An Empirical Analysis of Crime in Jamaica: The Influence of Socio-Economic Factors on Crime in Jamaica (1975-2008)

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Abstract

Previous studies have found that changes in crime can be significantly explained by disparities and changes in income as well as educational availability and investment in social programs. Guided by the results of these studies as well as Merton Strain theory and Becker's economic theory of crime, this study investigates the relationship between crime and income, labour participation, education, public social investment and also elections. The OLS estimates of the linearly detrended model of crime revealed that labour participation, education and public social investment significantly influenced crime in Jamaica.

Keywords: Time series, *crime, labour force, wages,*

1.0 Introduction

The rising crime rate continues to be a serious problem for many Jamaicans. The annual murder rate has been trending upwards, and reached record number in 2009 (approximately 1680) however other forms of serious crimes are declining. Over the years, there have been several policies and crime fighting initiatives introduced with the aim of reducing crime in Jamaica. However, these policies and initiatives have been unable to significantly reduce the levels of crime. The main problem arising from these approaches is that they try to tackle crime after it has been committed rather than focusing on the socio-economic and other causal factors of crime.

Several studies have been undertaken internationally to ascertain the main factors which cause crime. However, few studies have been carried out within the Caribbean that have examined the socio-economic causes of crime. This study add to the perspectives of crime in Jamaica by studying crime causation in relation to such socio-economic factors. Wang (2005) found that a lack of reasonable access to employment opportunities create strains on the society which leads to violence and other crimes. Several studies have also found that increased educational opportunities significantly lead to a decrease in first time crimes and also re-offending rates. Therefore, it can be hypothesized that persons with more education tend to commit less crimes. In addition, lower income earners are more likely to resort to crime as a means of supplementing income.

This study paper seeks to examine the relationship between crime and the socio-economic factors of income, unemployment, education and social investment. A time series analysis will be used to study the crime trends in Jamaica over the period 1975-2008. This study will focus on

serious crimes which include murders, shootings, robbery, breaking and entering and larceny. Furthermore, the study will also examine the influence of Jamaica's political environment on crime by comparing the difference between the amounts of serious crimes committed in election years as opposed to the amounts committed in non-election years.

Section 2 of this paper summarizes the results of several relevant studies which have been conducted to ascertain the socio-economic influences of crime across the world. Section 3 will outline the theoretical basis on which this study will be conducted. The two theories of crime causation that will be applied to this analysis are Merton's Strain Theory of crime and Becker's Economic Theory of crime. Section 4 explains the econometric models being used for this study as well as the process involved in the deriving this model. Section 5 is a description of the data being used in this study. Section 6 shows the results of the study and possible explanations for these results. Section 7 is the argument of possible policy implications of the study and also the conclusion.

2.0 Literature Review

Several studies have been conducted to ascertain the causes of crime across the world. Some researchers have investigated crime causation as a function of biological, social, economic and also psychological factors. Wong (1994) conducted a study of the relationship between crime and economic incentives using time series analysis. In his study, *An Economic Analysis of the Crime Rate in England and Wales, 1857-92*, Wong tried to determine the relationship between crime and the probability of being convicted, severity of punishment, economic risk of legal activity, gains from legal and illegal activities, unemployment rate and education standards of the country. The study found that the gains from legal activity had a significantly negative impact on

crime. Wong concluded that the declining crime rate observed in the period 1857-1892 can be explained primarily by the rising economic prosperity and educational standards of the population.

Machin and Meghir (2004) also studied crime and economic incentives in England and Wales (1975-1996). They used both ordinary least squares estimation and instrumental variable estimation to investigate the relationship between crime (property and vehicular crimes) and wages and convictions. As it relates to crime and wages, Machin and Meghir found that wages had a negative effect on both types of crimes. They concluded that crimes rates are higher in areas where wages are distributed at the lower end of the market.

In 2002, Gould, Weinberg and Mustard conducted a panel series study on the relationship between crime rates and labor market opportunities in the United States (1979-1997). Gould et al made the assumption that young unskilled men commit most crimes. From this assumption, the researchers investigated the impact of wages and unemployment on crime. The researchers used instrumental variable estimation to establish causality. The study revealed that both wages and unemployment had a significant impact on crime in the United States. However, wages had a larger effect on the variation in crime over the period under study.

Morgan Kelly (2000), sought to find a relationship between inequality, which was measured by income level, and crime (property and violent crimes) using logistic regression analysis. Kelly found that income inequality did not have an impact on property crime however it did have a significant impact on violent crime. By extension relating income inequality to the current model, it can be assumed that being unemployed results in a diminished level of income. Kelly

concluded that the economic theory of crime can substantially explain property crimes. However, violent crimes can be better explained by the strain theory.

The studies of the previously mentioned researches all highlight the significance of economic factors in determining changes in crime rates. They highlight the causal effects of disparities in wages and income on the various types of crimes. Therefore income and labour market factors are important areas that should be included in the investigation of crime in Jamaica. The social factors of education and public social investment have also been studied by other researchers.

Gillis (2004) investigated the influence of public education and literacy on the declining rates of serious crimes in France (1852-1913). The study focused primarily on literacy at the primary and secondary level. Gillis performed Ordinary Least Squares estimation on an ARIMA[1] model and found that literacy was significantly associated with declining rates of both violent and property crimes.

Sabates and Feinstein (2008) examined the impact of government initiatives on juvenile crimes. They concluded that educational policies should complement direct interventions in order to arrive at viable crime prevention. This conclusion can be supported by Donohue and Siegelman(1998) who concluded that close attention should be placed on social intervention (public policies) at the primary level rather than increasing expenditure on incarceration and rehabilitation facilities. Therefore, crime fighting measures must be complemented by increased investment in education, training, youth programs and social welfare in order to reduce criminal activities.

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[1] Auto-Regressive Integrated Moving Average- a model used for forecasting which has both an autoregressive component and a moving average component and is also differenced.

Anthony Harriott (2002), sought to give an accurate description of the crime problem faced by the island particularly in election years. He traced this problem from the post colonial period to the present day context and explains how the national institutions and a change in people's views can alleviate this problem. He describes Jamaica as being in a public safety and national security crisis. The high accommodation for white collar crime and mismanagement of resources severely exacerbates the crime problem. Based on the views of Harriott, the crime situation in Jamaica is a complex one that not only develops from socio-economic inadequacies but also political factors.

3.0 Theoretical Framework

The complex issue of crime causation has been examined from various perspectives over the years. Theories have been developed which relate crime causation to biological factors, social factors, economic factors and even psychological factors. This study will focus on the socio-economic factors that are associated with crime. Merton's Strain theory of crime explains crime from a macro-social perspective. This theory proposes that an individual resorts to crime when he experiences strain or pressure and his goals are being blocked. That is, persons who are lower in the social structure are frustrated by their failure to achieve success and therefore resort to crime (Kelly, 2000).

The variables of income and education are applicable when the strain theory is applied to the Jamaican context. A higher level of education achievement and availability in the society gives individuals the opportunity to achieve their basic and safety needs[2]. These needs may be satisfied through the availability of higher income earning opportunities. If these needs are satisfied, societal strains will be reduced and criminal activities will become less attractive. Therefore, the

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[2] Based on Maslow's Hierarchy of needs theory – the lower tier physiological and safety needs

government's intervention through social programs does act as a means of reducing strain on individuals.

Becker's economic theory of crime proposes that individuals allocate time market and criminal activities by comparing the returns from crime to the likelihood and severity of punishment (Becker, 1968). Therefore, if the gains from being educated or employed are low and the returns of criminal activities are high, persons may rationally resort to crime. As a result, labour participation will be reduced as more individuals will drop out of the labour force and resort to crime. Furthermore, if social welfare gains are consider low, persons will be attracted to the relatively high returns gained from crime.

4.0 Econometric model

For this study, the relationship between crime and socio-economic factors will be examined using time series analysis. The basic model used is represented by the following equation:

$$crime = \beta_1 + \beta_2 income_t + \beta_3 lpart_t + B_4 educ_t + B_5 pub_t + u_t \quad (1)$$

where crime represents number of serious crimes reported, income represents gross domestic product per person employed, lpart represents labour participation rate, education represents total enrollment in secondary educational facilities, pub represents percentage of recurrent expenditure spent on social programs and u represents the error term.

Crime is expected to have a negative relationship with income. As an individual's income decreases, that individual is more likely to crime. Crime is expected to have a negative relationship with labour participation. An individual who is employed or actively seeking employment will have less time and opportunity to commit crimes. Education is negatively related to crime; a rise in educational opportunities and achievement will result in increased

income earning opportunities for that individual. It is also expected that public social investment will have a negative effect on crime. That is, a rise in government spending on social programs will result in a decrease in crime.

Considering the relationship between crime and the independent variables discussed above, the resulting equation was produced.

$$crime_t = \beta_1 - \beta_2 income_t - \beta_3 lpart_t - \beta_4 educ_t - \beta_5 pub_t + u_t \quad (2)$$

The data used was time series, because the variables were analyzed over a specific time period (1975-2008). Ordinary Least Squares estimation was used to conduct the analysis. In order to conduct a time series analysis on this model, several assumptions must be satisfied. The variables must be linear in parameters and variables should not be perfectly collinear. There should not be variables in the error term that are correlated with the independent variable that are explicitly expressed in the model. The model should also contain all homoskedastic variables in order to give valid results. The error terms in different time periods should not be correlated with each other. It is also essential that all are normal or as close possible to normality so that inferential test can be conducted.

All variables in this analysis were linear in parameters. As table 1 indicates, crime, income and labour force participation rate were negatively skewed; social public investment and education were positively skewed. The skewness of these variables suggests that these variables were not normal. To address the normality problem of the variables, the logarithmic function of crime, income, labour force participation rate, public social investment and education were taken (eq 3). This transformation resulted in the following equation. The model did not suffer from a

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heteroskedasticity problem (see figures 6-9). Taking the Logarithmic form of the variable and /or first differences can also eliminate the multicollinearity problem.

$$\lg crime_t = \beta_1 - \beta_2 \lg income_t - \beta_3 \lg lpart_t - \beta_4 \lg educ_t - \beta_5 \lg pub_t + u_t \qquad (3)$$

Figures 1 to 5 suggest that crime, income, education and labour force participation and public social investment had a time trend. It is important that the variables are stable or stationary over time in order to obtain unbiased and efficient estimates. In order to test if the variables were trending with time and not as a result of other factors, each variable was regressed on time and a constant. The time trend was found to be significant for all variables, which indicates a spurious regression problem. Consequently, the detrending method was used to eliminate the trending portion of each variable. The residuals[3] of the following equations were collected and used for further analysis. The following set of equations represent the steps in the process arrive at detrended model; where T represents time and e_t is

$$\lg crime_t = \delta_0 + \delta_1 T + e_t \qquad (4)$$

$$\lg \overset{...}{crime} = \lg crime_t - \delta_0 - \delta_1 T \qquad (5)$$

$$\lg \overset{...}{crime} = e_t \qquad (6)$$

This resulted in the following regression model which is a linearly detrended[4].

$$\lg \overset{...}{crime}_t = \beta_1 - \beta_2 \lg \overset{...}{income}_t - \beta_3 \lg \overset{...}{lpart}_t - \beta_4 \lg \overset{...}{educ} - \beta_5 \lg \overset{...}{pub} + u_t \qquad (7)$$

An alternative test was conducted to examine the stationarity of the variables. The stationary property of a variable is that the variable reverts to its mean as time progresses. The Augmented Dickey Fuller test for the existence of a unit root was conducted on these variables. If the

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[3] The difference between actual value of the and the predicted or estimated value (Wooldridge, 2009)
[4] A model which contains only residuals after the time trend has been removed from all variables

variable did not have a unit root, it would have been considered stationary. The results of the Augmented Dickey Fuller Test indicated that these variables contained unit roots in levels. The Augmented Dickey Fuller Test was also conducted on the first difference of these variables which indicated that all the variables were stationary in their first differences (see table 4). These variables were integrated of order one. The first differences of these variables were also used for this analysis.

$$\Delta \lg crime_t = \beta_1 - \beta_2 \Delta \lg income_t - \beta_3 \Delta \lg lpart_t - \beta_4 \Delta \lg educ_t - \beta_5 \Delta \lg pub_t + u_t . \quad (8)$$

It was important to capture the effect of the Jamaican political climate on crime. Therefore, a dummy variable for election years was introduced into the model. This resulted in the following models; the linearly detrended model (eq 9) and the model of first differences (eq 10).

$$\lg crime_t = \beta_1 - \beta_2 \lg income_t - \beta_3 \lg lpart_t - \beta_4 \lg educ - \beta_5 \lg pub + \alpha_0 electyrs + \alpha_1 electyrs * lpart_t + u_t$$
$$(9)$$

$$\Delta \lg crime_t = \beta_1 - \beta_2 \Delta \lg income_t - \beta_3 \Delta \lg lpart_t - \beta_4 \Delta \lg educ_t - \beta_5 \Delta \lg pub_t +$$
$$\alpha_0 electyrs + \alpha_1 electyrs * \Delta \lg lpart_t + u_t \quad (10)$$

5.0 Data Description

Time series data was chosen to study the relationship between crime and income, labour force participation, education and public social investment over a period of time (1975-2008). The valid sample size was reduced to 30 after missing values were eliminated. It was also imperative to see if crime was significantly affected by politics, so election year was included as a dummy variable.

Crime rates were actual figures of serious crime committed in Jamaica over the specified period of time; which included murders, shootings, robberies and break-ins, received from the

Constabulary Communication Network of Jamaica (C.C.N.). Crime had a mean of 11350 with a standard deviation of 3764.815. The maximum amount of crimes committed was 16195 (1980) and the minimum was 5231(2003). The crime data was also negatively skewed.

The income variable was measured by gross domestic product per person employed in Jamaica ($US per annum). This data was taken from the World Development Indicators (2009) dataset provided by the World Bank. The average income per person employed was US$9,703.11 per annum with a standard deviation of US$437.09. The person income ranged from US$8,675 to US$10,313 per annum. GDP per person employed was also negatively skewed.

Labour force participation was obtained from the World Development Indicators dataset (2009) and was measured as the percentage of the total population who are in the labour force. The mean labour participation rate is 70.9% with a standard deviation of 3.451%. The highest labour participation rate was 75.4% (1982) and the lowest was 65.5% (2004).

Education data was received from the Ministry of Education, Youth and Culture. Education was measured as the number of students enrolled in grades 7 to 11 of secondary schools. The average number of students enrolled in any given year was 197,497 with a standard deviation 28,053. The maximum enrolment amount was 237,273 (2004) and the minimum amount was 161,582 (1985).

Public social investment was measured as a percentage of the functional classification of recurrent expenditure found in the Economic and Social Survey of Jamaica (1975-2009), published by the Planning Institute of Jamaica. The mean of public social investment was

27.14% with a standard deviation 14.46%. The highest level of public social investment was 68.79% in 1982 and the minimum amount of spending was 13.36% in 1986.

As table 3 indicates, income and education were both negatively related to crime (also see figure 6 and 8). There was a very strong relationship between education and crime (r= -0.9, p<0.05) and very weak insignificant relationship between income and crime (-0.07, p>0.05). There was a very weak, positive relationship between education and income (r=0.12, p<0.05). There was a positive moderate relationship between crime and public social investment (r=0.45, p<0.05). There was a very strong relationship between crime and labour participation (r=0.952, p<0.05) There was a moderately positive relationship between labour participation and public social investment (r=0.61, p<0.05). There was a moderate negative relationship between education and public social investment (r=-0.56, p<0.05) and a very strong negative relationship between education and labour force participation(r=-.88, p<0.05). Income was very weakly related to both public social investment (r=0.051, p>0.05) and labour force participation (r=0.028, p>0.05).

6.0 Results and Discussion

When the significance of the two models was observed, it was found that the detrended linear model was more significant (R^2= .564, F=6.816) than the model using first differences (R^2 = 0.125, F= 1.69). Therefore the results of the detrended model will be used for the analysis.

LABOUR PARTICIPATION AND CRIME

Column 1 (table 6) indicates that there is a significant positive relationship between labour force participation and crime (R^2 = 0.437 F = 22.76). A 1% increase in labour force participation results in a 9.06% increase in crime.

$$\lg \overset{...}{crime} = 0.0404 + 9.06 \lg \overset{...}{lpart} + u_t \qquad (11)$$
$$(1.898)$$

This result violates the hypothesized relationship which was discussed earlier. It was expected that an increase in labour force participation would result in a decrease in crime. However, in Jamaica's case labour force participation is positively related. Labour force participation rate encompasses both employed and unemployed persons. Consequently, the proportion of the population entering the labour force each year can be greater than the proportion that become discouraged and leaves the labour force. Therefore, the increasing portion of the labour force that is unemployed can account for the increase in crime. There is also another probable explanation for this positive relationship. As figure 1 and 2 suggest, crime and the labour participation rate are both declining. Therefore despite the increasing numbers of murder, other types of crimes reported have been decreasing. The declining labour force can be explained by the increasing informal economy in Jamaica. Therefore, not being employed in the formal economy does not immediately imply that an individual will resort to crime. A large portion of unemployed labour force is now engaging in the informal economy as a means of income generation.

INCOME, EDUCATION AND PUBLIC SOCIAL INVESTMENT

Column 2 (table 6) indicates that education and public social investment significantly affects crime in Jamaica; however, income had an insignificant positive effect on crime ($p>0.05$). The model was also significant in explaining the variation in crime; however, the variables only explained a small portion of the variation in crime ($R^2 = .344$, F5.724). The expect relationship between crime and education was substantiated by the results. A 1% increase in current secondary enrollment results in a 1.583% decrease in crime. Public social investment also

affected crime as expected. Public social investment had a significant but very small, negative effect on crime. For every 1% increase in public social investment, crime only decreased by 0.227%.

$$\lg \overset{...}{crime} = 0.0119 + 0.636 \lg \overset{...}{income} - 1.583 \lg \overset{...}{educ} - 0.227 \lg \overset{...}{pub} + u_t \quad (12)$$
$$(0.55) \qquad\qquad (0.514) \qquad\qquad (0.074)$$

The insignificance of income in explaining changes in crime can be explained by two points of view. The variable used to measure income was gross domestic product per person employed. This variable distributes total national income across all employed persons. The problem with this variable is that Jamaica suffers from a high level of income inequality (Gini coefficient =45.5 %). This variable does not capture crime at varying income levels within the society.

Although the expected relationship between crime and education and public social investment was substantiated, only a small portion of crime was explained by these variables. These variables may have a delayed effect on crime. That is, increased enrollment in educational institutions would have a greater negative effect on crime after those individuals enter the workforce. The same can be said for public social investment; government investment in social programs will take years to have a substantial effect on crime.

THE POLITICAL EFFECT OF ELECTION YEARS ON CRIME

Column 4 (table 6) shows the entire model, including the effect of election years as well as the interaction of election year and labour force participation. This model was significant in explaining the variation in crime ($R^2 = 0.564$, F=6.816). The amount of crime committed in an election year was 2.23% greater than the amounts committed in a non election year. However the difference amounts of crime committed in election year and non-election years was insignificant (p= 0.72>0.05). The interaction between election year and labour force participation also had an

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insignificant on crime (p= 0.541>0.05). Labour force participation during and election had a negative insignificant effect on crime (p= 0.54>0.05). This relationship is illustrated in the following model.

$$\lg \overset{...}{crime} = 0.017 - 0.529 \lg \overset{...}{income} - 1.003 \lg \overset{...}{educ} - 0.12 \lg \overset{...}{pub} +$$
$$(0.603) \qquad (0.406) \qquad (0.08)$$
$$\tag{13}$$
$$8.442 \lg \overset{...}{lpart} + 0.022 \ electyrs - 2.409 \ electyrs * \lg \overset{...}{lpart} + u_t$$
$$(2.323) \qquad (0.063) \qquad (3.874)$$

The insignificance of elections in explaining crime can be attributed to the fact that most political violence is concentrated in the twelve garrison constituencies. Political violence is also often unreported due to fear of retaliation. Political violence during election year has also decrease since the 1997 election because of the introduction several measures to combat the influence of Garrison politics.

7.0 Conclusion

Labour force participation, public social investment and education were most significant in explaining crime in Jamaica. Education had a negative effect on crime while labour force participation had a positive influence on crime. The effect of public social investment and education on crime was small. Income was insignificant in explaining changes in crime for all models.

The magnitude of the positive relationship between crime and labour participation indicates that a component of labour participation has a large effect on crime. The unemployed portion of the labour force could be this component. By reducing the unemployed labour force the effect of labour participation will tend towards a negative relationship. This can be done by creating an

environment in which small business are able to thrive and generate employment opportunities. Given that public social investment and education both result in reductions in crime, greater focus should be placed on these areas. Therefore, government should be spending more on social programs that will educate and enhance Jamaica's human capital.

The political influence on crime was found to be insignificant from the Jamaican social perspective. That is, in Jamaica, politics does not have such a significant effect on crime as was previously thought. The influence of the garrison activities and politics is waning as several safe guards were introduced to prevent corruption and reduce political intimidation.

Any subsequent crime fighting policies implemented by the Government of Jamaica must target education and also create employment opportunities. More funding should be diverted to building educational facilities and also training and literacy programs for the population. In addition policies should be put place to broaden the social safety net to include persons most vulnerable so their motivation to resort to criminal activities may be reduced. This is the only viable solution to Jamaica's crime problem.

APPENDIX 1: TABLES

Table 1

Variable description

Variable	Proxy/ variable name	Units of measurement
crime	Serious crimes as classified by the CCN 1975-2008	Number of crimes
income	GDP per employed person	US$ per annum
lpart	Labour participation rate	Percentage of the population
pub	Public social investment	A percentage of total recurrent expenditure
Electyrs	Election year	1 if it is an election year, 0 otherwise

Table: 2

Descriptive statistics of crime levels, income, public social investment, education and labour participation rates.

	CRIME	INCOME	LPART	EDUC	PUB
Mean	11350.57	9703.107	70.90000	197496.5	27.14000
Median	12989.00	9868.000	72.55000	188117.5	20.85000
Maximum	16195.00	10313.00	75.40000	237273.0	68.79000
Minimum	5231.000	8675.000	65.50000	161582.0	13.36000
Std. Dev.	3764.815	437.0924	3.450631	28052.69	14.45613
Skewness	-0.419325	-0.645993	-0.479367	0.184331	1.836698
Kurtosis	1.494612	2.472169	1.664760	1.354911	5.400344
Sum	317816.0	271687.0	1985.200	5529902.	759.9200
Sum Sq. Dev.	3.83E+08	5158345.	321.4850	2.12E+10	5642.455
Observations	30	30	30	30	30

Table: 3

Correlation coefficients for variables

	PUB	CRIME	LPART	EDUC	INCOME
PUB	1.000000	0.450102	0.609600	-0.564064	0.051486
CRIME	0.450102	1.000000	0.951695	-0.900291	-0.065825
LPART	0.609600	0.951695	1.000000	-0.886396	0.028445
EDUC	-0.564064	-0.900291	-0.886396	1.000000	0.122206
INCOME	0.051486	-0.065825	0.028445	0.122206	1.000000

Correlation statistics before any transformations have been made to the data

Table 4
Unit Root Tests

Augmented Dickey Fuller Test		
	Trend and constant	**Constant**
LevelsS		
Lcrime	-2.256	-0.932
Lincome	-1.054	-1.119
Lpub	-3.369	-2.03
Leduc	-3.279	-1.54
Lpart	-1.796	0.459
First difference		
Lcrime	-4.868 I[1]***	-4.970***
Lincome	-3.957I[1]**	-3.934***
Lpub	-4.605 I[1]**	-5.616**
Leduc	-5.309 I[1]***	-5.412***
Lpart	-3.686**	-3.789***

I[1] integrated of order one,
*** significant at the 0.01 level, ****** significant at the 0.05 level, *****significant at the 0.1 level
All variables were measured in logarithmic values

Table 5

Regression using first difference

Dependent variable: Lcrime

	Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
C	-0.0015*	-0.2576	-0.2353*	-0.2467	-0.2209
	(0.0308)	(0.0911)	(0.0929)	(0.096)	(0.1049)
Lincome	-	0.6423*	0.5102*	0.5026*	-
		(0.4971)	(0.54)	(0.526)	
Lpart	4.9031	-	2.34	3.0522*	1.9552
	(2.6064)		(2.047)	(2.4844)	(3.772)
Leduc	-	-0.5741	-0.5307	-0.4834	-0.4168
		(0.1383)	(0.1449)	(0.1768)	(0.1922)
Lpub	-	0.0708	0.0671	0.069	0.0591
		(0.0244)	(0.0245)	(0.024)	(0.0267)
electyrs	-	-	-	0.0353*	0.0596*
				(0.0425)	(0.0457)
Electyrs*lpart	-	-	-	-	3.284*
					(4.113)
R^2(adjusted)	0.073	0.171	0.156	0.131	0.125
Observations	31	31	31	31	31

*insignificant at 5% level , **insignificant at 10% level
Model using the logarithmic first differences of original variables

Table 6

Linear detrended regression

Dependent variable: Lgcrime

	Column 1	Column 2	Column 3	Column 4
C	0.0404*	0.0119*	0.0173*	0.0173*
	(0.0282)	(0.0354)	(0.0296)	(0.0297)
… Lgincome	-	0.636* (0.55)	-0.4862* (0.6317)	-0.5287* (0.6028)
… lglpart	9.058 (1.898)	-	7.697 (2.381)	8.4424 (2.3228)
… lgeduc	-	-1.583 (0.5136)	-1.0274 (0.4172)	-1.0029 (0.4057)
… lgpub	-	-0.2273 (0.0737)	-0.1241 (0.0818)	-0.1196 (0.0799)
electyrs	-	-	0.0251* (0.0638)	0.0223* (0.0634)
Electyrs*Rlpart	-	-	-	-2.4086* (3.8742)
R^2(adjusted)	0.437	0.344	0.576	0.564
Observation	30	30	30	30

* insignificant at the 5% level of significance
This detrended regression was done using the residuals of each variable regressed on time

APPENDIX 2: Time plots

Figure 1

The *amount of serious crimes committed in Jamaica between 1975 and 2008*

CRIME LEVELS IN JAMAICA (1975-2008)
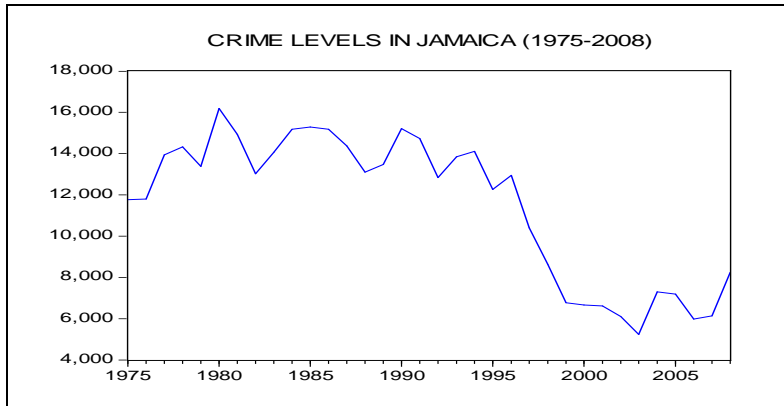
Figure 2
Time plot of labour participation rates

LPART
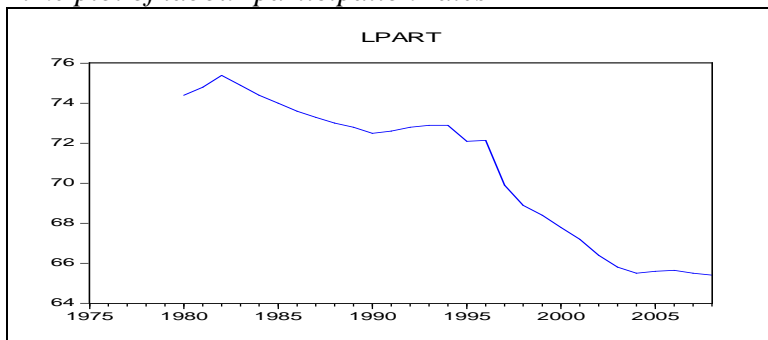
Figure 3
Time plot of public social investment

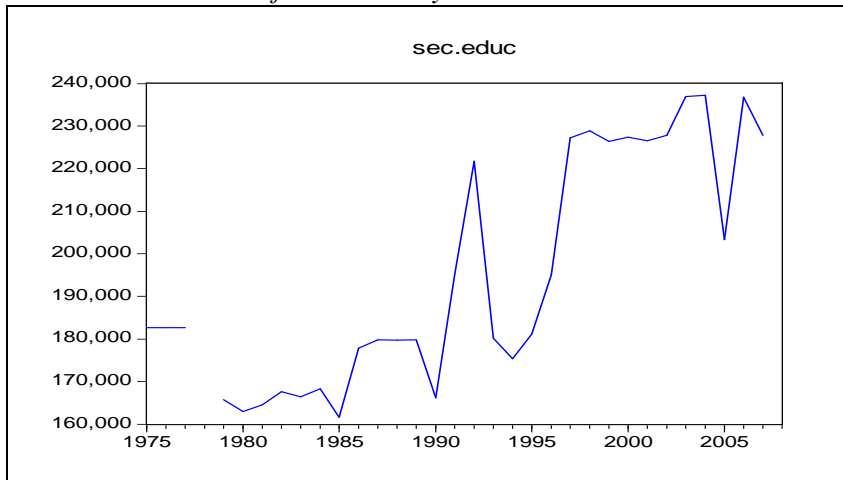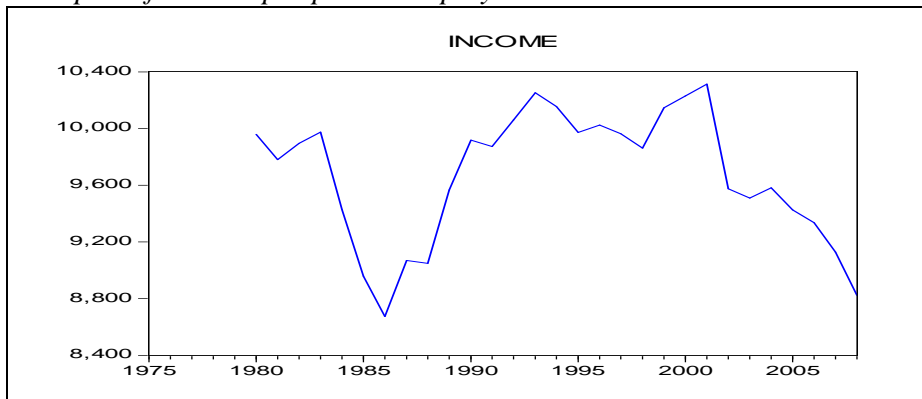PUBSOCINV
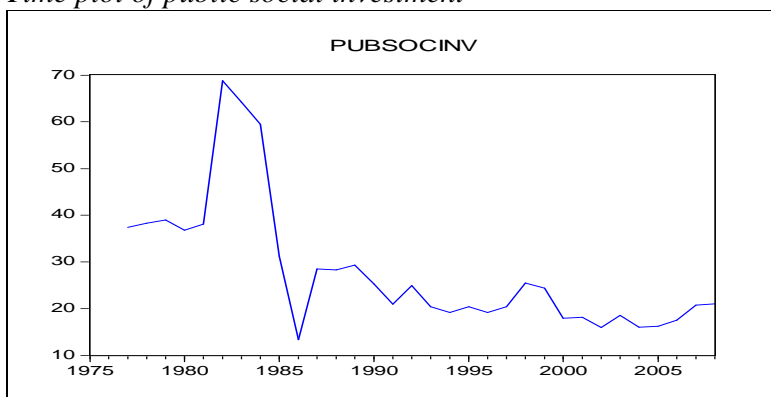
Figure 4

Trends in enrollment for secondary schools

Figure 5

Time plot of Income per person employed variable

APPENDIX 3: SCATTERPLOTS
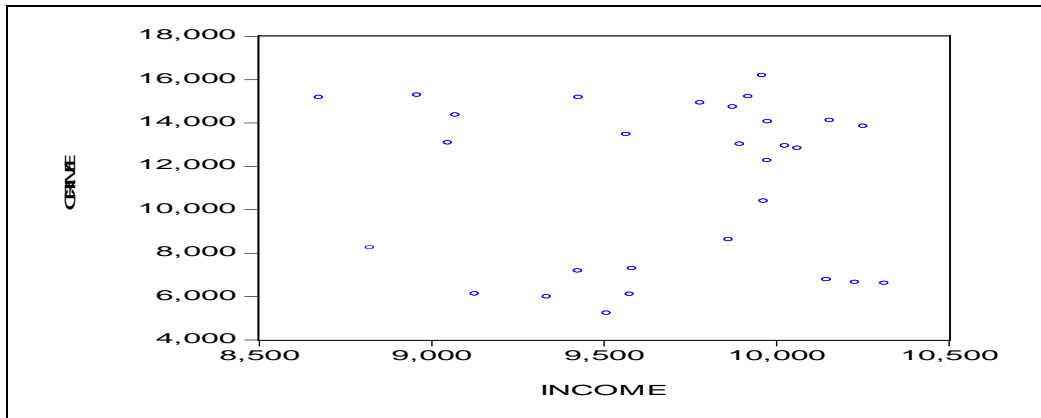
Figure 6

Scatterplot showing the relationship between crime and income

Figure 7
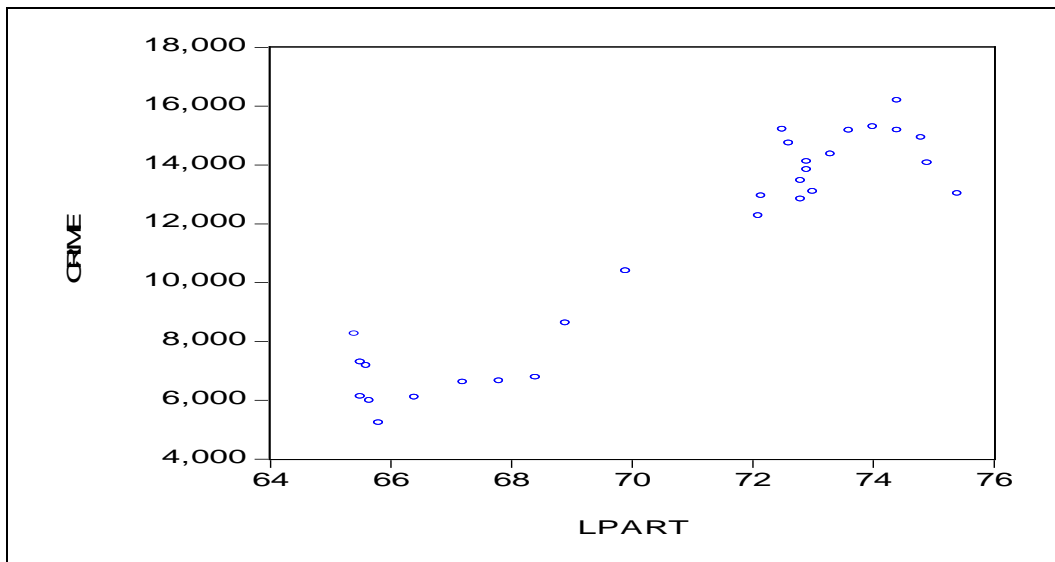*Scatterplot showing the relationship between crime and labour participation*

Figure 8
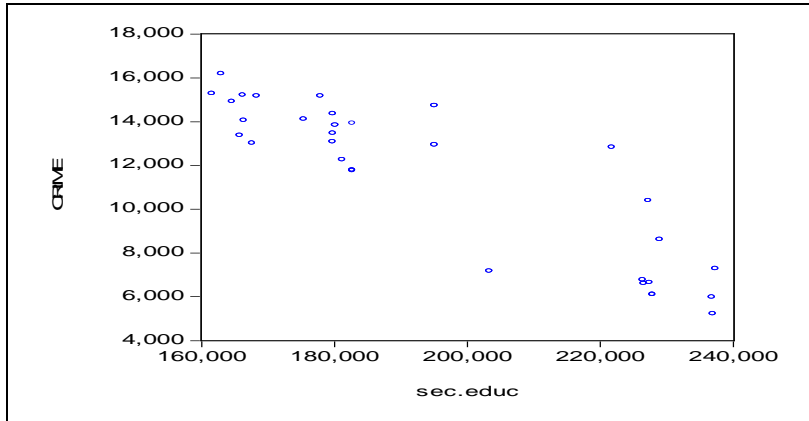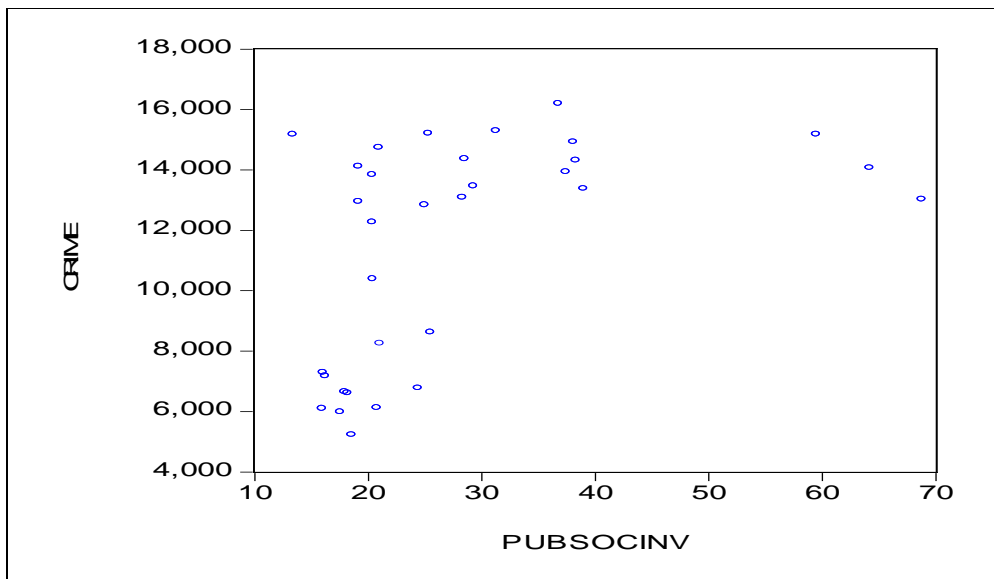*Scatterplot showing the relationship between crime and education*

Figure 9
Scatterplot showing the relationship between crime and public social investment

References

Becker, G. S. (1968). *Crime and punishment: An economic approach* . Retrieved May 8, 2010

Donohue, J. J., & Siegelman, P. (1998). Allocating resources among prisons and social programs in the battle against crime. *The journal legal studies*, *27*(1), 1-43.

Gillis, A. R. (2004). Institutional dynamics and dangerous classes: Reading, writing and arrest in nineteenth century France. *Social Forces*, *82*(4), 1303-1332

Gould, E. D., Mustard, D. B., & Weinberg, B. A. (2002). Crime rates and local labour market opportunities in the United States. *The review of Economics and Statistics*, *84*(1), 45-61.

Harriott, A. (2003). *Understanding crime in Jamaica: New challenges for public policy*. Kingston: UWI Press.

Kelly, M. (2000). Inequality and crime. *The review of Economics and Statistics*, *82*(4), 530-539.

Leon, F., & Sabates, R. (2008). Effects of government initiatives on youth crime. *Oxford economic papers*, *60*(3), 462-483.

Machin, S., & Meghir, C. (2004). Crime and economic incentives. *The journal of human resources*, *34*(4), 958-979.

Wang, F. (2005). Job access and homicidal patterns in Chicago: An analysis at multiple geographic levels based on Space-scale theory. *Journal of Quantitative Criminology*, *21*(2), 195-217.

Wong, Y. (1995). An economic analysis of the crime rates in England and Wales. *Economica*, *62*(246), 235-246. Retrieved February 20, 2010, from <http://www.jstor.org/stable/2554905>.

Wooldridge, J. (2009). *Introductory Econometrics* (fourth ed.). Canada: South Western.