THE ASYMMETRIC EFFECTS OF CONSUMER CONFIDENCE ON CREDIT CARD SPENDING IN TURKEY

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ABSTRACT

This paper analyzes the asymmetric effects of consumer confidence on personal credit card expenditures in Turkey. To this end, the impact of the consumer confidence index on real credit card spending is investigated from January 2013 to June 2023 using the threshold generalized method of moments (GMM). The linear GMM model findings indicate that consumer confidence increases real credit card expenditures. Furthermore, when the threshold GMM model is estimated using the annual percentage change of the consumer confidence index as a threshold variable, the coefficients differ across low- and high-confidence regimes. More specifically, the consumer confidence index has a statistically significant positive impact on credit card expenditure in the low-confidence regime but not in the high-confidence regime. This indicates that the optimistic expectations of economic units in a low-confidence environment may stimulate credit card spending.

Keywords: *Consumer Confidence, Credit Card Spending, Threshold GMM, Turkey.*

JEL Codes: *C34, E21, E51.*

1. INTRODUCTION

Expectations play a vital role in the spending decisions of economic units. Indeed, consumption theories also emphasize income-related expectations in explaining consumer behavior. Unlike *the absolute income hypothesis,* which defines consumption as a function of current income (Keynes, 1936), *the life-cycle income hypothesis* (Modigliani and Brumberg, 1954; Ando and Modigliani, 1963) and *the permanent income hypothesis* (Friedman, 1957) suggest that consumption decisions depend on expected future income as well as current income. On the other hand, *the random walk hypothesis* combines the permanent income hypothesis with rational expectations (Hall, 1978) to claim that expectations regarding lifetime incomes determine consumption decisions (Mankiw, 2010). Consumption theories indicate that uncertainty regarding future income can change current consumption and savings behavior (Dees and Brinca, 2013).

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Theoretically, economic agents can behave based on microeconomic optimization within rational expectations. However, confidence plays a decisive role in determining the effects of potential shocks on economic activity and should, therefore, be considered in forming expectations (Arabacı and Özdemir, 2020). Furthermore, expectations derive from various sources to shape an economy's confidence environment. In some cases, expectations consist of beliefs; in other cases, they include information about the current and future states of macroeconomic fundamentals. In any case, economic activities are affected by the level of confidence derived from expectations (Barsky and Sims, 2012). Rising consumer confidence can increase consumption expenditures by raising spending and borrowing tendencies (Arısoy, 2012). In particular, positive confidence shocks, especially during economic expansion, can induce the consumption of both durable and non-durable consumer goods (Ahmed and Cassou, 2016).

Credit cards are one of the options for easing the current income constraint on consumer spending. Credit cards allow consumers to spend their current income and borrow in installments, depending on their financial situation and confidence in the economy. They can also help consumption smoothing by acting as insurance against unexpected shocks (Brito and Hartley, 1995).

Credit card usage has become widespread in Turkey with increasing financial deepening due to the banking sector's restructuring since 2002. The average growth rate of real personal credit card expenditure was 34.55% between 2004 and 2008 (BRSA, 2023). After the 2008 global financial crisis, household indebtedness reached levels that threatened financial stability due to the impact of increasing capital inflows. Consequently, several macroprudential measures were implemented in June 2011 and October 2013 (CBRT, 2014; Kara, 2016). The rapid growth in credit card expenditure was tamed by the considerable impact of these tightening tools, leading to an average growth rate of -4.5% between 2014 and 2020. However, credit card spending recently regained momentum, with the real growth rate increasing by 102% in June 2023 compared to June 2022 (BRSA, 2023).

Credit card expenditure can be affected by psychological factors that influence consumers' decisions beyond policy measures and macroeconomic aggregates. Katona (1968) defines the ability to spend and willingness to spend as objective and subjective factors that determine consumers' discretionary spending. More specifically, the ability to spend depends on the consumer's income, assets, or access to credit, whereas willingness to spend depends on their expectations regarding the economic outlook. The main criterion used to measure willingness to spend is consumer confidence indices. Given that the consumer confidence index has been shown to explain consumer behavior in Turkey (Mazibaş and Tuna, 2017; Karasoy Can and Yüncüler, 2018; Deniz and Aslanoğlu, 2020), this study applies the threshold generalized method of moments (GMM) to analyze the asymmetric effects of the consumer confidence index on personal credit card expenditure for the Turkish economy from January 2013 to June 2023.

The rest of the paper proceeds as follows. The next section reviews the empirical literature on the relationship between consumer confidence and consumer spending. The third section describes the data and methodology. The fourth section presents and discusses the empirical findings. The final section concludes the paper.

2. LITERATURE REVIEW

There is a growing body of literature concerned with the impact of consumer confidence on consumption expenditures. Several studies have found a relationship between these variables for various countries and periods. Using Granger causality tests, Lamdin (2008) investigated the explanatory power of consumer sentiment on the change of revolving credits, which mainly comprises credit cards, for the US from 1978:02 to 2007:08. Changes in consumer confidence were associated with changes in revolving credit use, while the relationship became stronger when lags were increased. Dees and Brinca (2013) analyzed the US and the Euro area from 1985Q1 to 2010Q2 and found that consumer confidence is a good predictor of household spending under certain conditions. Ahmed and Cassou (2016) examined the effects of consumer confidence on US consumption between 1960Q1 and 2014Q2 for different economic conditions. They found a state-dependent relationship between consumer confidence and consumer spending, but only during periods of economic expansion. Öztürk and Stokman (2019) employed ordinary least squares (OLS) methodology to explore the effect of consumer confidence on consumer consumption in the US and European countries between 1995Q1 and 2018Q3. They found that consumer confidence affects spending growth. Analyzing Indonesia over 2000Q1-2019Q1, Juhro and Iyke (2020) demonstrated that business and consumer confidence indexes predict real and nominal consumption growth. Ghosh (2021) used the nonlinear autoregressive distributed lag (NARDL) model to examine the relationship between household consumer spending, consumer sentiment, and other macroeconomic and financial variables for Brazil from 1995:04 to 2018:10. The main indicator explaining household consumption expenditure was the consumer confidence index. Investigating 22 OECD countries from 2008 to 2020 employing dynamic panel methods, Mynaříková and Pošta (2023) reported that consumer confidence had a positive and statistically significant effect on durable and semi-durable goods and service expenditures.

There is also a growing literature on the relationship between consumer confidence and consumption expenditures in the Turkish economy. Arısoy and Aytun (2014) investigated the relationships between the consumer confidence index, consumption expenditure, interest rates, and consumer credit using causality and regression analysis between 2005:01 and 2012:08. They found causality from the consumer confidence index, consumer credit, and real interest rate to consumption spending. More specifically, the regression findings indicated that the consumer confidence index and consumer credit both positively and statistically significantly impacted consumption expenditure. Analyzing 2002Q1-2014Q4, Karasoy Can and Yüncüler (2018) demonstrated that the lagged values of

consumer confidence predicted future growth in private consumption, although the effect either decreased or disappeared after including real income, real interest, and exchange rate in the model. Finally, Yamak et al. (2019) showed that consumer confidence between 2004Q1 and 2018Q3 had a statistically significant and positive effect on both short- and long-run consumption spending.

There has also been rising interest recently in examining the specific effect of consumer confidence on credit card expenditures in the Turkish economy. Mazibaş and Tuna (2017) analyzed the determinants of consumer credit and credit card expenditure between 2004:01 and 2013:12, finding that one determinant was economic expectations. Gündüz et al. (2017) demonstrated a unidirectional causality from consumer confidence to credit card expenditure from 2004:01 to 2016:01. Sönmezler et al. (2019) examined the relationship between inflation, consumer confidence, and credit card spending using the ARDL model between 2012:02 and 2018:02. While there was significant cointegration between the variables, the impact of the consumer confidence index on credit card spending was statistically insignificant. Yıldırım and Demir (2021) applied the ARDL and NARDL models to investigate the determinants of credit card expenditure from 2014:01 to 2020:10. The ARDL model indicated no statistically significant long-run relationship between credit card spending and the consumer confidence index. In contrast, the NARDL model indicated that decreasing confidence reduced credit card expenditure in the long-run, while there was an asymmetric relationship between the variables in the short-run. Vergili (2023) applied the ARDL model to explore the impact of the consumer confidence index and consumer inflation on bank and credit card spending from 2014:03 to 2022:11. The findings show that the variables were cointegrated, while consumer confidence had a statistically significant and negative impact on bank and credit card expenditure.

Unlike previous studies on the Turkish economy, this study examines the effect of consumer confidence on credit card spending in an asymmetric manner using a threshold. Also, it differs from other studies (Ahmed and Cassou, 2016) regarding the regime variable used. The main contribution of this study to the literature is to provide evidence of the impact of the consumer confidence index on credit card spending for different confidence environments.

3. DATA AND METHODOLOGY

3.1. Data

This study investigates the asymmetric effects of consumer confidence on personal credit card expenditures in Turkey from January 2013 to June 2023. While data availability determined the sample period, control variables that may influence real credit card spending were incorporated into the model based on the empirical literature. Personal credit card spending is assumed to be the function of the following variables:

$$rcce_t = f(cci_t, ip_t, i_t, \pi_t, reer_t) \tag{1}$$

where $rcce_t$ represents real credit card spending calculated via the consumer price index; cci_t represents the consumer confidence index; ip_t represents the industrial production index, which reflects income; i_t represents the overnight borrowing rate, which is a proxy for monetary policy stance; π_t represents inflation, calculated from the annual percentage change of the consumer price index; $reer_t$ represents the real effective exchange rate. All series are transformed into the logarithmic form, except for inflation and interest rate. Furthermore, standardization was performed on all series to eliminate level differences. The variables showing seasonality are adjusted according to Census X-13. The data for the nominal value of personal credit card expenditure is taken from the Banking Regulation and Supervision Agency, whereas data for the other variables are taken from the Central Bank of the Republic of Turkey.

The consumer confidence index is an indicator that summarizes the answers to various consumer tendency survey questions. The survey aims to measure consumers' current situation evaluations and future expectations regarding their financial situation, the general economic outlook, and their near-term spending and saving tendencies. A consumer confidence index value is greater than 100 indicates optimistic consumer expectations, whereas a value less than 100 indicates pessimistic consumer expectations (TURKSTAT, 2023). Table 1 shows the descriptive statistics of the variables in level values.

Table 1. Descriptive Statistics

Variable	Mean	Median	Max.	Min.	Std. Dev.
$rcce_t$	144795.8	92257.6	793773.8	72075.3	130893.2
cci_t	85.523	87.385	97.370	63.410	7.655
ip_t	107.244	106.760	165.560	73.390	18.729
i_t	10.942	9.235	23.530	3.580	4.975
π_t	19.240	11.340	85.514	6.133	19.781
$reer_t$	82.325	84.040	113.630	47.610	19.231

During the sample period, both the average and maximum consumer confidence index values' were below 100. The highest value (in April 2014) corresponds to a moderate environment of relatively low-interest rates and an appreciated Turkish Lira (TL). In contrast, the TL's sharp depreciation in December 2021 and the subsequent jump in inflation played an important role in reducing the index to its lowest value in June 2022. Real credit card spending and industrial production index reached their minimum and maximum values around the beginning and end of the sample period, respectively. Average inflation rate was close to 20%, reaching its highest value in October 2022. While the interest rate remained relatively low despite high inflation, it increased sharply after the currency shock in August 2018 before peaking in April 2019. The real effective exchange rate exhibited a downward trend and fell to the lowest point during the sample period just after the interest rate cuts in fall 2021.

3.2. Methodology

GMM models were used to examine the impact of consumer confidence on credit card spending. The equation to be estimated in the linear GMM model is given as follows:

$$rcce_t = \beta_0 + \beta_1 cci_t + \beta_2 ip_t + \beta_3 i_t + \beta_4 \pi_t + \beta_5\ reer_t + \varepsilon_t \tag{2}$$

The threshold GMM model was employed to capture the asymmetric effects of the confidence index on credit card spending. The equation of the threshold model can be expressed as follows:

$$rcce_t = I[cci\_yoy \geq cci\_yoy^*][\alpha_0^H + \alpha_1^H cci_t + \alpha_2^H ip_t + \alpha_3^H i_t + \alpha_4^H \pi_t + \alpha_5^H\ reer_t] +$$
$$I[cci\_yoy < cci\_yoy^*][\alpha_0^L + \alpha_1^L cci_t + \alpha_2^L ip_t + \alpha_3^L i_t + \alpha_4^L \pi_t + \alpha_5^L\ reer_t] + \varepsilon_t \tag{3}$$

where cci_yoy is the threshold variable calculated from the annual percentage change of the consumer confidence index; cci_yoy^*, estimated endogenously, is the optimal threshold value that defines the regimes (Martin and Milas, 2013); $cci\_yoy \geq cci\_yoy^*$ and $cci\_yoy < cci\_yoy^*$ indicate, respectively, the validity of the high-confidence and low-confidence regime; $I[.]$ is the dummy indicator function, which equals 1 in the high regime and 0 in the low regime; cci_yoy^* is estimated by minimizing a convenient criterion function employing a one-dimensional grid search comprising possible breakpoints of consumer confidence. Because the error term and the regressors may be correlated, the GMM estimator minimizes the criterion function, as in Taylor and Davradakis (2006), instead of using the simple least squares approach. The criterion function that GMM minimizes is specified as follows:

$$J = \hat{\epsilon}' Z W^{-1} Z' \hat{\epsilon}' \tag{4}$$

where J is the criterion function; $\hat{\epsilon}'$ is the estimated residual vector; Z is the vector of ℓ instrumental variables that meets the orthogonality condition $E(Z'\epsilon) = 0$. The orthogonality condition will usually not hold exactly in-sample for estimated values of residuals. However, the GMM estimator works by minimizing a weighted average of the sample moments' squared values. Using the centered estimates of the moment conditions, the weight matrix W can be constructed in a linear context in two steps. Assuming this weight matrix has been selected, the estimation strategy entails conducting a grid search over the interval, Π^*, which includes the possible breakpoint of cci_yoy $[0.10, 0.90]$:

$$\widehat{cci\_yoy}^* = \arg min_{cci\_yoy^* \in \Pi^*}\ J, \tag{5}$$

where the GMM estimator minimizes the criterion function J, as described in Eq. (4) (Taylor and Davradakis, 2006; Caporale et al., 2018).

4. EMPIRICAL FINDINGS

Before proceeding to estimate the GMM models, unit root tests were performed to examine the stationarity of variables using the augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1981) and the Phillips-Perron (PP) (Phillips and Perron, 1988) unit root tests. Table 2 shows the unit root test results.

Table 2. Unit Root Test Results

	Level			
	ADF		PP	
Variables	Intercept	Intercept & Trend	Intercept	Intercept & Trend
$rcce_t$	0.647	1.125	1.177	2.231
cci_t	-2.174	-3.177*	-1.970	-3.177*
ip_t	-0.273	-3.039	0.103	-2.738
i_t	-3.391**	-3.567**	-2.346	-2.247
π_t	-1.699	-3.087	-1.587	-2.330
$reer_t$	-0.471	-4.204***	0.046	-3.034
	First-Difference			
$rcce_t$	-5.733***	-6.298***	-5.777***	-6.285***
cci_t	-11.467***	-11.429***	-11.684***	-11.661***
ip_t	-14.102***	-14.059***	-15.233***	-15.234***
i_t	-3.683***	-3.712**	-9.238***	-9.243***
π_t	-5.810***	-5.786***	-5.994***	-5.971***
$reer_t$	-8.715***	-8.679***	-7.732***	-7.840***

Note: *, **, and *** show significance at 10%, 5%, and 1%, respectively.

The findings indicate that series had a unit root in their levels. However, when the first differences were taken, the null hypothesis that the series contains a unit root was rejected, and the series became stationary based on both test results. Hence, the series can be treated as integrated order of one, and the GMM models were estimated at their first differences.

The linear GMM results are presented in Table 3. If the number of variables and orthogonality conditions exceeds the estimated parameters, there is an over-identified regression. Hence, the Sargan-J test was employed to examine the validity of the instruments in the regression model (Caporale et al. 2018). The test result indicated that the null hypothesis that the over-identifying constraints is valid could not be rejected at any significance level, thereby confirming the exogeneity of the instruments.

Table 3. Linear GMM Findings

Variable	Coefficient	Std. Error	t-Stat	Significance
α_t	0.027	0.010	2.706	0.006
cci_t	0.234	0.029	7.926	0.000
ip_t	0.254	0.067	3.756	0.000
i_t	-0.042	0.042	-0.992	0.320

π_t	-0.279	0.066	-4.214	0.000
$reer_t$	-0.209	0.054	-3.818	0.000

Sargan-J Specification	Significance of Sargan-J
42.162	0.897

The linear GMM findings show that all variables had a statistically significant impact on credit card spending, except for interest rate. Consumer confidence, increased credit card expenditure. This indicates that optimistic expectations encourage credit card spending. Regarding the control variables, while the coefficient of income, as proxied by the industrial production index, was positive, inflation and real effective exchange rate had a negative impact on credit card expenditure.

Eq. (3) analyzes the asymmetric effects of consumer confidence on credit card expenditure using the threshold GMM model. The optimum threshold value of consumer confidence, obtained from the grid search based on the minimization condition in Eq. (5), was estimated as 3%. Accordingly, periods when the annual percentage change in consumer confidence is above 3% are defined as the higher regime whereas periods when it is below 3% are defined as the lower regime. Figure 1 represents the regime classifications based on the threshold variable.

Figure 1. Threshold Variable: Consumer Confidence Index (year-on-year)
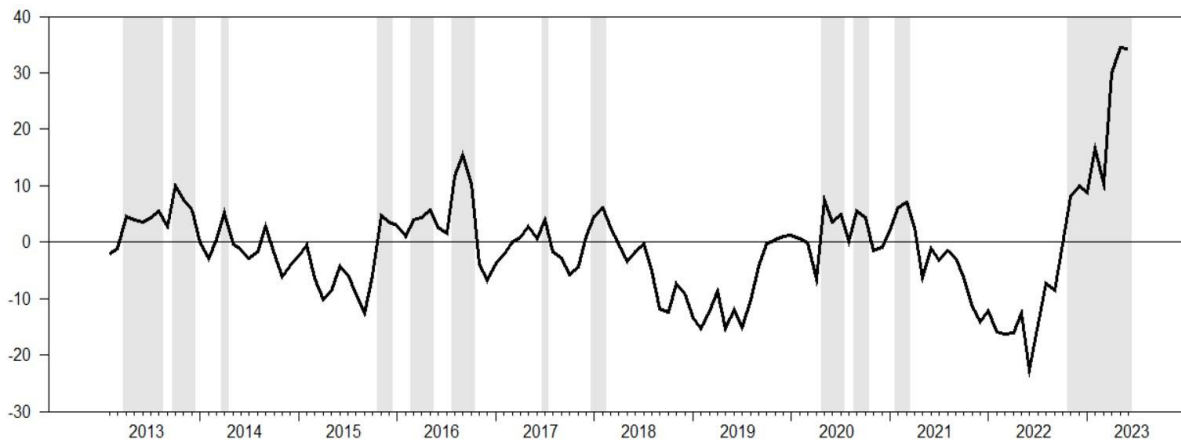
Note: The white areas indicate the low-confidence regime, while the shaded areas reflect the high-confidence regime.

As Figure 1 shows, the sample period is dominated by the lower regime, with three notable long-lasting lower regimes. The first corresponds to the period between 2014 and 2016, when capital outflows from emerging markets accelerated after signs of an end to quantitative easing. The second one coincides with the period from 2018 to 2020, when inflation rose following TL depreciation. The last is from the second quarter of 2021 to the end of 2022. During this period, the TL depreciated sharply while inflation peaked. Furthermore, increased global uncertainties due to the Russia-Ukraine war aggravated Turkey's domestic macroeconomic instabilities, with consumer confidence falling to its lowest point in June 2022.

Table 4 presents the threshold GMM results. The sign and significance of the coefficients differ across the regimes, which supports the nonlinear model specification for examining the effects of consumer confidence on credit card spending. Furthermore, similar to the linear GMM findings, the Sargan-J tests validate the exogeneity of the instruments.

Table 4. Threshold GMM Findings

High-Confidence Regime			
Variable	Coefficient	Std. Error	t-Stat	Significance
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α_t	0.159	0.030	5.171	0.000
cci_t	0.074	0.094	0.785	0.432
ip_t	0.378	0.213	1.772	0.076
i_t	-0.899	0.192	-4.666	0.000
π_t	-0.254	0.101	-2.514	0.011
$reer_t$	-0.712	0.244	-2.910	0.003
Low-Confidence Regime				
Variable	Coefficient	Std. Error	t-Stat	Significance
α_t	0.022	0.011	2.061	0.039
cci_t	0.259	0.036	7.161	0.000
ip_t	0.164	0.108	1.518	0.128
i_t	0.008	0.052	0.153	0.878
π_t	-0.229	0.081	-2.832	0.004
$reer_t$	-0.152	0.081	-1.863	0.062
Sargan-J Specification		Significance of Sargan-J		
34.566		0.940		

In the high-confidence regime, consumer confidence had no statistically significant impact on credit card spending, whereas higher interest rates and inflation significantly suppressed spending during these periods. While income was positively associated with credit card spending, the coefficient of real effective exchange rate was negative. On the other hand, the coefficients of the low-confidence regime indicate that the consumer confidence index was positively and significantly associated with spending whereas the coefficients of income and interest rates were statistically insignificant. The real effective exchange rate and inflation both had a negative and significant impact on spending. Regarding the size of coefficients, the largest was for the interest rate in the high regime and the consumer confidence index in the low regime.

Consumer confidence increased credit card expenditures in both regimes, whereas it had no significant impact in the high-confidence regime. In an environment where confidence is already high, macroeconomic fundamentals may have a more decisive effect on consumer behavior than expectations. On the other hand, sensitivity to macroeconomic aggregates decreases in unstable periods while increasing confidence encourages spending.

The effects of the other variables in the model on credit card expenditures were also largely consistent with theoretical expectations. In the high-confidence regime, higher income was unsurprisingly associated with higher spending whereas it had an insignificant effect in the low-confidence regime. This may indicate that individuals direct their income to savings rather than consumption in the latter environment. In the high-confidence regime, higher interest rates were associated with lower spending due to borrowing costs. In both regimes, inflation had a negative coefficient, which may be attributed to a reduction in purchasing power due to rising prices. Finally, the expenditure-reducing effect of TL appreciation in both regimes was probably because a rising TL value encourages saving over spending tendencies.

Considering the linear and threshold GMM findings, the statistically significant impact of confidence on credit card expenditures is largely consistent with the findings of Lamdin (2008), Dees and Brinca (2013), Karasoy Can and Yüncüler (2018), Öztürk and Stokman (2019), Juhro and Iyke (2020), and Ghosh (2021). They all reported a significant relationship between consumer confidence and consumer spending. Furthermore, the positive coefficient of consumer confidence in this study is similar to the findings of Arısoy and Aytun (2014), Yamak et al. (2019), and Mynaříková and Pošta (2023), who found that consumer confidence positively affects consumer spending. The findings of this study also confirm those of Mazibaş and Tuna (2017), who provided evidence of the positive effect of the consumer confidence index on consumer credit and credit card expenditures in the Turkish economy.

5. CONCLUSION

This study applied GMM models to analyze the effects of consumer confidence on individual credit card expenditures in Turkey from January 2013 to June 2023. Besides linear exploration, the consumer confidence index was used as a threshold variable, while the impact of consumer expectations on credit card spending was investigated for two different environments (high- and low-confidence).

The linear GMM findings indicated that consumer confidence has a positive and statistically significant impact on credit card spending in Turkey. The threshold GMM estimates also confirmed this positive impact, but indicated that it is asymmetric. More specifically, increasing confidence does not significantly affect credit card spending when consumer confidence is high. That is, in a stable environment, macroeconomic fundamentals rather than consumer expectations determine credit card spending, with consumer behavior being driven by macroeconomic aggregates like interest rate, income, inflation, and exchange rates. Conversely, consumer confidence is the main determinant of real credit

card spending in a low-confidence environment. In this environment, higher confidence leads consumers to turn to credit cards to fund their consumption because they expect to be in a better position in the future.

The empirical findings indicate that macroeconomic fundamentals drive credit card spending once confidence is established. However, increasing confidence is a key issue for policymakers in controlling consumption, especially when expectations are not optimistic. To do so, besides achieving the macroeconomic stability already necessary for high confidence, managing expectations is also crucial for policymakers.

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