



# Monetary policy and credit cards: Evidence from a small open economy<sup>☆</sup>

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## ARTICLE INFO

### Article history:

Accepted 26 September 2010

### JEL Classifications:

E44  
E50  
E60  
C32

### Keywords:

Credit cards  
Monetary policy  
Credit channel  
Vector autoregression  
Turkey

## ABSTRACT

This paper uses a unique monthly data set that covers the overall credit card usage in a small-open economy, Turkey, to investigate a possible credit channel of monetary policy transmission through credit cards. A reduced-form vector autoregression analysis is employed, where the forecast error variance decompositions are calculated for three-year windows over the period 2002–2009. It is shown that, during the recent financial crisis that has started in 2007, the monetary policy of Turkey has shifted toward focusing on output volatility and interest rate smoothing through setting short-term interest rates, while the inflation rate has been mostly affected by exchange rate movements and inflation inertia. Credit card usage has an increasing effect on inflation rates through time, requiring more policy emphasis on the credit channel through credit cards. When the effects of the *credit view* and the *money view* are compared, the former seems to be more effective on the real side of the economy, independent of the level of inflation.

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## 1. Introduction

There is a well-known debate between the *money view* and the *credit view* of monetary policy. The former, by assuming that all nonmoney assets are perfect substitutes, emphasizes the money supply affecting aggregate demand through short-term interest rates. The latter goes one step further and states by assuming that bank loans are imperfect substitutes to other nonmoney assets and that the money supply affects aggregate demand not only through short-term interest rates but also through new bank loans.<sup>1</sup> Within this context, the contemporary payment methods, such as credit cards, come into the picture, emphasizing more the role of credit view—so called the credit channel of monetary policy transmission.<sup>2</sup>

In particular, in the credit channel of monetary policy transmission, a contractionary monetary policy can force constrained financial institutions (constrained on both sides of their balance sheet) to restrict lending through credit cards, independent of the demand for loans.<sup>3</sup> For

borrowers dependent on financial institutions through credit cards, the contractionary monetary policy restricts their source of credit and increases the costs of seeking alternative sources.<sup>4</sup> Therefore, the most compelling literature on lending effects focuses on the relationship between small banks and small borrowers. Kashyap and Stein (1995, 2000), and Gertler and Gilchrist (1993, 1994) provide a combination of empirical evidence showing that small commercial banks do contract lending after a negative policy shock, and small firms are affected by that contraction.<sup>5</sup> The “small” commercial bank assumption is important, since it is assumed that the small borrower relies on a special relationship with the small bank for its credit and finds it difficult to get credit from larger banks or from nonbank alternatives; this is the exact case in the market for credit cards.

Within the big picture of credit markets, this paper investigates possible interactions between credit card usage and the monetary policy in a small-open economy, Turkey, which has experienced an increasing credit card usage, especially after 2002. In particular, the volume of transaction with credit cards (i.e., credit card usage) has increased from 24 billion Turkish liras (16 billion euros) in 2002 to 200 billion Turkish liras (92 billion euros) in 2009. During the same period, the real volume of credit card transactions (defined as credit card usage in Turkish liras over the Turkish consumer price index) has increased by 465%, while the number of transactions has increased from 630 million to

<sup>☆</sup> The author thanks Stephen Hall and two anonymous referees for their helpful comments and suggestions. The usual disclaimer applies.

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<sup>1</sup> Although most of the empirical evidence supports the credit view (see Bernanke, 1993, and the discussion therein), the exceptions that empirically find the money view more significant than the credit view include King (1986), Romer and Romer (1990), and Ramey (1993).

<sup>2</sup> See Brady (in press) for an excellent literature survey on consumer credit and the transmission mechanism of monetary policy.

<sup>3</sup> See Bernanke and Gertler (1995) for a detailed survey of the lending channel.

<sup>4</sup> See Kashyap and Stein (1995), and Gertler and Gilchrist (1993, 1994) for detailed discussions on the link between commercial banks and contractionary monetary policy.

<sup>5</sup> See also Kishan and Opelia (2000).

1.83 billion; these correspond to an increase in the GDP share of credit card usage from 6% to 20%. On the consumer side, the number of credit cards in Turkey has increased from 14 million to 45 million during 2002–2009; this corresponds to a credit-card-per-capita measure of 0.6 in 2010. On the firm side, the number of POS machines has increased from 0.3 million to 1.7 million during 2002–2009. More importantly, the share of credit card usage within the overall consumer credit market is, on the average, around 20% during 2002–2009. From a policy maker's point of view, these improvements require an increasing focus on the credit channel of monetary policy transmission through credit cards.<sup>6</sup>

Although underlying factors that influence individual credit card usage may mostly be at the micro level as discussed above, the aggregate credit card usage can be affected by the following macroeconomic variables: (i) prices as one of the most significant factors through the quantity theory of money; (ii) interest rates representing the opportunity cost of credit card usage, especially when credit card debt is not paid on time; (iii) exchange rates as one of the main determinants of prices through international trade; and (iv) production level as a measure for overall health of the economy. For sure, these are interacting factors/variables (e.g., credit card usage may affect prices through the high demand of individuals financed by credit cards, monetary authority may use short-term interest rates for the sake of price stability, which may further credit card usage through both interest rates and prices with opposite signs, or credit card usage may lead to more expensive expenditures such as internationally traded products, which, in turn, will affect exchange rates, prices, interest rates, and output); hence, a reduced-form vector autoregression (VAR) framework is employed to analyze the credit channel of monetary transmission mechanism through credit card usage. Considering the sample period of 2002–2009, the VAR framework will not only allow obtaining impulse response functions and variance decomposition analysis for included macroeconomic variables but also lead to a complete analysis of the Turkish economy during its inflation-targeting experience in both nominal and real terms through monetary and credit points of view.<sup>7</sup>

The results show that, although credit card usage has been affected only around 3–4% by the monetary policy shocks (through short-term interest rates), it has been relatively affected more during the implicit inflation-targeting regime (which corresponds to a high level of inflation) compared to the explicit inflation-targeting regime (which corresponds to a low level of inflation), suggesting that low-inflationary regimes are more suitable for a healthier (less volatile) credit card market. Due to relatively higher volatilities in exchange rates during the explicit inflation-targeting period, credit card usage has been affected by exchange rate movements by almost double (around 8%) during that period compared to the implicit inflation-targeting period (around 4%). When it comes to real shocks, credit card usage has been affected by 14%, on the average, during the sample period; when we consider implicit and explicit inflation-targeting periods separately, the former corresponds to an output effect on credit card usage of 18% while the latter corresponds to an effect of 17%. Finally, as expected, the movements in inflation have been more influential on credit card usage during the implicit inflation-targeting period, which corresponds to a higher level of inflation.

More important policy implications are on the real side of the economy: During the implicit (respectively, explicit) inflation-targeting period, the movements in output are determined at around 11% (respectively, 5%) through credit card usage, around 8% (respectively, 3%) by the short-term interest rates, another 8% (respectively, 0.5%) by inflation, and 13% (respectively, 1%) by exchange rates. This suggests that output has become self-explanatory during the explicit inflation-targeting regime, which is an indicator of a more stable real economy.

<sup>6</sup> For details about the history of payment cards in Turkey, see Yazgan and Yilmazkuday (2009).

<sup>7</sup> The following studies have also employed VAR frameworks for the Turkish economy: Berument and Pasaogullari (2003), Leigh and Rossi (2002), Diboglu and Kibritcioglu (2004), Berument (2007), Us (2004), and Civcir and Akcaglayan (2010).

This result also has an important policy implication: both the credit view (through credit cards) and the monetary view (through short-term interest rates) seem to be more important during high inflationary episodes for the real side of the economy. When one compares the credit view with the money view, the former seems to be more effective on the real economy during both implicit and explicit inflation-targeting periods (i.e., this last result is independent of the level of inflation). From a policy maker's point of view, this result justifies the motivation of the paper, as depicted above, that there is an increasing necessity for considering the credit channel of monetary policy transmission through credit cards.

## 2. Data and methodology

The monthly variables included in the analysis are industrial production index (as a measure of output), real credit card usage (defined as the total credit card usage divided by the consumer price index), short-term interest rates (overnight interbank interest rates as a measure of monetary policy), inflation rate (defined as the first log difference in consumer price index), and exchange rates (defined as the price of euro in Turkish liras). The specification is standard in that it includes a variable capturing real activity, a variable of credit markets, a variable representing monetary policy, a price index, and a variable representing international transactions. All variables are annual percentage changes that have been seasonally adjusted and Hodrick–Prescott (HP) filtered, where the latter is mostly because the original variables are not stationary due to decreasing inflation rates during the inflation-targeting regime that has started in January 2002. The monthly data covering the period over 2002–2009 have been obtained from the web page of Global Insight, except for credit card usage data that have been obtained from the Interbank Card Center of Turkey. Further details of the data are depicted in Data Appendix A.<sup>8</sup>

A reduced-form VAR framework is employed to analyze the credit channel of the monetary transmission mechanism through credit card usage. First, using several individual and group unit root tests, it is confirmed that all included variables (as described above) are stationary; this is expected, considering the HP filtered data. Second, Granger causality tests used to determine the causality between bilateral variables suggest an ordering of variables within the VAR, as they have been introduced above.<sup>9</sup> Finally, the lag length is determined as two according to several criteria.<sup>10</sup> Since these are all standard tests, their details have been skipped to save space but are available upon request.<sup>11</sup>

<sup>8</sup> Some studies have used other possible variables in VAR analyses on Turkish economy with forecast error variance decompositions to explain the movements in prices and output: (i) Berument (2007) has employed spread between interest and exchange rates, together with money, price, and output measures, in a VAR analysis on Turkey; both spread and money have been found to be not explanatory for prices or output; (ii) Berument and Pasaogullari (2003) have found that real exchange rates are not explanatory for output; (iii) Leigh and Rossi (2002) have found that oil prices account for only around 6% of prices, although they do not talk about the significance of their results; and (iv) Diboglu and Kibritcioglu (2004) show that output is mostly affected by terms of trade and supply shocks.

<sup>9</sup> In particular, according to the Granger causality test results with 2 lags, exchange rate causes interest rate and inflation at a 5% significance level, inflation causes interest rate at the 1% and credit card usage at the 10% significance levels, interest causes credit card usage and output at the 10% significance level, credit causes output at the 10% significance level, and output does not cause anything.

<sup>10</sup> In particular, final prediction error and Akaike information criterion has exactly selected two lags, sequential modified LR test has selected 5 lags, and Schwarz and Hannan–Quinn information criteria have selected 1 lag; within this picture, we have employed two lags in the analysis. Moreover, short-run restrictions are assumed in order to identify the structural VAR; this is achieved by recursive identification through a Cholesky decomposition with the variables ordered as listed above. In making this assumption, it has been followed what has been a standard identification practice with VARs in the credit channel literature; see Brady (in press) for further discussion on this topic.

<sup>11</sup> The model of this paper has also been compared with a restricted model where credit card usage has been excluded; both Akaike information and Schwarz criteria have selected the model of this paper.

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