Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.9, No.14, 2018

Causes of Congestion in the Justice System. Does Macroeconomic Environment Matter?

Moses Marang'a[1*] George Kosimbei[1] Duncan Ouma[2]
1.Kenyatta University, Kenya
2.Kenyatta University, Kenya & Macroeconomic, Policy Division-UNECA, Ethiopia

Abstract
Public services rendered by the justice system institutions are susceptible to congestion which arise from partial rivalry in consumption of these services. This paper investigated the causes of congestion in Kenyan justice system laying emphasis on select macroeconomic variables. A structural model was estimated using instrumental variable method, that entailed the use of data for the period 1960-2016. The findings were that increase in funding to justice system institutions, economic growth and enhanced resolution of cases reduces congestion. We recommend that the Government efforts to reduce congestion should cut across the demand and supply side of the justice market, and on environmental factors that affect the proper functioning of the justice sector. This should involve setting time limits, preferably through legislations, on the maximum period different types of cases should take to be finalized. Such a legislation could also specify the timelines that other players in the justice sector should take to finalize their legal tasks in relation to dispute resolution process. Further, allocation of optimal fiscal resources to justice system institutions would be crucial in financing congestion reduction programmes especially on uptake of technology and upgrading of capital infrastructure.
Keywords: Congestion, Macroeconomic Variables, Causes

1. Introduction

1.1 Congestion in the Justice system

Congestion in the provision of a public good arises whenever the public good is partially rival in consumption and hence its use as a productive input by one agent diminishes its usefulness to others (Barro & Sala-I-Martin, 2004). This implies that congestion is a negative externality that reduces the capability of economic agents to augment their welfare. In any economy therefore, existence of congestion renders the benefits gained by economic agents from consuming a public good to decrease as users increase. For economic agents to gain maximum benefits of consuming a public good, the level of congestion associated with the public good should be sufficiently weak.

In this paper, congestion on provision of justice system services has been explored. The justice system services are provided by public institutions and entail dispensation of justice and maintenance of law and order. These services are partially rival in consumption and therefore predisposed to congestion such that the services received by a single user declines as users increase (Barro & Sala-I-Martin, 2004; Kuehnel, 2010). The decline occur since the justice system becomes unable to finalize matters in each period, equal to the incoming ones. Espasa, Esteller and Alejandro (2015) describe the inability to finalize matters equivalent to incoming ones as an inefficiency. Congestion would then arise when the number of new cases is above the number that can be solved when full efficiency is achieved (Espasa *et al.,* 2015). Even if the justice system enjoys high efficiency level, the system would not be in full performance if they are congested. Hence, the effectiveness of a judicial system crucially depends on the ability of courts to resolve cases promptly especially if congested exists (Dimitrova, Grajzl, Sustersic & Zajc, 2012). According to Vereeck and Mühl (2000), incoming matters often exceed the supply in many justice markets yielding considerable waiting periods for those seeking justice. This renders the market for justice not to clear and achieve Pareto improvement.

One fundamental question is whether congestion in the justice system is a problem or not. We interrogate this question in two perspectives. First, regarding the implications of congestion to internal performance of justice system institutions and second, in terms of implications to the larger macro-economic environment. Internally, Maja and Arnab (2004) assert that congestion weakens democracy, the rule of law, and the ability to enforce human rights. Vereeck and Mühl (2000) affirm that congestion undermines the performance of the justice system institutions and yield untimely and unenforceable justice decisions. Second, understanding the economics of court delay is of importance to the economy. This is because the legal framework guides the interactions amongst the economic agents. The delay which typifies congestion depicts long waiting lists for those seeking justice services thereby imposing an opportunity cost to economic agents. Economides, Haug and McIntyre (2013) assert that delayed JS services undermine the productivity of the economy. The costs of delay are also borne by taxpayers, who shoulder the weight of incidental costs. Whether an economy in its steady state experiences growth rates or not, depends on enforcement of property rights (Irmen & Kuenhel, 2009).

From the foregoing, understanding the causes of congestion to recommend workable strategies that would reduce it is essential. According to Bielen, Peeters, Marneffe and Vereeck (2017), policy-makers have been pursuing reforms to address congestion, but most countries have remained unsuccessful in significantly reducing it. In his seminal paper on congestion equilibrium hypothesis, Priest (1989) pointed that the existence of congestion equilibrium could account for the fact that reforms aimed at reducing congestion are only temporarily effective. In congestion-equilibrium hypothesis, when delay-reducing reforms are put in place and court congestion declines, more disputes proceed to court and court congestion moves back towards equilibrium level. This implies that reduced delay is offset by an increased tendency to litigate.

This study investigated the causes of congestion in Kenyan justice system with an emphasis on the likely role of select macroeconomic variables. The Kenyan justice system comprises several players that collaborate to administer justice and ensure adherence to the rule of law. Congestion in this paper has been analyzed downstream at courts while incorporating the role of players in the upstream of justice chain notably that of the police. The rationale was that all criminal cases reported and investigated by police are filed and prosecuted downstream in courts. Also, civil disputes emanating from the community and their legal representatives upstream are filed downstream in courts for arbitration.

By providing that justice shall not be delayed, the Constitution of Kenya underscores the importance of expeditious dispensation of justice (Republic of Kenya, 2010). Despite this, the Kenyan Judiciary has been facing challenges on expeditious disposal of cases. For instance, the minimum ideal rate of resolution of cases that would guarantee non-increase in congestion is 100 per cent (Hall & Keilitz, 2012). However, the rate of resolution of cases by Kenyan courts has been below 100 per cent over the last two decades (Republic of Kenya, various issues). This has led to accumulation of cases over time. By mid-2017, Kenya had a total of 533,350 pending cases where 59 per cent of them had been pending for more than one year from the date they were filed (Judiciary, 2017b). A further 17 per cent had been pending for over ten years, 21 per cent between 5 and 10 years and 36 per cent between 2 and 5 years (Judiciary, 2017b).

1.2 Empirical Literature on Causes of Congestion in the Justice System

Empirical literature on causes of congestion has yielded diverse findings. Some papers have found that increase in caseload or litigiousness yields congestion (Buscaglia & Ulen 1997; Dimitrova *et al.* 2012; Espasa *et al.* 2015; and Rosales, 2008). Other empirical results indicate that increase in caseload incentivizes judges to resolve more cases hence congestion does not necessarily increase (Beenstock & Haitovksy, 2004; Bielen *et al.*, 2017)). Congestion equilibrium hypothesis was found to hold for highly litigious countries in Europe such that there is inverse relationship between litigation rate and court backlog (Bielen *et al.*, 2017). Further, congestion is influenced by the level of output or resolution of cases by courts (Buscaglia & Ulen, 1997; Dimitrova *et al.*, 2012; Maja & Arnab, 2004).

Kuehnel (2010) asserts that the productive capacity of a judicial system depends on human and infrastructural resources allocated to it and their efficient utilization. Maja and Arnab (2004) found that finalization of cases increases with a rise on available resources and this would consequently reduce congestion. On the contrary, Yeung and Azevedo (2011) found that courts could improve their level of efficiency, even if both human and material inputs were kept constant. Another interesting finding is that *ceteris paribus,* a court that resolves many cases attracts more filings than a court that consistently resolves fewer cases (Buscaglia & Ulen, 1997). Bielen *et al.* (2017) acknowledged the role of macroeconomic environment by including per-capita GDP as a control variable in estimating congestion in judicial systems across European countries.

According to Bielen *et al.* (2017), economic growth makes parties to find it easier to fulfill their obligations, and therefore fewer contracts would be broken yielding less litigation and consequently lowering congestion. Further, parties from prosperous economies have a higher ability to pay potential litigation costs thus speeding up case process and slowing congestion (Sobbrio, D'Agostino & Sironi, 2010). On the contrary, better economic performance could yield complex transactions which moves to courts for arbitration with potentiality of creating congestion (Clemenz & Gugler 2000 and Ginsburg & Hoetker 2006). Additionally, Bankruptcy litigation is more common when the economy slows down which could increase congestion (Clemenz & Gugler 2000). Despite the existence of empirical work on causes of congestion, knowledge gap exists in Kenyan context moreso on probable effects of macroeconomic environment. This paper filled this gap and recommended policy strategies to alleviate congestion.

Congestion in the justice system has been conceptualized and evaluated using different perspectives and measures. For instance, Posada and Sanguinetti (2013) and Chemin (2009) conceptualized it as the sum of pending cases in the previous period (PC_{t-1}) and filed cases in the current period (FC_t) divided with resolved cases in the current period (RC_t). Chemin (2004) calculated congestion as a ratio of PC_t to PC_{t-1} added to the FC_t. Giacommelli and Menon (2013) focused on the ratio of PC_t added PC_{t-1} divided by sum of FC_t and RC_t. According to Maja and Arnab (2004), congestion can be analyzed in terms of caseload per capita or per judge, cases older than a year per capita or per judge and ratio of backlog cases to cases disposed.

2. Methodology

2.1 Theoretical Framework

The theoretical framework for the paper draws from congestion model that links congestion of a public good and the productive process of an economy as explicated by Barro and Sala-I-Martin (2004). In economic theory, a public good is non-rivalrous in consumption such that the use of a unit of the public good by one economic agent does not preclude the benefit from another agent using the same good. Whenever public goods are partially rival in consumption, their use by one economic agent diminishes their usefulness to other agents and this may cause congestion (Kuenhel, 2010). Consider, an economy where production is done by economic agents using a production function with a public input such that;

$$Y_i = g \cdot f(G/Y_a) \tag{1}$$

where Y_i is output for the i^{th} agent, g is the public input required by the i^{th} agent, G is the total available public input in the economy and Y_a is aggregate economic performance. The amount of public good g received by the i^{th} agent is a fraction of aggregate public good G that is dependent on aggregate economic output Y_a. An increase in G relative to aggregate output Y_a expands g and hence Y_i. From Barro and Sala-I-Martin (2004), the flow of a public good g when G is characterized by congestion is given as;

$$g = GY_a^{\sigma_G - 1} \qquad 0 < \sigma_G < 1 \tag{2}$$

where σ_G is the scale of congestion associated with G such that g declines as other users congest the facilities. Further, a rise in g relative to the overall supply G would generate congestion. Rearranging Equation (2) yields;

$$\log g - \log G = (\sigma_G - 1)\log Y_a \Rightarrow \sigma_G = [(\log g - \log G)/(\log Y_a)] + 1 \tag{3}$$

Equation (3) implies that;

$$\sigma_G = f(G, Y_a) \tag{4}$$

According to Palumbo, Giupponi, Nunziata and Sanguinetti (2013), congestion in the justice system would be influenced by internal factors (*IF*) for instance the amount of public good or service (*G*) the justice system is internally able to provide as well as external factors (*EF*) like demand and other environmental factors. Most macroeconomic variables would be construed as an *EF* to the justice system. In courts for example, increase in litigation which depicts a rising demand, requires commensurate supply, and in presence of congestion, such supply should be sufficiently high to cater for cumulative demand that includes old pending cases. From Equation (4), we rewrite congestion equation as follows;

$$\sigma_G = f\left(\sum_i^K IF_i, \sum_i^N EF_i\right) \tag{5}$$

where *IF* and *EF* are vectors of potential internal and external causes of congestion respectively.

2.2 Empirical Model Specification

Drawing from Equation (5), the empirical model for the study was specified as;

$$Cong = \beta_0 + \beta_1 y + \beta_2 ejs + \beta_3 djust + \beta_4 \sec + \mu \tag{6}$$

In Equation (6), the macroeconomic factors are represented by economic performance (*y*) and expenditure allocated to justice system institutions (*ejs*). The potential internal causes are given by dispensation of justice (*djust*) and provision of security (*sec*). The expectation of the study was $\beta_1 < 0$ or > 0, $\beta_2 < 0$, $\beta_3 < 0$ and $\beta_4 > 0$.

2.3 Estimation Procedure

To ascertain the causes of congestion, Equation (6) was estimated using two-stage least square (2SLS) instrumental variable (IV) method. The estimation method was preferred due to potential endogeneity between congestion and some explanatory variables. Since one of the possible cause of congestion is the level of supply of public good, it was natural to expect endogeneity. Further, as elaborated by Acemoglu *et. al.* (2005), there exists two-way feedback between some macroeconomic variables and institutional factors. For instance, increase in *Cong* may trigger governments to allocate additional resources to justice system institutions to reduce it, and on the other hand, increase in expenditure would enhance service delivery and consequently reduce congestion. According to Bellami (2014) and Murray (2006), estimating a model suffering from endogeneity between the dependent and some explanatory variables using least square (LS) technique would be unsuitable to be interpreted as causal. To interpret the results as causal, then IV method was appropriate for estimation.

In Equation (6), three variables namely; *ejs*, *djust* and *sec* were treated as a *priori* endogenous and hence were instrumented. Expenditure in the justice system was instrumented with real public expenditure (*EXPG*) in the current and previous period. For *djust*, filed cases (*FC*) which reflect the level of litigation and leadership reforms in the Judiciary (*D4*) were used as instruments. Despite literature showing that *FC* is a potential cause of congestion, it could not be used as an explanatory variable because of its high and positive correlation with resolved cases of 96.89 per cent. For *Sec*, election related crimes (*D1*), institutional reforms in the NPS (*D2*) and leadership reforms in the NPS (*D3*) were used as instruments. The identifying assumption was that entry of new leadership in both the NPS and Judiciary would strive to bring admistrative and policy changes to enhance security and dispensation of justice respectively. Economic growth was treated as a *priori* exogenous drawing inspiration from Maja and Arnab (2004).

Prior to estimation, correlation analysis between the endogenous variables and the instruments was done to inform on potential relevance of instruments prior to estimation. As suggested by Posada and Mora-Sanguinetti (2012) and Woodridge (2016), the endogenous variable and potential instrument ought to have some correlation. All estimations were done after ensuring that the series were stationary. The Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test for unit root was carried out.
In the first stage regression, LS estimations of the following equations were done;

$$ej\hat{s} = \psi + \lambda_i X_i + \omega \; ; \; djus\hat{t} = \alpha + \beta_i Y_i + \varepsilon \; ; \& \; se\hat{c} = \theta + \delta_i Z_i + \mu \quad (7)$$

where *X, Y* and *Z* are vectors of instruments for the endogenous variables *ejs, djust* and *sec* and $ej\hat{s}$, $djus\hat{t}$ and $se\hat{c}$ are the fitted values that were consequently incorporated in Equation (6) to yield;

$$Cong = \beta_0 + \beta_1 djus\hat{t} + \beta_2 se\hat{c} + \beta_3 ej\hat{s} + \beta_4 y + \mu \quad (8)$$

In the second stage regression, Equation (8) was estimated using LS technique. Before the adoption of the results, various diagnostic tests were done.

2.4 Data Type and Sources

The study used secondary annual time series data for the period 1960-2016. Data of dispensation of justice, provision of security and that for computing congestion, were sourced from statistical abstracts and economic surveys published by the Kenya National Bureau of Statistics (KNBS), published Judiciary reports, previous Judicial and Police Department's reports. Data on economic growth and expenditure were obtained from economic surveys and statistical abstracts published by the KNBS.

2.5 Measurement of Variables

Congestion in the justice system was measured using the ratio of annual PC_t to PC_{t-1} added to the FC_t. Economic performance was calculated using annual percentage growth rate of real GDP. Expenditure in the justice system was the annual real expenditure for justice system institutions divided by total annual government expenditure. Annual resolved cases by courts was used for *djust* while *sec* was calculated using per capita crime. On instruments, EXPG was calculated using annual total real capital and recurrent expenditure by the Government. Filed cases were given by per capita annual filed cases in courts. Other instruments were computed using binary variables. For institutional reforms in the National Police Service (NPS), we had *0* for the period 1970-2010 before the establishment of the NPS Commission (NPSC) and Independent Policing Oversight Authority (IPOA) and *1* thereafter. On election related crimes, we used *1* for the years 1992, 1997, and 2008 when Kenya experienced post-election violence and *0* for other years. Regarding leadership reforms in the NPS and Judiciary, *1* was used for the years a new Inspector General of the Police or a new Chief Justice assumed office, and *0* otherwise.

3. Results and Discussion

3.1 Pre-estimation Analysis and Test Results

First, the mean, median, maxima, minima and standard deviation for the series were generated to give information on characteristics of the series. The information is provided in Table A1 in the appendices. Second, the stationarity properties of the series were analyzed. From Table A2, all the variables were stationary at level. Therefore, estimation in level could not yield spurious results. Third, correlation analysis between the endogenous variables and the potential instruments was done. The correlation results in Table A3 showed existence of some correlation between the three endogenous variables and the instruments. This indicated that the chosen would be useful. Although leadership reforms in the NPS had a weak correlation with *ejs*, it was used in the first stage regression since it had a relatively better correlation with other endogenous variables and it was essential for the study to investigate leadership reforms in totality.

3.2 Diagnostic Tests Results

The initial 2SLS estimates are given in Table A4. Prior to adoption of the estimates, diagnostic and stability tests were carried out as detailed in Table A5 and Figure A1. From Table A5, the *p*-value for the Jarque-Bera statistic of 1.417294 was 0.492310 > 0.05. The null hypothesis that residuals were normally distributed could not be rejected and hence the residuals were normally distributed. The critical value for the Ramsey RESET test statistic of 0.3186 was greater than 0.05 and therefore the null hypothesis that coefficients of powers of fitted values are all zero could not be rejected at 5 per cent. This implied that there were no omitted variables. The autoregressive conditional heteroscedasticity (ARCH) test statistic of 0.007193 had a *p*-value of 0.9324 greater than 0.05. Therefore, the null hypothesis of constant variance was not rejected implying there was no heteroscedasticity.

The Breusch-Godfrey serial correlation LM test statistic of 9.142848 had a *p*-value of 0.0103. The null hypothesis of no serial correlation in residuals was rejected hence there was serial correlation. Due to existence of residual serial correlation, the model was re-estimated using heteroscedasticity and autocorrelation consistent (HAC) standard errors. The results are highlighted in Table 1. To establish the stability of parameters in Table 1, cumulative sum (CUSUM) graph was generated. From Figure A1, the CUSUM line is inside the two critical lines, and hence the parameters were stable.

The results were further subjected to instruments diagnostic tests. The test results for endogeneity given in Table A6 show an *f*-statistic of 79.4574 that is statistically significant given its *p*-value of 0.0000. Consequently, the null hypothesis that *ejs*, *djust* and *sec* were exogenous was rejected and the study concluded that the three were indeed endogenous. From Table A7, the *chi*-square statistic of 4.99068 had a *p*-value of 0.2883 > 0.05 leading to non-rejection of the null hypothesis that instruments were uncorrelated with error term, and hence the instruments were valid. From Table A8, the adjusted partial *r*-squared for *djust* of 61.08 per cent was greater than the critical values of 13.95, 8.50, 5.56 and 4.40 at 5, 10, 20 and 30 per cent respectively. The adjusted partial *r*-squared for *sec* of 8.76 per cent was greater than the critical values of 8.50, 5.56 and 4.40 at 10, 20 and 30 per cent respectively. Further, the adjusted partial r-squared of 6.39 per cent for *ejs* was greater than the critical values of 5.56 and 4.40 at 20 and 30 per cent level respectively. Hence, the null hypothesis that instruments were weak was rejected.

3.3 Causes of Congestion in Kenyan Justice System

Since the estimated model satisfied the diagnostic tests, estimation results in Table 1 were used to explain the causes of congestion in Kenyan justice system.

Table 1: Causes of congestion in Kenyan justice system

Dependent variable	Congestion
R-squared	0.6059
Chi square	862.48
Probability chi square	0.0000

Variable	Coefficient	HAC Standard error	z-statistic	P-value
ejs	[-3.4303] ***	0.5890	-5.82	0.0000
y	[-0.0064] **	0.0027	-2.41	0.0160
djust	[-0.0063] ***	0.0019	-3.41	0.0010
sec	[-0.0138] ***	0.0011	-12.97	0.0000
constant	[1.4479] ***	0.1069	13.55	0.0000

Note: [***] denote significant levels at 1%; [**] denote significant levels at 5%

Source: Author's computation using study data from various sources

From Table 1, it is evident that congestion in the justice system is caused by both internal factors and macroeconomic variables outside the control of justice system institutions. The *r*-squared of 60.59 shows that the model variables explain approximately 61 per cent of variations in congestion. The *chi*-square statistic of 862.48, which was statistically significant at 95 per cent significance level, showed that the model variables were jointly important in congestion equation.

An increase in *ejs* would cause congestion to reduce. This is evidenced by the negative coefficient of -3.4303 for *ejs* shown in Table 1 that was statistically significant at 1 per cent level (*p*-value of 0.000). The results were in line with the study expectation that increase in *ejs* would lower congestion. This finding corresponds with the assertion by Irmen and Kuehnel (2009) and Barro and Sala-I-Martin (2004) that increase in productive government expenditure reduces congestion associated with a public good.

The growth of the economy (*y*) would reduce congestion in the justice system. This is illustrated in Table 1 by the negative coefficient of -0.00064 for *y* with a *p*-value of 0.0160. The finding reinforces one side of the study hypothesis that economic growth would be beneficial to the justice system. The finding compares with that of Maja and Arnab (2004) and Mueller (2003) that as the economy grows, more public goods would be provided and hence congestion associated with such goods would reduce. The result confirms Bielen *et al.* (2017) assertion that economic growth would render parties to find it easier to fulfill their obligations, break fewer contracts leading to low litigation and subsequently lowering congestion. This could also imply that with economic growth, parties are able to pay litigation costs hence speeding up case process and slowing congestion as found by Sobbrio *et al.* (2010).

From Table 1, enhancement of *djust* had a negative effect on congestion. This is evidenced by the negative coefficient of -0.0063 with a *p*-value of 0.0010. The finding is in conformity with the study hypothesis that a rise in resolution of cases, would lower congestion. The finding concurs with that of Maja and Arnab (2004) that increase in resolution of cases reduced congestion in India. Further, since dispensation of justice depicts the supply of a public good, then the finding is in conformity with the economic theory that congestion reduces with increase in supply of public good as expounded by Barro and Sala-I-Martin (2004) and Kuehnel (2010). Further, the finding compares with that of Dimitrova *et al*. (2012) and Maja and Arnab (2004) that the level of court output is important.

As per capita crime increases, congestion would reduce. This is depicted by the negative coefficient for sec (-0.0138) which is statistically significant at 1 per cent level (p-value of 0.000). The finding is unique since it is contrary to the study expectation that as crime increases, there would be increase in congestion. As asserted by Pellegrina (2008), high crime contemporaneously boosts the stock of trials and occasion delay in the justice system. However, the results were not entirely unexpected because of various reasons. First, crime enters the downstream justice system through filing of cases in courts. There was high and positive correlation between filed cases and resolved cases of 96.89 per cent suggesting that the justice system, on average, reacted to an increase in filed cases through resolution of more cases. Hence as crime rise, filed cases would rise and consequently resolution of cases would intensify, and congestion would therefore not increase. An increase in filed cases triggers courts to internally adapt to the increase by resolving more cases (Dakolias, 1999; Goerdt *et al*., 1989; and Maja & Arnab, 2004).

3.4 Robustness Analysis

To firm up the results, the study utilized an alternative measure for congestion following Giacommelli and Menon (2013). The initial estimation results given in Table A9 were subjected to various diagnostic tests. From Table A10, the residuals were not heteroscedastic and there were no omitted variables. However, there was serial correlation as evidenced by LM test statistic of 9.224903 with a *p*-value of 0.0099. To address serial correlation problem, the model was re-estimated using HAC standard errors. The results are provided in Table A14. This was followed by instruments diagnostic tests whose results are provided in Tables A11, A12 and A13. Robustness analysis results shown in Table A14 confirm that causes of congestion did not vary across its different measures, and hence, an increase in *djust*, *ejs*, *y* and *sec* reduce congestion.

As in Bellami (2014), Giacommelli and Menon (2013), Karolina *et Al.* (2016) and Ponticelli and Alencar (2016), the 2SLS estimates were also compared with LS estimates. The estimation results given in Table A17 reveals that *ejs* reduces congestion. Although the coefficients for *djust* and *y* had an appropriate sign, they were not statistically significant. The 2SLS instrumental variable estimation yielded relatively larger coefficients for the independent variables as compared to those obtained under LS regression and hence, the method yielded better results.

4. Recommendations

The study findings have shown that the macroeconomic environment influences congestion in the justice system. Based on the findings, we recommend that the Government efforts to reduce congestion should not only focus on the demand and supply side of the justice market, but also on environmental factors that affect the proper functioning of the justice sector. First, there is need to set time limits, preferably through legislations, on the maximum period different types of cases should take to be finalized. Such a legislation could also specify timelines that other players in the justice sector should take to promptly finalize their legal duties in relation to administration of justice and maintenance of law of law and order. Once the timelines are in place, the resolution of cases would be prompt thereby reducing the growth of congestion. Second, allocation of optimal financial resources to justice system institutions would be crucial in funding congestion reduction initiatives for instance the use of technology. This was informed by the finding that an increase in government expenditure to justice system institutions would reduce congestion. Third, sustaining high economic growth would be useful in reducing congestion. This suggests that economic growth provides ripples that positively support the contracting and security environment for factors of production. An area for future research would be to investigate whether congestion equilibrium hypothesis by Priest (1989) holds for Kenyan justice system especially micro analysis by court and case type., and implication on firm behaviour.

References

Acemoglu, D., & Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy, 113*(5), 949-995.

Barro, R., & Sala-i-Martin, X. (2004). *Economic Growth*. 2nd edition. MIT Press, Cambridge, MA.

Beenstock, B. & Haitovsky, Y. (2004). Does the appointment of judges increase the output of the judiciary? *International Review of Law and Economics*, *24,* 351-369.

Bielen, S., Peeters, L., Marneffe, W., & Vereeck, L. (2017). Backlogs and litigation rates: Testing congestion equilibrium across European Judiciaries. *International Review of Law and Economics, 53,* 9-22.

Buscaglia, E., & Thomas, S. U. (1997). A quantitative assessment of the efficiency of judicial sector in Latin America. *International Review of Law and Economics*, *17*(2). 275-291.

Chemin, M. (2012). Does court speed shape economic activity? Evidence from court reform in India. *Journal of Law, Economics & Organization*, *28*(3), 460-485.

(2009). The impact of the judiciary on entrepreneurship: Evaluation of Pakistan's access to justice programme. *Journal of Public Economics*, *93*(1-2): 114-125.

(2004). Does the quality of the Judiciary shape economic activity? Evidence from India. Department of Economics, LSE.

Clemenz, G. & Gugler, K. (2000). Macroeconomic development and civil litigation. *European Journal of Law and Economics,* 9, 215-230.

Dakolias, M. (1999). Court performance around the world: A comparative perspective. World Bank technical paper No. 430, Washington, DC: World Bank.

Di Vita, G. (2010). Normative complexity and length of administrative disputes: Evidence from Italian regions. *European Journal of Law and Economics*, *34,* 197-213.

Dimitrova-Grajzl, V., Grajzl, P., Sustersic, J. & Zajc, K. (2012). Court output, judicial staffing, and the demand for court services: Evidence from Slovenian courts of first instance. *International Review of Law and Economics*, *32,* 19-29.

Eicher, T. S., & Turnovsky, S. J. (2000). Scale, congestion and growth. *Economica*, *67*, 325-346.

Economides, K., Haug A., & McIntyre J. (2013). Are courts slow? Exposing and measuring the invisible determinants of case disposition time. Working Paper. University of Otago, New Zealand.

Espasa, M., Esteller, M. & Alejandro. (2015). Analyzing judicial courts' performance: Inefficiency Vs. Congestion. *Revista De Econ. Aplicada, 13(69),* 61-82.

Giacommelli, S., & Menon, C. (2013). Firm size and judicial efficiency: evidence from the neighbors' court. Working paper Number 898, Bank of Italy.

Ginsburg, T, & Hoetker, G. (2006). The Unreluctant Litigant? An empirical analysis of Japan's turn to litigation. *The Journal of Legal Studies*, *35*(1), 31-59.

Goerdt, J., Lomvardias, C., Gallas, G., & Mahoney B. (1989). Examining court delay: The pace of litigation in 26 urban trial courts, 1987. Williamsburg: National Center for State Courts.

Hall, D. H., & Keilitz, I. (2012). International framework for court excellence: Global measures of courts performance. International consortium for court excellence.

Irmen, A., & Kuehnel, J. (2009). Productive government expenditure and economic growth. *Journal of Economic Surveys*, *23*, 692-733.

Judiciary. (2014). *Judiciary Strategic Plan 2014-2018.* Nairobi, Kenya: The Judiciary.

Judiciary. (2015). *State of the Judiciary and Administration of Justice. Annual report 2013-2014*. Nairobi, Kenya: The Judiciary.

Judiciary. (2017a). *Sustaining Judiciary Transformation Strategy (SJT)* Nairobi, Kenya: The Judiciary.

Judiciary. (2017b). *State of the Judiciary and Administration of Justice. Annual report 2016-2017.* Nairobi, Kenya: The Judiciary.

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative. *Journal of Econometrics, 54*(1-3), 159-178.

Kuehnel, J. (2010). Essays on the theory of productive government activity and economic growth. University of Heidelberg.

Maja, B. M., & Arnab, K. H. (2004). The problem of court congestion: Evidence from Indian lower courts. Discussion paper on Dev. Policy No. 88, Center for Development Research (ZEF).

Murray, M. P. (2006). Avoiding invalid instruments and coping with weak instruments, *Journal of Economic Perspectives*, *20* (4), 111-132.

Mora-Sanguinetti, J. S. (2012). Is judicial inefficacy increasing the weight of the house property market in Spain? *Journal of the Spanish Economic Association, 3*(3), 339-365.

Palumbo, G., Giupponi G., Nunziata, L., & Sanguinetti, J. M. (2013). Judicial performance and its determinants: a cross-country perspective. OECD.

Pellegrina, L. D. (2008). Court delays and crime deterrence. *European Journal of Law and Economics, 26*(3), 267–290.

Ponticelli, J., & Alencar, L. S. (2016). Court enforcement and firm productivity: Evidence from a bankruptcy reform in Brazil. WP No. 425. Brazil Central Bank.
Posada, M., & Sanguinetti, J. S. (2013). Firm size and judicial efficacy: Local level evidence in Spain. Madrid, Spain: The Bank of Spain.
Priest, G. L. (1989). Private litigants and the court congestion problem. *Boston University Law Review*, 69(2), 527-559.
Republic of Kenya. (Various Issues). *Economic Survey.* Nairobi, Kenya: The KNBS.
Rosales, V. (2008). Economics of court performance: An empirical analysis. *European Journal of Law and Economics*, *25*, 231-251.
Sobbrio, G., D'Agostino, E., & Sironi, E. (2010). New disputes and delay in Italian courts. Paolo Baffi Centre Research Paper, 2010-84.
Stiglitz, J. E. (2001). Redefining the role of the state. *World Economics*, *2*(3).
Vereeck, L. & Mühl, M. (2000). An economic theory of court delay. *European Journal of Law and Economics*, *10*, 243-268.
Yeung, L. L., & Azevedo, P. F. (2011). Measuring efficiency of Brazilian courts with DEA. *IMA Journal of Management Mathematics*, *25,* 1-14.

Appendices

Table A2: Descriptive statistics

	Mean	**Median**	**Max.**	**Min.**	**Std. Dev.**
cong	0.415	0.446	0.810	0.114	0.167
cong*	0.842	0.777	2.003	0.132	0.549
ejs	0.024	0.025	0.037	0.014	0.004
y	4.672	4.800	9.500	0.200	2.536
djust	362,047	380,909	584,691	113,887	122,606
sec	0.004	0.004	0.006	0.002	0.001
FC	0.019	0.018	0.038	0.008	0.008
EXPG	449,644	425,897	1,252,385	58,151	273,015

*Key: Max = Maximum, Min= Minimum, Std. Dev= Standard deviation, *congestion for robustness analysis*

Table A3: KPSS test results for stationarity of the series

Variable	Test Level	Trend & Intercept	Test Statistic	Critical Value at 5 %	Conclusion
cong	Level	Trend & Intercept	0.10412	0.146	Stationary
cong*	Level	Trend & Intercept	0.078718	0.146	Stationary
djust	Level	Intercept	0.418726	0.463	Stationary
Sec	Level	Trend & Intercept	0.126032	0.146	Stationary
ejs	Level	Intercept	0.230968	0.463	Stationary
Y	Level	Intercept	0.363092	0.463	Stationary
FC	Level	Trend & Intercept	0.137834	0.146	Stationary
EXPG	Level	Trend & Intercept	0.084769	0.146	Stationary

Table A 4: Correlation between the variables and instruments

	ejs	djust	sec
EXPG	-0.277854	0.372789	-0.620768
lagEXPG	-0.303004	0.436369	-0.652981
FC	-0.397878	0.230485	0.729328
D1	0.184960	-0.175190	-0.456474
D2	-0.091492	0.333284	-0.211622
D3	-0.028209	0.104767	-0.258170
D4	-0.190227	0.084571	-0.007047

Table A 5: Initial 2SLS estimates on causes of congestion

Variable	Coefficient	Standard error	z-statistic	*p*-value
djust	-0.00635	0.00399	-1.590	0.1120
sec	-0.01383	0.00162	-8.550	0.0000
ejs	-3.43032	1.38188	-2.480	0.0130
y	-0.00644	0.00656	-0.980	0.3260
Constant	1.44788	0.29352	4.930	0.0000

Table A 6: Diagnostic test results for 2SLS estimates

2SLS condition	Test	Test statistic	Critical value	Conclusion
Normality	Jarque- Bera	1.417294	0.4923	Errors are normally distributed
Serial Correlation	Breusch-Godfrey LM	9.142848	0.0103	There is serial correlation
Heteroskedasticity	ARCH	0.007193	0.9324	There is no heteroscedasticity
Omitted Variable	Ramsey RESET	1.014787	0.3186	Model has no omitted variables

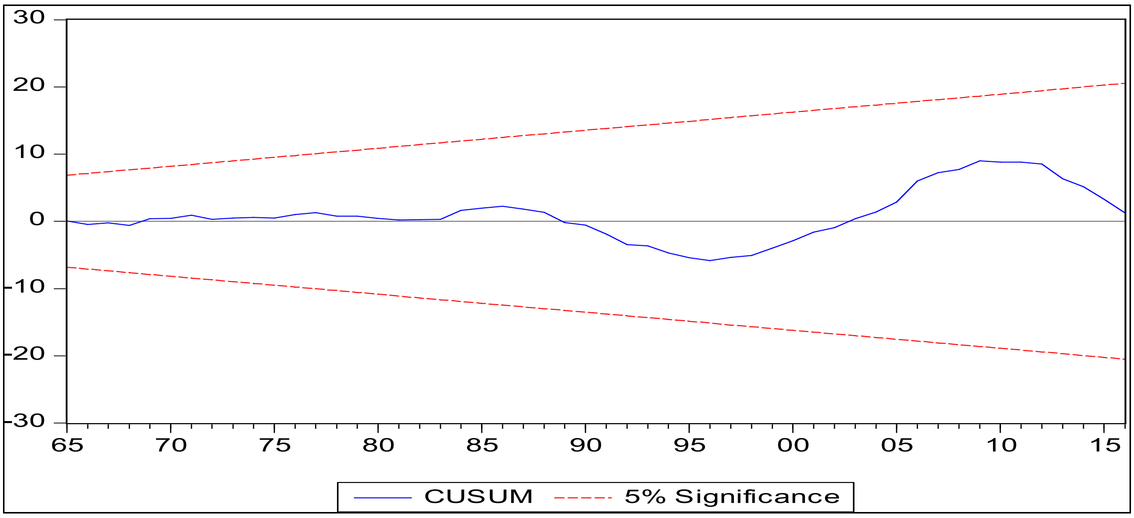

Figure A 1: The CUSUM graph for congestion equation

Table A 7: Endogeneity test results

Tests of endogeneity	
Ho: Variables are exogenous	
HAC regression f (3,49) = 79.4574	(*p*=0.0000)
(Based on Bartlett kernel with 54 lags)	

Table A 8: Validity of instruments test results

Test of overidentifying restrictions:	
Score chi2(2) = 4.99068	(*p*=0.2883)
(Prewhitening performed with 1 lag)	

Table A 9: Weak instruments test results

Variable	Shea's Partial R-sq.		Shea's Adjusted Partial R-sq.	
ejs	0.1831		0.0639	
djust	0.6604		0.6108	
sec	0.2027		0.0876	
2SLS relative bias	5%	10%	20%	30%
	13.95	8.50	5.56	4.40

Table A 10: Robustness analysis on causes of congestion

Wald chi2(4)	133.42			
Prob > chi2	0.000			
R-squared	0.7006			
Variable	Coefficient	Standard error	z	P>z
djust	-0.0151	0.0116	-1.3	0.193
sec	-0.0474	0.0047	-10.08	0.000
ejs	-4.9449	4.0139	-1.23	0.218
y	-0.0182	0.0190	-0.96	0.340
Constant	3.5569	0.8526	4.17	0.000

Table A 11: Diagnostic test results under robustness analysis

Condition	Test	Test statistic	Critical value	Conclusion
Serial Correlation	Breusch-Godfrey LM	9.224903	0.0099	There is serial correlation
Heteroskedasticity	ARCH	0.003240	0.9546	There is no heteroscedasticity
Omitted Variable	Ramsey RESET	0.315510	0.5768	Model has no omitted variables
Normality	Jarque- Bera	5.667083	0.06	Errors are normally distributed at 5 % significance level

Table A 12: Endogeneity test results, robustness analysis

Tests of endogeneity	
Ho: Variables are exogenous	
HAC regression f (3,49) = 46.9882	(*p*=0.0000)
(Based on Bartlett kernel with 54 lags)	

Table A 13: Weak instruments test, robustness analysis

Variable	Shea's Partial R-sq.		Shea's Adjusted Partial R-sq.	
cong	0.1831		0.0639	
djust	0.6604		0.6108	
sec	0.2027		0.0876	
2SLS relative bias	5%	10%	20%	30%
	13.95	8.50	5.56	4.44

Table A 14: Instruments validity, robustness analysis

Test of overidentifying restrictions:	
Score $chi^2(2)$ = 5.52327	(p=0.2377)
(Prewhitening performed with 1 lag)	

Table A 15: Robustness analysis on causes of congestion, HAC standard errors

Wald $chi^2(4)$	685.87			
Prob > chi2	0.000			
R-squared	0.7006			
Variable	Coefficient	HAC standard error	z	P>z
djust	-0.015	0.007	-2.15	0.031
sec	-0.047	0.002	-19.18	0.000
ejs	-4.945	2.820	-1.75	0.080
y	-0.018	0.008	-2.31	0.021
Constant	3.557	0.463	7.68	0.000

Table A 16: OLS regression results

F(4, 52)	36.14			
Prob > F	0.0000			
Adj R-squared	0.7151			
Variable	Coefficient	Standard error	t	P>t
djust	0.0001	0.0015	0.04	0.964
sec	-0.0108	0.0011	-9.79	0.000
ejs	-1.1108	0.5076	-2.19	0.033
y	-0.0058	0.0053	-1.11	0.274
Constant	0.9140	0.1172	7.8	0.000

Table A 17: Diagnostic test results for OLS regression

OLS condition	Test	Test statistic	Critical value	Conclusion
Serial correlation	Breusch-Godfrey LM	25.801	0.0000	There is serial correlation
Heteroskedasticity	ARCH	0.6991	0.4033	There is no heteroscedasticity
Omitted variable	Ramsey RESET	2.30	0.0892	Model has omitted variables at 5% significance level
Normality	Jarque- Bera	4.49193	0.11	Errors are normally distributed

Table A 18: OLS results, Robust standard error

F(4,52)	71.23			
Prob > F	0.000			
R-squared	0.7354			
Variable	Coefficient	Robust standard error	t	P>t
djust	0.00007	0.00161	0.04	0.967
sec	-0.01077	0.00085	-12.7	0.000
ejs	-1.11077	0.53193	-2.09	0.042
y	-0.00581	0.00448	-1.3	0.201
Constant	0.91398	0.11144	8.2	0.000

Table A 19: Comparison of 2SLS & OLS regression results

Dependent Variable - Private investment				
	2SLS		OLS	
Variable	Coefficient	P-value	Coefficient	P-value
djust	[-0.0063] ***	0.001	[0.00007]	0.967
sec	[-0.0138] ***	0.000	[-0.01077] ***	0.000
ejs	[-3.4303] ***	0.000	[-1.11077] **	0.042
y	[-0.0064] **	0.016	[-0.00581]	0.201
Constant	[1.4479] ***	0.000	[0.91398] ***	0.000

Note: [***] & [**] denote significant levels at 1% and 5 % respectively