The Effects of Terrorism on Happiness: Evidence from Turkey

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Abstract

The economic impacts of terrorism have been extensively examined in the literature. Yet, there is a paucity of empirical research investigating the effect of terrorism on welfare. Existing studies suggest that, in addition to economic costs, terrorism also has social costs. The aim of this paper is to examine the association of terrorism and life satisfaction for Turkey, by utilizing both micro-data at individual level and macro-data at provincial level. In order to address income endogeneity, the conditional mixed process estimation method has been utilized. Estimation results indicate that terrorism hinders happiness. Additional factors such as perceived relative income, gender, employment status and household size have significant effects on happiness levels of individuals. Empirical findings suggest that measuring only economic costs of terrorism fails capture the true extent of the costs imposed on the society. Additionally, single equation ordered probit estimates fail to capture the bidirectional relationship between life satisfaction and income level.

Keywords: Terrorism; Happiness; Conditional Mixed-Process Model; Turkey.

JEL Codes: D60, I31, R13, C30, O53

I. Introduction

Recent terrorist attacks in Istanbul, Ankara, Paris, Brussels and Nice, and a sharp rise in terrorist activities in Middle Eastern countries and North Africa have created a global concern and distress among many nations. Even though terrorist activities might be localized, the global fear of terrorism affects lives of vast populations, especially in targeted metropoles and big cities. Terrorism has economic, psychological, and social consequences for any country exposed to terrorist events. Even if a country has not been directly affected by terrorism, there could be spillover effects from the neighboring countries and/or trade partners. There are alternative channels through which terrorism may affect an economy. Terrorism may lead to an increase in transaction costs (Frey, Luechinger, & Stutzer, 2007); a decrease in tourism revenues (Blunk, Clark, & McGibany, 2006; Brian W Sloboda, 2003; Drakos & Kutan, 2003; Enders, Sandler, & Parise, 1992; Yechiam et al., 2005); a decrease in savings (Fielding, 2003); a decrease in number of firms and employment (Greenbaum, Dugan, & Lafree, 2007) and a decrease in foreign direct investment (Fielding, 2004), that hinder economic progress. The counter terrorism activities entailing an increase in security and military expenditures may have a negative impact on economic growth (Eckstein & Tsiddon, 2004). In addition to its economic impacts, terrorism also has intangible costs, including the increased levels of anxiety in the society; pain and despair of victims; a reduced life satisfaction and happiness.

Turkey has been suffering from terrorist activities for almost fifty years. During these years, Turkey was exposed to both domestic and international terrorist attacks. However, large part of terrorism in Turkey arises from the attacks of PKK, and has a regional context in the sense that the terrorist activities are mainly concentrated in the Southeastern region of the country (Ocal & Yildirim, 2010; Yildirim & Öcal, 2013). With intensification of terrorist events in Turkey, claiming many lives and damaging property, Turkish people has been experiencing major interruptions of daily activities such as delayed commuting in metropoles, closed schools, interrupted education, difficulties in access to health services, inconsistent work hours, in addition to a significant amount of stress and fear, which are similar to the experiences reported for Israel (Shalev, Tuval, Frenkiel-Fishman, Hadar & Eth, 2006). Moreover, fear of terrorism deters people from their daily activities, such as shopping, as they try to stay away from crowded places, leading to a decrease in daily economic transactions.

The economic impact of terrorism for Turkey has been examined in the literature. Existing studies agree that terrorism hinders economic growth in Turkey (Araz-Takay, Arin, & Omay, 2009; Ocal & Yildirim, 2010). Yet the impact of terrorism on wellbeing of Turkish citizens

has not been previously investigated. This study aims to explore the impact of terrorism on happiness by utilizing both micro-data at individual level and macro-data at provincial level from Turkey. The micro-data are from Life Satisfaction Survey of 2013 where the sampling enables the researchers to obtain individual level variables. Additionally, provincial level data regarding macroeconomics correlates are obtained from regional accounts/statistics of Turkish Statistical institute. Data relating to terrorist incidents are gathered from the Global Terrorism Database (GTD) of international terrorism incidents. Terrorism index is calculated as averages of incidents, injuries and fatalities occurred in each province. Conditional mixed-process models are employed for the empirical analysis. Rest of the paper is structured as follows: The next section reviews the literature for the impact of terrorism on well-being of individuals. The third section summarizes the data. Analytical framework and estimation method are presented in section four. The model and estimation results are summarized in section five. Finally, section six concludes.

II. Literature Review

In defence economics literature terrorism is generally defined as the premeditated use or threat to use violence by individuals or subnational groups against noncombatants to obtain political and social objectives through the intimidation of a large audience beyond that of immediate victims (Enders & Sandler, 1993, 2000). Terrorist incidents have ideological, social and political motives. Terrorist activities are carried out to spread fear so that the terrorist can reach their ultimate goals, by forcing the officials and politicians to reach an accommodation with them. Several national and international terrorist organizations have been contributing to terrorism in Turkey.[1] Since 1980s until recently the Kurdistan Workers' Party (PKK) was the major terrorist organization in Turkey, which is accompanied by Islamic Great Eastern Raiders/Front, and Turkish Workers' and Peasants' Liberation Army (TIKKO) (Drakos & Kutan, 2003).

Even though the roots of ethnic terrorism have been attributed to the regional inequalities prevalent in Turkey[2], unrest in Middle East, especially in Iraq and Syria, has contributed to the escalation of ethnic terrorism in South Eastern Turkey since the early 1990s. There have been attempts to solve the conflict peacefully and the ruling party (Justice and Development

[1] Please see Ocal and Yildirim (2010) for a detailed account of terrorism in Turkey.
[2] Please see Feridun & Sezgin (2008) and Yildirim and Ocal (2013) for the root causes of terrorist incidents in Turkey.

Party) has initiated a peace process in 2009.[3] Within the framework of the peace (resolution) process meetings between the Turkish National Agency representatives and the PPK leaders have been held in Oslo in 2012, which later came to be known as the Oslo Process. As a consequence of the peace process, there has been a decline in the number of PKK-initiated terrorist events between 2012 and 2013. However, continued terrorism activities on the part of PKK, which is met by military operations by the security forces, interrupted the Oslo Process. After the 2015 elections, PKK terrorism has been escalating with a new strategy of targeting urban areas, especially big cities, rather than the rural areas. PKK claimed the responsibility of the car-bomb attack that took place on February 17, 2016, in Ankara, the capital of Turkey, costing at least 30 lives and 60 fatalities. The elevated political upheaval in Syria and Iraq, leading to the rise of the Islamic State in Iraq and Levant, (ISIL), has proven to be a new source of terrorist activity. The ISIL threat to Turkey became clearer with suicide attacks in Southeastern province of Sanliurfa on July 20, 2015 resulting in 32 deaths and nearly 100 injuries; in Ankara bombing on October 10, 2015, costing 102 lives; and in Istanbul on March 19, 2016, killing 12 people all of which were foreign tourists, in addition to bomb attack on January 12, 2016.

Existing research on Turkey agrees that terrorism hampers economic growth. Araz-Takay et al. (2009) investigate the macroeconomic effects of terror by employing non-linear econometric methods for 1987-2004 periods. They report a large and significant economic impact, which is pronounced during expansionary periods. Ocal and Yildirim (2010), on the other hand, employ provincial level data and perform a regional effect analysis employing geographically weighted regression approach. They report that terrorism negatively affects economic growth across Turkey. However, its adverse effects are more accentuated in the South Eastern provinces, where most of the terrorist activity has been concentrated. Bilgel and Karahasan (2013) explore impact of terrorism on real GDP in the terror stricken Eastern and Southeastern Turkey, for the period 1975 to 2001, by employing the synthetic control method. Their empirical results reveal an average gap of about 7 percent between the actual real GDP of Eastern and Southeastern Anatolia and the real GDP of a comparable synthetic Eastern and Southeastern Turkey in the absence of terrorism. They attribute the estimated gap to PKK terrorism.

Turkey has been a popular tourist destination, attracting more than 25 million foreign tourists in 2016 with total revenue of 31.36 billion US dollars according to recent Turkstat figures. In

[3] Please see Ünal (2016) for a detailed account of terrorism activities of PKK and Peace Process in Turkey.

2015, Turkey has been the 6th most visited country according to the World Tourism rankings published by the United Nations World Tourism Organization. Tourism sector has been regarded as a source of foreign exchange reserves in the literature, while creating employment and leading to economic growth. In addition to international conflict in the Middle East, international and national terrorism are reported to have a negative impact on tourism revenues (Tosun, Timothy, & Ozturk, 2003). Accordingly, another strand of the literature examines the impact of terrorism on tourism for Turkey (Drakos & Kutan, 2003; Yaya, 2009). Terrorist events generally have a long lasting negative impact, even after the reestablishment of the stability (Enders and Sandler, 1991; Enders, Sandler, & Parise, 1992). Empirical research for Turkey suggests that the negative effect of a terrorist event is observed after 10 months (Yaya, 2009). Drakos and Kutan (2003) examine the issue for three countries in the Mediterranean region with a high incidence of terrorism: Turkey, Israel, and Greece. Their empirical findings support the results from single country studies in that terrorism significantly hampers tourist arrivals. Moreover, terrorist incidents in any country not only affect domestic economy, but also have significant spillover effects on the tourism markets of neighboring countries, leading to regional loss in economic activity.

The effects of terrorism on various sectors and overall economy have been assessed by the researchers. Terrorism leads to an increase in production and transaction costs; a decrease in savings; and a decrease in foreign direct investment. In turn, these all result in a significant cost on the economy which causes reduced economic growth. However, total social and political impact of terrorism is difficult to estimate. Terrorism and counter terrorism policies may have psychological consequences for individuals, impairing daily life of the citizens who are not only directly affected by terrorist events, but also those who are indirectly affected by the terrorist incidents. Post-traumatic stress disorder and depression is common among the individuals who live in the countries exposed to terrorist attacks (Schuster et al., 2001; Schiff, 2006; Canetti-Nisim, Halperin, Sharvit & Hobfoll, 2009). All of these consequences reduce the welfare of the society (Frey et al., 2007). Yet, there is a lack of empirical research investigating the effect of terrorism on welfare.

Frey, Luechinger and Stutzer (2009) estimate the cost of terrorism on life satisfaction in the regions of France, British Isles and Northern Ireland between the years of 1973/75 and 2002. They report significantly negative effect of terrorism and positive effect of income on life satisfaction. Similarly, Romanov, Zussman and Zussman (2012) study effect of terrorism on happiness of Israelis between the years 2002-2004 (during the Intifada). They reveal the differences in happiness levels of Jewish and Arab Israelis. Although terrorism fatalities does

not have a significant impact on the happiness level of Jewish Israelis; the authors show that Arab citizens of Israel are not satisfied with their lives due to terrorist attacks. Vorsina et al. (2015) also investigate social costs of terrorism employing cross country data from 117 countries covering the period from 2006 to 2011. They explore the direct relationship between life satisfaction of individuals and terrorism, and the indirect effect of terrorist activities on life satisfaction through its impact on national income. According to Vorsina et al. (2015), terrorist activities directly cause lower life satisfaction. Secondly, terrorist activities reduce national income and then it indirectly reduces life satisfaction.

Previous research on the determinants of life satisfaction in Turkey examine the relationship between subjective well-being and socio-demographic factors (Dumludag, 2013; Dumludag, Gokdemir, & Giray, 2016; Ekici & Koydemir, 2014; Selim, 2008). Empirical findings of Selim (2008) reveal that health, income and employment significantly affect happiness and life satisfaction in Turkey. Ekici and Koydemir (2014) reveal the relationship between happiness and different aspects of social capital. Dumludag (2013), (Dumludag, Gokdemir, & Giray, 2016) and Caner (2014) provide a comparative analysis for life satisfaction of Turkish individuals. Dumludag (2013) find that household consumption level and income have a significant impact on life satisfaction. Caner (2014) suggests that in addition to absolute income, favorable income comparisons enhance the level of happiness in Turkey, while their effects vary with business cycles. Dumludag et al. (2016) and Caner (2014) point out that relative standing of income level is an important determinant of individual's life satisfaction. Moreover, household income, being a housewife, being retired and living in rural areas are positive correlates of happiness. Yet, none of the existing studies shed light on the link between terrorism and happiness for Turkey. Thus, this study aims to complement the literature by exploring the effects of terrorism on happiness in Turkey.

III. Data and Descriptive Statistics

The data for this study is obtained from the Life Satisfaction Survey (LSS) conducted in Turkey by the Turkish Statistical Institute (TUIK) in 2013, which was the first LSS to reveal the data at province level. The survey consists interviews with 196,203 individuals aged 18 or over, belonging to 125,720 households. Individuals' answer to the question "Thinking about your life as a whole, how happy would you say you are?" constitutes the self-reported happiness variable. Answers were given on a scale of five (1 completely happy; 5 completely unhappy). In order to be in line with other studies, the answers converted into a scale as

ranging from 1 completely unhappy; to 5 completely happy. Monthly household income variable consists of 5 response categories, ranging from income of less than $1,000 to an income of $2950 or more. Additionally, respondents' perception of their own income have also been captured by asking the question ''Imagine a 10-step ladder, on the bottom of which, on the first step, stand the poorest 10 % people in Turkey, and on the highest step, the 10th, stand the richest 10 % of people in Turkey. On which step of the ladder are you?''. Data relating to terrorist incidents are gathered from the Global Terrorism Database (GTD) of international terrorism incidents. Terrorism index is calculated as the averages of incidents, injuries and fatalities occurred in each province following Eckstein and Tsiddon (2004) and Ocal and Yildirim (2010). During 2013 there had been 37 terrorist incidents in Turkey, resulting in 83 deaths, 38 wounds and property damage. The major incidents include suicide bombing to US Embassy in Ankara, car bomb attack in the Syrian border city of Hatay, which cost 66 lives. The major target sites were schools, military bases, police headquarters, construction areas and government buildings.

Descriptive statistics are presented in Table 2, where happiness variable is grouped into three categories: Happy (completely happy + happy), Neither happy nor unhappy, Unhappy (completely unhappy + happy). The mean happiness score is 3.56 with a standard deviation of 0.86. 60.32% of the sample report that they are happy whereas 10.89% of respondents reveal their unhappiness. Higher proportions of females (62.05%) and married (62.47%) individuals report that they are happy compared to males (57.96%) and unmarried (53.45%), respectively. Youngest and oldest groups of the sample exhibit higher proportions of happy individuals. University graduates have the highest proportion (62.5%) as happy individuals whereas illiterate group has the highest proportion (15.8%) as unhappy. Unemployed people are more likely to be unhappy compared to the employed people. It appears that money brings happiness since percentage of happy people rises as the level of income increases.

Table 1. Variable Definitions

VARIABLES	*DEFINITION*
Terrorism Index	Averages of incidents, injuries and fatalities in each province
Individual Variables	
Happiness	Self-reported. Ranges from 1="completely happy" to 5="completely unhappy"
Gender	= 1 for Females and = 0 for Males
Age	Age of the individual
Education level	No schooling (Reference Group)
	Primary education
	High School
	University and higher education
Work status	Working or temporarily laid off (Reference Group)
	Unemployed
	Retired
	Permanently disabled
	Keeping house
	Student
Married	= 1 for Married, = 0 otherwise
Immigrant	=1 if the person had migrated in the previous year, =0 otherwise
Unhealthy	=1 if the person had serious health problems in the previous year, =0 otherwise
Perceived Income	Income ladder. Ranges from 1(lowest) to 10 (highest).
Household Variables	
Income Group	Group 1 0 – 1000 US Dollar
	Group 2 1001 – 1435 US Dollar
	Group 3 1436 - 2000 US Dollar
	Group 4 2001 – 2950 US Dollar
	Group 5 More than 2950 US Dollar
Number of females in the household	
Number of disabled in the household	
Number of students in the household	
Number of income earners in the household	

Table 2. Level of happiness (%)

	Happy	Neither happy nor unhappy	Unhappy
Total	60.32	28.79	10.89
Male	57.96	30.40	11.63
Female	62.05	27.61	10.34
Age group			
18-24	65.1	26.8	8.1
25-34	60.3	30.9	8.8
35-44	55.1	33.8	11.1
45-54	54.5	33.2	12.4
55-64	58.2	28.9	13.0
65+	63.4	23.6	13.0
Education level			
Illiterate/not graduated from primary school	59.8	24.4	15.8
Primary school	57.3	31.9	10.9
Secondary school	58.4	31.9	9.7
High School and equivalent	59.8	31.2	9.0
University/graduate education	62.5	29.5	8.0
Marital status			
Married	62.47	28.01	9.52
Not married	53.45	31.28	15.27
Working Status			
Working or temporarily laid off Employed	59.46	31.16	9.38
Unemployed	42.12	33.83	24.05
Retired	61.72	28.07	10.22
Permanently disabled	44.21	28.78	27.01
Keeping house	64.01	26.49	9.49
Student	51.04	33.23	15.73
Unhealthy	51.33	29.85	18.81
Income Groups			
0-$1000	56.42	28.82	14.76
$1001- $1435	61.41	29.36	9.24
$1436- $2000	61.73	30.01	8.26
$2001-$2950	64.59	28.93	6.47
$2950+	69.72	25.31	4.97

IV. Analytical Framework and Estimation Method

Depending on the field of specialization, different estimation methods have been employed in the literature investigating the determinants of happiness (Ferrer-i-carbonell & Frijters, 2004; Kristoffersen, 2010). Generally, psychologists and sociologists prefer to employ Ordinary Least Squares (OLS) regressions, treating happiness as a cardinal variable. Economists, on the other hand, regard happiness as an ordinal variable and thus opt for ordered response models (van Praag, 2007). The preference of cardinality assumption by psychologists has been criticized by economists, arguing that the subjectivity of happiness hinders the assessment of the realism of the cardinality assumption (Ferrer-i-Carbonell and Frijters, 2004; MacKerron, 2012). Economists, by relaxing the assumption of cardinality, generally employ the standard ordered probit and logit models, which treat ordinal data as the discrete expression of a continuous latent variable of arbitrary scale (Blanchflower & Oswald, 2004b). Yet results obtained using models that do and models that do not assume cardinality are usually extremely similar (MacKerron, 2012). There are empirical studies employing both methods in order to demonstrate that results are not biased by the particular technique used in the analysis (Stevenson & Wolfers, 2009). The models which impose cardinality provide results similar to ordered ones such as logit and probit (Ferrier-i-Carbonell and Frijters, 2004; Blanchflower and Oswald, 2004b; MacKerron, 2012).

We employ the following model specification for the underlying relationship between self-rated happiness level and its determinants.

$$H_i^* = X_i\beta + \alpha T_i + \varepsilon_{i1} \qquad (1)$$

Where $X_{i=}(X_{1i}, X_{2i}, \ldots, X_{ki})$ is a k×1 vector of covariates, $(\beta_1, \beta_2, \ldots, \beta_k)$ is a vector of parameters to be estimated, H_i is the happiness level of the respondent i; T_i is the terrorism index for the region/city in which the respondent lives and ε_{i1} is normally distributed error term.

Although H_i^* cannot be observed, a discrete ordered categorical variable H is observed. The relationship between H_i and H_i^* can be represented as follows

$$H_i = 1 \quad if \quad H_i^* \leq \mu_1$$

$$H_i = 2 \quad if \quad \mu_1 < H_i^* \leq \mu_2$$

$$H_i = 3 \quad if \quad \mu_2 < H_i^* \leq \mu_3$$

$$H_i = 4 \quad if \quad \mu_3 < H_i^* \leq \mu_4$$

$$H_i = 5 \quad if \quad H_i^* > \mu_4$$

Where μ_i (i=1, 2, 3, 4) are free parameters that represent the threshold values of the model, that bound the categories into which H_i^* falls. Since we observe levels of self-rated happiness as a categorical variable, we utilize ordered probit models for empirical estimation. All models are estimated with heteroscedasticity-consistent standard errors.

The models are intended to be estimated primarily by ordered probit to account for the ordinal comparability in rated happiness. However, to address the issue of endogeneity of income in determination of happiness and interdependence leading to unobserved heterogeneities, a conditional mixed process model has been employed where the correlation between the error terms of happiness and income is estimated as an auxiliary parameter. The conditional mixed process estimator (CMP) is an alternative which is more suitable for multiple equations estimations involving different types of dependent and independent variables (Roodman, 2011). It enables researchers to jointly estimate the system of reduced and structural equations.

Our model is a simultaneous equation system with two equations where model equations can have different dependent variables.

$$H_i^* = X_i\beta + \alpha T_i + \varepsilon_{i1} \qquad (2)$$

$$IG_i = X_i\lambda + \varepsilon_{i2}$$

where H denotes ordinal variable of happiness ranging from 1 completely unhappy to 5 completely happy; IG denotes income group ranging from 1 (0- 350 USD) to 5 (over 2950 USD), and the error terms are assumed to be bivariate normally distributed with zero mean, unit variance and correlation coefficient ρ . $X_i = (X_{1i}, X_{2i}, \ldots, X_{ki})$ is a k×1 vector of covariates, T_i is average terrorism variable, $(\beta_1, \beta_2, \ldots, \beta_k)$ and $(\lambda_1, \lambda_2, \ldots, \lambda_k)$ are vectors of parameters to be estimated.

The correlation between the error terms of two equations would capture the interdependence of unobserved components in subjective life satisfaction and income. If error terms of both equations are affected by similar components, they will not be independent, leading to inconsistent parameter estimates in univariate models. The Wald test, and / or Lagrange Multiplier Test provide evidence on the correlation between unobserved explanatory variables that affect both equations. A conditional maximum likelihood estimation approach, which imposes appropriate restrictions on the correlation structure between the errors of the two equations, can be employed to attain consistent and efficient estimates. Roodman's (2009, 2011) novel mixed-process model deals with the endogeneity problem and obtain efficient estimates. Roodman (2011) proposes a general tool implemented on Stata software and using the CMP algorithm to estimate a limited information maximum likelihood.

V. Estimation Results

Within constraints of the available data, we follow the literature and firstly estimate equation (1) to investigate the impact of terrorism on happiness in Turkey. The dependent variable is self-rated happiness and the main explanatory variable is the terrorism index of each province.[4] The remaining explanatory variables are gender, age, education level, household income, perceived relative income, marital status, health indicator, work status and immigration status.

The single equation ordered probit estimation results for equation (1) are presented in Table 3. Empirical results reveal that average terrorism hinders self-reported happiness in Turkey. Females are significantly happier than males. There is a U-shaped relationship between age and self-reported happiness. As the level of education increases, people feel less happy. Marriage enhances self-reported happiness levels. With respect to work status, compared to an employed person, unemployed, retired and permanently disabled people tend to be less happy. Students and housekeepers are more likely to be happy compared to employed people. Migration also has a positive impact on self-reported happiness. Both household income level and perceived income foster happiness.

[4] Alternative specifications for terrorism variable have also been considered. We have estimated models using average of terrorism index for 2000-2013 to examine the cumulative effect and models with the lagged values of terrorism index. The estimation results remained robust when alternative definitions of terrorism variable have been used.

Table 3. Ordered Probit Single Equation Estimates

VARIABLES	***Happiness***
Terrorism Index	-0.021***
	(0.000)
Gender	0.054***
	(0.01)
Age	-0.045***
	(0.000)
Age Square	0.0005***
	(0.000)
Primary School	-0.0195**
	(0.015)
High School	-0.072***
	(0.000)
University and Higher Education	-0.119***
	(0.000)
Household Income Level	0.057***
	(0.000)
Perceived Relative Income	0.128***
	(0.000)
Married	0.327***
	(0.00)
Unhealthy	-0.237***
	(0.00)
Unemployed	-0.334***
	(0.000)
Retired	0.036***
	(0.006)
Student	-0.085***
	(0.000)
House Keeping	0.0573***
	(0.000)
Disabled	-0.206***
	(0.000)
Immigrant	0.089***
	(0.000)
P-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1.	
LR: $\chi^2(17)$ =16035.32	
Prob > χ^2 = 0.0000	
Pseudo R^2 = 0.0501	

As self-ratings of individual's overall life satisfaction are measured by an ordered categorical variable, existing studies have generally employed single equation standard ordered response models to analyze determinants of subjective well-being. Since these studies consider various forms of subjective well-being and income level as independent achievements or choices, they fail to account for any interdependency among these variables. There is extensive evidence provided by cross-sectional and panel survey data studies which suggest that higher

income is associated with elevated levels of satisfaction with life (Blanchflower & Oswald, 2004a; Diener, Diener, & Diener, 1995; Ferrer-i-Carbonell & Frijters, 2004; Frijters, Haisken-denew, & Shields, 2004; Kahneman et al., 2006; Stevenson & Wolfers, 2009). On the other hand, Easterlin's pioneering study shows that, on average, people with higher income are happier. However, raising income of all individuals does not increase happiness level for all of them. Hence, Easterlin Paradox suggests that increasing income should not necessarily lead to an increase in happiness since individual`s income in comparison to others' income has not changed (Easterlin, 1974, 1995, 2001). Thus, only the relative income is significant for life satisfaction (Clark, Frijters, & Shields, 2006; Mentzakis & Moro, 2009). These mixed findings pave the way for further research on income-happiness relation.[5]

The random disturbances that affect various forms of subjective well-being such as happiness, life satisfaction and income level may be correlated. Thus, happiness and income levels may be interdependent. Neglecting this unobserved heterogeneity will result in personality bias on the obtained estimates.[6] Earlier studies reveal that happy people are more likely to have a number of positive psychological traits. Thus, they are more productive and successful in their professions leading to improved workplace outcomes and higher satisfaction levels with their jobs compared to unhappy people (Boehm & Lyubomirsky, 2008; Judge & Ilies, 2004; Mignonac & Herrbach, 2005). Moreover individual characteristics have an impact on both subjective well-being and income determination. Individuals who are extravert and resilient are more likely to be happy and earn more (Boehm & Lyubomirsky, 2008; Lyubomirsky, King, & Diener, 2005). Furthermore, individuals may need to work in unfavourable conditions, long hours and spend time away from their homes and loved ones, all of which negatively affect their subjective well-being. In such a case, estimating standard ordered response models would inappropriately constrain the correlation between the random disturbances to be equal to zero, implying that any randomness affecting the subjective well-being is unrelated to the income level. This constraint can be relaxed by jointly estimating the equations in the form of a bivariate ordered response model, which contains an extra parameter to account for the correlation across equations in the same sense as a seemingly unrelated regression model.

The empirical results of the conditional mixed effect estimation for two-equation system in Equation (2) are presented in Table 4, where the dependent variables are self-rated happiness and income level, respectively. The conditional mixed process estimation results reveal that

[5] Please see Frey and Stutzer (2002) for a detailed literature review of economics and happiness.
[6] Please see (Powdthavee, 2010) for a review.

the correlation coefficient between the disturbances of the two equations (atanhrho) is statistically significant, indicating that single equation ordered probit estimates fail to capture the association of life satisfaction and income level. A statistically significant positive value of the correlation coefficient (atanhrho) suggests that happiness and income are directly associated.

The estimation results for the happiness equation presented in Table 4 are quite similar to the single equation model. Terrorism has a statistically significant negative impact on happiness, supporting the earlier evidence provided by (Frey et al., 2007; Vorsina et al., 2015). The great majority of the existing research reports a positive association between absolute income and happiness or subjective well-being, though its impact is smaller compared to variables such as marriage and unemployment (Ferrer-i-Carbonell, 2013). Yet, the empirical evidence regarding the relation between happiness and relative income is mixed (Verme, 2013).

A strand of the literature using panel data for developed countries report a negative relation between self-reported happiness and income of the reference group (Helliwell, 2003; Stutzer, 2004; Vendrik & Woltjer, 2007). Whereas a positive association between perceived income and happiness is reported for a number of less developed countries (Dumludag, Gokdemir, & Giray, 2016; Knight, Song, & Gunatilaka (2007); Knight, Shi, & Song, 2004; Stutzer, 2004). Results presented in Tables 3 and 4 reveal that level of perceived relative income has a positive impact on self-reported happiness in Turkey. Individuals are happier when their income is higher than the income of the reference group. This results is consistent with previous findings for Turkey reported by Dumludag et al. (2016).

The single equation estimation results of Table 3 reveal that increases in education level hinder happiness. According to results presented in Table 4, however, education variables are not statistically significant when the endogeneity of income group variable has been taken into account. Previous studies report mixed results for the relationship between education level and life satisfaction. While Dumludag (2013) and Kangal (2013) find a positive education effect, Selim (2008) reports that education is not a statistically significant determinant of happiness. Recently, Dumludag et al. (2016) provide empirical evidence for the U-shaped relationship between education and happiness. The endogeneity of income could be one of the reasons of mixed empirical findings with respect to education variable. Even though education may have an impact on happiness, it is not a direct effect. Rather, education fosters happiness indirectly through its positive effects on income level. The empirical results of CMP estimation of the income equation, presented in Table 4 suggest that higher levels of education lead to an increase in income which then enhances individuals'

happiness. This could be due to the fact that enhancing human capital enables people to get better jobs with higher earnings.

Existing empirical research confess that absolute income enhances happiness and its marginal impact on self-reported happiness decreases when individual income increases. In addition to this direct effect, income also affects happiness through social comparisons with certain reference groups (Clark, Frijters, & Shields, 2008; Dumludag et al., 2016; Wolbring, Keuschnigg, & Negele, 2013).

With respect to socio-demographic variables, our results indicate that self-reported happiness follows a U-shape over age which is consistent with the existing literature (Blanchflower & Oswald, 2008; Cheng, Powdthavee, & Oswald, 2015; Landeghem, 2008; Stone, Schwartz, Broderick, & Deaton, 2010). For Turkey, the literature either reports a negative (Ekici & Koydemir, 2014; Selim, 2008) or a U-shaped (Caner, 2014; Dumludag et al., 2016) impact of age on happiness. Empirical findings of our study indicate that happiness falls and reaches a minimum at age 51, which is very close to age 55 reported in the literature and then rises again (Blanchflower & Oswald, 2004a; Frijters & Beatton, 2012). Gender differences in happiness exist and our estimation results imply that females are happier than males. This finding is consistent with previous evidence (Caner, 2014; Cordero, Salinas-Jiménez, & Salinas-Jiménez, 2017; Ekici & Koydemir, 2014; Selim, 2008). Being married enhances the likelihood of being happy supporting the earlier findings (Dumludag et al., 2016; Ekici & Koydemir, 2014; Mentzakis & Moro, 2009; Stutzer & Frey, 2006). Stack & Eshleman (1998) suggest three intermediating processes through which marriage or cohabitation may positively impact happiness: marriage may enhance financial resources, stimulate better physical health and yield greater emotional support. Stutzer & Frey (2006), on the other hand, claim that happier people are more likely to get married; hence there is a bidirectional relationship between them.

Considering the work status, being unemployed or disabled hinders happiness. However, retirees and house keepers are more likely to be happy compared to employed individuals. Employment is generally considered to provide basic financial resources, social contacts, a social status and identity within society's institutions and networks (van der Meer, 2014; Warr, 1982). Thus, unemployment is expected to be negatively related with happiness, which is empirically supported by both longitudinal and cross-sectional research (Ferrer-i-Carbonell & Frijters, 2004; Stam, Sieben, Verbakel, & de Graaf, 2016; Winkelmann & Winkelmann, 1998).When unemployed, an individual loses both financial and social benefits. Winkelmann and Winkelmann (1998) argue that non-pecuniary costs of unemployment are greater than the

pecuniary costs resulting from loss of income. The loss of financial resources during unemployment may refrain people from planning their future and fulfilling various psychological needs; and it may even lead to poverty (Shields & Price, 2005). The loss of non-pecuniary benefits, on the other hand, may lead to social exclusion. These loses of non-pecuniary benefits may explain the happiness levels of individuals who belong to other work / employment status, such as retirees, housekeepers, disabled people and students (Stam et al., 2016).[7] The ability to compensate for the lack of non-pecuniary benefits determines the degree of well-being. Hence, homemakers are expected to follow employed people in terms of happiness as family sphere may reward the lost non-pecuniary benefits. Students also have a social environment and they can create identities and activities that compensate the lost benefits (Calvo, Mair, & Sarkisian, 2015). Similarly, retirees may also benefit from a family environment, which makes up the lost benefits of employment. On the other hand, unemployed and disabled may have some difficulties compensating for the lack of non-pecuniary benefits through other activities (Stam et al., 2016; Strandh, Hammarström, Nilsson, Nordenmark, & Russel, 2013). Thus, empirical results provided in Table 4 are in line with the existing literature, except for students. Being a student hinders happiness in Turkey.

The accumulated evidence indicates that the better the individual's both physical and psychological health, the happier (s)he is on average.[8] Bloom & Canning (2000) argue that there is two-way causality between health and income. Healthy people tend to be more productive; more likely to invest in human capital, hence they are more educated. Additionally, since they are more likely to live longer they tend to invest in physical capital. Accordingly, any improvement in health status elevates happiness. Moreover, chronic diseases and specific conditions, such as heart attacks and strokes reduce satisfaction with life (Dolan, Peasgood & White, 2008). Our findings are in line with the previous literature that being unhealthy in the previous year reduces happiness (Dumludag, 2013; Peiró, 2006; Selim, 2008; Stam et al., 2016).

Considering only economic motives for migration, one may assume that life in wealthier countries/provinces bring more happiness and prosperity. However, the bulk of evidence in the literature generally suggests that migrants are less happy than natives in destination countries even though there has been a rise in their income levels (Bălţătescu, 2007;

[7] Please see Stam et al. (2016) and Calvo, Mair, & Sarkisian (2015) for a detailed discussion on how work status and subjective wellbeing is associated.

[8] Please see (Frey & Stutzer, 2002) for a review.

Bartram, 2013; Knight & Gunatilaka, 2010; Kóczán, 2016). Several factors may contribute to this finding, such as underemployment and social factors such as discrimination, extended separation from close family, and isolation (Bartram, 2013). Similar findings are reported in research on internal migration for China (Knight & Gunatilaka, 2010); for Thailand (Jong, Chamratrithirong, & Tran, 2002), for Germany (Nakazato, Schimmack, & Oishi, 2011) and for Britain (Nowok, van Ham, Findlay, & Gayle, 2013). The empirical findings of this study suggest that immigrants are more likely to be happy compared to natives in Turkey, supporting the findings of Melzer (2011) and Switek (2016) though there appears to be decline in their household income. Melzer (2011) finds that migrants, moving from East to West Germany, have improved their life satisfaction levels. Switek (2016), on the other hand, states that the migration's impact on happiness depends on the reason for move, and only individuals migrated for better employment opportunities experience an increase in life satisfaction which lasts 6–10 years after their move. Both papers focus on more homogenous groups of migrants, which could be the case for Turkey as well. Our finding that internal migration reduces income is in line with Tunalı (2000) who reports that nearly 75% of migrants in Turkey realizes net negative monetary returns over the period 1963-1973.

When the remaining variables for Income Level equations are considered, it appears that as number of females, number of disabled, and number of students in the household increases, there is a decline in the household income level. However, an increase in number of income earners would lead to a rise in income level of the household.

Table 4. CMP Estimation Results

VARIABLES	*Happiness*	*Income level*
Terrorism Index	-0.021***	
	(0.000)	
Gender	0.054***	
	(0.000)	
Age	-0.046***	0.0537***
	(0.000)	(0.000)
Age Square	0.0004***	-0.0005***
	(0.00)	(0.000)
Primary School	0.003	0.566***
	(0.703)	(0.000)
High School	-0.0002	1.384***
	(0.988)	(0.000)
University and Higher Education	0.0184	2.345***
	(0.344)	(0.000)
Perceived Relative Income	0.127***	
	(0.000)	
Married	0.321***	
	(0.000)	
Unhealthy	-0.237***	
	(0.000)	
Unemployed	-0.333***	
	(0.000)	
Retired	0.044***	
	(0.001)	
Student	-0.0762***	
	(0.001)	
House Keeping	0.0538***	
	(0.000)	
Disabled	-0.225***	
	(0.000)	
Immigrant	0.080***	-0.120***
	(0.000)	(0.000)
Number of females		-0.200***
		(0.000)
Number of disabled in the household		-0.453***
		(0.000)
Number of students in the household		-0.183***
		(0.000)
Number of income earners in the household		0.761***
		(0.000)
atanhrho	0.0803***	
	(0.00)	
Wald: χ^2	Wald: χ^2 (16) = 11758.38	
	Prob > χ^2 = 0.0000	
Log pseudolikelihood	-383029.76	
P-values in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The coefficient of atanhrho is transformed version of rho which indicate the correlation between errors terms of happiness equation and income group equation.		

VI. Conclusion

Terrorism can be classified as a subset of human-caused disasters (Colletta, 2004; Goldfrank, Panzer and Butler, 2003) which in addition to causing material damage, can have a particularly devastating impact on psychological functioning. Goldfrank, Panzer and Butler (2003) state that terrorism may have a greater impact than other disasters on distress responses, behavioral change, and psychiatric illness due to the unique characteristics of terrorism events. Previous empirical evidence suggests that terrorism has economic, psychological, and social consequences. The economic costs of terrorism have been well-documented in the literature. Yet, empirical evidence for the welfare costs is limited. This study investigates the impact of terrorism on self-reported happiness for Turkey, which has been suffering from terrorist activities for almost fifty years. Although previously terrorist activities have been localized in South Eastern provinces and major cities, the frequency and severity of attacks have been increasing. In addition to claiming many lives and damaging property, terrorism spreads fear, uncertainty, anxiety and anger, which collectively lead to changes in daily activities of people because of the unpredictability of such attacks. Understanding the extend of the welfare impacts of terrorism is crucial and may shape efforts to develop intervention strategies in order to lessen the adverse psychological effects of terrorism.

Employing a unique dataset which combines micro-data at individual level and macro-data at provincial level for Turkey, this article makes two major contributions to the literature. This study is the first to analyze the impact of terrorism on self-reported happiness in Turkey. Secondly, it contributes to happiness literature by jointly estimating self-reported happiness and income group variables, taking the possible endogeneity of the latter into account. For this purpose, it employs conditional mixed process estimation method, where the correlation between error terms of happiness and income models is estimated as an auxiliary parameter.

Empirical findings suggest that terrorism hinders self-reported happiness, supporting the findings of Frey, Luechinger and Stutzer (2007), Romanov, Zussman and Zussman (2012) and Vorsina et al. (2015). Furthermore, results indicate that there is a U-shaped relationship between age and self-reported happiness, while marriage, being female and being healthy enhance self-reported happiness levels. Though the single equation estimation results reveal that increases in education level hinder happiness, education variables are not statistically significant when the endogeneity of income has been taken into account. This finding

suggests that education fosters happiness indirectly through its positive effects on income level. Regarding the work status, unemployed or disabled people are less happy compared to employed respondents. While migration elevates happiness, this is achieved at the expense of a lower household income. Regarding the determinants of income level, it appears that as number of females, number of disabled, and number of students in the household increases, there is a decline in the household income level. However, an increase in number of income earners would lead to a rise in income level of the household. Finally, the conditional mixed process estimation results reveal that the correlation coefficient between the disturbances of income and happiness models is statistically significant and positive. This result implies that any increase in income level enhances self-reported happiness. In addition to absolute level of household income, perceived relative income level is also positively related to life satisfaction of Turkish individuals.

In all, this study reveals that the true costs of terrorism include both tangible and intangible costs. The results suggest that the welfare costs of terrorism would be underestimated if it considers only the traditional economic costs.

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