Relationship between Misery Index and Lottery Games: The Case of Turkey

Süleyman Emre Özcan
Assistant Professor
Department of Economics
Dumlupınar University
Kütahya, Turkey

Sezgin Açıkalın
Associate Professor
Department of Economics
Anadolu University
Eskişehir, Turkey

Abstract

The purpose of this study is to identify whether individuals are depressed with inflation and got worsening expectations due to rising unemployment and interest rates try to compensate their worsening situation by an increased tendency to play lottery games. Therefore, we examine the relationship between misery index and lottery games for Turkey over the period of 2005 and 2013. When calculating misery index, we use inflation, unemployment and interest rates due to the absence of monthly GDP data. Johansen co-integration and Granger Causality tests indicate that individuals react to bad economic performance with playing more lottery games.

Keywords: Misery index, economic performance, discomfort, lottery

1. Introduction

Misery index isderived from the sum of inflation rate and unemployment rate.An increase in the misery index (rise in unemployment and inflation rate) indicates that the economic conditions of people are getting worse and hence worsening their future prospects. In this study, it is aimed to answer the question "Will increasing inflation, which leads to relative income deterioration, and increasing interest rates and unemployment, which lead to worsening expectations, result in people buying more and more lottery games in search of restoring their economic condition?". Here, the term lottery games, in practice mean National Lottery (MilliPiyango) ticket sales.

2. Misery Index

In general, living quality of a country's citizens depends on the level of employment, price stability, economic growth all of which are related with macroeconomic performance. It is quite difficult to evaluate the macroeconomic performance because of such reasons as difficulties associated with expressing variables in the same units, a varying degree of differences in the importance level among these variables and existing interconnections among some of the variables (Moesen and Cherchye, 1998). With the help of "Synthetic Performance Indicators", researchers have been trying to solve these problems. By using synthetic performance indicators, it is aimed to reach one figure that is a general representative of macroeconomic condition. That is because following up only a single figure would be easier for everyone to understand macroeconomic condition. Therefore, a synthetic figure would provide this information to foster the understanding of ordinary people.

Inflation and unemployment variables are included almost in all synthetic indicators. Due to their direct and indirect negative impacts, inflation and unemployment carry great importance for both policy makers and individuals. Inflation causes social and political problems by disrupting income distribution. It also negatively affects resource allocation among sectors in addition to increasing the pressure of devaluation by impairing current account balance.Moreover, through tightening savings and increasing consumption, inflation causes a move-away from the local corrency which results in speculative currency attacks. On the other hand, unemployment also has psychological and sociological costs.

Unemployment is a phenomenon that reduces tax revenues, disrupting income distribution as well as real production loss (Herman, 2010). It causes losses in social status and self-confidence of individuals which in turn escalate crime rates. In the economies where unemployment rate is high, presumably it is difficult to find a job and average expected wage is low as well. Moreover, inflation causes depreciation in the purchasing power of nominal income. Both high inflation and high unemployment figures contain higher economic and social costs. Thus, for each economy, it is possible to constitute a poverty – misery index which is the sum of inflation and unemployment rates (Grabia, 2011).

Arthur Okun's misery index is the most widely used one that measures macroeconomic performance and thereby peoples' satisfaction. Okun's misery index, derived by adding the unemployment and inflation rates, also gives equal weight to both rates (Okun, 1970). Rises in the index indicate poor economic performance and growing misery. Owed to this simplicity and ability to measure the absolute misery in the economy, Okun's index shows whether things are getting better or worse and the index is often used by politicians (Lovel and Tien, 2000). Robert Barro (1999) improved Okun's index so as to allow make better macroeconomic performance comparisons between the governments. In addition to changes in inflation and unemployment rates, in Barro's index, 30-year government bond rates are used to reflect changes in inflationary expectations and the deviations in the long-run GDP. It clearly shows that increase in inflation, unemployment, bond yields and drop in GDP growth rate indicate poor macroeconomic performance and increased misery.

Hanke (2009) state that Barro's modifications allow index to measure relative changes more accurately in the economy. Hanke has analysed US and Jamaica with misery index that is reached as a result of subtracting percentage change in GDP per capita from sum of the inflation, interest and unemployment rates. Di Tella, MacCulloch and Oswald (2001), point out that individuals care about inflation and unemployment, and their happiness have a higher correlation with these two variables. However, Okun's misery index underweights unhappiness caused by unemployment hence inflation and unemployment have equal weights. In addition, it is found that as inflation and unemployment rates increase, the satisfaction level of European and US citizens decrease which reflect negative relationship. Lovell and Tien (2000) test the validation of Okun's index which is a practical measure of economic dissatisfaction, with the help of Michigan Consumer Sentiment Index. Accordingly, misery index provides a rough and spot account of economic situation. According to Lechman (2009), misery index is not a perfect measure of poverty but index certainly reflects the changes in society's economic performance. Therefore, it can be perceived as a raw utility – disutility function of the economy.

According to Lechman (2009), although misery index is not a perfect measure of poverty, it quite certainly reflects the changes in economic performance. Thus, it may be perceived as a rough utility – disutility function of the economy. Welsch (2007) suggests that people care about growth and unemployment on the one hand and stability on the other. Stability may alternatively be captured by the inflation rate or the long term interest rate. Clark and Oswald (1994), Oswald (1997), Winkelmann and Winkelmann (1998), Frey and Stutzer (2002), Wolfers (2003), Stutzer and Lalive (2003) and Ohtake (2012) indicate that the unemployment has a significant negative effect on happiness. People appear to be happier when inflation and unemployment rates are low. In their paper, Luengas and Ruprah (2009), Ruprah and Luengas (2011) reveal that both unemployment and inflation reduce welfare and happiness in Latin American economies. A one percentage point increase in unemployment has a greater effect on happiness than does a one percentage point increase in inflation (Ruprah and Luengas, 2011). Misery index differs for subgroups. Young and left–leaning citizens are more concerned about unemployment than inflation (Ruprah and Lueangas, 2011).

According to Layton (1992), society is concerned more about the variations in the unemployment rate rather than its current level. Blanch flower's (2007) study on the EU countries indicates that one percentage point increase in the unemployment rate lowers happiness by as much as one and a half times more than does an increase in the inflation rate. According to Blanch flower, unemployment's negative impact on happiness is more than that of inflation. While less-educated and elderly people are more worried about inflation figures rather than unemployment figures, just the opposite holds true for young and well–educated people. In their study for Iran for the period of 1972–2011, Sadeghi et.al. (2014) conclude that a meaningful relationship is observed between misery index and income inequality as misery index exceeds its calculated threshold value of 49.52. Smyth and Dua (1988) use inflation and unemployment to measure political popularity and reach the conclusion that there is a quadratic relationship between the two. Existing literature show that the level of misery rises as increases in inflation, unemployment and interest rates yet a drop in growth rate are observed.

3. Lottery

The English word lottery is derived from the Dutch word "loterij" in the sense of faith (Rasiah, 2010). It is an activity that regarded as winning a prize depending on fate as people buy hoping that their numbers are chosen by chance in draw so that they can win the prizes. The earliest known public lottery belongs to Augustus Sezar period. During the Sezar period, lotteries used for entertainment during the dinner party and to repair the city of Rome.

In the 15th century's Holland and Belgium, while lotteries proceeds were used for public-spirited purposes, in 1566 England, Queen Elizabeth organized lotteries to public reparations. In America, lotteries held to finance and improve the colony settlement and military operations. In many countries of the world, lottery was prohibited on various dates but in the sake of such similar reasons as abuse and fraud. As soon as lotteries started to be regulated and audited by the state at the beginning of the 20th century, they became fairly common.Today, more than half of the world population plays lotteries (Rasiah 2010). It may be inferred that this figure reflects the number of people, who dream and wish a better life standard far beyond the one they currently have.

Lottery players risk either small or large bulk of money against a very low possibility to win a very large prize (Rasiah, 2010). As Shapira and Venezia (1992) state, the demand for lottery depends on lottery prize, cost of tickets and the probability of winning; yet, the prize remains to be the major driving factor. According to Rasiah (2010), low-income countries spend more per-capita lottery sales than high-income countries. Moreover, the economic performance of a country and the lottery sales are found to be interrelated. Misery index is expected to increase as unemployment, inflation and interest rates rise and economic growth drops.As the misery index escalates, people tend to buy more lottery tickets for more future income and welfare. In their paper covering the states of Texas, Missouri and Louisiana, Clark, Green and Robertson (2004) report that lottery ticket sale have a high correlation with the misery index.Our paper is also inspired by the work of Clark et.al. (2004).In common sense, lottery games are perceived to be a shortcut in reaching a higher level of wealth. As individuals get tired of unfavorable conditions such as economic crises, inflation, unemployment and low economic growth, their tendency to buy lotteries increases. It is quite evident that individuals are motivated to play lottery games mainly by such economic motives as a reduced poverty and an improved life quality. In this paper, the correlation between misery index and legal lottery games is investigated in a manner that is highly simple to follow.

In Turkey, the right to organize lottery games was first granted to Turkish Aeronautical Association in 1926. This right was transferred to General Directorate of the National Lottery in accordance with the law no: 3670 in 1939. General Directorate of the National Lottery is the only institution which conducts cash or non-cash draws. In the institution, five basic drawings corresponding to cash are performed.They can be listed as NationalLotteryTicket, Number Ten, ChanceBall, SuperLotto, Lotto.National lottery tickets areprinted infull fare, half fare and quarter fare and lottery playersare entitled to raffle via buying these tickets. Draws are made on each month's 9th, 19th and 29th days in addition to draws on special occasions like new year's day.In other games, players try to guess the 3 or 10 lucky numbers from different sets of universes which consist of 34, 49, 54, 80 numbers. These games are played every week on certain days. In Turkey, gambling is prohibited by law. Although there are sports-based lottery games, they are not included in this study due to the difficulty in accessing data set. Although there are sports based - games, these games will not be considered in this study, because of difficulty to reaching the data. According to General Directorate of the National Lottery annual report, most popular lottery games are lotto and national lottery ticket, accounting market shares of %67.06 and %25.23 respectively.

4. Data and Methodology

The number of lotteries sold, inflation, unemployment and interest rates are used in the analysis. The numbers of sold lotteries are obtained from General Directorate of the National Lottery. The data regarding inflation, unemployment and interest rates are gathered from Turkish Statistical Institute. The analysis is performed on a monthly data set which consists of 101 periods between January 2005 and May 2013. Number of data is appropriate for apply long term time series analysis. Misery index(MI) is obtained by summing inflation, unemployment and interest rates. The unit sales of lottery games are used to represent the lottery games variable (LG). After controlling the stationary of the series, Johansen Cointegration test and Granger Causality test are applied. The purpose of the analysis is to determine whether there is long term trend between lottery games and misery index and whether there is causality from misery index to lottery games. Therefore, unit root test and vector error correction mechanism test results are provided in short.

As it is well known, these two tests are not directly related with the purpose of the analysis; however, they are required to run co-integration and causality tests.

5. Empiricial Findings

Unit root test results that performed to test stationarity of data is shown in Table 1.

Table 1: Unit Root Test Results

Variable	Null Hypothesis	ADF	Prob
LG (Total sales of lotterytickets)	LG has a unit root		
	Constant	-2,42	0,14
	Constant, Linear Trend	-1,98	0,60
	None	1,26	0,95
	1st difference	-174,32	0,0001
MI (unemployment + inflation + interest rates)	MI has a unit root		
	Constant	-1,42	0,57
	Constant, Linear Trend	-3,16	0,099
	None	-1,32	0,17
	1st difference	-11,70	0,0001

Table 1 reports that LG and MI series have a unit root, and hence the series are not stationary at level. Unit roottests, performed by taking the first difference, indicate that both LG and MI series are stationary and integrated at the first degree.Since both variables are integrated at the same degree, Johansen cointegration test is used to determine whether these two series have a common trend inthe long run.Table 2 shows the results.

Table 2: JohansenCointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob**
None*	0,407359	49,28138	15,49471	0,000
At Most 1	0,001103	0,103741	3,841466	0,7474
UnrestrictedCointegrationRank Test (Maximum Eigenvalue)				
Hypothesized No. Of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob**
None*	0,407359	49,17764	14,26460	0,000
At Most 1	0,001103	0,103741	3,841466	0,7474

According to the test results, LG and MI series have one cointegration in the long run.This indicates that both misery index and lottery games have a common trend in Turkey. In the third stage of the analysis, it is examined to test whether there is a statistically significant causality relationship from misery index to lottery games. Granger causality test is one of the most appropriate test for the purpose.However, since the co-integration inclines us to use VEC standards rather than VAR standards, VEC mechanism is performed before causality test. Results are shown in Table 3 below.As mentioned earlier, it is the structure of VEC model that carries more importance for the purpose of this study rather than the results of it. Therefore, we wheel to the causality analysis without mentioning VEC model results.

Table 3: Vector Error Correction Estimates

Cointegrating Eq:	CointEq1
LG (-1)	1,000000
MI	48525,12
	(74577,7)
	[0,65067]
C	-6941335
R-squared	0,634587

Table 4: Granger Causality Test Results

VEC Granger Causality/Block Exogenity Wald Tests Dependent Variable: D(MI)			
Excluded	Chi-sq	df	Prob.
D(LG)	16,88172	6	0,0097
All	1688172	6	0,0097

As reported in Table 4, Granger causality test indicates that there is a statistically significant relationship from misery index to lottery games.In other words, Turkish people spend more money on lottery games to compensate increases in their misery index, which is expressed to reflect the combined effect of increasing inflation, unemployment and interest rate. Deteriorations in macroeconomic variables worsen the misery level of individuals. This, in turn, leads them to seek solutions to restore their current level of welfare or at least to preserve it. Playing more lottery games appears to be one, presumably the easist one, of the possible solutions in having more money to promote welfare and happiness.

6. Conclusion

It may be inferred from the analysis that, for the analysed period of 2005-2013, people's reaction to poor economic conditions in Turkey was to play more lottery games. When people lose their hope on the current or future prospects of the macro economy, they tend to play more lottery games to rebalance this situation in the short run. Even though people reckon that lottery game is a short run solution to pessimistic expectations, policymakers are the main responsible part to solve these matters permanently. High inflation, unemployment and interest rates are a signal for insufficient or defective macroeconomic policy.Moreover, as this study's results suggest, an increasing demand for lottery games may play a signalling role to draw policymakers' attention that some things are not going well in the economy.

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