidated balance sheets of banks that operated between 1994Q1 and 2011Q4. The balance sheets are obtained from The Banks Association of Turkey and Banking Regulation and Supervision Agency. There are 29 conventional banks and 4 Islamic banks in 1994Q1–2011Q4. Macroeconomic variables are from Central Bank of Turkey and the Undersecretariat of Treasury who are responsible for economy management in Turkey. As per the effects of macroeconomic variables, the real interest rate on government bonds used to proxy interest rate. The daily interest rate of government bonds is not available. Therefore we use one-year T-bill rates at the data issue. These will proxy for the interest rates for each and every quarter. The level of foreign exchange rate is the USD/TRY rate and an increase in exchange rate implies depreciation in Turkish Lira.

Islamic banks constitute a small portion of the banking system in Turkey but potential to grow, may be in size rather than number. Of these four banks, two of them are open to public and are daily traded in the stock market. Three of these four banks are foreign and only one bank is domestic. In terms of bank specific determinants, we look at various different variables, namely the ratio of equity to total assets, the ratio of net loans to total assets, log of real assets, and the ratio of non-performing loans to total loans. To control for macroeconomic determinants of profitability, we use GDP

growth, level of foreign exchange rates, consumer inflation, and real interest rate. Turkey has experienced great growth during the period subject to analysis. Therefore, GDP growth is expected to have a positive impact on profitability regardless of being conventional or Islamic.

Industry-wise we do not include concentration measures in our analysis. The Turkish banking industry constitutes a competitive market without a dominant group of banks or single bank. Dietrich and Wanzenried (2011) take concentration into their analysis. Yet, their focus is on the Swiss banking industry, where there exists a huge concentration. As per industry specific variables we use growth measures. The reason why we employ growth measures is that the growth in the banking industry was visible in the Turkish case in the last decade. The recapitalisation was the major theme of the banking industry (see Yeldan, 2007).

We define state bank as the base and present three dummies for private bank, state banks and Islamic banks. In doing so, we aim at controlling for industry specific effects on bank profitability. The variables that are used in our analysis are detailed in Table 3.

Table 4 provides descriptive statistics for our sample showing the observations, means and standard deviations of all variables. Observations are divided into two groups

Table 3. Variables used in the Empirical Analysis

	Variable	Notation	Measure
Bank-Specific Variables	Return on asset	ROA	Net income/total assets
	Return on equity	ROE	Net income/total equity
	Net interest margin	NIM	Net interest income/total assets
	Capital adequacy	ETA	Equity/total assets
	Asset quality	LTA	Loans/total assets
	Asset size	NPLTA—log (TA)	Non-performing loans/total assets (Natural logarithm of total assets)
	Liquidity	LQD	Liquid assets/total assets
	Deposits	DPTA	Deposits/total assets
	Credit risk	CR	Loans loss provision/loans
	Liquidity risk	LR	Loans/deposits
Market-Specific Variables	Total asset growth	TAG	Growth of total assets
	Total equity growth	TEG	Growth of total equity
	Total loans growth	TLG	Growth of total loans
Macroeconomic Variables	GDP growth	GDPGR	Growth of GDP
	Inflation rate	INF	Inflation rate
	Exchange rate	FX	Exchange rate between TL and $
	Real interest rate	IR	Real interest rate
Dummy Variables	Islamic bank dummy	IB	1=Islamic banks, 0=Normal banks
	Ownership dummy	PD	1=Privately owned; 0=Publicly owned
		FD	1=Foreign owner; 0=Domestic owner
	Crisis dummy	CD	1=After the crisis; 0=Before the crisis

Table 4. Descriptive Statistics

Variable	Conventional Banks					Islamic Banks				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ROA	1044	0.013	0.027	−0.176	0.322	144	0.007	0.003	0.001	0.024
ROE	1044	0.074	0.128	−1.786	0.465	144	0.058	0.033	0.007	0.236
NIM	1044	0.030	0.028	−0.0217	0.169	144	0.017	0.009	0.005	0.063
ETA	1044	0.174	0.140	0.037	0.916	144	0.118	0.024	0.073	0.183
LTA	1044	0.413	0.212	0.001	0.847	144	0.694	0.089	0.436	0.835
NPLTA	1044	0.023	0.022	0.000	0.177	144	0.036	0.022	0.005	0.135
LOGTA	1044	6.574	0.890	4.346	8.231	144	6.569	0.391	5.664	7.236
LQD	1044	0.217	0.182	0.009	0.812	144	0.080	0.050	0.016	0.235
DPTA	1044	0.513	0.235	0.000	0.903	144	0.786	0.068	0.322	0.880
CR	1044	0.029	0.146	0.000	3.095	144	0.008	0.002	0.001	0.012
LR	1044	1.138	1.883	0.000	34.532	144	0.897	0.186	0.518	2.012

as conventional banks with 1044 observations and Islamic banks with 144 observations. Simple inspection of the table shows that conventional banks are likely to perform better in profitability since the means of return on asset, return on equity and net interest margin are higher. For conventional banks, ROA is 1.3%, ROE is 7.4% and NIM is 3% on average. For Islamic banks, ROA is 0.7%, ROE is 5.8% and NIM is 1.7%. On the other hand, credit risk and liquidity risk are lower for Islamic banks as one may expect this result because of the risk-sharing principle. While credit risk and liquidity risk are 2.9% and 114% for conventional banks, 0.8% and 89% for Islamic banks. Another issue that is worth underlining is the total cumulative asset growth, which is higher for Islamic banks than conventional banks, being 31.28% and 25.64% respectively. Correlation matrix for independent variables is presented in Table 5. Correlations among most of the variables are quite low, signalling multi-collinearity does not create significant bias in any of our analyses.

4. Methodology

In the banking literature, it is quite common to use ordinary least square (OLS) methods. The recent studies also employ a generalized method of moments (GMM) since the profit persistence is the common feature of banking data. The main focus of our study is to observe the differing behavior of Islamic banking in profitability. To observe the differing behavior, the sample can be split into two sub-samples, or pooled estimation can be done through assigning a dummy variable to examine the "being an Islamic bank" effect. However, one of the main problems in such analysis is the selection bias or non-random selection that may have been produced by OLS or GMM estimators. Specifying some certain banks as Islamic banks and investigating the effect of being an Islamic bank is a self-selection choice, therefore it is possible to have self-selection bias.

In order to overcome this possibility, we introduce the method of propensity score matching developed by Rosenbaum and Rubin (1985) to the banking literature in order to estimate the "average treatment effect" (ATE) of being an Islamic bank in Turkey where there exists a dual banking system. The purpose of this method is to create a control group that is similar to a treatment group, and the similarity among banks will be assessed

by calculating the propensity score that is defined as the conditional probability of receiving a treatment despite the unavailability of experimental data. In the present context, while Islamic banks constitute the treatment group, conventional banks constitute the control group, and being an Islamic bank is defined as receiving the treatment.

IB_{jt} is defined as a dummy variable whether bank j is an Islamic bank at time t. While, y_{jt}^1 denotes the profitability of bank j that is an Islamic bank at time, y_{jt}^0 denotes the profitability of bank j at time t that is a conventional bank. The average treatment effect of being an Islamic bank is defined as:

$$\tau_{jt} = y_{jt}^1 - y_{jt}^0, \tag{1}$$

If both states of the world, $\left(y_{jt}^1\right)$ and $\left(y_{jt}^0\right)$, were observable, the average treatment effect would be estimated with no trouble. Nevertheless, due to unobservability, the average treatment effect (τ) would be equal to the difference of mean outcomes $\left(\bar{y}^1 - \bar{y}^0\right)$. Since either of states of world, $\left(y_{jt}^1\right)$ and $\left(y_{jt}^0\right)$, are observable, we use propensity score matching to calculate the average treatment effect. As argued in Rosenbaum and Rubin (1985), a vector of covariates, Z, can be used to compare Islamic and conventional banks. Z is defined as:

$$y_{jt}^1, y_{jt}^0 \perp IB | Z \quad \Pr(IB = 1 | Z) \in (0,1), \tag{2}$$

where $\perp$ denotes independence. However it is not possible to find observations with identical values for all covariates in Z. In order to eliminate this problem, they suggest using propensity score matching, which uses probability of bank pairs that receive the treatment (IB) on the characteristics of the pair. I estimate the probability of a bank-pair that receives the treatment (IB) using the following logit specifications.

$$p(IB_{jt} = 1) = F(BSF, MSF, MAC), \tag{3}$$

where BSF is a vector of bank-specific variables includes capital adequacy, asset quality, credit risk, etc. MSF is a vector of market specifics variables, including total asset growth, total loans growth and total equity growth, and

Table 5. Correlation matrix

	ROA	ROE	NIM	ETA	LTA	NPLITA	LOGTA	LQD	DPTA	CR	LR	IB	PD	FD	TAGR	TEGR	TLGR	GDPGR	INF	FX	IR
ROA	1.000																				
ROE	0.643	1.000																			
NIM	0.246	0.167	1.000																		
ETA	0.420	0.016	0.226	1.000																	
LTA	−0.189	0.046	0.037	0.464	1.000																
NPLITA	0.174	−0.003	0.248	0.376	0.024	1.000															
LOGTA	0.016	0.265	0.000	0.421	0.379	−0.033	1.000														
LQD	0.136	0.078	0.113	0.424	0.549	0.019	−0.507	1.000													
DPTA	−0.254	0.006	0.081	−0.518	0.581	0.000	0.357	−0.409	1.000												
CR	0.131	0.024	0.074	0.424	0.258	0.137	−0.113	0.199	−0.197	1.000											
LR	0.066	0.136	0.004	0.062	0.020	−0.086	−0.081	0.036	−0.375	−0.066	1.000										
IB	0.084	0.043	0.163	0.137	0.415	0.192	−0.002	−0.253	0.373	−0.051	−0.045	1.000									
PD	0.024	0.200	0.000	0.162	0.118	−0.044	−0.421	0.161	0.055	0.042	−0.082	0.117	1.0000								
FD	0.026	0.098	0.033	0.077	−0.164	−0.091	−0.490	0.366	−0.185	−0.071	0.087	−0.011	0.326	1.0000							
TAGR	0.029	0.035	0.030	−0.063	0.141	−0.006	0.007	−0.090	0.127	−0.026	−0.008	0.281	0.033	−0.003	1.0000						
TEGR	0.081	0.104	0.115	0.006	0.050	0.036	−0.036	−0.062	0.081	−0.024	−0.018	0.207	0.024	−0.002	0.111	1.000					
TLGR	−0.027	0.034	0.059	−0.067	0.050	−0.042	−0.038	−0.094	0.058	−0.021	0.010	0.142	0.017	−0.002	0.770	−0.182	1.000				
GDPGR	−0.076	0.077	0.108	−0.043	−0.065	−0.019	−0.050	−0.051	−0.006	0.033	−0.004	0.000	0.000	0.000	0.184	−0.117	0.501	1.000			
INF	−0.017	0.013	0.017	0.006	−0.256	0.068	−0.199	0.006	−0.026	−0.011	−0.042	0.000	0.000	0.000	−0.308	0.052	−0.288	0.015	1.0000		
FX	−0.050	0.034	0.009	0.001	0.022	0.066	0.098	0.069	0.014	0.051	−0.048	0.000	0.000	0.000	−0.219	−0.103	−0.359	−0.124	0.048	1.000	
IR	−0.028	0.034	0.019	−0.027	−0.252	0.005	−0.220	−0.014	−0.030	−0.013	−0.022	0.000	0.000	0.000	−0.295	0.017	−0.242	−0.028	0.824	−0.105	1.000

MAC is a vector of macroeconomic variables, including GDP growth, inflation rate, foreign exchange rate between the Turkish lira and the US dollar and real interest rate. The logit model is used here to identify the effect of Islamic banking on banking profitability. By using the logit model we can compare banking profitability of conventional and Islamic banks since both types of banks are similar in terms of their propensity scores. Next step is to use a matching technique in order to estimate missing counterfactuals by using obtained propensity scores, $\left(y_{jt}^{1}, y_{tjt}^{1} \right)$ or $\left(y_{jt}^{0}, y_{tjt}^{0} \right)$. There are several methods used as matching technique but we use three of them in our analysis, Nearest-Neighbor Matching, Stratification Matching and Kernel Matching. Thanks to these techniques we will be able to observe whether different matching algorithms result in different treatment effects. The average treatment effect of Islamic banking is given by

$$\tau_{TT} = E\left\{ E\left[y^{1} | IB = 1, z \right] - E\left[y^{0} | IB = 0, z \right] \right\}, \quad (4)$$

5. Results

To test the relationship between bank profitability and the bank specific, market specific and macroeconomic determinants described earlier, we first estimate a linear regression model in the following form:

$$ROA = \alpha + \beta_1 BSF_{it} + \beta_2 MSF_{it} + \beta_3 MAC_{it} + \varepsilon_{it} \quad (5)$$

$$ROE = \alpha + \beta_1 BSF_{it} + \beta_2 MSF_{it} + \beta_3 MAC_{it} + \varepsilon_{it} \quad (6)$$

$$NIM = \alpha + \beta_1 BSF_{it} + \beta_2 MSF_{it} + \beta_3 MAC_{it} + \varepsilon_{it} \quad (7)$$

Tables 6,7 and 8 present regression results for three different dependent variables (ROA, ROE and NIM). In our analysis, the coefficients are estimated for the entire, pre-crisis and post-crisis periods. For each time period, we estimate three regression models while the first one only includes bank specific factors, the second one includes both bank and market specific factors, and the third one includes bank-specific, market-specific and macroeconomics factors. Table 6 depicts the regression results when ROA is the dependent variable. According to Table 6, the determinants of profitability vary over the periods, and being an Islamic bank does not have a statistically significant effect on ROA except in the third model for the full sample. Capital adequacy, asset size, credit risk, liquidity risk, total asset growth, total equity growth, foreign exchange rate have statistically significant effects on ROA. The results are in line with the recent literature (Athanasoglou et al., 2008).

Table 7 shows the results when banking profitability is measured as return on equity (ROE). It is obvious that the determinants of profitability do not vary over periods as much as they do for ROA. However for ROE, being an Islamic bank never plays a significant role, even though the coefficients are higher compared to the coefficients in Table 6. On the other hand, being a private bank is one of the determinants of profitability over periods. Interestingly, liquidity risk is an important factor for ROE while it is not for ROA.

Table 8 treats NIM as a dependent variable and presents regression results. The determinants of NIM and ROE are very similar as they are revealed. ETA, LTA and NPLTA are positively correlated with NIM and ROE. The most interesting result is being an Islamic bank is negatively

Table 6. Regression results: ROA is the measure of bank profitability

Dependent Variable ROA	Full sample (1994–2011)			Before the crisis (1994–2007)			After the crisis (2008–2011)		
Independent Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
IB	−0.0053	−0.0081	−0.0091	0.0098	−0.0139	−0.0140	−0.0021	−0.0036	−0.0033
ETA	0.0661	0.0631	0.068	0.0759	0.0709	0.0674	0.0898	0.0916	0.0934
LTA	0.014	0.0143	0.0187	0.0316	0.0325	0.0312	−0.0076	−0.0022	0.0000
NPLTA	−0.0329	−0.0250	−0.0161	0.0025	0.0170	0.0128	−0.0673	−0.1036	−0.1071
LOGTA	0.0028	0.0027	0.006	0.0053	0.0042	0.0026	0.0071	0.0079	0.0097
LQD	0.0043	0.0044	0.0071	0.0164	0.0155	0.0122	0.0043	0.0066	0.0101
DPTA	−0.0016	−0.0028	−0.0035	0.0082	0.0063	0.0056	0.0075	0.0059	0.0051
CR	−0.0235	−0.0229	−0.0211	−0.0059	−0.0053	−0.0040	−0.0214	−0.0189	−0.0162
LR	0.0003	−0.0003	−0.0004	−0.0004	−0.0005	−0.0005	0.0027	0.0028	0.0031
PD	−0.0045	−0.0042	−0.0024	−0.0069	−0.0073	−0.0082	0.0007	0.0011	0.0023
FD	0.0003	0.0002	0.0025	0.0033	0.0026	0.0018	0.0001	0.0008	0.0018
TAGR		0.0579	0.0533		0.1075	0.0826		0.0642	0.1019
TEGR		0.0314	0.0318		0.0141	0.0118		0.0238	0.0098
TIGR		−0.0209	−0.0006		−0.0558	−0.0188		−0.0879	−0.1709
GDPGR			−0.0002			−0.0016			0.0002
INF			0.0003			0.0003			0.0003
FX			−0.0086			0.0284			−0.0155
IF			0.0001			−0.0004			−0.0001
R-SQ	0.18	0.18	0.19	0.14	0.15	0.16	0.39	0.43	0.45
PROB>CHI2 (F test)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7. Regression results: ROE is the measure of bank profitability

Dependent Variable ROA	Full sample (1994–2011)			Before the crisis (1994–2007)			After the crisis (2008–2011)		
Independent Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
IB	−0.0116	−0.0256	−0.0306	−0.0023	−0.0177	−0.0220	−0.0170	−0.0267	−0.0260
ETA	0.1389	0.1204	0.1424	0.2284	0.2026	0.1702	0.1966	0.2042	0.2298
LTA	0.062	0.0643	0.0877	0.11778	0.1244	0.1119	−0.1393	−0.1109	0.0999
NPLTA	−0.5497	−0.5206	−0.5001	0.486	−0.4218	−0.4526	−0.1330	−0.3459	−0.2325
LOGTA	0.0233	0.0228	0.0400	0.0422	0.038	0.0298	0.0623	0.0694	0.0926
LQD	0.0070	0.0068	0.0188	0.0130	0.0065	−0.0181	0.0248	0.0354	0.05655
DPTA	−0.0005	−0.0072	−0.0113	0.0137	−0.0238	−0.0301	0.1387	0.1318	0.1216
CR	−0.0509	−0.047	−0.0369	−0.0120	−0.0090	−0.0015	−0.0157	−0.0057	0.0169
LR	0.0075	−0.0075	−0.0077	−0.0105	−0.0107	−0.0115	0.0452	0.0458	0.0465
PD	−0.0806	−0.0794	−0.0694	−0.0894	−0.0907	−0.0936	0.0004	0.0057	0.0206
FD	0.0104	0.0099	0.0220	0.0354	0.0331	0.0297	0.0028	0.0083	0.0225
TAGR		0.2695	0.2350		0.5297	0.3850		0.2357	0.3929
TEGR		0.1898	0.1901		0.0979	0.1059		0.1601	0.0953
TIGR		−0.1402	−0.0217		−0.3472	−0.0486		−0.3472	−0.647
GDPGR			−0.0011			−0.0099			0.0003
INF			0.0030			0.0013			0.0061
FX			−0.0452			0.0421			−0.0718
IF			0.0001			−0.0008			−0.0010
R-SQ	0.12	0.13	0.15	0.14	0.15	0.17	0.23	0.26	0.26
PROB>CHI2 (F test)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8. Regression results: NIM is the measure of bank profitability

Dependent Variable ROA	Full sample (1994–2011)			Before the crisis (1994–2007)			After the crisis (2008–2011)		
Independent Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
IB	−0.019	−0.0238	−0.0244	−0.0110	−0.0176	−0.0185	−0.0229	−0.0272	−0.0272
ETA	0.0263	0.0197	0.0229	0.0383	0.0293	0.0226	0.0203	0.0239	0.0239
LTA	0.0165	0.0165	0.0182	0.0136	0.0139	0.0056	0.0233	0.0355	0.0385
NPLTA	0.1572	0.1651	0.1754	0.0977	0.1258	0.1313	0.3258	0.2664	0.2905
LOGTA	−0.0011	−0.0017	0.0002	0.0033	0.0017	−0.0026	0.000	0.0012	0.0033
LQD	0.0167	0.0157	0.0168	0.0211	0.0203	0.0134	0.0231	0.0259	0.0315
DPTA	0.0084	−0.0062	0.0059	0.0026	−0.0007	−0.0014	0.0025	−0.0003	−0.0012
CR	−0.0163	−0.0153	−0.0142	−0.0077	−0.0065	−0.0059	−0.0076	−0.0025	0.0019
LR	−0.0004	−0.0005	0.0005	−0.0006	−0.0007	−0.0008	0.0032	0.0033	0.0038
PD	−0.0021	−0.0020	−0.0008	−0.0004	−0.0001	−0.0017	0.0003	0.0005	0.0018
FD	−0.0027	−0.0032	−0.0018	0.0045	0.0056	−0.0081	0.0024	0.0038	0.0050
TAGR		0.1326	0.1123		0.1311	0.1098		0.1681	0.3036
TEGR		0.0472	0.0520		0.0401	0.0453		0.0447	0.0249
TIGR		−0.0685	−0.0329		−0.0510	−0.0128		−0.185	−0.4159
GDPGR			−0.0003			−0.0025			0.0008
INF			0.0001			0.0009			0.0023
FX			−0.0006			0.0289			−0.0190
IF			0.0002			−0.0003			−0.0001
R-SQ	0.11	0.14	0.17	0.13	0.15	0.14	0.22	0.30	0.35
PROB>CHI2 (F test)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

correlated with NIM and it is always significant at a 99% level for the full sample and after the crisis. Nevertheless, being an Islamic bank lowers the profitability when it is measured as net interest margin (NIM). The effect of Islamic banks was pretty limited or not significant before the crisis.

Capital adequacy (ETA) has a positive and significant impact on ROA and ROE in all periods with different models. The findings imply that banks that have higher capital adequacy are more profitable. This may be related to the fact that banks with higher capital adequacy tend to be more credible and operate with lower costs. The specific finding for the Turkish case constitutes a different dimension in explaining the solvency risk (capital adequacy) on profitability. Pervan, et al. (2012) find that capital adequacy ratio is negatively related with return in their analysis. They conclude that higher capital adequacy implies lower profitability. They point out that a higher level of bank capital provides safety and over-caution in the banking business and it reduces profitability in the Macedonian banking system. Likewise, our results show that capital adequacy doesn't have a significant effect on NIM after the crisis. While it has a positive and significant effect on NIM for the full sample, the relationship between capital adequacy and NIM is blurry before and after the crisis with different models.

In terms of liquidity risk, the findings are quite specific to the Turkish case and are not in accordance with studies in the literature (Pervan et al., 2012). While liquidity risk has a positive and significant effect on ROA and ROE only after the crisis, it has a negative effect on ROE before the crisis and for the full sample. The banks with less liquidity risk are deemed to be more profitable, since the banks that have higher loan to deposit ratios are expected to produce more returns due to interest revenues. However, the Turkish case proves to be different than the theory, and Turkish banks are more tempted to invest in government assets that proposed higher yields (Aysan and Ceyhan, 2007). Therefore, the liquidity risk implies a positive relationship between liquidity and profitability as it is in some extent not in line with recent findings.

In the model where ROA is dependent, it is interesting to note that the coefficient of non-performing loans to asset reveals a negative relationship with bank profitability and is statistically significant only after the crisis. The estimated coefficients are negative for all the samples. When the ROE is a dependent variable, the coefficients are still negative, but they are statistically significant only for the full sample. The empirical finding is in contrast with the skimping hypothesis of Berger and DeYoung (1997). Berger and DeYoung (1997) suggest that under the skimping hypothesis, a bank maximizing the long run profits may rationally choose to have lower costs in the short run by skimping on the resources devoted to underwriting and monitoring loans but bear the consequences of greater loan performance problems. Therefore, cost minimization in the short run may not bring long-term profitability. Yet, the findings are plausible in Turkey's case where the non-performing loans are low. Therefore, holding more funds kept for potential losses in the future increases banks cost, thus diminishing bank profitability. However the effect on NIM reveals a different picture since the coefficients are always positive and significant.

The sector specific variables, the asset and equity growth positively affect profitability in Turkey. In aggregate terms, as the banking system as a whole scales up, the asset and equity size, individual banks tend to be more profitable. This also implies that asset and equity growth is distributed evenly among banks. Therefore, no specific bank or banking group dominated the others. In contrary to this, total loans growth has a negative and significant effect on profitability.

In both estimated regressions where ROA and ROE is the dependent variable, asset size is found to have a significant and positive impact on profitability. Hauner and Peiris (2005) suggest two potential explanations for this impact. First, if it relates to market power, large banks should pay less for their inputs, i.e., lower cost as mentioned in capital adequacy case. Second, there may be increasing returns to scale gains through the allocation of fixed costs.

The deposit to total assets ratio has a negative but insignificant impact on bank profitability. This might be an indication of the fact that the link between deposit and lending is not efficiently operated. Turkish banking systems have suffered from the short term character of its deposit base. The maturity of deposit is mainly short and cannot be efficiently converted into lending, i.e., higher income earnings.

Our results regarding the impact of ownership on profitability support the findings of Micco, et al. (2007) and Iannotta, et al. (2007), who point out that state banks exhibit a lower profitability than privately owned banks. The case also holds for foreign banks. Foreign banks are also more profitable than state banks. The findings shed light on the inefficiency of state banks in the past where state banks were mandated as the lender of unprofitable and politically driven projects. For instance, the duty losses that were one of the main causes of the 2001 banking crisis were an indication of how state banks operated with political bias. One of the main purposes of this paper is to find the average treatment effect (ATE) of being an Islamic bank. Regression results give us some insights about how the ATE might look for different measures of profitability. According to the regression results Islamic banks play an insignificant role when the measure is ROA and ROE. In addition to this, Islamic banks lower the profitability when the measure is NIM.

Estimates of treatment effects are presented in Table 9. As we mentioned above we use the different algorithms to calculate the treatment effect for the sake of robustness. First, the treatment effect proves that there is no relationship between Islamic banks and ROA. The coefficient is always zero. Second, Islamic banks are positively correlated with ROE and the magnitude is higher. However, OLS coefficients are insignificant. Third, the ATE on NIM varies over periods. It is always positive before the crisis and negative after crisis. For the entire period, different algorithms prove the negative relationship between Islamic banks and NIM.

Table 9. Estimates of treatment effect

		1994–2011			1994–2007			2008–2011		
		RE	**NM**	**S**	**OLS**	**NM**	**S**	**OLS**	**NM**	**S**
ROA	Islamic Banking	−0.005	0	0	−0.014	0	0	0.005	0.001	0.001
	No. Obs	1188	160	1080	660	84	600	528	68	478
	Treated	144	144	144	80	80	4	64	64	62
	Controls	1044	16	936	580	4	596	464	4	416
		1994–2011			**1994–2007**			**2008–2011**		
		RE	**NM**	**S**	**OLS**	**NM**	**S**	**OLS**	**NM**	**S**
ROE	Islamic Banking	−0.010	0.004	0.003	−0.006	−0.007	0.012	0.017	0.015	0.013
	No. Obs	1188	160	1080	660	84	600	528	68	478
	Treated	144	144	144	80	80	4	64	64	62
	Controls	1044	16	936	580	4	596	464	4	416
		1994–2011			**1994–2007**			**2008–2011**		
		RE	**NM**	**S**	**OLS**	**NM**	**S**	**OLS**	**NM**	**S**
NIM	Islamic Banking	−0.023	−0.003	−0.004	−0.018	0.001	0.011	−0.023	−0.005	−0.005
	No. Obs	1188	160	1080	660	84	600	528	68	478
	Treated	144	144	144	80	80	4	64	64	62
	Controls	1044	16	936	580	4	596	464	4	416

6. Conclusion

This paper provided evidence on the implications of Islamic banking in Turkey. As a baseline analysis and in parallel with the literature, the determinants of profitability in Turkish banking have been found to be familiar with the previous studies. However, our main difference comes with the role of being an Islamic bank. In our study we investigated the effect of being an Islamic bank on bank performance in terms of various bank profitability measures. Specifying some certain banks as Islamic bank and investigating the effect of being an Islamic bank is a conscious "self-selection" choice, therefore have a potential to have "self-selection bias". In order to overcome this possibility, we introduced the method of propensity score matching to the banking literature in order to estimate the average treatment effect (ATE) of being an Islamic bank in Turkey where there exists a dual banking system. In order to estimate the average treatment effect propensity score matching has been conducted. The results are compared with the OLS results. According to the OLS results, Islamic banks have a negative relationship with NIM and a positive relationship with ROA. The effect of being an Islamic bank on ROE is insignificant on the other hand. Propensity score matching technique confirms some of OLS results. The ATE of being an Islamic bank, on ROA and ROE, are positive, yet it is blurry but negative on NIM. The results provided evidence of increasing performance of Islamic banks in the Turkish banking system. Therefore, although not in total asset size – these banks signal the efficacy of Islamic banks in the near future.

Several potential research themes emerge as well. Firstly, the blurry results of being an Islamic bank on NIM have to be identified in some detail. This discrepancy could provide further insights about Islamic banks operations if deeply investigated. Second, the results of the Turkish case have to be compared with other country cases by identifying more proper econometric methodologies as introduced in this paper. The issue of "self-selection bias" needs to be tested in other country cases as well. As a continuation of the concurrent problem of "self-selection bias," the profitability of Islamic banks should be compared with the conventional banks in a synthetic control group framework introduced by Abadie and Gardeazabal (2003).

Notes

1. See Hasan and Dridi (2010) for differing performance of conventional and Islamic banks during and after the financial crisis in countries where conventional banks and Islamic banks jointly operate.
2. After the decree, initial institutions were Bahrain-based Al Baraka Turk and Saud-based Faisal Finans Kurumu, which each opened subsidiaries in 1985. The Kuwaiti-based Kuveyt Turk Kurumu began operations in 1989. Eventually, special finance houses began lending with mainly domestic capital, including: Anadolu Finans (1991), Ihlas Finans (1995) and Asya Finans (1996).
3. See Darrat (1988), Zuberi (1992), Darrat and Salaaming (1990), Kia and Darrat (2007).

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