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Abstract

In Chapter 1, the competitive conditions for the Turkish banking industry is examined by using the Panzar-Rosse (1987) model and considering the foreign investments to the banking industry. Within the liberalization of the financial markets, foreign direct investment activities have grown very quickly especially in the banking sector. Acquisition by foreigners has been linked to introduction of new technology and expansions in products and service range. This suggests that the inflow of foreign capital can alter the competitive structure of an industry. I plan to investigate the quantitative importance of this phenomenon using the data from the Turkish banking industry. To measure the competition upon increase in foreign ownership, I will use the Panzar and Rosse (1987) model that allows to test for market structure relying solely on information from the financial statements of the banks. The results indicate a monopolistic competition for the Turkish banking industry.

In Chapter 2, the effects of credit supply in increasing demand of a durable good (car market) by vector auto-regression (VAR) is examined. After the devaluation of the Turkish Lira against Euro and US Dollar, automobile prices in Turkey rose substantially. Despite this context, car sales also increased. In this paper, I explore the role of credit supply of the Turkish banks. Throughout this period, consumer credit increased due to the modernization of the Turkish banking sector. The results indicate that car credits first boost car sales and then affects the latter negatively.

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Chapter 1

The Effect of Foreign Ownership on Competition: Evidence from the Turkish Banking Industry

Introduction

Within the globalization and emerging technology after the 1980s, many countries drawn into a rapid change in their financial systems. The willing of spreading the risk, rent-seeking behaviour and liquidity saturation in their home country, countries began to canalize their investments to foreign markets. Cull et. al. (2017) reports that, in all countries, 43% of the banking system assets belongs to foreign holders while the 18% of it is being hold by government. They also indicated that, there exists a significant increase in foreign holders in developing countries, also in high-income countries. In response to this, bank assets hold by government shows a downward trend in all regions.

The consequences of the foreign acquisition for the overall banking industry are ambiguous since acquired and the remaining banks can follow different strategies and also the size of the banks' matter. That's why there is still not a straightforward answer. When there is a foreign purchase agreement takes place in a domestic bank, this might force other domestic banks work more aggressively to keep their customers attracted. They can innovate new financial services and products inspired from their traditions and/or using their legal systems. On the contrary, banks which have foreign-hold assets are less dependent to political tensions and they are better in monitoring customers with advanced technology (Havrylchyk, 2006). Outsourced by their mother companies or investors, foreign owned banks are better access to different sources of financing, have higher technological software and more sophisticated banking products and labours than the remaining banks (Hermes et. al., 2004). It has also been claimed that foreign banks might adopt cream-skimming behaviour, selecting low default risk borrowers due to having lack of information about the existing firms and let the domestic banks work with more opaque customers. But domestic firms have more data about risky customers, they are able to monitor better and turn out the risk into their favour (Detragiache et. al., 2008; Poghosyan, 2009). But in some cases, it has been found that foreign banks can take over another strategy instead of cherry-picking behaviour and lean on small-medium size enterprises (Torre et. al., 2010).

The possible effects of the ascent of foreign inhesion in developing as well as developed markets are studied in the academic literature intensively. Understanding competitive conditions in

a banking industry is crucial since it instructs the country about the quality and production of the financial services and products. It gives information about how the households and firms enjoy and use the financial services and also, it is matter for the economic growth for macroeconomic level (Claessens et. al., 2004; Northcott, 2004; Goddard et. al., 2009). Many evidence can be found in the literature that estimates the effect of foreign bank ownership on bank competition through analysing efficiency from interest rate margins, profit-cost measurement, cost functions or direct assessment of competition, but differ from their methodologies and data selections such as country level, regional and large samples of countries. It has been mostly indicated that foreign ownership boosts competition in developing countries by providing resources and funding, and lowering costs for the domestic banks to operate more efficiently and enhancing economic growth (Demirgüç-Kunt et. al., 1999; Denizler, 2000; Weill, 2003; Wang et. al., 2004; Kraft et. al., 2006; Gupta et. al., 2006; Yañez et. al., 2007; Schnitzer et. al., 2008), while in high-income countries the opposite case is accurate (Claessens et. al., 2001). There are also studies stating that foreign presence effect on bank performances are indefinable (Sensarma, 2006; Berger et. al., 2009). Despite all, Lensink et. al. (2008) indicates that foreign bank existence penetrates bank efficiency in a negative way.

Interest rate spreads can be affected from countries' macro-economic performance and environment, and moreover, liabilities of being a financial intermediary specific to country and particular to banks factors such as preferences of risk and scales (Peria et. al., 2010). Hence, in this draft paper, a direct measurement of competition will be conducted. This draft study provides the consequences of controlling the bank foreign ownership scale by using a different technique in the analysis of the Panzar-Rosse, 1987 (PR) competition test model. The competition analysis will be done by adding foreign ownership variable specific to each bank. In other words, competitive conditions without foreign ownership will be discussed, then the same model will be examined with foreign ownership control variable to see how the competition index reacts to the change in variables. Instead of using dummy variable which is commonly preferred in the literature, foreign ownership percentages specific to each bank will be considered. Since dummy variables take only values 0 or 1, it will not reflect the bank specific foreign ownership character to the analysis. The first results show an increasing competition when the foreign ownership is controlled. One possible problem might arise is a potential endogeneity. Both parameters may be affected from the macroeconomic indices. Besides, a reverse causality between bank revenues and foreign acquisition can lead to an estimation bias since foreign banks are more attracted to invest on better performed banks. An instrumental variable approach will be applied to adjust those problems for foreign ownership control variable.

The draft paper is organized as follows: Several examples relevant to the research question from the literature are given in Section 2. In section 3, the evolution of foreign existence in the Turkish banking industry is described for the years 2003-2017. Data and methodology are described in Section 4 and Section 5 respectively. Section 6 presents the empirical results and discussion.

Literature Review

The relationship between competition and foreign bank participation analysis is debated in many ways by using different models and data types. Some studies focused on this issue by analyzing concentration ratio, Lerner Index, Herfindahl-Hirschman Index and/or Panzar and Rosse (1987) methodology. Most of the studies used bank-level panel database and Panzar-Rosse (1987) model. Shaffer (1982) used PR method first in the literature to examine the competitive conditions by using U.S. bank data and others followed his technique.

The first study in the literature concerning the foreign penetration in banking industry is Claessens et. al. (2004), who used 50 countries' banking data for the period 1994-2001. First, they examined the competitive conditions for each country by using PR method then indicated a positive relationship between competition and country-specific foreign participation by using cross-country regressions. Another study Gelos et. al. (2004) also used PR methodology to assess the competition level in several Central European and Latin American countries. Their results suggest a positive relation between the competition indexes gathered through H-statistics and foreign bank association by evaluating the correlation between them. Yıldırım et. al. (2009) indicates an increasing competition in Latin America when bank assets are opened to foreign investment. For the period 1998-2008, Jeon et. al. (2011) used 17 Asian and Latin American developing countries in total to test the effect of foreign ownership status on competition by taking into account the endogeneity issue. By implementing an instrumental variable regression, their results show a positive measure.

Despite of all positive findings so far, Yeyati et. al. (2008) focused on 8 Latin American countries' bank-level data by using PR method and instrumental variable. They used the remaining 7 countries' average foreign share as an instrumental variable and calculated the time-varying H-statistics for each Latin American country in their sample. Consequently, their results suggest a less competitive environment when there is foreign presence in the banking industry.

Hsieh et. al. (2016) adopted a group of bank competition variables such as Herfindahl-Hirshman Index and concentration ratios instead of considering PR method by dividing the sample into regions. By using dynamic panel GMM method, they present various outcomes depending on the regions. For Sub-Saharan Africa region, they found that an increase in foreign presence raises competition while the results for Latin America yields in an opposite way. For Middle East-North

African and Asian regions, they find no significant evidence of an influence on competition through foreign ownership. Delis et. al. (2016) used Lerner Index to address the same concern by using 131 countries' pooled bank-level data over the period 1997-2009, but they found insignificant relationship between market power and foreign bank ownership.

As it is understood in the literature, the link between competition and foreign bank ownership is still ambiguous and the number of studies which addressed on this topic are few. In this draft paper, the competition will be analysed by following a new manner in PR method. The literature presented above alongside other works in the literature studied competition assessment mainly used same variables. This study will try to examine the competitive conditions for the Turkish banking industry by changing the control variable side of the PR methodology.

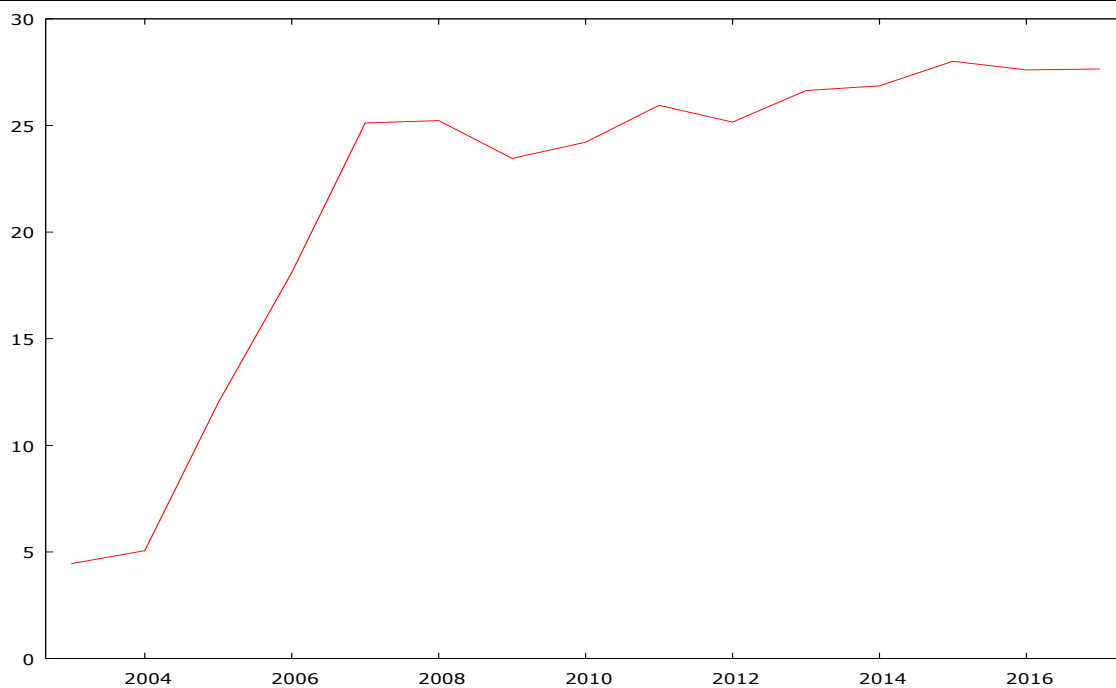
A Short History of Turkish Banking Industry

The inference of the economic crisis happened abroad in the late 90s and the systemic banking and liquidity crisis happened in 2000-2001 in Turkey, the banking industry experienced a rapid change. In 1999-2002, the Turkish Banking Regulation and Supervisory Agency implemented reconstruction program to banks and incorporated them into Saving and Deposit Insurance Fund. With this program, some banks ran into liquidation process or some combined with others. Through these processes, it is aimed to encourage foreigners to invest on the Turkish banking industry, moreover, strengthening the capital side of the bank according to the Basel II criteria (Karacaođlan, 2011). Aysan et. al. (2007) provides the pull factors specific to Turkey for foreign bank investment such as high growth potential backed by an increasing young population, being a part of IMF's reconstruction plan and European Union negotiations, political stability and geo-strategic advantage due to its position between two continents. Following the crises, Turkish bankrupt banks were promising profitable investments and suitable area to implement new technologies with cheaper costs (Sönmez, 2014).

Table 1 shows the graph of foreign ownership market percentage of the Turkish banking industry since 2003. The left-hand-side of the graph represents the annual foreign owned percentages. Since not all banks are same sized, foreign ownership percentages are weighted with respect to total assets. The reason why there exists some foreign bank existence before 2003 in Table 1 is that, some Turkish banks were already sold to foreign investors. In 2001, there were Demirbank T.A.Ş. and Sitebank A.Ş. were sold to HSBC Group and Novabank S.A. respectively. In October 2002, UniCredito Italiano and Koçbank A.Ş. got into a strategic partnership alliance by 50% each. In addition to that, there are already some foreign banks existed before 2003 by opening a branch and/or doing greenfield investment. These banks are Arap Türk Bankası A.Ş., Banca di

Roma S.p.A., Bank Mellat, Citibank A.Ş. (through Citibank N.A.), Habib Bank Limited, Portigon AG, Société Générale S.A. and The Royal Bank of Scotland Plc. After the acquisitions, some banks' names are changed.

Table 1: Yearly Foreign Ownership Percentage - Weighted by Banks' Total Assets (2003-2017)



Especially in 2004 and after, a peak can be seen due to the corporate tax reduction and investment barriers relaxation (Süer et. al., 2016). Besides, when there is a foreign investment, it has been observed that the asset size of the bank balance sheet multiplies. Although there is no foreign investment took place in 2003-2004, the jump in this years can also be explained as a result of an increase in the asset size of the banks who were foreign owned before 2003, since the data used in the graph above are weighted by the total assets of the banks. The foreign penetration took place during this period for instance as acquisition and/or buying stocks of a bank, greenfield investments and/or opening a branch. As it can be seen in Table 1, there exists an upward trend in the foreign participation. The upward trend of foreign existence in the Turkish banking industry makes the data useful to analyse the effect of foreign penetration on competition. Moreover, Table 2 provides a brief information about the changes and developments in foreign penetration in the Turkish banking system.

Table 2: Foreign Participations in Domestic Banks in Turkey (2003-2017)

2005	Fortis Bank A.Ş. invested in Türk Dış Ticaret Bankası A.Ş. by 94,11%. BNP Paribas invested in Türkiye Ekonomi Bankası A.Ş. by 42,12%. General Electric invested in Türkiye Garanti Bankası A.Ş. by 25,5%. UniCredito became a partner of Yapı ve Kredi Bankası A.Ş. indirectly by 28,7%. National Bank of Kuwait invested in Turkish Bank A.Ş. by 39,19%.
2006	Foreign share increased to 65% from 54,09% in Arap Türk Bankası A.Ş. Dexia Participation Belgique S.A. invested in Denizbank A.Ş. by 99,74%. UniCredito increased its indirect investment in Yapı ve Kredi Bankası A.Ş. to 40,09%. National Bank of Greece S.A. invested in Finans Bank A.Ş. by 46%.
2007	Citibank Overseas Investment Corporation invested in Akbank T.A.Ş. by 20%. ING Bank invested in Oyakbank A.Ş. by 100%. Eurobank EFG S.A. invested in Tekfenbank A.Ş. by 70%. BTA Securities JSC invested in Şekerbank T.A.Ş. by 33,98%. Arab Bank and BankMed invested in MNG Bank A.Ş. by 50% and 41% respectively.
2008	Foreign share increased to 94,79% in Finansbank A.Ş.
2010	Foreign share increased to 100% in MNG Bank A.Ş.
2011	Foreign share increased to 99,81% in Finans Bank A.Ş. Foreign share increased to around 68% in Türkiye Ekonomi Bankası A.Ş.
2012	Burgan Bank S.A.K. invested in Tekfenbank A.Ş. by 99,26%. Odea Bank A.Ş. started operating.
2013	Commercial Bank of Qatar invested in Alternatif Bank A.Ş. by 74,24%. Bank of Tokyo-Mitsubishi UFJ Turkey started operating.
2014	Intesa Sanpaolo S.p.A. started operating. Rabobank A.Ş. started operating.
2015	Foreign share increased to 19,9% in Fibabanka A.Ş. Industrial and Commercial Bank of China limited invested in Tekstil Bankası A.Ş. by 92,82%. Foreign share increased to 75% in Alternatif Bank A.Ş. Foreign share increased to around 72,48% in Türkiye Ekonomi Bankası A.Ş. BBVA SA invested in Türkiye Garanti Bankası A.Ş. by 39,90%.
2016	Foreign share increased to 100% in Alternatif Bank A.Ş. Foreign share increased to 27,87% in Fibabanka A.Ş.
2017	Foreign share increased to 49,85% in Türkiye Garanti Bankası A.Ş.

Source: Banks' annual operating reports, historical reports in Bank Association of Turkey website and Sönmez, 2014, Süer et.al., 2016.

Note: Koçbank A.Ş., 50% owned by UniCredito Italiano, merged with Yapı ve Kredi Bankası A.Ş. Ak Uluslararası Bankası A.Ş., foreign owned by 60%, merged with Akbank T.A.Ş. in 2005. Banca di Roma S.p.A. stopped operating in 2007. Fortis Bank A.Ş. merged with Türkiye Ekonomi Bankası A.Ş. in 2011. Portigon AG stopped operating in 2013. In 2015, COIC sold back its holdings in Akbank T.A.Ş. Foreign ownership in Şekerbank T.A.Ş. decreased from 33,7% to 19,3 7% through 2013 to 2017.

Methodology

Panzar-Rosse (1987) model is preferred to examine the competition levels for each case: first without the foreign ownership control variable and the second with foreign ownership control variable. Its easily applicable structure and data requirements make it a popular competition assessment methodology in the literature. Basically, this model first measures the elasticities of firm's revenue with respect to the input prices. These input prices are derived mostly from the main

costs of firms' like capital and labour. The summation of these elasticities (coefficients of input prices) generates H-statistic, a degree between the range $-\infty$ and 1. Depending on the value that H will take, we will be able to compare the H-statistics in both cases. If H takes zero value, this means that the input prices and the revenue are not correlated (Shaffer, 1982). When the H-statistics is equal to 1, the industry is under perfect competition. This means that, the revenues and the marginal cost increase in the same proportion with an increase in input prices. When H-statistic is smaller than 1 but positive, this condition regards to monopolistic competition. This tells us that, an increase in the input prices both scales up the revenues and the marginal cost but not as the same amount of that increase in input prices. When H-statistics is negative; a rise in the input prices decreases the revenues, this indicates that the market operates under a monopoly.

In this draft paper, bank-level observations are used to investigate how the bank revenue responses to the input prices. First, the model without the foreign ownership control variable will be used to measure the competition level. A large scale of similarity of this model can be found in the literature.

$$\ln R_{i,t} = \alpha + \beta_1 \ln(DEP_{i,t}) + \beta_2 \ln(OP_{i,t}) + \beta_3 \ln(PER_{i,t}) + \beta_4 \ln(LO_{i,t}) + \beta_5 \ln(EQ_{i,t}) + \beta_6 \ln(TA_{i,t}) + \varepsilon_{i,t}$$

In this model, the dependent variable which is $R_{i,t}$, is the ratio of Total Interest Revenues plus Commissions and Fees Received over Total Assets, as a proxy for bank revenues. Instead of using taking Total Interest Revenues, Commissions and Fees are also added to the model because banks' price charging for operating processes might differ. The first three independent variables are the input prices and the summation of their coefficients β_1 , β_2 and β_3 will give us the H-statistics. The ratio $DEP_{i,t}$ is the banks' Interest Expenses on Deposits over Total Deposits which is an input price stands for the deposits. Second, $OP_{i,t}$ is the ratio of Other Operating Expenses over Total Assets, is an input price for fixed capital. The last input price $PER_{i,t}$ that is a proxy for personnel, is the ratio of Personnel Expenses over Number of Employees. The remaining independent variables are control variables to eliminate size effects, namely, $LO_{i,t}$ is the ratio of Total Loans and Receivables over Total Assets, $EQ_{i,t}$ is the ratio of Total Equity over Total Assets and $TA_{i,t}$ is for Total Assets.

Second, to understand how the competition index changes with respect to foreign ownership, an additional variable specific to each bank, namely $FO_{i,t}$ is added to the first model.

$$\ln R_{i,t} = \alpha + \beta_1 \ln(DEP_{i,t}) + \beta_2 \ln(OP_{i,t}) + \beta_3 \ln(PER_{i,t}) + \beta_4 \ln(LO_{i,t}) + \beta_5 \ln(EQ_{i,t}) \\ + \beta_6 \ln(TA_{i,t}) + \beta_7 \ln(FO_{i,t}) + \varepsilon_{i,t}$$

H-statistics will be equal to $\beta_1 + \beta_2 + \beta_3$, the first three coefficients of the input prices. The coefficients for the first two control variables $\ln LO$ and $\ln EQ$ are expected to be positive since higher revenues will be generated from and higher allocation of assets to loans and better capitalization levels (Turk-Ariss, 2009). The coefficient of the third control variable $\ln TA$ will give us information whether one Turkish Lira of asset generated higher or lower revenues.

Panzar and Rosse model holds only when the market operates in equilibrium. To be in equilibrium, the rate of return to assets (or equity) should not be correlated with the input prices (Shaffer, 1982, Nathan et. al., 1989). Following Molyneux et al. (1994) return to asset ratio (ROA) is replaced by the total revenues. Other independent variables remain the same. As it is done in the first two models, summation of the first three coefficients will give us E-statistics, a parameter for equilibrium. By using F-test, it is going to be tested whether $E=0$. If this hypothesis will be rejected, then the market is not supposed to be in equilibrium. If E is significantly equal to 0 or very close to 0 in absolute value, this means that the market is decided to be in equilibrium; otherwise the market is in disequilibrium (Claessens et. al., 2004).

The model for equilibrium conditions with and without the foreign ownership control variable can be written as:

$$\ln ROA_{i,t} = \alpha + \beta_1 \ln(DEP_{i,t}) + \beta_2 \ln(OP_{i,t}) + \beta_3 \ln(PER_{i,t}) + \beta_4 \ln(LO_{i,t}) + \beta_5 \ln(EQ_{i,t}) \\ + \beta_6 \ln(TA_{i,t}) + \varepsilon_{i,t}$$

$$\ln ROA_{i,t} = \alpha + \beta_1 \ln(DEP_{i,t}) + \beta_2 \ln(OP_{i,t}) + \beta_3 \ln(PER_{i,t}) + \beta_4 \ln(LO_{i,t}) + \beta_5 \ln(EQ_{i,t}) \\ + \beta_6 \ln(TA_{i,t}) + \beta_7 \ln(FO_{i,t}) + \varepsilon_{i,t}$$

In each 4 models, i indicates the bank and t is for the time. Foreign ownership control variable $FO_{i,t}$ is not nonzero for each bank. Since the natural logarithm of 0 is undefined, all the foreign ownership percentages are taken in decimals and then summed with 1. This means that, $FO = FO_0 + 1$, where FO_0 is the exact values of foreign ownership that each bank has. This procedure is also carried out for $ROA_{i,t}$ because some banks have negative returns in some years. Following the literature, $ROA = ROA_0 + 1$, where ROA_0 is the exact value of return for each bank.

In the models with foreign ownership control variable, to scrutinising the potential endogeneity problems in appointing the degree of bank competition, following Jeon et. al. (2011),

Delis et. al. (2016) and Hsieh et. al. (2016), foreign ownership variable lnFO will be lagged for one year and two years.

Data

In this draft study, the data covers all deposit banks (public, private and foreign banks) operating in Turkey for the years between 2003-2017. The data consists of 37 deposit banks with an unbalanced panel of 446 observations. Among this 37 banks, 6 of them are domestically-owned in which 3 of them are state-owned banks. The rest 31 banks include foreign ownership such as completely foreign-owned and/or joint-ownership through the period. 7 of these 31 banks are foreign banks opened a branch in Turkey. The banks under SDIF, islamic banks and development and investment banks are not included into the sample. Annually financial statements and the number of employees of the banks are obtained from the Bank Association of Turkey database. Balance sheet items are comprised of total assets, total deposits, total equity and loans and receivables. Income statement items are total interest revenue, commissions and fees received, interest expense on deposits, other operating and personnel expenses. The summation of total interest revenue and commissions and fees received will form total revenues, which is the dependent variable. On the contrary of the majority of the literature, the data for commisions and fees received is decided to be added since foreign owned banks are appeared to being further productive than the existing banks in the sense of non-interest income (Claessens et. al., 2001). Return to asset ratios are taken from the annual financial statements. Foreign ownership percentages for each bank is obtained from banks' annual reports and also from the historical data in the Bank Association of Turkey website. Table 4 displays the descriptive statistics of the data of deposits banks' operating in Turkey for the years 2003-2017.

Table 4: Descriptive Statistics of Turkish Banking Industry 2003-2017

Variable	Obs.	Mean	Std. Dev.	Min	Max
Total Deposits	446	24088,74	42781,97	0,115	266384,2
Loans and Receivables	446	23112,01	44848,99	1,243	298032,5
Total Equity	446	4376,672	7915,326	7,874	47009,83
Total Assets	446	39263,49	71071,14	25,564	434274,5
Total Interest Revenue	446	3288,016	5397,414	2,287	35463,46
Interest Expense on Deposits	446	1412,419	2254,216	0,015	12249,17
Fees and Commissions Income	446	480,5768	826,0279	0,007	4876,857
Other Operating Expenses	446	929,3411	1386,776	1,424	7395,787
Personnel Expenses	446	394,141	581,1387	0,502	3399,059
Number of Employees	446	5556,206	6995,456	14	25697
Foreign Ownership (%)	446	54,77072	44,39041	0	100
Return on Assets (%)	446	1,416304	2,355742	-17,6914	13,43182

Except the variables Foreign Ownership and Return on Assets which are denoted in percentage, the other variables are in million Turkish Lira. As it is shown in the Table 4, the mean of Foreign Ownership percentage comes to the forefront as approximately 55%, which is signs a high foreign penetration for the industry.

Empirical Results

The H-statistics and the coefficients are gathered from the four models are represented in tables below. Each model is ran with OLS and fixed-effects regression. In order to control the possible time varying effect for both regressions, year dummies are also added through Vardar et. al., 2014. In the year dummy column in each table, the first year 2003 is omitted. All the variables used are in natural logarithm. The ratio of Total Revenues (Total Interest Income plus Commissions and Fees Received) to Total Assets is the dependent variable. H-Statistics and the coefficients in Table 5 are referred to the estimation of the first model. The first model is widely used in the literature and in this draft paper, it is used to account the competitive nature for the banking industries without adding the foreign ownership control variable.

**Table 5: Estimation Results for *H*-Statistics
(without the control variable *lnFO*)
Dependent Variable: *lnR***

	OLS	OLS with Year Dummies	Fixed Effects	Fixed Effects with Year Dummies
lnDEP	0.2151 (0.0171)***	0.1692 (0.0174)***	0.2403 (0.0191)***	0.1678 (0.0223)***
lnOP	0.3118 (0.0343)***	0.3299 (0.0301)***	0.3299 (0.0527)***	0.3612 (0.0513)***
lnPER	-0.1248 (0.0265)***	-0.0859 (0.0347)**	-0.1591 (0.0507)***	-0.0782 (0.0691)
lnLO	-0.0379 (0.0184)**	-0.046 (0.0181)**	-0.0124 (0.0204)	0.00194 (0.0202)
lnEQ	0.1297 (0.037)***	0.1112 (0.0339)***	0.152 (0.0449)***	0.1821 (0.0458)***
lnTA	0.0396 (0.011)***	0.0509 (0.0096)***	0.0741 (0.0347)**	0.1861 (0.0449)***
Constant	-1.0275 (0.1583)***	-1.086 (0.144)***	-1.2079 (0.335)***	-1.7957 (0.3315)***
<i>H</i>-Statistics	0.4021	0.4132	0.4111	0.4508
Observations	446	446	446	446
Adjusted R- sq	-	-	0.4596	0.5239

Standard errors in parentheses

***, **, * represent significant at 1%, 5% and 10%, respectively. F-tests are statistically significant at 1% level.

Note: All variables are in natural logarithm. Year dummies are from 2004 to 2017. DEP is the banks' Interest Expenses on Deposits over Total Deposits. OP is the ratio of Other Operating Expenses over Total Assets. PER is the ratio of Personnel Expenses over Number of Employees. LO is the ratio of Total Loans and Receivables over Total Assets, EQ is the ratio of Total Equity over Total Assets and TA is for Total Assets.

Estimation results of the first model is given in Table 5. All coefficients except lnPER for fixed effects with time dummies and lnLO for all fixed effects regression, are statistically significant. Input prices as a proxy for deposits and fixed capital appear to be statistically significant and positive. This suggests that, expenses made on fixed capital and funds collected generate more

revenues in banking industry. In spite of this, an increase in labor price seems to have a negative impact on bank revenues. $\ln EQ$, proxy for Total Equity shows us the expected positive sign for revenues, however; $\ln LO$, proxy for Loans and Receivables appeared to be negative. It has been claimed that higher level of loans will generate higher revenues (Molyneux et. al.,1994) whereas in these results, it has the reverse situation. This might be signaling us that non-performing loans might be better to be considered in the model. According to the H-statistics in Table 5 obtained, we can say that the Turkish banking industry is operating under monopolistic competition since all H values are between 0 and 1. The hypothesis that the banks operate under monopolistic market or in a perfectly competitive market is strongly rejected. The findings are also related with Vardar et. al. (2014), Sakinç et. al. (2015) and Çelik et. al. (2016).

Table 6 provides the results of the examination of the second model. The second model includes the same variables of the first model and bank-specific foreign ownership structure is added. When we look at the signs of the input prices, personnel expenses have an insignificant effect on bank revenues in OLS and fixed effects with year dummies estimations. Even though we added the foreign ownership control variable, the other parameters' signs and significances did not change. Adding the foreign presence variable to the model did not make a radical change in the signs and significances of the coefficients mostly but decrease the value of coefficient of $\ln DEP$ and increase the values of coefficients of $\ln OP$ and $\ln PER$. This situation actually proves the statements done in the literature that foreign presence has an improving impact on bank revenues. With these changes, the H-statistics gathered from the second model is higher than the H-statistics in the first model. When we controlled for the foreign penetration, the competition increases in the Turkish banking industry gathered through H-statistics. The findings in these draft papers are also coherent with the outcomes displayed in Claessens et. al. (2004), Yıldırım et. al. (2009) and Jeon et. al. (2011).

**Table 6: Estimation Results for *H*-Statistics
(with the control variable *lnFO*)
Dependent Variable: *lnR***

	OLS	OLS with Year Dummies	Fixed Effects	Fixed Effects with Year Dummies
lnDEP	0.213 (0.0171)***	0.1659 (0.0176)***	0.2401 (0.019)***	0.1558 (0.0222)***
lnOP	0.3181 (0.0347)***	0.3377 (0.0310)***	0.3541 (0.0534)***	0.4127 (0.0523)***
lnPER	-0.1008 (0.0311)***	-0.0618 (0.0382)	-0.1362 (0.0514)***	0.0078 (0.0718)
lnLO	-0.0366 (0.0184)**	-0.0442 (0.0181)**	-0.0137 (0.0203)	-0.0003 (0.0199)
lnEQ	0.1219 (0.0374)***	0.1033 (0.0346)***	0.1417 (0.0449)***	0.1639 (0.0453)***
lnTA	0.0359 (0.0114)***	0.0468 (0.0103)***	0.0862 (0.0349)**	0.2256 (0.0454)***
lnFO	-0.0946 (0.0631)	-0.0997 (0.0574)*	-0.1731 (0.0736)**	-0.2733 (0.0734)***
Constant	-0.8943 (0.1821)***	-0.9519 (0.1663)***	-1.1283 (0.3349)***	-1.6666 (0.328)***
<i>H</i>-Statistics	0.4303	0.4418	0.458	0.5763
Observations	446	446	446	446
Adjusted R- sq	-	-	0.4656	0.5391

Standard errors in parentheses

***, **, * represent significant at 1%, 5% and 10%, respectively. F-tests are statistically significant at 1% level.

Note: All variables are in natural logarithm. Year dummies are from 2004 to 2017. DEP is the banks' Interest Expenses on Deposits over Total Deposits. OP is the ratio of Other Operating Expenses over Total Assets. PER is the ratio of Personnel Expenses over Number of Employees. LO is the ratio of Total Loans and Receivables over Total Assets, EQ is the ratio of Total Equity over Total Assets and TA is for Total Assets. FO is 1 plus the percent share of foreign ownership of a bank.

The following two tables are for equilibrium tests. Table 7 gives the results of the third model which is without the foreign ownership control variable. The foreign ownership structure included

to the fourth model, the results are denoted in Table 8. Conducting the equilibrium tests for both cases, it has been found that the banking system in Turkey is in equilibrium. Although the F-tests indicate disequilibrium for Turkish banking industry; in other words, the tests reject that the E-statistics equals to 0, the absolute levels of the E-statistics variables are closed to 0 so that the parameters can be accepted for equilibrium. It can also be said that, when we added the foreign ownership control variable, E-statistics appear to be getting closer to 0, that is to say; both models hold for equilibrium conditions for the Turkish banking industry.

When we checked the adjusted R-squared results in each four tables, fixed effects with year dummies appeared to be higher explanatory measure. Also when we compare the models with and without foreign ownership control variable, the models with foreign presence have higher adjusted R-squared values. To sum up, the independent variables in all models can explain the dependent variables $\ln R$ and $\ln ROA$, better with $\ln FO$ control variable.

**Table 7: Estimation Results for E-Statistics
(without the control variable *lnFO*)
Dependent Variable: *lnROA***

	OLS	OLS with Year Dummies	Fixed Effects	Fixed Effects with Year Dummies
lnDEP	0.0067 (0.0013)***	0.0009 (0.0015)	0.0073 (0.0013)***	0.0033 (0.0016)**
lnOP	-0.0303 (0.0033)***	-0.0201 (0.0026)***	-0.0334 0.0036***	-0.0306 (0.0037)***
lnPER	-0.0098 (0.0029)***	0.0183 (0.0031)***	-0.0115 (0.0035)***	0.0013 (0.005)
lnLO	0.0061 (0.0014)***	0.0078 (0.0015)***	0.0056 (0.0014)***	0.0076 (0.0015)***
lnEQ	0.0286 (0.0031)***	0.0244 (0.0029)***	0.0313 (0.0031)***	0.0356 (0.0033)***
lnTA	-0.0015 (0.0017)	0.0040 (0.0008)***	-0.0019 (0.0024)	0.009** (0.0032)***
Constant	-0.0237 (0.0191)	0.0382 (0.0129)***	-0.0233 (0.0233)	-0.0527 (0.0241)**
<i>E-Statistics</i>	-0.0334	-0.0009	-0.0376	-0.026
Observations	446	446	446	446
Adjusted R- sq	-	-	0.2191	0.2501

Standard errors in parentheses

***, **, * represent significant at 1%, 5% and 10%, respectively. F-tests are statistically significant at 1% level.

Note: All variables are in natural logarithm. Year dummies are from 2004 to 2017. ROA is 1 plus the percentage of return to assets of a bank. DEP is the banks' Interest Expenses on Deposits over Total Deposits. OP is the ratio of Other Operating Expenses over Total Assets. PER is the ratio of Personnel Expenses over Number of Employees. LO is the ratio of Total Loans and Receivables over Total Assets, EQ is the ratio of Total Equity over Total Assets and TA is for Total Assets.

Table 8: Estimation Results for E-Statistics
(with the control variable *lnFO*)
Dependent Variable: *lnROA*

	OLS	OLS with Year Dummies	Fixed Effects	Fixed Effects with Year Dummies
lnDEP	0.0066 (0.0013)***	0.0008 (0.0015)	0.0073 (0.0013)***	0.0026 (0.0016)
lnOP	-0.0295 (0.0033)***	-0.0199 (0.0027)***	-0.032 (0.0037)***	-0.0279 (0.0038)***
lnPER	-0.0079 (0.0030)***	0.0197 (0.0034)***	-0.0102 (0.0036)***	0.0058 (0.0052)
lnLO	0.0060 (0.0014)***	0.0079 (0.0016)***	0.0056 (0.0014)***	0.0075 (0.0015)***
lnEQ	0.0279 (0.0031)***	0.0239 (0.0031)***	0.0308 (0.0031)***	0.0346 (0.0033)***
lnTA	-0.0014 (0.0017)	0.0039 (0.0009)***	-0.0012 (0.0024)	0.0111 (0.0033)***
lnFO	-0.0096 (0.0051)*	-0.0046 (0.0051)	-0.0099 (0.0051)*	-0.0143 (0.0054)***
Constant	-0.0143 (0.0197)	0.0443 (0.0148)***	-0.0187 (0.0234)	-0.0459 (0.024)*
<i>E-Statistics</i>	-0.0308	0.0006	-0.0349	-0.0195
Observations	446	446	446	446
Adjusted R- sq	-	-	0.2243	0.2617

Standard errors in parentheses

***, **, * represent significant at 1%, 5% and 10%, respectively. F-tests are statistically significant at 1% level.

Note: All variables are in natural logarithm. Year dummies are from 2004 to 2017. ROA is 1 plus the percentage of return to assets of a bank. DEP is the banks' Interest Expenses on Deposits over Total Deposits. OP is the ratio of Other Operating Expenses over Total Assets. PER is the ratio of Personnel Expenses over Number of Employees. LO is the ratio of Total Loans and Receivables over Total Assets, EQ is the ratio of Total Equity over Total Assets and TA is for Total Assets. FO is 1 plus the percent share of foreign ownership of a bank.

It has been mentioned above that there might be an endogeneity problem between the bank revenue and foreign ownership structure of the bank. Both variables can be affected from omitted variables like macroeconomic variables. For example, higher GDP, low inflation, high growth rates might attract foreigners to invest. More than that, foreign investments will take place in high revenue promising firms, this means that there can be a reverse causality between the bank revenue and foreign ownership structure. To avoid these problems, an instrumental variable approach is adopted. Table 9 gives the instrumental variable approach for the models fixed and random effects with foreign ownership.

Table 9: Estimation Results for IV Regression

	Dependent Variable: lnR		Dependent Variable: lnROA	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
lnDEP	0.2028 (0.0169)***	0.2287 (0.0181)***	0.0046 (0.0011)***	0.0045 (0.0012)***
lnOP	0.3349 (0.0341)***	0.3014 (0.0547)***	-0.0202 (0.0239)***	-0.0299 (0.0035)***
lnPER	-0.0841 (0.0307)***	-0.1001 (0.0489)**	-0.0089 (0.0021)***	-0.0136 (0.0031)***
lnLO	-0.0096 (0.0185)	0.0321 (0.0206)	0.0015 (0.0012)	0.0041 (0.0013)***
lnEQ	0.1635 (0.0382)***	0.2323 (0.0467)***	0.0296 (0.0025)***	0.0347 (0.0029)***
lnTA	0.0292 (0.0105)***	0.018 (0.0341)	0.001 (0.0007)	-0.0003 (0.0022)
lnFO	-0.0411 (0.0738)	-0.1183 (0.1099)	0.0028 (0.005)	-0.0019 (0.0069)
Constant	-0.6656 (0.1816)***	-0.4353 (0.3268)	-0.0137 (0.0122)	-0.0335 (0.0206)
H-Statistics	0.4677	0.43	-	-
E-Statistics	-	-	-0.0245	-0.039
Observations	373	373	373	373

Standard errors in parentheses

***, **, * represent significant at 1%, 5% and 10%, respectively. F-tests are statistically significant at 1% level.

Note: All variables are in natural logarithm. Year dummies are from 2004 to 2017. ROA is 1 plus the percentage of return to assets of a bank. DEP is the banks' Interest Expenses on Deposits over Total Deposits. OP is the ratio of Other Operating Expenses over Total Assets. PER is the ratio of Personnel Expenses over Number of Employees. LO is the ratio of Total Loans and Receivables over Total Assets, EQ is the ratio of Total Equity over Total Assets and TA is for Total Assets. FO is 1 plus the percent share of foreign ownership of a bank. FO is instrumented by one and two lagged of FO.

When it is controlled for the endogeneity problems, it has been observed that in all cases, foreign ownership presence is not statistically significant as a variable. All input prices are statistically significant at 1% level except for the control variables, Total Loans and Receivables and Total Assets. Regardless of the fact that the literature mostly indicates an increasing competition for developing countries, H-statistics has a lower value with respect to former fixed effects results. Despite of insignificant result of foreign ownership presence, the market is in equilibrium.

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Chapter 2

The Role of Credit Supply in Increasing Demand: Evidence from Turkish Automobile Market

Introduction

Vehicle prices in Turkey show a rising trend due the devaluation of the Turkish Lira against Euro and US Dollar since vehicles are mostly imported. Furthermore, the government imposed high percentages of taxes on vehicle purchases and diesel and gasoline prices also increased due to the devaluation. Despite those developments, the demand for vehicles in Turkey escalated. Normally, when the price of a good increases due to several reasons, a drop in the demand is expected. This demand grow in the Turkish vehicle market can be a result of consumers using their savings to buy cars or purchasing cars through applying bank credit.

Credit availability is crucial for the mobility of the market since it can provide financing to small and medium size entrepreneurs who are opaquer and more dependent on external financing than others (Berger and Udell, 2002). In the macro economical point of view, it provides descriptive provisions for future consumption and income growth. In the case of consumer behaviour, it is mostly found that, the credit availability and household consumption are highly interacting each other (Chrystal and Mizen, 2005) and credit availability plays an important role also in investment decisions. In fact, in the line with a reduction in credit availability, consumer spending significantly declines (Ludvigson, 1989 and Beaton, 2009). Especially for durables goods i.e. houses, mortgage credit availability is the key determinant for the demand in the housing sector (Guttentag, 1961; Meltzer, 1974). The relationship between credit availability and consumption of households is mainly studied in the literature through focusing on macro-economic variables, household financing conditions and credit constraints. It has been indicated that vehicles sales went down as a result of the credit tightening in the 2007-2009 recession period in US car market (Johnson, Pence and Vine, 2014). Depending on income level and interest rate-maturity conditions of credit availability, it has been found that low income households are more sensitive to borrowing constraints especially to maturity than high income households (Attanasio, Goldberg and Kyriazidou, 2008). On the other hand, payment to income ratio of households is not a suitable proxy to determine the consumption behaviour, instead nominal interest rates and unemployment rates have more significant effect on purchases than real interest rates do (Wilcox, 1989).

Rather than the macroeconomic policies, the credit availability can be raised by investments, especially from abroad. Foreign direct investments in domestic banking sector has advantages for the purchased banks since foreign owned domestic banks, partially or totally, are more able to access funding and equipped with better technological software and labours (Hermes and Lensink, 2004). Evidences show that foreign subsidiaries in banking industry canalise capital and credit in developing countries' banks which results in an expansion in credit supply (De Haas and Lelyveld, 2004) and being a back-up component for risk posing environments (De Haas and Lelyveld, 2006). Since 2000, Turkey is enjoying an intense foreign direct investment to the banking sector.

The main focus of this draft is to examine the effect of credit availability on durable good demand. To answer this question data from Turkish car market will be used. Table 1 demonstrates the new vehicle sales and the balance of car credits in Turkey given for the years 2005-2017. The blue line presents the car credits given (right sided) and the red line for the new car sales (left sided). Since the car sales are affected from seasonality, i.e. many consumers tend to buy the cars at the end of the year due to the discounts made on previous year's car models and also new models will be launched for the upcoming year, the data used in Table 1 are seasonally-adjusted car sales. From the beginning of the period till the late 2006s, an increase in the credits given can be observed, since in that period many acquisitions held by the foreign investors. A peek can also be seen after 2010, in which the Turkish banks were enjoying more foreign investments from abroad. This rise might be a result of the foreign penetration because when banks acquired partly or in total, foreign-owned banks became better access to different sources of financing by being outsourced from their mother companies (Detragiache, Tressel and Gupta, 2008). The first drop in 2008 September for car credits can be a consequence of the global financial crises through experiencing liquidity shortage all over the world. It is important to mention that in that period; the Turkish banking industry was foreign owned by around 25%. Since foreign-owned banks tend to spread outer shocks to the domestic sector (Stiglitz, 1994), the downfall happened from 2008 to 2010 can be explained by the external constraints derived from the global financial crises. This statement also relates with the literature since in the recent global financial crisis period, the credit supply shows a declining trend in the banking industry (Fungáčová, Herrala and Weill, 2013). Despite the reduction in the credit availability in that period, a sharp increase in the car sales stand out for the mid 2009s. This contrast can be explained by the tax deduction policies held by the Turkish government to stimulate the economy for few months. In that period, it can be claimed that households might use their savings to purchase cars. After 2010, an upward trend can be observed as an effect of more acquisitions made by foreign investors. Besides, car sales seem to follow the same trend as credits, with a few exceptions such as minor falls in 2014 and 2016. These descents might be a result of political

tensions since households reduce consumption when the overall country is not promising safe environment for acquisitions. To sum up, it is clearly seen that car credits given and demand for the cars are moving in the same path.

Table 1: New Car Sales and the Balance of Car Credits Given (2005-2017)

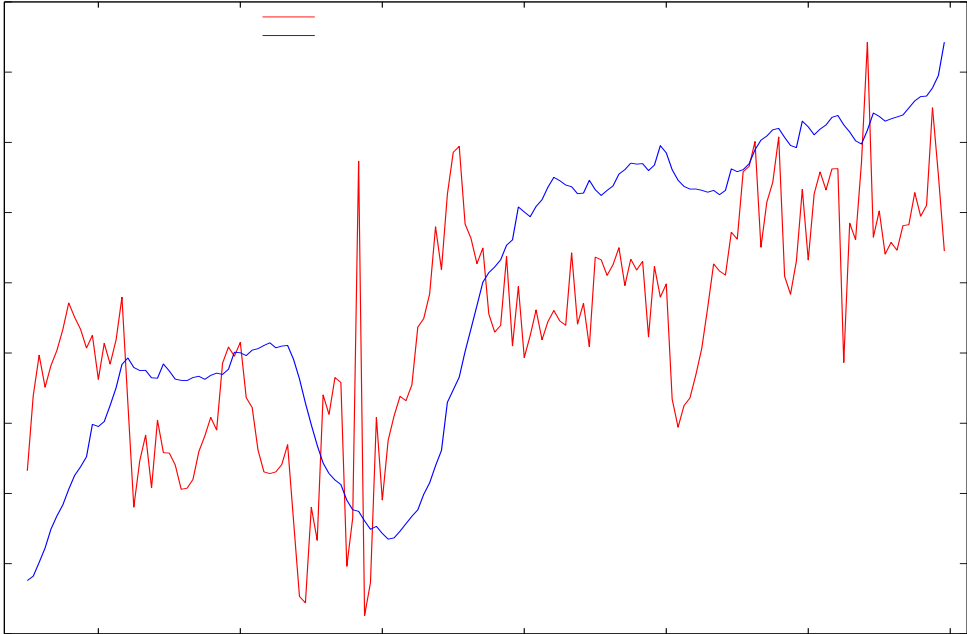
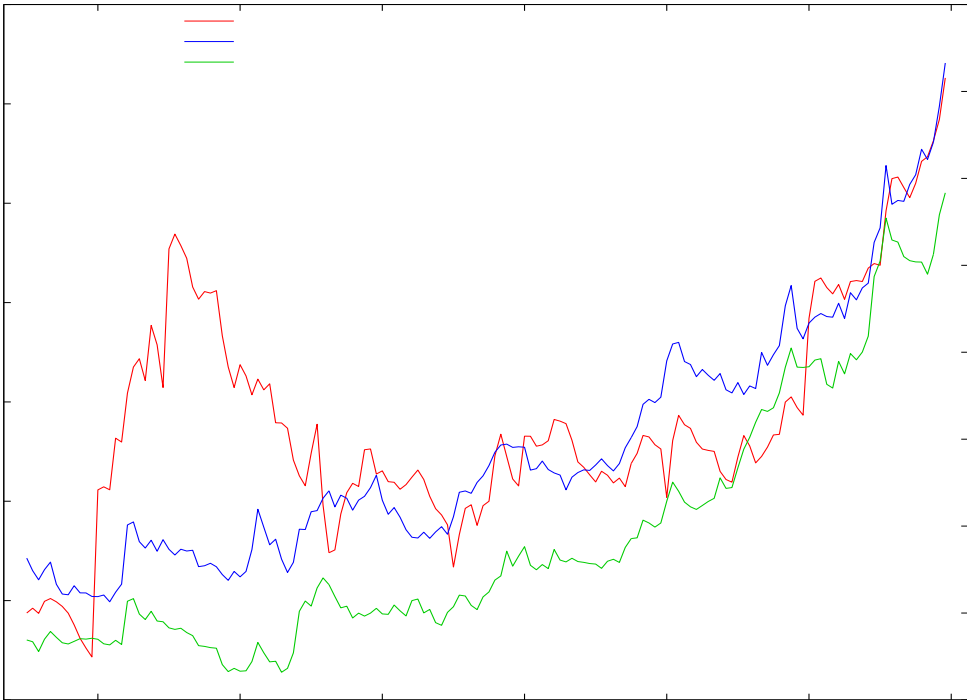


Table 2: Real Car Prices and EURO-USD/Turkish Lira Exchange Rate (2005-2017)



The second graph introduces the real car prices with Euro and US Dollar currency rate against the Turkish Lira. Since Turkey mostly imports cars, the tendency between the variables in the same graph is showed. The red line represents real car prices and it is indexed in the left-hand-side of the graph while the exchange rates are Euro/Turkish Lira (blue line) and US Dollar/Turkish lira (green line) which are indexed in the right-hand-side of the graph. Except the ascent between the years 2006 and 2007, real car prices and currency rates are highly interactive. The demand increase and availability of car credits in that period can express the notable ascent of real prices in earlier of the overall period. When the effects of the global financial crises began to be felt by the market, the decay after 2007, many companies went on discounts and campaigns on current car prices to boost the car market.

Table 3: Energy Prices: Gasoline, Diesel and LPG (2005-2017)

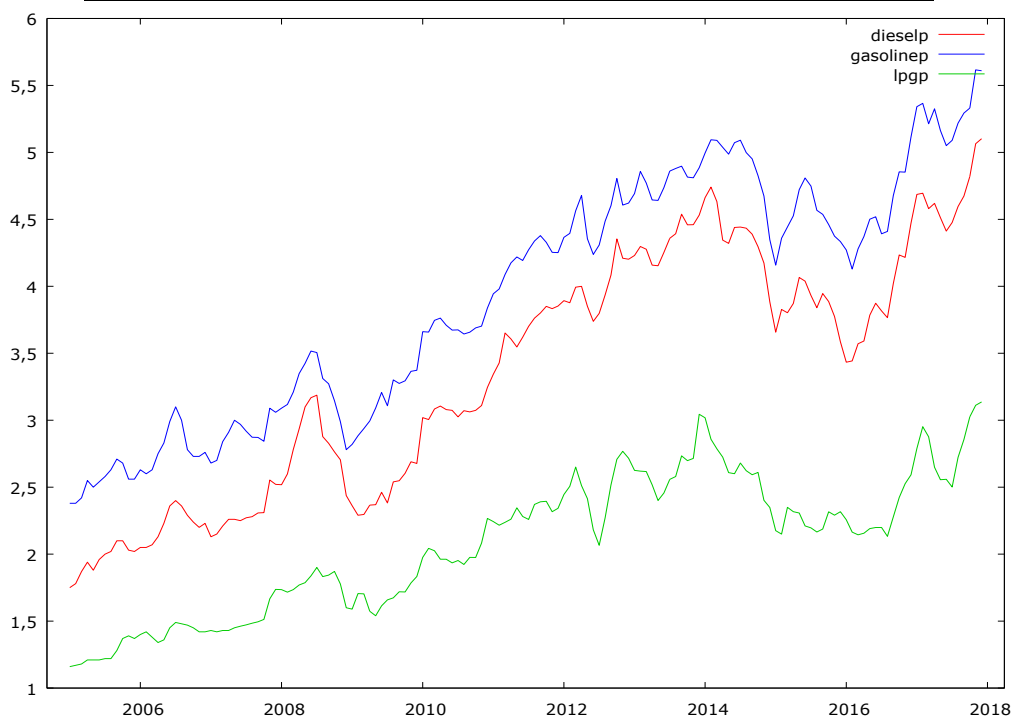


Table 3 shows the fuel prices for the given period 2005-2017. Gasoline (blue line) and diesel (red line) seemed relatively coherent. The green line which refers to liquefied petroleum gas (LPG) is cheaper than the remaining energy prices and the affordability of LPG can trigger households to buy cars because consumers can convert the fuel type of the car to LPG after the acquisition. According to the Turkish Statistical Institute database, the cars with LPG is counted for 38% of the overall car market by July 2018.

Normally, the tax rates for car purchases in Turkey are implemented as 60% and 110% depending on the cylinder volume of the engine. This high taxation is a huge deterring factor for consumers to purchase cars, but the availability of credit can be defined as a subsidiary that can

compensate the financing process for the households. Moreover, Turkey has a high young population percentage among European countries. Since young people do not have enough savings generally to purchase a durable good, they are more likely to be attracted by the credit availability. In these conditions, credit became an integral part of consumption behaviour for durable goods in Turkey.

Methodology

To understand the role of credit supply in car demand, the following model will be applied. In this draft, a simple vector autoregressive (VAR) model is adopted to analyse how credit supply affects car sales.

$$Y_t = \alpha + A_1 Y_{t-1} + u_t$$

The index t denotes the time and α represents the vector of constants while A_1 represents the matrix of polynomials. The vector Y is comprised of car sales, car credits, real car prices, the ratio of diesel price over gasoline price, and inflation rate. Car sales, car credits and the ratio of fuel prices are in log levels. The growth rate of real car prices and the inflation rate itself are included in to the model. All variables are monthly with 156 observations and the model will be estimated for the years 2005-2017.

Data

In this study, the data covers for the period 2005-2017 with 156 observations. The monthly data consists of new vehicle sales, the balance of car credits given, real car prices, inflation rate and the ratio of gasoline and diesel prices. The banks are deposit and participation banks; investment and development banks are not included into the sample. Sales of new cars and commercial vehicles are obtained from the website of Automotive Distributors' Association of Turkey. Monthly car credit balances are acquired from the website of Banking Regulation and Supervision Agency of Turkey. The inflation rates are taken from the website of Central Bank of Turkey. The remaining variables which are monthly average car prices and fuel prices are gathered from the website of Turkish Statistical Institute. Descriptive statistics table for the data is given in Table 4.

Table 4: Descriptive Statistics of Turkish Car Market (2005-2017)

	Car Sales	Car Credits	Car Price	Gasoline	Diesel	Inflation Rate
Mean	63368	17668,638	44000,429	3,928	3,356	8,475
Median	63942	18152,562	37455,743	4,184	3,578	8,316
Std. Dev.	15838	4193,895	16665,388	0,903	0,913	1,771
Kurtosis	-0,274	-1,318	0,493	-1,343	-1,341	0,208
Skewness	-0,253	-0,26	1,002	-0,108	-0,099	-0,006
Min	22602	9517,627	20322,566	2,38	1,75	3,986
Max	104245	24853,571	93386,393	5,616	5,102	12,984
Obs.	156	156	156	156	156	156

Empirical Results

The following two tables represent the response of car credit shock on each variable. The solid lines in the graphs show the response of variables with respect to a one standard deviation shock in car credits. The dashed lines describe the 68% of confidence interval around each point on the solid line.

The first response graphs in Figure 1 are plotted when credit supply is ordered first. We identify the car credit shock by a recursive ordering (Cholesky), meaning that car credit affects all the variables in the system contemporaneously but not the other way around. When we look at the car sales graph, a significant positive impact from the standard deviation car credit shock can be observed till the 6th quarter of the period. From the 7th quarter in the same graph, a significant negative effect of 1% on car sales can be seen. When we check the car price graph, car credits have a negative impact in the 1st quarter, after following by a boost till the 7th quarter. The same effects also stand out for the inflation rate, however, after the 7th quarter, the effects for both car prices and inflation rate are not different from zero. Lastly, car credits have a significant positive impact on the ratio of gasoline and diesel prices for the first twelve quarters.

In Figure 2, to check the robustness of the results, car credit is ordered last implying that all the rest of the variables in the system affect it contemporaneously and the response graphs are displayed. As it is also found in the first graphs, this time, car credit has an insignificant impact on inflation rate and ratio of fuel prices over the whole period. Car credits boosts the car prices by 0.5% point till the 4th quarter, but after the effect is not different from zero till the end of the period. Most importantly, the response of car sales shows a positive significant impact of 3% till the 5th quarter. After that, a negative significant impact of 1% can be measured on car sales.

In both graphs, to sum up, it has been screened that, till the first 5th and 6th quarters of the period, car credits have an enhancing effect on car sales. After these periods, car credits appeared to have a reducing impact on sales. This might be an outcome of the recent financial crisis resulting in a liquidity recession or households might postpone consumption. The model described above is

open to be edited and new variables can be added i.e. household savings and income, number of cars recorded and scrapped, demographic information of the society.

Figure 1: Response Graphs (Car Credits –Ordered First)

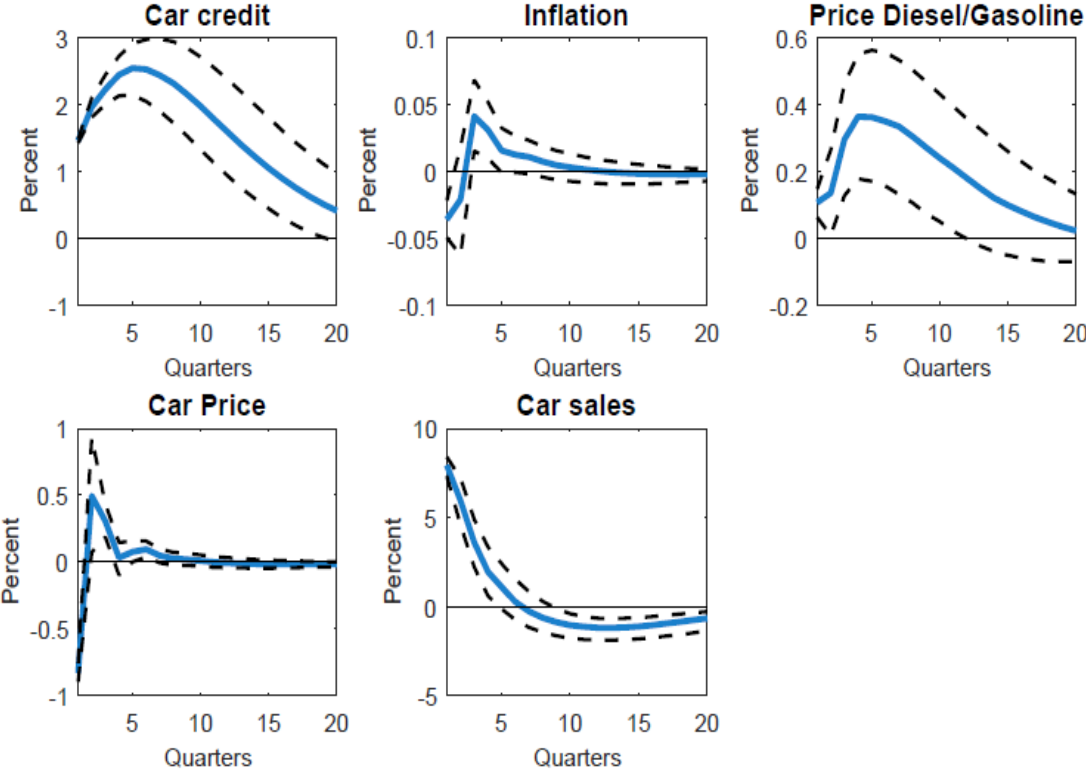
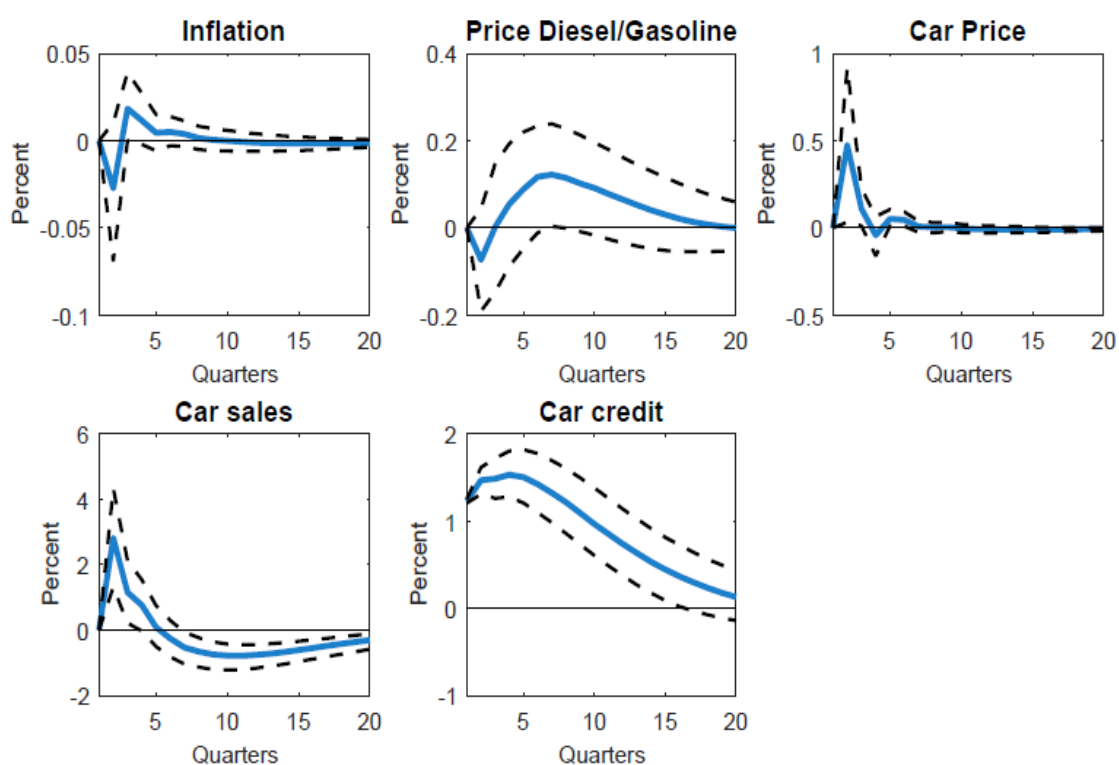


Figure 2: Response Graphs (Car Credits – Ordered Last)



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