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Public Order Expenditure and Crime Upsurge in Kenya

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Abstract:
Kenya is critical in terms of threats from terrorism, cross border crime and fighting across ethnic lines. As such it needs active policing, law enforcement and reformed criminal justice system. All these need more money and huge commitment. The analysis in our paper covered the period 1980-2012 and the co integration methodologies of Johansen (1988) and Johansen-Juselius (1990, 1992) were applied to the VAR model. We intended to contribute to the current debate about security nightmare in Kenya for crime wave has become a distinct stress and a threat to the country from both international crime and domestic. In particular, Crime and the fear of crime rank number one noticeable issue in Kenya. We demonstrated that the effect of an increased public order spending on crime was significant and correlate much more strongly with crime as well as the real per capita income. However it was evident that an increase in expenditure does not reduce crime in Kenya.

Keywords*: Crime, Police spending, Per capita income, co integration, Kenya*

1. Introduction

This paper presents a statistical analysis of the relations between crime trends and the level of public safety resources and Per capita income by controlling for the major conditions that affect each variable. We chose to study on crime because Crime activities can lead to both direct and indirect costs which can have negative effects on domestic and foreign direct investments, employment and economic growth (Sandler and Enders, 2005). These costs are defrayed by both the government and the private sector.

The 1990s in Kenya saw the unanticipated side effects of social economic changes associated with the policies of liberalization, globalization and democratization. These changes are widely accepted to have had a great influence on many areas of modern life in Kenya. The unfortunate side effects of the same are unemployment, economic inequality, social exclusion immigrants flows and criminality while criminal justice and maintenance of law and order received little attention as well as growth of Real GDP per capita.

The government expenditure on the police is covered under the Public Safety, Law and Order Sector. Public Safety, Law and Order can be defined under the Governance, Law and Order Sector (GLOS) Programme. It is the one responsible for the provision of security, making laws, ensuring good governance and accountability in public resources, management of electoral process, rehabilitation of all categories of offenders, providing immigration services and maintaining law and order for its citizens. It also works to improve housing facilities for the

Security forces, creation of special police desks to deal with violence against women and children, decongestion of prisons, equipping and retraining of the police, prisons and other

Staff, increased awareness on corruption and HIV/AIDS, delivery of quality and timely audit reports, and adoption of performance contracting.

Police is an institution and a governmental department charged with multifarious duties and responsibilities of maintenance of law and order, regulating traffic, prevention and detection of crime, VIP security, and combating terrorism. The Kenya police started in 1887 and have virtually remained maimed by underfunding from government. As an important component to economic growth, Kenya currently has 456 police stations, 156 police divisions, 241 posts and 397 patrol base serving 41 million people. These are far below expectations if Kenya has to contain the current wave of crime. Therefore the efforts made to professionalize and modernize the Kenyan police have put enormous costs and a burden on Government Treasury. However, on average, we cannot compare the expenditure encurred in Kenya to what richer countries spend in terms of per capita on criminal justice. In spite of lots of fundamental changes happening in policing in the world ranging from new technologies used by police departments, like “body cameras” worn by officers and automated license plate readers, analytical software designed to predict when and where crimes are likely to occur in a city, still security and crime is a night mire in almost all countries in the world.

Without doubt, amongst the most profound tribulations in Kenya is the fact that the Police establishment, their role of keeping internal law, order and enforcement, protecting the people, prevent and detect the commission of crimes and keep the general peace in the country has collapsed. The basic characteristics of crime trend in the past 3 decades is shocking and remain a puzzle to the authority and very little is known about the thriving factors. Crime has graduated from common street crime, kidnapping, murders, violent robbery and carjacking to terror and transnational terrorism. In addition, firms and households increasingly spend more on private security but still crime rate is high. This is why we support economists who interpreted criminal activity as being similar to paid employment which pays back an income and requires time to be managed.

The challenges emanating from crime and transnational crime has undermined the Kenyan national security objectives in spite of the strides made in the criminal justice in the country. This stretches from International terrorism and drug trafficking, illegal immigration and influx of refugees, the illicit transfer and smuggling of materials for weapons of mass destruction, arms trafficking and ivory. The situation is worsened by the rapid pace of globalization, porous borders and technological advancements which have rendered Kenya and especially, the Eastern and North Eastern parts, the Coastal areas and Nairobi resemble war zones where gunshots ring out every night, crude weapons and arson and grenade attacks is normal .

That aside, Kenya is faced with a new type of crime known as fighting across ethnic lines. This is based on fundamental issues concerning the distribution of economic and political power and historical injustices. Some tribes or regions are suffering economically, socially or politically compared with other tribes, regions or groups in society. Political Leaders especially losers in elections are taking the advantage of these resentments caused by the deprivations experienced by many of the tribes in Kenya to mobilize their support, incite community against the other. Without a hold to this trend then Kenya may be thrown or the country is at blink of war. Even the relatively privileged groups are up in arms to protect their share of resources from being encroached on or envied by those who are relatively deprived.

Because of these threats to Kenyan lives and property embodied from crime, the police and the government is striving to succumb to pressure from the public without necessarily analyzing the situation. Even the demoralized police force sometimes leases brutality over the innocent citizens in an unpalatable and horrendous manner as a cover up. Nevertheless it is clear that their stress arises from and is worsened by the inadequate and proper training facilities, absence of effective work tools and equipments, lack of training on modern ways of crime prevention, detection and civilized policing, poor living conditions and remuneration.

On the other hand it is also puzzling that in spite of the increase in government budgetary allocation to police, prisons, courts, firms and households' spending on private security, crime trend in Kenya is on the rise. The spade of violence experienced in the country from 1997 reached the peak or most intense point in 2007, 2012 and 2013 and have had a social impact and economic cost which have risen to unprecedented high levels unnoticed. Even the attentions of Kenyans is now being shifted from getting scared of drug trade and drug related corruption, organized crime especially in the matatu industry, participation of Kenya's own police in crime to grisly transnational terrorists attacks, strikes, ideologies and alliances. As such it is becoming clear that the Kenyan public is at the mercy of the police and criminals.

2. Literature Review

2.1. Basic Theory

Police expenditures and crime can be explained and traced back from the classical as well as the time economists grappled a change from the sociologist to explain crime. They have found out that Crime rates are strongly affected by economic conditions. Since they entered the fields of controversy to quest in the area of crime, pioneered by Gary Becker in 1968, the flurry of researchers have not though agreed as to what causes crime. Becker examined the impact of legitimate labor market experiences (e.g., unemployment) and sanctions on criminal behavior.

On the other hand, expenditures on maintenance of law and order can be traced back to Adam smith in his book (1776) 'wealth of nations', where he stated that the government should restrict her activities to defense, maintenance of internal peace and order. He termed any other expenditure out of these as wasteful and out of the scope of the state. Similarly Wagner's law of increasing state activities suggested that an increase regularly takes place in the activity of both the Central government and county governments constantly undertaking new functions, while they perform both old and new functions more efficiently and more completely with more public expenditure.

Another classic theory based on the Marxian perspective, suggested that crime is associated with the unequal distribution of income and the exploitation of labour (Hopkins and Waller stein, 1981). Conversely Criminal motivation theory proposes that unlawful behaviors are caused, at least in part, by frustrations at the gap between aspirations and expectations, and their achievement in practice. During times of economic hardship, large numbers of individuals may suffer sudden reductions in income. This, in turn, has the potential to cause an increase in the proportion of the population with a higher motivation to identify illegal solutions to their immediate problems.

On the modernization theory, which is also based on Durkheim's theory, attributed the increase in crime rate to the economic and social transformation in the process of modernization and proposes that crime rate and economic growth are positively correlated. However, many social scientists argue that crime is closely related to work, education, poverty, truancy, youth unemployment and it is by product or even measure of social exclusion. Nevertheless, most of the economic models conclude that if the expected gain from criminal activity exceeds the gain from legal activity, one is attempted to participate. On the contrary, in the early literature, where

economists applied static one period time allocation models to analyze criminal behavior realized that crime and work are assumed to be substitute activities, if an individual allocates more time to work, he will commit less crime because he will have less time to do so.

2.2. Empirical Literature

Yao et al (2005) warned that 'the skewed income distribution has many undesirable consequences, and it can lead to social unrest, rising crime, moral degradation, corruption, and regional conflict.' Sherman, (1995), Nagin, 1998) in their criminological models of crime participation explained that more spending on police can, if effectively utilized, improve police productivity and this can result in reductions in crime.

Police expenditure has a consistently positive effect on the probability of arrest .It was expected that higher expenditure on deterrence would lead to a reduction in crime rate, however, a higher crime rate may also lead to higher expenditure (Levitt, 1997, Levitt, 1998). Similarly, Gordon et al. (2009) found that low criminality can lead to a decline in inequality. Equally ,Habibullah and Baharom (2008) while employing bounds test, found out that in the long run, strong economic performances (real income per capita) indeed have a positive impact on murder, rape ,assault, daylight burglary and motorcycle theft, while on the other hand, economic conditions have negative impact on armed robbery.

On the contrary, Habibullah and Law (2007) utilized vector error correction model (VECM) in their study about crime and financial economic variables in Malaysia and suggested that criminal activity in Malaysia cannot be explained properly by real income per capita, financial wealth and interest rate. On the other hand, Fajnzylber et al. (2002b) reported that average income, as measured by GNP per capita, is positively correlated with crime rates. Fajnzylber *et al.* (2002) while using simple correlations, OLS regressions and dynamic Generalized Method of Moments (GMM) for panel data showed that both income inequality and crime rate are positively related. However, Edlund et al. (2008) could not find any significant relationship between income per capita and crime rates. Similarly, Wu and Rui (2010) also reported that there is no relationship between crime rates and lagged GDP per capita.

Thus in our paper we used the Per capita income to measure potential returns from legal earnings, and it showed that an increase in income led to an increase in crime. A higher GDP per capita is expected to attract more crime since it entails greater opportunities. This is the picture in Kenya, because real personal incomes per capita have roughly doubled since 1980, from US$ 447 to US $ 862 in 2012, an indication that crime should have substantially reduced but instead it went up. This means then that the interplay between underlying factors that affect crime levels is complex. Consequently, also against the backgrounds of Becker, Wagner's law and others, and also against the popular belief that getting tough on crime reduces crime or toughest law enforcement and greater police effort creates more crime and more crime calls for a greater police effort to conjecture that crime is related with government expenditure and the economic growth, we progressed to establish whether an increase in spending on law and order and public safety (internal security) and per capita income reduces crime rates in Kenya.

3. Methodology

3.1. Data

Although the identification and the estimation of crime costs have received wide attention in economic literature, the effect of crime on economic activities has not attracted much attention. That notwithstanding ,crime inflicts great costs to the public and private actors, such as theft and damaging goods, losing lives, security spending, pain and suffering. The estimation of such social cost of crime has become an important field of study in the last few decades (Czabanski, 2008), to show how crime imposed a significant burden in the society.

However, in this paper we deviated and projected to highlight how spending on the police force marred by corruption allegations and a reputation of menace in spite of the reforms introduced in the force can reduce crime in the country. The study made use of time series observations over a period 1980-2012.The data analyzed was provided from police-recorded crime data. Police data have much strength, including their permanent institutional nature and resultant time series trends. Though, the official crime data from police reporting activity, suffer from the underreporting and underrecording bias (Mauro and Carmeci, 2007). Most of the secondary data also on public order expenditure and per capita GDP were taken from the Kenya National Bureau of Statistics and from IMF and World Bank data base.

3.2. Statistical Model

In this section we estimated criminal behavior using official reported crime statistics. The data and recorded offences are both by victims' willingness to report crime and by police recording them. We therefore estimated this equation to test whether crime is related to per capita income and police expenditure.

Crime=f (per capita income, public expenditure)

The model specification for the regression analysis is:

$CRMT = \beta_0 + \beta_1 GDPP + \beta_2 PEXP + e_t$

CRMT = Crime trends

GDPP =GDP Per Capita income

PEXP =Police expenditure on Public Safety, Law and Order

e_t = Error term

In time series models, a substantial period of time may pass between the economic decision-making period and the final impact of a change in a policy variable. Therefore in our first step, we computed unit root tests (Augmented Dickey Fuller) to investigate integration order of CRMT, GDPP and PEXP time series. We used Augmented Dickey Fuller (ADF) test of this form.

$Y_t = \mu + Á_1 Y_{t-1} + Á_2 Y_{t-2} + ----Á_p Y_{t-p} + \varepsilon t$

Both series were integrated at the same order, and then we proceeded to test the possibility of co integration between these variables. We established that both series were clearly integrated in order of I (1), as shown in Table 1,at critical value of 1%, then we proceeded to test the possibility of a co integrating relationship using the Johansen procedure (1988, 1991). The Johansen procedure is a multivariate VAR approach. This method allows studying many co integrating relationships between the series.

VARIABLE	Test critical values:	CRITICAL VALUE AT 1%	CRITICAL VALUE AT 5%
CRMT	-5.246553	-3.6661	-2.9627
PEXP	5.195823	-2.6395	-1.9521
GDPP	-2.920989	-2.6423	-1.9526
D(U)	-4.315423	-3.6496	-2.9558

Table 1: ADF TEST- after first difference

3.3. Co Integration

We applied this econometric technique to estimate long-run relationship among these variables. Co integration analysis is a technique used in the estimation of long-run equilibrium parameters in relationship with non-stationary variables. Thus we used this model to test for co integration, and estimate long-run and short-run dynamics. That is to say both the co integration and Error Correction Model (ECM), among our variables were run. The purpose of the VECM estimation is to determine the way in which the short-run dynamics of the time series eventually get to a stable long-run equilibrium state. We used this equation to get the co integration results.

$y_t = \beta_0 + \beta_1 y_{t-1} + ...+ \beta_k y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + ... + \alpha_q x_{t-q} + \varepsilon_t$

Where, εt is a random disturbance.

The estimation of the dynamic VEC model of crime rates in the case of Kenya is expressed in the appendix Table 5:

By the use of Trace statistics, we found two co integrating equation at 5% while Max-eigenvalue test indicated one co integration at 5% as shown in Table 2.

Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.551525	40.40895	29.79707	0.0021
At most 1 *	0.359496	16.35184	15.49471	0.0371
At most 2	0.094766	2.986857	3.841466	0.0839
Trace test indicates 2 co integrating eqn(s) at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.551525	24.05710	21.13162	0.0188
At most 1	0.359496	13.36499	14.26460	0.0690
At most 2	0.094766	2.986857	3.841466	0.0839
Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 2

4. Empirical Findings

After we finished with stationarity processes, of the series GDPP and PEXP using the unit root tests, we proceeded to establish the number of lags to use. We used AIC, SC, LR, FPE and HQ to select optimal lag length for all the variables and 2 lags were chosen to be included in the VAR as shown in Table 3.

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-639.1229	NA	1.67e+16	45.86592	46.00866	45.90956
1	-589.5215	85.03095	9.22e+14	42.96582	43.53677	43.14037
2	-573.9797	23.31275*	5.94e+14*	42.49855	43.49770*	42.80400*
3	-566.1875	10.01849	6.92e+14	42.58482	44.01219	43.02118
4	-559.8099	6.833178	9.52e+14	42.77214	44.62771	43.33940
5	-542.9734	14.43127	6.90e+14	42.21239*	44.49617	42.91056
* indicates lag order selected by the criterion						

Table 3

Because all the variables were stationary after first differencing, 1(1), we proceeded to run a VECM. The results indicated that both GDP per capita and expenditure on the maintaining law and order would explain and influence crime increase and reduction respectively in the long run but police expenditure is very insignificant in the short period to explain crime, compared to lagged per capita income and lagged crime rates which turned out to explain crime very strong.

We ran the model and both variable were significant to explain crime. The model is not spurious because the R squared is less than Dw, and the residual is stationary at levels.

Dependent Variable: LNCRMT				
Method: Least Squares				
Sample: 1980 2012				
Included observations: 33				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNPEXP	0.133656	0.047083	2.838714	0.0081
LNCGDPP	-3.156370	0.680870	-4.635789	0.0001
C	16.23713	0.996934	16.28707	0.0000
R-squared	0.535577	Mean dependent var		11.27433
Adjusted R-squared	0.504615	S.D. dependent var		0.118142
S.E. of regression	0.083153	Akaike info criterion		-2.049773
Sum squared resid	0.207430	Schwarz criterion		-1.913727
Log likelihood	36.82125	F-statistic		17.29813
Durbin-Watson stat	1.459863	Prob(F-statistic)		0.000010

Table 4

The residuals were also found to be normally distributed as evidenced by Jarque-Bera recording 64%. We also tested for serial correlation and Breusch—Godfrey Obs. R square was found to be more than 5 % (53.5%). Thus our model passed the serial correlation test, normality test, and heteroskedascity test of more than 5%. The F statistics was also significant with probability of 0.000010.

We then proceeded to run the VECM, to give us the speed of adjustment. The error term was significant and negative. The system would correct the disequilibrium at 0.66% annually as shown in Table 5 in the appendix. It also indicates that there is long run causality running from Per capita income and government expenditure to crime. Similarly, the results in table 3 in the appendix (Wald test) indicate a short run causality running from per capita income to crime rate and Government expenditure does not influence or affect crime in the short period.

From our co integration equation the sign of GDPP is positive and the one of PEXP is negative and both are significant. The level of GDP per capita is positive as also pointed out by Adam Smith and significant. The positive coefficient of GDPP suggests that, holding the influence of PEXP constant, a one percent point increase in the GDPP rate leads to, on average, an increase in crime rate by about 207. On the other hand, holding the influence of GDPP constant, a decrease in PEXP by one percentage point, on average, leads to about a 10.6 percent point decrease in CRMT. Thus this can be interpreted to mean that if there is an increase in real per capita income it will increase the overall level of crime in the country. These results also indicate that the variation in crime level is correlated to government spending. We expected that when expenditure increases, crime would reduce but it is contrary to the situation in the ground and daily occurrences of crime .This can be associated to misuse of the funds, inefficient allocation to targets of crime and priority. It can also be due to improvement in recording crime. However may be in the long term as the expenditure goes up the police

as an institution will be strong and equipped to fight, control, prevent and detect crime. As a result there will be gradual decline in crime levels.

In this equation, the t values are in parentheses.

CRMT= - 292.1684 + 202.73485(GDPP) - 10.57944(PEXP)

(3.06804) (-2.270264)

We can then confidently say that the positive associationship between GDP per capita and crime may come as a result of the upper and middle class becoming richer compared to underclass and this income disparity can in return have greater effect on crime rise for want to fend for their life. At the same time the high income people may use the lower income class to commit crime in a bid to safeguard their interests and businesses. Therefore our findings concur with some previous researchers, like Fajnzylber et al (2002b) who found a positive correlation between GNP per capita and crime, Newman and Howard (1999) identified a strong relationship between a country's economic welfare, measured as GDP, and its expenditure on criminal justice and Meera, (1993) who said that Crime is a by-product of development in which societies are becoming more materialistic and animistic among others.

5. Conclusion

The dependent variable in our model is the crime rate. The crimes include murder, manslaughter, rape, robbery, assault, burglary, theft and motor vehicle theft among others. Crime results from the combination of a huge variety of different contributing factors and their intricate interactions with one another, making it extremely difficult to pinpoint the exact relationship between individual variables. The variables which passed the unit root test and were significant to explain and be included in the regression were the per capita income and public expenditure on law and order. Although the evidence in general leans towards there being some relationship between crime and the economy, amongst other things, it is to a degree which does not allow solid conclusions or predictions to be drawn about future patterns because so many variables were omitted from the regression because data was not available like the number of police.

Notwithstanding the inherent limitations of both the data and multicolinearity in our model, the strongest evidence from the study points towards growing GDP Per capita as having the greatest influence on crime. On the other hand, findings that there is a negative link between public expenditure and crime is an important one in and of itself, to allow us to dismiss the popular belief that an increase in public expenditure on law and order can reduce crime as much as it is unclear how. It also dispels the idea that when the quality of an individual's life is increased, the marginal benefit of crime can be expected to decrease thus decreasing that individual's willingness to participate in criminal activity. It is evident that a person's resources should increase as the per capita income increases, and a higher standard of living is possible results that also reflect increasing quality of life, and as a result decrease the benefit of criminal activity. But from our findings the GDP per capita increases as crime increases .Thus not to a great enough degree that it can be said with certainty that it does ease persons from engaging in crime.

An enormous amount of media attention that has focused on the policing strategies in Kenya may be right, albeit is an issue on which reasonable people might disagree given the lack of hard evidence. But our reading of the limited data that are available leads us to the conclusion that the impact of policing strategies on crime are very important because from our study we found a negative link between crime and public expenditure, even though the impact may be minor. Thus the negative sign from our analysis can be interpreted to mean that it's not public expenditure on maintenance of law and order alone but police strategy and reforms. There is need for the Police to expand their mission greatly, taking on the goals of preventing crime and reducing crime rates, rather than focusing solely on responding to crimes after they are committed, and to be proactive as well. Thus, it is perhaps for the jubilee administration to improve with respect to police functions and department structure, communication and the relationship between police agencies and the community, what role technology and social media play, and how officer recruitment and retention could be affected by budget cuts.

In Kenya today the government is on the race to increase expenditure on the police to match the wave of crime in Kenya which is attributed to the porous borders that surround the country like the failed state of Somalia, war-torn Sudan, and crime-ridden Ethiopia and Uganda and the scourge of terrorism. But the truth from our study is that crime in Kenya cannot be solved merely by providing more funds, manpower and equipment to the police. This study supports prevailing situations in the USA and India where, with their huge resources to law enforcement agencies and latest tools in science and technology, they have not been able to arrest the escalating crime rate. However the present future trends in policing in Kenya looks good specifically, if the focus on new technologies and strategies such as predictive policing, community policing, 'nyumba kumi' initiative ,partnering with academia and law enforcement agencies and the use of social media to disseminate information as well as gather intelligence is well coordinated and made use of. Both these groups should come together to discuss and develop solutions for society's public-safety challenges, address most pressing issues of today and to how new technology is used, shed light on shifting trends in policing, give insight into the future of law enforcement, and help inform new approaches for solving emerging issues.

Therefore to address crime in all its complexity, and the challenges of insecurity, the field of policing in Kenya needs new thinking and rebranding about developing leaders within the police hierarchy, insights into how policing could change by combining both predictive policing and intelligence-led policing as well as gathering a wide range of different types of data, eliminate slow and top-heavy decision-making process, hiring incredibly well educated and well trained people, emphasize on allowing people to grow and thrive in a specialty, consider the root causes of the disconnect between the police and the community. That will make police departments in Kenya to be far more complex than they were one generation ago. It will go on to make them respond to calls for service, and at the most fundamental level, expand their mission, taking on the goal of preventing crime and reducing crime rates,

rather than merely responding after crimes are committed. Today's Kenya police are always looking for ways to be proactive instead of reactive. However with the today's young people being bright, ambitious, impatient to achieve things, and less inclined to political cocoons than past generations and the introduction of the vast network of cameras in most cities and towns, combined with the vibrant courts, crime waves in Kenya may no doubt go down. The police departments across the country have also to recognize the importance of community policing, public trust, accountability, and transparency in nearly everything they do. As a shocker to the government and security agencies, it is hoped that the present study provokes better data recording on crime and avail to researchers the so regarded as 'classified data' to encourage the investigation on missing variables important to crime studies in Kenya like the number of police and unemployment levels.

6. Appendix

Sample (adjusted): 1983 2012 Included observations: 30 after adjustments Trend assumption: No deterministic trend (restricted constant) Series: LNCASES LNCAPITA LNPUBLIC Lags interval (in first differences): 1 to 2 Unrestricted Cointegration Rank Test (Trace)			
Hypothesized		**Trace**	**0.05**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**
None *	0.533055	38.95026	35.19275
At most 1	0.357149	16.10398	20.26184
At most 2	0.090588	2.848717	9.164546
Trace test indicates 1 co integrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			
Hypothesized		**Max-Eigen**	**0.05**
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**
None *	0.533055	22.84628	22.29962
At most 1	0.357149	13.25526	15.89210
At most 2	0.090588	2.848717	9.164546
Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Unrestricted Co integrating Coefficients (normalized by b'*S11*b=I):			
LNCASES	**LNCAPITA**	**LNPUBLIC**	**C**
0.185514	-37.61015	1.962635	54.20133
11.75780	84.20506	-4.572704	-260.0714
-15.13730	-33.47324	1.228855	223.7733
Unrestricted Adjustment Coefficients (alpha):			
D(LNCASES)	-0.035687	0.003706	0.016948
D(LNCAPITA)	0.003842	-0.010031	0.001528
D(LNPUBLIC)	-0.062279	-0.095555	-0.000345
1 Co integrating Equation(s):		Log likelihood	143.8890
Normalized co integrating coefficients (standard error in parentheses)			
LNCASES	LNCAPITA	LNPUBLIC	C
1.000000	-202.7349	10.57945	292.1684
	(66.0416)	(4.65979)	(95.9141)
Adjustment coefficients (standard error in parentheses)			
D(LNCASES)	-0.006620		
	(0.00254)		
D(LNCAPITA	0.000713		
	(0.00069)		
D(LNPUBLIC)	-0.011554		
	(0.00658)		
2 Co integrating Equation(s):		Log likelihood	150.5166

Normalized co integrating coefficients (standard error in parentheses)			
LNCASES	LNCAPITA	LNPUBLIC	C
1.000000	0.000000	-0.014670	-11.39561
		(0.06767)	(0.35909)
0.000000	1.000000	-0.052256	-1.497345
		(0.00796)	(0.04224)
Adjustment coefficients (standard error in parentheses)			
D(LNCASES)	0.036950	1.654235	
	(0.16099)	(1.26260)	
D(LNCAPITA	-0.117234	-0.989190	
	(0.03635)	(0.28510)	
D(LNPUBLIC)	-1.135073	-5.703893	
	(0.34532)	(2.70819)	

Table 5

Wald Test			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	4.534120	(2, 23)	0.0219
Chi-square	9.068240	2	0.0107
Null Hypothesis: C(2)=C(3)=0 Null Hypothesis Summary:			

Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	3.987320	(2, 23)	0.0326
Chi-square	7.974639	2	0.0185
Null Hypothesis: C(4)=C(5)=0 Null Hypothesis Summary:			

Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	0.423411	(2, 23)	0.6598
Chi-square	0.846822	2	0.6548
Null Hypothesis: C(6)=C(7)=0 Null Hypothesis Summary:			

Table 6

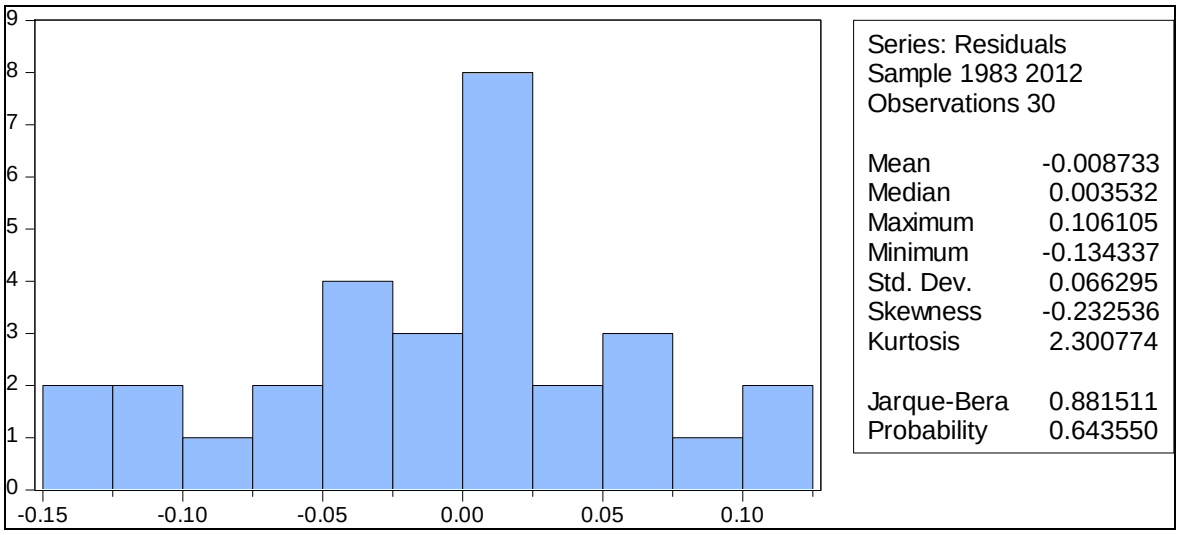

Table 7

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.501793	Prob. F(2,21)	0.2457
Obs*R-squared	3.282748	Prob. Chi-Square(2)	0.1937
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.771367	Prob. F(9,20)	0.6438
Obs*R-squared	7.730189	Prob. Chi-Square(9)	0.5615
Scaled explained SS	3.282472	Prob. Chi-Square(9)	0.9520

Table 8

Dependent Variable: D(LNCRMT) Method: Least Squares Sample (adjusted): 1983 2012 Included observations: 30 after adjustments				
D(LNCRMT) = C(1)*(LNCRMT(-1) - 202.734856292*LNGDPP(-1) + 10.5794450229*LNPEXP(-1) + 292.168441905) + C(2) *D(LNCRMT(-1)) + C(3)*D(LNCRMT(-2)) + C(4)*D(LNGDPP(-1)) + C(5)*D(LNGDPP(-2)) + C(6)*D(LNPEXP(-1)) + C(7)*D(LNPEXP(-2))				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(1)	-0.006620	0.002544	-2.602518	0.0159
C(2)	-0.410514	0.167450	-2.451557	0.0222
C(3)	-0.370963	0.166710	-2.225204	0.0362
C(4)	-2.457504	1.010624	-2.431669	0.0232
C(5)	-1.730404	0.965517	-1.792204	0.0863
C(6)	0.050858	0.092468	0.550004	0.5876
C(7)	-0.057110	0.098280	-0.581097	0.5668
R-squared	0.512385	Mean dependent var		0.002950
Adjusted R-squared	0.385181	S.D. dependent var		0.095787
S.E. of regression	0.075107	Akaike info criterion		-2.138850
Sum squared resid	0.129743	Schwarz criterion		-1.811903
Log likelihood	39.08274	Hannan-Quinn criter.		-2.034257
Durbin-Watson stat	1.871860			

Table 9

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