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Other Contributor(s)	University of Hong Kong
Author(s)	Choi, Sin-ying; 蔡倩瑩
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THE UNIVERSITY OF HONG KONG

CRIME RATE AND SOCIO-ECONOMIC FACTORS

**A DISSERTATION SUBMITTED TO
THE FACULTY OF ARCHITECTURE
IN CANDIDACY FOR THE DEGREE OF
BACHELOR OF SCIENCE IN SURVEYING**

DEPARTMENT OF REAL ESTATE AND CONSTRUCTION

BY

CHOI SIN YING

HONG KONG

APRIL 2007

DECLARATION

I declare that this dissertation represents my own work, except where due acknowledgment is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signature : _____

Name : _____

Date : _____

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ABSTRACT

This dissertation is a study on the relationship between crime rate and socio-economic factors (i.e. poverty, income inequality, age, education and unemployment) in Hong Kong. Although there are many such studies on crime in foreign countries, similar study in Hong Kong is rare. This dissertation examines if any functional relationship could be established by regression analysis and how this can be related to new town development.

This dissertation uses disaggregate data from the Hong Kong Police Force (previously known as the Royal Hong Kong Police Force) - the number of “other robberies”, “burglary with breaking”, “other burglary” and “other miscellaneous theft” for the period 1986 to 2001. The idea of using police data in Miss Li’s doctoral research came from Professor Lai Lawrence W. C. Lai who was indeed in the Royal Hong Kong Police Force in the early 1980s and was a Town Planner in Town Planning Board in the late 1980s. The police and district boundaries were provided by Miss Christine,

S. P. Li¹ as part of her research.

Hypotheses were set up to propose different relationships between crime rates and socio-economic factors. These hypotheses were tested by multiple linear regression.

The outcomes of regression were not as perfect as expected since different crimes correlated with certain factors but not others. This may be due to the nature of specific crime. The results are summarized as below:

Hypothesis	Results
Median household income has a negative effect on the property crime rates.	It has only a slight negative effect on theft rate while no effect on other type of property crimes.
Inequality has a positive effect on property crime rates.	It also has only little effect on robberies but no effect on other type of property crimes.
Education has a negative effect on property crime rates.	It accounts for a negative effect on robberies and theft rates but not the other two types of property crimes.

¹ Miss Li is a doctoral student of Professor Lai.

<p>A higher percentage of juvenile in the population will bring a positive effect on property crime rates.</p>	<p>Juvenile percentages (9 – 14 and 15 – 19) have certain effects on robberies and “burglary with breaking” but nearly no effect on other two types of property crimes.</p>
<p>A higher unemployment rate will increase the property crime rate.</p>	<p>Unemployment rate affect the robberies and “burglary without breaking” rates but not the other two types of property crimes.</p>

CHAPTER 1

INTRODUCTION

Background

The relationship between Hong Kong's property crime rate and socio-economic factors has long been discussed. Buonanno (2003) said that socio-economic factors could be defined as poverty, social exclusion, wage and income inequality, age, cultural and family background, level of education, and other economic and social factors. In this study, I shall focus on poverty, income inequality, education, age, and unemployment.

Generally, economists say that crime produces a negative externality to the society by placing social costs on it. Therefore, if social and economic policies could be used to tackle and prevent crime, costs related to crime would be reduced. Indeed, if better crime prevention is carried out, the police expenditures could help reduce its social costs. In 2006, the expenditure for the Hong Kong

Police Force¹ was 10,912.7 million Hong Kong Dollars, which accounted for 4.7% of total government expenditures (233,071M²).

This study will focus on property crimes in Hong Kong by analyzing police data from 1986 to 2001 for the Tuen Mun and Shatin new towns. According to Allan and Steffensmeier (1989), property crimes refer to robbery, burglary, larceny, and authentic theft. In this dissertation, I shall focus on robbery, burglary, and thefts. My overall approach follows that of Miss Christine S.P. Li, who was a doctoral student of Professor Lawrence W.C. Lai and conducting a research on the crime and high-density urban living.

Since there has been no other similar work in Hong Kong, another major objective of this study is to testify the similarity of Hong Kong's case to previous foreign experiences. The outcome of this dissertation may also serve as a short review of new town development.

¹ This was previously known as the Royal Hong Kong Police Force.

² On the date (25th February, 2007) I accessed this figure, it was still subject to audit by the Director of Audit.

Objectives of the study

1. To carry out an original study on the functional relationship between property crimes and socio-economic factors in Hong Kong, following the methodology of Ms. Li and the advice of Professor Lai.
2. To test the methodology of the magnitude and significance of the functional relationship.
3. To briefly review how new town planning has affected the factors studied and how the problems can be tackled.

Significance of the study

There have been long academic discussions over the relationship between youth profiles and poverty, juvenile delinquency, planning, etc. However, there has been no study on the relationship between property crime rates and socio-economic factors in Hong Kong. If such a relationship exists, the government could have implemented better policies in its town planning projects to prevent and solve problems before they occur or become too large.

In fact, the new town policy in Hong Kong was adopted to provide a better living environment by moving people away from its old and congested urban areas for years. Chan (1998) argued that the planning and development of Tuen Mun was incomprehensive and had led to a high rate of juvenile delinquency in that district. Therefore, by analyzing the relationship between property crime rates and socio-economic factors, I wish to identify strategies that may help solve these problems.

Organization of the dissertation

This dissertation consists of five chapters. Chapter One is an introduction to the background, objectives, and organization of this study. Chapter Two is a literature review examining the theories behind the relationship between property crime rates and socio-economic factors. Also, I will present the results of previous studies in this chapter. Chapter Three presents the hypotheses and methodologies for this study. Chapter Four presents the results of the regression exercised, which I will

analyze and discuss. Chapter Five concludes the study, discusses its limitations, and provides a scope for further study.

Chapter Two

LITERATURE REVIEW

Background

Before Gary Becker's seminal paper (Becker 1968) of criminal choice was traditionally understood as outcomes of mental illness or bad attitudes (Buonanno 2003). In that 1968 paper, Becker established the first model of criminal choice.

Indeed, Becker was inspired by Fleisher (1967), who wrote the paper "The Effect of Unemployment on Juvenile Delinquency". Fleisher studied the economic determinant of individual's criminal behaviour. He assumed that individuals are calculating, choice-making individuals, and their decisions to engage in illegitimate behaviour could be regarded in terms of demand-and-supply (opportunities) relationship involving costs and benefits. Although Fleisher's research did not aim at developing a model of criminal choice, it stimulated Becker to write his 1968 paper.

Followed the economist's usual analysis of choice, the choice of committing a crime or not is modeled as the result of an economic decision by rational agents. The agents will maximize his benefits by comparing the costs and benefits of legal and illegal activities, the probability of being arrested and punished and the expected return from crime:

"The approach ... assumes that a person commits an offense if the expected utility to him exceeds the utility he could get by using his time and other resources at other activities. Some persons become 'criminals,' therefore, not because their basic motivation differs from that of other persons, but because their benefits and costs differ." (Becker 1968:176)

Furthermore, Becker shows that if there is a rise in the returns from legal activities, the incentive to engage in illegitimate activities would be reduced.

According to Buonanno (2003), the economics of crime interacted

with a number of variables, poverty, social exclusion, wage and income inequality, cultural and family background, level of education and other economic and social factors that may affect an individual's propensity to commit crimes such as cultural characteristics, age and sex.

There have been a lot of studies on the crime and its determinants since the release of Becker's model. For example, Patterson (1991) showed that Burglary rates were significantly higher in areas with larger youthful population and higher levels of family disorganization. Allan (1989) showed that the unemployment rate has a positive effect on delinquency rates.

As there are really numerous factors related to crime, this dissertation will only focus on the relationship between property crimes and poverty, education, juvenile and unemployment rate.

Poverty

There have been many findings showing a positive relationship between absolute poverty and relative poverty crime rates (Howsen and Jarrell, 1987; Patterson, 1991). In fact, poverty and income inequality are two different things. Poverty can be defined as the lack of a certain amount of material goods necessary for survival and minimal well-being. It is an **absolute** deprivation. However, inequality refers to a comparison between the material wealth level of those with the least in a society and that of other groups that have more. This is a **relative** deprivation. Among countries, income inequality is measured by different scales. An example is the Gini Index, which ranges from zero to one. The value “zero” represents a absolute equality in the country while the value “one” represents a absolute inequality in the country. It should be noted that country where everyone is poor may has poverty only but no income inequality, while a well-off country may have severe inequality but a very low rate of poverty.

There are different ways to measure poverty and inequality (e.g. unemployment, high rates of divorce, single-parent households,

high population density, poor schooling, etc.). As quoted in Patterson (1991), Vol and Bernard (1986) argued that poverty is a subjective concept:

“[It] is always in part a subjective condition, relative to what others have, rather than any simple objective fact of the presence or absence of a certain amount of property or other measure of wealth.”

Absolute poverty

As mentioned before, economists link an individual's absolute poverty to the expected benefits of legal and illegal activities of an individual. Allen (1996:294) elaborated that absolute poverty may create the perception that one's skills would be better served when engaging in criminal activities. That is, engaging in criminal activities may bring higher returns to the offender.

Cohen, et al. (1981) explained that the poor are more likely to commit property crimes, as their opportunity costs of judicial

sanctions are less than that of the rich. During the sanctions used to punish offenders, the offenders' potential capital earnings during the time they undergo sanctions may be forgone. Thus, property crime can be regarded as a method for the poor to borrow against future capital. Sociological theories show that the strained social structure of the lower class, lower guardianship, social control, and more opportunities to learn criminal behavior will bring about criminal activities.

Nevertheless, people may choose to engage in work or criminal activities based on their expected returns from such an activity. Since work is a legal alternative to crime, crime rates should respond to changes in wages (Grogger 1998:757). Similarly, Machin and Meghir's (1999:6, 9) model showed that the unemployment rate is a reflection of labour supply and is controlled by the wage rate (i.e. the returns from employment). They held that the possibility of engaging in both activities illustrates that the effect of wages is ambiguous and depends on the influence the relative size of the average wage might have on the

value of: (1) engaging in work only and (2) engaging in both work and crime.

In Grogger's (1998:776, 785) analysis in the US,³ a 10% increase in wages will reduce the crime rate by 0.27 percent. Also, Grogger showed that a 20% fall in wages will increase the youth crime rate by 20%. Grogger's study showed that wage trends might have played an important role in the increase in youth crime. However, he suggested that falling wages cannot completely explain the rise in youth arrests but also other factors like education and unemployment.

Indeed, Cohen, et al (1981) said that poverty will change the activity patterns of potential criminal targets, and thus reduce crime opportunities. Machin and Meghir (1999:1) showed that a fall in wages of unskilled workers leads to an increase in crime. They concluded that wages have a strong impact on crime and thus reinforced the theory of returns to crime.

³ Data was from the National Survey of Youth.

To measure the absolute poverty of families, household incomes representing the aggregate income of each family member should be measured. Thus, I hypothesize an insignificant relationship between absolute poverty (i.e., the household income) and the property crime rate for testing purposes.

Relative poverty

Relative poverty (income inequality) is another determinant that likely affects crime rates. Stack (1984: 231) defined relative poverty as the difference between the standard of living of the poor and the average standard of living in a given society.

On the other hand, “relative deprivation” is a feeling of envy and animosity towards others that increases one’s probability of engaging in criminal behavior (Jacobs, 1981). The concept of relative poverty is similar to relative deprivation. It can be found in the work of Runciman (1996: 9-35). The condition of relative deprivation by Runciman (1996) is illustrated as:

A is relatively deprived of X when: (1) he does not have X, (2) he sees some other person or persons, which may include himself at some previous or expected time, as having X (whether or not this is or will be in fact the case), (3) he wants X, and (4) he sees it as feasible that he should have X...Given

the presence of all four conditions, relative deprivation produces feelings of "envy and injustice".

Stack (1984:231) explained the problem of income inequality and property crime using the concept of "relative deprivation". He said that relative deprivation will occur when:

(1) People lack an average income. When the size of this group grows, the frequency of relative deprivation will also rise.

(2) They are aware that others in a comparative reference group have incomes equal to or greater than theirs. The greater is this perceived gap between groups, the greater would be the magnitude of relative deprivation.

(3) They desire a higher income, and this desire will increase the intensity of relative deprivation.

(4) It is historically feasible for income redistribution to take place.

These four conditions combined will bring about a sense of injustice that increases the probability of property crime. Thus, Stack (1984:231) concluded the criminal behavior as an attempt by people (probably those from the low income bracket) who seek income redistribution to achieve beneficial gains. The relationship between a sense of injustice and inequality could be used as a rationalization for property crime.

Inequality seems to be one of the major causes of crime, since many criminal activities are determined by economic motivations. Freeman (1991:12) said that increasing income inequality will bring about two effects:

- 1) The rich have more money, and thus, the return of offenders (e.g. stealing goods from the richer) during property crimes will increase.
- 2) The poor have a higher demand for the returns that come from illegitimate activities, as they have lower incomes.

Nevertheless, some have argued that relative poverty, not absolute poverty, is a more relevant variable for explaining any variation in criminal activities. This is because the differentials in income distribution across workers and society will increase the possible returns from criminal activities when low-income individuals are in close proximity to high-income individuals. The link between increasing crime rates to increasing inequality was predicted by Becker's (1968) economic theory of crime and Merton's strain theory

Under the economic theory of crime, when the gap in legitimate income between the poor and the rich increases, the poor will perceive greater and greater marginal returns from illegitimate activities. Hence, the poor will have a higher incentive to participate in such activities (Ehrlich, 1973:538 - 540). On the contrary, as the distribution of income narrows, those at the bottom half will have less incentive to commit property crimes. The economic perspective assumes a rational model of human nature that is considered amoral, wherein the choice between criminal and

non-criminal behaviour is a question of absolute and relative economic need (Stack 1984:253). Also, provided that incarceration is used to punish a crime like burglary, it entails a loss of income to the offenders for a certain period. In economics, individuals with low earning potential will have lower opportunity costs than richer individuals to commit certain crimes, and thus, a greater incentive to engage in something like burglary (Chiu and Madden 1998: 124). Therefore, the percentage of people in absolute poverty may not correlate with the number of criminal activities, while for those people living in district of high relative poverty, such inequality would affect criminal activity in their areas.

On the other hand, under Merton's (1938) "strain theory," individual of a lower status in a community would be frustrated by their failure to attain the perceived material attributes of success. This failure is all the more galling when they are confronted by the success of those around them. As the poor are frustrated at their situation, some of them would be more likely to commit crimes.

Merton said that the greater the inequality, the higher the strain, and thus, the greater the inducement for poor individuals to commit crimes. In the study conducted by Merton, he found that an increased gap between the rich and poor will frustrate the poor and lead them to react violently against the inequities in society.

As Buonanno (2003) mentioned, the effect of inequality depends on the relative income position of an individual. A larger gap between the rich and poor may imply a greater incentive for the poor to commit crimes. Thus, rising inequality may give rise to a crime-inducing effect, which is also known as an “envy effect”.

Another study by Ehrlich (1973) revealed a positive relationship between crime and poverty, which is measured as the percentage of families living on less than half the median income for that society.

Nevertheless, Kelly (2000) showed that the property crime rate in the US⁴ was negatively correlated with the percentage of its

⁴ Data was from 1991 FBI Uniform Crime Reports.

population aged 16-24, but found no relationship between it and inequality. Also, Patterson (1991) examined the correlation between poverty and income inequality to criminal activity, and found no relationship between absolute poverty, income inequality, and crime, while burglary rates were significantly higher in areas with a larger youth population and higher levels of family disorganization.

Comparing the effects of poverty and inequality on crime, Allen (1987) showed that property crime increases as absolute poverty is *reduced*, while income inequality has no effect on property crime. To verify the effect of poverty and inequality on crime, I will later hypothesize the positive relationships between these two crime factors.

Education

Education can be regarded as a process of accumulating human capital. Under the human capital approach (e.g. Locherner 2004), training and learning throughout our lives give rise to an increasing opportunity cost of crime. It is up to an individual to choose between a life of honest toil and a life of crime.

Huang (2004) said that people can choose the amount of human capital to acquire through schooling and work before entering the labour market. People may acquire knowledge and skills to obtain formal employment or they could choose not to acquire knowledge and skills required for formal employment, but instead engage in criminal activities. Huang established a set of multiple steady-state equilibria to estimate the correlation between crime, levels of education attainment, long spells of unemployment, and poverty. The results of his study revealed a positive relationship between a high crime rate with low levels of educational attainment, unemployment and poverty.

Lochner (1999) suggested that for crimes that require few skills that could be learned in a conventional classroom, such as larceny, assault, and drug dealing, both age and education should be negatively related to crime among adults. He also predicted that rises in youth crime are linked to rises in property crime. On the other hand, adult crime rates can rise or fall, as many of them can more easily reduce or hide their criminal activities, while those least able to invest in their own well-being tend to increase their criminal activities. Lochner's (1999) model suggested that law enforcement policies that increase education, training, and the labor supply will reduce criminal activities.

Later on, Lochner (2004) used the data from the National Longitudinal Survey of Youth to show that both ability and high school graduation will significantly reduce the youth crime rate. High school graduation will also reduce one's probability of being incarcerated in the five years after graduation. However, Lochner added that a high school diploma's effect on criminal participation declines with age.

It has been argued that penalties and sanctions are useful tools for punishing criminals and preventing them from engaging in crime until they are older. However, Freeman (1992) reminded us that many offenders return to society with marketable skills after serving their sentences. But after their incarceration, their skills could be outdated and unable to cope with market demands. As a result, their job opportunities would be reduced, as it would be less easy for them to find suitable employment.

Freeman's research showed that: (1) poor education, (2) poor academic results, and (3) youth will place greater limitations on one's earning potential in legal activities than in illegal activities. Thus, people who fall into these categories are more prone to engaging in criminal behavior.

On the other hand, a higher education level for a person will increase his/her opportunity cost of committing crimes, and thus lead to a lower crime rate. In addition to the skills and training gained through education, education has an indirect effect on

“civilization,” making criminal decisions more costly in psychological terms (Usher 1997, Buonanno 2003). Education does not only enhance the earning power of people, but also promotes good citizenship and the common values of a society, as well as teaches people to be hard-working and honest. This helps further reduce the chances of educated people resorting to crimes and conveys a certain positive civic externality.

Apart from examining education as a factor that affects wage rates (returns from legal opportunities), Hirschi and Gottfredson (1995) said that education helps influence much more than a person's potential earnings: biological development, maturity, and/or the establishment of social networks, families, and norms as other channels can also be affected by age and education.

Therefore, I hypothesize that a greater percentage of poorly educated people will lead to an increase in the property crime rate.

Youth

The effect of the number of youth in a society is a complicated issue for understanding property crime rates and juvenile delinquency. Grogger (1991) and Freeman (1991) showed that the level of education in a society is closely related to its crime rate. Their studies showed that street criminals are usually less educated and hailed from poorer economic backgrounds than the rest of society. Besides, Cohen, et al. (1980) linked age structure to property crime by pointing out that young people, on average, have less formal education and skills required for legal employment, thus increasing the possibility that they would engage in illegitimate activities.

On the other hand, Greenberg (1977) said that youth are pressured to consume, to express their masculinity in the absence of adequate access to the labor market (in the case of males), and to make the transition from adolescence to adulthood. Similarly, Hirschi and Gottfredson (1983) suggested that some people may commit crimes for fun or because they have weak self-control. Lam

(1998) showed that juvenile delinquency is linked to the amount of time parents could spend with their children, the negative and unfair labeling they may receive from their schools, and a subculture of marginalized youth.

As Howsen and Jarrell (1987) reported, significantly positive, significantly negative, and insignificant effects were found from different studies on youth crime, and the results remain inconclusive when trying to explain its effect on society.

Under economic theories, the tendency for less-educated people to engage in crime is due to the fall in returns from legitimate activities that reduce the opportunity cost of committing crimes. This is because a fall in real earnings will reduce the opportunity cost of crime and convince some youth that they are better off by taking their chances engaging in illegal activities than in the legitimate job market. The long term effect is that more poorly educated youth engage in crime (Freeman 1991:21). This expectation mismatch could be explained by the strain theory,

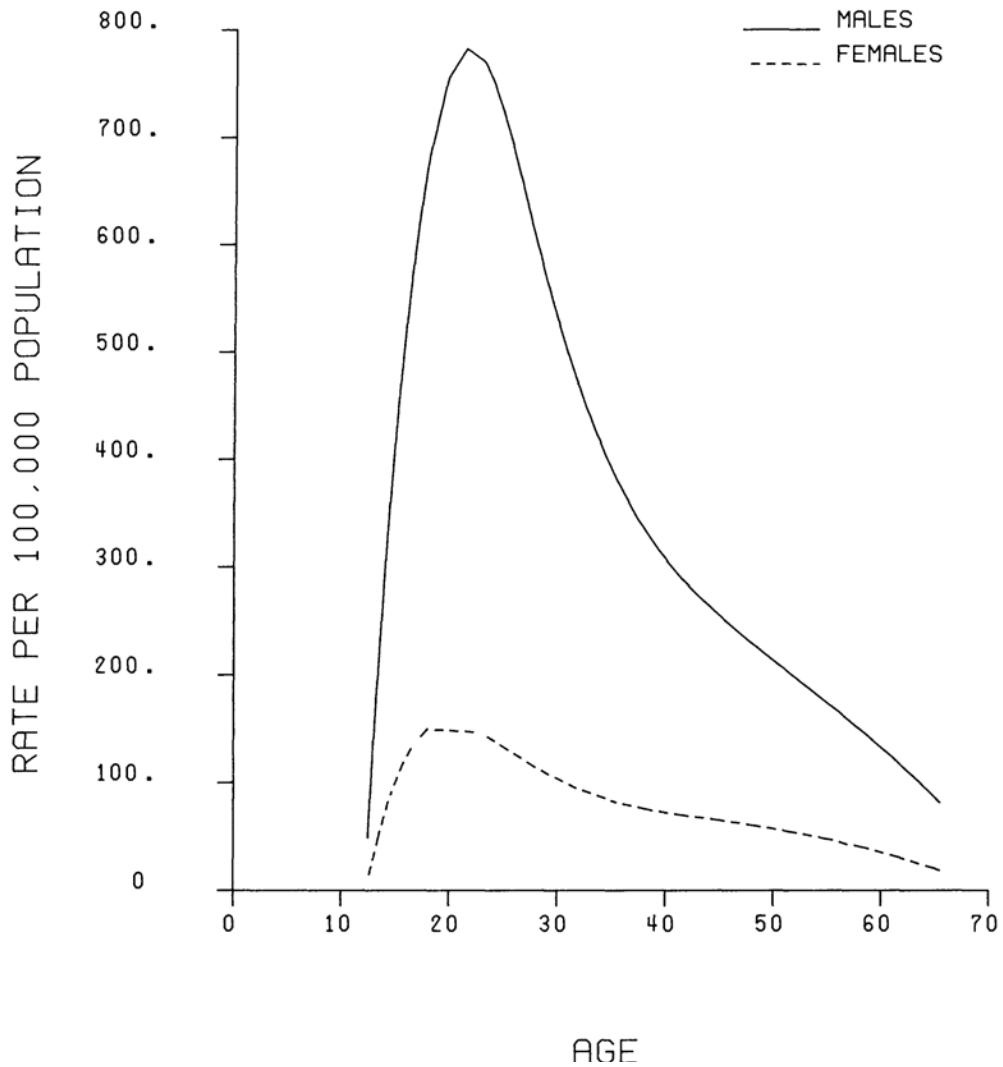
which specifies that the causes of crime and delinquency are “structurally induced frustrations” that result from a discrepancy between aspirations and reality.

According to Grogger’s (1998:757) research, the probability of one committing crimes increases until his/her late teens, and then declines after that. If wages affect criminal behaviour, then the age distribution of criminals should be a labour market phenomenon. Since wages are the returns from legal activities and represent the opportunity costs of committing crimes, costs increase with age in the early phase of one's career.

However, Hirschi and Gottfredson (1983) showed that involvement in crime does not level off during one’s adult years, although it declines with advancing age, i.e. early adulthood. This contradicts previous theories, which showed that youth have a higher tendency to commit crimes. The authors noted that factors explaining age distribution could be totally different from those explaining how crime varies with personality traits. In fact, they

showed that the age distribution of criminals is the same regardless of the society, social group, and offence. If all groups share a common age distribution, young offenders will be disproportionately represented. The graph is shown below:

Figure 1 Variation of crime rates by age



Source: Hirschi T. and Gottfredson (1983), pp.556. Age and the explanation of crime. *The American Journal of Sociology*, Vol. 89, No. 3, pp.552-584.

Nevertheless, the age variations among different cities is beyond the scope of this work, which will focus on the effect of the percentage of youth in the general population who have become involved in crime. The literature mentioned hypothesized that a higher percentage of youth of a certain age range in a district will have a negative effect on its crime rate.

Unemployment

In view of microeconomics, the decision over whether or not to engage in criminal activities can be a time allocation problem. Changes in the opportunities available to job seekers in the formal labor market will have a direct impact on the opportunity cost of criminal behavior.

According to the model of choice by Ehrlich (1967) and Becker (1968), if legal and illegal activities are mutually exclusive during a given period, one could choose between them by comparing their expected utilities, the anticipated returns from formal employment (which depend on wage rates), the "tightness" of the labour market, and the crime rate. The last depends on the ease of finding potential victims, the returns that accrue from thefts, the likelihood of interdictions, and the severity of the sanctions imposed by the state.

However, an important thing to note is that specializing in a single activity among the two does not always hold. Incentives to

specialize come from the time dependencies generated by specific training and the amount of time spent in previous training or learning. Multiple job holdings allow switching between the two activities and maximizing the returns from the time spent in each activity.⁵

In fact, given the complexity of unemployment, a criminal relationship is difficult to interpret, since a rising crime rate may cause unemployment⁶ by encouraging people to leave their jobs if crime offers better returns. Generally, people think that unemployment would increase crime, as one would turn to it to satisfy his/her economic needs when s/he is unemployed.

Allan and Steffensmeier (1989) and Stack (1981:235-236) argued that from an ecological relationship between underemployment (for example) and crime, it does not follow that underemployed individuals are necessarily the ones committing crimes or being

⁵ For example, one may engage in legal employment for a basic salary and in illegal employment for "extra" economic gains.

⁶ An areas with a higher crime rate may reduce investors' confidence in investing there. For example, they may close factories if crime is unbearable. As a result, employment opportunities would decrease and the unemployment rate would go up.

arrested. Instead, unemployment can only reveal that the labor market "climate" of a region establishes conditions that may be conducive to the growth of conformist or criminal behavior in a population at large.

Cohen, et al. (1981) proposed that during high unemployment periods, more individuals will stay home and reduce their chances of being victimized. Also, unemployment will reduce the wealth of potential criminal targets, and thereby reduce crime.

As further explained by Cantor and Land (1985), there are two possible negative effects of unemployment on property crimes. First, as employment brings individuals from households to the outside world, a higher unemployment rate may allow for an increased concentration of sustenance and leisure activities within their residences or neighborhoods. They thus suffer from a reduced risk of victimization (Cohen, et al., 1980).

Second, Cantor and Land (1985) added that since a higher unemployment rate generally signals a general slowdown in production and consumption activities, the unemployment rate can be viewed as an index of total system activity (i.e., a lower level of which corresponds to a lower rate of circulation of people and property).

Both effects, which may be termed the guardianship effect and the system activity effect, respectively, lead to the inference that, *ceteris paribus*, a higher unemployment rate results in a lower chance that motivated offenders will encounter ineffectively guarded and suitable property-crime targets, which means lower property crime rates (Cantor and Land, 1985: 320). Cantor and Land (1985) expressed the conventional path of committing crimes in a diagram reproduced below. The negative impact of unemployment on crime, guardianship, and system activity effects are shown in the upper half of the figure. In the same sense, the positive effect, as mentioned by other studies that found unemployed people to be more motivated to commit crimes, is

shown in the lower half of the figure. Apart from these, the solid and dotted arrows represent the possibility of direct relationships between criminal opportunities and motivated offenders.

Figure 2. Path Diagram of Structural Relationships and Reduced-Form Effects of Unemployment on Crime

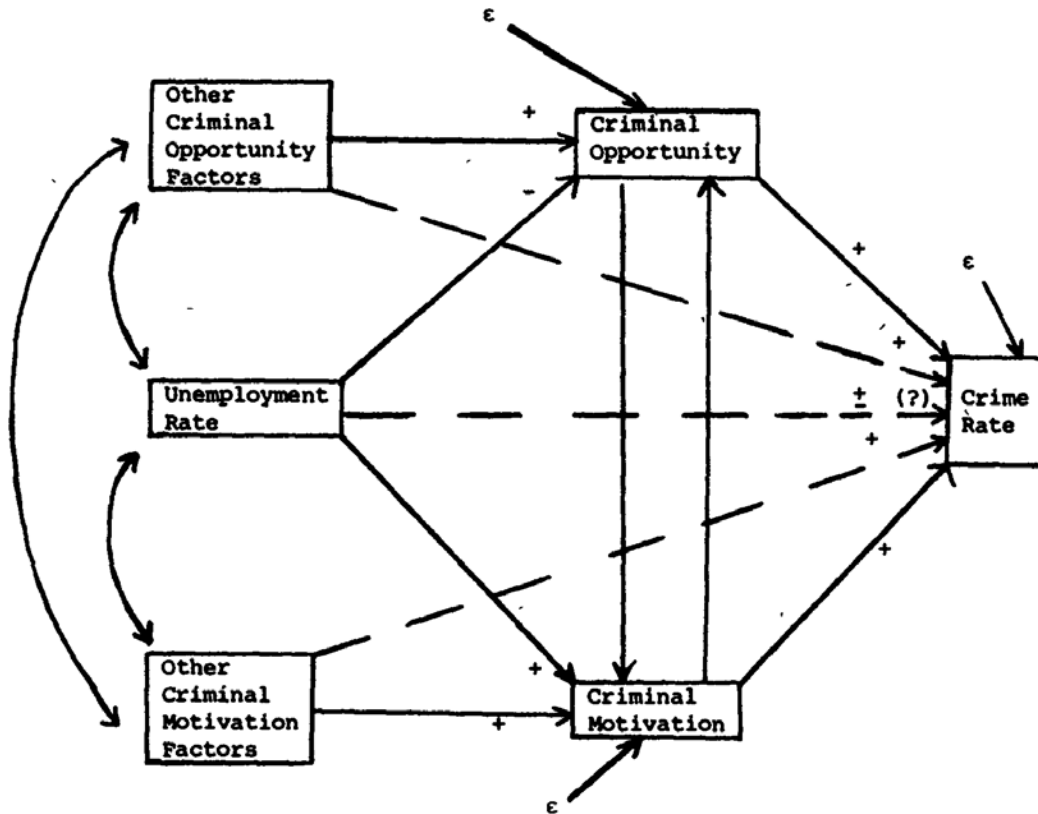


Figure 1. Path Diagram of Structural Relationships and Reduced-Form Effects of Unemployment on Crime

Notation:—denotes structural relationships
 -- denotes reduced-form relationships

Source: Cantor and Land (1985), *Unemployment and Crime Rates in the Post-World War II U.S.: A Theoretical and Empirical Analysis*, p. 321.

Cantor and Land (1985) explained the indeterminateness of the signs of the unemployment-crime relationship (U-C relationship) through the absence of methods for measuring "criminal opportunity" and "criminal motivation". Since the two structural effects of opposite signs determine the effect of unemployment on crime, the value is suppressed to zero.

Cantor and Land (1985) also suggested that the question of the U-C relationship is not the inconsistency of strength, significance, or even the direction of the relationship, but why it seems to not exist. Unemployment may have a positive and negative impact on crime rates (i.e., to increase the motivation and decrease the opportunity for criminal activities). Land and Felson (1976) and Cohen, et al. (1980, 1981) expected that an increase in unemployment will reduce the opportunities for crime. They suggested that when unemployment rises, there would be fewer economic goods (crime targets) in circulation, and those that exist would be better protected. Thus, the interaction of these two contradictory forces

constitutes the term, "consensus of doubt," and explains why the U-C relationship is difficult to detect.

“Consensus of Doubt”

According to Chiricos (1987:187-8), the "consensus of doubt" is concerned with the strength, significance, and direction of the unemployment-crime relationship. It was argued that the "consensus of doubt" is premature and unable to recognize the conditional nature of the link between unemployment and crime. Chirico's analysis showed that the positive and significant relationship between unemployment and property crime probably has a greater presence at the sub-national level, while there is no significant/negative unemployment-crime relationship for property crime at a level of aggregation lower than that of the entire nation. The reason for this is probably twofold:

- (1) There is less aggregation bias at the lower levels of aggregation. That is, smaller units are more likely to be homogeneous and reduce the amount of variation within each

unit. Thus, a more meaningful variation is out there. In contrast, national data may cancel out the substantial differences among different units in unemployment and crime that characterize different sections of cities. Thus, the variation among different units cannot be notified.

(2) Most researchers use local data that more easily captures what can be termed the "milieu effects" of unemployment. This means that higher unemployment may have a demoralizing effect on surrounding environments and create a climate of hopelessness, which gives rise to criminal activities. In other words, intra-city data could be the most sensitive, while national data is the least sensitive to variations between units (Chiricos 1987:195).

The stress theory states that at the individual behavior level, poor labour market conditions (e.g., high unemployment) will create a stressful state that renders some individuals susceptible to criminal behavior in order to resolve their economic problems. At the

aggregate level, some unemployed individuals are motivated by economic need to commit crimes. However, whether or not deleterious labor force conditions have "milieu" effects⁷ can be seen in the crime rate (Chiricos 1987).

Allan and Steffensmeier (1989) noted that for young adults, the choice of legitimate over illegitimate pursuits may be influenced more by the quality of their employment than by its mere availability. When rewards for work are low compared to those that can be obtained from illegitimate pursuits, they would pursue illegitimate activities, particularly if adolescent opportunities have been too limited for them to develop a strong commitment to work.

However, if institutional factors exist to prevent wage adjustments at the bottom of the wage distribution, wage fluctuations would not be able to fully reflect employment opportunities. For instance, if minimum wages are present, some of the unemployed would be

⁷ These are the better captured results of research using local data at the lower levels of aggregation.

willing to work instead of committing property crimes (Machin and Meghir 1999:9).

Chiricos (1987:203) concluded that “for the present, it is appropriate to argue that evidence favors the existence of a positive, frequently significant unemployment-crime relationship.”

Howsen and Jarrell (1987) showed that unemployment, which increases poverty by increasing one’s difficulties in acquiring legal employment, will raise the property crime rate. However, Machin and Meghir (1999:24-5, 28) showed an insignificant effect of high unemployment rates on crime. They suggested that wage levels in a relevant area have a bigger effect on crime variations. Their model showed that crime would be higher if wages at the bottom end of the wage scale are lower, which reflects poorer labour market opportunities.

Since Machin and Meghir concerned more about wage levels, which we have discussed in the part about poverty, I will also

hypothesize in this dissertation that when the unemployment rate of a district increases, the property crime rate will rise accordingly.

Chapter Three

HYPOTHESES AND METHODOLOGY

As discussed in previous chapters, there have been much discussions on the various effects of the socio-economic factors on crime rates. Since most of the literature concern about the situations in the United States of America and no similar study has been done about Hong Kong, I propose the following hypotheses based on the previous literature review:

Hypothesis 1

Household income (measuring absolute poverty) has a negative relationship with property crime rate.

Hypothesis 2

Income inequality (measuring relative poverty) has a positive relationship with property crime rate.

Hypothesis 3

Education level, measured by the percentage of people attaining

lower secondary or below, will be positively and significantly correlated with property crime rates.

Hypothesis 4

Increase in the percentage of juveniles in a population will push up the property crime rates.

Hypothesis 5

The property crime rates would be positively influenced by unemployment rate.

Methodology

This dissertation will evaluate the above hypotheses by a multiple linear regression model.

Regression analysis

Regression analysis is a statistical technique for developing equations which describe the relationship between dependent and independent variables. It can be employed to control the influence

of other variables and thus allow testing the influence of the factor concerned.

The regression model aims at searching the best fit line using the Ordinary Least Square criterion of residuals. Potential problems associated with the regression are autocorrelation, multi-collinearity and heteroscedasticity. However, these biases will not be discussed here.

In this dissertation, a dummy variable is used in the model to determine if the data from Tuen Mun or Shatin districts. There are only two values for dummy variables, either 0 or 1. For the data concerning about the Tuen Mun District, its value would be set equal to 1, and 0 vice versa. This is useful to measure the differences between the two districts.

Three values are of particular importance if the results are satisfactory. They are (1) the coefficients of multiple determination (R^2), (2) the estimate partial regression coefficients and (3) the

p-value. R squared states the degree to which changes in the set of casual variables generate changes in the dependent variable. In other words, it describes how well the suggested hypothesized relationship explains the facts. Apart from that, the regression coefficients will specify how an independent variable affects the dependent variable, while certain parameters are held constant. A negative value of coefficient represents an inverse variation between the independent and the dependent variable. However, whether the relationship is significant, we have to compare the value of p-value. For $p < 0.05$, the relationship shows a 95% confident level; for $p < 0.1$, the relationship shows a 90% confident level.

In this dissertation, regression analysis would be conducted to analyze the relationships between the dependent variables (the four types of crime rates) and the socio-economic factors.

Time-series model vs cross-section model

The suitability and merits of different regression models has been argued by different writers. In a discussion by Grillespie (1978: 602 - 3) about the time-series model and cross-section model, it is said that “the strength of the relationship ... can best be characterized as neither trivial nor substantial, but modest. When specific crime rates were used rather than total rates, property crimes tended more frequently to show the predicted relationship with unemployment than did crimes of violence...”

Grillespie says that the significant statistical relationship would be absent only when state cross-sectional data are used, and only among studies using time series data in city level would there be a consistently significant positive relationship. In a numerical sense, there is a dominance of findings of a sign positive relationship... (1978: 615 - 16).

Chiricos (1987:196) showed that the cross-sectional and time-series studies have different merits. Time - series studies may

include too few estimates of the unemployment - crime relationship and changes through the years have to be measured with reliable methods. In the case of the USA, it is more proper to adopt cross-sectional method as there might be overlapping between time-series data and only national level data are available for analysis.

In the case of Hong Kong, data of the district unemployment rate (as well as household income and education) in districts are only available in the census and by-census on a 5 – year basis. However, as mentioned by Grillespie, the time-series model is easier to show a significant positive relationship for property crime. Also, many researchers argued that cross-sectional effects are insensitive to age effects. Therefore, many criminologists view cross-sectional approaches as flawed because they are incapable of detecting developmental or social trends (Bartol and Bartol 1989:269) Thus, a time-series model is adopted in this dissertation.

Data

Data collection and conversion

The data used for the regression were collected from the Crime and Enforcement Reports. The idea came from Professor Lai who was a Town Planner in the Town Planning Office from 1985 to 1989. Also, data from population census and by-census in Hong Kong are used. The crime rates collected are named as follows: “other robberies”, “burglary with breaking”, “other burglaries” and “other miscellaneous theft”. There are in total 128 samples, while 32 samples for each type of crime and separate analysis. According to the Theft Ordinance (Cap. 210, S.9, 10 and 12), theft, robbery and burglary are defined as below:

Theft - Any person who commits theft shall be guilty of an offence and shall be liable on conviction upon indictment to imprisonment for 10 years.

Robbery - (1) A person commits robbery if he steals,

and immediately before or at the time of doing so, and in order to do so, he uses force on any person or puts or seeks to put any person in fear of being then and there subjected to force.

(2) Any person who commits robbery, or an assault with intent to rob, shall be guilty of an offence and shall be liable on conviction upon indictment to imprisonment for life.

Burglary - (1) A person commits aggravated burglary if he commits any burglary and at the time has with him any firearm or imitation firearm, any weapon of offence, or any explosive.

(2) For the purposes of subsection (1) -
"firearm" includes an airgun or air pistol;
"imitation firearm" means anything which has the appearance of being a firearm, whether capable of being discharged or not;
"weapon of offence" means any article made or

adapted for use for causing injury to or incapacitating a person, or intended by the person having it with him for such use;

"explosive" means any article manufactured for the purpose of producing a practical effect by explosion, or intended by the person having it with him for that purpose.

(3) Any person who commits aggravated burglary shall be guilty of an offence and shall be liable on conviction upon indictment to imprisonment for life.

Socio-economic data were collected from the Census, By-Census and the General Household Survey. They include median household income, the number of families having different range income, number of people with different educational attainment, number of people with different age and number of people with formal employment. The definitions of these variables could be found at Appendix I. The data were then converted into the median

household income, inequality, educational level, percentage of juveniles in the population and unemployment rate.

The converted factors are described as follows:

1. Absolute poverty (POV)

Median household income is used to measure the absolute poverty of the families. According to the Census and Statistics Department, the median household income is measured by the average monthly domestic household income so calculated that 50% of the total number of domestic household had incomes above that figure and the other 50% had incomes below it. Zero income households are included in the calculation.

2. Inequality (INEQ)

Inequality is defined as the percentage of people with household income below the half of overall median income in Hong Kong. Ehrlich's (1973) study uses the fraction of the families in an area with less than half of the median income as a proxy for inequality. In order to distinguish the impact of inequality on

crime from that of poverty, Kelly (2000) uses the ratio of mean to median household income, which is a measure of inequality that is derived independently of income.

According to the census and by-census conducted in 1986, 1991, 1996 and 2001, the median household incomes in Hong Kong are \$5159, \$4984, \$8750 and \$18705 respectively. Therefore, the poverty line, being half of the median household income in the year, would be set as \$2580, \$4984, \$8750 and \$9353 correspondingly. The income inequality level is measured by the percentage of household with income lower than the poverty line.

3. Education (EDU)

The education focus on this study is the percentage of people with education level of lower secondary or below. The highest level attended is the highest level of education ever attained by a person in school or other educational institution, regardless of whether he had completed the course. Normally, people who

complete the lower secondary would be at the age of 15.

Indeed, there is a compulsory education of 9 years in Hong Kong for all children. It includes primary schooling (P.1 – 6) and lower secondary schooling (S.1 – 3).

4. Percentage of juveniles in the population (JUV1 and 2)

In the analysis, there are two groups of variables for the juveniles. The first one JUV1 is percentage of 9 – 14 age group in the district while JUV2 is the percentage of 15 – 19 age group in the district. The juvenile effect is separated into two variables to test if the percentage juvenile leaving school after form III will increase property crime rates.

5. Unemployment (UNEMP)

The unemployment rate is estimated from the Census, By-Census and the General Household Survey. By 2000, the unemployment population in districts is no longer available in the Census and By-Census carried out by the Census and

Statistic Department but reported in the General Household Survey. The Survey has been conducted quarterly since 2000 to provide more updated information. However, the sample sizes in the survey for estimating the numbers of unemployed persons in each district are comparatively small compared to that of the Census. Therefore, the sampling errors in the data in 2000 – 2005 may have larger sampling errors.

According to the Hong Kong Statistics and Census Department, the unemployment rate is defined as follow:

“The unemployed population comprises all those persons aged 15 and over who fulfill the following conditions:

(a) have not had a job and have not performed any work for pay or profit during the 7 days before enumeration; and

(b) have been available for work during the 7 days before enumeration; and

(c) have sought work during the 30 days before enumeration.

However, if a person aged 15 or over fulfils the conditions (a) and (b) above but has not sought work during the 30 days before enumeration because he/she believed that work was not available, he/she is still classified as unemployed, being regarded as a so-called "discouraged worker".

6. Dummy variable (TMST)

Since there are two groups of data used in this analysis, the crime data of 1986 – 2001 of Tuen Mun and Shatin. If the data is from Tuen Mun, the value of TMST would be 1; if the data is from Shatin, the value of TMST would be 0.

However, given that the population census and by-census were conducted every five year while data from Crime Enforcement Report were released every year, interpolation is used to generate the data in-between the five years. This may increase the inaccuracy of the data as the fluctuation figures during the five years would be flattened. Also, if there is any sudden rise/ drop of figures during the five years, the peak/ trough could not be

recognized.

Although some may argue that the data pool is too small and the interpolation may eliminate certain effects within the 5-year period, Chiricos (1987) mentioned that there is a lower aggregation bias at the lower levels of aggregation, i.e. the small units are more likely to be homogeneous and reduce the variation within each unit. Thus, a more meaningful variation could be found between these units. In contrast, the national-level data may cancel the substantial differences in unemployment and crime that characterize different sections of cities of cities themselves. Thus the variation among different units cannot be notified. As a result, a small aggregate unit a district level is adopted to get a more specific result.

In the following, the background of the districts for study would be discussed.

Background of the districts for study

In order to minimize and control on the location factor more effectively, only data from the Tuen Mun and Shatin would be used. The main reason for choosing these two districts is to avoid conversion problems. Since the police district used in the Crime Enforcement Report and that of the District Council are different, the two sets of data would be incompatible. Since the boundary of Tuen Mun in the two reports are the same while that of Shatin is approximately the same (except the area with little housing estates). These two districts are selected for analysis. The boundary of the districts could be found in the appendix (a location map is attached in appendix II for reference).

Moreover, Chan (1998) said that the rate of juvenile delinquency is especially high in new towns and the situation in Tuen Mun has the worst situation. In fact, the number of crime in Tuen Mun and Shatin is about the same in 2001 while the crime rate of these two district remain the 3rd and the last in the ratio of crime against population.

Fig. 3. Aggregated crime rate of New towns in 2001

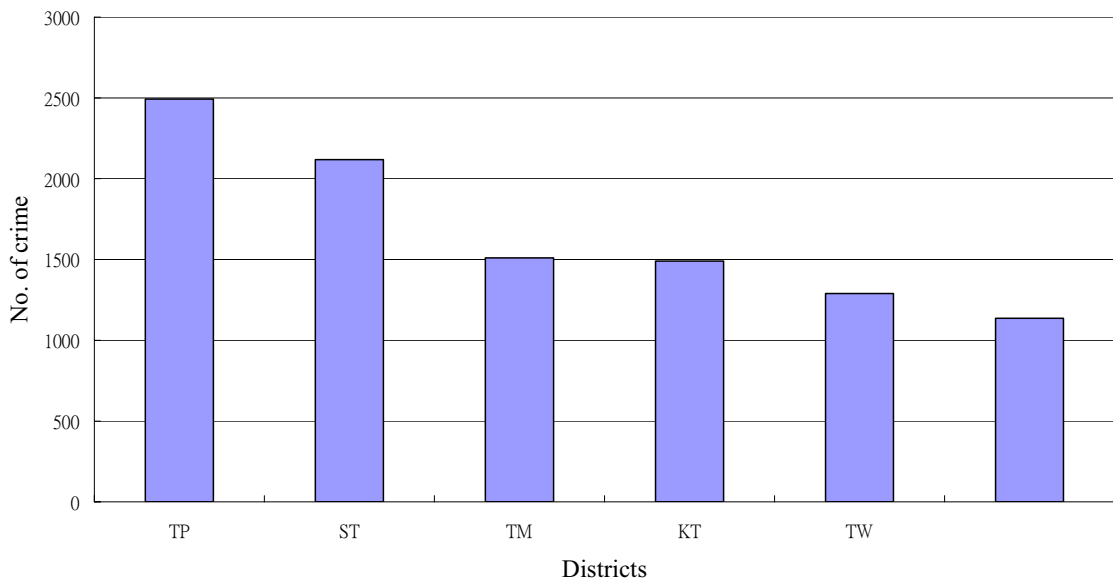
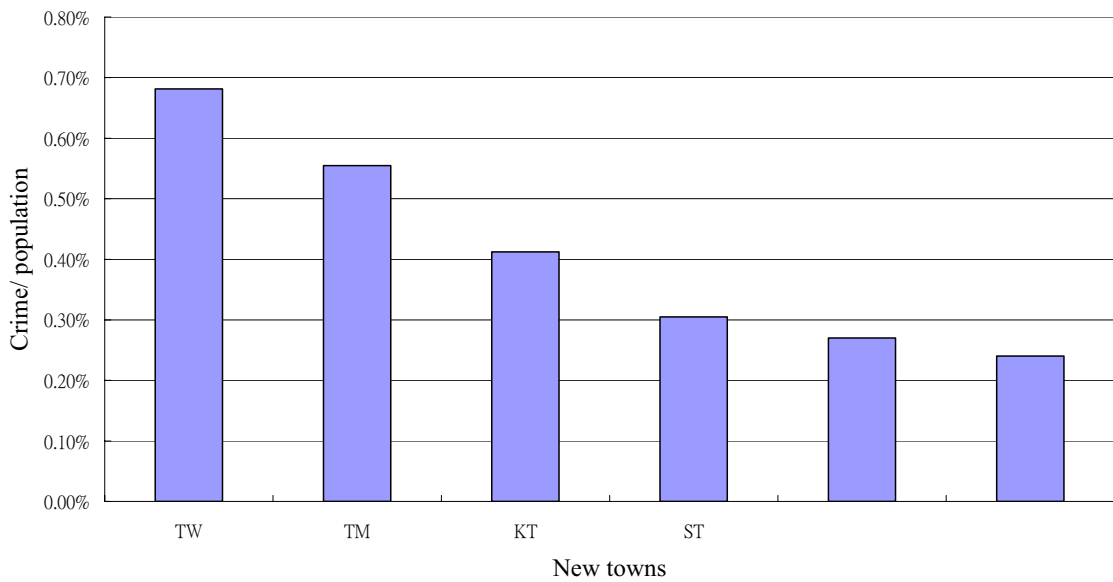


Fig. 4. Crime rate of new towns in 2001



Background of Tuen Mun

Tuen Mun New Town is located in the western New Territories, 32 km from the Kowloon Peninsula, 7 km southwest of Yuen Long and 18 west of Tsuen Wan. It is mainly developed on land reclaimed from Castle Peak Bay and on platforms formed in the valley between Castle Peak and the Tai Lam Hills. It covers a total development area of about 1 900 hectares with a population of 488831.00 in 2001. It is claimed to be the area of highest crime rate in Hong Kong.

Tuen Mun is originally named Castle Peak New Town when planning. Tuen Mun in the Chinese language means a gateway where military is stationed. The district was subsequently named Tuen Mun after its establishment in the early 1980s.

The ratio of public housing to private housing in 2001 was 1.6:1⁸, which means that more than 60% people live in public housing. Since there is an upper limit of household income for public

⁸ Data from the 2001 Population Census

housing provision, these families are more likely to have a lower income than those living in private housing.

For educational provisions, there are currently 50 secondary schools, 56 primary schools and 50 kindergartens in Tuen Mun. There are also five special schools for mentally or physically disabled children.

Background of Shatin

The Shatin District covers 6940 km², including the Shatin New Town and several country parks. It was the second batch of satellite towns, or new town, to be built in the New Territories, on land reclaimed from the sea. According to the Population Census conducted in 2001, Sha Tin has the highest population among new towns in Hong Kong.

The first plan for development in Shatin was approved by the then Governor-in-Council in 1961. In October 1972, the Draft Shatin Outline Development Plan was issued. Nowadays, the Hong Kong

Government used to showcase Shatin as an achievement in building a modern new town. Visiting foreign dignitaries were often invited to tour Shatin and its housing estates.

In 2001, around 65% of the district's population lives in public rental housing⁹ under Hong Kong's Tenants Purchase Scheme, or Home Ownership Scheme (HOS). Shatin has now become a major new community, including an extension at Ma On Shan, of about 640,000 people today. There are also around 29,000 people living in some 48 indigenous villages.

At present, there are 46 primary and 44 secondary schools in Shatin and Ma On Shan. Besides, there are tertiary institutions like the Chinese University of Hong Kong, the Heng Seng School of Commerce and the Hong Kong Sports Institute, etc located in Shatin.

⁹ Data from 2001 Population Census

In addition, there are four industrial areas for light industries in Shatin including Tai Wai, Fo Tan, Siu Lek Yuen and Shek Mun. This helps to provide employment opportunities to the residents.

Regression Analysis

1. “Other Robberies”

Table 1 Regression results of the “other robberies” rate and socio-economic factors

Dependent Variable: CR1

Method: Least Squares

Sample: 1 32

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	t			
C	2068.098	8.878483	232.9338	0.0000
INC	-0.001169	0.000989	-1.181519	0.2490
INQ	-0.000355	0.000366	-0.970364	0.3415
EDU1	26.53281	11.23186	2.362281	0.0266
JUV1	-95.89738	9.239917	-10.37860	0.0000
JUV2	-2.540851	22.53113	-0.112771	0.9112
TMST	49.89809	22.37373	2.230209	0.0353
EMP	6.117496	0.986178	6.203236	0.0000
R-squared	0.988985	Mean dependent var		1993.500
Adjusted R-squared	0.985773	S.D. dependent var		4.683533
S.E. of regression	0.558642	Akaike info criterion		1.885704
Sum squared resid	7.489953	Schwarz criterion		2.252138
Log likelihood	-22.17126	F-statistic		307.8455
Durbin-Watson stat	0.699522	Prob(F-statistic)		0.000000

The value for the adjusted R-square in this regression was 0.985, which is quite a satisfactory result. The model showed that the education level, the percentage of youth aged 9-14, and the unemployment rate in an area have a significant effect on the crime rate with a 95% level of confidence. Indeed, the educational level had a positive effect on the crime rate, while the percentage of youth aged 9-14 had a negative effect on it. That means the higher the number of people in the area who have no more than a secondary school level of education, the higher its crime rate will be, while a higher percentage of youth aged 9-14 tends to lower the crime rate. However, the magnitude of the effect of the unemployment rate was low compared to the other two factors.

As only education and unemployment affected the robbery rates and both of them were positively related to robbery rates, it is logical to propose that these factors are correlated with and have a positive effect on the rates. With a lower educational level, people are less able to find decent jobs, and thus, see more purpose in turning to crime. Since robbing people does not require

complicated skills (Lochner 1999), it is easier for people to engage in such activities. In fact, Carmichael and Ward (2000:569) also showed that the level of youth unemployment is also consistently and significantly related to robbery.

The other three factors on the chart – income, inequality, and the percentage of youth aged 15–19 – showed an insignificant relationship with the robbery rate, and this violated our hypothesis.

It is remarked that the factor of Tuen Mun/ Shatin had a large and significant effect on the robbery rate. This might be due to the different characteristics (e.g. community characteristics and the composition of each household) of the two districts.

2. Burglary with breaking

Table 2 Regression results of the “burglary with breaking” rate and socio-economic factors

Dependent Variable: CR3

Method: Least Squares

Sample: 1 32

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	283.8389	416.9215	0.680797	0.5025
INC	0.040061	0.046458	0.862319	0.3970
INQ	0.002779	0.017177	0.161768	0.8728
EDU1	241.5139	527.4330	0.457904	0.6511
JUV1	-1018.514	433.8940	-2.347380	0.0275
JUV2	5747.357	1058.031	5.432123	0.0000
TMST	143.7820	1050.640	0.136852	0.8923
EMP	48.57359	46.30959	1.048888	0.3047
R-squared	0.747102	Mean dependent var		83.06250
Adjusted R-squared	0.673341	S.D. dependent var		45.89886
S.E. of regression	26.23309	Akaike info criterion		9.580403
Sum squared resid	16516.21	Schwarz criterion		9.946837
Log likelihood	-145.3478	F-statistic		10.18067
Durbin-Watson stat	2.353118	Prob(F-statistic)		0.000007

In a linear regression model of burglary with breaking, the R-square was 0.67. The results showed that only the percentage of youth aged 9–14 and 15-19 had a positive and significant effect on the burglary rate. However, the effect of the two factors contradicted each other. An increase in the number of youth aged 9–14 will decrease the crime rate, while an increase in youth aged 15–19 will increase it. This is an interesting phenomenon, since as the 9–14 year old youth grow up, their chances of engaging in crime will increase. Two possible reasons for this could be peer influence and greater economic needs and wants.

As youth grow up, their economic needs and wants increase, bringing about larger demands for economic goods. However, they may not have enough purchasing power to satisfy their own economic desires, and may engage in crime to achieve them. One may suggest that any sudden increase in the crime rate could be due to high youth unemployment, since many have just completed their compulsory nine years of free education by age 15. However, the regression showed that unemployment did not have a

significant effect on the crime rate. Therefore, this proposition was refuted.

On the other hand, youth tend to be easily influenced by their peers. Bartol and Bartol (1989:241), quoting from Hans Sebald (1986), said that adolescents seek parental advice on financial matters, education, and career plans, but when it comes to their social lives (e.g. dress, drinking, dating, drugs, etc.), they tend to seek opinions from and adopt standards set by their peers. Sebald showed that adolescents are under peer pressure to conform to their peers' views on life. Therefore, they could be influenced by their peers' positive and negative traits, including turning to crime.

I found no linear relationship between other factors and the burglary rate.

3. Other Burglaries

Table 3 Regression results of the “other burglaries” rate and socio-economic factors

Dependent Variable: CR4
 Method: Least Squares
 Sample: 1 32
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1744.971	1344.787	-1.297581	0.2068
INC	0.244843	0.149850	1.633913	0.1153
INQ	-0.025443	0.055405	-0.459225	0.6502
EDU1	902.0434	1701.244	0.530226	0.6008
JUV1	2007.921	1399.532	1.434709	0.1643
JUV2	4382.018	3412.698	1.284033	0.2114
TMST	3858.532	3388.857	1.138594	0.2661
EMP	-369.6109	149.3724	-2.474426	0.0208
R-squared	0.741297	Mean dependent var		467.7812
Adjusted R-squared	0.665842	S.D. dependent var		146.3771
S.E. of regression	84.61529	Akaike info criterion		11.92642
Sum squared resid	171833.9	Schwarz criterion		12.29286
Log likelihood	-182.8228	F-statistic		9.824361
Durbin-Watson stat	1.716189	Prob(F-statistic)		0.000010

In the third model, the R-square was 0.6658, which is a fair result. The regression showed that only the unemployment rate had a significant effect on the “other burglaries” rate.

It was surprising to find a negative coefficient of unemployment to the burglary rate. The results might have been due to the “guardian effect,” as suggested by Cantor and Land (1985). Many unemployed people like to gather with friends and family for leisure activities within their residences or neighborhoods, and thus, keep away from potential or perennial criminals. Also, they may be less financially secure and have less attractive goods for burglars to steal. As a result, the expected returns from robbing such people should be lower, and thus reduce a crook’s incentive to prey on them.

4. Miscellaneous Forms of Theft

Table 4 Regression results of the “miscellaneous forms of theft” rate and socio-economic factors

Dependent Variable: CR6

Method: Least Squares

Sample: 1 32

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	259.5181	196.2287	1.322529	0.1985
INC	-0.031271	0.021866	-1.430134	0.1656
INQ	-0.008144	0.008085	-1.007347	0.3238
EDU1	-472.2558	248.2421	-1.902400	0.0692
JUV1	-251.4263	204.2170	-1.231172	0.2302
JUV2	354.7771	497.9740	0.712441	0.4831
TMST	1727.076	494.4952	3.492604	0.0019
EMP	-9.843256	21.79612	-0.451606	0.6556
R-squared	0.555167	Mean dependent var		26.18750
Adjusted R-squared	0.425424	S.D. dependent var		16.28860
S.E. of regression	12.34689	Akaike info criterion		8.077004
Sum squared resid	3658.699	Schwarz criterion		8.443438
Log likelihood	-121.2321	F-statistic		4.278970
Durbin-Watson stat	2.395333	Prob(F-statistic)		0.003386

In the analysis of miscellaneous theft, education level was the only significant factor. Nevertheless, the coefficient was negative, implying that an increase in the percentage of people with a low level of education will lower the crime rate. This contradicts the previous analysis and hypothesis.

Attempting to further analyze the relationship, I conducted a logarithm analysis. The results are as follows:

Table 5 Regression results of the “miscellaneous thefts” rate and socio-economic factors with logarithm

Dependent Variable: CR6

Method: Least Squares

Sample: 1 32

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	431.0919	832.0023	0.518138	0.6091
LOG(INC)	-27.75581	11.28708	-2.459077	0.0215
LOG(INQ)	-50.60669	83.57641	-0.605514	0.5505
LOG(EDU1)	-87.43077	28.79802	-3.036000	0.0057
LOG(JUV1)	-293.5867	164.0102	-1.790052	0.0861
LOG(JUV2)	56.57293	47.42660	1.192852	0.2446
TMST	2052.453	444.4133	4.618344	0.0001
EMP	4.089864	20.24637	0.202005	0.8416
R-squared	0.642155	Mean dependent var		26.18750
Adjusted R-squared	0.537784	S.D. dependent var		16.28860
S.E. of regression	11.07405	Akaike info criterion		7.859404
Sum squared resid	2943.229	Schwarz criterion		8.225837
Log likelihood	-117.7505	F-statistic		6.152598
Durbin-Watson stat	2.482184	Prob(F-statistic)		0.000341

After I converted the factors, the analysis showed that household income, education level, and youth aged 9–14 had a significant effect on the miscellaneous theft rate. All three factors had a negative influence on it.

The negative effect of household income satisfied the hypothesis that the higher an area's median household income, the lower would be its crime rate. However, the negative signs of education and youth aged 9–14 implied that a higher percentage of poorly educated people and youth in the 9-14 age bracket will contribute to a lower crime rate, which violates the hypothesis.

The phenomenon of **high incomes and low education**, which gives rise to a lower crime rate, is too complicated for me to explain in this dissertation. Comparing the four factors, I tried to summarize the phenomenon in this way:

1. When people have sufficient incomes, they will have less incentive to commit crimes.
2. Youth aged 9–14 may be more easily satisfied with what their parents provide them. Similar to the results of burglary with breaking, youth aged 15–19 have a higher tendency to commit crime than their 9–14 year old peers. In this case, the number of youth aged 9–14 might have dominated

education and affected the average education level of their districts. Therefore, a “lower education level” will give rise to a lower crime rate, as hard as it is to believe.

Nevertheless, the TMST factor had a significant and enormous effect on the theft rate when compared to other factors outside of this study, which may have a prevailing effect on theft rates.

Summary of the Results

Table 5 Summary of the Results of Regression Analysis

Factors (expected signs)	Coefficients of factors and p-value in bracket				
	Robberies	Burglary with breaking Ordinary number	Other burglaries	Ordinary Miscellaneous theft number	Logarithm
C	2068* (0.0000)	283.8389** (0.5025)	-1744.971 (0.2068)	259.5181 (0.1985)	431.0919 (0.6091)
INC (-)	-0.001169 (0.249)	0.040061 (0.3970)	0.244843 (0.1153)	-0.031271 (0.1656)	-27.75581* # (0.0215)
INQ (+)	-0.000355* (0.0266)	0.002779 (0.8728)	-0.025443 (0.6502)	-0.008144 (0.3238)	-50.60669 # (0.5505)
EDU1 (+)	26.53281* (0.0266)	241.5139* (0.6511)	902.0434 (0.6008)	-472.2558 *(0.0692)	-87.43077 #* (0.0057)
JUV1 (+)	-95.89738* (0.0000)	-1018.514 # *(0.0275)	2007.921 (0.1643)	-251.4263 (0.2302)	-293.5867 #** (0.0861)
JUV2 (+)	-2.540851 (0.9112)	5747.357* (0.0000)	4382.018 (0.2114)	354.7771 (0.4831)	56.57293 # (0.2446)
TMST (insignificant)	49.89809* (0.0353)	143.7820 (0.8923)	3858.532 (0.2661)	1727.076 *(0.0019)	2052.453 #* (0.0001)
EMP (+)	6.117496* (0.0000)	48.57359 (0.3047)	-369.6109 *(0.0208)	-9.843256 (0.6556)	4.089864 # (0.8416)
Adjusted R square	0.985773	0.673341	0.665842	0.425424	0.537784

Logarithm transformation applied

* Significance level at 95%

** Significance level at 90%

The above results were inconsistent with the hypothesis.

1. Median household income had only a slight effect on miscellaneous theft, while it had none on other property crimes.
2. Inequality also had only little effect on robberies, but none on other property crimes.
3. Education accounted for robberies and the miscellaneous theft rate, but not for burglaries.
4. The percentage of youth in the population (aged 9–14 and 15–19) had a certain effect on robbery and burglary with breaking, but a negligible one on two other property crimes.
5. The unemployment rate affected the robbery and burglary without the breaking rates.

Discussions

The Poverty Level and Inequality

It was surprising that the poverty level and inequality had no significant effect on property crime. The possible reason for this is the subsidies and forms of welfare provided by the government, like the Comprehensive Social Security Assistance (CSSA) Scheme. In Hong Kong, CSSA is provided for families with insufficient monthly household incomes, as recognized under the scheme.

In the same sense, Lochner (2004) said a current wage subsidy would lower the crime rate by enhancing the current returns from work. The CSSA scheme aims to assist people in finding jobs that pay enough to satisfy their needs (Tse 2006). This effect may help reduce crime, and absolute poverty and inequality had an insignificant impact on the crime rate.

Education

Lochner (2004) said that although human capital investments cannot boost current productivity, they do increase future skill levels and wage rates. A higher future wage rate increases opportunities for employment and results in a lower crime rate for individuals. Also, education subsidies from the government encouraging investments in human capital will reduce crime by raising future wages.

The education factor in the “other robberies” case and the “other thefts” case was significant in reducing crime. Therefore, if policies are enacted to tackle robberies and theft, more resources should first be put into the education field.

Youth

Youth aged 9–14 had a negative effect on “other robberies,” “burglary with breaking,” and thefts. It consistently lowered the property crime rate in the above three cases. The positive and significant effect of youth aged 15–19 and negative and significant

effect of youth aged 9–14 on the “burglary with breaking” rate showed that youth transition from the 9–14 group to the 15–19 group may give rise to a higher probability of committing property crimes. This transition might be due to certain factors like peer pressure or exposure to deviant forms of behavior that led some of them to commit crimes.

To resolve this problem, family and school support should be more concentrated on the development of youth during these crucial years of their development. Also, social workers should pay them special attention, as they are more likely to be influenced by their peers.

The Unemployment Rate

I found no significant interpretation of the unemployment rate in this study, since it was only significant in the cases of robberies and “other burglaries”. Nevertheless, the effect of unemployment on people’s tendency to rob was slight, although it had a large, but negative, impact on the crime rate. This defied the common

belief that more unemployment leads to more crime. More studies should be conducted to reveal the real effect of unemployment on crime.

The Tuen Mun and Shatin Factors

The significant value of the TMST factors could be due to the different characteristics of the two districts. The positive values of the TMST factors implied that the crime rate in Tuen Mun was higher than that in Shatin. However, it was difficult to judge the fundamental reasons for this with the limited information at hand.

Implications of the Study

The Situation in Hong Kong

The reason for guiding new towns in Hong Kong is similar to that in Britain. During the 1960s, there was another unexpected influx of immigrants from China into Hong Kong. This led to a great increase in its population, and new towns were built to accommodate the people's growing housing and employment needs. Moreover, Hong Kong's industries were growing rapidly and stimulated demand for more industrial land. The government turned to the New Territories to relieve the burden of the old urban areas. In those days, as many as three generations of the same family lived together under one roof. However, the size of the average family has since fallen to just 3-4 members.

There two main motives behind the establishment of new towns were: (1) to solve the housing problem and 2) to alleviate the urban congestion and therefore improve environmental conditions in the

urban areas. The two main concepts of new towns are self-contained and balanced development, as summarized below:

"Self-contained" developments are new towns satisfying the basic needs of its inhabitants in terms of housing, employment, education, recreational and other community facilities thereby lessening the dependence on the nearby city (Lands Department 1988, Lai 1987; 1989).

"Balanced development" is the objective [of achieving] a community composed of people of diversified socio-economic status and skills. Through this concept, it is hoped that a healthy and harmonious social mix within a community can be achieved (Lands Department, 1988).

In fact, self-containment can be achieved primarily by providing local job opportunities and eliminating the amount of time required for workers to get to their jobs.

Unfortunately, Hong Kong's economy soured during 1998 to 2003, when its unemployment rate was high. This created large income differences at the time. The economy finally recovered in late 2003, and the situation of many people in Hong Kong gradually improved.

In 2006, the percentage of people with a tertiary education level reached 31%, while it was only 21% ten years earlier. The globalization process in Hong Kong widened the gap between the rich and poor. At the same time, many jobs moved to developing countries, and this worsened the plight of low-income earners.

The increasing ratio of high-income employment opportunities to low-income employment opportunities also exacerbated income inequality. In the past, the incomes of all workers were very similar. Only a small proportion of businessmen enjoyed large incomes. Now, an increased number of high-income employment opportunities has shifted a small portion of low-income people into

high-income jobs, but most low-income earners have remained poor.

The New Town Planning Process

Both Tuen Mun and Shatin are among the first generation of new towns. The development in Tuen Mun commenced during the 1970s, while that of Shatin started in 1961.

In fact, large-scale public housing developments, including public housing, rental housing, home ownership scheme estates etc., epitomized the development of Tuen Mun and Shatin. According to the 2001 Population Census, 62% and 59% of the people living in Tuen Mun and Shatin, respectively, lived in public housing.

The objectives of the new town development programme were “to provide a balanced provision of public and private housing, job opportunities and community facilities both at the end of each stage of development and on completion of the total programme.”

Nevertheless, Cullingworth (1973:129) showed that public housing experienced faster development than private housing because it is less sensitive to market forces. As a result, a gap occurred between the provision of public and private housing. This led to a social imbalance and violated Aldridge's (1979) provision for new town development. An imbalanced social structure could lead to strain and encourage some people to commit crimes.

During the planning stages in the development of new towns, special attention was given to transportation and employment. To provide connections between the new town and other districts, new physical infrastructure, like a rail and road network, was built.

Cullingworth (1973:123) stressed the importance of social planning in new towns:

The environment needs to be "good" not only in terms of physical layout and design, but also in terms of social opportunity and satisfaction. This is a matter partly of the

provision of services, but also of the social composition of the area and its relationship with other areas.

Chan (1998) argued that Hong Kong's transport network and facilities were uncoordinated during the early stages of new town development. An inadequate transport network separated the new towns from other areas, contravening the concept of building "connected" new towns to the urban areas. As each district heavily relied on the operation of a transport network, once it fails, people will find it difficult to access resources and job opportunities from other areas. For instance, annual landslides along Tuen Mun Road, which connects it to Tsuen Wan, have affected Tuen Mun's links to the rest of Hong Kong.

A portion of the land in Shatin has been reserved for the development of light industries to provide job opportunities. However, these opportunities may not meet the demands of the community, as the unemployment rate of Shatin (6.9%) in 2001

was higher than that of Tuen Mun (6%)¹⁰. On the other hand, the inadequate transport network discouraged children from attending schools outside these districts. Since people in these two new towns are largely confined to their community, they find it harder to make friends with people in other districts. It would be less easy for juveniles to escape from the peer pressure among his/ her group of friends in town.

Therefore, it is important to adjust the new town planning process to take into account the problem of an imbalanced class structure, insufficient job opportunities, and insufficient social facilities and services.

¹⁰ According to the 2001 Population Census

Recommendations

To tackle the above problems, the government should devote resources to resolve the imbalanced class structure, insufficient social facilities, and community network.

Insufficient job opportunities mean that the demand for jobs is not satisfied by the provision of jobs. Also, the kind of jobs offered may not fit the skills and training of the targeted population.

1. The Development Process of New Towns

Regarding the management of new town development, construction periods should be considered so that on the day of the completion of public housing, transportation and public facilities should already be there to serve the community. This will allow people to access resources in other districts. Also, the proportion of the population living in public housing to that living in private housing should be maintained at a certain ratio, which has to be found by further empirical studies, to ensure a housing balance in each district.

2. Land Allocation to Provide Meaningful Employment Opportunities

Land allocation would not only affect the provision of public facilities, like parks, to the community, but also affect the quality of life for its residents (Yip 2006). In fact, focus should not be put merely on the economic development of each district during town planning, but also on the effect such developments may have on the community. For instance, certain redevelopments may get rid of small business owners and hawkers, which will adversely affect their ability to work and sense of independence. To compensate, land for shopping malls and industrial facilities may help provide job opportunities for low-skilled residents like sales workers. Also, this type of facility can help to boost the economy and stimulate further development within the district.

3. A Youth Training Programme

There should be programmes to enhance the employability of youth. This can improve their skills and allow them to adapt to

society's changing conditions. Such a programme should focus on developing personal and computer skills and provide subsidies for youth to attend. This should help enhance the "returns" from legal activities and discourage youth from engaging in illegal activities.

4. Employment Creation

Through career programmes and cooperation with private and non-profit organizations in the new towns, employment opportunities could be provided for youth and the unemployed. On the other hand, Tang (2006) suggested that entrepreneurship programmes could be introduced to youth to help them create their own businesses and hence, escape unemployment.

5. Education

Support and consultant services could be provided for Form Three or other education level graduates to face the difficulties that will arise during job hunts and when they make the transition from school to work. This would ensure a proper

way for youth to develop valuable skills and avoid going astray and engaging in criminal activities.

6. Social Support

A social support network should be provided for low income households. Although the CSSA in Hong Kong has been around for years, Tse (2006) said that it is not sufficient to help those in the lowest income groups escape from poverty because it only helps suffering families obtain employment opportunities while the income employment may only help them make ends meet, but not improve their economic situations and allow them to accumulate wealth to escape poverty. However, in foreign countries like the UK and Taiwan, a concept of asset building is incorporated to help families accumulate assets and investment.

Chapter Five

CONCLUSION

This study is an initial study on the relationship between property crime rates and socio-economic factors in Hong Kong. I first reviewed a number of papers from the relevant literature. Then, I conducted a regression analysis using crime data for the Tuen Mun and Shatin Districts to discover the effect of certain socio-economic factors on property crime rates. The data I used in this study consisted of the Hong Kong Police's Crime and Enforcement Reports and the socio-economic factors reported in the Population Census, By-Census, and General Household Survey.

Due to the limited availability of data, only a total of 128 samples were identified from 1986 to 2001. The method I employed to testify to the relationship between crime rates and socio-economic factors was multiple linear regression. The dependent variables were the "other robberies" rate, "burglary with breaking," "other burglaries" rate, and "theft" rates, while the independent variables were median household income, inequality, education level,

percentage of youth aged 9-14 and 15–19, and the unemployment rate.

As I showed in the analysis, the five socio-economic factors had a different effect on the different property crime rates. The effect of these factors was inconclusive as a whole, but each of the five factors individually was related to property crime to a certain extent. In short, the relationships were as follows:

1. The “other robberies” rate was affected by the education level, the percentage of youth aged 9-14, the unemployment rate, and the differences between Tuen Mun and Shatin.
2. The “burglary with breaking” rate was influenced by the percentage of youth aged 9-14 and 15-19.
3. The “other burglaries” rate was determined only by the unemployment rate.

4. The “theft” rate was affected by the median household income level, the education level, the percentage of youth aged 9-14, and the differences between Tuen Mun and Shatin.

The differences between the two districts seemed to have a certain effect on the “other robberies” and “theft” rates. This could be due to fundamental differences in the location, cultural characteristics, and household characteristics of the two areas.

Upon reviewing new town development, I found that the process of development affects the crime rate of an area. For example, the development of public housing could be completed at an early stage with insufficient facilities to support the community. Also, the proportion of public housing to private housing might have brought about some social imbalances, and thus, encouraged people to engage in criminal activities.

On the other hand, the land allocation, community facilities, and means of social support in the new towns affected the employment and education opportunities provided in the districts.

Limitations

1. Literature Reviews from Foreign Countries

Most of the literature on crime and socio-economic factors came from foreign countries, with few studies on the situation in Hong Kong or Chinese communities in general. The results of such works were not the most suitable references due to cultural differences. Traditionally, Chinese people are educated not to commit crimes because of the fear and shame of sanctions. If this proposition is true for Hong Kong, Chinese people here will have less incentive to commit property crimes.

2. Limited Data from the Two Districts

In this study, I used data from only two new towns. This was not sufficient for me to probe deeper into the topic. Hence, one should be cautious in interpreting the results, as certain

characteristics of the two new towns might have been incorporated into the model of regressions.

3. Underestimation of Crimes

The crime rates used in this study represented the number of cases reported to the police throughout the years. The actual number of crimes committed was almost certainly higher, since some people simply did not bother to report crime. As people have become richer, they may be less concerned with their property being stolen, and some of them may not report the case because they find it a hassle.

To enhance the accuracy of the analysis, victimization-based crime rates should be used to avoid problems associated with the officially reported crime rates across aggregate units. Thus, a more accurate study of differences in crime rates across different district areas should be carried out in the future.

4. Limitation of the Data at the District Level

Due to the absence of the annual data on socio-economic factors at the district level, I used interpolation in this study. This might have omitted data fluctuation during the five-year period and given rise to less accurate results. However, this problem is difficult to resolve.

5. Variation of Indicators

Economists have traditionally assumed that unemployment is an indicator of economic need that could be satisfied by committing property crimes. However, in a modern welfare system, which provides unemployment compensation and other forms of social support, the situation may not be so. Moreover, unemployment does not reveal joblessness, but the job-seeking process. The job-seeking process reflects people's commitment to work instead of engaging in illegal activities.

Further Study

1. Incorporation of Other Factors

Apart from the factors I used in this study, I could have used other factors, like punishment, strictness of legislation, and underemployment. Also, Allan and Steffensmeier (1989) suggested that factors like job insecurity, low pay, poor benefits, and few opportunities for advancement could affect the dimensions of employment. These measures could provide incentives for young people to commit crimes. On the other hand, punishment and the duration of sanctions could also affect the crime rate.

2. Data from Other Districts

Since I only used data from Tuen Mun and Shatin, the conclusions may only apply to new towns, but not the urban areas in Hong Kong. Therefore, there should be a study of other districts in the city.

3. Public Housing

As I mentioned in this dissertation, the development process and proportion of public housing in new towns may affect their crime rate. Future studies can consider where public and private housing should be located and the most suitable proportion of public to private housing in new towns.

Appendix I

Definition of terms

Age: age is the number of complete years a person has passed since birth. It is derived from month and year of birth. (Population Census 2001, Census and Statistics Department, HKSAR)

District Council District: These geographical districts are as declared in the District Councils Ordinance (L.N. 77 of 1999) and Electoral Affairs Commission Ordinance (G.N.E.) 6 of 1999) for the District Council district election held on 28 November 1999. There are 18 districts: 4 on Hong Kong Island; 5 in Kowloon and 9 in New Territories. (Population Census 2001, Census and Statistics Department, HKSAR)

Domestic Household: A domestic household consists of a group of persons who live together and make common provision for essentials for living. These persons need not be related. If a person makes provision for essentials for living without sharing with other persons, he is also regarded as a household. In this case the household is a one-person household. (Population Census 2001, Census and Statistics Department, HKSAR)

Unemployed population: Refer basically to persons aged 15 and over who should (a) not have had a job and should not have performed any work for pay or profit during the seven days before the Census; (b) have been available for work during the seven days before the Census; and (c) have sought work during the thirty days before the Census. (Population Census 2001, Census and Statistics Department, HKSAR)

Educational Attainment (Highest level attended): The highest level attended is the highest level of education ever attained by a person in school or other educational institution, regardless of whether he had completed the course. Only formal courses are counted as educational attainment. A formal course shall be one that lasts for at least one academic year, requires specific academic qualifications for entrance (except sub-degree/ degree/ post-graduate courses offered by the Open University of Hong Kong) and includes examinations or specific academic assessment procedures. The Lower secondary level (used in the regression analysis) includes Secondary 1 – 3 in all schools.

Median Monthly Domestic Household Income: The average monthly domestic household income so calculated that 50% of the total number of domestic household had incomes above that figure and the other 50% had incomes below it. Zero income households are included in the calculation.

Population: It refers to the “Hong Kong resident Population”. The Hong Kong Resident Population at the census moment covers “Usual Residents” and “Mobile Residents”. “Usual Residents” refer to two categories of people: 91) Hong Kong Permanent Residents who had stayed in Hong Kong for at least three months during the six months before or for at least three months during the six months after the census moment, regardless of whether they were in Hong Kong or not at the census moment; and (2) Hong Kong Non-permanent Residents who were in Hong Kong at the census moment. As for “Mobile Residents”, they are Hong Kong Permanent Residents who

had stayed in Hong Kong for at least one month but less than three months during the six months before or for at least one month but less than three months during the six months after the census moment, regardless of whether they were in Hong Kong or not at the census moment.

Type of Quarters: Quarters are classified according to the type of building in which they are located. The buildings are classified by the type of construction materials; the purpose for which they are built; and the sector responsible for their construction.

Public rental flats:

Housing Authority rental flats: These include flats in housing estates previously known as the Government Low Cost Housing and those built by Hong Kong Housing Authority and flats in housing estates previously known as Resettlement Estates but have been put under the management of the Housing Authority since 1973.

Housing Authority rental flats (Interim Housing/ Tenants Purchase Scheme): These are rental flats in Interim Housing blocks and Tenants Purchase Scheme (TPS) blocks of the Housing Authority.

Housing Society rental flats: These are rental flats built and managed by the Hong Kong Housing Society.

Subsidized sale flats

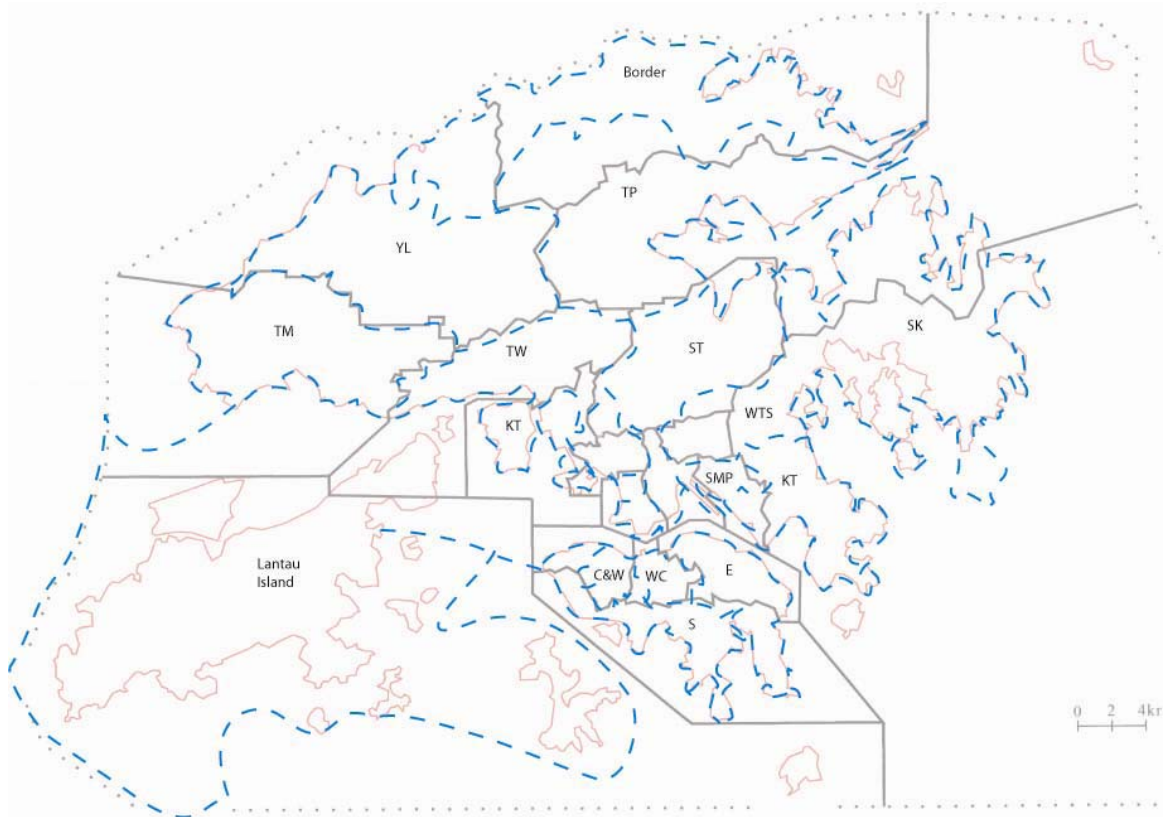
Housing Authority subsidized sale flats: These include flats sold under

the Home Ownership Scheme (HOS), Middle Income Housing (MIH) Scheme, Private Sector Participation Scheme (PSPS), Buy or Rent Option (BRO) Scheme, Mortgage Subsidy Scheme (MSS) and TPS of the Hong Kong Housing Authority, but exclude those flats that can be traded in open market.

Housing Society subsidized sale flats: These include flats built under the Flat for Sale Scheme (FFSS) and Sandwich Class Housing Scheme (SCHS) of the Hong Kong Housing Society, but exclude those flats that can be traded in open market.

The above public rental flats and subsidized sale flats were regarded as the “Public Housing” in this study.

Appendix II



Dotted line: police district boundary

Solid line: district board boundary

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