

TESTING THE CREDIBILITY OF TURKISH POLICY ANNOUNCEMENTS

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Abstract

This paper examines the credibility of two cases of policy announcements: namely being the monetary programming 1990, and the stabilization programming 1994 in Turkey by using error correction methodology, along with Chow stability tests. The paper concludes that two economic policy announcements are not characterized as credible by public.

Özet

TÜRKİYE'DE POLİTİKA DUYURULARININ GÜVENİLİRLİK TESTİ

Bu çalışmada, hata düzeltim yöntemi ile Chow istikrarlılık testi kullanılarak, Türkiye'deki 1990 para programı ve 1994 istikrar programı politika duyurularının güvenilirliği incelenmektedir. Çalışmada, her iki ekonomik politika duyurusunun da kamuoyu nezdinde güvenilir bulunmadığı sonucuna ulaşılmaktadır.

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Keywords: Credibility, Economic Policy Announcements, Monetary Policy Games, Time Inconsistency, Stability Test

Anahtar Sözcükler: Güvenilirlik, Ekonomik Politika Duyuruları, Para Politikası Oyunları, Zaman Tutarsızlığı, İstikrarlılık Testi

I. Introduction

Due to the exogenous nature of economic policy, from traditional Keynesian to new classical rational expectations, macroeconomics is not able to say much about the credibility of macroeconomic policy, although credibility has always been something that policymakers talk much about. However, recent research on the theory of macroeconomic policy had been able to characterize credibility problems, evaluate their costs and suggest some solution methods.

During the last two decades the theory of macroeconomic policy has undergone very dramatic changes. Policy was started to be defined as endogenously specifying a government objective function, and by assuming that the government maximizes its own objective function under the constraints imposed by private equilibrium behavior. Policymaker has been viewed as a player choosing its policy in a strategic game shaped by interactions between policy actions and private agents' actions.

The central theme of the recent research on monetary policy games has been how to avoid the inflationary bias of monetary policy, which is an irrevocable consequence of the time inconsistency problem formulated first by Kydland and Prescott (1977) and popularized by Barro and Gordon (1983). In the literature on time inconsistency and monetary policy games, the private agents are assumed to be fully rational so that they could compute the best of the alternative strategies of the policymaker by maximizing an appropriate objective function and formulate their expectations accordingly. In this respect, the credibility of policy announcements plays an important role on the private sector's expectations, and thereby upon the success of the announced policies. Change in private sector's expectations indicates that it finds the policy announcement credible. This is exactly what Lucas' (1982) critique points out. Lucas critique states that private sector behavior is influenced by expectations concerning government policy and its expected effects on economy. Once one postulates that private sector's expectations are formed rationally, these expectations become fully endogenous in the model. In this case, a change in policy will lead to a change in private sector's expectations. These changes are reflected in changes within the structural parameters governing the relationships among economic variables. Thus, the parameters can no longer be assumed invariant with respect to policy variables.

There are two main approaches to test of the credibility hypothesis empirically: prediction error method used by Blanchard (1985), Baxter (1985), Christensen (1987) and Marlow (1991); parameter constancy test used by Apergis et al. (1997). We use the parameter constancy approach in this paper in order to analyze the credibility hypothesis for two policy cases announced by Turkish policymakers; namely the monetary program in 1990 and the

stabilization program in 1994. Since monetary policy games are repeated games, credibility hypothesis is a dynamic phenomenon. So, a dynamic relationship is constructed first by using error correction methodology. In line with Lucas' critique, the policy announcements can be said to be credible as long as they change private sector's expectations. Therefore, we shall be testing whether the private sector has reacted to the related policy announcement by applying parameter constancy test.

This paper is organized as follows: The next section presents the theoretical model. In Section III, a brief overview of the two economic policy announcements in Turkey are presented. Section IV reports the results of the empirical findings, and Section V concludes.

II. The Theoretical Model

Persson and Tabellini (1993) have recently presented a theoretical model to analyze the concept of credibility in the context of monetary policy games. The model is general enough to encompass many important contributions in the related literature as special cases. Actually this is the model we use in this paper to test the credibility of two policy cases announced by the Turkish government. The model assumes that society evaluates the results of a monetary policy according to the welfare function of the following form:

$$E_{\theta, \varepsilon} W(p, p - p^e; \theta, \varepsilon) \quad (1)$$

where p and p^e denote actual and expected inflation respectively such that (1) is a concave and continuously differentiable function, and E denotes the unconditional expectation operator. The random variables θ and ε denote on the other hand the shocks to the economy that change the welfare effects of a given inflation or an unexpected inflation rate.

The basic postulate of the Persson and Tabellini is that the policymaker has an incentive to create inflation surprises by controlling p which is determined by the money supply. Let $x = p - p^e$ and let the subscripts denote partial derivatives. The model also makes three principal assumptions¹, as follows:

A1. Inflation surprises are welfare-improving: $W_x \geq 0$, for all $x \leq 0$, with strict inequality for at least some θ, ε , if $x = 0$.

A2. Shocks change the desirability of inflation surprises: I.e. $W_{x\theta}, W_{x\varepsilon} \geq 0$.

A3. The policymaker has an information advantage with respect to ε but not with respect to θ : The policymaker sets inflation having observed the

¹ Interested readers should refer to Persson and Tabellini for further details on these assumptions.

realization of both θ and ε . Thus, inflation is a function $p(\theta, \varepsilon)$. The wage setters, representative of the private sector, set nominal wages having observed the realization of θ , but not ε . Thus, expected inflation is a function $p^e(\theta) = E_{\varepsilon|\theta} p(\theta, \varepsilon)$, where $E_{x|y}$ denotes the expectation over x which is conditional on y .

Suppose that the policymaker announced an anti-inflationary policy to reduce inflation, for example, to zero. Also suppose that the economy has been at equilibrium point C with high inflation as depicted in Figure 1.

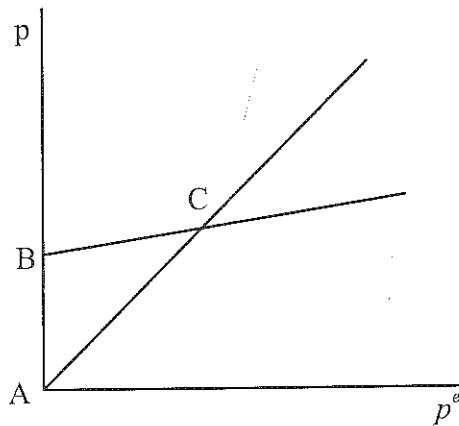


Figure 1

If the agents in private sector believe that the policymaker will implement the announced policy, they should set lower wages and prices as contracts come up for renewal during the interval between the policy announcement and its implementation. However, the agents in private sector know that if they set lower prices, the policymaker would renege on its announcement, in other words it would follow a cheating policy. By awaring that it is to be fooled, the private sector does not believe the announced disinflationary policy such that the economy will stay at equilibrium point C. This means that the policy announcement is not credible. Point A in the Figure 1 shows the other equilibrium, where the private sector considers the announcement as credible and fully responds to it. Point B on which the cheating policy is followed does not present an equilibrium, because the expected inflation is lower than the actual rate which is contrasted with the rational expectation assumption. Thus the credibility problem is related to whether the private sector has reacted to the policy announcement. As mentioned before, this problem is similar to Lucas' critique. Therefore, parameter constancy implies that private sector does not react to policy change by revising its expectations, and hence the policy announcement is not credible.

III. Two Cases of Policy Announcements in Turkey

The empirical analysis in this paper examines the credibility hypothesis for two cases announced by the Turkish policymakers; being namely the monetary programming in 1990 and the stabilization program in 1994. In January 1990, The Central Bank of the Republic of Turkey (CBRT) announced its monetary program. The program had three objectives. The first was to improve the foreign exchange risk position of CBRT by increasing its net foreign assets. On the asset side of the balance sheet, this implies a reduction in the share of the valuation account. The second objective was to restrain the growth of the balance sheet by controlling domestic credit expansion. The third objective was to increase the share of Central Bank Money in total liabilities by reducing the Central Bank's foreign exchange liabilities to residents.

The leading factors behind the stabilization program in 1994 are as follows. The demand for domestic borrowing assets had decreased due to the fact that the interest rate on them had been kept low -despite the high budget deficit at the beginning of 1994. As a result of these developments, the exchange rate reserves have considerably decreased causing the exchange rate to go outside of the banking sector. On the other hand, because of the bottlenecks in ensuring the external debt, the budget deficit began to be financed mostly by the resources of Central Bank. The possibility of facing with the danger of serious economic crisis made it necessary to implement a stabilization program which would include permanent measures to improve the instabilities in the economy. Thus in April 5th a stabilization program had come into force in accordance with the needs of economy. The program was aimed at lowering rapid inflation, improving the stability in financial markets and exchange rates in the short run, and to take necessary and permanent steps to solve the budget deficit and trade deficit problems.

IV. Empirical Analysis

The credibility test is applied to newly-industrializing and high inflation economy of Turkey. The Turkish economy has been suffering from high level of inflation which has become chronic since 1982. The monetary nature of sustained inflation was widely recognized in the economy. The experience of the two decades showed that the factors other than money growth could also play a role in triggering inflation. These factors can be separated into two groups as demand-side factors and supply-side factors. The demand-side factors include past rates of inflation itself beside the money growth. The increased openness of Turkish economy to international trade and the widespread adoption of flexible exchange rate arrangements have also tended to enhance the importance of the exchange rate channel of the monetary transmission mechanism.

We test the credibility hypothesis in the context of a three-variable model. The three variables are price indices (CPI), exchange rate (Turkish lira/US dollar) and nominal money stock (M1). The data frequency is monthly. The data were obtained from various sources of the Turkish Central Bank Statistics (monthly reports). Below, lower-case letters denote variables expressed in logarithms.

Integration analysis

Unit root nonstationarity was tested by using the tests developed by Dickey and Fuller (1979) in augmented form as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 T + \alpha_2 y_{t-1} + \sum_{i=1}^m \beta_i \Delta y_{t-i} + \varepsilon_t \quad (2)$$

where ε_t is assumed to be independently distributed random variable. The choice of m largely depends on the serial correlation pattern that may be present in ε_t .

Using the regression results, we obtain the following three statistics:

$$Z(\tau_\tau) \text{ tests: } H_0 = \alpha_2 = 0$$

$$Z(\phi_2) \text{ tests: } H_0 = \alpha_0 = \alpha_1 = \alpha_2 = 0$$

$$Z(\phi_3) \text{ tests: } H_0 = \alpha_1 = \alpha_2 = 0$$

In each case, the alternative is that y_t is stationary. These $Z(\cdot)$ statistics require the regression of the first-order autoregressive model only and are free from nuisance parameters such as the order of autoregression. As these $Z(\cdot)$ statistics are asymptotically equivalent to the corresponding Dickey-Fuller tests, critical values from Dickey-Fuller (1981) can be used in testing.

The results of the tests are reported in Table 1. Tests involving levels of the series do not reject the presence of unit roots in all cases. However, tests involving differences of the series reject the presence of unit roots in all cases. Thus, price level, money stock and exchange rate series appear to be integrated of order 1.

Table 1. Tests for Unit Roots

Variable (y)	$Z(\tau_\tau)$	$Z(\phi_2)$	$Z(\phi_3)$
CPI level	-1.42	19.43*	3.03**
CPI difference	-5.48*	10.09*	15.03*
M1 level	-2.10	27.51*	2.81
M1 difference	-9.31*	28.92*	43.38*
Dollar level	-1.43		
Dollar difference	-5.68*	10.76*	16.14*

* and ** denote significance at the 1 and 5 percent levels, respectively.

We have also examined the series to determine whether there are important structural changes in their trend functions by using the Perron unit root test with exogenous break. After visual inspection of the data, we decided to apply the innovational outlier model in Perron (1989) to each time series, as follows:

$$y_t = \mu + \beta t + \theta DU_t + \gamma DT_t^* + \delta D(T_b)_t + \alpha y_{t-1} + \sum_{i=1}^k a_i \Delta y_{t-i} + e_t \quad (3)$$

Here, DU_t is a dummy variable which is defined as:

For monetary program in 1990: 0 values up to 1990:1, and 1 thereafter.

For stabilization program in 1994: 0 values up to 1994:7, and 1 thereafter.

DT_t^* is a dummy variable being defined as:

For monetary program in 1990: 0 values up to 1990:1, and $t - T_b$ thereafter.

For stabilization program in 1994: 0 values up to 1994:7, and $t - T_b$ thereafter.

$D(T_b)_t$ is a dummy variable defined as:

For monetary program in 1990: 1 at 1990:2, and 0 otherwise.

For stabilization program in 1994: 1 at 1994:8, and 0 otherwise.

Table 2. Perron's Unit Root Tests

	Levels	First differences
Monetary Program in 1990		
CPI	-2.34 (4)	-5.45* (4)
	LM= 19.91 [0.07]	LM= 19.97 [0.07]
	HE= 0.006 [0.94]	HE= 0.002 [0.96]
M1	-2.59 (1)	-5.30* (11)
	LM= 20.84 [0.05]	LM= 14.34 [0.28]
	HE= 0.005 [0.94]	HE= 1.13 [0.29]
Dollar	-2.76	-6.50*
	LM= 12.35 [0.42]	LM= 7.09 [0.85]
	HE= 0.26 [0.61]	HE= 1.25 [0.26]
Stabilization program in 1994		
CPI	-4.16 (1)	-8.13*(1)
	LM= 19.75 [0.07]	LM= 19.79 [0.07]
	HE= 0.05 [0.82]	HE= 0.02 [0.90]
M1	-3.55 (1)	-11.67* (5)
	LM= 19.13 [0.09]	LM= 17.70 [0.13]
	HE= 0.03 [0.86]	HE= 0.04 [0.83]
Dollar	-0.96 (1)	-7.07*
	LM= 17.48 [0.13]	LM= 16.95 [0.15]
	HE= 0.38 [0.54]	HE= 0.58 [0.45]

Numbers in parentheses denote the number of lags in the augmented term that ensures white noise residuals, while numbers in brackets denote p-values.

Table 2 reports the results of the Perron unit root test. The results of the unit root tests indicate that the null hypothesis asserting that the level of the series follows a random walk with exogenous break is not rejected. However, tests involving first differences of the series reject the null hypothesis for all cases. Thus, all series considered appear to be integrated of order 1 according to Perron's innovational outlier model. The results are consistent with the Dickey-Fuller unit root tests reported in Table 1.

TABLE 3. JOHANSEN-JUSELIUS MAXIMUM LIKELIHOOD TEST FOR COINTEGRATION: $cpi_t = b_0 + b_1m_t + b_2dollar_t$

Maximum lag in VAR=2					
List of eigenvalues in descending order:					
0.16209	0.070136	0.026430			
Null	Alternatif	m. λ	95 %	Tr.	95 %
e					
$r = 0$	$r = 1$	22.6362	20.9670	35.3725	29.6800
$r \leq 1$	$r = 2$	9.3077	14.0690	12.7363	15.4100
$r \leq 2$	$r = 3$	3.4286	3.7620	3.4286	3.7620

r =number of cointegrating vectors

m. λ =maximum eigenvalue statistic

Tr.=trace statistic

Cointegration analysis and an error correction (EC) model

The cointegration method developed by Johansen and Juselius (1990) is used to investigate a possible presence of a long-run relationship. The method utilizes a maximum likelihood procedure which jointly estimates the number of cointegrating vectors. The results of cointegration test are presented in Table 3.

As seen from Table 3, both maximum eigenvalue and trace statistics indicate that there is only one cointegrating vector. After visual inspection of error terms, we decided that only the following cointegrating vector should be accepted:

$$cpi = 0.89495m + 0.16495dollar \quad (4)$$

Having provided the cointegrating relationship among consumer price index, money supply and exchange rate, an error correction model (EC) is established to analyze the short run dynamics. The mentioned error correction model has the following form:

$$\Delta cpi_t = a + \sum_{i=1}^{n1} b_{1i} \Delta cpi_{t-i} + \sum_{i=1}^{n2} b_{2i} \Delta m_{t-i} + \sum_{i=1}^{n3} b_{3i} \Delta dollar_{t-i} + \sum_{i=1}^{n4} b_{4i} \Delta u_{t-i} + fEC_{t-1} + \zeta_t \quad (5)$$

where EC are the residuals from the selected cointegrating vector with f being negative and ζ_t being a random term. The estimated procedure yielded:

$$\begin{aligned} \Delta cpi_t = & 0.5018 \Delta cpi_{t-1} - 0.1332 \Delta cpi_{t-2} - 0.1468 \Delta cpi_{t-4} + 0.1605 \Delta cpi_{t-5} \\ & \quad \quad \quad (8.13) \quad \quad \quad (-2.15) \quad \quad \quad (-2.35) \quad \quad \quad (2.56) \\ & + 0.0723 \Delta m + 0.3164 \Delta dollar - 0.0609 EC_{t-1} \end{aligned} \quad (6)$$

$$LM=15.30 [0.23] \quad HE=0.90 [0.34] \quad NO=1.55 [0.46]$$

$$RESET=4.08 [0.04] \quad ARCH(12)=5.92 [0.92]$$

Above, numbers in parentheses denote t-statistics, while those in brackets the p-values.

The EC term has the correct sign and it is significant, indicating that the price index adjusts to restore long-run equilibrium after a short-run disturbance. The estimated equation satisfies certain econometric criteria, namely absence of serial correlation (LM), presence of normality (NO), absence of heteroscedasticity (HE), and absence of ARCH effects at 12 lags.

TABLE 4. Tests for structural stability

Sample	Chow test
I. N₁=1987:1-1990:2	
LM=16.66 [0.16] ARCH(12)=8.14 [0.77]	
HE=1.57 [0.21]	
	0.50
N₂=1990:2-1997:10	
LM=14.82 [0.25] ARCH(12)=8.48 [0.75]	
HE=1.24 [0.27]	
II. N₁=1987:1-1994:4	
LM=17.08 [0.15] ARCH(12)=4.87 [0.96]	
HE=0.18 [0.67]	
	0.58
N₂=1994:5-1997:10	
LM=9.51 [0.66] ARCH(12)=7.52 [0.82]	
HE=0.35 [0.56]	

In Table 4 the Chow test statistic is calculated as:

$$Chow = \left[\frac{(SSE - SSE_1 - SSE_2)}{(SSE_1 + SSE_2)} \right] \left[\frac{(N - 2k)}{k} \right]$$

Numbers in brackets denote p-values.

Stability tests

Chow methodology was applied to test the coefficients in equation (5) for structural stability. The results are reported in Table 4. where SSE_1 and SSE_2 are the sum of squared errors from the first and second parts at the split sample, and N is the number of estimated parameters.

The estimations of the *EC* model in both periods and for two cases satisfy the econometric criteria mentioned in the previous subsection. The F -statistic for the Chow test indicates that the null hypothesis of equal coefficients should not be rejected as regards the monetary program in 1990 and the stabilization program in 1994.

V. Conclusion

This paper analyzes the credibility hypothesis for two policy cases announced by Turkish policymakers, namely the monetary program in 1990, and stabilization program in 1994. In particular, the error correction methodology and Chow stability test have been employed to examine the credibility of announced policies. The empirical findings demonstrated that the parameters in the price equation remain constant for both announced policies.

The implication of the empirical findings is that two economic policy announcements were not taken as credible by the public. We can refer this to the unsuccessful efforts made by the successive governments for a long time, so that the private sector could not believe that any policy announcement would really be implemented. In the literature on game-theoretic approach to the monetary policy, this refers to the situation in which the governments do not have affirmative reputation. Although discussing the reasons for this is out of the scope of this paper, we can say that one of the most important factors behind this, is the long-lasting unstable political, and thereby economic environment, stemming mainly from the observation that the successive governments' first objective in Turkey has been to gain the elections and not to maximize the social welfare function.

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