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EXAMINING VIOLENT AND PROPERTY CRIMES IN THE PROVINCES OF  
TURKEY FOR THE YEARS OF 2000 AND 2007 has been approved by his or her  
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EXAMINING VIOLENT AND PROPERTY CRIMES IN THE PROVINCES OF  
TURKEY FOR THE YEARS OF 2000 AND 2007

A Dissertation submitted in partial fulfillment of the requirements for the degree  
of Doctor of Philosophy at Virginia Commonwealth University.

by

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## Abstract

### EXAMINING VIOLENT AND PROPERTY CRIMES IN THE PROVINCES OF TURKEY FOR THE YEARS OF 2000 AND 2007

By Ekrem Mus, Ph.D.

A Dissertation submitted in partial fulfillment of the requirements for the degree  
of Doctor of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2010

Major Director: Jill A. Gordon, Ph.D.  
Associate Professor and Criminal Justice Graduate Coordinator

This dissertation explores the relationship between social, economical, and demographic variables and reported violent and property crime incidents in the provinces of Turkey between 2000 and 2007. The data on violent and property crimes comes from Turkish National Police. All other variables are secondary data gathered from open sources and Turkstat. The research is one of the first studies to examine this relationship in Turkey. This research argues that Institutional Anomie Theory and Life Course Theory can offer insights into the effect of social, economic, and demographic conditions on crime at the city level.

The findings of the study suggest that family disruption rate and gross domestic product were significantly related to the violent crime rate while family disruption rate,

gross domestic product, population, population density, and urbanization rate were significantly related to the property crime rate in the provinces of Turkey at bivariate level.

The findings of the multivariate analysis for violent crimes reveal strong support that high school graduation rate, family disruption rate and gross domestic product have a considerable significant positive impact on violent crimes while unemployment rate and urbanization rate have significant negative relationship with violent crimes in the provinces of Turkey. Likewise, the findings of the multivariate analysis for property crimes reveal strong support that high school graduation rate, family disruption rate, gross domestic product and population in a province have a considerable significant positive impact on the number of property crimes in a province in Turkey. Implications of findings and policy recommendations and future research suggestions are also discussed.

# CHAPTER 1

## Statement of the problem

### Introduction

Crime rates and types of committed crimes vary across cities and nations (Archer & Gartner, 1984; Fields & Moore, 1996; He, 1997; Tonry, 1997; Blumstein & Wallman, 2000; Shaw, Van Dijk, & Rhomberg, 2003; Yoon & Joo, 2005). Some empirical studies on the causes of crime have analyzed aggregate level crime data such as county, city, province, state, and international perspectives to find explanatory reasons as to why some localities produce more crime than others in a comparative approach (Shaw & McKay, 1942; Blau & Blau, 1982; Messner, 1983; Bailey, 1984; Messner & Golden, 1992; Shihadeh & Ousey, 1996; Koseli, 2006; Simsek, 2006). Some of the repeated variations of crime trends amongst nations or jurisdictions include social, economic, and demographic conditions such as race, poverty, education, immigration, urbanization, and inequality of service distribution. Furthermore, Glaeser and Sacerdote (1999) argue that crime rates are higher in larger cities than in both small ones or rural areas and that between one-third and one-half of the urban effect on crime can be explained by the presence of more female-headed households in those cities by analyzing victimization data and the Uniform Crime Reports (UCRs).

Prior research suggests that some social conditions that are related to crime incidents are education, marriage, and divorce (Warner & Pierce, 1983; Greene, Bynum & Webb, 1984; Lochner & Moretti, 2004; Steurer & Smith, 2003; Joo, 2003). Research

also indicates that economical conditions such as poverty, unemployment, the number of people below poverty level, and distribution of public investment are also associated with crime trends (Sampson, 1985; Sampson & Grooves, 1989; Britt, 1997; Hagan, 2006; Koseli, 2006). Finally, demographic information, including population density, age structure of the population, race, urbanization, and number of households influence crime (Fox, 1978; Blau & Blau, 1982; Bryant, 1997; Land, McCall, & Cohen, 1990; Simsek, 2006).

The top priority for the Turkish government since 1970 has been fighting terrorism. This is due to the thirty to forty thousand people that have been lost in this fight (Cline, 2004; Yayla, 2005; Durna & Hancerli, 2007; Smith & Teymur, 2008). Therefore, other crimes such as property and violent crimes and organized crimes like narcotics, smuggling, and white-collar crimes have not been comprehensively studied because until recently the crime phenomenon is seen only as a matter of the police performance in Turkey. The criminal justice system has discounted other social and economical variables for two important reasons; difficulties in accessing crime data from Turkish National Police (TNP) and viewing crime prevention and fight with crime solely as a matter of police duty.

While terrorism is still a priority for Turkish government, the time has come to examine other crimes within the country. The primary focus of this study is to explore the relationship between social, economical, and demographic variables and crime incidents in the provinces of Turkey between 2000 and 2007. This study will examine how and to what extent the above-mentioned variables can explain crime incidents (crimes against goods and crimes against people) in Turkey. The research is amongst the first to examine



this relationship in Turkey. The prior aggregate crime studies in Turkey focuses on crime rates between 2004 and 2006 (Bahar & Ferd, 2008), crime categories and limited social indicators between 1967 and 2004 (Kustepeli & Onel, 2006) and economic and social determinants of crime rates in Turkey for the year of 2000 (Comertler & Kar, 2007). Examination of crime trends in Turkey is rather a new practice due to unavailability of the information to the larger research community.

There are many studies that have examined the factors that are related to crime within the United States and other developed countries. However, this relationship has been ignored in Turkey. The previous research on crime in Turkey is very limited and it has been conducted either at the national level or at the provincial level and only for one year at a time. This study attempts to fill this gap in Turkey by exploring the relationship between property and violent crimes and other social, economic and demographic variables. This research will advance the current crime trends in Turkey by employing a longitudinal approach for an eight-year-period. It will also be the first study to test whether there is a relationship between crimes against goods and crimes against people and other independent variables by utilizing a multivariate modeling statistical tool.

Specifically, the research will address the following two research questions; Are the social, economic, and demographic variables related to the number of committed crimes (crimes against goods, crime against persons) in the provinces of Turkey between 2000 and 2007? To what extent do these variables explain this relationship accordingly?

## 1.1. Organizational Map of the Dissertation

This study includes six chapters. This chapter briefly introduces the topic under analysis, the importance of the topic, the current research on the topic, and how this research will advance the issue in current literature.

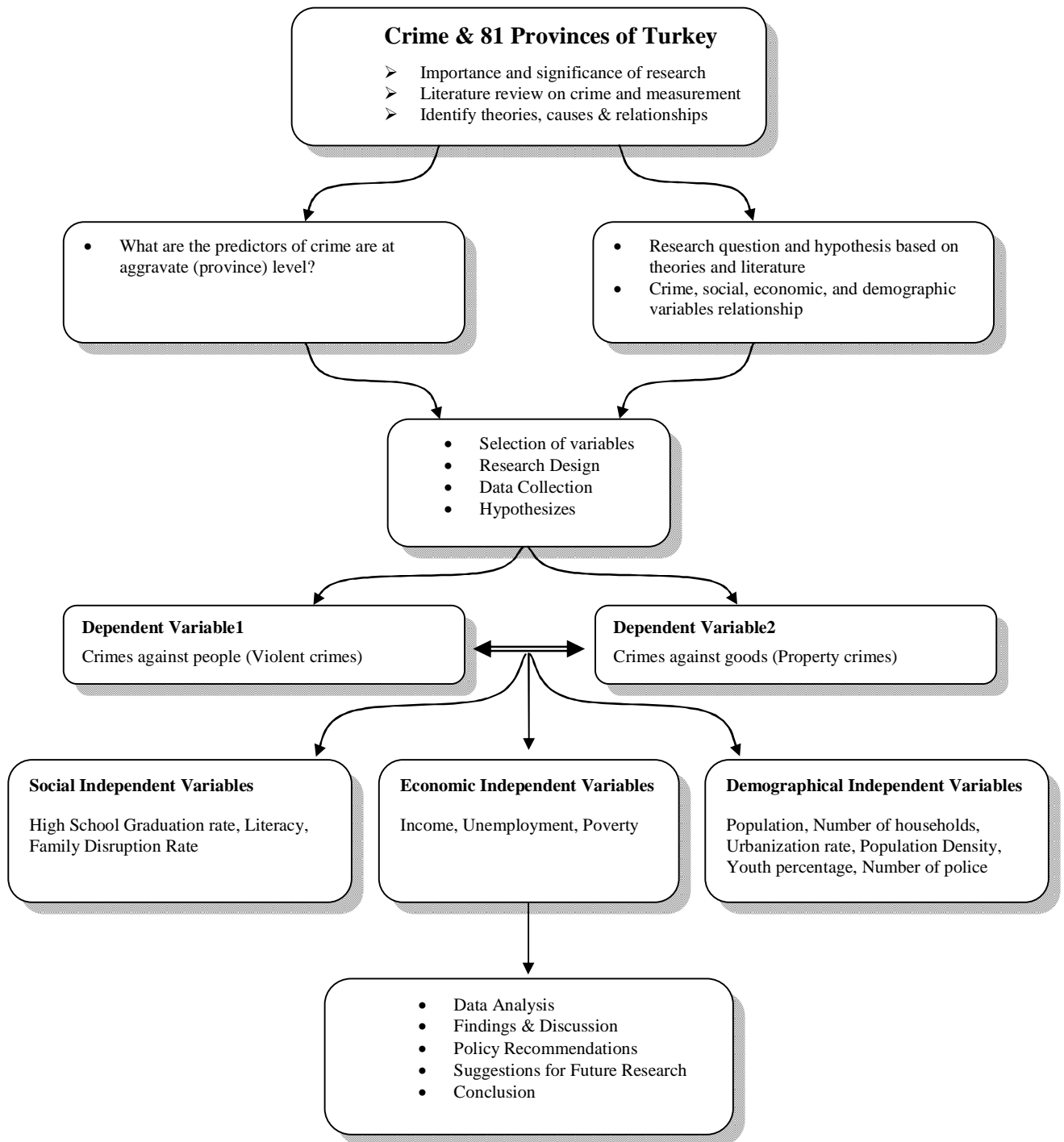
The second chapter provides a general overview of the literature and a review of the two criminal theories. It then interprets selected social, economical and demographical variables and crime relationships from the literature and theoretical perspectives. It also offers a discussion on crime measurements, aggravated level crime measurements, crime measurement issues, and the limitations of crime measurements.

The focus of the third chapter will be brief information about Turkey, Turkish Criminal Justice System. Crime measurement practices of Turkish National Police (TNP) and the current Turkish crime rates (terrorism, organized crime, property and violent) will be briefly introduced along with the structure of the law enforcement agencies.

Chapter four presents the research design and the methodology of the study. Also discussed are the data collection strategies, variable measurement, the instrumentation of the hypothesizes, and the process of the data analysis method. The hypothesizes are derived from the literature and from crime theories.

Chapter five focuses on the results of the study. The findings of the research will be explained along with the crime against goods and crime against people relationship and the other variables of the 81 provinces in Turkey.

Finally, chapter six provides a conclusion that summarizes the major findings, limitations, policy recommendations, and other recommendations for future research to specifically crime measurement and crime trends in Turkey.



**Figure 1: Dissertation Diagram.**

## CHAPTER 2

### Literature Review & Theoretical Framework

#### Introduction

Crime has been a fundamental part of human history and the underlying factors of crime have been at the heart of many different disciplines. Moreover, no eventual conclusions on the cause or effect of crime have been agreed on in each discipline; rather they have focused on several different types of explanations. Nevertheless, one of the essential accomplishments in understanding crime is the tracking of primary factors that originate the crime and criminals. Most of the conducted research has contributed to identifying the primary factors that shape crime and criminals and has developed innovative policies aimed at reducing crime.

Variations in crime both types and frequency vary across cities and nations (Blau & Blau, 1982; Fields & Moore, 1996; Tonry, 1997; Cerrah & Semiz, 2001). Some empirical studies on the causes of crime have analyzed aggravated level crime data to find explanatory reasons as to why crime rates fluctuate (Shaw & McKay, 1972; Messner, 1982; Bailey, 1984; Messner & Golden, 1992; Shihadeh & Ousey, 1996; Koseli, 2006; Simsek, 2006). The research indicates several factors exploring the relationship between city and national level crime incidents (Chamlin & Cochran, 1995; Messner & Rosenfeld, 1996).

The main purpose of this study is to identify and to understand to which degree the social, economic, and demographic variables explain crime incidents in urban areas of

the Turkish provinces between 2000 and 2007. The focus of this chapter is on the theoretical foundation of the study, the relationship between the social, economic and demographic factors on crime, way of measuring crime and evaluating crime measurement practices along with strength and limitations.

## **2.1. Theoretical Framework**

Most of the prior research on crime and deviance focused on routine activity theory (Cohen & Felson, 1979; Sampson & Wooldredge, 1987; Sherman, Gartin, & Buerger, 1989; Kennedy & Forde, 1990; Mustaine & Tewksbury, 1998), social disorganization theory (Shaw & McKay, 1942; Sampson & Groves, 1989; Warner & Pierce, 1993) and anomie-strain theory (Tittle & Villemez, 1977; Elliott, & Ageton, 1980; Lafree, Drass, & O'Day, 1992; Savolainen, 2000; Koseli, 2006; Murphy & Robinson, 2008) to evaluate rural-urban crime, crime victimization, and fluctuations of crime trends. This study considers Messner and Rosenfeld's (1994) Institutional Anomie Theory and Sampson and Laub's (1992) Life Course Theory to derive the variables and to explain why crime trends have fluctuated in the provinces of Turkey between 2000 and 2007. Messner and Rosenfeld presented Institutional Anomie theory by advancing the issue of anomie at a societal level. Sampson and Laub (1990) theorized that their causal model exists within a structural context and is shaped by larger historical and macro-level forces. This research argues that Messner and Rosenfeld's Institutional Anomie Theory and Laub and Sampson's Life Course Theory can offer insights into the effect of social, economic, and demographic conditions on crime at the city level.

### 2.1.1. Institutional Anomie Theory

Sociological theories observe social understanding within the society, and interaction between the individuals and groups. Sociologists want to find out the relationships between individuals and social groups to characterize the behaviors of people within the groups. Merton (1938) developed a body of the research on the “Social Structure and Anomie” theory. Merton borrowed the concept of anomie from Emile Durkheim, who used the term of anomie as a way to understand that a lack of social regulation contributed to a higher suicide rate in modern society. Merton then developed the concept of *anomie*, a French word meaning “normlessness or deregulation,” to provide a generalized theory of deviant behavior (Mendlovic, Ratzoni, Doron, & Braham, 2001).

Like Merton, Messner and Rosenfeld , (2002, p.104) wanted to explain the high level of crime in the United States. To Merton, anomie is a disjunction between the socially approved means to success and legitimate goals. It seeks to understand the relationship between social structure, culture, and the deviant behavior. Social structure and anomie theorize that societies which value monetary success (wealth, respect, good family, luxury vehicles, and houses) but do not offer legitimate means (education, hard work) to gain that success are more likely to have higher crime rates than societies that place less importance on it. It is also espoused that widely accepted means to attain these goals are not equally distributed to all members of society. Chamlin and Cochran (2007) assert that Messner and Rosenfeld (1994) identified two characteristics of the U.S., which differentiate it from other nation-states; first, residents of U.S. place an enormous emphasis on the property. Second, compared to the inhabitants of other countries,

residents are faced with “exceptionally” high levels of serious crime, especially homicide.

Anomie and strain theories hypothesize that criminality is a result of social causes. Micro-anomie theory (Konty, 2005) argues that criminality results from selfishness and personal states of egoism and caused by a lack of integration into the society. On the other hand, Chamlin and Cochran (1995) argue that Messner and Rosenfeld broaden Merton’s ideas pertaining to the relationships amongst anomie, culture, social structure, and crime rates by taking a macro level approach. American society instructs people in the possible ways to the monetary achievement. It is believed that each nation emphasizes the monetary success and achievement through legitimate means to an acceptable degree and Turkey is no exception. These monetary successes include wealth, respect, and a “good life” by means of education and employment. However, not everyone in society has the same means to achieve these goals which leads to anomie.

Institutional anomie theory can contribute to the understanding of variations in the rate of crime across and within macro social units like states and cities. Messner (1982) argues that the macro social aspect of Merton’s paradigm was reasonably underdeveloped and that the institutional anomie theory represents a relevant attempt to invigorate Merton's anomie theory in this respect. Institutional anomie theory constructs the classical anomie approach by attributing high levels of crime to interrelated cultural and structural conditions (Messner & Rosenfeld, 1996; Rosenfeld, Messner & Baumer, 2001). In particular, Messner and Rosenfeld argue that the cultural emphasis on money is paralleled by an institutional structure that is dominated by the economy. The other



institutions (family, school, and community) are all subservient to economic institutions. The institutional balance of power has been dominated by economic institutions in three ways; devaluation, accommodation and penetration. The goals and roles other than economic are devalued and noneconomic institutions must bow to the demands of the economy which causes the penetration of other institutions (family, school and community) by economic norms. As a result, these institutions are less capable of effectively sanctioning deviant behavior by socializing individuals.

Institutional anomie theory tries to explain and predict the rates of instrumental crime and decipher if aggregate-level data are appropriate. Messner and Rosenfeld (2007, p.43) argue that one of the crucial reasons for the debate on crime is over levels of explanation and that much of the inquisition on crime occurs at the individual level. In contrast, macro-level crime studies concentrate on questions about the groups and populations such as nations, cities and neighborhoods. Chamlin and Cochran (1995) analyzed property crimes across 50 U.S. states for the year of 1980 to test institutional anomie theory. Their findings reveal that higher levels of voting participation and church membership, and lower levels of the divorce-marriage ratio decrease the property crimes across the states. Likewise, Messner and Rosenfeld (1996) explored the relationship between the levels of homicides and economic and political systems of the societies across eighteen developed countries. They argue (p.1407) that “overall levels of homicide will be lower in capitalist societies that decommmodified labor by reducing dependence on the market for well-being”. Economic inequalities as measured by the Gini coefficient and economic discrimination against social groups have moderate positive effects on

homicide rates. Thus, institutional anomie theory can offer useful insight to explore both property and violent crimes at the macro level.

### **2.1.2. Life Course Theory**

Many of the empirical tests on criminological theories have been conducted on adolescent delinquency because this stage in one's life course is known to generate a higher likelihood of engaging in illegal behavior. Caspi and Moffitt (1995, p. 493) noted that the delinquency curve reaches its highest point at approximately 17 years of age, "The majority of criminal offenders are teenagers; by the early 20s, the number of active offenders decreases by over 50%; by age 28, almost 85% of former delinquents desist from offending."

Interest in adolescence and in the stability of antisocial behavior throughout offenders' lives had grown rapidly by the late 1980s and early 1990s. The term often used to describe this emerging paradigm is life-course criminology (Sampson & Laub, 1990, 1992; Sampson & Laub, 2003, 2005). Much of the research in this area examined both the predictors of offending (onset, persistence, and desistance) and the pathway of events that directed people in and out of crime (Farrington, 2003). The life-course perspective was enhanced by the recognition that there is continuity or stability in antisocial conduct from childhood into adolescence and adulthood. However, scholars also observed that the behavior of offenders can change or discontinue. Childhood misconduct predicts later problem behavior, but the relationship is not clear. The key theoretical issue in life-course criminology is explaining both continuity and change in offending. Sampson and Laub (1993) suggest that offending is marked by continuity and changes across time.

Sampson and Laub (1993) used this theory to explain crime over a person's life course through a theory of age-graded informal social control. They attempted to revisit Hirschi's (1969) original social bond theory that examined the impact of social bonds on young people. Unlike Hirschi, Sampson and Laub indicated that the social bond theory can explain the understanding of continuity and change in offending across the entire life course from childhood, to adolescence, and into adulthood. Furthermore, Sampson and Laub (1993) introduced the idea of "social capital" (marriage, employment) which is the capital or resources produced by the quality of relationships between people. They argued that social bonds strengthen as social capital rises. Thornberry (1987) also realized that the effects of variables differ with a person's stage in the life course. As youths move from early to middle adolescence, the effects of parents' influence decrease and those of peers and school become more important. New bonds such as employment, college, military service and marriage can be established during late adolescence. These new variables play an important role in determining whether delinquency will continue or desist.

Sampson and Laub (1994) theorized that their model exists within structural macro-level forces. They contended that what goes on inside the family is influenced by "structural background factors" such as poverty, residential mobility, and immigrant status. There are "child effects" on the social environment that during the first stages of life, the most significant social control process is found in the family. It is an instrument for both direct and indirect controls. In families where discipline is harsh and where children and parents reject one another, bonds are weak and delinquency is the likely result. If youth have a strong attachment to their families, these processes mediate the

effects of structural factors on youth misconduct (Laub, Sampson, & Allen, 2001; Sampson, Laub, & Wimer, 2006). However, according to Gottfredson and Hirschi's (1990) view, these individual differences appear to consistently have some independent effects on antisocial conduct across the life course. Finally, beyond the family, juvenile delinquency is fostered by weak school attachments and attachments to delinquent peers.

Sampson and Laub (1992, 1993) showed that delinquency weakens adult social bonds by making stable employment and rewarding marriages less likely, which in turn fosters continued criminality. Incarceration, another likely outcome of persistent criminal involvement, helps to stabilize crime by weakening social bonds. On the other hand, social bonds like marriage and employment may foster control, but they also may be contexts that attract individuals away from antisocial peers and into contact with prosocial influences (Warr, 1998; Wright & Cullen, 2004).

Ten years later, in their book *Shared Beginnings, Divergent Lives*, Laub and Sampson (2003) revised their theory. Although retaining the core components of their social bond perspective, they expanded their analysis on the process of desistance. They suggested that stopping crime was the result of the convergence of several factors such as a stable job, marriage, education, and of "human agency." The recent expansion of their perspective represents a critique of both Gottfredson and Hirschi's self control theory of continuity in offending and of Moffitt's two-group developmental theory of antisocial conduct.

Laub and Sampson (2003) extended the Gluecks' data set by studying the 500 males defined as delinquents in the original data set until they were age 70 (they had been followed until age 32 by the Gluecks). In this research, they examined the criminal

records of these 500 offenders and conducted interviews with 52 of the men. This qualitative data was important because it allowed Laub and Sampson further exploration as to why these offenders persisted and in particular, desisted from crime. This supplied them with an enriched understanding of the process of continuity and change. Furthermore, tracing the person until old age (or death) allowed them to conduct a life-course study. Most of the previous longitudinal projects had followed respondents only into early adulthood. As a result, these projects were limited in their ability to explore the nature of offending patterns into middle and later adulthood. They were unable to study how childhood and adolescent experiences predict criminal conduct across the adult years.

Laub and Sampson (2003, 2005) present two key findings by analyzing the data across the entire life course. First, it appears that desistance from crime, even among high-rate offenders, is virtually universal. Unless death intervenes first, everyone eventually stops breaking the law. Secondly, it is difficult to predict when desistance will occur. Events occurring earlier in life, such as childhood risk factors, do not seem to differentiate the point at which crime is surrendered (Sampson & Laub, 1995, 2005; Laub & Sampson, 2003).

Laub and Sampson (2003) identify four aspects in the process of desistance during adulthood. In the first perspective, they argue that structural turning points such as marriage, employment, and military service set the stage for change for desistance. The second point, also consistent with their earlier idea, is that these structural events create social bonds that increase the informal controls over offenders and reduce/ eliminate criminal activity. The third part of the desistance departs from a strict control theory,

suggests that as offenders move into marriages and jobs, their daily routine changes from unstructured, and focused in deviant locations (e.g., bars) to structured and filled with positive social responsibilities resulting in a reduction in deviant associates and other “bad influences.” Finally, Laub and Sampson (2003) assert that the desistance process does not fully determine the choices of offenders. They observed that these individuals have a subjective reality and that offenders are active participants in the journey, whether resisting or voluntarily participating in opportunities to desist from crime.

## **2.2. Crime and Other Independent Variables**

In the literature, the underlying factors of crime are commonly summarized in four main categories. The first category is social variables and consists of education level, race percentage of the population, and social interactions like family relations. The second category is economic variables that include but is not limited to unemployment, income inequality, gini coefficient, median income, and gross domestic product. The third category is demographical variables like population, race, urbanization level, age structure of the society, the male-female percentage of the population and the number of people in the police force. The final category is deterrent variables relating to the punishment of criminal behavior including the use of police force, severity of punishment, justice and court systems, and prison and jail conditions. In this study, the researcher will focus on the first three variables and all independent variables are constructed from theory and literature.

Crime is a complex social issue and related to many different concepts as discussed above and not only a variable or sets of variables alone can be enough to understand this phenomenon comprehensively. However, each variable can offer an

insight to see the bigger picture of crime. Likewise, Bound, Jaeger, and Baker (1995) argue that empirical researchers want to make causal inferences about the effect of one variable on another and some of the explanatory variables are influenced by some of the same forces that influence the outcome under study. For instance, criminologists examining the effect of education and employment on crime have been concerned on high correlation between education that the same unobserved variables may influence both individuals' educational attainment and employment. Another example might be that poverty has a strong relationship with low education and high crime rate and higher unemployment rate. All these variables are interrelated with each other and it is difficult to take one variable out of the equation.

### **2.2.1. Crime and Social Variables**

#### **2.2.1.1. Educational Attainment**

In the literature, measures of education vary widely from literacy to college graduates. Most of the studies used high school graduates as educational attainment measurement (Greene, Bynum, & Webb, 1984; Thornberry, Moore, & Christenson, 1985; Siegel & Senna, 1988) because high school graduation is the most comprehensive educational level throughout the communities. Swanson (2004) argues that completing high school represents a landmark in an individual's school performance and graduation rates are an important indicator of educational systems.

The effects of education on crime and criminal activity have been a major area of study in criminology. Most of the research has found a negative relationship between education and violent and property crimes both at the individual and aggregate level (Boufard, Mackenzie, & Hickman, 2000, Lochner, 2004; Waldfogel, Garfinkel & Kelly,

2005; Kustepeli & Onel, 2006). Education makes a difference and society benefits from it over time by the enhancement of earning power among individuals (Usher, 1997).

Huang, Laing, and Wang (2004) argue that crime can be decreased through the advancement of education among individuals. They examined the relationship between criminal activity, unemployment, and educational attainment and found that higher levels of crime relate to lower levels of educational attainment and that being unemployed for long periods along with poverty are correlated with a higher level of crime and lower education level. Siegel and Senna (1988) argue that school failure is a stronger predictor of delinquency than socioeconomic status. Kustepeli and Onel (2006) analyzed the relationship between crime against state, crime against goods, and crime against people and the percent of offenses solved, per-capita Gross Domestic Product (GDP), rates of divorce and higher education between 1967 and 2004 at the national level. The research uncovered the relationship between crime against people, crimes against goods, and crimes against state and higher education that education helps reducing all three types of crime.

Another important predictor of delinquency is whether a person is a school dropout (Elliott, 1966; Cernkovich & Giordano, 1992). Elliott gathered the data on 743 tenth grade boys over a three-year period until their graduation. Of the 743 boys in the study, 561 graduated from school while 182 of them dropped out of school. She found that boys who dropped out of school had a higher delinquency rate than the graduates and that boys coming from lower socioeconomic neighborhoods had a higher delinquency rate than those that came from higher socioeconomic neighborhoods. High-school dropouts are also more likely to get public assistance than high-school graduates



(Waldfogel, Garfinkel & Kelly, 2005). Harlow (2003) asserts that around 68 percent of state prisoners, 60 percent of jail inmates, and 50 percent of federal inmates do not have their high-school diploma. Thornberry, Moore, and Christenson (1985) indicate that dropping out of high school is positively associated with crime controlling for age, race, and social status. Comertler and Kar (2007) analyzed the social determinants of the crime rate in Turkey for the year of 2000. The research shows that education is a focal determinant of crime rate in the country.

Swanson (2004) asserts that the national high school graduation rate in America is 68 percent, with nearly one-third of all public high school students failing to graduate. Likewise, the research examined the panel data from the National Longitudinal Survey of Youth 1997 Cohort (NLSY97) found that approximately one-third of U.S. high school students are unable to graduate within four years and the percentage among non-white individuals is 50 percent. Additionally, the research disagrees with the previous studies, which indicate a positive relationship between high school dropout and delinquency. Instead, Sweeten, Bushway, and Paternoster (2009) emphasize that dropping out of school is not identical for all students with varying (gender and time of departure) affecting the likelihood of delinquency.

Lochner and Moretti (2004) argue that adults with more education should commit fewer street crimes while white-collar crimes decline with age and education by examining the National Longitudinal Survey of Youth and arrest data from the UCR at the aggregate level. High school graduation decreases the likelihood of participation in criminal activity and reduces the probability of incarceration for whites about .76 percent

and for blacks 3.4 percent. High school graduation has the biggest impact on murder, assault, and motor vehicle theft.

Furthermore, education during incarceration also has a positive impact on crime. Steurer and Smith (2003) conducted a three-state recidivism study (Maryland, Minnesota, and Ohio) at the aggregate level to discover whether correctional education reduces crime. They compared the correctional education program of participants to non-participants in these three states. They found that correctional education participants in Minnesota and Ohio had lower rates of re-arrest, re-conviction, and re-incarceration than non-participants at a significant level. Maryland had similar findings but it was not significant. Interestingly enough, participants made a statistically higher income than non-participants did. Harer (1995) argues that prison education promotes pro-social behaviors and encourages the elimination of anti-social norms of prison life. Boufard, Mackenzie, and Hickman (2000) discuss that several jurisdictions have adopted vocational education and employment programs intended to reduce recidivism among adult correctional populations. They found that several of these programs were successful at reducing offender recidivism, such as the vocational education and community employment programs.

In contrast to the above findings, other research indicates that the level of delinquency decreases among the dropouts (Ehrlich, 1975; Loeber & LeBlanc, 1990). Krueger and Maleckova (2002) argue that evidence does not necessarily support an increase in educational attainment reduces crime. They rather assert that relationship between education, poverty, and crime is more complicated and indirect.

### **2.2.1.2. Family Disruption**

Family plays an important role in socializing the children through love, cohesion, supervision, and discipline. A family provides children with physical, psychological, and social needs in order to prepare them for societal life. The family composition is consistently linked with delinquency. Children who live with only one parent because of family disruption (divorce or separation) are more likely to experience a variety of emotional and behavioral problems, including delinquency, than children from two parent families (Wells & Rankin, 1991; Dembo et al., 2000). Fagan and Wexler (1987) argue that family is central to existing theories of delinquency but the process as to how families shape violent behavior in their children are not completely understood. Lugaila (1998) argues that the proportion of families that have children who live with both parents has declined significantly since 1970 in America. In 1970, 64 percent of African American children lived with two parents while it reduced to 35 percent in 1997. For white children, it was 90 percent in 1970 while it decreased to 74 percent in 1997.

Research on the family and delinquency relationship focuses on exposure to delinquency as a child or growing up in an antisocial family. Family disruption has been associated with violent delinquency (Lewis, Shanok, & Balla, 1981; Guarino, 1985; Lewitt, 2004), family size (West, 1982; Akman & Zengin, 1985; Turkeri, 1996), having a working mother (Glueck & Glueck, 1957; Geismar & Wood, 1986), broken families (Free, 1991; Johnson, 1986; Rosen, 1985; Sampson & Laub, 1994, 1995) and child abuse (Alfaro, 1978). These studies offer sufficient evidence to argue, “Violence begets violence.” However, the influence of the family as a socializing environment may change through time spent in school, neighborhoods, work and with peers.

Some studies show that anti social behaviors and lack of parenting during childhood increase the likelihood of later crime participation and delinquency. During the first stages of life, the most significant social control process is found in the family (Kandel, 1990; Yoshikawa, 1995). It is an instrument for both direct and indirect controls. In families where discipline is harsh and where children and parents reject one another, bonds are weak and delinquency is the likely result. If youth have a strong attachment to their families, these processes mediate the effects of structural factors on youth misconduct (Laub, Sampson, & Allen, 2001). The relationship between age of onset and crime is very important because offenders who start to commit crime at earlier ages are more likely to commit a higher frequency of crimes over a longer period of time (Piquero, Paternoster, Mazerolle, Brame, & Dean, 1999). When a family can postpone the interaction of juveniles with the criminal justice system, they are less likely to commit crimes and with less frequency. Yoshikawa (1995) affirms that the literature review from criminology, psychology, and education demonstrates that early childhood programs reduce the later effects of antisocial or delinquent behaviors.

The imprisonment of a parent can be an important determining factor for delinquency in youth and involvement in the criminal justice system as an adult (Uggen, Wakefield, & Western, 2005). Murray and Farrington (2005) assert that children of incarcerated parents demonstrate a range of behavioral problems from school difficulties to delinquency. Glaeser, Sacerdote and Scheinkman (1999) found that between one-third and one-half of the urban effect on crime can be explained by having a higher number of female-headed households in urban cities. Thomas and Torrone (2006) argue interestingly that high rates of incarceration are associated with high rates of teenage

births. Foshee, Bauman, and Linder (1999) examined the relationship between exposure to family violence and adolescent dating violence. The data was collected from self-administered questionnaires completed in schools by 1,965 eighth and ninth grade students. Family violence was positively associated with dating violence for both genders.

The drug use habit of children and parents is also related to the family disruption. Hoffmann and Johnson (1998) examined the relationship between the distribution of drug use among adolescents between the age of 12 and 17 years and family structure by using three years of data from the National Household Survey on Drug Abuse. The research indicates that the risk of drug use is lowest in mother-father families whereas it is the highest among adolescents in father-custody families. Flewelling and Bauman (1990) conducted two-year study of 2,102 adolescents in ten southeastern cities to assess the relationship between family structure (intact, single-parent, or stepparent) and use of controlled substances by children. They have found that children from nonintact families are more likely to using substances and engaging in sexual intercourse. Akers and Lee (1999) conducted a research to find out the relationship between a child's attachment to their parents and the child's drug use (low, moderate, or high parental drug use). The findings indicate that attachment to parents related inversely where the youths who use drugs have a low or moderate level of family attachment. There is not a significant relationship between attachment to family and a child's drug use for youths whose parents are relatively high-level users (Lee, Akers, & Borg, 2004).

There is also a counter argument in the literature suggesting that it is not the keep of parents in the household or the family structure but the quality of parenting that makes

the real difference. Simons, Chao, Conger, Elder (2001) argue that quality of parenting is an important predictor and mediator on the effect of childhood defiance, adolescent friendship choices and delinquency. They analyzed data over a four-year-period that was collected from a sample of 149 boys, 157 girls, and their parents. They found that early oppositional behavior undermined effective parenting practices and that there is no direct association between rebellious behavior during childhood and increasing involvement with deviant peers and delinquency during adolescence. The deviant behavior of adolescents has a significance relationship with the quality of parenting. Improvements in parenting during adolescence reduced the delinquency by decreasing association with deviant peers. Past studies have provided strong evidence of a relationship between deviant peers and involvement in delinquency (Elliott & Ageton, 1980; Kandel, 1990; Akers, 2000). Some research indicates that children are in a better position when a criminal parent has been imprisoned because these children and their remaining parent are able to freely form a healthier relationship (Uggen, Wakefield, & Western, 2005; Clear, 2007).

**Table 1: Previous Research on Crime and Social Variables**

Social Independent Variables	Authors & Relationship
Education High school graduate & Literacy	Elliott (1966) (-) Greene, Bynum, & Webb (1984) (-) Thornberry, Moore, & Christenson (1985) (-) Siegel & Senna (1988) (-) Cernkovich & Giordano, 1992 (-) Lochner & Moretti (2001) (-) Steurer & Smith (2003) (-) Swanson (2004) (-) Garfinkel, Kelly, & Waldfogel (2005) (-) Kustepeli & Onel (2006) (-) Comertler & Kar (2007) (-) Sweeten, Bushway, & Paternoster (2009) (-)
	Ehrlich (1975) (+) Loeber & LeBlanc (1990) (+) Krueger and Maleckova (2002) (+)
Family Disruption Rate Marriage & Divorce	Glueck & Glueck (1957) (+) Roy (1977) (+) Alfaro (1978) (+) Lewis, Shanok, & Balla (1981) (+) West (1982) (+) Akman & Zengin (1985) (+) Geismar & Wood (1986) (+) Flewelling & Bauman (1990) (+) Free (1991) (+) Yoshikawa (1995) (+) Turkeri (1996) (+) Hoffmann & Johnson (1998) (+) Lugaila (1998) (+) Akers & Lee (1999) (+) Foshee, Bauman, & Linder (1999) (+) Glaeser & Sacerdote (1999) (+) Simons, Chao, Conger, & Elder (2001) (+) Laub, Sampson, & Allen (2001) (+) Lee, Akers, & Borg (2004) (+) Thomas & Torrone (2006) (+)
	Simons, Chao, Conger, Elder (2001) Uggen, Wakefield, & Western, 2005 (-) Clear (2007) (-)

### **2.2.3. Crime and Economic Variables**

#### **2.2.3.1. Unemployment & Income**

Does aggregate unemployment have a positive, negative, or ambivalent effect on levels of crime across jurisdictions? The existence of a strong relationship between unemployment and crime has been examined for over a hundred years in the social science literature (Allison, 1972; Cantor & Land, 1985; Farley, 1987). The literature suggests that there is a positive relationship between education, employment, and income. Therefore, offenders are more likely to have had a poor education, and would have had difficulties in finding a well-paid, stable job. Crutchfield and Pitchford (1997) argue that youth who have stable jobs are less likely to commit crime than those who do not. Messner (1980) asserts that the levels of homicide are positively associated with economic discrimination against social groups. According to the U.S. Department of Labor (2004), high-school dropouts are 72 percent more likely to be unemployed than high school graduates.

Cantor and Land (1985) analyzed the unemployment rate and the fluctuations in seven Index Crime rates (homicide, rape, aggravated assault, robbery, burglary, larceny-theft, and motor vehicle theft) by using annual time-series data for the United States between 1946 and 1982 at the aggregate unemployment on crime. They found an expected positive pattern of unemployment rate and burglary, robbery and larceny-theft. Likewise, Raphael and Winter-Ebmer (2001) analyzed the relationship between crime and unemployment by using U.S. state data. They found the effect of unemployment on the rates of seven felony offenses. They argue that the decline in the property crime rates during the 1990s can be explained by the unemployment rate but the evidence for violent



crime is noticeably weak. Sampson and Laub (1992, 1993) showed that delinquency weakens adult social bonds by making stable employment and rewarding marriages less likely, which in turn fosters continued criminality. Incarceration, another likely outcome of persistent criminal involvement, helps to stabilize crime by weakening social bonds.

Hagan (1993) argues the social embeddings of crime and employment by analyzing London panel data and macro level research shows that unemployment leads to crime. It is reversely true that amid adolescents, unemployment leads to serious crime at the individual level. Britt (1997) argues that instead of a direct relationship between unemployment and crime, it is better to analyze the joint influence of age and unemployment on crime. The research found that the unemployment-crime relationship varies over time and that unemployment has a greater impact on young adults participating in property crimes. Glaeser and Sacerdote (1999) analyzed the relationship between crime and social variables and geographic attributes. They argue that social interactions create enough covariance across individuals to explain the high cross-city variance of crime rates. Comertler and Kar (2007) analyzed the relationship between property crimes and economic variables such as income and unemployment, they found that income, and unemployment rate is significant predictors of property crimes at the provincial level in Turkey.

Paterson (1991) examined the relationship between violent crimes and burglary and aggregate economic conditions for 57 small social areas by using victimization data. He argues that poverty is more strongly associated with neighborhood crime rates, although the relationship is conditional on the type of crime considered. Messner and Tardiff (1986) analyzed the relationship between levels of economic inequality and

homicide rates for a sample of 26 Manhattan neighborhoods. They argue that high level of economic inequality in a neighborhood increase the relative deprivation and homicide rates but the results of analyses fail to support this hypothesis and the neighborhoods have no significant association with levels of homicide when controlling other social and demographic variables. Kustepeli and Onel (2006) argued that income increases the likelihood of committing crime against property, crime against public and crime against state in Turkey at the national level for the years of 1967 and 2004.

On the other hand, Kapuscinski, Braithwaite and Chapman (1998), argue that the official crime statistics in many countries show that unemployed people have high crime rates. Communities with high unemployment experience a lot more crime however, they did not find such a relationship in time-series studies of unemployment and crime in Australia. Sesay (2002) did not find significant relationship between crime victimization and household income, poverty and employment rate while his research examined crime victimization of urban areas of US.

Kapuscinski, Braithwaite, and Chapman (1998) assert that many criminologists have doubts about the association between unemployment and crime (Gottfredson & Hirschi, 1990; Wilson & Herrnstein, 1985). They also discuss that studies show a strong positive association between crime and unemployment at the individual level, this positive association gets weaker at as the level of analysis increases (macro level), but a inconsistent relationship over time. Chiricos (1987) examined time-series studies of the unemployment and crime correlation, he found 43 positive relationships while only 22 of them statistically significant, and 26 negative relationships while only 5 of them statistically significant. Thornberry, Moore and Christenson (1985) conducted a research

on a sampling of young adult males to find out the reciprocal causal structure for unemployment and criminal involvement. They found that one-way models, neither from unemployment to crime nor from crime to unemployment, were adequate to show the relationship, which presents strong support for a reciprocal model of crime causation.

### **2.2.3.2. Poverty**

Poverty is considered an important cause in predicting crime rates both at the individual level and at city level (Bailey, 1984; Sampson, 1985). Unequal distribution of income and wealth produces high crime rates in general and high crime rates for blacks in particular (Jackson & Carroll, 1981; Shihadeh & Steffensmeier, 1994). Income has a strong, negative relationship with crime while poverty has a strong, positive relationship. According to the U.S. Bureau of the Census (2005), the average annual income for high-school graduates is about \$26,000 while it is only \$16,450 for dropouts, nearly a difference of ten thousand dollars for each year.

Lee (2000) asserts that research on the relationship between poverty levels, urbanization, and crime rates hypothesize the existence of the relationship between these variables at the aggregate level. Messner (1983) examined the regional differences in the economic correlation of the urban homicide rate at the city level for a sample of 256 non-southern cities and a sample of 91 southern cities. The population below the poverty line has a significant, positive effect on the homicide rate in the non-southern sample. He argues that the impact of economic deprivation on violent crime varies depending on the general culture, as he did not find this relationship on southern states.

Patterson (1991) examines the relationship between crime rates and aggregate economic conditions (absolute poverty, relative poverty) for 57 small social areas. He

found that absolute poverty is strongly associated with neighborhood crime rates. Neighborhoods under the poverty level cannot afford the necessary resources for their communities such as high quality of school system and recreational areas, which endangers the youth supervision and community cohesion (Sampson & Grooves, 1989). Nye, Short, and Olson (1958) examined whether youth from the lower class are involved with more delinquent behavior than upper class youth. They collected data from 3,000 high school students from different levels of society. They found no significant difference between the youths from the lower, middle, and upper classes on delinquent behaviors. Rather, they claim that those delinquent behaviors can be evenly seen in all socioeconomic levels of society.

Hsieh and Pugh (1993) conducted a meta-analysis to 34 aggregate data studies reporting on the relationship between economic conditions and violent crime. Their research presented that 97 percent of the coefficients were positive and among the positive coefficients, almost 80 percent was at least moderate strength ( $>.25$ ). The research concluded that poverty and income inequality is associated with violent crime. Rape and robbery is less likely to be associated with poverty than homicide and assault are. Shihadeh and Steffensmeier (1994) examined the relationship between income inequality, family disruption and rates of violent crime among blacks in U.S. cities. Their research suggests that income within black communities has a strong positive effect on the rate of black violence; however, the effect is indirect showing that income inequality increases family disruption, which raises the rate of black violence.

Several studies use the Medicaid beneficiaries as a proxy for low-income people or poverty level (Gortmaker, 1981; Sullivan, 1993; Ellwood, 1999). The Green Card in

Turkey is very similar to the Medicaid program in the U.S. Poverty in this study is measured as the percentage of people holding green card in each province. It is a social security coverage administered by Department of Health in each province since 1993 under the Ministry of Health to help those people who cannot afford health insurance, do not work for the government (everyone who works for the government has mandatory health insurance), and live below the poverty level. Several previous studies have used the green card to measure the poverty level in various provinces in Turkey by determining the proportion of the population holding one (Koseli, 2006; Simsek, 2006; Basibuyuk, 2008).

**Table 2: Previous research on crime and economic variables**

<b>Economic Independent Variables</b>	<b>Authors &amp; Relationship</b>
Unemployment & Income	Cantor & Land (1985) (-) Messner (1989) (-) Messner & Tardiff (1986) (-) Paterson (1991) (-) Sampson & Laub (1992, 1993) (-) Hagan (1993) (-) Britt (1997) (-) Glaeser & Sacerdote (1999) (-) Raphael & Winter-Ebmer (2001) (-) Comertler & Kar (2007) (-)
	Thornberry & Christenson (1984) (+) Chiricos (1987) (+, -) Braithwaite & Chapman (1998) (+) Kustepeli & Onel (2006) (+)
Poverty	Messner (1983) (-) Bailey (1984) (-) Sampson (1985) (-) Patterson (1991) (-) Shihadeh & Steffensmeier (1994) (-) Lee (2000) (-)

	Nye, Short, & Olson (1958) (-) Berk (1980) (-) Bourguignon (2001) (-) Sesay (2002) (-)
Number of Green Card Holders	Simsek (2006) (+) Koseli (2006) (+) Basibuyuk (2008) (+)

## 2.2.4. Crime and Demographical Variables

### 2.2.4.1. Population & Urbanization Rate & Population Density

Many research studies examining crime rates in the metropolitan areas of the United States have found that areas with a large population usually experience higher crime rates than smaller, less populated ones (Wirth, 1938; Blau & Blau, 1982; Glaeser & Sacerdote, 1999; Leichenko, 2001). There is a consistent body of literature on rural and urban differences in crime and delinquency stating that crime rates are generally higher in urban areas compared to rural. Crime is heavily concentrated in the central segment of the city (Schmid, 1960; Boggs, 1965; Hanson, 1984). Urban areas generate more than half of all criminal events and crime does not occur evenly across urban landscapes (Braga et al., 2001).

Shaw and McKay (1942) argued that high poverty areas were characterized by high levels of population turnover and attracted large numbers of immigrants. This was an indication that these areas of high urbanization (zone of transition) also had high levels of crime and delinquency resulting in poverty. The effects of crime include loosening community social control. Flango and Sherbenou (1976) evaluated six independent factors (wealth, stage in life cycle, economic specialization, expenditures policy, poverty,

and urbanization) for the situational determinants of crime by using 59 demographic and socioeconomic characteristics of 840 American cities. Two out of the six mentioned factors, urbanization and poverty, were found to be the more important predictors of crime across the U.S., exception for Southern region. Land, McCall and Cohen (1990) showed the relevance of urbanization (population size, urbanization) and family dissolution for explaining homicide rates across cities, metropolitan areas, and states from 1960 to 1980.

Urbanization rate, measured as the percentage of the population living in urban areas, has been constantly increasing both in Turkey and in the United States for the last three decades. Cullen and Levitt (1999) analyzed the link between city crime rates and urbanization. Interestingly, they found that for each person migrating out of the city, it is associated with one additional reported crime. Households who leave the city because of crime are more likely to move within the boundaries of the Standard Metropolitan Statistical Area (SMSA) compared to those who leave the city for other reasons.

Quinney (1966) emphasizes that local communities are becoming a part of the larger urban-industrial society and that the differences between the rural and urban crimes are likely to diminish. Sampson and Groves (1989) argue that community variations in social disorganization and the community structural characteristics (population density) have an influence on both the rates of victimization and offending. Comertler and Kar (2007) analyzed the determinants of the crime rate for 2000 in Turkey. The research shows that population density and urbanization ratio is the focal determinants of crime rate in the provinces of the country. On the other hand, some studies show that population size may not necessarily be associated with some violent crimes such as murders and

rapes. Blau and Blau (1982) argue further that these serious crimes may be controlled by other variables in society than population size.

#### **2.2.4.2. Age Structure & Number of Households**

Criminologists have concentrated a majority of their interests on the teenage years and delinquency. The reason given for this tendency in criminological analysis is that this stage in one's life course that is known to generate the higher rates of illegal behavior.

Patterson, DeBaryshe, and Ramsey (1989) state that "antisocial behavior appears to be a developmental trait that begins early in life and often continues into adolescence and adulthood." (p.329). Caspi and Moffitt (1995) categorize the adolescents in two groups. The first group is small, consisting of 5% to 10% of the male population; the antisocial proportion of the population for females is even lower. This group manifests antisocial behaviors during childhood and shows continuity in misconduct into and beyond adolescence. The second group is large and includes most youths during their juvenile years. The members of this group evidence little or no antisocial tendencies during childhood but suddenly engage in a range of delinquent acts during adolescence, only to stop offending as they mature into young adulthood. Thus, they argue that the offending or antisocial conduct of the second group is marked by change or discontinuity.

Thornberry and Krohn (2005) hypothesize that onset into delinquency or misconduct might occur at three different stages of the life span. First, there are those who manifest conduct problems in childhood. This early onset is the result of exposure to family disorganization and ineffective parenting, school failure, and association with delinquent peers. Second, most youths start offending "in mid-adolescence, from about age 12 to age 16" (p. 192) as a way to establish their autonomy from parents, as a result,



parental control weakens and this reinforces deviant behaviors. Third, there are “late bloomers” who wait until adulthood to begin offending. As Thornberry and Krohn (2005) note, previous studies show that 17.2 percent of non-delinquents begin offending in adulthood. Cohen and Land (1987) argue that adolescents both commit crimes more frequently than other age groups and they are also more likely to be victimized. Therefore, at the aggregate level, the age structure has an effect on offenders and victims.

Use of alcohol or other drugs at an early age is an indicator of a future alcohol or drug problem. The youth who abuse these substances increase their lifetime dependency chances. People who begin drinking before age 15 are four times more likely to develop alcoholism than those who begin at 21 (Hawkins, Catalano, & Miller, 1992). Anthony and Petronis (1995) support this idea and claim that people who start drug use at an early age (under age 15) will have a higher lifetime prevalence of drug abuse problems than the drug users who started in mid-adolescence (between 15 and 17 years of age). They also assert that the youth who delay substance use until age 21 will almost never develop substance abuse problems. Therefore, knowing the age of initiation to any substance abuse is very important because age of initiation of any drug and level of drug use are the two important factors of a person’s drug history. These characteristics are significant indicators of later drug use (Kandel, Yamaguchi, & Chen, 1992).

Research also indicates that the number of people in a household is an important factor for delinquency. Most of the teenagers who commit crimes at very early ages came from bigger sized families with a large number of people residing in the household (4 or more). The size of the family can also have a negative relationship of physical abuse towards children and inconsistent discipline in the household (Glueck & Glueck, 1957;

West & Farrington, 1973). However, having more children does not necessarily canalize the children to delinquency if the family has enough resources to provide the necessary means for its family members. Research in Turkey also posit that the juveniles who come from poor and more populated families are more likely to commit crimes than their counterparts from median income and less populated families (Akman & Zengin, 1985; Turkeri, 1996).

#### **2.2.4.3. Number of Police**

The standard measure of the police protection ratio is the number of police officers per 1,000 citizens (Walker, 2005, p.86). Marvell and Moody (1996) argue that the relationship between the number of police and the crime rate is ambivalent like many other criminological topics. They analyzed police data and UCR crime rates at city and state levels for over two decades. They found that the impact of police on most crime types is considerable while the impact of crime on the number of police is small (Sherman & Weisburd, 2004). The Kansas City Preventive Patrol Experiment (1972-1973) and the Newark Foot Patrol Experiment (1978-79) found that increased police patrol makes no difference.

Eck and Maguire (2000) examined 27 studies that looked at the effects of police strength on violent crime. They found that just fifteen percent of the studies illustrate that crime lessens as the police numbers increase. If more police focus on small areas they reduce crime however, detecting actual cause of effect due to police numbers or tactics is very difficult. Likewise, Sherman (2004) argues that risk factors should be the criteria to determine police numbers in each community. The number of police should be increased in the field where the risk and crime is high. Walker (2005) argues that more police

officers are not effective to reduce crime but that increasing the number of police officers, in combination with other community policing programs, can diminish the crime rate to some extent. The number of police in Washington D.C. is 6.5 to every 1,000 persons, while nationally it is only 2.5 per 1,000 persons. However, this does not on face value; make Washington D.C. a safer place.

Cook (1980) argues that visible police presence increases certainty of detection and apprehension but it can also increase the police presence and potential offenders' perception of risk in that specific area. Weisburd and Eck (2004) assert that adding more police to cities, regardless of assignment, does not bring the expected outcome. Sherman (2004) argues further that neither police level nor police tactics are capable of preventing and reducing crime. On the other hand, public policy makers and the police believe that hiring more will reduce crime. For example, President Clinton promised to hire 100,000 police officers in 1992. However, studies did not show a direct relation in crime drop and the number of officers. For instance, the Dallas crime rate declined 39 percent while its police number declined by only three percent. Eck (1987) found that effective communication with the public decreased robberies up to 43 percent. After conducting a randomized experiment in Jersey City, Braga, Kennedy, Waring, & Piehl (2001) stressed that focused police efforts can reduce crime and any disorder problems without causing displacement to the surrounding areas.

In sum, scholars like Eck and Maguire (2000) and Walker (2005) claim that focused policing is much more effective than generic police tactics. However, evidence for their effectiveness is also limited. The success of the police cannot only be measured by its numbers because it does not show how police departments utilize their officers.

**Table 3: Previous research on crime and demographic variables**

<b>Demographic Independent Variables</b>	<b>Authors &amp; Relationship</b>
Population Urbanization Rate Population Density	Shaw & McKay (1942) (+) Schmid (1960) (+) Boggs (1965) (+) Quinney (1966) (+) Flango & Sherbenou (1976) (+) Katzman (1980) (+) Blau & Blau (1982) Sampson & Groves (1989) Land, McCall & Cohen (1990) (+) Cullen & Levitt (1999) (+) Glaeser & Sacerdote (1999) (+) Braga (2001) (+) Leichenko (2001) (+) Dangizer (2006) (+) Comertler & Kar (2007) (+)
Age Structure (Youth 15-24)	Cohen & Land (1987) (+) Patterson, DeBarshy, & Ramsey (1989) (+) Hawkins, Catalano, & Miller, 1992 (+) Kandel, Yamaguchi, & Chen, 1992 (+) Anthony & Petronis (1995) (+) Caspi & Moffitt (1995) (+) Thornberry & Krohn (2005) (+)
Family size Number of households	Glueck & Glueck (1957) (+) West & Farrington (1973) (+) West (1982) (+) Akman & Zengin (1985) (+) Turkeri (1996) (+)
Number of Police	Cook (1980) Jackson & Carroll (1981) Levitt (1995) Marvell & Moody (1996) Braga et al. (1999) Eck & Maguire (2000) Sherman & Eck (2001) Sherman (2004) Walker (2006)

### 2.3. Crime Measurement

Crime levels and trends are measured by applying three primary methods in jurisdictions. The first is official crime statistics, which are collected by police and law enforcement agencies. These statistics are known as the Uniform Crime Reports (UCRs) in the U.S., the National Crime Recording Standard (NCRS) in Britain, and Turkish National Police (TNP) Crime Statistics in Turkey. The second is a regular household victimization survey conducted in most jurisdictions. These reports are known differently by name across jurisdictions. For example, they are known as the National Crime Victimization Survey (NCVS) in the U.S. and the British Crime Survey (BCS) in Britain. The official crime statistics and victimization surveys employ different bases for crime rates. The official crime statistics use general population while the victimization surveys use eligible population (age 12+). The third method is self-report surveys to collect the crime data. Each data source has sets of strengths and weaknesses. The crime measurement practices in Turkey will be discussed in the third chapter.

The underlying idea to apply three different measurement methods is fully understand the crime levels and trends from both the offender perspective and the victim perspective. However, some countries, like Turkey and other developing nations, measure crime trends and their levels by official crime statistics only. Crime levels and trends show similarities and divergences because of the similarities and differences of the data sources methodology, recording and rating differences. In this section, crime measurement will be discussed briefly to understand the measurement issues, the differences of the data sources, and its limitations.

### 2.3.1. Official Crime Statistics

Official crime statistics are the most comprehensive crime data sources across jurisdictions. The main objective of official statistics is to produce reliable information and uniform crime data for use by the law enforcement administration, operation, and management. This data is the primary and main social indicators of most of the countries crime trends.

UCR is the one of the oldest official crime statistics that has been administered by the Federal Bureau of Investigation (FBI) and the agency was responsible for collecting, publishing and archiving the data across the nation since 1930. The UCR program provides information about violent crime (Index crimes or Part-I crimes) and property crime (Part-II crimes). Violent crimes include murder and non-negligent manslaughter, forcible rape, robbery and aggravated assault. Property crimes include the offenses of burglary, larceny-theft, motor vehicle theft and arson. Participation in the program is voluntary. During 2004, law enforcement agencies active in the UCR program represented 94.2 percent of the total population and included 17,000 different city, college, university, county, state and federal law enforcement agencies across the country (CIUS, 2004). Since 1989, the National Incident-Based Reporting System (NIBRS) has been the newly enhanced form of UCR. This data set is incident based and stores more detailed information about each case, such as offender and victim information. NIBRS is very good for measuring the level of crime and it has been adopted to address some of the limitations of UCR. Unlike the UCR, NIBRS categorizes crimes into 22 basic categories. It is too early to determine the effectiveness of NIBRS program because as of 2005, only 10 percent of the population was represented in this program.

The problems with counting and scoring of official crime statistics are mostly associated with the variability in counting and scoring across individual reporting units. The primary source of variability include differences across local jurisdictions in their interpretations of crime incidents, the “hierarchy rule”, the diligence of record keeping, and the adequacy of follow-up procedures. Some scholars agree that the official crime statistics is a valid indicator for serious crime (Gove, Hughes, & Geerken, 1985; Walker, 2006). However, some scholars (Mosher, Miethe, & Phillips, 2002; Pepper & Petrie, 2003) argue that there is no uniformity in classifying and scoring crimes among police agencies. There are dark figures, which are crimes not known either by persons or by police. The police do not record some of the crimes because of legal and extralegal factors or because of bias (Montoya, 2003). Police only record crimes that are more serious and local police do not report all crimes or downgrade some that are serious. There is no information about the socioeconomic status of persons either.

### **2.3.2. Victimization Surveys**

The victimization surveys are another source of crime data. It provides systematic and detailed information about crime incidents, victims, and trends in the nation. NCVS is considered one of America’s primary sources of information on criminal victimization of residential addresses. It is the world’s largest and technically sophisticated national victimization survey. NCVS provides a very comprehensive national estimate and it is free of manipulation of local officials. Each year, data is obtained from a nationally, representative sample of nearly 49,000 households and includes nearly 100,000 people who are 12 years of age and older on the frequency, characteristics and consequences of criminal victimization in the US (NCVS, 2008). The NCVS enables the Bureau of Justice

Statistics (BJS) to estimate the likelihood of victimization by rape, sexual assault, robbery, assault, theft, household burglary and motor vehicle theft for the whole population. In addition, it provides different information for segments of the population. This includes women, the elderly, and members of different racial groups, city residents or other groups. The NCVS provides the largest national forum for victims to describe the impact of crimes as well as characteristics of violent offenders in the country (NCVS, 2008).

However, some problems are associated with victimizations surveys. Victimless crime such as drug and alcohol violations, prostitution, gambling, and illegal weapon possession are excluded from victimization survey. There are also conceptual and definitional problems. Different definitions of crime across cultures and social groups are fundamental problems with victimization survey. Some sampling errors and sampling biases are characteristics of victimization survey. Sampling error will result in variations in estimates of national victimization rates. As for sampling bias, particular groups such as homeless people, members of minority groups are reluctant to participate in victimization surveys. There are data collection issues stemming from the general characteristics of survey research. These include variation in the administration of surveys, question wordings and reference periods, and limitations of human judgments. If the offender is known, victims are less likely to report the crime. The perception of crime may change from person to person. A person who has a higher education might evaluate acts differently than a lower educated person.

Gove, Hughes, and Geerken (1985) also mention problems with the official data. Most of the crimes are not reported to the police; there are victim filters as well as police



filters. Secondly, if the victim and the offender know each other, the police tend not to file a report. Similarly, Gove et al. also claim that all crimes suffer from serious definitional problems; samples will make mistakes while categorizing an incident. Perception of crime differs from one person to another. The other issue is the distribution of crime since crime is concentrated in certain areas. However, when samples are selected they select from all areas equally, but crime is not distributed equally between them.

### **2.3.3. Self-Report Surveys**

Self-report surveys are developed against the limitations of official data and increased during the 1960s and 1970s. The major advantage of self-report studies is that they are not filtered by any official or judicial process. In this data collecting method, people are surveyed about their crimes, perception about crimes, and victimization. The National Youth Survey (NYS), Monitoring the Future (MTF), National Household Survey on Drug Abuse (NHSDA) and Partnership Attitude Tracking Study (PATS) are some of the major self-report surveys.

The NYS began in 1977. There were 1,725 adolescents between the ages of 11 and 17 years old (now they are 41-47) interviewed along with one of their parents. A longitudinal (cohort) survey uses individuals (random sampling) representative of the national population. This study is still ongoing and has been one of the most influential studies to date; determining the changing attitudes, behaviors, and beliefs of adolescents.

The MTF Survey was conducted first in 1975. Its goal was to determine the use of drugs, tobacco and alcohol amongst students. Almost 60,000 students complete the questionnaire every year and around 2,400 in the senior grades are asked follow up

questions the next year. The MTF Survey is an important review to measure the drug habits of juveniles. Having the adequate information and being capable of predicting the future offers a great opportunity for policy makers. The level of substance abuse among the American youth is observed every year by the MTF. They collect data from the representative sample of schools and conduct an ongoing study about the behaviors, attitudes and drug use of the American secondary school students, college students and young adults. Each year, a random sample totaling around 50,000 students in the eighth, tenth, and twelfth grades are surveyed.

The NHSDA is the primary source of information on the use of illicit drugs, alcohol and tobacco by the civilian, non-institutionalized population of the United States aged 12 years or older. This survey was initiated in 1971 and approximately 67,500 persons are interviewed each year. The results of this survey offer a great opportunity to measure the current drug use in the US. According to NSDUH, in 2004, an estimated 19.1 million Americans aged 12 or older were current (past month) illicit drug users, meaning they had used an illicit drug during the month prior to the survey interview. This estimate represents 7.9 percent of the population aged 12 years or older. The overall rate of current illicit drug use amongst persons aged 12 or older in 2004 (7.9 percent) was similar to the rate in 2003 (8.2 percent) and in 2002 (8.3 percent).

Self-report surveys also have generalization, reliability, and validity issues associated with survey method in particular. However, relying merely on what individual tell about their behaviors may not reliable and a valid source. The evaluation of survey and collected data revolve around two central questions. (1) Were the right people asked the right questions? (2) Did they answer truthfully?

## CHAPTER 3

### A Closer Look at Turkey

#### Introduction

Turkey (Türkiye in Turkish), known officially as the Republic of Turkey, is a Eurasian country that stretches across the Anatolian peninsula in western Asia and Thrace (Rumelia) in the Balkan region of southeastern Europe. Turkey is located at the cross roads of Europe and Asia and is a bridge both structurally and culturally between these two continents. Turkey is bordered by eight countries: Bulgaria, Greece, Georgia, Armenia, Azerbaijan, Iran, Iraq and Syria. The Bosphorus and the Dardanelles separates the border between Asia and Europe by making Turkey transcontinental (Figure 2).

According to the 2008 adjusted Census, Turkey's population is about seventy-two million, 71 percent of the total population live in the cities while 29 percent inhabit in villages or small towns in rural areas. Turkish total area is 780,580 sq km. which is slightly larger than Texas. Some of the major cities are Ankara, Istanbul, and Izmir. Ankara is located in the middle of the country and is the capital of Turkey with a population of 4.5 million, which is 6.4 percent of a total population. Istanbul has a population of 12.6 million people, which is 17.8 percent of the total population, and Izmir has the population of 3.7 million people, which is 5.3 percent of the total population. Approximately 30 percent of the total population of Turkey inhabit in these three major cities.

### 3.1. The Country

Turkey is a democratic, secular, unitary, constitutional parliamentary governmental system established in 1923 under the leadership of Mustafa Kemal Atatürk, following the fall of the Ottoman Empire in the aftermath of World War I. The nation was modernized primarily by Mustafa Kemal Atatürk. The country adopted wide-ranging social, legal, and political reforms to modernize her practices. The culture of Turkey is diverse and combines elements from Ottoman, European and Middle Eastern traditions. Islamic culture and Persian culture profoundly influenced Turkish culture. Atatürk transformed a religion-driven former Ottoman Empire into a modern nation-state with strong separation of state and religion (secularism). During the first years of the republic, the government invested a large amount of resources into fine arts and process of modernization by creating a cultural identity. Turkish culture combines “modern” and traditional religious and historical values (Ministry of Culture and Tourism, 2009).

Turkey's dynamic economy is a complex mix of industry, commerce, and agriculture sector. Some of the natural resources are coal, iron, copper, antimony, mercury, gold, borate, marble, arable land, and hydropower. Turkey has a strong and rapidly growing private sector, yet the state still plays a major role in basic industry, banking, transport, and communication. Turkey's most important industry and largest exporter is textiles and clothing, which is almost entirely managed by private sector. Average GDP per capita is \$11,250 and unemployment rate is 8.9 percent as of 2008.

Turkey is divided into 81 provinces by administrative boundaries. Provinces are called cities (il in Turkish). Each province consists of sub-units such as districts, municipalities, villages and neighborhoods. In order to be a province, it must have an

urban population of more than 20,000. Population shift in Turkey is from rural areas to the urban areas. The population of urban areas was 53 percent in 1980 while this number increased to 70 in 2000. Turkey is a country of immigration and asylum. More than 1.6 million people immigrated to Turkey, mostly from Balkan countries. Turkey also becomes a transit country of migrants from Asian countries such as Afghanistan, Bangladesh, Iraq, Iran, and Pakistan to the European Union.

The structures of the provinces are very different from those in the United States. A province in Turkey does not refer to a state or sub-state entity. Rather, it is a geographical administrative unit including a city center and numerous townships around it. The governor who is appointed by the approval of prime minister and president of the country manages central government in each province. He is responsible for all public service institutions in the provinces.



**Figure 2: Physical map of Turkey with provincial boundaries.**

### **3.2. Turkish Criminal Justice System**

Turkish civil law system derived from various European continental legal systems. Turkish Criminal Code is based almost entirely on the Italian Penal Code of 1889 (Ansay, Yucel, & Friedman, 1965). The code was enacted on March 13, 1926, and put into effect on July 1, 1926. TNP and Gendarmerie enforces the Criminal Code in Turkey. Security services are categorized into two groups; the civilian police for urban policing and the gendarmerie for rural law enforcement. The Turkish National Police (TNP) is responsible for policing urban areas, such as municipal boundaries of cities and towns. On the other hand, the Gendarmerie is responsible for enforcing law in rural areas and villages (Cerrah & Haberfeld, 2008).

Turkey applied to join in 1959 but the European Commission denied application on several occasions on the merits of political and economic reasons. Turkey earned a candidate status in joining the EU in 1999. Turkey developed several reforms and policies such as: changes of the State Security Courts, a new Turkish Penal Code, and new strategies in combating terrorism. These were all regarding the improvement of human rights in the country. During 2000 and 2007, no policies have been implemented on crime data collecting quality or crime reporting issues.

#### **3.2.1. Turkish National Police (TNP)**

The TNP was established in 1845 during the Ottoman period and was later organized to reflect the modern police organizations found in European countries. The institutional structure has two main sections; the central and the provincial. An appointed Directorate General of Security by the Ministry of Internal Affairs rules the central police force while the appointed governors (vali) manage the provincial police forces. The

district governors (*kaymakam*) are responsible for the security and welfare of districts and towns (Cerrah, 2005). The TNP is responsible for enforcing the law in the urban areas (approximately 71% of the total population, 50 million) of Turkey. As of 2008, the TNP have a force of nearly 200,000 officers (Basibuyuk, 2008; Bahar & Ferd, 2008). It is highly centralized and structured in the 81 provinces of Turkey. The main headquarter is located in Ankara under the Presidency of Directorate General of Security (Cerrah & Haberfeld, 2008).

Police structure in Turkey is similar to mixture of federal and local security agencies in the United States. Information and knowledge sharing between main headquarter and local provinces are very high on a daily basis. The main headquarter in Ankara and other provincial police departments share the intelligence because of the centralization of TNP. Police education is unique and most of the police officers get the same basic police training in the police schools. There are 19 police vocational schools throughout the country. TNP lengthened 9-month-police education to two-year-education in 2001, and currently 68 percent of the TNP personnel hold a 4-year college degree (Cerrah & Semiz, 2001; Cerrah, 2005). Police vocational schools are governed by the President of the Police Academy and they have their own directors in each school.

Provincial police is appointed from Ankara main headquarter and a police officer can be deployed to anywhere in the country. The institutional extension of the Directorate General of Security in the provincial area refers to the provincial directorates of security. The Ministry of Interior and Director of TNP appoint the provincial directors of security. Turkish police is highly specialized and divided into special branches in each province. Each branch is responsible for its specialty areas and to the provincial directors. Some of

these branches are Intelligence, Interpol, Public Order, Security, Anti-Terror, Smuggling and Organized Crime, Crime Scene Investigation and Identification, Traffic Registration and Supervision, Personnel, and Education. Each branch police is trained by an internal training according to needs of branches.

### **3.2.2. Gendarmerie**

The gendarmerie is a part of the Turkish Army that is responsible for enforcing the law in the rural areas (roughly 29% of the total population, 21 million people). The gendarmerie is responsible to the Ministry of Internal Affairs. The gendarmerie has a force of nearly 286,000 officers as of 2008 (Bahar & Ferd, 2008). The bulk of the gendarmerie (80 percent) consists of privates who are performing their obligatory military duty. In Turkey, every male older than 21 years old have to join the army. The compulsory service time is 15 months for high school graduates and 12 months for 4-year college graduates.

While, 20 percent of the gendarmerie is professional soldiers, the gendarmerie is also part of the civilian administration and functions as a domestic security unit akin to the police. They are under the command and control of the governors and district governors. However, they are not under the complete command of the civilian authority for their discipline, record and appointment. They are rather responsible to the Turkish Military Forces for their discipline and appointment.

### **3.3. Crime Measurement in Turkey**

TNP collects official hierarchical crimes in the provinces of Turkey and it only captures reported crimes. Official crime reports are the only source of crime measurement method in Turkey. Victimization and self-report surveys are not



administered in the country. The entire provincial polices participate the crime collection process because the participation is compulsory. TNP is responsible for collecting, publishing and archiving the data across the nation. Official incident level crime reports are drafted by the first respondent unit, mainly police stations or other associated branches such as public order, anti-terror divisions, and traffic branches of the provincial police department at the neighborhood level based on a uniform crime reports. This report includes all the details about the crime such as type of the crime, description of the crime, time and date of the crime, information about the victim and the offender if applicable. After this process, statistical information about the incident is reported to the Crime Analysis Unit (CAU) in each province under the Public Order Branch. The administrators in the CAU in each province send crime reports to the TNP headquarters on a daily basis by a local network called polnet, or the police network. All computers are linked to each other via polnet and all the data and official documents are transferred by polnet.

The Principal Command and Control Department (PCCD) under the TNP in Ankara are responsible for collecting and disseminating the crime related reports. When the daily crime reports are entered in any province, the responsible unit can gather the information through polnet. The PCCS prepares the national annual crime reports. The crime reports are always disseminated annually and are based on the national statistics. This makes it very difficult for researchers and academicians to identify and analyze the underlying factors of crime on a provincial or local level.

The official police reports have some limitations to keep in mind. There is no uniformity in classifying and scoring crimes among police departments. There are dark

figures, which are crimes not known either by police or by people. The police do not record some of the crimes because of legal and extralegal factors or because of bias. Police only record more serious crimes and do not report all crimes or downgrade some that are serious. However, these reports are the only sources to study the crime trends in Turkey. The official police reports are similar to the UCR methodology.

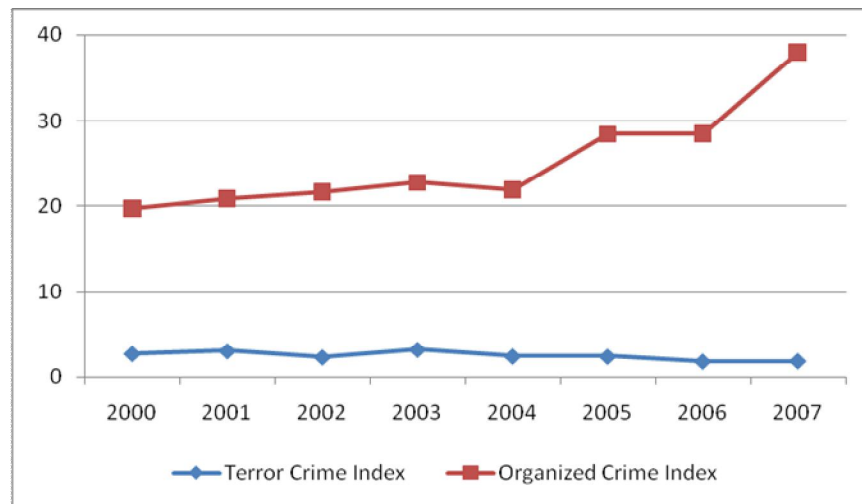
The categories of crime come from the Turkish National Police (TNP) offense data and Turkish penal law defines these offenses into three broad offense categories (Turkish Penal Law #5237) as organized crimes, terrorism, and order crimes (property and violent crimes).

Organized crime is defined according to Article 220 of the Turkish Penal Law. Three or more people establish organizations for committing crimes is considered as organized crimes. Criminal activities which can be defined as organized crimes; Smuggling of firearms, ammunition, nuclear and radioactive materials, smuggling of cultural and natural assets, smuggling of immigrants and trafficking of human beings, smuggling of organs and tissues, counterfeiting, forgery and fraud, money laundering, corruption, and cyber crimes.

Terrorism in Turkey is defined in the Anti-Terror Law #3713 (TMK, 1991) as follows:

“Terror is all kinds of activities attempted by a member or members of an organization by using any coercion, intimidation, suppression, force, violence, oppression, and threat methods for the purpose of changing the characteristics of the Republic; the political, jurisdictional, social, secular, economic system which are stated in the constitution, destroying the territorial integrity of the state and its people, jeopardizing the existence of Turkish State and Republic, weakening, ruining or invading the authority of the State, demolishing the basic rights and freedoms, destroying homeland and foreign security of the State, public order, or public health.”

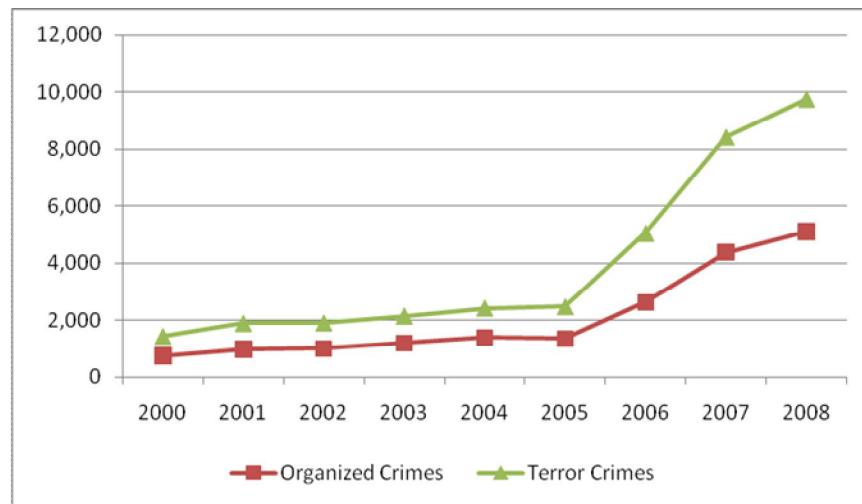
Organized crimes have increased dramatically in recent years. In 2007, organized crime index reached its highest level to 38. From 2000-2004, organized crime index was flat however, the number of organized crime increased significantly by almost two times in the last three years (Figure 3). On the other hand, terror crime index did not change a lot for the last eight years.



**Figure 3: Terror and Organized Crime Index per 100,000.**

It is essential to understand current crime trends and number of offenders in Turkey before analyzing the property and violent crime trends. Understanding the number of offenders who committed organized crime and terror crimes is vital as these kind of offenses most of the time necessitate cooperation of more than three offenders to take place. The number of crimes alone cannot justify the accurate level of these two crime types. Offenders who are convicted of organized crimes have increased dramatically in recent years. According to Ministry of Justice (MoJ), organized crime offenders reached its highest level with 5,092 offenders in rehabilitation centers in 2008. From 2000-2005, organized crime offenders slightly increased (MoJ, 2008). The number of organized crime offenders increased significantly by almost three times in the last

three years (Figure 4). Offenders who are convicted of terror crimes have slightly increased in recent years. In 2000, terrorism offenders reached the highest level with 8,667 offenders in rehabilitation centers. Terrorism offenders dropped 43 percent from 2000- 2004 and did not change much between 2004 and 2007 (MoJ, 2008). The number of terrorism offenders increased faintly from 2007 to 2008 with 20 percent (Figure 4).

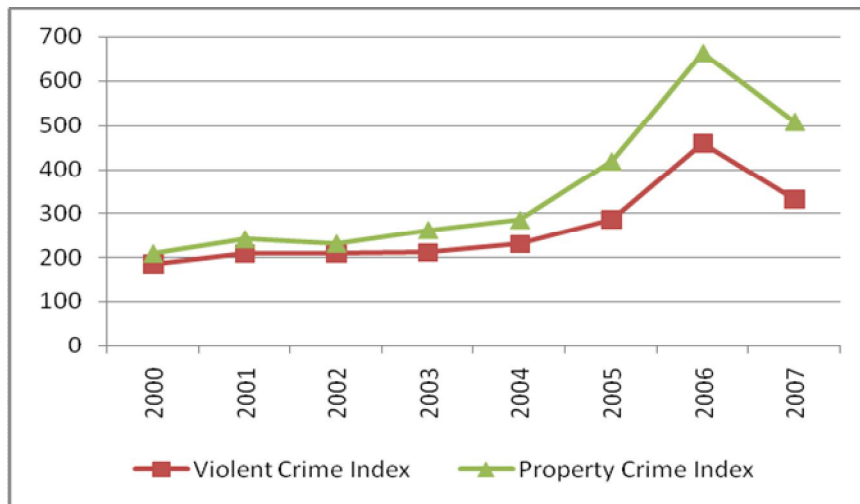


**Figure 4: Number of Offenders for Organized and Terror Crimes.**

According to the Turkish Penal Code, order crimes are divided into two categories; crimes against goods (property) and crimes against people (violent). Therefore, crimes against goods are referred to as property crimes and crimes against persons as violent crimes. Property crimes include burglary, larceny, motor vehicle theft, theft from businesses, and unlawful taking (seizure). Violent crimes consist of homicide, nonnegligent manslaughter, aggravated assault, robbery, abduction, hostage, rape, domestic violence, and arson.

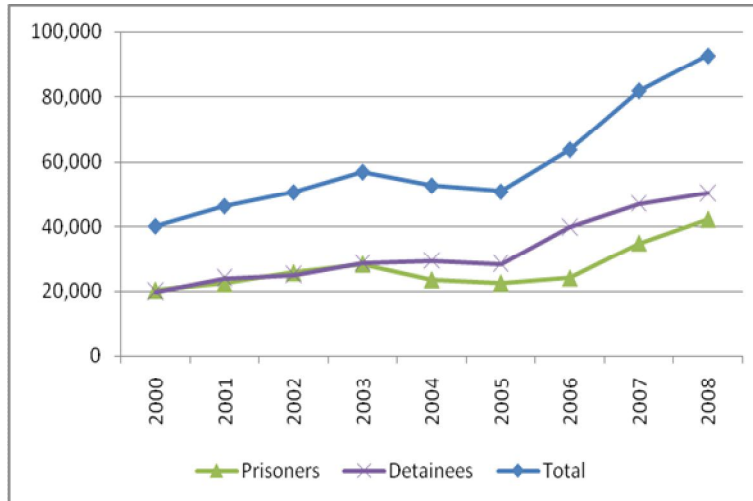
Crime rates for violent and property crimes have increased in recent years from 2004 to 2007. In 2000, violent and property crime rates were at their lowest in the last eight years. Violent and property crimes increased slightly from 2000 to 2004, 24 percent

and 36 percent respectively. However, violent and property crime rates increased significantly from 2003 to 2006, almost twice for violent crimes and triple for property crimes. For violent crimes, crime rates decreased 38 percent and crime rates for property crimes dropped 30 percent from 2006 to 2007 (Figure 5). This study will address the huge increase in violent and property crimes by analyzing other social, economical, and demographic variables.



**Figure 5: Violent and Property Crime Index per 100,000.**

According to the MoJ (2008) offender statistics, offenders who are convicted for order crimes (property and violent crimes) have increased in recent years. In 2008, the number of order crime offenders reached its highest level since 2000. The number of offenders for order crimes slightly increased from 2000 - 2003 and dropped 12 percent for the period of 2003-2005. The number of offenders increased significantly from 2005 to 2008 with 82 percent at about 100,000 offenders (Figure 6).



**Figure 6: Number of Offenders for Order Crimes.**

## CHAPTER 4

### Methodology & Data Analysis

The primary purpose of this study is to provide a macro-level analysis of reported violent and property crimes and to identify at what degree the social, economic and demographic variables explain fluctuations in violent and property crime incidents in urban areas of the Turkish provinces between 2000 and 2007. This study does not consider organized or terrorist crimes because these crimes are committed with large members of groups (three or more people) and it is difficult to capture the real crime trends in provinces. The urban areas in each province are isolated in comparison amongst the provinces and Turkish National Police (TNP) is responsible to enforce the law in urban areas. There are 81 provinces that are divided by administrative divisions and managed by a Governor appointed by the central authority. These provinces consist of both rural and urban areas such as central city centers, towns and villages. Crime control at the provincial level is also managed by the TNP. Gendarmerie controls the crime at the rural part of the provinces.

The current study applies a quantitative research methodology to carry out a trend design. A trend design is used to examine crime trend over time to examine crime trends. Particularly, this research entails a specific data base building from several existing resources by secondary data analysis and manifest content analysis to collect all the dependent and independent variables of interest. All variables are collected or projected

for the years of 2000 and 2007 for all provinces from the same data sources for consistency.

Longitudinal research refers to the analysis of data collected at different points of time. There are three different types of longitudinal research methods; trend, panel, and cohort studies. Each of them has advantages and disadvantages. Panel studies generally provide data that enable researcher to use sophisticated statistical analysis and to predict cause-effect relationships. The trend study is one of the most commonly used studies amongst others. A trend study samples different groups of people in different points in time from the same population. A trend design will be used for this study.

The analysis isolated to the years of 2000-2007 because the dependent variables of interest (property and violent crimes) are only available for this eight-year-spectrum to the researcher. Specifically, the study seeks to understand the variations in crime rates in the Turkish provinces. It will address the following research questions. Are social, economic and demographic variables related to property and violent crimes in the provinces of Turkey between 2000 and 2007? To what extent can these variables explain this relationship accordingly? More specific, the following hypothesizes are examined:

- Provinces with a higher literacy rate have lower violent and property crime incidents.
- Provinces with a higher high school graduation rate have lower violent and property crime incidents.
- Provinces with a higher family disruption rate have higher violent and property crime incidents.



- Provinces with higher income (GDP) have higher violent and property crime incidents.
- Provinces with a higher unemployment rate have higher violent and property crime incidents.
- Provinces with a higher level of poverty have higher violent and property crime incidents.
- Provinces with a higher youth percentage have higher violent and property crime incidents.
- Provinces with a higher population have higher violent and property crime incidents.
- Provinces with a higher number of households have higher violent and property crime incidents.
- Provinces with a higher urbanization rate have higher violent and property crime incidents.
- Provinces with a higher population density have higher violent and property crime incidents.
- Provinces with a higher number of police have lower violent and property crime incidents.

#### **4.1. Data Collection**

Several pre-existing data sources are used to examine the research questions. Data collection technique will be mainly content analysis for all variables by extracting the data from pre-existing national data sources (Table 4). Each category will be discussed along with the definition, measurement level, and data collection method. Each

dependent and independent variables collected for each provinces for covering the eight-year spectrum.

**Table 4: Variables and Data Sources.**

<b>Variable</b>	<b>Measurement</b>	<b>Data Source</b>
Violent Crimes	DV: Number of violent crimes per 100,000 people (Ratio)	Turkish National Police
Property Crimes	DV: Number of property crimes per 100,000 people (Ratio)	Turkish National Police
Provinces	Names of the provinces (Nominal)	Turkstat
Literacy (Social)	IV: Percentage of population who are literate in each province (Ratio)	Turkstat
High School Graduate (Social)	IV: Percentage of high school graduates in each province (Ratio)	Ministry of National Education
Family Disruption (Social)	IV: Number of divorce per marriage in each province (Ratio)	Turkstat
Poverty (Economic)	IV: Portion of population using green card in each province (Ratio)	Ministry of Health
Income (Economic)	IV: Annual mean income in each province (Ratio)	Ministry of Labor and Social Security
Unemployment (Economic)	IV: Unemployment rate in each province (Ratio)	Ministry of Labor and Social Security
Population (Demographic)	IV: Number of people residing in each province (Ratio)	Turkstat
Urbanization rate (Demographic)	IV: Number of urban residents over the total population in each province (Ratio)	Turkstat
Population Density (Demographic)	IV: Number of urban residents over area of each province (Ratio)	Turkstat
Number of households (Demographic)	IV: Number of household each province (Ratio)	Turkstat
Youth (16-24) percentage (Demographic)	IV: Percentage of youth in each province (Ratio)	Turkstat
Number of police (Demographic)	IV: Number of police per 10,000 people (Ratio)	Turkish National Police

## 4.2. Variables & Measurement

### 4.2.1. Dependent Variables

In this study, the dependent variables are the number of crimes against goods (property) and the number of crimes against persons (violent). Each dependent variable will be collected for each of the 81 provinces for the eight-year spectrum. Specifically, the dependent variable of property crimes is measured as the number of committed property crimes in each province in a given year ( $\text{PropertyIndex} = (\text{Number of property incidents} * 100,000) / \text{population of the province}$ ). Property crime index is calculated for each province per 100,000 people in the population in a given year. This was calculated by multiplying the number of incidents by 100,000 and dividing by population of a given province. Amongst 81 provinces, property crime index ranges from 47 to 2,805 property crime per 100,000 people, with an average of 342.

The dependent variable violent crime is measured as the number of committed violent crimes in each province in a given year ( $\text{ViolentIndex} = (\text{Number of violent incidents} * 100,000) / \text{population of the province}$ ). Violent crime index is calculated for each province per 100,000 people in the population in a given year. This was calculated by multiplying the number of incidents by 100,000 and dividing by population of a given province. Amongst the 81 provinces, violent crime index ranges from 76 to 2,035 violent crimes per 100,000 people, with an average of 455.

The dependent variables of violent and property crime incidents by province is annually available from the TNP Principal Command and Control Department (Ana Komuta Kontrol Kademe Merkezi) which is responsible for collecting the TNP crime

database throughout the country. The data are derived from the information submitted through polnet.

#### **4.2.2. Independent Variables**

There are three broad categories of independent variables; social, economic and demographic.

##### **4.2.2.1. Social Variables**

Social variables are high school graduate rate, literacy, and family disruption rate. Specifically, high school graduate rate (*HSGR*) is measured by the number of students graduated from high school each year per 10,000 people in a province. The high school graduate rate in Turkey ranges from 27 to 156, with an average of 88. Literacy (*Literacy*) is the percent of people older than fifteen years that can read and write in Turkish in each province. Amongst the 81 provinces, literacy ranges from 65.8 percent to 95.8 percent, with an average of 87 percent. The family disruption rate is operationalized as the number of divorces per marriages ( $FDR = \text{Number of divorces} * 100 / \text{Number of marriages}$ ). The Turkish FDR ranges from 5.35 to 16.89 between provinces with an average of 8.64.

Ministry of National Education is responsible to regulate the elementary and secondary education throughout the country. Data on education (high school graduates and literacy) is collected by the Ministry of National Education of Turkey each year at the provincial level. It includes the literacy rate, the number of schools, the numbers of teachers, the number of students, and the education level of the students. Literacy does not have a universal definition but the common definition is the ability to read and write

at a specified age, which is 15 in Turkey. Literacy is a national standardized measure and it is not different among each province.

The Ministry launched a project called “ILSIS- Provincial Data Collection System” in order to collect and publish formal education statistics. School directors send their recorded data covering the level of education to the data collection center of the Minister through the internet. The data is then submitted to Turkstat for recording and disseminating.

The data on the number of marriages are collected by the General Directorate of Population and Citizenship Affairs. The data on marriage is collected monthly through means of marriage statistic forms prepared and filled out by the municipal marriage officers and population directorates. They are then transmitted to Turkstat by the municipality directorates and population directorates in the provinces. The divorce statistics have been collected in Turkey since 1926. The responsible civil courts fill out Divorce Statistics Forms for every divorce granted through a final decree. A copy of this registration record is transmitted to Turkstat every six months by the public prosecutors.

#### **4.2.2.2. Economic Variables**

Economic variables are unemployment rate, income, and poverty as measured those who have a green card. The unemployment rate (*Unemployment*) is the ratio of unemployed people to the labor force in each province. Amongst the 81 provinces, unemployment rate ranges from 3.22 percent to 18.91 percent, with an average of 7.79 percent. Income or Gross Domestic Product (*GDP*) per person is calculated by using production, expenditures, and income variables for each province. Amongst the 81 provinces, income ranges from \$568 to \$9,899, with an average of \$2,553. The percent of

green card holders is the number of individuals who obtain a green card from the government for health care purposes to the general population. It is a good proxy for poverty level in each province (*PovertyRate*). The percent of green card holders ranges from 2.53 to 56.35, with an average of 18.67 percent, amongst the 81 provinces.

Each year the unemployment rate is collected by the Household Labor Force Survey (HLFS). The unemployed consist of all persons 15 years of age and older who were not employed (neither worked for profit, not in school, payment in kind or as a family worker at any job even for one hour) during the reference period. The Ministry of Labor and Social Security of Turkey collect the data in reference to the unemployment rate and income. The data on the number of green card holders has been obtained from the Ministry of Health of Turkey. The green card in Turkey is similar to Medicaid in the United States. It aims to help the poor who do not have health insurance or cannot afford it.

#### **4.2.2.3. Demographic Variables**

Demographic variables are provinces, population, urbanization rate, population density, number of households, youth percentage, and number of police. The variables are measured as follows: Province (*Prov*) is a nominal variable representing the provinces of Turkey for each year over the eight year span from 2000 to 2007. There are 81 provinces in Turkey and the names of the provinces are ordered from A to Z.

Population (*Population*) is the total number of individuals reported living in each province. Amongst the 81 provinces, population ranges from 76,609 to 12,573,836 with an average of 854,385. The urbanization rate (*UrbanRate*) is the percentage of urban residents over the total population. Urbanization rate ranges from 25.99 percent to 89.88

percent, with an average of 58.91 percent amongst 81 provinces. Population Density (*PopDen*) is the percent of people living in each province over the total area of that province in terms of square kilometers (km<sup>2</sup>). Population density ranges from 11 to 2,408 with an average of 107 people amongst 81 provinces. The number of households (*Household*) is the average number of households in each province. The number of households ranges from 3.09 to 9.76 with an average of 4.79 amongst the 81 provinces. It is measured as the total population of each province over the total number of households. The percentage of youth (*YoungRate*) between the ages of 15-24 is measured as the total number of population over the youth between the ages of 15-24. Youth percentage ranges from 6.20 to 25.84, with an average of 10.76. The number of police (*PoliceRate*) is the total number of police in each province per 10,000 people (ratio). The number of police ranges from 9.49 to 109.01, with an average of 25 amongst the 81 provinces.

The General Population Censuses are conducted by the Turkstat ([www.turkstat.gov](http://www.turkstat.gov)) each decade. The fourteenth Population Census was carried out in 2000. The purpose of the 2000 population census was to determine the correct and complete size, the distribution by the administrative division and the demographic, social and economic characteristics of the population within the boundaries of Turkey. All persons present at a place that constitutes a household were counted and the population within the boundaries of Turkey was completely covered on that census day. The 2000 Population Census was carried out in one day by the application of a trained curfew. Information including all social (marriage, divorce, literacy, and education), economic (income, employment, and green card), and demographic (age, number of households) variables are obtained from each individual separately. Two frames are used in reaching

the persons; housing units (dwellings) and places that are not housing units (hospital, dormitory, prison, military quarter, hotel, etc.). The demographic variables such (population, number of households, and age) are collected each Census year and projected other years by taking into account population growth, the numbers of birth and the death, marriage and divorce rates in each province annually.

The number of police officers is collected by the Personnel Department (Personel Daire Baskanligi). They are responsible for collecting and analyzing the entire TNP personnel database.

### **4.3. Data Analysis**

The data analysis in this study will have three folds; descriptive, bivariate and multivariate level of analysis. First, a descriptive analysis will be used to identify the descriptive statistics of property, violent crimes, and other independent variables. Second, bivariate analysis will be examined to analyze and identify the relationship between property and violent crimes and other independent variables. Third, a multiple regression will be used to analyze the percentage of variance by giving the various combinations of independent variables in the model for property and violent crimes. Multiple regression allows the researcher to explore the relationship between one dependent variable and several independent variables. Therefore, the relationship between property crimes and other independent variables and the relationship between violent crimes and other independent variables will be explored separately.

Multiple regression enables the researcher to analyze between a continuous DV (number of violent and property crimes) and several continuous and dichotomous IVs



(Tabacnick & Fidell, 2008). Therefore, multiple regression is one of the good statistical techniques to identify and analyze this study. This study does not use a sample instead it considers the entire population; therefore strength is more important than the significance of the study. Multiple regression is a statistical tool that needs to meet certain practical assumptions. These assumptions and the data analysis process will be discussed in the fifth chapter.

#### **4.4. Limitations of the Study**

Limitations exist in every study and acknowledging them allows the researcher to interpret the findings within appropriate parameters. This study is no exception.

The current research analyzes the urban crime rates, which are collected by the TNP, and the official statistics from Gendarmerie is not available to the researcher.

The data is collected for a limited eight-year spectrum (2000-2007) because other dependent variables are not available for all the provinces of Turkey for the previous years.

The current study provides a macro-analysis of violent and property crimes and it does not account for the relationship between each individual crime type such as homicide, aggravated assault, theft, robbery and mentioned independent variables.

The research is examining the crime rates throughout provinces of Turkey as a population rather than a sample. However, it may be difficult to generalize to all crime incidents in dissimilar part of the world and it enables other researchers to make a comparative research between Turkey and other countries.

#### 4.5. Reliability & Validity

Reliability refers to the extent to the results are reliable time after time and it can be explained by variables (Nardi, 2006). However, variable errors are inescapable fact that measurement in social science is not as direct as it is in physical science. Although the random errors cannot be eliminated completely, they should occur on an acceptable level. Stability, equivalence, and internal consistency are three dimensions of reliability. Stability refers to the ability of the quantify to yield the same result time after time as the data has been measured and collected year by year by the same agency; it is supposed to have stability. Equivalence means that there is consistency amongst the results of the studies done by different researchers using the same instrument. Crime rates in Turkey have been studied by only a handful other researchers; therefore it is going to be difficult to assess equivalence and to make a comparison. Internal consistency measures whether the items are all measuring the same thing or not. The results of the study will determine the reliability of the study as it will enable researcher to compare the results with the other literature results.

Nachmias and Nachmias (2000) categorize three types of validity; content validity, empirical validity, and construct validity. Content validity refers to all the attributes of the concept that study is measuring. The measurement of crime incidents has limitations as they are mentioned in the literature review but they are the only secondary data to study crime. This study will deeply examine the literature and analyze different dimensions of the crime rates and contributing variables. Therefore, it will hopefully have content validity and the measurement instruments covered all the attributes of the concept that the study was trying to measure as supported from the previous research. Empirical

validity means that the relationship and the implementation among the variables measured should be the same in the actual world. To enhance empirical validity, this study will select a wide range of related variables to increase the validity and will compare the results. Construct validity is more than descriptive sense that researcher should relate measurement instrument to general theoretical framework. The variables are constructed from both theory and literature and have been tested by numerous studies as noted in the second chapter.

## CHAPTER 5

### Data Analysis and Results

This chapter will provide a discussion of the data analysis in three sections. First, the chapter will discuss and identify the descriptive statistics on each of the variables being examined. Second, the chapter will argue the bivariate analyses between two dependent variables and other independent variables along with the hypothesis testing that was conducted at the beginning of the study. Finally, multiple regression assumptions and discussion of retention or removal of specific variables for further analyses will be explored along with developing and interpreting multiple regression models.

#### 5.1. Descriptive Statistics

This section presents the information for the independent and dependent variables. While a portion of the descriptives are presented in the text, Appendix 1 contains a more robust picture of each variable.

##### 5.1.1. Dependent Variables

It is important to normalize the crime data by calculating the crime index per 100,000 residents in order to make appropriate comparisons among provinces. Frequency distributions, means, medians, standard deviations, and ranges were used to generate the descriptive statistics of all dependent and independent variables. Descriptive statistics indicate that there are 648 cases (81\*8) for the eight-year spectrum (Appendix 1,2).

The number of violent crimes (DV) per 100,000 population is calculated for the years of 2000 and 2007. As shown in Table 5, the minimum number of incidents in provinces is 76.11 and the maximum number of incidents is 2,035.19 per 100,000 population with a 455.31 mean, and a standard deviation of 278.87. This descriptive statistic shows that provinces greatly differ in terms of violent crimes while some of them have low crime rates and others have very high incident rates. The median is 375.49.

The number of property crimes (DV) per 100,000 population is calculated for the years 2000 and 2007. As shown in Table 5, the minimum number of incidents in provinces is 47.73 and the maximum number of incidents is 2,805.31 with a 342.77 mean and a standard deviation of 304.38. It shows that provinces also greatly differ in terms of property crimes. The median is 242.97 incidents.

**Table 5: Descriptive Statistics for Dependent Variables**

Variable	$\bar{x}$	S.d.	Range
Violent Crime Index	455.31	278.87	76.11-2,035.19
Property Crime Index	342.77	304.38	47.73- 2,805.31

### 5.1.2. Descriptive Statistics for Social Variables

The information regarding the social variables is presented in Table 6. The provinces of Turkey vary in terms of education level which is measured by two variables in this study: literacy rate and high school graduation rate (HSGR). The minimum literacy rate is 65.80 and the maximum percentage of literacy is 95.80 with an 87.05 mean and a standard deviation of 6.71. The median is 89.10.

The high school graduation rate is another proxy for education. This is the number of students who graduated from high school each year per 10,000 people. The minimum

high school graduation rate is 26.60 and the maximum graduation rate is 155.76 with a 88.02 mean and a standard deviation of 24.10. The median is 88.83.

The number of the marriages and divorces rate is calculated for each province to see the family disruption rate (FDR) and crime relationship. The family disruption rate ranges from 5.35 to 16.89 between provinces with a 8,64 mean and a standard deviation of 1,79. The median is 8,32.

**Table 6: Descriptive Statistics for Social Variables**

Variable	$\bar{x}$	S.d.	Range
Literacy	87.05	6.71	65.80- 95.80
HSGR	88.02	24.10	26.60-155.76
FDR	8.64	1.79	5.35- 16.89

### 5.1.3. Descriptive Statistics for Economic Variables

Table 7 contains the information for the gross domestic product (GDP), unemployment rate, and poverty rate. The gross domestic product is a proxy for economic well being of each province. This variable is measured by US dollars and ranges from 568.00 to 9,899.73 between provinces with a 2,553.16 mean and a standard deviation of 1,336.80 dollars. The median is 2,304.81.

The unemployment rate is the percentage of people who are not employed in the provinces of Turkey. This variable ranges from 3.22 to 18.91 between provinces with a 7.79 mean and a standard deviation of 2.97. The median is 7.10. The poverty rate is measured by the percentage of green card beneficiaries in the provinces of Turkey. This variable ranges from 2.53 to 56.35 between provinces with a 18.67 mean and standard deviation of 13.18. The median is 15.01.

**Table 7: Descriptive Statistics for Economic Variables**

Variable	$\bar{x}$	S.d.	Range
Unemployment rate	7.79	2.97	3.22-18.91
GDP	2,553.16	1,336.80	568.00- 9,899.73
PovertyRate	18.67	13.18	2.53- 56.35

#### **5.1.4. Descriptive Statistics for Demographic Variables**

Table 8 presents the descriptive statistics for the number of households, population of provinces, percentage of youth, population density, urbanization rate, and number of police. The number of households is measured as the average number of people living in each residence. It ranges from 3.09 to 9.76 between provinces with a 4.79 mean and a standard deviation of 1.3. The median is 4.42. Population illustrates the number of people residing in each province. The frequency analysis shows that the smallest province population is 76,609 while the maximum province population is 12,573, 836, with a standard deviation of 1,365,410 people. The mean of the population is 854,385, and the median is 492,785 for the 81 provinces of Turkey between the years of 2000 and 2007.

The percentage of the young population between the age of 15-24 (YoungRate) ranges from 6.20 to 25.84 between provinces with a 10.76 mean and standard deviation of 2.35. The median is 10.39. Population density is reported as residents living in a kilometer diameter. There is wide variation in this variable with some provinces having more population than others. The population density ranges from 11.31 to 2,419.91 with a 107.94 mean and standard deviation of 240.49. The median is 60.58.

The urbanization rate is measured as the percentage of residents living in the urban part of the province. This variable ranges from 25.99 to 89.88 between provinces

with a 58.91 mean and standard deviation of 12.45. The median is 58.96. The number of police officers in a province is another proxy for crime rates. Number of polices per 10,000 residents ranges from 9.49 to 109.01 with a 25.99 mean and standard deviation of 12.27. The median is 22.99.

**Table 8: Descriptive Statistics for Demographic Variables**

Variable	$\bar{x}$	S.d.	Range
Household	4.79	4.42	3.09- 9.76
Population	854,385	1,365,410	76,609-12,573,836
YoungRate	10.76	2.35	6.20- 25.84
PopDen	107.94	240.49	11.31- 2,419.11
UrbanRate	58.91	12.45	25.99- 89.88
PoliceRate	24.99	12.27	9.49- 109.01

## 5.2. Bivariate Statistics and Hypothesis Testing

In this section, bivariate correlations between the dependent variables and independent variables are conducted to determine the magnitude and strength of the correlation. This study is looking at a population rather than a sample so the strength of the study is much more important than the significance of the study. All hypotheses testing used a 95% confidence interval with a specified error of  $\alpha=0.05$ .

Before examining the bivariate relationship, the skewness and kurtosis of each variable was examined (Tabachnick, & Fidell, 2007). The results of evaluation of the skewness and kurtosis values led to transformation of the variables to reduce skewness and the number of outliers, as well as to improve the normality, linearity, and homoscedasticity of the residuals (Appendices 1, 2). It is seen that violent crimes, property crimes, percentage of young population, population density, number of police and population are all skewed and have a kurtosis problem. In order to avoid possible



distortion of the results, transformation should be considered for these variables (Tabachnick, & Fidell, 2007, p. 86). Two of the dependent variables (violent crimes and property crimes) are transformed by applying square root (Sqrt) transformation and the other four variables (percentage of young population, population density, number of police, population) are transformed by using logarithmic transformation (Lg10).

### **5.2.1. Social Variables & Violent and Property Crimes**

Table 9 presents the results of the bivariate relationships between the social variables and both violent and property crimes. The statistic that examines this relationship is the ANOVA.

#### **5.2.1.1. Literacy**

Literacy is an educational assessment in which a person should be able read and write in their native language. Literacy and violent crimes have a statistically significant positive correlation.

This study has hypothesized that provinces with a higher literacy rate have lower violent crime incidents. The data reveal a statistically significant positive correlation between literacy rate and violent crime incidents in the provinces of Turkey. The value of  $F = 87.67$  is significant at the  $p \leq 0.01$  level. The relationship between violent crimes and literacy is positively correlated and literacy ( $R^2 = .118$ ) can explain 11.8% of the variance of violent crimes at the aggregate level.

Likewise, this study has hypothesized that provinces with a higher literacy rate have lower property crime incidents. The data indicate a statistically significant positive correlation between literacy rate and property crime incidents in the provinces of Turkey. The relationship between property crime and literacy is positively correlated and literacy

( $R^2=.183$ ) can predict by 18.3% of the variance of property crimes at the aggregate level while keeping other variables constant ( $F= 145.85$ ,  $p \leq 0.01$ ). Contrary to expectations, the frequency of the literacy rate is greater in the provinces with higher violent and property crimes.

The finding of this study is not consistent with the results of many other previous studies (Boufard, Mackenzie, & Hickman, 2000; Lochner, 2004; Garfinkel, Kelly, & Waldfoegel, 2005; Kustepeli & Onel, 2006) in crime which indicate a significant negative relationship between education and the number of delinquencies.

#### **5.2.1.2. High School Graduation Rate**

Consistent with prior research, this study hypothesizes that provinces with a higher high school graduation rate (HSGR) there will be lower violent crime incidents. The data show a statistically significant positive correlation between high school graduation rate and violent crime incidents in the provinces of Turkey. The high school graduation rate has a significant positive correlation with violent crimes ( $F = 124.39$ ,  $p \leq 0.01$ ) that high school graduation rate ( $R^2=.160$ ) can predict by 16% of the variance of violent crimes at the aggregate level.

Similarly, this study hypothesizes that provinces with a higher high school graduation rate will have lower property crime incidents. The data reveal a statistically significant positive correlation between high school graduation rate and property crime incidents in the provinces of Turkey. The high school graduation rate has significant positive correlations with property crimes, and high school graduation rate ( $R^2=.170$ ) can predict by 17.0% of the variance of property crime at the aggregate level while keeping other variables constant ( $F= 133.76$ ,  $p \leq 0.01$ ). Contrary to expectations, the frequency of

the high school graduation rate is greater in the provinces with higher violent and property crimes.

Previous researches (Usher, 1997; Huang, Laing, & Wang, 2004) have highlighted the influence of education on crime in a negative way, in that crime decreases as the education increases. However, most of the studies that are conducted in Turkey are on education and terror related crimes (Yayla, 2005; Koseli, 2006; Simsek, 2006; Basibuyuk, 2008; Nikbay, 2009). Koseli (2006), Basibuyuk (2008), and Nikbay (2009) have measured education as the student and teacher ratio in a province and their researches did not uncover a significant relationship between terror crimes and education.

#### **5.2.1.3. Family Disruption Rate**

The bivariate relationship between violent crimes and family disruption rate for the provinces of Turkey is significant. Family disruption rate (FDR) has a significant positive correlation with violent crimes that family disruption rate ( $R^2=.110$ ) can predict by 11% of the variance of violent crimes at the aggregate level. The strength of the model is  $R=0.334$  and the value of  $F= 80.980$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher family disruption rate have higher violent crime incidents. The data assert a statistically significant positive correlation between family disruption rate and violent crime incidents in the provinces of Turkey.

Likewise, this study has hypothesized that provinces with a higher family disruption rate have higher property crime incidents. The data reveal a statistically significant positive correlation between family disruption rate and property crime incidents in the provinces of Turkey. Family disruption rate has a significant positive correlation with property crimes that family disruption rate ( $R^2=.032$ ) can predict by

3.2% of the variance of property crime at the aggregate level ( $F= 22.210, p\leq 0.01$ ).

Specifically, in the provinces where family disruption rate is higher, the number of violent and property crimes are higher.

The findings of this study are consistent with previous researches (Fagan & Wexler, 1987; Wells & Rankin, 1991; Lugaila, 1998) that have highlighted the influence of family disruption on crime in a positive way in that children who live with only one parent because of family disruption (divorce or separation) are more likely to experience a variety of emotional and behavioral problems, including delinquency, than children from two parent families. Family disruption and delinquency have been positively associated (Lewis, Shanok, & Balla, 1981; Guarino, 1985).

**Table 9: Bivariate Relationship- Social Variables & Violent and Property Crimes**

Social Variables	Violent Crime			Property Crimes		
	F	R	Adjusted R <sup>2</sup>	F	R	Adjusted R <sup>2</sup>
Literacy	87.67**	.346	.118	145.85**	.429	.183
HSGR	124.39**	.402	.160	133.76**	.414	.170
FDR	80.98**	.334	.110	22.21**	.182	.032

\*\* . Correlation is significant at the 0.01 level (2-tailed)

### 5.2.2. Economic Variables & Violent and Property Crimes

Table 10 presents the bivariate relationships for violent and property crimes and gross domestic product, unemployment rate, and poverty rate.

#### 5.2.2.1. Gross Domestic Product

The bivariate relationship between violent crime and gross domestic product (GDP) is significant. Gross domestic product has a significant positive correlation with

violent crimes that gross domestic product ( $R^2=.097$ ) can predict by 9.7% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.314$  and the value of  $F= 70.876$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher income (gross domestic product) have higher violent crime incidents. The data specify a statistically significant positive correlation between gross domestic product and violent crime incidents in the provinces of Turkey.

Likewise, this study has hypothesized that provinces with a higher income (gross domestic product) have higher property crime incidents. The data identify a statistically significant positive correlation between gross domestic product and property crime incidents in the provinces of Turkey. The bivariate relationship between property crimes and gross domestic product is significant. Gross domestic product has a significant positive correlation with property crimes that gross domestic product ( $R^2=.317$ ) can predict by 31.7% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.564$  and the value of  $F=301.61$  is significant at the  $p\leq 0.01$  level. Namely, the frequency of violent and property crimes tend to be higher in the provinces where the gross domestic product is higher.

The finding of this study is persistent with much of the previous research (Messner, 1982; Glaeser & Sacerdote, 1999; Hagan, 2006; Comertler & Kar, 2007) in that gross domestic product per person increases the likelihood of crime in a positive way especially for property crimes. Previous researches (Messner, 1982; Glaeser & Sacerdote, 1999; Raphael & Winter-Ebmer, 2001; Hagan, 2006) also have highlighted the influence of gross domestic product on crime in a positive way, in that the crime rate increases as the economy and gross domestic product increase.

### 5.2.2.2. Unemployment Rate

The bivariate relationship between violent crimes and unemployment rate is significant. Unemployment rate has a significant negative correlation with violent crimes that unemployment rate ( $R^2=.177$ ) can predict by 17.7% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.423$  and the value of  $F= 140.48$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher unemployment rate have higher violent crime incidents. The data specify a statistically significant negative correlation between unemployment and violent crime incidents in the provinces of Turkey. The frequency of violent crimes tends to be higher in the provinces where the unemployment is lower.

This study has hypothesized that provinces with a higher unemployment rate have higher property crime incidents. The data do not indicate a statistically significant correlation between unemployment rate and property crime incidents in the provinces of Turkey. The strength of the model is  $R=0.116$  and it has the very little explanatory power of 1.2%. Moreover, the value of  $F= 8.750$  is not significant at the  $\leq 0.01$  level so this study fails to reject the null hypothesis.

Most of the previous research (Cantor & Land, 1985; Britt, 1997; Glaeser & Sacerdote, 1999) suggests the correlation between unemployment and violent crimes in a positive way in that the provinces with higher unemployment rate have a higher crime rate. However, some of the studies (Kapusinski, Braithwaite, & Chapman, 1998; Chiricos, 1987) did not find a significant relationship between unemployment and crime. Kapuscinski, Braithwaite and Chapman (1998) did not find such a relationship in time-series studies of unemployment and crime in Australia. Thornberry and Christenson

(1984) argue that neither from unemployment to crime nor from crime to unemployment was an adequate analysis to show the relationship.

### 5.2.2.3. Poverty Rate

The bivariate relationship between violent crime and poverty rate is significant. Poverty rate has a significant negative correlation with violent crimes that poverty rate ( $R^2=.074$ ) can predict by 7.4% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.276$  and the value of  $F= 53.061$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher poverty rate have higher violent crime incidents. The data indicate a statistically significant negative correlation between unemployment and violent crime incidents in the provinces of Turkey.

Likewise, this study has hypothesized that provinces with a higher poverty rate have higher property crime incidents. The data point out a statistically significant negative correlation between poverty rate and property crime incidents in the provinces of Turkey. Poverty rate ( $R^2=.140$ ) can predict by 14.0% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.376$  and the value of  $F= 106.438$  is significant at the  $p\leq 0.01$  level. This relation indicates that poverty has a negative impact on violent and property crimes in Turkey. The frequency of violent and property crimes tends to be higher in the provinces where the poverty rate is lower. Previous research (Bailey, 1984; Sampson, 1985; Shihadeh & Steffensmeier, 1994; Lee, 2000) suggests that poverty, unequal distribution of income and wealth produces high crime rates in general.

**Table 10: Bivariate Relationship- Economic Variables & Violent and Property Crimes**

Economic Variables	Violent Crime			Property Crimes		
	F	R	Adjusted R <sup>2</sup>	F	R	Adjusted R <sup>2</sup>
GDP	70.87**	.314	.097	301.61**	.564	.317
Unemployment	140.48**	.423	.177	8.75	.116	.012
Poverty Rate	53.06**	.276	.074	106.43**	.376	.140

\*\* . Correlation is significant at the 0.01 level (2-tailed)

### 5.2.3. Demographic Variables & Violent and Property Crimes

Table 11 presents the results of the ANOVA analysis between the demographic variables and both violent and property crime rates.

#### 5.2.3.1. Number of Households

The bivariate relationship between violent crime and number of households for the provinces of Turkey is significant. The number of households has a significant negative correlation with violent crimes that the number of households ( $R^2=.224$ ) can predict by 22.4% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.475$  and the value of  $F= 187.784$  is significant at the  $p \leq 0.01$  level. This study has hypothesized that provinces with a higher number of households have higher violent crime incidents. The data indicate a statistically significant negative correlation between the number of households and violent crime incidents in the provinces of Turkey.

Likewise, this study has hypothesized that provinces with a higher number of households have higher property crime incidents. The number of households has a



significant negative correlation with property crimes that the number of households ( $R^2=.154$ ) can predict by 15.4% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.395$  and the value of  $F= 119.089$  is significant at the  $p\leq 0.01$  level. Especially, the frequency of violent and property crimes tends to be lower in the provinces where the number of households is higher.

Most of the previous research (Glueck & Glueck, 1957; West & Farrington, 1973; West, 1982) indicates that the number of people in a house is an important factor for delinquency. Some of the research in Turkey also posits that the juveniles who come from more populated families are more likely to commit crimes than their counterparts from less populated families (Akman & Zengin, 1985; Turkeri, 1996).

### **5.2.3.2. Population of Provinces**

The relationship between violent crime and the (log of) population of the provinces is significant. The population of the provinces has a significant negative correlation with violent crimes. Population ( $R^2=.029$ ) can predict 2.9% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.173$  and the value of  $F= 20.000$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with higher populations have higher violent crime incidents. The data assert a statistical significant negative correlation between population of the provinces and violent crime incidents in the provinces of Turkey.

On the contrary, the data indicate a statistically significant positive correlation between population of the provinces and property crime incidents in the provinces of Turkey. This study has hypothesized that provinces with a higher population have higher property crime incidents. The relationship between property crimes and population of the

provinces is significant. Population of the provinces has a significant positive correlation with property crimes. Population ( $R^2=.104$ ) can predict by 10.4% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.324$  and the value of  $F= 75.995$  is significant at  $p\leq 0.01$  level.

The findings of this study on property crimes and population are similar to previous research findings in that many research studies examining crime rates have found that areas with a large population usually experience higher crime rates than smaller, less populated ones (Wirth, 1938; Katzman, 1980; Blau & Blau, 1982; Glaeser & Sacerdote, 1999; Leichenko, 2001).

### **5.2.3.3. Percentage of Young Population**

The relationship between violent crimes and percentage of young population between the ages of 15-24 is not significant for the provinces of Turkey at the  $p\leq 0.01$  level. The strength of the model is  $R=0.112$  and it has the very small overall explanatory power of 1.1%; and the value of  $F= 8.245$  is not significant at  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher percentage of young population have higher violent crime incidents. The data do not indicate a statistically significant correlation between percentage of young population and violent crime incidents in the provinces of Turkey so this study fails to reject the null hypothesis.

Similarly, this study has hypothesized that provinces with a higher percentage of young population have higher property crime incidents. The data do not point out a statistically significant correlation between percentage of young population and property crime incidents in the provinces of Turkey so this study fails to reject the null hypothesis. The relationship between property crimes and percentage of young population between

the ages of 15-24 is not significant for the provinces of Turkey. The strength of the model is  $R=0.100$  and the value of  $F= 6.524$  is not significant at the  $p<0.01$  level.

#### **5.2.3.4. Population Density**

The relationship between violent crimes and population density is not statistically significant for the provinces of Turkey. The strength of the model is  $R=0.094$  and it has very little overall explanatory power (0.7%); and the value of  $F= 5.800$  is not significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher population density have higher violent crime incidents. The data do not indicate a statistically significant correlation between population density and violent crime incidents in the provinces of Turkey so this study fails to reject the null hypothesis.

On the contrary, the bivariate relationship between property crimes and population density is significant. Population density has a significant positive correlation with property crimes that population density ( $R^2=.135$ ) can predict by 13.5% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.369$  and the value of  $F= 101.575$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher population density have higher property crime incidents. The data affirm a positive statistically significant correlation between population density and property crime incidents in the provinces of Turkey so this study rejects the null hypothesis.

The findings of this study on property crimes and population density are consistent with the previous research findings. Most research studies examining crime rates and population density found that areas with a large population density usually

experience higher crime rates (Sampson & Groves (1989; Land, McCall & Cohen, 1990; Cullen & Levitt, 1999).

#### **5.2.3.5. Number of Police**

The relationship between violent crime and (log of) number of police per 10,000 people is not significant for the provinces of Turkey. The strength of the model is  $R=0.061$  and the value of  $F= 2.432$  is not significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher number of police have lower violent and property crime incidents. Likewise, the relationship between property crime and (log of) number of police per 10,000 people is not significant for the provinces of Turkey. The strength of the model is  $R=0.020$  and the value of  $F= 0.253$  is not significant at the  $p<0.1$  level. The data do not reveal a statistically significant correlation between number of police and violent and property crime incidents in the provinces of Turkey so this study fails to reject the null hypothesis.

Marvell and Moody (1996) argue that the relationship between the number of police and the crime rate is ambivalent. Sherman and Eck (2001) assert that adding more police to cities regardless of assignment does not reduce crime rates. Sherman (2004) further argues that only numbers of police or police tactics are not capable of reducing crime. However, the research on the number of police in a province and the crime relationship has mixed results and studies did not show a direct relation in crime drop and the number of officers.

#### **5.2.3.6. Urbanization Rate**

The relationship between violent crimes and the urbanization rate is significant for the provinces of Turkey. The urbanization rate has a significant negative correlation

with violent crimes that the urbanization rate ( $R^2=.035$ ) can predict by 3.5% of the variance of violent crime at the aggregate level. The strength of the model is  $R=0.190$  the value of  $F= 24.216$  is significant at the  $p\leq 0.01$  level. This study has hypothesized that provinces with a higher urbanization rate have higher violent crime incidents. The data disclose a statistically significant negative correlation between the urbanization rate and violent crime incidents in the provinces of Turkey. The frequency of violent crimes tends to be lower in the provinces where the urbanization rate is higher.

The relationship between property crimes and the urbanization rate is significant for the provinces of Turkey. The urbanization rate has a significant positive correlation with property crimes that the urbanization rate ( $R^2=.011$ ) can predict by 1.1% of the variance of property crime at the aggregate level. The strength of the model is  $R=0.112$  and the value of  $F= 8.148$  is significant at the  $p<0.05$  level. This study has hypothesized that provinces with a higher urbanization rate have higher property crime incidents. The data point out a statistically significant positive correlation between the urbanization rate and property crime incidents in the provinces of Turkey. The frequency of property crimes tends to be higher in the provinces where the urbanization rate is higher.

There is a consistent body of literature on rural and urban differences in crime and delinquency stating that crime rates are generally higher in urban, compared to rural, areas. Crime is heavily concentrated in the central segment of the city (Schmid, 1960; Boggs, 1965). Therefore, the finding of this study on property crimes and urbanization rate is akin to previous research findings in that the provinces with a higher urbanization rate tends to bring about more property crimes.

**Table 11: Bivariate Relationship- Demographic Variables & Violent and Property Crimes**

Demographic Variables	Violent Crime			Property Crimes		
	F	R	Adjusted R <sup>2</sup>	F	R	Adjusted R <sup>2</sup>
Household	187.78**	.475	.224	119.08**	.395	.154
PopulationLg	20.00**	.173	.029	75.99**	.324	.104
YoungRateLg	8.24	.112	.011	6.52	.100	.008
PopDenLg	5.80	.094	.007	101.57**	.369	.135
PoliceRateLg	2.43	.061	.001	0.25	.002	.000
UrbanRate	24.21**	.190	.035	8.14*	.112	.011

\*. Correlation is significant at the 0.05 level (2-tailed)

\*\* . Correlation is significant at the 0.01 level (2-tailed)

#### 5.2.4. Summary of Bivariate Relationships

This section examined the bivariate relationships for all the independent variables on both violent and property crime. Tables 12 and 13 summarize the findings.

The following variables were significantly related to the violent crime rate in the expected direction: family disruption rate and gross domestic product. That is, in the provinces where the divorce rates and gross domestic product are higher, the number of violent crimes is higher. Some variables were statistically significant but in the opposite of the anticipated direction; the variables include literacy, high school graduation rate, unemployment rate, poverty rate, number of households, population and urbanization rate. Young rate, population density, and the number of police and violent crimes do not have a significant correlation at the bivariate level in the provinces of Turkey.

As anticipated, bivariate analyses of property crimes and independent variables (Table 13) indicate that there is a strong positive correlation between family disruption

rate, gross domestic product, population, population density, urbanization rate and property crimes in a province. That is, in the provinces where the family disruption rate, gross domestic product, population, population density, and urbanization rate are higher, the numbers of property crimes are higher. Interestingly, the correlation between property crimes and four variables (literacy, high school graduation rate, poverty rate, and number of households) were statistically significant but in the opposite of the anticipated direction. Unemployment, young rate, and the number of police and property crimes do not have significant correlation at the bivariate level in the provinces of Turkey.

**Table 12: Hypothesis Testing - Violent Crimes and Independent Variables**

	<b>Violent Crimes</b>			
<b>Variables</b>	<b>F</b>	<b><math>\beta</math></b>	<b>Adjusted R<sup>2</sup></b>	<b>Hypothesis Testing (H<sub>1</sub>)</b>
<b>Social Variables</b>				
Literacy	87.67**	.346	.118	Supported- Opposite Direction
HSGR	124.39**	.402	.160	Supported- Opposite Direction
FDR	80.98**	.334	.110	<b>Supported</b>
<b>Economic Variables</b>				
GDP	70.86**	.314	.097	<b>Supported</b>
Unemployment	140.48**	-.423	.117	Supported- Opposite Direction
Poverty Rate	53.06**	-.276	.074	Supported- Opposite Direction
<b>Demographic Variables</b>				
Household	187.78**	-.475	.224	Supported- Opposite Direction
PopulationLg	20.00**	-.173	.027	Supported- Opposite Direction
YoungRateLg	8.24	-.112	.011	Not Supported
PopDenLg	5.80	-.094	.007	Not Supported
PoliceRateLg	2.43	.061	.001	Not Supported
UrbanRate	24.21**	-.190	.035	Supported- Opposite Direction
Number of Cases	648			

\*\* . Correlation is significant at the 0.01 level (2-tailed)



**Table 13: Hypothesis Testing - Property Crimes and Independent Variables**

	<b>Property Crimes</b>			
<b>Variables</b>	<b>F</b>	<b><math>\beta</math></b>	<b>Adjusted R<sup>2</sup></b>	<b>Hypothesis Testing (H<sub>1</sub>)</b>
<b>Social Variables</b>				
Literacy	145.85**	.429	.183	Supported- Opposite Direction
HSGR	133.76**	.414	.177	Supported- Opposite Direction
FDR	22.21**	.182	.032	<b>Supported</b>
<b>Economic Variables</b>				
GDP	301.61**	.564	.317	<b>Supported</b>
Unemployment	8.75	-.116	.012	Not Supported
Poverty Rate	106.43**	-.376	.140	Supported- Opposite Direction
<b>Demographic Variables</b>				
Household	119.08**	-.395	.154	Supported- Opposite Direction
PopulationLg	75.99**	.324	.104	<b>Supported</b>
YoungRateLg	6.52	-.100	.008	Not Supported
PopDenLg	101.57**	.369	.135	<b>Supported</b>
PoliceRateLg	0.25	.020	.001	Not Supported
UrbanRate	8.14*	.112*	.011	<b>Supported</b>
Number of Cases	648			

\*.Correlation is significant at the 0.05 level (2-tailed)

\*\* .Correlation is significant at the 0.01 level (2-tailed)

### 5.3. Multiple Regression Analysis of Violent Crime

This study analyzes the relationship between two dependent and twelve independent variables. However, only independent variables that have significant bivariate correlation with violent crime will be included in the regression analysis based upon earlier bivariate analysis. These variables are high school graduation rate, family disruption rate, gross domestic product, unemployment rate, population, and urbanization rate.

#### 5.3.1. Ratio of cases to IVs

According to Tabachnick and Fidell (2007, p.123), the rule of thumb is  $N \geq 50 + 8m$  ( $50 + 8 * 14 = 120$ ) (where m is the number of IVs) for testing multiple correlation. The number of cases needs to be above the minimum requirement of 120. The number of cases is 648 which is by far above the minimum requirement of 120. It is ensured that there is no missing data from descriptive statistics (Appendix 1).

#### 5.3.2. Outliers

Extreme cases can have too much impact on the regression analysis. SPSS provides Mahalanobis distance for outliers (Tabachnick & Fidell, 2007, p.124). Any Mahalanobis value above the value in the chi-square table with  $df=12$  and ( $\alpha = .001$ ) and  $\chi^2 = 26.2170$  can be considered as an outlier (p.949). Saved Mahalanobis values indicate that 612 cases have the Mahalanobis distance below 26.2170 and they will be included in the regression analysis (Appendix 7).

### **5.3.3. Absence of Multicollinearity and Singularity**

Multicollinearity is explained as two or more IVs being identical or very similar to each other (p.124). When the collinearity diagnostics are run on SPSS, the Collienarity Statistics/ Tolerance column has to be studied carefully to see the low tolerance values because low tolerance values have high Squared Multiple Correlation (SMC) values. Small tolerance is interpreted as large SMC on these tables which also means large similarity because of the formula  $(1-SMC)$ . Literacy (.200), poverty rate (.186), and number of households (.152) tolerance index values are closer to 0 (less than .2, Appendix 5.8), indicating multicollinearity issues, thus they are excluded for the regression analysis. When the collinearity is studied at the Tolerance column none of the variables have lower values which shows that the Multicollinearity assumption is met (Appendix 9).

### **5.3.4. Normality, Linearity, and Homoscedasticity of residuals**

Normality of the data set is already met by transforming the highly skewed variables that have also high kurtosis values before employing bivariate analysis (Appendix 6). According to Tabachnick and Fidell (p.125), linearity and Homoscedasticity assumptions can be checked by running scatterplot in the SPSS multiple regression program. The distribution of the residual in the plot (Appendices 13, 14) does not suggest any violations of these assumptions and residuals are concentrated in the center through the zero line as they are supposed to be.

After satisfying all the assumptions of the regression analysis, linear multiple regression analysis was run in the SPSS statistics software for all 81 provinces of Turkey. Multiple regression analysis shows the relationship between violent crimes and other six

independent variables (high school graduation rate, family disruption rate, gross domestic product, unemployment rate, population, and urbanization rate) that are included in the regression model.

### **5.3.5. Interpretation of Results for Violent Crimes**

Table 14 reports the findings of the multivariate model for violent crimes. As indicated, the strength of the model is  $R=0.642$  and overall explanatory power is 40.7% which is a strong explanation of variance of violent crimes. In this regression analysis, the observed and predicted values of the dependent variable (R) is 0.642. Independent variables that are included in the model reliably predicted the dependent variable because the value of  $F= 70.853$  is significant at the  $p \leq 0.01$  level (.000) reflecting the overall significance of the model (Appendices 10-12).

High school graduation rate, family disruption rate, gross domestic product, and unemployment rate significantly contribute to the model at the  $p \leq 0.01$  level whereas population does not significantly contribute to the model. High school graduation rate, family disruption rate, and gross domestic product contribute to the model in a positive way while unemployment and urbanization rate contributes to the model in a negative way. The unstandardized coefficient or correlation coefficient represents the magnitude of the change in the DV when the given IV changes one unit holding all other else constant. Unstandardized coefficients are standardized to make a comparison between the independent variables. Beta weights are calculated to see the magnitude of contribution of each IV and it allows the researcher to make a comparison between the contributions of each IV.

Family disruption rate has the highest standardized coefficient value meaning that it makes the most contribution to the model explanation or change in the average rate of violent crime in the provinces of Turkey ( $\beta=.303$ ,  $p=.000$ ). Specifically, in the provinces where family disruption rate is higher, the number of violent crimes is higher. This finding is similar to the previous research findings (Free, 1991; Rosen, 1985; Johnson, 1986) that state that family is an important place to educate children. Provinces having a higher divorce rate and higher family disruption rate tend to have more violent crimes than provinces that have lower divorce rates.

Gross domestic product ( $\beta=.260$ ,  $p=.000$ ) is the second significant variable indicating that violent crime rate increases as the economy and gross domestic product increase. The frequency of violent crimes tends to be higher in the provinces where the gross domestic product is higher because gross domestic product per person increases the likelihood of crime positively (Messner, 1982; Glaeser & Sacerdote, 1999; Hagan, 2006; Comertler & Kar, 2007).

The third significant variable is high school graduation rate ( $\beta=.258$ ,  $p=.000$ ) meaning that it makes the third largest contribution to the model explanation of violent crime in the provinces of Turkey. However, the finding is in the opposite direction than originally predicted. The study shows that the frequency of high school graduation rate is greater in the provinces with higher violent crimes. The contribution of the variable unemployment ( $\beta=-.205$ ,  $p=.000$ ) is stronger than the variable urbanization rate ( $\beta=-.156$ ,  $p=.001$ ). The finding of multivariate analysis is consistent with bivariate analysis in that the unemployment and urbanization rates have a negative relationship with violent crime.

That is, the prevalence of violent crimes tends to be higher in the provinces where the urbanization and unemployment rates are lower.

**Table 14: Multiple Regression Results for Violent Crimes**

Variables	Violent Crimes		
Variables	B	$\beta$	Sig.
HSGR	.063	.258**	.000
FDR	1.034	.303**	.000
GDP	.001	.260**	.000
Unemployment	-.403	-.205**	.000
PopulationLg	-.910	-.055	.136
UrbanRate	-.073	-.156**	.001
<b>Number of Cases</b>	612		
<b>Model R</b>	.642		
<b>Model R<sup>2</sup></b>	41.3%		
<b>Adjusted Model R<sup>2</sup></b>	40.7%		

\*\* p ≤ .001

#### 5.4. Multiple Regression Analysis of Property Crime

The data analysis part of the research includes property crimes as a dependent variable and twelve other social, economic, and demographic independent variables. However, only independent variables that have significant bivariate correlation with property crimes will be included in the regression analysis based upon earlier bivariate analysis. These variables are; high school graduation rate, family disruption rate, gross domestic product, population density, and urbanization rate. Multiple regression practical

assumptions have to be controlled before each analysis. Ratio of the cases to IVs is the same as with the violent crimes; therefore, it will not be discussed again in this section.

#### **5.4.1. Outliers**

Extreme cases can have too much impact in the regression analysis. SPSS provides Mahalanobis distance for outliers. Any Mahalanobis value above the value in the chi-square table with  $df=12$  and ( $\alpha=.001$ ), and  $\chi^2 = 26.2170$  can be considered as an outlier value (Tabachnick & Fidell, 2007, p.949). Saved Mahalanobis values indicate that 595 cases out of 648 cases have the Mahalanobis distance below 26.1270 and they are included in the regression analysis (Appendix 15).

#### **5.4.2. Absence of Multicollinearity and Singularity**

Multicollinearity is explained as two or more IVs being identical or very similar to each other (p.124). When the collinearity diagnostics are run on SPSS, the Collienarity Statistics/ Tolerance column has to be studied carefully to see the low tolerance values because low tolerance values have high Squared Multiple Correlation (SMC) values. Small tolerance is interpreted as large SMC on these tables which also means large similarity because of the formula  $(1-SMC)$ . Literacy (.203), poverty rate (.186), and number of households (.162) tolerance index values are closer to 0.2 (Appendix 16), then these variables have a multicollinearity issue and they will be excluded for the regression analysis. After removing literacy, poverty rate, and number of households from the regression analysis, the tolerance index for other variables is increased (Appendix 17).

### **5.4.3. Normality, Linearity, and Homoscedasticity of residuals**

Normality is met before regression analysis of violent crime and when the skewness and kurtosis of the variables is not an issue to perform a regression analysis (Appendix 6). According to Tabachnick and Fidell (p.125), Linearity and Homoscedasticity of residuals can be checked by running scatterplot in the SPSS multiple regression program. The distribution of the residual in the plot (Appendices 21, 22) does not suggest any violations of these assumptions and residuals are concentrated in the center through the zero line as they are supposed to be. The data is ready to perform a regression analysis between property crimes and other independent variables.

Multiple regression analysis shows the relationship between the property crimes and other six independent variables (high school graduation rate, family disruption rate, gross domestic product, population, population density, and urbanization rate). The strength of the model is  $R=0.665$  and the overall explanatory power is 44.2% which is a very powerful explanation of variance in property crime. R square is reduced to 43.6% in the model in proportion with the sample size of 595 (Appendix 15). The ANOVA table displays the variance between the residual and prediction values. The value of  $F= 77.596$  is significant at the  $p \leq 0.01$  level and it also shows the overall significance (.000) of the model.

### **5.4.4. Interpretation of Results for Property Crimes**

Table 15 reports the findings of the multivariate model for property crimes. As indicated, the strength of the model is  $R=0.665$  and the overall explanatory power is 43.6% (Adjusted  $R^2$ ) which is a strong explanation of variance of property crime. In this regression analysis, the observed and predicted value of the dependent variable (R) is



0.665. Independent variables that are included in the model reliably predicted the dependent variable because the value of  $F= 77.596$  is significant at the  $p \leq 0.01$  level (.000) reflecting the overall significance of the model (Appendices 18-20).

Family disruption rate, gross domestic product, population, and urbanization rate significantly contribute to the model at the  $p \leq 0.01$  level whereas high school graduation rate significantly contribute to the model at the  $p < 0.05$  level. Population density does not significantly contribute to the model. High school graduation rate, family disruption rate, gross domestic product, and population contribute to the model in a positive way whilst urbanization rate contributes to the model in a negative way (Appendix 20).

Gross domestic product has the highest standardized value ( $\beta=.496$ ,  $p=.000$ ), meaning that it makes the highest contribution to the model explanation in the average rate of property crimes in the provinces of Turkey. Exclusively, in the provinces where gross domestic product is higher, the number of property crimes is higher. Comertler and Kar (2007) analyzed the relationship between property crimes and income and they emphasize that income is a significant predictor of property crimes at the provincial level in Turkey. Likewise, Kustepeli and Onel (2006) argue that income increases the likelihood of committing crime against property.

The second significant variable is the family disruption rate ( $\beta=.261$ ,  $p=.000$ ) meaning that it makes the second highest contribution to change in the average rate of property crimes in the provinces of Turkey. The composition of family is linked with delinquency, and children who live with only one parent because of family disruption (divorce or separation) are more likely to experience a variety of emotional and behavioral problems, including delinquency, than children from two parent families

(Wells & Rankin, 1991). This relationship is also true for the provinces of Turkey in that provinces with a higher family disruption rate tend to have more property crimes than the provinces that have a lower family disruption rate.

The third significant variable is population ( $\beta=.235$ ,  $p=.000$ ) meaning that it makes the third highest contribution to change in the average rate of property crimes in the provinces of Turkey. These findings are similar to previous research findings (Wirth, 1938; Katzman, 1980; Blau & Blau, 1982; Glaeser & Sacerdote, 1999; Leichenko, 2001), that is, the provinces that are more populated tend to have more property crimes than the provinces that are less populated.

High school graduation rate has a positive value ( $\beta=.143$ ,  $p=.002$ ) meaning that there is a positive relationship with high school graduation rate and property crimes. The frequency of the high school graduation rate is greater in the provinces of Turkey with a higher rate of property crimes. Urbanization rate is the final variable that is related to poverty crimes ( $\beta=-.134$ ,  $p=.001$ ). Particularly, the number of property crime incidents is higher in the provinces where urbanization rate is lower.

**Table 15: Multiple Regression Results for Property Crimes**

Variables	Property Crimes		
Variables	B	$\beta$	Sig.
HSGR	.040	.143*	.002
FDR	1.017	.261**	.000
GDP	.003	.496**	.000
PopulationLg	4.449	.235**	.000
PopDen	.360	.015	.718
UrbanRate	-.070	-.134**	.000
<b>Number of Cases</b>	595		
<b>Model R</b>	.665		
<b>Model R<sup>2</sup></b>	44.2%		
<b>Adjusted Model R<sup>2</sup></b>	43.6%		

\*  $p < .005$ , \*\*  $p \leq .001$

### 5.5. Summary of Multiple Regression Analysis

Tables 16 and 17 provide a summary of findings from this chapter. The results from these analyses present expected, significant, and unpredictable findings.

#### 5.5.1. Violent Crimes

The findings of the final multiple regression for violent crimes (Table 16) reveal strong support that high school graduation rate, family disruption rate and gross domestic product have a considerably significant positive impact on the number of committed violent crimes in the provinces of Turkey. Unemployment rate and urbanization rate have a significant negative relationship with violent crimes in the provinces of Turkey.

However, population did not explain the number of violent crimes in provinces of Turkey for this study.

**Table 16: Summary of Hypotheses Testing- Violent Crimes and Independent Variables (Multiple Regression)**

Dependent Variable	Violent Crime	
	$\beta$	Hypothesis Testing (H <sub>1</sub> )
Provinces with a higher HSGR have lower violent crime incidents.	.258**	Supported-Opposite Direction
Provinces with a higher FDR have higher violent crime incidents.	.303**	<b>Supported</b>
Provinces with a higher GDP have higher violent crime incidents.	.260**	<b>Supported</b>
Provinces with a higher unemployment have higher violent crime incidents	-.205**	Supported-Opposite Direction
Provinces with a higher urbanization rate have higher violent crime incidents.	-.156**	Supported-Opposite Direction
Provinces with a higher population have higher violent crime incidents.	-.056	Not Supported
Number of Cases	612	

\*\*  $p \leq .001$

### 5.5.2. Property Crimes

The findings of the final multiple regression for property crimes (Table 17) reveal strong support that high school graduation rate, family disruption rate, gross domestic product and population in a province have a considerably significant positive impact on the number of committed property crimes in a province in Turkey. Urbanization rate has a considerably significant negative impact on the number of committed property crimes. However, population density did not explain the number of property crimes.

**Table 17: Summary of Hypotheses Testing- Property Crimes and Independent Variables (Multiple Regression)**

Dependent Variable	Violent Crime	
	$\beta$	Hypothesis Testing ( $H_1$ )
Provinces with a higher HSGR have lower violent crime incidents.	.143*	Supported-Opposite Direction
Provinces with a higher FDR have higher violent crime incidents.	.261**	<b>Supported</b>
Provinces with a higher GDP have higher violent crime incidents.	.496**	<b>Supported</b>
Provinces with a higher urbanization rate have higher violent crime incidents.	-.134**	Supported-Opposite Direction
Provinces with a higher population have higher violent crime incidents.	.235**	<b>Supported</b>
Provinces with a higher population density have higher violent crime incidents.	.015	Not Supported
Number of Cases	595	

\* $p < .005$ , \*\*  $p \leq .001$

## 5.6. Discussion of Findings

Crime is such a complex and multi dimensional issue that it is difficult to take a snapshot with limited variables. It has a relationship with social, economic, socioeconomic, demographic, cultural, judicial, and ecological factors. The underlying factors of crime have been explored by different disciplines. However, no eventual explanations on the cause or effect of crime have been agreed on by each discipline or scholars. They rather have focused on several different types of explanations. This study is one of the few studies to explore the relationship between social, economic, and demographic variables and crime incidents in the provinces of Turkey for an eight-year window. This study intends to fill the crime research gap in the country to a small extent.

According to bivariate and multivariate statistical analysis, family disruption rate has a significant direct impact on the violent and property crimes in the provinces. The family composition is related with delinquency. Children who live with only one parent because of family disruption (divorce or separation) are more likely to experience a variety of emotional and behavioral problems, including delinquency, than children from two parent families (Wells & Rankin, 1991). Chamlin and Cochran (1995) emphasize that lower levels of the divorce-marriage ratio decrease the property crimes across the states. Additionally, Laub and Sampson (2000) assert that marriage is one of the trajectories that have a relationship with crime in that the offenders who are married are more likely to desist than the ones who are not married.

Gross domestic product is another variable that contributes to both the violent crime and property crime models. Such findings are similar to prior research. Specifically, Comertler and Kar (2007) analyzed the relationship between property crimes and income and they found that income is a significant predictor of property crime at the provincial level in Turkey. Likewise, Messner and Rosenfeld (1997) explored the relationship between the levels of homicides and economic systems of eighteen developed countries. They argue that economic inequalities against social groups have moderate positive effects on violent crimes (homicide).

Another important finding of this study is the relationship between property crimes and population, population density and urbanization rate. The findings of this study are similar to those of many other research studies (Wirth, 1938; Katzman, 1980; Blau & Blau, 1982; Glaeser & Sacerdote, 1999; Leichenko, 2001) which analyzed crime rates and have found that neighborhoods with a large population usually experience

higher crime rates than smaller, less populated neighborhoods. There is a consistent body of literature on crime and delinquency stating that crime rates are usually higher in urban areas compared to rural areas, and crime is heavily concentrated in the central segment of the city (Schmid, 1960; Boggs, 1965; Braga, 2001).

Interestingly, the current study specifies a significant negative relationship between education (literacy and high school graduation rate) and violent and property crimes in the unexpected direction. The researcher argued that higher school attainment will decrease the crime rates. However, the findings of this study do not support this argument. Literacy rate is the measurement level that is first used in a crime study (as the researcher understands). High school graduation rate in this study is linked to both education and the young population rate as the high school students are the ones between the ages of 15 and 20. The youth between these ages are more likely to be offended or victimized. On the other hand, most of the studies (Koseli, 2006; Basibuyuk, 2008; Nikbay, 2009) that have been conducted in Turkey have measured education as the students and teacher ratio in a province and their researches did not uncover a significant relationship between terror crimes and education.

Prior research measures educational attainment measurement as high school graduation (Greene, Bynum, & Webb, 1984; Thornberry, Moore, & Christenson, 1985; Siegel & Senna, 1988). Most of the differences found in education as related to crime have the variable listed as completed high school or not. However, the obligatory education is eight years through the secondary school and high school education is optional in Turkey. Therefore, this may explain why education as measured by high school graduation rate is not related to crime in the provinces of Turkey. School may

prevent teenagers from being involved in delinquent activities by keeping them away from illegal environments and delinquent peers.

Unemployment was not related to the crime rate in the current study. Some of the prior studies (Nye, Short, & Olson, 1958; Bourguignon, 2001) did not find a significant relationship between employment, income, and crime. Kapuscinski, Braithwaite, and Chapman (1998) assert that many criminologists (Fox, 1978; Gottfredson & Hirschi, 1990; Wilson & Herrnstein, 1985) have doubts about the association between unemployment and crime. They also discuss that studies show a strong positive association between crime and unemployment at the individual level; this positive association gets weaker as the level of analysis increases (macro level), but shows an inconsistent relationship over time. Likewise, Chiricos (1987) examined time-series studies of the unemployment and crime correlation. He found 43 positive relationships while only 22 of them are statistically significant and 26 negative relationships while only five of them are statistically significant. Unemployment and poverty rates in Turkey are on the increase because of rapid urbanization, migration, economic crises, and a high percentage of youth rate. Several studies measured poverty as a Gini coefficient (Cantor & Land, 1985; Messner, 1989) or the total income whereas this study measured poverty as the percentage of people who are provided health care insurance by the government.

Additional findings of the study do not disclose any relationship with number of households, young population rate, and number of police and violent and property crimes. Research indicates that the number of people in a household is an important factor for delinquency and most of the delinquent teenagers came from big families with a large number of people residing in the household (4 or more). The size of the family



can also have a negative relationship of physical abuse towards children and inconsistent discipline in the household (Glueck & Glueck, 1957; West & Farrington, 1973). Cohen and Land (1987) support the idea that adolescents in this case commit crimes more frequently and they are also more likely to be victimized.

Examining the issue of family structure and size from a cultural prospective might shed some light on the importance of family in Turkey. The Turkish family structure is an essential component of the culture and focuses on maintaining a tight intact family structure with an emphasis on not only a primary family unit but extended family unit. Given this, it is plausible that the Turkish family structure may serve as a protective factor in explaining crime. Such protective factors can influence family members away from potential negative outside effects. To illustrate, in the Turkish culture if a family member needs financial assistance the first consideration is to ask the immediate family members for assistance. Whereas, in other cultures the bank is a first line of resource for a loan or monetary assistance Turkey is a non-westernized developing country where family support among family members and the discipline imparted to the adolescent is somewhat different from that which occurs in families in westernized developed countries. Older siblings take care of the younger siblings and keep them away from trouble and delinquent peers.

In terms of the number of police in a province, this study did not find significant covariance between the number of police and violent and property crimes. Thus, the number of police does not necessarily increase or reduce crimes in the provinces of Turkey. The literature on the relationship between the number of police and level of crime is also ambivalent. Eck and Maguire (2000) examined 27 studies that looked at the

effects of police strength on violent crime and they found that only fifteen percent of the studies illustrate that crime lessens as the police numbers increase. Marvell and Moody (1996) argue that the relationship between the number of police and the crime rate is ambivalent.

## CHAPTER 6

### Summary and Conclusion

#### Discussion & Implications & Policy Recommendations

##### Introduction

The present study has established a macro-level examination of reported violent and property crime in the provinces of Turkey between the years of 2000 and 2007. This particular study examined the relationship between the number of reported violent and property crimes to literacy, high school graduation rate, family disruption rate, gross domestic product per capita, unemployment, poverty, number of households, population, percentage of young population, population density, number of police, and urbanization rate. Crime literature suggests correlation between such variables and crime rates.

The study's findings reveal that the underlying factors of violent and property crimes vary to some extent in the provinces of Turkey. Family disruption rate and gross domestic product are two of the variables that are significantly contributing to the model for both violent crime and property crime. Family disruption rate is the strongest predictor of violent crimes while gross domestic product is the strongest predictor of property crimes according to multivariate analysis. According to multivariate analysis of violent crimes, high school graduation rate, unemployment rate, and urbanization rate are strong predictors of violent crime but in the opposite of the anticipated direction while population does not significantly contribute to the model. According to multivariate analysis of property crimes, population is a strong predictor of property crimes at the

macro level in the provinces of Turkey. High school graduation rate and urbanization rate are strong predictors of property crimes but opposite of the anticipated direction while population density does not significantly contribute to the model.

This chapter provides a comprehensive discussion on policy implications, limitations of the study and suggestions for future research.

### **6.1. Policy Implications**

One of the purposes of this study is to assist decision-makers in developing policies to reveal the underlying factors of violent and property crimes. The current research at hand provides some important gateways for policymakers and practitioners. These findings illustrate that policy decisions on crime are important in combating crime and criminals.

This study shows that family disruption rate is related primarily to higher violent and poverty crime rates. The family disruption rate has been increasing during recent years in Turkey. According to the Turkish Statistical Institute (TUIK), the total number of divorces increased from 34,382 in 2000 to 93,489 in 2006, nearly tripling in six years. Family plays an important role in socializing the children through love, supervision, and discipline, and family prepares children for societal life. Family structure is an important variable related to crime, absence of one parent weakens family functioning as individual, and aggregate level theories suggest. The father's role in a family serves as a key contributor to the quality of the family. The research on hand suggests that fathers' behaviors may serve either as a risk factor or as a protective factor because fathers who engage in antisocial behavior patterns offer their children, particularly their sons, a deviant role model to imitate (Carr, 1998).

A possible contributor to family disruption is domestic violence. The victim of domestic violence may suffer from physical and emotional pain, live under fear of being harmed, and confront physical and emotional dangers including injuries, mental disorders, and even loss of life if not handled properly (Straus, 1991). For some, domestic violence has been perceived as a normal behavior in the family, one which women should expect when they marry within the rules of monogamous family design (Erez, 2001).

Turkish government should work on policy strategies to decrease the family disruption rate. A criminal justice-based policy recommendation involves the use of domestic violence arrest policies. Currently, domestic violence in Turkey is perceived as moderate use of force by husbands to compel wives to “know her place.” The justice system stayed away from domestic violence cases unless serious physical harm occurred.

The Turkish government should evaluate domestic violence interventions by taking into consideration a better understanding of culture, violence perpetration, and victimization. A mandatory or discretionary arrest policy should be implemented in the country. In mandatory arrest, the police should be limited with time, noticeable injury, and felony cases. Discretionary arrest should be enforced in conjunction with other criminal justice and community-based policies. Before making an arrest, courts may issue protection orders for an offender to keep him away from the victim; or the domestic violence victim should be placed in a domestic violence shelter. Sherman and Berk (1984) concluded that the offending and attempted domestic violence rate was reduced by 50 percent when a suspect was arrested.

As a civil remedy, government should find innovative policies to increase the schooling of girls especially in the rural parts of the country and provide additional

employment opportunities to the women. According to official statistics (2006), 20.5 percent of urban women are unemployed, while total urban unemployment is 11.7 percent. The social status of women in Turkey varies like that of other women in most countries. On one hand, it is possible for women to be in top-level administrative positions, but on the other hand, they can have difficulty in gaining access to education, health and employment resources. The literacy rate and schooling of girls is much lower than expected or planned (Bolak, 1997).

The current study indicates that gross domestic product in each province is related to violent and property crimes. The fair distribution of governmental resources to the provinces may be a key factor to combating violent and property crimes. Messner (1982) tested a cross-sectional data to examine the relation between equality and violent crime (homicide) for 50 nations and he found that the equality variable has consistent support in the model. Therefore, it is important to develop governmental policies to decrease income inequalities among provinces. The Turkish government can provide incentives (tax deduction, providing land) to the business owners and private industries to move their investments to the rural parts of the country and these industries can easily find cheap labor and accommodation. This is essential because the gross domestic product is linked with employment and education. The unemployment rate in Turkey is enlarging because of rapid increase in migration, urbanization, and population in metropolitan cities as three big provinces of Turkey (Istanbul, Ankara, Izmir) house nearly one fourth of the population. These factors are diminishing job market and labor force participation rate in these provinces.

Likewise, the educational system within the provinces needs improvement. Currently, the required minimum education in Turkey is 8 years, up to secondary school, which is equivalent to the completion of middle school or eight grade in the United States. A secondary school education is not enough to get a good and well-paid job; a high school education should be the minimum required in Turkey. Therefore, the Turkish government should consider a new education policy that requires a high school education and emphasizes the importance of a college education. According to The Council of Higher Education (YOK), as of 2009, there are 141 universities in Turkey: 97 are public universities and 44 are private (foundation) universities. The government officials and directors of higher education are discussing the possible ways of opening new public or private universities throughout the country. This discussion should encourage and provide incentives to those private sectors to open such universities in the rural parts of the country rather than in metropolitan cities. Opening new public and private universities in the certain regional centers such as Bursa in Marmara region, Kayseri in Anatolia Region and Gaziantep and Sanliurfa in Southeastern Region would enhance the economy, societal life and amenities in those areas. These regional universities can specialize and promote specific industries such as a university specializing in textile may be inaugurated in Bursa and another university promoting agricultural sector may be opened in Sanliurfa.

This study also suggests that higher population, population density, and urbanization rate of provinces is related to a high number of property incidents. Policies should address practical solutions to decrease the high number of population in urban areas, and migration from rural areas to urban areas. People should be encouraged to

migrate back to their towns and villages by the implementation of new policies and the transformation of villages and towns into attractive places of residence. Reverse migration (migration from urban areas to the rural part of the country) is hard and people are reluctant to migrate back to where they came from. However, this may be possible to some extent by bringing new jobs and amenities, and enhancing lifestyle in these rural locations. The government should initiate new policies for the people who have been forced to leave their villages because of terrorism and hard economic conditions to encourage them to migrate back to their villages. The government should provide incentives at a very low or no cost (credit, build their houses, provide land for farming) to those who want to return to their villages.

This study also suggests that the number of police in a province is not an important factor in the fight against violent and property crimes in Turkey. One of the possible explanations of this insignificant relation may be because of the fact that Turkey has a national police force and having a national police force allows the management to deploy the officers more easily to any particular provinces where any increases in crime occur across the country. However, the Turkish National Police Personnel Department should develop new policies to deploy the police forces throughout the country not only for the number of crimes but also for other economic and social dynamics. Moreover, crime data in Turkey should be enhanced by implementing incident based crime-reporting system, which provides more accurate picture of the reported crimes instead of hierarchical crime data. Clearance rate of the specific crimes should be also disseminated in a timely manner, which is an important measurement for police performance and



success. However, it is very difficult to obtain clearance rates fore specific crimes in the provinces especially when it is low.

## **6.2. Limitations of the study**

Limitations exist in every study and acknowledging them allows the researcher to interpret the findings within proper parameters. This study is no exception and some of the limitations of this study are described below:

- This study uses secondary data which were gathered by different governmental departments as discussed in Chapter Four. Reliability and validity of the data depends on the accuracy of official statistics collected by these agencies. One of the most important limitations of secondary data is that the data is not collected by this specific research; rather it has been used on the base of availability to the researcher.
- This study is not designed to analyze the causality. It is a retrospective and trend study. Therefore, it is not possible to identify the reciprocal order and causality of the variables. Instead, it indicates the relationship between the dependent variables and the independent variables due to the nature of the statistical analysis and research design.
- This study provides a macro-analysis of violent and property crime in Turkey; the findings of this study may not be generalized to other types of crimes (terror, white-color crimes) and it does not specify the relationship between each individual crime type (homicide, aggravated assault, theft, robbery) and independent variables.

- This study analyzed the violent and property crimes at the aggregate level (provincial) in Turkey. Therefore, it may not be appropriate to generalize the findings of the study to the smaller units such as towns, municipalities, and neighborhoods.
- Crime is multidimensional (social, economical, geographical, demographical, cultural, political, etc.) and dynamic in nature. A province is not a static unit but a dynamic unit over time, and it is quite impossible to capture all of the changes in a province or in a community by a limited number of variables. Therefore, the researcher does not claim that the variables included in this study are the only predictors of crime.
- This study supposes that offenders commit a crime in a province where they live but some offenders may commit a crime in provinces other than the ones they inhabit; or metropolitan provinces may be more attractive to commit a crime in than the province where they reside.
- Crime is measured by the TNP using a hierarchical crime measurement model in Turkey. Therefore, the actual number of crime incidents may be different from the reported number of crime incidents. An incident based crime measurement model may be implemented to have the actual number of crime incidents. Moreover, the success of police is usually perceived as the low number of crime rates in the provinces of Turkey. Police directors/ police may be willing to underreport some of the crime incidents.

### 6.3. Suggestions for Future Research

Discussions of crime in Turkey center on terrorism issues (Yayla, 2005; Teymur, 2006; Koseli, 2006; Smith & Teymur, 2008) and few studies have examined non-terrorism criminality in Turkey. This study examined and identified correlations between violent and property crime and social, demographic and economic issues over time. Such a focus must continue in an attempt to understand and identify factors that influence crime at the macro level.

The current study did not include any political or ideological variables across provinces of Turkey. One avenue for future research may be to analyze if the variation of political shift has an impact on the provincial crime rates. Future research may also analyze some other factors (judicial, deterrent, ecological, political) that are related to crime. Future research should also focus on the specific type of crime rather than on a macro analysis of violent and property crime because different types of crime have different dynamics in nature.

Future research can study the offender characteristics at the individual level because crime data at this level can be more concrete and precise. Future researchers may collect their own data instead of using secondary data (interview, survey) with the offenders to reveal the underlying factors of why they commit crime and why they cannot desist from committing crime. This survey would use a sample of the population in each province of the country or a systematic sampling in the provinces. Using alternative measurement methods may increase the reliability and validity of the data.

Future research should consider using smaller units of analysis (neighborhood) because this would increase the number of cases for the analysis and there may be a large

variation in social and economic indicators in a province. Unfortunately, most of the data (TUIK or TNP) is collected at the provincial level in Turkey and it is difficult to get the neighborhood-level data.

Empirical studies show that certain criminals specialize in offending, such as violent and nonviolent criminals. Legislators and practitioners, therefore, doubtlessly believe that criminals who start their criminal carriers at their early ages are more likely to specialize in certain crimes because of assuming that they have tendency for committing certain crimes, and with repeated acts they become experts. This general belief has shaped policies, police investigation techniques, criminal profiling, and crime analyzing strategies. However, no research has been undertaken in Turkey on crime specification and recidivism issues. Therefore, future research may analyze the crime specification and recidivism in Turkey because knowing the characteristics and needs of offenders may be very useful to offer any policies and solutions to fight against crime and criminals.

As discussed in the text, one of the problems for the researchers in Turkey is unavailability of crime data. Examination of crime trends in Turkey is rather a new practice due to unavailability of the information to the larger research community. Police should display its crime data online for the neighborhoods, towns, and provinces so that researchers can conduct research and inhabitants of these places may know the crime rates in their areas. The National Victimization Survey in Turkey should be initiated as soon as possible and should be implemented once every two years to collect the data on victimization. This survey can be a primary source of information on crime victimization figures of population in the country; and the results of this survey may offer a great

opportunity to measure the current crime rates on all types of crimes in Turkey. Thus, researchers can compare the official crime data with victimization data and examine if any discrepancy occurs between these two sources. This will also improve the credibility and reliability of official crime figures. There is now available only police data on crime rates and this is difficult to obtain.

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## APPENDICES

### Appendix 1: Descriptive Statistics of Variables & Mean& Std. Deviation & Skewness & Kurtosis

#### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ViolentIndex	648	76.11	2035.19	455.3188	278.87402	1.825	.096	4.896	.192
PropertyIndex	648	47.73	2805.31	342.7730	304.38647	2.867	.096	12.284	.192
Literacy	648	65.8	95.8	87.055	6.7130	-1.248	.096	.719	.192
HSGR	648	27	156	88.02	24.107	-.165	.096	-.156	.192
FDR	648	5.35	16.89	8.6431	1.79080	.944	.096	1.490	.192
GDP	648	568	9899	2553.16	1336.801	1.441	.096	3.719	.192
Unemployment	648	3.22	18.91	7.7984	2.97106	.870	.096	.261	.192
PovertyRate	648	2.53	56.35	18.6748	13.18270	1.006	.096	.116	.192
Household	648	3.09	9.76	4.7915	1.30269	1.486	.096	1.724	.192
Population	648	76609	12573836	854385.52	1365640.150	5.936	.096	42.008	.192
YoungRate	648	6.20	25.84	10.7641	2.35349	2.138	.096	8.518	.192
PopDen	648	11.31	2419.91	107.9426	240.49504	8.022	.096	67.475	.192
UrbanRate	648	25.99	89.88	59.9123	12.45723	.077	.096	.017	.192
PoliceRate	648	9.49	118.50	24.9968	12.27547	4.721	.096	31.158	.192
Valid N (listwise)	648								

## Appendix 2: Descriptive Statistics of Dependent Variables

		Statistics	
		ViolentIndex	PropertyIndex
N	Valid	648	648
	Missing	0	0
Mean		455.3188	342.7730
Median		375.4956	242.9712
Std. Deviation		278.87402	304.38647
Variance		77770.720	92651.126
Range		1959.07	2757.58
Minimum		76.11	47.73
Maximum		2035.19	2805.31

## Appendix 3: Descriptive Statistics for Social Variables

		Statistics		
		Literacy	HSGR	FDR
N	Valid	648	648	648
	Missing	0	0	0
Mean		87.055	88.02	8.6431
Median		89.100	88.83	8.3200
Std. Deviation		6.7130	24.107	1.79080
Variance		45.065	581.163	3.207
Range		30.0	129	11.54
Minimum		65.8	27	5.35
Maximum		95.8	156	16.89

#### Appendix 4: Descriptive Statistics for Economic Variables

		Statistics		
		GDP	Unemployment	PovertyRate
N	Valid	648	648	648
	Missing	0	0	0
Mean		2553.16	7.7984	18.6748
Median		2304.82	7.1081	15.0108
Std. Deviation		1336.801	2.97106	13.18270
Variance		1787036.879	8.827	173.784
Range		9331	15.70	53.83
Minimum		568	3.22	2.53
Maximum		9899	18.91	56.35

#### Appendix 5: Descriptive Statistics for Demographic Variables

		Statistics					
		Household	Population	YoungRate	PopDen	UrbanRate	PoliceRate
N	Valid	648	648	648	648	648	648
	Missing	0	0	0	0	0	0
Mean		4.7915	854385.52	10.7641	107.9426	59.9123	24.9968
Median		4.4250	492785.50	10.3972	60.5897	58.9657	22.9965
Std. Deviation		1.30269	1365640.150	2.35349	240.49504	12.45723	12.27547
Variance		1.697	1.865E12	5.539	57837.864	155.183	150.687
Range		6.67	12497227	19.64	2408.60	63.89	109.01
Minimum		3.09	76609	6.20	11.31	25.99	9.49
Maximum		9.76	12573836	25.84	2419.91	89.88	118.50

## Appendix 6: Descriptive Statistics of Transformed Variables & Mean& Std. Deviation & Skewness & Kurtosis

### Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ViolentIndexSqrt	648	8.72	45.11	20.5092	5.89436	.938	.096	1.013	.192
PropertyIndexSqrt	648	6.91	52.97	17.2618	6.69871	1.432	.096	2.778	.192
PopDenLg	648	1.05	3.38	1.8313	.33389	1.200	.096	3.772	.192
YoungRateLg	648	.79	1.41	1.0232	.08446	.903	.096	2.270	.192
PoliceRateLg	648	.98	2.07	1.3674	.15023	1.092	.096	4.030	.192
PopulationLg	648	4.88	7.10	5.7255	.38494	.533	.096	.728	.192
Valid N (listwise)	648								

## Appendix 7: Descriptive Statistics of ViolentIndexSqrt

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
ViolentIndexSqrt	612	9.45	45.11	20.5160	5.82789
Valid N (listwise)	612				

## Appendix 8: Descriptive Statistics of Collienarity Statistics/ Tolerance with all IVs

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	33.438	6.651		5.027	.000		
	Literacy	-.112	.060	-.127	-1.867	.062	.200	5.010
	HSGR	.040	.013	.162	3.023	.003	.321	3.112
	FDR	.967	.120	.284	8.040	.000	.745	1.342
	GDP	.001	.000	.268	5.837	.000	.439	2.279
	Unemployment	-.207	.108	-.105	-1.919	.055	.307	3.256
	PovertyRate	.078	.031	.175	2.471	.014	.186	5.382
	Household	-2.031	.364	-.435	-5.573	.000	.152	6.582
	UrbanRate	-.089	.022	-.190	-4.023	.000	.417	2.401
	PopulationLg	-.556	.626	-.034	-.889	.374	.638	1.567

a. Dependent Variable: ViolentIndexSqrt

## Appendix 9: Descriptive Statistics of Collienarity Statistics/ Tolerance with IVs that are included in the regression analysis

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	15.573	3.462		4.498	.000		
	HSGR	.063	.011	.258	5.630	.000	.464	2.156
	FDR	1.034	.112	.303	9.191	.000	.892	1.121
	GDP	.001	.000	.260	5.790	.000	.480	2.083
	Unemployment	-.403	.086	-.205	-4.696	.000	.509	1.965
	UrbanRate	-.073	.022	-.156	-3.310	.001	.434	2.302
	PopulationLg	-.910	.610	-.055	-1.491	.136	.702	1.424

a. Dependent Variable: ViolentIndexSqrt

## Appendix 10-12: Regression Results for Violent Crime

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642 <sup>a</sup>	.413	.407	4.48837

a. Predictors: (Constant), PopulationLg, HSGR, FDR, Unemployment, GDP, UrbanRate

### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8564.173	6	1427.362	70.853	.000 <sup>a</sup>
	Residual	12188.027	605	20.145		
	Total	20752.201	611			

a. Predictors: (Constant), PopulationLg, HSGR, FDR, Unemployment, GDP, UrbanRate

b. Dependent Variable: ViolentIndexSqrt

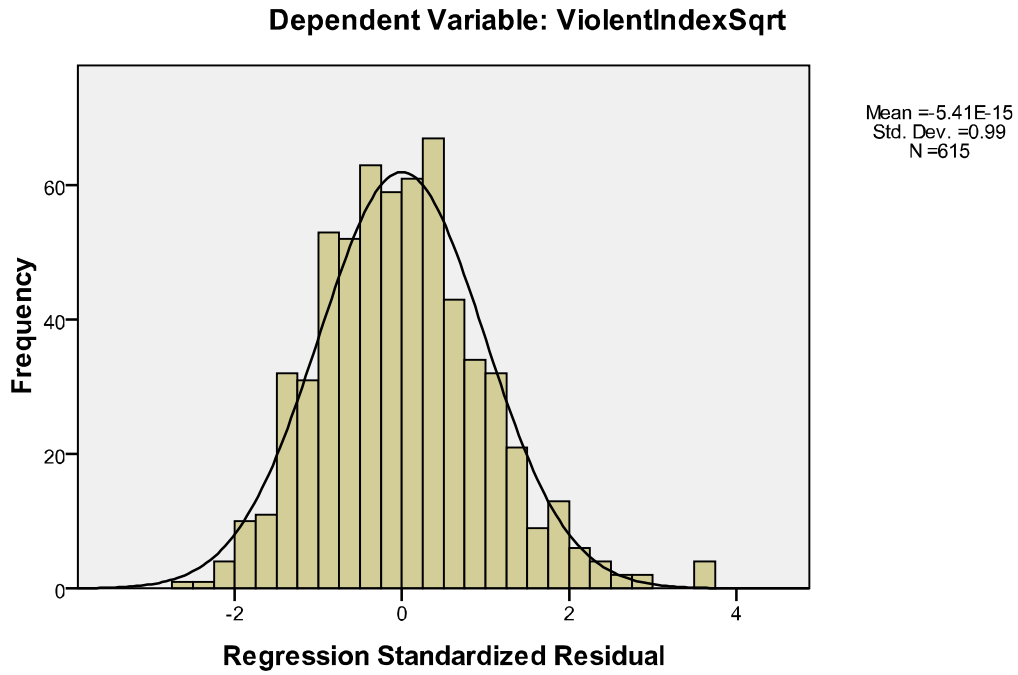
### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	Collinearity Statistics	
		B	Std. Error	Beta	t		Tolerance	VIF
1	(Constant)	15.573	3.462		4.498	.000		
	HSGR	.063	.011	.258	5.630	.000	.464	2.156
	FDR	1.034	.112	.303	9.191	.000	.892	1.121
	GDP	.001	.000	.260	5.790	.000	.480	2.083
	Unemployment	-.403	.086	-.205	-4.696	.000	.509	1.965
	UrbanRate	-.073	.022	-.156	-3.310	.001	.434	2.302
	PopulationLg	-.910	.610	-.055	-1.491	.136	.702	1.424

a. Dependent Variable: ViolentIndexSqrt

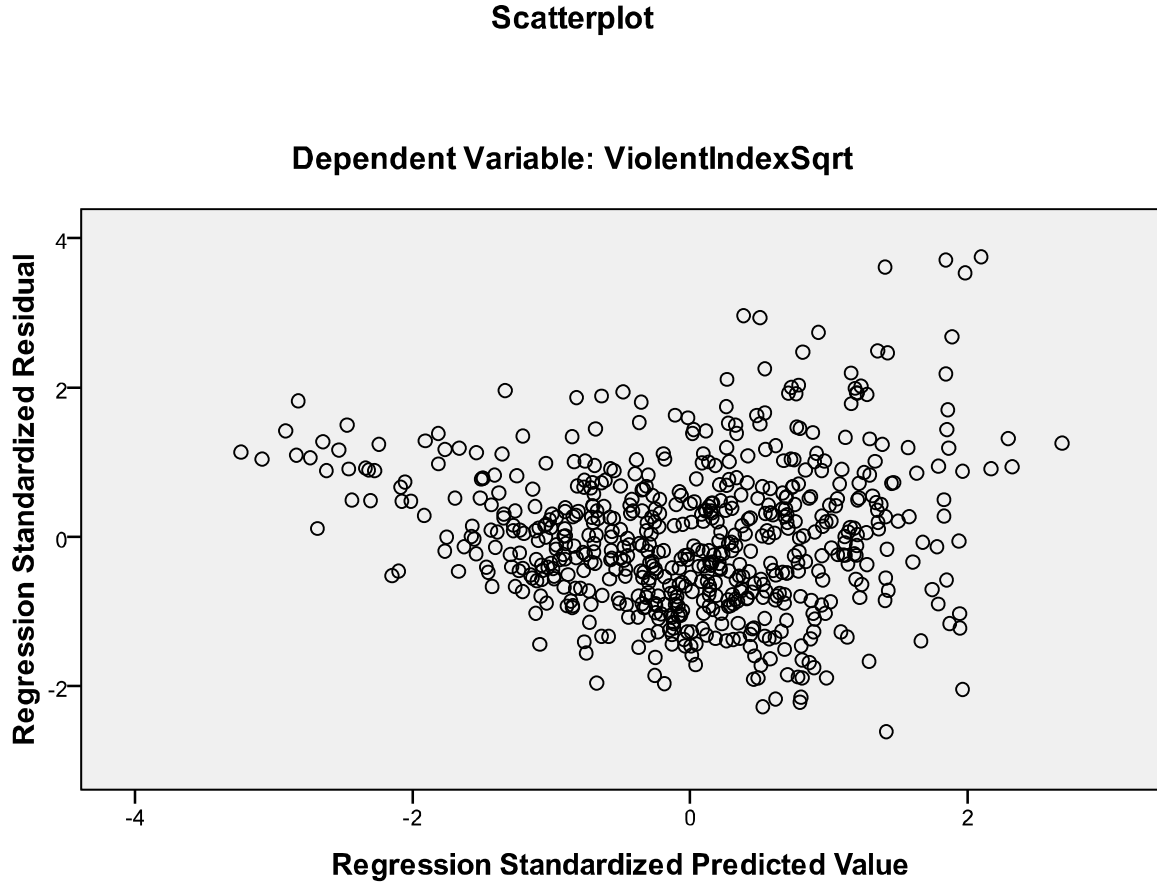
## Appendix 13: Histogram for ViolentIndexSqrt

### Histogram





## Appendix 14: Scatterplot for ViolentIndexSqrt



## Appendix 15: Descriptive Statistics of PropertyIndexSqrt

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
PropertyIndexSqrt	595	6.91	52.97	17.1939	6.53780
Valid N (listwise)	595				

**Appendix 16: Descriptive Statistics of Collienarity Statistics/ Tolerance with  
all IVs**

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-26.138	7.831		-3.338	.001		
	Literacy	.053	.069	.052	.765	.445	.203	4.929
	HSGR	.026	.015	.093	1.711	.088	.323	3.100
	FDR	1.011	.139	.260	7.279	.000	.743	1.345
	PovertyRate	.044	.036	.087	1.220	.223	.186	5.386
	GDP	.003	.000	.475	10.107	.000	.429	2.331
	UrbanRate	-.064	.021	-.123	-3.002	.003	.568	1.759
	Household	-.574	.420	-.105	-1.366	.172	.162	6.182
	PopulationLg	4.409	.858	.233	5.139	.000	.462	2.163
	PopDenLg	.826	1.034	.034	.799	.425	.513	1.948

a. Dependent Variable: PropertyIndexSqrt

**Appendix 17: Descriptive Statistics of Collienarity Statistics/ Tolerance with IVs  
that are included in the regression analysis**

Coefficients <sup>a</sup>								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-24.067	4.074		-5.908	.000		
	HSGR	.040	.013	.143	3.177	.002	.469	2.132
	FDR	1.017	.127	.261	8.003	.000	.890	1.123
	GDP	.003	.000	.496	11.501	.000	.510	1.962
	UrbanRate	-.070	.020	-.134	-3.499	.001	.648	1.542
	PopulationLg	4.449	.850	.235	5.235	.000	.472	2.119
	PopDenLg	.360	.996	.015	.361	.718	.553	1.807

a. Dependent Variable: PropertyIndexSqrt

## Appendix 18-20: Regression Results for Property Crime

### Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.665 <sup>a</sup>	.442	.436	4.90898

a. Predictors: (Constant), UrbanRate, FDR, PopDen, HSGR, PopulationLg, GDP

b. Dependent Variable: PropertyIndexSqrt

### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11219.574	6	1869.929	77.596	.000 <sup>a</sup>
	Residual	14169.694	588	24.098		
	Total	25389.268	594			

a. Predictors: (Constant), UrbanRate, FDR, PopDen, HSGR, PopulationLg, GDP

b. Dependent Variable: PropertyIndexSqrt

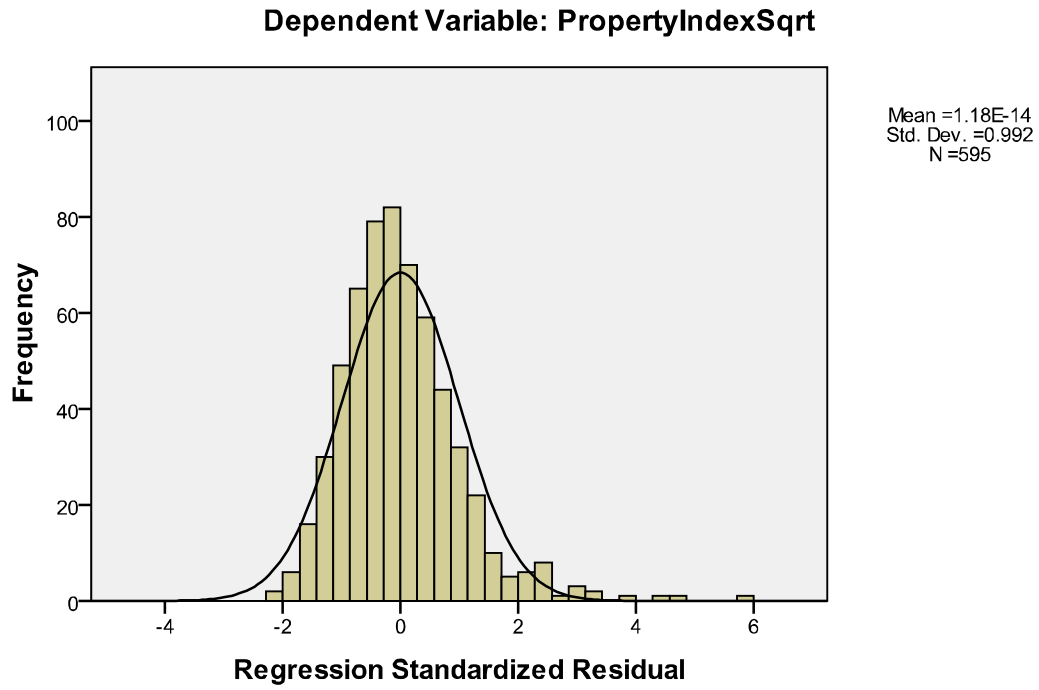
### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-24.067	4.074		-5.908	.000		
	HSGR	.040	.013	.143	3.177	.002	.469	2.132
	FDR	1.017	.127	.261	8.003	.000	.890	1.123
	GDP	.003	.000	.496	11.501	.000	.510	1.962
	UrbanRate	-.070	.020	-.134	-3.499	.001	.648	1.542
	PopulationLg	4.449	.850	.235	5.235	.000	.472	2.119
	PopDenLg	.360	.996	.015	.361	.718	.553	1.807

a. Dependent Variable: PropertyIndexSqrt

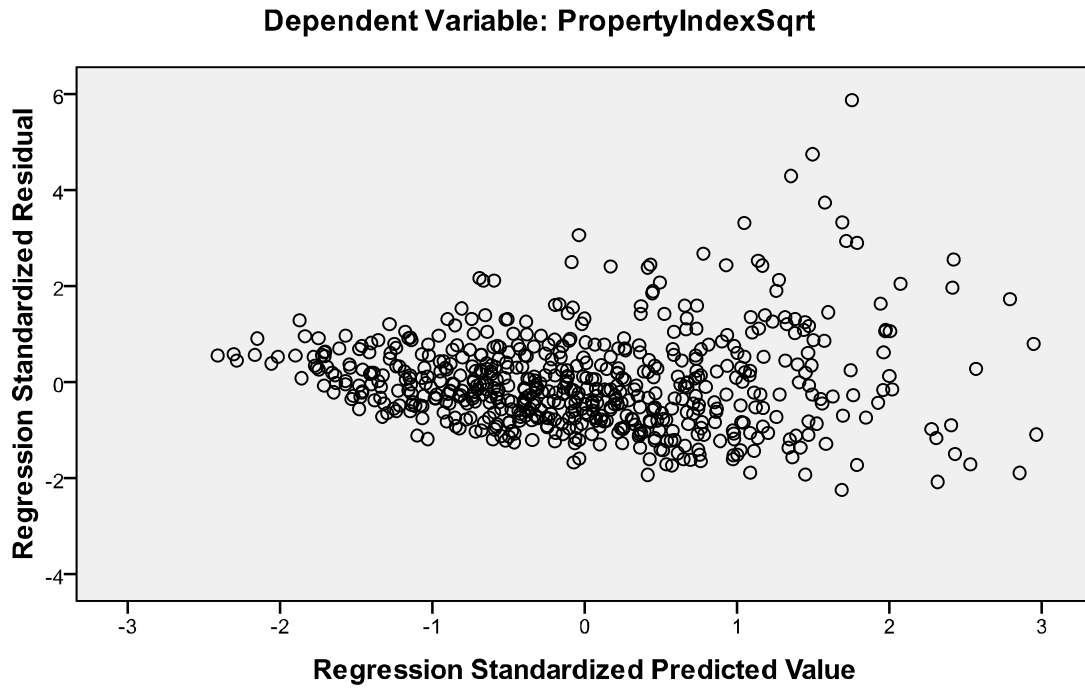
## Appendix 21: Histogram for PropertyIndexSqrt

### Histogram



## Appendix 22: Scatterplot for PropertyIndexSqrt

### Scatterplot



## VITA

Ekrem Mus was born in Yozgat, Turkey in 1973 and he is a Turkish citizen. He graduated from Izmir Police College in 1991. He holds a B.A. degree from the Turkish National Police Academy. Following to graduation from Police Academy, he started to work in the Istanbul Police Department, Forensic Science Unit. He is currently serving as a Superintendent. After six years of service in Istanbul, he joined the UN Peacekeeping Mission in Bosnia and Herzegovina (BiH) and served there in different locations between 2001 and 2003. After completing his mission, he was deployed to Kayseri Forensic Science Unit where he currently works for.

In August 2004, he had a full scholarship from Turkish Ministry of Interior for graduate education in the United States. He had his M.S. degree from Criminal Justice Program at the Virginia Commonwealth University in 2006. Mr. Mus completed the doctorate of philosophy at the Center for Public Policy and Administration in Wilder School of Government and Public Affairs, Virginia Commonwealth University in 2010. He is interested in continuing his research of crime analysis, policing and public policy.