Emerging Markets Finance and Trade

ISSN: 1540-496X (Print) 1558-0938 (Online) Journal homepage: https://www.tandfonline.com/loi/mree20

The Failure of Price Competition in the Turkish Credit Card Market

G. Gulsun Akin , Ahmet Faruk Aysan , Gazi Ishak Kara & Levent Yildiran

To cite this article: G. Gulsun Akin , Ahmet Faruk Aysan , Gazi Ishak Kara & Levent Yildiran (2010) The Failure of Price Competition in the Turkish Credit Card Market, Emerging Markets Finance and Trade, 46:sup1, 23-35, DOI: 10.2753/REE1540-496X4603S102

To link to this article: https://doi.org/10.2753/REE1540-496X4603S102

Published online: 07 Dec 2014.

The Failure of Price Competition in the Turkish Credit Card Market

G. Gulsun Akin, Ahmet Faruk Aysan, Gazi Ishak Kara, and Levent Yildiran

ABSTRACT: The failure of competition and the consequent high and sticky interest rates in credit card markets have recently been the subject of considerable debate and research. This paper presents the first regression testing for the existence of price competition in a credit card market to be estimated free of dynamic panel bias using recent quarterly data from Turkey. The estimation reveals that even though the effect of the cost of funds on credit card rates is statistically significant, it is very weak. The paper thus provides empirical evidence for the failure of price competition in the Turkish credit card market.

KEY WORDS: banking, credit cards, price competition, system GMM.

The level of credit card interest rates in Turkey remained persistently high despite the recent substantial declines in the cost of funds and in the other consumer credit interest rates. While banks swiftly reflected the increase in the cost of funds during the November 2000 and February 2001 crises to credit card interest rates,[1] their response to the decline in the cost of funds afterward was very slow. Overnight interest rates, which may be considered as the cost of funds in the credit card business, declined from 44 percent to 15.75 percent in the 2003–2007 period. However, the weighted average interest rate in the credit card market barely declined from 85 percent in 2003 to 60 percent in 2005, and rose again to 80 percent in 2007.

A similar downward-sticky interest rate trend has not been observed in the other consumer credit markets (vehicle, housing, etc.). Interest rates in these markets closely followed the decline in the cost of funds. The major reason for the decline in these interest rates was the increasing competition in consumer banking beginning in 2000.[2] In the credit card market, on the other hand, card-issuing banks adopted strategies to enhance customer loyalty and have been competing with nonprice features (number of installments, card limits, rewards, etc.).

High and sticky credit card interest rates are not unique to Turkey. Credit card interest rates are higher than other consumer credit interest rates all over the world. Empirical evidence from other countries indicates that credit card interest rates are also downward-sticky and show asymmetric response to the changes in the cost of funds. In his seminal paper, Ausubel (1991) showed that although there were about 4,000 banks in the U.S. credit card market and in that sense the market fitted the perfect competition model, the

G. Gulsun Akin (gulsun.akin@boun.edu.tr) is an assistant professor of economics at Bogazici University, Istanbul. Ahmet Faruk Aysan (ahmet.aysan@boun.edu.tr) is an associate professor of economics at Bogazici University, Istanbul. Gazi Ishak Kara (gkara@email.unc.edu) is a Ph.D. candidate at the University of North Carolina at Chapel Hill. Levent Yildiran (levent.yildiran@boun.edu.tr) is an assistant professor of economics at Bogazici University, Istanbul. The authors acknowledge financial support from the Bogazici University Research Fund (Project #08C103). They are grateful for the valuable comments of anonymous referees.

Emerging Markets Finance & Trade / May–June 2010, Vol. 46, Supplement 1, pp. 23–35.

1540-496X/2010 $9.50 + 0.00.
DOI 10.2753/REE1540-496X4603S102

response of credit card interest rates to the decline in the cost of funds was very slow in the 1983–1987 period.[3]

The Turkish credit card market has grown enormously in recent years, becoming the third biggest market in Europe after England and Spain in terms of card numbers and the tenth biggest in terms of transaction volume. With 37.4 million cards, a transaction volume of TRY 141.5 billion was obtained in 2007, reaching 15 percent of the gross domestic product. There are currently twenty-one card-issuing banks and the six largest banks control 87 percent of the market. The high concentration of the market, the prevailing nonprice competition, and the high and sticky interest rates suggest that banks exercise market power. With these concerns, presumably, the Central Bank started to impose a ceiling on credit card rates in 2006. Further regulations of credit card interest rates are on the government's agenda. Card-issuing banks, on the contrary, argue that the competition in the Turkish credit card market is fierce, and any further price regulations will cause banks to reduce the quality and availability of their credit card services, hurting the Turkish economy.

In order to design and implement effective and efficient regulations, a rigorous analysis of the nature of competition in the market is necessary. In this study, the experience of the Turkish credit card market in recent years is examined and the price competition in this market is empirically analyzed by employing a quarterly data set of average credit card interest rates of all issuers in Turkey for the period between the second quarter of 2001 and the last quarter of 2006.

Ausubel (1991) and Aysan and Muslim (2006) empirically analyzed the response of credit card interest rates to the changes in the cost of funds for the U.S. and Turkish markets, respectively, by using conventional fixed and random effects panel data models and instrumental variable techniques. We employ dynamic panel data models to better measure the response of credit card interest rates to the changes in the cost of funds. In that sense, we improve the methodology used in previous studies for similar estimations. Moreover, we cover an extended time period compared to the Aysan and Muslim (2006) study with the availability of new data. System GMM (general method of moments) regressions are run on a dynamic panel data model, and it is shown that credit card interest rates are economically insensitive to the changes in the cost of funds. This result is an indication of the failure of price competition in the market.

The Turkish Credit Card Market

Even though the first credit cards entered the Turkish market in 1968 with Diners Club, they were accessible only to high-income people and accepted at a small number of stores for more than two decades. There were only 554,000 credit cards in Turkey in the early 1990s. High inflation rates, frequent economic crises, and the consequent increases in consumer default rates delayed the development of the credit card market in the 1990s (Aysan and Muslim 2006; Aysan et al. 2008).

The rapid development of the market started in the late 1990s and accelerated in the first decade of 2000. The number of credit cards increased almost threefold from 13.6 million to 37.3 million between January 2002 and December 2007. The tremendous increase in the number of points of sales (POS) from 382,000 to 1.5 million during the same period reflects the widespread acceptance of credit cards by merchants and vast investments made by banks in the credit card business (Table 1). Not only the number of cards but also the total and average volumes of transactions with credit cards increased. The total

Table 1. Developments in the Turkish credit card market

	Total number of credit cards (million)	Total value of credit card transactions (billion TRY)	Number of POS (thousand)
2002	15.7	24.5	495.7
2003	19.9	39.4	662.4
2004	26.7	64.6	912.1
2005	30.0	85.3	1,141.0
2006	32.4	108.4	1,282.7
2007	37.3	141.5	1,453.9

Source: Interbank Card Center.

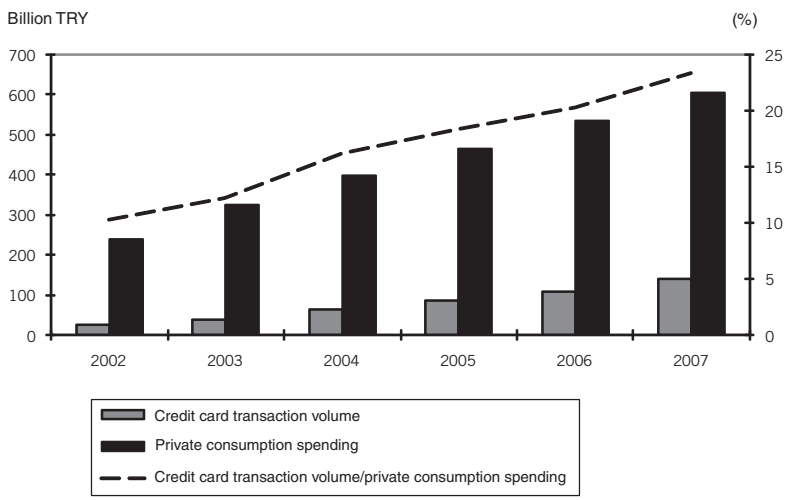

Figure 1. Credit card transaction volume and total private consumption spending

Source: Central Bank of Turkey and Interbank Card Center
Note: Transaction volume includes cash withdraws with credit cards.

volume rose from TRY 24.5 billion in 2002 to TRY 141.5 billion in 2007, reaching 23.4 percent of total private consumption spending (Table 1 and Figure 1). Transaction volume per card increased from TRY 170 to TRY 373 in the same period.

Consumers gained a number of benefits from credit cards such as not having to carry cash, being able to borrow at any time, enjoying the benefits of online shopping and gaining rebates, money points, actual gifts, and travel miles, which increased the attractiveness of credit cards. They also benefited from being able to pay in installments without any surcharge over the cash prices of goods, while merchants preferred credit cards over traditional methods of sales with installments, since credit cards transferred the default risk and the cost of collecting receivables to banks.

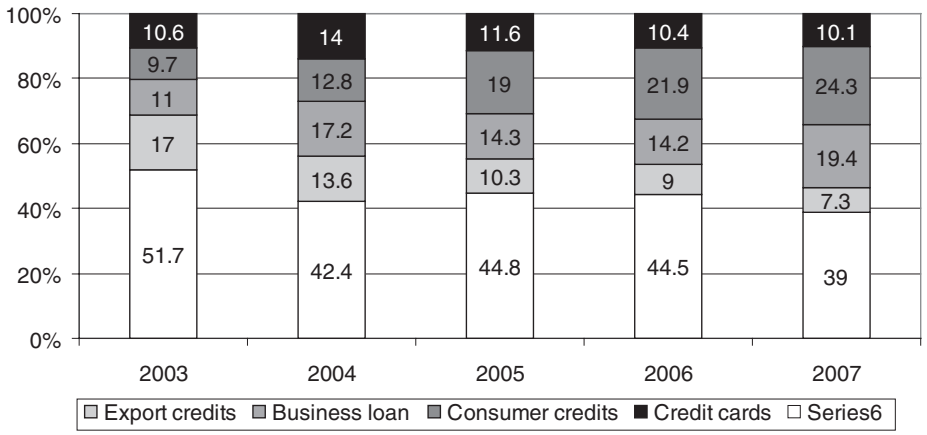

Figure 2. Distribution of credits in the Turkish banking sector by types

Source: Banking Regulation and Supervision Agency of Turkey and Central Bank of Turkey.

Besides their increasing popularity as a payment instrument, credit cards also gained widespread usage as a credit instrument. Total revolving debt, excluding balances from installments, went up from TRY 6.3 billion in 2005 to TRY 8.1 billion in 2007. The ratio of revolving credit card debt to total outstanding balances was 30.50 percent in 2007, reflecting that a significant number of consumers borrowed on their credit cards in spite of abnormally high interest rates. However, the share of credits provided by credit cards in total credits exhibits a stable trend in recent years at around 10 percent (Figure 2). This indicates that other credit markets have also grown significantly in recent years due to the shifting focus of banks from the government bond market to industrial, commercial, and consumer credit markets.

At the same time, the number of delinquent consumers in credit card debt increased sharply despite buoyant economic growth, low inflation, and political and economic stability in recent years. The number of delinquent consumers more than doubled, rising from 415,000 in January 2005 to 950,000 in July 2007. Delinquent credit card loans, meanwhile, increased from TRY 311 million to TRY 1.8 billion between January 2004 and June 2006.[4]

Looking at the supply side of the market, there are twenty-one credit card issuers in Turkey.[5] While the bulk of them are private domestic banks, three are public and eight are foreign banks. All of these issuers provide general corporate and individual banking services at the same time. The credit card market is quite concentrated. The market share of the six largest issuers is 87 percent in total outstanding balances and 80 percent in the number of customers (Table 2).

Twenty-one issuers should be enough to establish price competition in the market. However, banks' reluctance to decrease credit card rates in response to the decline in the cost of funds indicates that competition in the market is not concentrated on prices. Especially the largest issuers focus on strategies that will increase customer loyalty by providing nonprice benefits to credit card customers. Until the imposition of the price ceiling in June 2006, they charged higher than average credit card interest rates, and they

Table 2. The six largest issuers in the Turkish credit card market (June 2007)

Bank	Market share (%) (outstanding balances)	Market share (%) (number of customers)
Yapi Kredi	24.8	24.7
Garanti	20.8	13.3
Akbank	14.5	12.6
Isbank	12.4	11.9
Finansbank	7.6	9.6
HSBC	7.1	8.1
Six largest issuers	87.1	80.2
Sector	100.0	100.0

Source: Central Bank of Turkey.

set their rates at the ceiling level afterward. On the other hand, small issuers and public banks charged lower than average rates during the sample period, though still not succeeding in improving their market shares. This failure is an indication that on average customers are more concerned about nonprice benefits than interest rates.

An important dimension of the nonprice competition among issuers in Turkey is the number of POS. Banks are not able to offer some nonprice benefits such as large numbers of installments, rebates, and gifts for credit card transactions made through the points of sale of other issuers. Thus consumers prefer to have the credit card of the issuers with large POS networks. The market leaders of credit card issuers also have the largest POS networks. This puts the smaller banks with smaller POS networks at a considerable disadvantage in nonprice competition.

The high concentration in the market and the high and sticky credit card interest rates point to the market power of these issuers. Coupled with the increasing complaints from card holders and consumer organizations, these paved the way for the first regulation in the credit card market in 2003, which proved not to be very effective in reducing credit card interest rates (Aysan and Yildiz 2007). Consequently, the Bank and Credit Cards Law was enacted on March 1, 2006. Authorized by this law, the Central Bank started imposing an interest rate ceiling at the beginning of each quarter, determined by adding 0.5 percentage points to the weighted average of credit card rates in the market.

However, most of the banks, especially larger banks, set their credit card rates at the maximum level allowed by the ceiling. These rates are still perceived to be very high by consumer organizations and the public at large. They deem further regulations to be necessary. Banks, on the other hand, claim that the industry is competitive and that further regulations will seriously harm the profitability of the credit card business. In this case, banks may be compelled to reduce the quality and availability of their services, which would in turn discourage credit card usage and lead to economy-wide consequences. The resulting liquidity and credit constraints would prevent consumers from smoothing their consumption, thus reducing welfare. Moreover, credit card usage is expected to decrease the size of the informal economy and increase tax revenue. Retailers support banks as well, fearing that their sales will decline. All these debates show that a rigorous analysis

of the nature of competition in the market is necessary in order to design and implement effective and efficient regulations.

Theoretical Background

As a credit instrument, credit cards are inherently more costly than other credit types. To begin with, as they are uncollateralized, loans extended through credit cards expose banks to higher default risk. Credit cards also entail high liquidity risk. Banks commit to lending any amount up to the credit card limit, and the utilization of this credit, by withdrawing cash for instance, is solely at the discretion of consumers. As banks ex ante do not have information as to when and how much they are going to lend to credit card consumers, they have to keep provision equal to the difference between total credit card limits and total outstanding balances. Banks secure themselves against this liquidity risk by keeping short-term, low-yield securities or by being prepared to borrow short-term expensive funds (Shaffer and Thomas 2007). In that sense, funding of credit cards is more expensive than funding of other credit types. Furthermore, operating a credit card system entails huge investments in technology and other infrastructure. Banks also provide credit card consumers with many nonprice benefits such as money points, gifts, and travel miles, which again entail high costs. Finally, credit card consumers do not make any payment during the grace period, which can be forty-five days in Turkey, and banks have to finance the card holders' purchases in this period.

While all of these factors are related to the nature of the credit card business, they explain the high cost of credit card borrowing only in part. When we consider that credit cards turn out to be the most profitable line of business for some banks in Turkey, credit card interest rates still seem to be very high, even after controlling for the above costs.[6] This observation suggests that the reasons for high credit card rates lie somewhere else.

There are various explanations for high credit card rates in the literature. A leading explanation is based on the customer structure in credit card markets. Chakravorti (2003) classifies customers into two groups according to their credit card usage behavior: convenience users who regularly pay their bills at the end of the grace period, and revolvers who use the credit option of their cards. Chakravorti argues that the level of credit card interest rates is related to the relative ratios of these two groups. Convenience users are not profitable for issuers. Consumers in this group use their credit cards only as a means of payment. Additionally, they benefit from rewards, rebates, and so on, that depend on credit card usage. Hence, their costs in the noninterest bearing grace period are financed through the interest income from revolvers. Since 30–40 percent of the customers in the U.S. credit card market are convenience users,[7] there are two revolvers for each convenience user. The ratio of convenience users in Turkey is 78 percent.[8] This means that each revolver is financing three convenience users. It has been argued that this consumer structure in the market is an important reason for the extremely high credit card interest rates in Turkey.

Despite the existence of sufficient numbers of competitors, Ausubel (1991) explains the failure to achieve competitive rates in credit card markets on the basis of low price elasticity on the demand side, emanating from search cost, switch cost, and consumer irrationality, and asymmetric information on the supply side. Stating that search and switch costs are not sufficient to explain price stickiness, he categorizes credit card holders in three groups. The first group is made up of convenience users who never borrow and hence are insensitive to interest rates. These customers are not risky for a bank;

however, they are costly and do not yield any profit opportunities. The second group includes consumers who exhibit some sort of irrationality: they do not intend to borrow ex ante, but somehow end up doing so ex post. These consumers are generally low-risk and pay their debt, hence they are the preferred consumer group for banks. Since they do not plan to use the credit option of their cards ex ante, their perceived expected benefit from switching to a lower-rate card is lower than the cost of switching for these consumers. Therefore, they are not sensitive to credit card rates. Consumers in the third group plan to use the credit option of their cards, they are illiquid, and hence are risky and not preferred by banks. These customers are sensitive to interest rates because they actually intend to borrow and pay their debt. According to the new adverse selection theory suggested by Ausubel (1991), in a situation where banks cannot differentiate between these three consumer types, a bank that unilaterally lowers its interest rate will attract only the consumers in the third group.[9] This theory is one of the fundamental explanations for banks' reluctance to compete in prices.

Calem and Mester (1995) and Calem et al. (2006) introduce impatience, and, by mingling it with search and switch costs, define another set of categories to assess credit card holders. Their first category consists of patient customers with low search costs and high price elasticity of demand. They have low credit card balances and hence are not profitable for banks. The second category includes low-risk and impatient credit card holders. These consumers do not want to postpone consumption and have high search costs. They are profitable for banks as they carry high balances. Impatient credit card holders with high default risk, high search costs, and high balances constitute the third category. They are not desirable for banks. Asymmetric information again results in sticky prices. If a bank lowers its interest rate in the presence of search costs only, it merely attracts customers from the unprofitable first category. Switching costs can affect interest rates in two ways. If credit card balances (but not the types of customers) can be observed by all banks and are taken to indicate risk, then the consumers in the second and third categories will have high switching costs because they will need to reduce their balances in order to be able to get new cards. A decrease in the credit card interest rate will thus only attract the consumers in the first category. If the types are known only by their own banks, banks increase switching costs for the consumers in the second category, for example, by offering higher limits, so that they do not respond to rate reductions of other banks. Any unilateral interest rate cut by a bank in this situation will thus attract only the undesirable first and third types of customers.

Search cost and asymmetric information explanations for high credit card rates are less relevant for the Turkish market. A number of factors decrease the search cost for consumers in Turkey. First, the Banking Regulatory and Supervisory Agency (BRSA) of Turkey and the Central Bank of the Republic of Turkey (CBRT) publish all of the relevant information about credit cards such as interest rates, benefits and update this information monthly. Therefore, consumers do not need much time and effort to obtain information about different credit cards. Second, there are only twenty-one issuers. This number is very small compared to the average number of issuers from which a consumer in the United States or Europe have to choose.

In Turkey, the asymmetrical information problem is not serious either. First, there is a developed information-sharing system among banks, which eliminates interbank information asymmetries. Through the Credit Bureau of Turkey, each bank can have access to information about the credit positions of other banks' customers. Moreover, advancements in risk management and information technology have provided banks with better means

for screening the default risks of credit card consumers. The Credit Bureau of Turkey assists credit institutions in this respect as well by providing them with risk monitoring and evaluating services. Therefore, banks are now able to differentiate between high- and low-risk customers at lower costs.

We believe that switching cost and nonprice competition through product differentiation arguments are more valid for the Turkish credit card market. To enhance customer loyalty and increase switching costs, banks provide nonprice credit card benefits such as money points, actual gifts, travel miles, and a higher number of installments, and improve the quality of their general banking services. We deal extensively with the switching cost and nonprice competition arguments in another paper (Akin et al. 2008).

Empirical Analysis of Credit Card Rates in Turkey

Previous studies emphasize that the main determinant of the marginal cost for credit card issuers is the cost of funds. In addition, the cost of funds is the only part of the marginal cost that changes relatively frequently (Ausubel 1991; Budde 2001). Therefore credit card interest rates are expected to move together with the cost of funds in the continuous spot market equilibrium (Ausubel 1991). Credit card operations of banks must be funded with short-term funds because of the unexpected liquidity constraints arising from the nature of credit cards. Hence, overnight interest rates or interest rates on short-term government bonds are likely proxies for the cost of funds in the credit card sector. Ausubel (1991) employs the Treasury-bill (T-bill) interest rates in the United States to account for the cost of funds. Similarly, in this study the overnight interest rates, which display parallel movement to T-bill rates, are used to proxy the cost of funds.

The Model

In order to analyze the response of credit card interest rates to the changes in the cost of funds, these rates are regressed on their own lags and the lag of the cost of funds as:

$$\text{rate}_{it} = \alpha\text{rate}_{i,t-1} + \beta\text{cost}_{i,t-1} + \eta_i + \nu_{it}, \tag{1}$$

where the subscripts i and t stand for banks and quarters, respectively. The variable "rate" is the credit card interest rates of the issuers in the Turkish credit card market, and "cost" is the interest rate on the T-bills, proxying the cost of funds. The data are quarterly, spanning the postcrisis period from the second quarter of 2001 to the last quarter of 2006 after which the Central Bank started imposing a credit card interest rate cap.[10] Fixed effects are shown by η_i, and ν_{it} stands for idiosyncratic error terms. β captures the cost sensitivity of credit card rates while the model controls for the effect of the previous period's credit card rate on the current one through the lagged variable $\text{rate}_{i,t-1}$.

If OLS (ordinary least squares) is used to estimate Equation (1), a dynamic panel bias occurs due to the fact that the lagged dependent variable, $\text{rate}_{i,t-1}$, is correlated with the fixed effects and therefore is endogenous. Thus, the estimated coefficients would be inconsistent, and the coefficient of the lagged dependent variable would be upward biased as a result of this positive correlation.

When we apply mean transformations to Equation (1) we obtain:

$$\text{rate}^*_{it} = \alpha\ \text{rate}^*_{i,t-1} + \beta\text{cost}^*_{i,t-1} + \nu^*_{it} \tag{2}$$

where

$$\text{rate}^{*}_{i,t-1} = \text{rate}_{i,t-1} - 1 / (T - 1) \times (\text{rate}_{i2} + ... + \text{rate}_{iT}),$$

$$\text{cost}^{*}_{i,t-1} = \text{cost}_{i,t-1} - 1 / (T - 1) \times (\text{cost}_{i2} + ... + \text{cost}_{iT}), \text{ and}$$

$$\nu^{*}_{it} = \nu_{it} - 1 / (T - 1) \times (\nu_{i2} + ... + \nu_{iT}).$$

In the mean-transformed regression, the correlation between the transformed lagged dependent variable and the transformed error term is negative (Bond 2002; Nickell 1981). Therefore, we expect the coefficient on the lag of the dependent variable in this regression to be downward biased. The order of the correlation in the above regression is $1 / (T - 1)$, and therefore when T becomes large, this bias disappears.

Since applying OLS to Equation (1) inflates the coefficient of the lagged dependent variable for short panels and applying within groups transformation creates a downward bias, both of these estimates are inconsistent. Bond (2002) suggests that the candidate for a consistent estimate should create a coefficient for the lagged dependent variable between these two estimates. When we apply a "first-difference transformation" to the model in Equation (1), we obtain:

$$\Delta\text{rate}_{it} = \alpha\Delta\text{rate}_{i,t-1} + \beta\Delta\text{cost}_{i,t-1} + \Delta\nu_{it} \quad (3)$$

First-difference transformation removes the fixed effects, but the lagged dependent variable in this transformation is still correlated with the error term. To see this, note that the term $\text{rate}_{i,t-1}$ in $\Delta\text{rate}_{i,t-1} = \text{rate}_{i,t-1} - \text{rate}_{i,t-2}$ is correlated with the term $\nu_{i,t-1}$ in $\Delta\nu_{it} = \nu_{it} - \nu_{i,t-1}$. Fortunately, however, deeper lags of the lagged dependent variable are now uncorrelated with the transformed error term, and they remain as instruments for the transformed lagged dependent variable in Equation (3).

Results

The results of the estimation of Equation (1) are presented in Table 3. OLS gives a higher coefficient than the within groups estimation in the regressions, as can be seen in the first and second columns of Table 3. Thus we can expect the consistent estimations to give coefficients between 0.87 and 0.75 for the lagged dependent variable. However, since T is relatively large (23) in our regressions, a strong bias is not expected in the within groups estimation. Hence, it is reasonable to expect the coefficient of the lagged dependent variable to be close to the within groups coefficient in a proper estimation of this dynamic panel data model.

Two-step system GMM is run to estimate the model without biases. The coefficient of the lagged dependent variable (0.75) is almost equal to the within groups estimation. The m1 test shows that there is a first-order serial correlation in the transformed error terms as expected, and the second-order serial correlation is rejected by the m2 test;[11] hence, it is possible to use the second lag of the dependent variable as an instrument for the transformed lagged dependent variable.[12]

The two-step system GMM estimation gives a coefficient of 0.37 for the lag of the cost of the funds. This coefficient indicates that a 10 percent decline in the cost of funds results in a 3.7 percent reduction in credit card interest rates. Although this coefficient is statistically significant, in economic terms it is not a very substantial amount. In other words, credit card interest rates adjust to the changes in the cost of funds at a sluggish

Table 3. Empirical results

	1	2	3
Dependent variable: Rate	**OLS**	**Within groups (fixed effect)**	**System GMM ($t-2$ $t-3$)**
Lag of rate	0.87	0.75	0.75
p-value	0.00	0.00	0.00
Lag of cost of fund	0.13	0.22	0.37
p-value	0.00	0.00	0.00
R^2	0.93	0.92	
m1			0
m2			0.099
Sargan test			1
Instrument count			26
Number of steps in GMM			2
Time period		2001q2–2006q4 (23 periods)	
Number of observations	496		
Number of cross-sections (banks)	22		

Table 4. Persistency of credit card rates

	GMM Sys $t-2$ $t-3$	GMM Dif $t-2$ $t-3$	GMM Dif $t-3$ $t-4$
Lag of rate	0.73	0.64	0.84
p-value	0.00	0.00	0.00
R^2			
m1	0.002	0.003	0.002
m2	0.022	0.008	0.017
Sargan-Hansen test	1		1
Instrument count	25/22	23/22	23/22
Steps in GMM	2	1	1

rate. This result provides empirical evidence for the lack of price competition in the Turkish credit card market.

Note that the Hansen test of joint validity does not work properly, and it gives extremely good results such as a *p*-value equal to 1 because the number of instruments (26) exceeds the number of cross-sections (22) in this system GMM estimation.[13]

Simulations show that if the panel series at hand is highly persistent, that is, if they exhibit a pattern close to a random walk, then applying a "difference GMM" performs poorly and the results could be improved by using what is called a system GMM. To check for persistency, the credit card interest rates are regressed on their own lags and on time dummies. Bond (2002) shows in simulations that system GMM gives the best result in checking for persistency in panel data series. The results of these estimations are reported in Table 4, along with OLS and within group estimations that are presented

for comparison. The coefficient on the lag of rate is 0.73 in the two-step system GMM regression, and it is statistically significant.

Conclusion

This study analyzes price competition in the Turkish credit card market. In a competitive spot market model, a close connection is expected between credit card interest rates and the cost of funds for the credit card issuers (Ausubel 1991). However, credit card interest rates did not appear to respond much to the decline in the cost of funds in different countries and in different periods. We empirically analyze the response of credit card interest rates to the changes in the cost of funds in Turkey during the period 2001–2006. A quarterly data set of the credit card interest rates for all twenty-two issuers in the market is employed in an empirical model where these rates are regressed on their own lags, the lags of the cost of the funds, and time dummies. This regression is the first in the literature to be estimated free of dynamic panel bias. In this dynamic panel data setting, the two-step system GMM estimations yield a statistically significant but economically weak coefficient on the response of credit card interest rates to the changes in the cost of funds.

The study thus provides empirical evidence for the failure of price competition in the Turkish credit card market. Banks' claim that there is fierce competition in this market is legitimate nonetheless, as banks are observed to be involved in nonprice competition. To design effective regulations, therefore, the nature of this nonprice competition should be explored. Furthermore, considering that banks interact with both card holders and merchants in their credit card business, the effects of interest rate regulations on the merchants' side of the market should also be investigated.

Notes:

1. The weighted average credit card interest rate rose from 107 percent in the first quarter of 2000 to 181 percent in the second quarter of 2001. Some banks stopped advancing cash and reduced credit card limits in this period. See Aysan and Muslim (2006).

2. The main source of profits for the banking industry throughout the 1990s was lending to the government at high interest rates. This "low-risk, high-return" period ended with the November 2000 and February 2001 financial crises. Tight fiscal policy after the crisis and the accompanying standby agreement with the International Monetary Fund have been beneficial in establishing stability in the economy. Due to lower inflation and higher growth rates, government bonds lost their attractiveness and banks shifted their focus to the consumer credit market. Consequently, interest rates and profit margins in consumer credit markets decreased to competitive levels quickly with the increasing competition (Akin et al. 2009).

3. Moreover, he calculated that banks earned three to four times the ordinary rate of return of the banking industry from their credit card business in that period.

4. Data for outstanding credit card balances, delinquent credit card loans, revolving credit card debt, and the number of credit card consumers are obtained from the Central Bank of Turkey.

5. In this study, we do not consider the four small financial institutions that do not charge interest for credit cards. Kocbank and Yapi Kredi merged under Yapi Kredi in the second half of 2006. This merger decreased the number of issuers in the market to twenty-one. However, in the empirical part of the study, we include data for twenty-two issuers since we cover the period until the second half of 2006.

6. Ausubel (1991) documents similar evidence for the U.S. market.

7. Predictions for 2003 (Chakravorti 2003).

8. Interbank Card Center (ICC), Bank and Credit Card Usage Survey, May 2008; available at www.bkm.com.tr.

9. The well-known Stiglitz and Weiss (1981) adverse selection theory predicts an opposite outcome. Only high-risk consumers respond if a bank unilaterally increases its interest rates. Hence, this bank's risk position worsens and its expected future profits decrease. Ausubel argues that the Stiglitz-Weiss theory fits more collateralized credits, while his own theory is better for uncollateralized credits.

10. Monthly credit card interest rate data were obtained from the BRSA and CBRT to compile our quarterly data set. Only BRSA data were available for the period before December 2005. There were small differences between the data from these sources for some banks, and hence their average was used for the period December 2005–August 2006. In the period after August 2006, only CBRT data were available. The number of observations in the data set is 496. The credit card interest rates for banks range between 2.75 percent and 10 percent, with a mean of 6.67 percent and a standard deviation of 1.65. The interest rate on the T-bills (the "cost" variable), on the other hand, has a mean of 2.66 percent and a standard deviation of 1.48 percent, varying between 1.13 percent and 5.97 percent.

11. In Tables 3 and 4, m1 and m2 are the Arellano and Bond tests for first- and second-order serial correlation, asymptotically $N(0,1)$. The reported values for m1 and m2 are the p-values for the null hypothesis of no-serial correlation. In the OLS estimation, they test the serial correlation in levels residuals, and in GMM-estimations, they test the first differenced residuals.

12. First-order serial correlation in the first-differenced residuals is expected by construction since $\Delta\nu_{it} = \nu_{it} - \nu_{i,t-1}$ and $\Delta\nu_{i,t-1} = \nu_{i,t-1} - \nu_{i,t-2}$ share the same term, $\nu_{i,t-1}$. What we need to check is the second order correlation in the first-differenced residuals. The reason is that if there is a correlation between $\Delta\nu_{it} = \nu_{it} - \nu_{i,t-1}$ and $\Delta\nu_{i,t-2} = \nu_{i,t-2} - \nu_{i,t-3}$, this indicates a first-order correlation in levels due to the correlation between $\nu_{i,t-1}$ in the first and $\nu_{i,t-2}$ in the latter. If we find a second-order correlation in differenced residuals, we can no longer use the twice lag of the dependent variable, $\text{rate}_{i,t-2}$, as an instrument for the first-differenced lag of the dependent variable, $\Delta\text{rate}_{i,t-1}$, and therefore we need to use deeper lags of the dependent variable.

13. Since the instrument matrix creates one column for each period and lag available to that period, the number of instruments is quadratic in T. In the literature, as a rule of thumb, limiting the instrument count with the number of cross-sections in the regression is recommended. There is no universal rule, however, and therefore instrument counts are also reported in Tables 3 and 4 following the advice of Windmeijer (2005). When the number of instruments exceeds the number of cross-sections, the Sargan-Hansen test of joint validity does not work properly and it gives extremely good results such as a p-value equal to 1 (Hansen 1982).

References

Akin, G.G.; A.F. Aysan; and L. Yildiran. 2009. "Transformation of the Turkish Financial Sector in the Aftermath of the 2001 Crisis." In *Turkish Economy in the Post-Crisis Era: The New Phase of Neo-Liberal Restructuring and Integration to the Global Economy,* ed. Z. Onis and F. Senses, pp. 73–100. London: Routledge.

Akin, G.G.; A.F. Aysan; G.I. Kara; and L. Yildiran. 2008. "Non-Price Competition in Credit Card Markets Through Bundling and Bank Level Benefits." MPRA Paper, no. 17768.

Ausubel, L.M. 1991. "The Failure of Competition in the Credit Card Market." *American Economic Review* 81: 50–81.

Aysan, A.F., and N.A. Muslim. 2006. "Assessing the Competition in the Credit Card Market in Turkey: A New Empirical Evidence." In *International Management Development Research Yearbook,* ed. K. Erdener and H. Talha, vol. 15, pp. 147–154. Hummelstown, PA: International Management Development Press.

Aysan, A.F., and L. Yildiz. 2007. "The Regulation of the Credit Card Market in Turkey." *International Research Journal of Finance and Economics* 2, no. 11: 141–154.

Aysan, A.F; L. Yildiran; G.I. Kara; N.A. Muslim; and U. Dur. 2008. "Türkiye'de Kredi Kartı Sektöründe Yasal Düzenlemeler ve Rekabet." *Iktisat Isletme ve Finans* 23, no. 265: 34–49.

Bond, S. 2002. "Dynamic Panel Data Models: A Guide to Micro Data Methods and Practice." Institute for Fiscal Studies Working Paper 09/02. London.

Budde, S. 2001. *Card Industry Directory*, 2002 ed. Chicago: Thomson Financial Media.

Calem, P., and L. Mester, 1995, "Consumer Behavior and the Stickiness of Credit-Card Interest Rates." *American Economic Review* 85: 1327–1336.

Calem, P.; M. Gordy; and L. Mester. 2006. "Switching Costs and Adverse Selection in the Market for Credit Cards: New Evidence." *Journal of Banking & Finance* 30: 1653–1685.
Chakravorti, S. 2003. "Theory of Credit Card Networks: A Survey of the Literature." *Review of Network Economics, Concept Economics* no. 2: 50–68.
Hansen, L. 1982. "Large Sample Properties of Generalized Method of Moments Estimators." *Econometrica* 50, no. 3: 1029–1054.
Nickell, S.J. 1981. "Biases in Dynamic Models with Fixed Effects." *Econometrica* 49: 1417–1426.
Shaffer, S., and L. Thomas. 2007. "A Reassessment of Market Power Among Credit Card Banks." *Applied Financial Economics* 17: 755–767.
Stiglitz, J.E., and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information." *American Economic Review* (June): 393–410.
Windmeijer, F. 2005. "A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators." *Journal of Econometrics* 126: 25–51.