

Effect of Dispensation of Justice and Provision of Security on Private Investments

Moses Marang^{1*}, George Kosimbei² and Duncan Ouma³

^{1*} *Kenyatta University, Kenya*

² *Kenyatta University, Kenya.*

³ *Kenyatta University, Kenya & Macroeconomic Policy Division-UNECA, Ethiopia.*

Abstract: *Most economists have argued that government institutions play a crucial role on performance of private investment. One such institution is the justice system that dispenses justice and provides security. There has been concerns that provision of these services hasnot beenoptimal for most developing economies and this could be affecting the growth of private investments. Thispaper investigated whether dispensation of justice and provision of security had effects on growth of private investments in Kenya. This was realized by estimating a structural model using instrumental variable method and data for the period 1960 to 2016. The findings were that enhanceddispensation of justice spurs the growth of private investments while insecurity hampers the growth. Based on these findings, governments policies to support the growth of private investments should transcend interventions on macroeconomic aggregates and encompass interventions in the justice system. This can be achieved by enhancing the resolution of cases for instance through increased mediation and arbitration of disputes out of court, use of transcription services in courts and establishment of a legal framework to guide minimization of case adjournments. Further, upscaling the use of technology in crime detection and surveillance and setting time limits for completion of criminal investigations and adducing of relevant evidence and expert reports in courts, wouldaid in controlling and reducingcrime. Once dispensation of justice is enhanced and crime is reduced, a favourable environment for the growth of private investments would ensue.*

Keywords:*Dispensation of justice, security, effect, private investments.*

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I. Introduction

Background

The contribution of investment to economic performance has widely been acknowledged by economists. For instance, the role of capital accumulation in an economy is underpinned in the Solow-Swan model attributed to Solow (1956) and Swan (1956) within the framework of neoclassical economics, consumer optimization growth models refined by Cass (1965) and Koopmans (1965), and in the endogenous growth theory (Barro & Sala-i-Martin, 2004). Empirical linkage of the role of investment in economic growth across world economies and time is enormous (Chirwa & Odhiambo, 2016). Governments also acknowledge the existence of linkage between investments and growth. For instance, World Bank (2017) provides information on the contribution of investment to economic growth for different countries. The Kenyan government acknowledges the essential role of investment in economic growth as elaborated in Republic of Kenya (2017).

Given these linkages, policy-makers have supported and prescribed diverse public-sector initiatives aimed at enhancing growth of investments. According to Maingi (2010), such initiatives, often and largely financed through public expenditure, supports the growth of private investments yielding an upsurge of output. The initiatives by public institutions constitutes what has generally been appreciated as the critical role of institutions in development. As asserted by Acemoglu and Johnson (2005), majority of conventional investment theories may not be fully applicable to developing economies since in such economies, government institutions play an immense role on private investment behaviour. This implies that institutions shape investments in physical and human capital as well as technology and organization of production (Acemoglu & Johnson, 2005).

This paper focused on the role of services provided by justice system institutions on private investments. Specifically, the paper examined the effect of dispensation of justice and provision of security on private investment in Kenya. One of Kenya's macroeconomic policy objectives has been the need to enhance private investment given its expected positive contribution to economic growth. However, the expected contribution of private investment to economic growth has not been satisfactory. As underscored in *Kenya Vision 2030*, private investment to Gross Domestic Product (GDP) was targeted to rise from 15.9 per cent in the year 2006 to 22.90 per cent in the year 2013, and above 24 per cent by the year 2030 (Republic of Kenya, 2007).

However, the target was not achieved. Private investments to GDP stood at 17.76 per cent in the year 2013 and averaged at 15.57 per cent in the period 2014-2016 (Republic of Kenya, 2017). For the period 1995-2015, the contribution of private investment to GDP for Kenya, which averaged at 14.71 per cent, was less than the global average, which according to World Bank (2017), was 15.43 per cent over the same period. Consequently, continuance of this trend may affect the achievement of other socio-economic growth targets for instance, raising the overall gross fixed capital formation (GFCF) to meet its desired growth rate. For the period 2012 to 2016, GFCF to GDP averaged at 20.74 (Republic of Kenya, 2017), way below its desired rate of 32 per cent of GDP as affirmed by Republic of Kenya (2007). This would in turn affect the realization of the desired economic growth rate of 10 per cent per annum as set out under the Republic of Kenya (2007).

It was therefore imperative to investigate the factors that could be contributing to this scenario. Further, the realization of economic development envisaged in *Kenya Vision 2030* would require a stable, peaceful and secure environment for businesses to optimally thrive and generate sundry employment opportunities (Republic of Kenya, 2017). According to Republic of Kenya (2007), crime in Kenya was to be reduced by 46 per cent from the year 2006 to 2012. However, crime increased by 7.8 per cent from 72,225 incidents recorded in the year 2006 to 77,852 incidents in 2012 (Republic of Kenya, 2008&2017). On dispensation of justice, the desirable minimum case clearance rate (CCR), which is the ratio of resolved to filed cases, is 100 per cent (Hall & Keilitz, 2012). However, CCR in Kenya remained, on average, below 100 per cent for the period 1996-2016 as illustrated in Figure 2. The motivation of this paper was therefore to seek clarity if the lowly performance on provision of justice system services could be affecting the growth of private investments.

Justice System Services and Private Investments in Kenya

This paper focused on public services provided by both the Judiciary and Police. While Judiciary dispenses justice, Police provides security services. Under Article 239 (c) of the Kenyan Constitution, the National Police Service (NPS) is mandated to promote and guarantee national security and ensure safety of persons and property (Republic of Kenya, 2010). The Kenyan Judiciary, established under Chapter 10 of the Kenyan Constitution, administers justice through arbitration of disputes (Republic of Kenya, 2010). Emphasis on the services provided by the Judiciary and Police was motivated by the potential relationship of their mandate with investment as spelt out in the Kenyan Constitution and the *Kenya Vision 2030* policy document. The two institutions are highly interdependent exhibiting strong forward and backward linkages (Republic of Kenya, 2007). For instance, all criminal complaints are reported at police stations in the upstream before being filed downstream in courts for determination. Further, civil disputes emanating from the public in the upstream, are filed downstream in courts for arbitration where at times, courts issue orders whose execution requires the police or by other agents under police protection.

On dispensation of justice, a well-functioning Judiciary would be expected to sustain proper functioning of markets by guaranteeing fair and efficient dispute resolution (Judiciary, 2014). Once the court adjudicates on these disputes, the outcome is the resolution of cases or in economic perspective, the supply of justice (Judiciary, 2017). Therefore, underlying the filing and resolution of cases, is useful information on how dispensation of justice as a public service is efficiently provided. Figure 1 gives the trends for dispensation of justice, measured by CCR, and that for private investments as a percentage of GDP in Kenya.

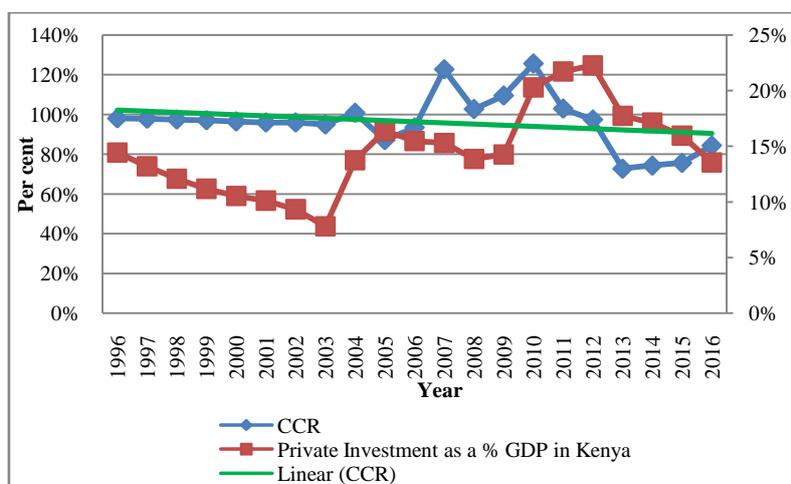


Figure 1: CCR and private investments in Kenya, 1996-2016

Source: Own computation using data from KNBS and other sources

For the period 1996-2016,CCR generally stagnated below 100 per cent as demonstrated by the linear trend linein Figure 1. Over the same period, private investments to GDP stagnated around 15 per cent which could be a pointer to existence of potential relationship between the two. For the periods; 1996-2003, 2008-2010 and 2012-2015, there was a declining trend for both curves. The two trends moved in opposite direction in the period 2006-2008 and 2010-2012. Between the years 2007 and 2011, CCR rose above 100 per cent. A CCR of over 100 per cent implied that the resolved cases were more than the filed cases hence some old pending cases which had accumulated overtime were reduced. According to Judiciary (2015), the optimism in the justice sector after the enactment of a new *Constitution* in the year 2010 could have contributed to this. This period coincided with a new era of reforms in courts following the general elections that were held in the year 2007. Thereafter, CCR decreased to 80 per cent in the year 2013. This could be attributed to the uncertainty emanating from vetting of Judiciary and NPS employees (Judiciary, 2015).

Provision of security as a public service has been highlighted as a foundation for Kenya’s socio-economic transformation and is expected to support the accomplishment of key investment projects(Republic of Kenya, 2007).As indicated in *Kenya Vision 2030*, the realization of investment targets requires among other things, enhancement of the rule of law and sustenance of a secure environment (Republic of Kenya, 2013). Reduction of insecurity has been pinpointed as an essential ingredient for the growth of tourism sector, agriculture sector, wholesale and retail trade sector, and manufacturing sector (Republic of Kenya, 2007). Weak provision of security is outwardly manifested by increased level of crime. Figure 2 provides a comparison of trends for both crime and private investments in Kenya for the period 1996-2016.

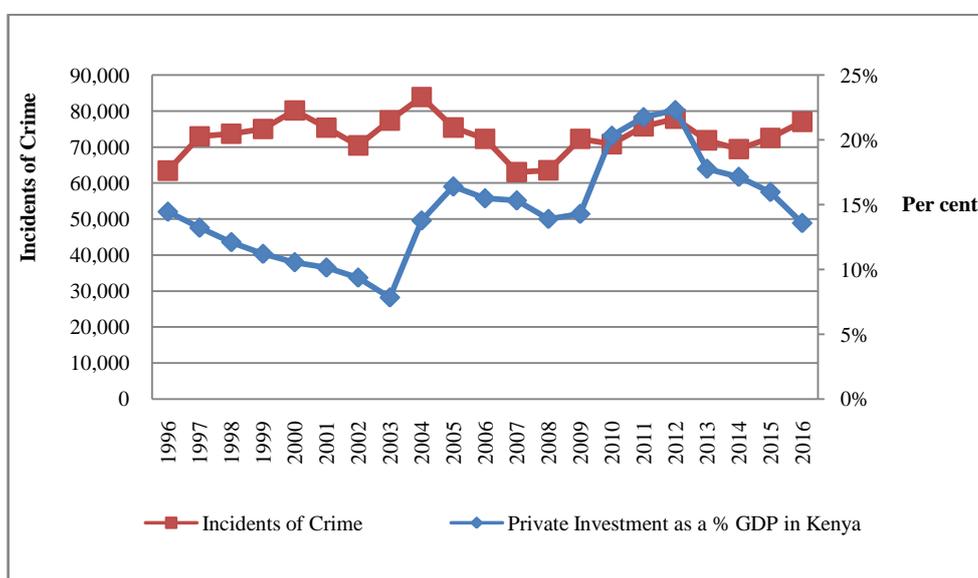


Figure 2: Crime and private investments in Kenya, 1996-2016

Source: Own computation using data from various sources

On average, crime oscillated around 73,029 incidents annually for the period 1996-2016. Over the same period, private investments to GDP registered a mild increase and averaged at 14.06 per cent. For the periods; 1996-2000, 2004-2005, 2007-2009 and 2014-2016, crime and private investments moved in different directions which could be a pointer to a possible negative relationship. However, for the periods; 2000-2004, 2005-2007 and 2009-2014, the two trends portrayed movement in the same direction. There was therefore the need to conduct further analysis to find out if insecurity was affecting the growth of private investments. Further, Kenya has experienced some major crimes over time which could be impacting on private investments growth. For instance, between the year 2013 and 2015, there were 108 terrorism incidents resulting to 466 deaths, 728 injuries and destruction of property (Republic of Kenya, 2015). According to the Institute for Economics and Peace (2016), in the year 2015, Kenya ranked number 19 in global terrorism index. In the year 2015, a total of 21,279 robberies were committed in Kenya, 24,830 livestock were stolen, 3,323 economic crimes were committed, and 242 arrests were made in relation to smuggling of contraband goods (Republic of Kenya, 2015). According to Njuru et al. (2014), crimes that arose from political instability following the disputed elections in the years 1997 and 2008, could have stifled private investments.

II. Empirical Literature

According to García-Posada and Mora-Sanguinetti (2015), the justice system affects firm growth through investment decisions faced by firms. Kuenhel (2010) points out that the institutional activities that strengthen the rule of law such as police and court services affect the ability of people to retain the rights to their goods and profits thereby shaping their incentives to invest. Dougherty (2014) asserts that without high-quality justice system institutions, transaction costs may be prohibitive, deter market transactions and inhibit trade. Stone (2006) argued that crime imposes direct losses that reduce investment funds, induces government to spend money on crime prevention that would otherwise be available to stimulate growth, and induces households to spend money on security precautions instead on investments. In the absence of proper enforcement of property rights, economic agents would rely on relational contracting which is not ideal for an economy (Boehm, 2015). Palumbo, Giupponi, Nunziata and Sanguinetti (2013) asserts that security of property rights is essential for protecting returns on investment and dissuading opportunistic behavior. Under weak protection of property rights, firms become unwilling to acquire goods from new firms (Boehm, 2015).

Specifically, there is convergence in most empirical work that dispensation of justice impacts on investment behavior. This is attested by studies by Bellani (2014) for European countries, Boehm (2015) for USA, Chemin (2012) for India, Dougherty (2014) for Mexico and Laeven and Majnoni (2003) for 106 countries and Lichand and Soares (2014) for Brazil. Insecurity has also been found to negatively affect the growth of private investments. This is affirmed from empirical work by; Rios, Karolina and Cano (2016) which covered Mexico and Daniele and Marani (2008) which covered Italian Provinces. Studies by the United Nations Office on Drugs and Crime (UNODC) (2012), Ngugi and Nyang'oro (2005) and Miguel, Shanker and Ernest (2004), also established that insecurity negatively affects the growth of private investments.

However, dispensation of justice and provision of security as potential drivers of growth of private investments, to the best of our knowledge, has not been adequately explored in Kenyan context. Hence, knowledge gap exists as evidenced in empirical work by Karumba (2009), Kiprop (2013), Mbaye (2014), Menjo and Kotut (2012), Mundia (2014), Njuru et al. (2014) and Ocharo et al. (2014). These studies majorly focused on fiscal and monetary policy determinants of private investments but did not provide information knowledge on probable effect of dispensation of justice and provision of security. Provision of such information could have been insightful on what could be occasioning the slow growth of private investments. Although studies by Ngugi and Nyang'oro (2005), Kenya Institute for Public Policy Research and Analysis (KIPPRA) and World bank (2004) and Kiprop (2013) explored some limited aspects of the justice sector, they did not examine the effects of dispensation of justice and crime on private investments. This paper attempted to bridge the gap.

III. Methodology

Theoretical Framework

The theoretical framework for this paper was drawn from the neoclassical theory of investment attributed to Jorgensen (1963) and Jorgenson and Hall (1971). Consider an economy that produces its aggregate output Y using aggregate private capital K and a constant aggregate labour L . Assume that the economy consists of N identical private firms growing at a constant exponential rate. For a representative firm, the output is given as $y = Y/L$ and private capital as $k = K/L$. Further, assume the representative firm is a price taker and is facing adequate demand for y . At time t and technology A , the representative firm produces its output (y) using a production function defined as;

$$y_t = ALf(k_t) \tag{1}$$

Following Barro and Sala-I-Martin (2004) and Kuehnel (2010) the production function is modified to capture a government activity as a productive input hence rewriting Equation (1) yields;

$$y_t = ALf(k_t, j_t) \tag{2}$$

where j_t is the productive government input available to a firm at time t . In neoclassical theory of investment, firms maximize their discounted flow of profits over indefinite time, subject to depreciation of capital. Over time, private capital (k) is reduced by depreciation rate (δ) and increased by gross investment (I) such that;

$$\dot{k}_t = I_t - \delta k_t \tag{3}$$

where $\partial y / \partial k = f_1 > 0$, $\partial y / \partial j = f_2 > 0$, $\partial^2 y / \partial k^2 = f_{11} < 0$ and $\partial^2 y / \partial j^2 = f_{22} < 0$.

From Jorgensen (1963), the time path of investment chosen to achieve the target capital stock is that which maximizes the net present value (NPV) given as;

$$NPV(0) = \int_0^{\infty} \{ ALp_y f(k_t, j_t) - wL_t - p_k I_t \} e^{-rt} dt \tag{4}$$

subject to accumulation of capital defined by Equation (3) and initial value $K(0)$ as given. In Equation (4), p_y is price of output, w is wage, p_k is price of capital, I is investment, r is discount rate and e is the exponent.

The maximization entailed setting the current-value Hamiltonian as;

$$H = e^{-rt} \{ [Lf(k, j) - wL - p_k I + q(I - \delta k)] \} \quad (5)$$

and then solving the first order conditions, $\partial H / \partial L = \partial H / \partial I = 0$ and $\dot{q} = -\partial H / \partial k$ as well as the transversality condition $\lim_{t \rightarrow \infty} (qKe^{-rt}) = 0$. Consequently, private investment equation was derived as;

$$i = f(j, r, y) \quad (6)$$

where private investment (i) depends on productive government input (j), interest rate (r) and output (y).

Empirical Model Specification

To analyze the effect of dispensation of justice and provision of security on private investments, a structural model was used. This was important in illuminating the structural features of the economy especially the role of institutions. In structural models, the interest is in α_i the coefficient of explanatory variables (Woodridge, 2016). Hence, drawing from Equation (6), the empirical model was specified as;

$$INV = \alpha_1 + \alpha_2 DJUST + \alpha_3 SEC + \alpha_4 r + \varepsilon \quad (7)$$

The productive government input j in Equation (6) was unpacked to comprise two justice system services namely dispensation of justice (DJUST) and provision of security (SEC). This was in line with Acemoglu and Johnson (2005) and Barro and Sala-I-Martin (2004) that a productive government input may comprise a public service or a good. The other variables in Equation (7) that were drawn from Equation (6) are private Investment (INV), the dependent variable and which incorporated the level of output (y) in its measurement, and interest rate (r), an explanatory variable at the centre of the neoclassical theory of investment. The expectation was that an increase in DJUST would spur the growth of private investments while insecurity would reduce the growth.

Estimation Procedure

According to Acemoglu and Johnson (2005) and Lichand and Soares (2014), the analysis of the role of institutions on macroeconomic variables generally face two traditional challenges of endogeneity and omitted variables. Dougherty (2014) concurs that the justice system services cannot be exogenous to economic outcomes such as investment and firm size. The structural model given by Equation (7) comprised two institutional variables that were potentially endogenous to the dependent variable, the private investments. In Equation (7), DJUST, SEC and INV were taken as endogenous while interest rate (r) as exogenous.

If an equation with endogenous variables is estimated using LS regression, the estimators would be biased and inconsistent (Wooldridge, 2016). Hence, drawing inspiration from Wooldridge (2016) and empirical work by Bellani (2014), Dougherty (2014), Lichand and Soares (2014), Menjo and Kotut (2012), Miguel et al. (2014) and Rios et al. (2016), this paper employed two stage least square (2SLS) instrumental variable (IV) method to overcome endogeneity problem. The 2SLS regression entailed two stages of estimation. The first stage involved least square (LS) regression of the reduced form equations given as;

$$\left. \begin{aligned} DJUST\hat{T} &= \alpha + \beta_i X_i + \varepsilon \\ SEC\hat{C} &= a + \delta_i Z_i + \mu \end{aligned} \right\} \quad (8)$$

where X_i and Z_i are vectors of instrumental variables affecting DJUST and SEC respectively, $DJUST\hat{T}$ and $SEC\hat{C}$ are the fitted values of DJUST and SEC, β_i and δ_i are coefficients while ε and μ are the random terms.

To estimate Equation (7) using 2SLS, at least two exogenous variables not in Equation (7) but correlated with DJUST and SEC were required as instruments in the reduced form equations for DJUST and SEC specified by Equation (8). Brooks (2014) asserts that more than one instrument for an endogenous variable can be used in the structural equation. Under these specifications for the instruments, the time-varying random term ε in Equation (7) would not be expected to be correlated with covariates. Further, the coefficients α_2 and α_3 for dispensation of justice and provision of security respectively would not be biased.

Acemoglu and Johnson (2005) assert that the key requirement for an instrument is that it should have some correlation with endogenous regressor. Hence, the choice of instruments entailed ensuring that they had some correlation with DJUST and SEC and had a low likelihood of affecting INV directly. The variables that were used as instruments for DJUST and SEC were filed cases (FC), establishment of the National Council on the Administration of Justice (NCAJ), election-related crimes (ERC) and institutional reforms in the police

(IRP). The FC represents the demand for justice and are expected to bear minimal effect on private investment apart from their consequent conversion into resolved cases. The NCAJ, which is mandated to coordinate policy improvement in the justice sector, was expected to have indirect bearing with private investments growth except through its support in reduction of insecurity or enhanced dispensation of justice. Election-related crimes are a subset of all crimes hence correlated with crime. The institutional reforms in Police on establishment of National Police Service Commission (NPSC) and Independent Police Oversight Authority (IPOA) would be expected to affect private investments only through the actions of police on provision of security.

To ensure that the instruments chosen were appropriate for the endogenous regressors, different strategies were applied. Primarily, the estimated 2SLS results are usually subjected to diagnostic test on endogeneity, validity of instruments and weak instruments tests (Angrist & Pischke 2009; Murray, 2006; Wooldridge, 2016). These tests were carried out. Further, from Murray (2006) and Wooldridge (2016), prior analysis of correlation between endogenous regressors and instruments serves as guide on relevance of the would-be instruments. Wooldridge (2002), Staiger and Stock (1997) and Stock, Wright and Yogo (2002) guides that the computation of *f*-statistic in the first stage regression is necessary, and that the rule of thumb requiring the *f*-statistic to be larger than 10, works well in most models. In the first stage regression therefore, the *f*-statistic was computed and interpreted.

The second stage involved least square (LS) regression after replacing *DJUST* and *SEC* in the structural Equation (7) with the fitted values $DJUST\hat{T}$ and $SEC\hat{C}$ respectively to yield;

$$INV = \alpha_1 + \alpha_2 DJUST\hat{T} + \alpha_3 SEC\hat{C} + \alpha_4 r + \varepsilon \tag{9}$$

The results were interpreted as effect of a unit change on coefficient of dispensation of justice or provision of security on private investment. The 2SLS regression results was also compared with those of LS regression drawing inspiration from Dougherty (2014), Lichand and Soares (2014) and Ponticelli and Alencar (2016). Before the adoption of the results, various diagnostic tests were conducted to ensure that estimates were unbiased and consistent. These tests were normality test, serial correlation LM test, heteroskedasticity test and model specification test. The instruments diagnostic tests that carried out were endogeneity test, validity test, and weak instruments test. The cumulative sum (CUSUM) test for parameter stability test was also carried out.

Data type and Sources, Measurement of Variables and Expected sign

The study used secondary annual time series data for the period 1960-2016. The definitions and measurement of variables in Equation (7) are detailed in Table 1.

Table 1: Definition and measurement of the variables

| Variable | Definition | Measurement | Expected sign |
|----------|---|--|--------------------|
| INV | Accumulation of capital by private agents for productive purposes over time | Real annual GFCF less government investment divided by real GDP | Dependent variable |
| DJUST | Resolution of cases by courts | Annual resolved cases by courts of law | + |
| SEC | Promotion and guaranteeing of national security | Annual recorded incidents of crime by police divided by population | - |
| R | Lending rate | Average annual lending rate on loans by commercial banks | - |

Data on private investments and real GDP were sourced from statistical abstracts and economic surveys published by Kenya National Bureau of Statistics (KNBS). Data on dispensation of justice, provision of security and filed cases defined in Table 2 were sourced from statistical abstracts and economic surveys from KNBS, published Judiciary and NPS reports, and hitherto Judicial and Police Department’s reports from Judiciary, NPS and Kenya National Archives. Data on interest rate were obtained from World Bank and Central Bank of Kenya reports. The definitions and measurement of instrumental variables are explained in Table 2.

Table 2: Definition and measurement of the instruments

| Variable | Definition | Measurement |
|----------|---|--|
| FC | A case(s) registered or initiated in a court of law for arbitration | Annual filed cases in courts divided by population |
| D1 | Establishment of NPSC and IPOA | 0 for the period 1970-2010 and 1 thereafter |
| D2 | Elections related crimes | 1 for the years 1992, 1997, and 2008 and 0 otherwise |
| NCAJ | Establishment of the NCAJ | 0 for the period 1960-2007 and 1 thereafter |

IV. Results and Discussion

Descriptive Statistics

The descriptive statistics for the variables used are provided in Table 3.

Table 3: Descriptive Statistics

| Variable | Mean | Median | Max. | Min. | Std. Dev. |
|----------|---------|---------|---------|---------|-----------|
| INV | 0.134 | 0.134 | 0.223 | 0.073 | 0.032 |
| DJUST | 362,047 | 380,909 | 584,691 | 113,887 | 122,606 |
| SEC | 0.004 | 0.004 | 0.006 | 0.002 | 0.001 |
| R | 14.72 | 14.00 | 30.55 | 8.39 | 5.97 |
| FC | 0.019 | 0.018 | 0.038 | 0.008 | 0.008 |

Key: Max = Maximum Min= Minimum Std. Dev= Standard deviation

From Table 3, private investment (INV) measured by the ratio of real private investment to real GDP averaged at 0.134. The minimum ratio was 0.073 while the maximum was 0.223. A standard deviation of 0.032 and a median of 0.134 depicted minor variation from the mean. This signified that there was minimal growth of INV across the study period. Dispensation of justice (DJUST) calculated using the number of resolved cases averaged at 362,047 with a median of 380,909. A mean of 362,047 as compared with that for filed cases at 375,386 depicted growth of pendency in the justice system. The minimum annual resolved cases were 113,887 while the maximum was 584,691. The standard deviation for DJUST was 122,606.

Provision of security (SEC) calculated using per capita crime averaged at 0.004. In absolute terms, the mean and median for crime were 69,063 and 71,239 incidents respectively. The lowest level for SEC was 0.002 while the maximum level was 0.006. A low standard deviation for SEC of 0.001 portrayed that the Kenyan economy experienced incidents of crime that were close to the mean of 69,363 in the entire study period. The mean for the per capita filed cases (FC) was 0.019 while the median was 0.018. The deviation from the mean was 0.008. In absolute terms, the annual average filed cases were 375,386 while the maximum and minimum were 597,223 and 137,933 cases respectively. Interest rate (R) averaged at 14.715 per cent. The lowest rate was 8.390 per cent while the highest rate was 30.550 per cent. The standard deviation was 5.969 per cent. This was an indication that the Kenyan economy has been experiencing fluctuations in interest rate over time.

Stationarity Test Results and Correlation Analysis

The paper utilized time series data for estimation. It was therefore imperative to ascertain the stationarity properties of the series to avoid spurious regression. In a model whose coefficients are nonstationary, the previous values of error term will have a non-declining effect on current value of dependent variable as time evolves (Brooks, 2014). To avoid this problem, stationarity test was done using Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. Brooks (2014) asserts that KPSS test results are more consistent as compared to Augmented Dickey Fuller (ADF) and Philips Perron (PP) tests whose power is low if the process is stationary but with a root close to non-stationary boundary. The null hypothesis for KPSS test is that stationarity is either around the mean or a linear trend, while the alternative hypothesis is that the series is non-stationary due to presence of a unit root. Whenever the computed test statistics were less than the critical value, the null hypothesis could not be rejected, and this led to the conclusion that the series were stationary. The results are given in Table 4.

Table 4: KPSS Stationarity test results

| Variable | Test Statistic | Crit. Value at 5 % | Conclusion |
|----------|----------------|--------------------|------------|
| INV | 0.339609 | 0.463 | Stationary |
| DJUST | 0.418726 | 0.463 | Stationary |
| SEC | 0.126032 | 0.146 | Stationary |
| R | 0.135784 | 0.146 | Stationary |
| FC | 0.137834 | 0.146 | Stationary |

All the computed test statistics were less than the critical values at level. This led to the conclusion that all the variables were integrated of order zero. Consequently, the estimation was done without differencing the variables or their instruments. As evidenced in Table A1 in the appendices, correlation existed between the instruments and endogenous variables. This pointed that the instruments were not weak and would therefore be relevant in explaining changes in endogenous regressors.

Diagnostic and Stability Test Results

The initial 2SLS estimates are given in Table A2 in the appendices. These results were then subjected to diagnostic tests to ensure that they were unbiased and consistent. The diagnostic test results are given in Table 5.

Table 5: Diagnostic Test Results

| Condition | Test | Test statistic | Critical value | Conclusion |
|---------------------|-----------------|----------------|----------------|----------------------------------|
| Normality Test | Jarque- Bera | 0.14739 | 0.9290 | Errors were normally distributed |
| Model specification | Ramsey RESET | 3.01350 | 0.0085 | Model was correctly specified |
| Serial Correlation | Breusch-Godfrey | 26.6108 | 0.0068 | There is serial correlation |
| Heteroskedasticity | Breusch-Pagan | 7.17232 | 0.0074 | There is heteroscedasticity |

The Jarque-Bera statistic of 0.147388 in Table 5 had a p -value of $0.92896 > 0.05$. Hence, the null hypothesis that residuals were normally distributed could not be rejected implying that residuals were normally distributed. The Ramsey RESET test statistic of 3.013497 had a p -value of 0.0085. Since the p -value was greater than 0.05, the null hypothesis that coefficients of powers of fitted values were all zero could not be rejected and hence the model was correctly specified. The Breusch-Pagan test statistic of 7.172325 for heteroscedasticity had a p -value of 0.0074. Consequently, the null hypothesis of constant variance could not be rejected leading to the conclusion that there was heteroscedasticity. From Table 5, the Breusch-Godfrey LM test statistic of 26.61080 had a p -value of 0.0068. This led to rejection of the null hypothesis of no serial correlation in residuals and therefore there was serial correlation. To address serial correlation and heteroscedasticity, the model was re-estimated using heteroskedasticity and autocorrelation consistent (HAC) standard errors. The re-estimated 2SLS regression results are given in Table 7. To determine the stability of parameters in the re-estimated 2SLS model, cumulative sum (CUSUM) test was carried out. The CUSUM graph is shown in Figure 1.

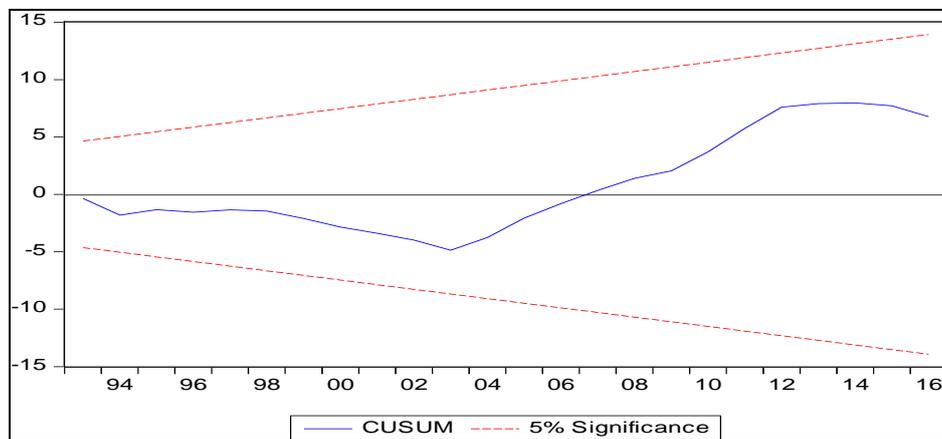


Figure 1: The CUSUM graph for the estimated investment equation

From Figure 1, the CUSUM line was in-between the two critical lines that signifies the 5 per cent significance level. This implied that the parameters were stable. Before the adoption of the results in Table 7, diagnostic tests specific to instrumental variable regression were also conducted. This aimed at ensuring that the instruments were relevant. The instruments diagnostic test results are given in Table 6.

Table 6: Instruments Diagnostic Test Results

| Test | Test statistic | Critical value | Conclusion |
|------------------------------|-----------------|----------------|-------------------------------|
| Endogeneity | 4.31052 | 0.0019 | DJUST and SEC were endogenous |
| Overidentifying restrictions | 1.47917 | 0.4773 | Instruments were valid |
| Weak instruments | 21.24* & 2.82** | 11.04 | Instruments were not weak |

**for DJUST and ** for SEC*

Foremost, the paper tested whether dispensation of justice and provision of security were indeed endogenous in private investment equation. From Table 6, the test-statistic of 4.31052 had a p -value of 0.0019 which was less than the critical value of 0.05. Hence the null hypothesis that dispensation of justice and provision of security are exogenous was rejected. This implied that dispensation of justice and provision of security were indeed endogenous variables in private investment equation. The χ^2 statistic of 1.47917 had a p -value of 0.4773. Since the p -value was greater than 0.05, the null hypothesis that all instruments were uncorrelated with error was not rejected. This led to the conclusion that instruments were valid. Despite the instruments being valid, there was likelihood they could be weak. To ascertain this, weak instruments test was done. From Table 6, the Shea’s partial adjusted R-squared of 21.24 per cent for dispensation of justice and 32.82 for provision of security were greater than the 2SLS relative bias of 11.04 per cent. This led to rejection of the null hypothesis that the instruments were weak.

Effect of dispensation of justice and provision of security on Private Investment in Kenya

Having satisfied the diagnostic and stability tests, the estimated model was used to explain the effect of dispensation of justice and provision on security on private investment. In the first stage regression, dispensation of justice and provision of security, were regressed against the instruments. The outcomes for the first-stage estimation are given in Tables A3 and A4. The instruments jointly explained variations in dispensation of justice and provision of security as evidenced by the *f*-statistic of 25.90 and 512.27 in Tables A3 and A4 respectively. The two *f*-statistics were statistically significant at 1 per cent level. Further, both *f*-statistics were greater than 10 as recommended by Staiger and Stock (1997), Stock et al. (2002) and Wooldridge (2002). Details on the effect of dispensation of justice and provision of security on private investment are provided in Table 7.

Table 7: Effects of dispensation of justice and security on private investments

| Chi Square: | 41.34 | Probability Chi Square = 0.0000 | | |
|---------------------|--------------------|---------------------------------|-------------|---------|
| Dependent Variable: | Private investment | | | |
| Variable | Coefficient | HAC Std. error | z-statistic | P-value |
| DJUST | 0.00190 *** | 0.00061 | 3.10 | 0.002 |
| SEC | -0.00225 *** | 0.00038 | -5.95 | 0.000 |
| R | -0.00464 *** | 0.00113 | -4.10 | 0.000 |
| Constant | 0.21375 *** | 0.01264 | 16.91 | 0.000 |

*Note: [***] denote significant levels at 1%*

From Table 7, *chi*-square statistic of 41.34 had a *p*-value of 0.000. Since the *chi*-statistic was statistically significant, then all the model variables were significantly different from zero. This implied that the variables jointly explained the growth of private investments. The coefficient for dispensation of justice was positive (0.0019) and statistically significant at 1 per cent level (*p*-value of 0.002). This showed that enhanced dispensation of justice would support the growth of private investments. The results conformed with the hypothesis where dispensation of justice was expected to increase the growth of private investment.

The finding was consistent with the previous empirical work by Bellani (2014) where dispensation of justice was found to support investments inflows. Hence, as investors structure their production and growth, consideration of the justice system institutions should be a key factor. The results were also consistent with previous empirical results by Zaaruka (2012) that security of property rights through dispensation of justice enhances capital accumulation. Investments would increase when investors are guaranteed that disputes will be resolved when they arise. As found out by Boehm (2015), investments would be low whenever contract enforcement is weak. The results further collaborated with those by Mora Sanguinetti et al. (2017) that enhancing performance of courts would favour investment environment. Therefore, diversification by firms would be negatively affected whenever the business environment is characterized by courts that are inefficient in contract enforcement. Empirical results by Dougherty (2014) and Lichand and Soares (2014) also attest that firms are more likely to invest if the judicial system is of high quality.

From Table 7, the coefficient for provision of security (SEC) of -0.00225 had a *p*-value of 0.000. This showed that an increase in crime would reduce the growth of private investments. The results were in line with the study expectation that a rise in crime would negatively affect the growth of private investments. The finding agreed with the previous empirical result by Rios et al. (2016) that crime hampers growth of industries in the long run. This suggests that growth in crime could be creating uncertainty thus persuading potential investors to withhold investment funds or invest elsewhere, until such a time the environment is secure. Therefore, crime is a disincentive to growth or diversification of investment. The finding also implied that insecurity could be imposing cost on firms thereby deterring new investments. The results concur with those of Daniele and Marani (2008), Fedderke and Luiz (2008), and UNODC (2012) that insecurity negatively affects growth of private investments. Further, previous empirical work by Zaaruka (2012) and Ngugi and Nyong'oro (2005) points that political instability and conflicts reduces the growth of investment. The finding further reinforced Kuenhel (2010) assertion that the strength of rule of law supports investment. Since crime was found to deter investment growth, reducing it would be an ingredient for attracting investors.

Other results in Table 7 showed that the coefficient for interest rate of -0.00464 was statistically significant at 1 per cent given its *p*-value of 0.000. Hence, an increase in interest rate would reduce private investments. This finding reinforced the choice of neoclassical theory of investment that guided the theoretical framework that was followed by this paper. In neoclassical theory of investment, interest rate is a key driver of capital accumulation. The finding was also consistent with empirical work by Menjo and Kotut (2012) and Njuru et al. (2014) that an increase in interest rate reduces the growth of private investment.

For robustness analysis, the 2SLS regression estimates were compared with LS estimates drawing inspiration from Dougherty (2014) and Lichand and Soares (2014). The preliminary results for the LS regression are presented in Table A5. This was followed by carrying out diagnostic tests which are given in Table A6. From diagnostic tests results, it was evident that there existed serial correlation and

heteroscedasticity. To address this challenge, the model was re-estimated using robust standard errors yielding the results given in Table A7. The results were then compared with those of 2SLS regression as illustrated in Table 8.

Table8: Comparison of 2SLS and OLS regression results

| Variable | 2SLS | | LS | |
|----------|--------------|---------|------------------|---------|
| | Coefficient | P-value | Coefficient | P-value |
| DJUST | 0.00190 *** | 0.002 | [0.0010319] *** | 0.003 |
| SEC | -0.00225 *** | 0.000 | [-0.0014295] *** | 0.000 |
| R | -0.00464 *** | 0.000 | [-.0025778] *** | 0.000 |
| Constant | 0.21375 *** | 0.000 | [0.1856238] *** | 0.000 |

*Note: [***] denote significant levels at 1%*

From Table 8, all the coefficients obtained from LS regression were statistically significant at 1 per cent level but were lesser in magnitude compared to those under 2SLS regression. This could have been occasioned by omitted variables. In a situation where 2SLS estimates are larger than those obtained under LS estimation, Angrist and Pischke (2009) puts forth that the LS regression could have been affected by omitted variables.

V. Recommendations

The Government should enhance resolution of cases. This can be realized through interventions within courts, supported by those in the upstream by police, prosecutors, the public and their legal representatives. For courts, inefficiencies that increase the time taken to finalize cases ought to be reduced. This could be achieved through increased mediation and arbitration of cases, formalizing alternative dispute resolution mechanisms and establishing a legal framework to guide minimization of adjournment of cases. Further, quick determination of cases could be realized through enhanced uptake of technology for instance the use of court transcription services, technology-based case management system and enhanced use of Information Communication Technology (ICT) based evidence in courts. For the police, timely investigation of crime and adducing of relevant evidence and expert reports in courts should be a central focus. The government should set time limits, by way of a statute, for completion of criminal investigation by police. For the public and their legal representatives, participation in court process without creating unnecessary adjournments is crucial. Once these measures are in place, resolution rate of cases would improve yielding growth of private capital.

The Government should curtail insecurity to create a favourable environment where investors and their capital are protected from various dangers and risks. To achieve this, the use of technology in crime detection and surveillance should be upscaled to increase the likelihood of timely apprehension of offenders, shorten the time to finalize investigations and ensure prompt adducing of evidence in courts. Establishment of a common ICT platform for real-time sharing of crime information and data across the justice sector institutions would be pivotal in controlling and reducing crime. Reduction of socio-economic challenges that intensify the propensity to commit a crime amongst the populace would be essential. Once crime is reduced, investors would be willing to allocate more of their scarce resources for capital accumulation. Further, a monetary policy that guarantees low interest rate for borrowers would be ideal for capital accumulation. This is ascribed to the finding that interest rate had a negative effect on the growth of private investment. Whether the Government pursues a regime of capped or uncapped interest rates, the desirable outcome should be an amplified demand for loanable funds to support the growth of private investment.

Future empirical research could focus on the relationship between the justice system services with other macroeconomic variables. This could target key industries and integrate locational dynamics for instance the devolved structures of the Kenyan economy. Exploring whether various monetary costs within or related to the justice sector like bail and bond fees, court deposits, legal representation fees, travel costs and cost of provision of private security could be affecting firm growth would be informative.

References

- [1]. Acemoglu, D., & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy*, 113(5), 949–995.
- [2]. Angrist, J., & Pischke, J. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. 1st Edition. Princeton Univ. Press.
- [3]. Barro, R., & Sala-i-Martin, X. (2004). *Economic Growth*. 2nd edition. MIT Press, Cambridge, MA.
- [4]. Bellani, M. M. (2014). Judicial efficiency and foreign direct investments: Evidence from Organization for Economic Co-operation and Development (OECD) Countries. Working Paper. <https://www.etsg.org/ETS2014/Papers/358.pdf>.
- [5]. Boehm, J. (2015). The impact of contract enforcement costs on outsourcing and aggregate productivity. Discussion Paper No 1382, Centre for Economic Performance, LSE, London.
- [6]. Brooks, C. (2014). *Introductory Econometrics for Finance*. 3rd edition. Cambridge University Press, Cambridge.
- [7]. Cass, D. (1965). Optimum growth in an aggregative model of capital accumulation. *The review of eco. studies*, 32 (3), 233–240.
- [8]. Chirwa, T. G., & Odhiambo, N. M. (2016). Macroeconomic determinants of economic growth: A review of international literature. *South East European Journal of Economics and Business*, 11 (2), 33–47.
- [9]. Daniele, V., & Marani, U. (2008). Organized crime and foreign direct investment: The Italian case. MPRA WP. No. 7217.
- [10]. Dougherty, S. M. (2014). Legal reform, contract enforcement and firm size. *Review of International Economics*, 22(4), 825–844.

- [11]. Fedderke, J. W., & Luiz, J. M. (2008). The political economy of institutions, stability, and investment: The case of South Africa. *The Journal of Development Studies*, 44(7), 1056–1079.
- [12]. García-Posada, M., & Mora-Sanguinetti, J. S. (2015). Does average size matter? Court enforcement, business demography and firm growth. *Journal of small business economics*, 44(3), 639–669.
- [13]. Hall, D. H., & Keilitz, I. (2012). International framework for court excellence: Global measures of courts performance. *International Framework for Court Excellence (IFCE)*. <https://www.ncsc.org/resources/~media/microsites/files/icce/ifce>
- [14]. Institute for Economics and Peace. (2016). *Global terrorism index*. University of Maryland, USA.
- [15]. Jorgenson, D. W. (1963). Capital theory and investment behavior. *American Economic Review*. 53(2), 247–259.
- [16]. Jorgenson, D. W., & Hall, R. (1971). Application of the theory of optimum capital accumulation. In G. from (ed.), *Tax incentives and capital spending*. The Brookings institute, Washington.
- [17]. Judiciary. (2014). *Judiciary Strategic Plan 2014–2018*. Nairobi, Kenya: The Judiciary.
- [18]. Judiciary. (2015). *State of the Judiciary and Administration of Justice. Annual report 2013–2014*. Nairobi, Kenya: The Judiciary.
- [19]. Judiciary. (2017). *State of the Judiciary and Administration of Justice. Annual report 2016–2017*. Nairobi, Kenya: The Judiciary.
- [20]. Karumba, M. M. (2009). *Impact of institutional factors on private investment in Kenya*. Unpublished master's thesis, Kenyatta University, Kenya.
- [21]. KIPPRA & World Bank. (2004). *Enhancing the competitiveness of Kenya's manufacturing sector: The role of investment climate*. APSG.
- [22]. Kiprop, S. K. (2013). Effect of budget deficit and corruption on private investment in developing countries: A panel data analysis. *African Journal of Business Management*, 7(27), 2720–2732.
- [23]. Koopmans, T. C. (1965). On the concept of optimal economic growth, in *Econometric Approach to Development Planning Chapter 4*, 225–287. North-Holland Publishing Company, Amsterdam.
- [24]. Kuehnle, J. (2010). *Essays on the theory of productive government activity and economic growth*. University of Heidelberg.
- [25]. Laeven, L., & Majnoni, G. (2003). Does judicial efficiency lower the Cost of credit? *World Bank Policy Research Working*.
- [26]. Lichand, G., & Soares, R. R., (2014). Access to justice and entrepreneurship. *Journal of Law and Economics*, 57(2), 459–499.
- [27]. Mbaye, E. Z. (2014). *Determinants of domestic private investments in Kenya*. Unpublished Master's Thesis, University of Nairobi, Nairobi, Kenya.
- [28]. Menjo, K. I., & Kotut, C. S. (2012). Effects of fiscal policy on private investment and economic growth in Kenya. *Journal of Econ. & Sustainable Development*, 3(7), 8–16.
- [29]. Miguel, E., Shanker, & Ernest S. (2004). Economic shocks and civil conflict: An IV approach. *Journal of Political Economy*, 112(4), 725–753.
- [30]. Mora-Sanguinetti, J. S., Martinez-Matute, M., & Garcia-Posada, M. (2017). Credit, crisis and contract enforcement. *European Journal of Law and Economics*, 44(2), 361–383.
- [31]. Mundia, R. K. (2014). *Analysis of determinants of private investment in Kenya*, Unpublished Master's Thesis, University of Nairobi, Nairobi, Kenya.
- [32]. Murray, M. P. (2006). Avoiding invalid instruments and coping with weak instruments, *Journal of Economic Perspectives*, 20(4), 111–132.
- [33]. Ngugi, R. W., & Nyang'oro, O. (2005). *Institutional factors and FDI flows: Implications for Kenya*. Discussion Paper No. 48. Nairobi: KIPPRA.
- [34]. Njuru, S. G., Ombuki, C. O., Wawire, N. W. & Okeri, S. (2014). Effects of fiscal policy on private investment in Kenya. *Research Journal's Journal of Econ*, 2, 2347–8233.
- [35]. Palumbo, G., Giupponi G., Nunziata, L., & Sanguinetti, J. M. (2013). *Judicial performance and its determinants: a cross-Country perspective*. OECD.
- [36]. Ponticelli, J., & Alencar, L. S. (2016). *Court enforcement and firm productivity: Evidence from a bankruptcy reform in Brazil*. Working Paper, No 425. Brazil Central Bank.
- [37]. Republic of Kenya. (2007). *Kenya Vision 2030: A globally competitive and prosperous Kenya*. Nairobi, Kenya: The Government Printer.
- [38]. Republic of Kenya. (2008). *Economic Survey 2008*. Nairobi, Kenya: The KNBS.
- [39]. Republic of Kenya. (2010). *Constitution of Kenya. Laws of Kenya*, Nairobi, Kenya: The National Council for Law Reporting.
- [40]. Republic of Kenya. (2013). *Kenya Vision 2030: Second MTP, 2013–2017*. Nairobi, Kenya: The Government Printer.
- [41]. Republic of Kenya. (2015). *Crime situation report 2015*. Nairobi, Kenya: The NPS.
- [42]. Republic of Kenya. (2016). *Economic Survey 2016*. Nairobi, Kenya: The KNBS.
- [43]. Republic of Kenya. (2017). *Economic Survey 2017*. Nairobi, Kenya: The KNBS.
- [44]. Rios, V., Karolina, M., & Cano, M. (2016). The impact of crime and violence on economic sector diversity. The Wilson Center.
- [45]. Solow, R M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 70(1), 65–94.
- [46]. Stone, C. (2006). *Crime, justice, and growth in South Africa: Center for International Development Working Paper No. 131*.
- [47]. Staiger, D. & James H. Stock, J. H. (1997). IV regressions with weak instruments. *Econometrica*. 65(3), 557–586.
- [48]. Stock, J. H., Wright, J. H. & Yogo, M. (2002). A survey of weak instruments and weak identification in generalized method of moments. *Journal of business and Economic Statistics*, 20(4), 518–529.
- [49]. Swan, T. W. (1956). Economic growth and capital accumulation. *The Economic Record*, 32(2), 334–336.
- [50]. UNODC. (2012). *Monitoring the impact of economy on crime*. Statistics and surveys section (SASS), UNODC.
- [51]. Wooldridge, J. M. (2016). *Introductory Econometrics: A Modern Approach*. 6th Edition. The MIT Press.
- [52]. Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. 2nd Edition. The MIT Press.
- [53]. World Bank. (2017). *Gross fixed capital formation, private sector [Data File]*. World Bank. <http://data.worldbank.org/indicator/ne.gdi.fprv.zs>.
- [54]. Zaaruka, B. P. (2012). *Institutional dynamics and capital accumulation: Evidence from Namibia and Tanzania*. ERSA Working Paper No. 318.

Appendices

Table A 1: Correlation between endogenous variables and instruments

| Variable | Provision of Security | Dispensation of Justice |
|-------------|-----------------------|-------------------------|
| Filed Cases | 0.316108 | 0.968933 |
| D1 | -0.451837 | -0.156568 |
| D2 | -0.215988 | 0.333160 |
| NCAJ | -0.532278 | -0.044097 |

TableA 2: Initial results for 2SLS regression

| Wald chi2(3) | 16.06 | | | |
|--------------|-------------|----------------|-------|-------|
| Prob > chi2 | 0.0011 | | | |
| Variable | Coefficient | Standard Error | z | P>z |
| DJUST | 0.00190 | 0.00077 | 2.47 | 0.014 |
| SEC | -0.00225 | 0.00057 | -3.96 | 0.000 |
| R | -0.00464 | 0.00161 | -2.89 | 0.004 |
| Constant | 0.21375 | 0.02636 | 8.11 | 0.000 |

TableA 3: First-stage regression results for dispensation of justice

| HAC VCE: | Bartlett kernel with 55 lags | | | |
|-------------------------|------------------------------|----------------|-------|-------|
| F (5, 51)Prob >f=0.0000 | | | | |
| Variable | Coefficient | Standard Error | t | P>t |
| FC | 891.6277 | 337.7571 | 2.64 | 0.011 |
| NCAJ | 12.83884 | 6.051538 | 2.12 | 0.039 |
| IRP | -7.894002 | 1.711219 | -4.61 | 0.000 |
| ERC | 3.678573 | 1.920446 | 1.92 | 0.061 |
| R | 1.557085 | 0.3858715 | 4.04 | 0.000 |
| Constant | -4.997604 | 14.07207 | -0.36 | 0.724 |

TableA 4: First-stage regression results for provision of security

| HAC VCE: | Bartlett kernel with 55 lags | | | |
|-----------|------------------------------|----------------|-------|--------|
| F (5, 51) | 512.27 | Prob >f | 0.000 | |
| Variable | Coefficient | Standard Error | t | P>t |
| FC | 603.9731 | 343.6353 | 1.76 | 0.085 |
| NCAJ | -14.20112 | 5.562832 | -2.55 | 0.014 |
| IRP | 1.469366 | 0.8721795 | 1.68 | 0.098 |
| ERC | -1.933121 | 1.570582 | -1.23 | 0.224 |
| R | -0.7778355 | 0.233033 | -3.34 | 0.002 |
| Constant | 37.74366 | 11.64715 | 3.24 | 14.361 |

TableA 5: Initial LS regression results

| F (3 53) | 9.08 | Prob > F | 0.0001 | |
|-----------|-------------|----------------|--------|-------|
| Variable | Coefficient | Standard Error | t | P>t |
| DJUST | 0.0010319 | 0.0003737 | 2.76 | 0.008 |
| SEC | -0.0014295 | 0.0003275 | -4.37 | 0.000 |
| R | -0.0025778 | 0.0008521 | -3.03 | 0.004 |
| Constant. | 0.1856238 | 0.0205829 | 9.02 | 0.000 |

Table A 6: Diagnostic test results for LS regression

| OLS condition | Test | Test statistic | Critical value | Conclusion |
|---------------------|--------------------|----------------|----------------|----------------------------------|
| Serial Correlation | Breusch-Godfrey LM | 28.583 | 0.0000 | There is serial correlation |
| Heteroskedasticity | ARCH | 14.431 | 0.0001 | There is heteroscedasticity |
| Model specification | Ramsey RESET | 0.77 | 0.5147 | Model was correctly specified |
| Normality Test | Jarque- Bera | 2.7969 | 0.2470 | Errors were normally distributed |

Table A 7: LS regression results,robust standard errors (RSE)

| f (3 53) | 11.03 | Prob >f | = 0.0001 | |
|----------|-------------|-----------|----------|-------|
| Variable | Coefficient | RSE | t | P>t |
| DJUST | 0.0010319 | 0.0003336 | 3.09 | 0.003 |
| SEC | -0.0014295 | 0.0003463 | -4.13 | 0.000 |
| R | -.0025778 | 0.0006365 | -4.05 | 0.000 |
| Constant | 0.1856238 | 0.0204931 | 9.06 | 0.000 |